

CUSTOM SOLUTIONS

BESPOKE BATTERY PACK AND CHARGER MANUFACTURING
FROM ULTRALIFE



ULTRALiFE®



DRIVEN BY RESEARCH & DEVELOPMENT

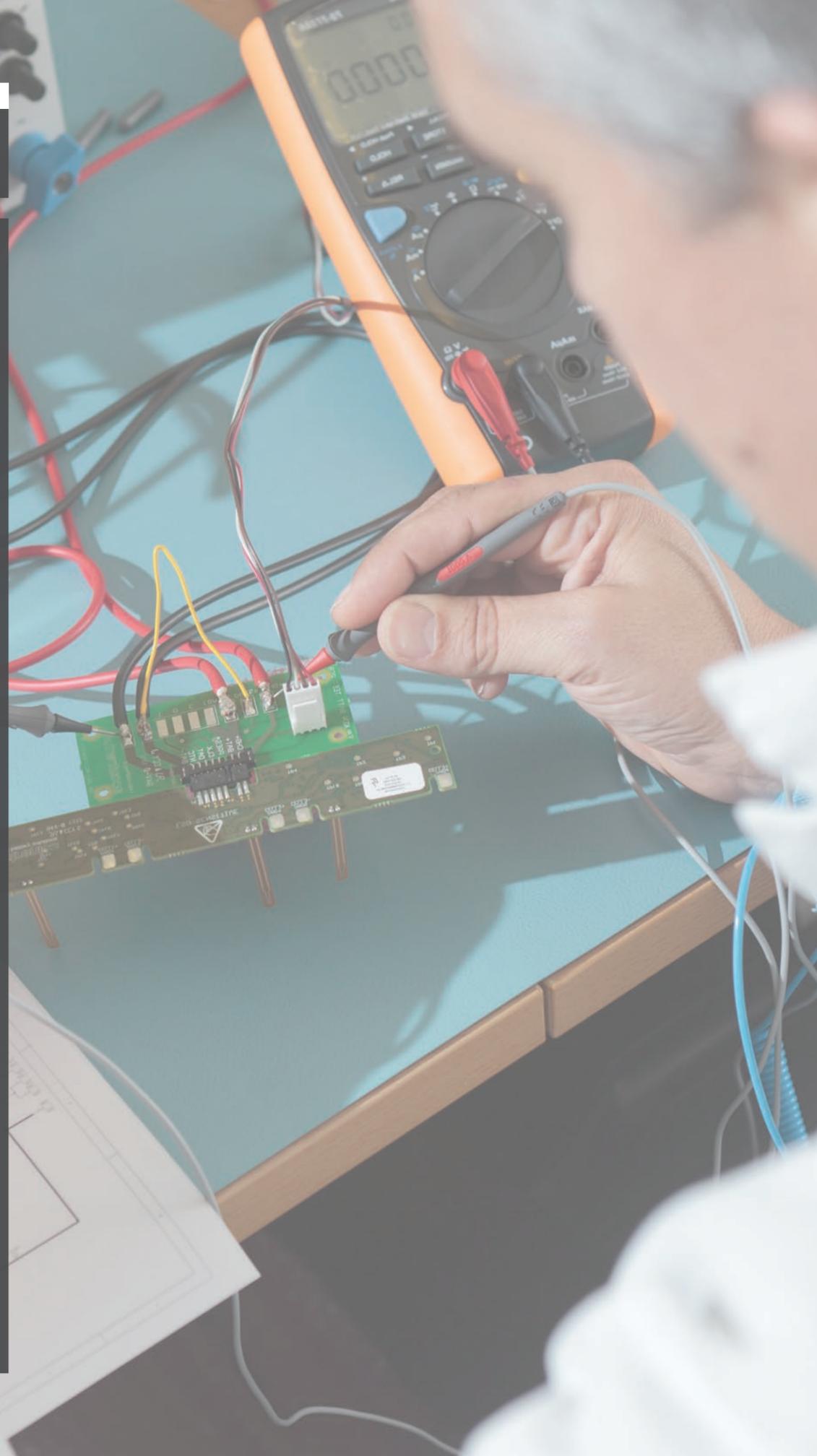
ULTRALIFE is a leading designer, developer and manufacturer of high-performance smart batteries and chargers; with experience spanning over 30 years.

