

# Packing power

Custom designed battery packs might be the solution for your portable product. By **Graham Pitcher**.

**P**ower supplies have long been regarded as one of those design areas which can be ignored until the last moment. While that may have been the case some years ago with system level products, the same approach can't be taken today; particularly when you're looking to develop a supply for a portable device.

Getting the right power supply for a portable product is now important – consumers want longer operating times between charges and cosmetic issues impinge upon the type of battery selected.

Some designers might be happy to include space in their product for a traditional two AA battery compartment and know that it will fit the bill. Others, however, realise the battery is a critical part of the product's design.

Recognising that batteries aren't always a 'one size fits all' solution, Varta MicroBattery has launched a custom battery design service for those creating portable and handheld electronic devices. The product is a rechargeable lithium battery supported by complex electronics and encased in either a soft pack or in a custom made plastic housing.

The service, called CellPac Plus, allows an optimised solution to be developed. Gordon Clements, global head, sales and marketing, PowerPack solutions, said: "Part of what we're trying to do with this service is to educate engineers that, in order to get the battery system that meets their particular needs, they have to consider battery design at the outset of their project."

However, Clements is keen to point



out that CellPac Plus isn't the solution for every portable product. "It's aimed at products where there is high added value and where battery performance is critical to the performance of the end product."

The service is seen by Varta to be particularly appropriate in the medical and telecom fields. Clements noted: "Where there's high product value, it makes sense to have a battery that will justify the performance of the electronics."

In essence, Varta is offering a contract manufacturing service for batteries. "We appoint a project manager,

*'One size fits all' isn't necessarily the case when it comes to portable products: a custom battery may be the best solution*

develop a plan, execute on it and deliver on time," said Clements.

Elements considered when designing the custom battery pack include mechanical design, battery chemistry, electrical and electronic design, embedded or removable batteries, and certification and test.

"The process starts with a blank sheet of paper and one of the first steps is to identify the load profile," Clements explained. "How important is the battery to the product's performance? What capacity is needed, what is the expected run time and what are the operating conditions?"

According to Clements, it's an important question to ask. "Every engineer tends to ignore the battery. It can deliver its full capacity many times or less capacity over a longer time. We need to know how often the battery needs to be charged and for how long."

He cited the Sapura Tetra mobile phone as an example. "It's in use constantly, so the handset may be fitted with 10 batteries during its life. The battery has to be designed with that in mind."

Mechanical design is an important criterion. According to Varta, 'protection and connection are key considerations in mechanical design'. The company says capacity calculations need to be reconciled with the mechanical envelope and consideration needs to be given to how the battery will be connected to the product. Customers also need to ask themselves what certification will be needed for the battery pack.

Sometimes, those questions can't be answered immediately. "If the designer doesn't know what's needed," Clements offered, "we can supply batteries in soft pack format until they know. Once they've reached that point, they can enter the CellPac Plus programme."

However, CellPac Plus isn't appropriate to every product; Varta says the service will suit products with a requirement of 10,000 batteries a year.

Once requirements have been determined, the specification is written up and drawings produced. From that point, it takes six weeks for samples to be provided from Varta's Germany facility and a further six weeks for the design to enter volume at an Asian facility.

"Quality doesn't start in manufacturing," Clements concluded, "it starts with the customer. If the specification is high quality, then the batteries will also be high quality."

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### Safe power supply for handheld terminals

UK based TouchStar's TouchPC computers are used robust field automation solutions are required. Examples include fuel distribution, on board sales on airlines and trains, van sales and field service organisations.

Two of its products – the Raven and Kestrel TouchPC portable terminals – are aimed at fuel distribution operations. When used in fuel tankers, the devices help to automate the process of logging fuel deliveries and reporting them wirelessly to fleet control centres and invoicing departments. The handheld terminals are mounted inside the cab on a quick release bracket, allowing them to be removed for mobile use by the driver on arrival at a delivery site.

Safety is of paramount concern in the design and operation of electrical equipment in and near fuel tankers and the sites to which they deliver. Particular care has to be taken with the battery inside the Raven and Kestrel devices: when mounted, they are connected to the vehicle's electrical system and, when fully charged, are a concentrated source of electrical power in contact, or in close proximity, with highly combustible liquids and gases. The battery must therefore be designed and manufactured in such a way as to prevent arcing and other dangerous electrical effects potentially arising from the charging and discharging processes.

In the petrochemical industry, stringent ATEX regulations govern the safe design and operation of electrical equipment. Design of the electronic circuitry that controls, regulates and isolates the battery pack is a complex and technically challenging task.

At the beginning of the development process for the Raven and Kestrel PCs, TouchStar commissioned Varta Microbattery's specialist CellPac Plus service to design the circuitry for the battery packs and to pilot them through the ATEX certification process.

Using CellPac Plus gave TouchStar the confidence that it would achieve certification of a high performance battery pack design within the project timeline, while keeping its internal engineering teams focused on the design of the company's core delivery tracking software applications.

TouchStar director Chris Phillips said: "During the development process, we and Varta Microbattery have become familiar with each other and the quality of the relationship between the companies has helped ensure that the projects went smoothly – we have worked hand in hand with each other to get the job done.

"We like Varta's flexibility – we have not had to adapt our requirements to its offering; rather, Varta has worked hard to deliver what we want in the way we want it, right down to cooperating with other approved suppliers in the manufacture of the battery packs.

"TouchStar would be very happy to use the CellPac Plus service in future."

