

Survival of the Fittest

Battery holders evolve with modern electronics manufacturing and assembly.

When English naturalist Charles Darwin penned his landmark book "On the Origin of Species" he could have just as easily been referring to the evolution of battery holders. Much as he theorized that traits evolved to fill ecological niches, different styles of battery holders have evolved to fill the many engineering niches and market needs that developed over the years.

The earliest battery holders were utilized in Japanese consumer toys and electronics manufactured during the 1960s. The designs were primitive but utilitarian, and were not developed for specific manufacturing techniques, but merely to encapsulate the cells.



In the 70's and 80's battery holders found their way into increasingly sophisticated devices, culminating in broad market usage of memory-protection devices for clocks and memory back-up applications

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in personal computers, peripherals and hand-held devices. To support these applications battery holders that could be mounted directly to a multi-layer PCB using through-hole mount technology were developed. This required the adoption of more robust plastics and plating technologies that would not be affected by wave solder techniques. Packaging to better support high speed manufacturing, such as tape and reel, also began to penetrate the market.

Today, we are witnessing another evolution with more and more powerful microprocessors causing rapid migration to surface mount technology (SMT) and mixed technologies, especially for electronic devices powered by primary lithium or rechargeable lithium batteries. Battery holders have followed suit, with SMT versions specifically engineered to survive the even harsher manufacturing environment of surface mount PCB assemblies. The design of battery holders has been challenged further by the adoption of lead-free ROHS-compliant soldering lines.

The rate of adoption of SMT has been slower with devices powered by alkaline batteries. While through-hole battery holders are now considered a legacy technology, these devices are seen as more robust than SMT battery holders, making them better suited to handle heavier alkaline batteries. In this case the size and weight of a battery pack are important design considerations, and battery holders have evolved to compensate, incorporating eyelets, screws or pcb pins to secure them firmly to the PCB. However a major drawback to using any through hole securing mechanism is its impact on tracer routing in multi-layer boards.

Recently, there has been significant sales activity of battery holders for lithium ion

batteries found in cell phones, laptops, as well as portable, hand held devices. According to industry tracking experts, use of lithium ion technology is growing at an annual rate of XX%, quickly overtaking nickel cadmium and nickel metal hydride battery technologies, which are hindered by performance limitations such as reduced capacity, fewer recharge cycles, and the “memory effect.” These applications are typically very space constrained, leading to the evolution of specialty battery holders with extremely low profiles, engineered for maximum strength with minimum material.

Within the lithium ion market, we are also starting to see subtle shifts in demand. Whereas this market was initially dominated by large players purchasing entire production runs of shrink wrapped 18650 cell packs, manufacturing capacity has now started to catch up with worldwide demand, spurring demand for smaller production volumes consisting of smaller packs containing 1-2 batteries. In addition, there is growing demand for micro battery holders, which have evolved from larger 20mm sizes to miniaturized cells ranging from 1-6 mm in diameter.

Global macroeconomic factors have also impacted battery holder demand. Despite the ongoing global economic slowdown, demand for battery holders in medical applications remains strong, while military and aerospace markets have weakened. Consumer product manufacturers also seem to be holding up reasonably well, as experts believe that consumer spending on electronics typically strengthens during a recession, as consumers seek to derive emotional benefits from purchasing consumer electronics devices.

The evolution of the battery holder has been tied to steady advancements in

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electronics manufacturing and assembly processes as well as ongoing improvements in primary and rechargeable batteries chemistry. Despite the media hype surrounding energy harvesting devices, the vast majority of electronics applications will continue to rely on the humble but evolving battery holder.

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