Our substantial Research & Development programme addresses future customer requirements, allowing us to create robust, future-proofed power solutions suited to our clients' long product life cycles.

We harness the latest battery innovations for the benefit of original equipment manufacturers (OEMs) with next-generation devices and maintain a dialogue with the device OEM R&D community.



ISO 9001 & ISO 13485 certified facility in Newark, NY, USA. Other facilities in Texas (USA), the UK and China.

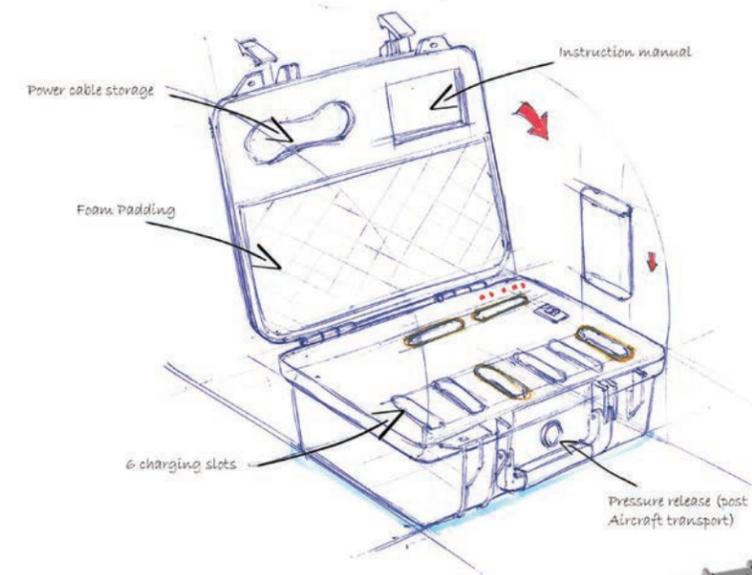


PROVIDING CHOICE

Original equipment manufacturers have differing power sourcing strategies and approach battery and charger procurement in different ways. This is why we strive to make the integration of a battery or charger as simple as possible; by offering multiple development routes coupled with flexible commercial agreements.

For customers who want a pre-engineered solution or who require minor customization of an existing design, our off-the-shelf range of batteries and chargers could be the solution. When complete freedom in design is required, our custom battery and charger design and manufacturing service integrates seamlessly into OEM device development programmes. Our well-proven project management processes ensure that custom solutions are delivered on time and on budget.

With custom solutions, there is no need to compromise on product design, the battery and charger are designed in tandem with your device; weight, volume, functionality, materials and regulatory compliance are all optimized.



**FROM CONCEPT
TO COMPLETION**



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BESPOKE BATTERIES

With a proven track record, ULTRALIFE develops products that are both functional and stylish.

