

Do you have the power?

THE TOPIC OF CHOOSING HOW YOU POWER YOUR NEXT PORTABLE PRODUCT IS A TOUGH ONE. THERE ARE PLENTY OF OPTIONS BUT WHICH ONE IS RIGHT FOR YOUR MARKET, YOUR CUSTOMERS AND YOUR BOTTOM LINE?

Choosing the right power supply for your product will enable you to outperform your competitors and deliver significant value to customers, allowing you to charge a premium. Get it wrong and you've got a dead duck on your hands. Not only have you wasted money and time, but you've enabled your competitors to take advantage by learning from your mistakes.

When it comes to making your power decision, is the best policy to go for the longest lifespan that you can afford, even if this means a heavier product? Or is your biggest issue limiting weight and size? And is there a compromise?

So how do you choose?

The decision on power is often overlooked and left towards the end of a product development cycle, but with the battery typically being the largest single component within your device and a very expensive part of your bill-of-materials, you need to get it right. Often this process of making the right choice involves some compromise as the ultra-light, ultra-small, high-performance and super-low-cost battery doesn't exist – sadly! I don't mean a compromise that diminishes your products – more of a balance of trade-offs to get the best design possible.

When you and your product development team sit down to conceptualise the Next Big Thing, take the time to understand

each user group and how they will actually use your product (which always differs from your plans). Often, when we develop a product from scratch for our clients, we create 'user personas' for each client's key target segment. This usually involves a lot of research, but the results benefit the entire product development process and enable engineers to go back and reference each of the users when making decisions in development. An important part of the user's persona is their charge and discharge patterns – in other words, how they use the device. We'd all like to imagine that customers turn a product on at 9am, use it in a consistent fashion all day and then charge it up overnight; however, this is rarely the case. Each person uses the same product in a different way and this has a major effect on how power is consumed. Take the mobile phone for example; some leave their phone on all the time, dipping in every so often to send a text message or to make a quick call. Others will turn their phone off at night, will use the phone more regularly to send text messages, play games, take pictures and make calls at different times each day. This means that the developer has to factor both usage profiles into their product design and battery choice.

Understanding exactly how your product is to be used will help you identify and prioritise the most critically important features (such as weight, longevity, etc). This list of priorities will enable you to make important decisions based on key requirements, although your



choice may take you by surprise. By way of an example, we worked with Sound Foresight to develop the Ultracane – a guide cane for the blind that uses ultrasonic signals to help the visually impaired to locate obstacles. When designing the product we chose to use the standard double-A alkaline battery because research had shown that the users wanted to be able to quickly and easily replace the batteries, rather than having to charge the cane for a number of hours before it was ready to use again. Plus a small pack of double-A batteries is fairly easy to purchase or to take out with you. This meant that we had to develop and optimise the system around this power supply requirement, rather than designing the product, then solving the power problem.

Choosing the power supply shouldn't be a standalone decision; it needs to be a decision made as part of the entire system. This approach enables you to optimise the electronics used in your device to draw as little power as possible from the battery, extending its lifespan and giving you an advantage over your competitors – who may have purchased the same 'off-the-shelf' battery as you. The best approach when optimising is to look at each part of the system and analyse the 'effort-reward' trade-off. For example, many new portable products use the latest 32-bit processors, where in fact a more optimised 16-bit processor could do the same job whilst saving power, size and money.

Optimising doesn't just stop with picking the best individual electrical components, as it's likely that these same elements will be available to the competitors. Instead, every effort should be made to write or utilise efficient software. Highly focussed and optimised software can save valuable power as it avoids unnecessary levels of code, which can affect the responsiveness of your product, as well as consuming far too much power.

Through selecting, designing and integrating your hardware and software you'll be able to satisfy more of your requirements for weight, size, longevity and cost, as well as exceeding your customers' expectations on functionality.

Power is a complicated and critical issue, but it's possible to achieve all of your objectives with careful planning and a thorough and early understanding of your users and their relationship with your product. Once you've made your decision on the power source, you can then design and optimise the device around it and provide the market with a very efficient and highly valuable product.

As we all know, no matter how cool your latest product is, if it doesn't meet with the expectations of users it won't sell.

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