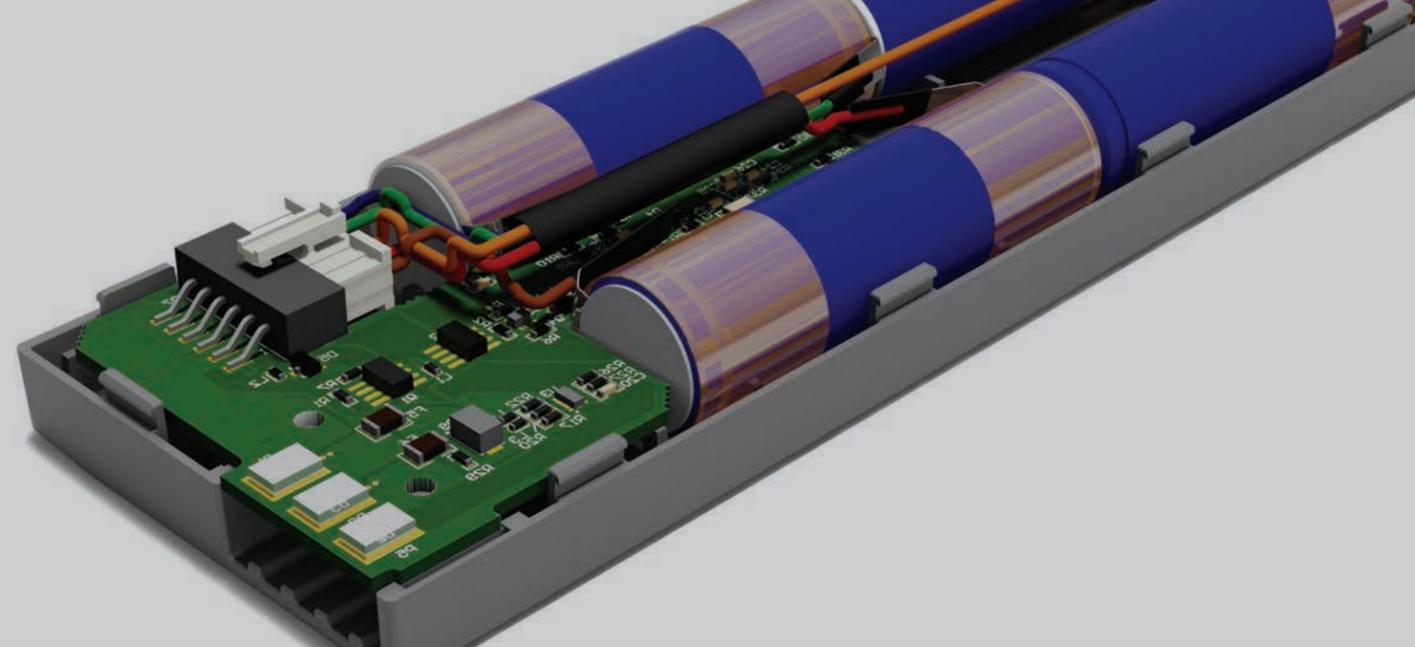
We work closely with you to understand how the battery will function in your device as well as in the workplace and, through creative and innovative design, create a solution that complements the workflow.

Batteries are developed, tested and produced by Ultralife's mechanical and electrical engineers, ensuring total consistency & single-point accountability.

Highly trained and motivated assembly operators, dedicated assembly fixtures and our own purpose built test equipment ensures every single battery tested provides you with quality and peace of mind.



Simple operation, stylish design and outstanding reliability and safety are hallmarks of our products



BRINGING YOUR BATTERY PACK TO LIFE

ULTRALIFE manufactures its own non-rechargeable cells and works with the world's leading cell manufacturers to bring the latest rechargeable technologies to our OEM customers.

We specialize in the design and manufacture of battery packs that utilize cylindrical, prismatic and pouch cell types across all of the major chemistries, including rechargeable Lithium-ion and Lithium Iron Phosphate, as well as non-rechargeable Lithium Manganese Dioxide (LiMnO₂), Lithium Thionyl Chloride (Li/SOCl₂) and Lithium Carbon Monofluoride Manganese Dioxide hybrid cells. Our experts select the optimum chemistry for your application.

For an initial consultation about our custom battery design service, please contact our sales team.

SALES & CUSTOMER SERVICES

Tel: +1 315 332-7100

Email: sales@ultralifecorp.com

www.ultralifecorp.com

RECHARGEABLE

FUEL GAUGING

We use the very latest impedance tracking fuel gauges to provide highly accurate runtime predictions.

VISUAL STATE-OF-CHARGE INDICATION

LCD or LED displays allow users to quickly identify how much charge remains in their battery – ideal for quickly differentiating state-of-charge between multiple batteries.

ACTIVE PROTECTION

Battery safety is maximized by layers of active electronic protection around the cells. This ensures that they cannot be over-charged, over-discharged or overloaded and are protected against over temperature conditions.

COMMUNICATION

Robust communications between battery, host device and charger are vital for reliable operation of any battery powered system. ULTRALIFE implement Smart Battery Specification (SBS), utilizing System Management Bus (SMBs) communication. We also provide solutions based on I2C, HDQ and RS232 protocols.

VALIDATION & CERTIFICATION

Fuel gauge accuracy, capacity, runtime, cycle life, environmental performance, ingress protection and mechanical integrity are all verified alongside mandatory testing for electromagnetic compatibility and transportation. Batteries are also certified to performance and safety standards (e.g. IEC 62133 and UL 2054).

NON-RECHARGEABLE

VARIED VOLTAGES/CAPACITIES

From 9 Volt to 3 Volt, 115mAh to 16,000mAh capacity, ULTRALIFE manufacture cells with varied attributes. Many of these can be turned into custom battery packs.

HIGH ENERGY DENSITY

ULTRALIFE utilize the latest cell technology to provide maximum performance whilst keeping battery packs small and light. Thin Cells® offer an energy density of around 500Wh/l and 400Wh/kg compared to just 300Wh/l and 260Wh/kg for the best lithium coin cells.

LOW SELF-DISCHARGE

As many non-rechargeable battery packs are used in devices that lie dormant for frequent periods, ULTRALIFE manufacture cells with a long shelf-life, service life and low rate of self-discharge.

WIDE OPERATING TEMPERATURE RANGE

If your non-rechargeable battery pack is to be used in an extreme environment or may be subjected to high or low temperatures, ULTRALIFE can work with you to create a suitable battery pack.

SAFETY

Our engineers can arrange testing to whatever performance, safety and transportation standards you require, giving you peace of mind out in the field. All ULTRALIFE battery packs and cells are assembled in ISO 9001 and ISO 13485 registered facilities.





CUSTOM CHARGERS

We specialize in the development and manufacture of desktop, portable and embeddable battery chargers for medical, military, security, industrial and other critical applications. Our proven smart charging technologies allow batteries to be charged faster and more safely than conventional charger designs.

DESKTOP OR EMBEDDABLE

Desktop chargers are selected when batteries are removed from equipment for charging – usually in an office, hospital or industrial environment.

Embeddable chargers are PCB level solutions that customers can embed directly into the devices during manufacture.

SINGLE OR MULTI-BAY

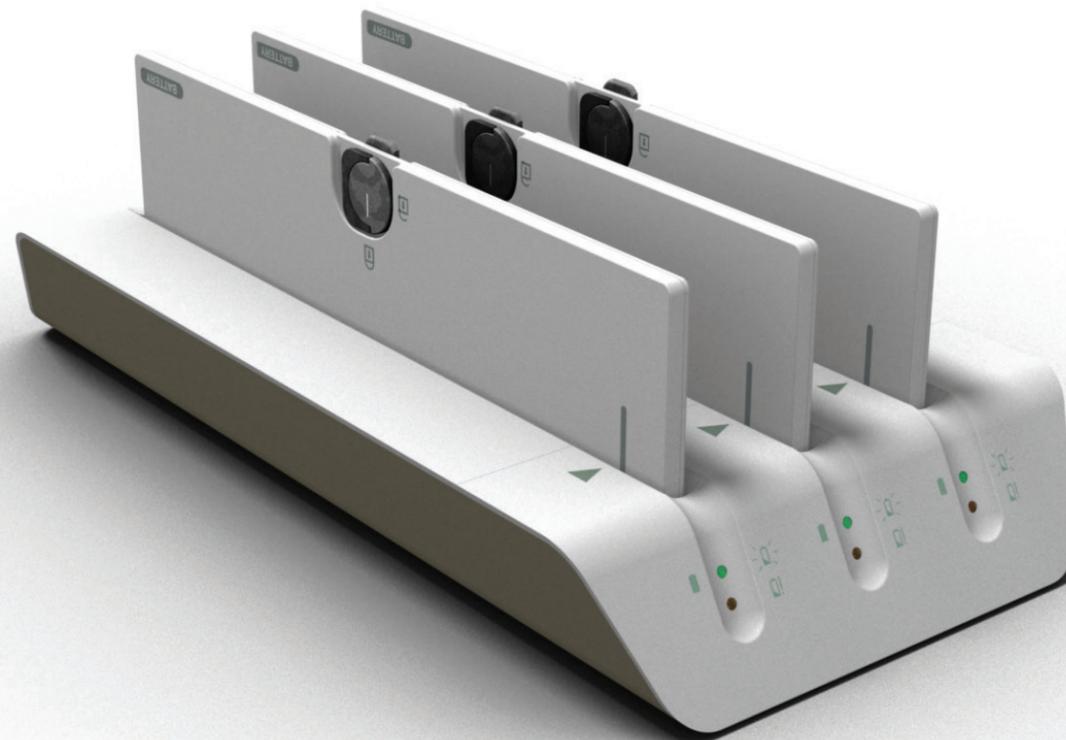
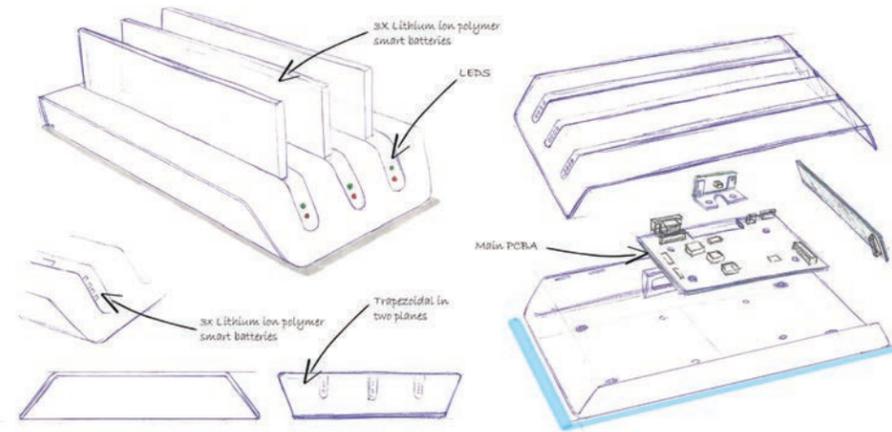
Single bay chargers offer a convenient method for charging individual batteries, whilst multi-bay allow for the rapid charging of many batteries in busy work environments. Our multi-bay chargers can include intelligent power distribution algorithms to minimize charging times, reducing device down time.

AESTHETIC DESIGN

Our in-house design team have a proven track record in designing chargers that are both functional and stylish to ensure the charger complements your battery and host device.



Our proven smart charging technologies allow batteries to be charged faster and more safely than conventional charger designs



CUTTING EDGE

HOW SMART CHARGERS WORK

In conjunction with smart batteries, smart chargers work to maximize safety, reduce charge time and extend product life. When a compatible smart battery is inserted into a smart charger, the battery communicates its charging requirements, the charger responds by providing the voltage and current until the battery is fully charged. The battery may amend its charging criteria during charging if environmental conditions (e.g. temperature) change. A smart charger can choose to modify the charge regime but is never allowed to exceed the voltage or current requested by the battery.

CHEMISTRY INDEPENDENCE & FUTURE PROOFING

One of the main advantages of a smart charger is its ability to adapt to an unknown future. We design smart chargers to respond to the charge requests made by the battery, which means they can be used with batteries of different voltages, capacities, chemistry or manufacturer. ULTRALIFE's customers have peace of mind that their smart charger will be compatible with existing and future ranges of batteries – meaning fewer chargers are required and last longer in the field.

COMMUNICATION & AUTHENTICATION

Smart chargers can communicate with smart batteries operating either SMBus, I²C or HDQ interfaces. We can also deploy SHA-1 digital encryption and authentication between the battery and charger to ensure only approved batteries are used – batteries that fail the authentication test are rejected by the charger and will not be charged.

CALIBRATION

Smart chargers can include calibration functionality which ensures the battery fuel gauge is correctly aligned with the capability of the battery cells. Routine calibration of smart batteries ensures that host devices report runtime information correctly.

STATE OF HEALTH MONITORING

ULTRALIFE's smart chargers can perform diagnostic checks on batteries during the fuel gauge recalibration process. The charger can communicate the state-of-health to the user by means of an LED or LCD display, so that the user can make an informed decision to use or replace their battery.

POWER SUPPLY

A choice of either internal or external power supplies is available. Internal supplies allow the charger to be connected to an AC supply via a standard IEC connection. External supplies allow the charger size and weight to be minimized as the power supply is either a desktop or wall mount unit.

REGULATORY CERTIFICATION

ULTRALIFE's chargers meet all regulatory requirements and may be qualified to IEC/UL60950-1 (Information Technology Equipment – Safety – Part 1: General Requirements) or IEC/UL60601-1 (Medical Electrical Equipment – Part 1: General requirements for basic safety and essential performance).



PROFESSIONAL DEVICE MARKETS

ULTRALIFE serve OEMs worldwide in the medical, test & instrumentation, defence and robotics markets; offering high quality, high performance battery and charger solutions to satisfy the most demanding application requirements.

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MEDICAL & HEALTHCARE



WHEN POWER FAILURE IS NOT AN OPTION

When powering medical devices; performance, reliability and safety are the most critical aspects of any specification. This is why healthcare OEMs worldwide look to ULTRALIFE when designing new battery powered medical equipment.

Whether it is non-rechargeable battery packs for compact devices (such as those used for remote patient monitoring) or rechargeable packs and chargers for high-power equipment (such as ventilators and digital radiography equipment); ULTRALIFE has the in-house engineering expertise to help you acquire the optimum solution.

It does not matter if you wish to use batteries as the main power source or a back-up supply; our experienced engineers work with your design team to ensure the complete power solution is brought in on time and within budget.

ULTRALIFE's battery packs and chargers undergo rigorous testing and evaluation and meet all current performance, safety and transportation standards, including the latest IEC standards that are mandatory for medical devices. Power failure is not an option.

As experts in the field of medical batteries, ULTRALIFE ensure that our customers get the performance, environmental and size attributes that they require.

Attention to detail is what sets us apart from our competitors.

Whatever your development budget and timescales, ULTRALIFE provide a service to suit and deliver the solution.



TEST & INSTRUMENTATION



PUT LIFE IN YOUR EQUIPMENT

ULTRALIFE are experts in developing and manufacturing rechargeable and non-rechargeable battery packs and chargers to allow professional people to measure, calculate, interrogate, sample, monitor or communicate.

Our battery packs utilize a wide range of chemistries from non-rechargeable Lithium Thionyl Chloride (for utility metering, off-shore drilling and more) to rechargeable Lithium-ion and Lithium Iron Phosphate (for oceanographic/earthquake monitoring and more).

Test and instrumentation equipment comes with many challenges, with devices expected to operate for long periods in extreme environments. Many of our batteries and cells boast low self-discharge rates and wide operating temperature ranges; both ideal for these use cases.



DEFENSE & SECURITY



POWERING THE MISSION

ULTRALIFE is famous throughout the world for its work in the defense and security arena, delivering safe, lightweight, ruggedized, high energy power solutions for a wide range of systems such as man-portable communications, covert airfield-landing lights, night vision goggles, rugged portable computers and critical server back-up; providing high performance and reliable power for the harshest of environments.

Defense contractors, OEMs and leading design houses trust ULTRALIFE to think beyond conventional wisdom and produce a solution that will increase end-user benefit, with features such as advanced cell technology, ruggedized environmental proof design and power harvesting capabilities.

We know that the qualification of military products is of paramount importance and manage this in a methodical and timely manner.



ROBOTICS & INTERNET OF THINGS



POWER FOR TOMORROW

ULTRALIFE designs and manufactures rechargeable and non-rechargeable battery packs to meet the emerging needs of robot and internet-of-things device manufacturers worldwide.

For robot manufacturers who need the highest energy density, rechargeable Lithium-ion batteries provide both power and energy in compact packages. When service life is critical, but space is at less of a premium, rechargeable Lithium Iron Phosphate chemistry offers rugged, dependable power.

In addition to robotics, ULTRALIFE also manufacture battery packs for Internet of Things (IoT) applications, such as smart home devices and wireless security.

For user-replaceable devices, like glass break detectors, non-rechargeable battery packs utilizing Lithium Manganese Dioxide chemistry (e.g. CR123A cells) are ideal. For industrial devices that require higher voltage, Lithium Thionyl Chloride (e.g. ER Generation X cells) are well-suited.



BETTER THAN EXPECTED RESULTS

The design experts at ULTRALIFE strive to deliver better than expected results to maximize commercial value and optimize product performance.

Your customers demand reliable devices, which is why we are totally committed to quality. The excellent field reliability of our products gives you guaranteed quality and peace of mind.

Our business is organized to fit our customers' expectations, providing a cradle-to-grave service from initial design concepts to aftermarket support.

OUR PHILOSOPHY

We seek to develop strategic long-term customer partnerships based on service excellence.

We strive to develop superior battery and charger solutions that deliver reliability, functionality, safety, performance and commercial value for our customers.

We are always open to customer needs, always willing to change, always determined to deliver.



Our multi-disciplined team work with you to ensure a smooth transition from initial concept to series production; enabling you to get to market faster, within budget and with confidence



- **SELECTING THE CELL TECHNOLOGY**
THE HEART OF YOUR BATTERY SOLUTION
- **ELECTRICAL & ELECTRONIC DESIGN**
SAFETY AND PERFORMANCE
- **MECHANICAL DESIGN**
STRENGTH AND DURABILITY
- **REGULATORY & QUALIFICATION TESTING**
COMPLIANT & CORRECT
- **MANUFACTURING, QUALITY & TESTING**
RELIABILITY & PEACE OF MIND



CUSTOMER VALUE

CUSTOMER SERVICE

What sets us apart is a culture that engages its people in delivering outstanding levels of customer service from initial concept through to series production.

We pride ourselves on delivering real commercial value by enhancing your product competitiveness, delivering aftermarket revenue for you and driving down your total acquisition costs.

TOTAL COST OF OWNERSHIP

Our customers include leading global OEMs, many of whom have single-sourced their custom batteries from us for many years – they understand the value we deliver:

- High product performance
- Delivering outstanding levels of customer service from initial concept through to series production
- In-house multi-disciplined teams offer total end-to-end project management – improving quality and efficiency
- Quality products - low return rate
- Product safety
- Agency testing and approvals
- Customized pre-production and post-production testing
- Three ISO 9001 and ISO 13485 certified manufacturing facilities in the USA, UK and China
- World class manufacturing processes
- All design and manufacturing by internal engineering teams
- Project delivery reliability, on time and within budget
- Just in time product supply
- Long term commercial agreements
- Continuous improvement and lean manufacturing

DEDICATED & EXPERIENCED TEAMS

'WHOLE LIFE' SERVICE

Technical assistance is provided long after the product has been shipped as we understand that customers in professional markets have product life cycles measured in years or even decades.

We advise you about possible upgrades to your battery or charger in order to improve performance or reduce cost whilst minimizing risk.



We design specifically for you and sell only to you – no unapproved specification changes; no aftermarket issues



CUSTOMER RELATIONSHIPS

We are committed to developing strategic long-term customer partnerships based on service excellence.

We aim to drive continuous improvement in overall service and keep customers up-to-date with new technologies through regular development meetings and technical reviews.

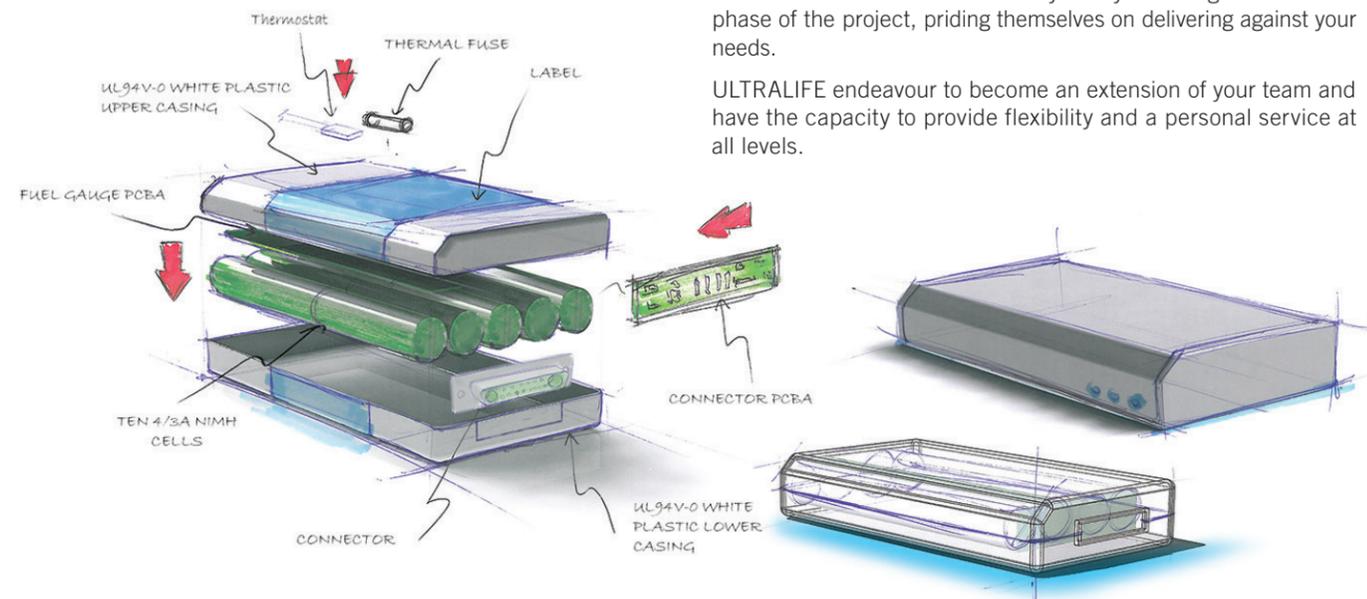
Working closely with our customers, we have developed customer specific services that include:

- Vendor Managed Inventory
- Supplier Management
- Flexible shipping and ordering options

PERSONAL SERVICE

Experienced account managers, project managers, technical and customer service staff work closely with you throughout each phase of the project, priding themselves on delivering against your needs.

ULTRALIFE endeavour to become an extension of your team and have the capacity to provide flexibility and a personal service at all levels.



- Specification details are correct at the time of printing.
- For the latest data please refer to published specifications which are available on our website at www.ultralifecorp.com
- Operator & regional variations may apply to the transport of Lithium batteries. Check with your operator.
- Product images in this brochure are computer generated representations. Refer to technical data sheets for actual product dimensions.

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