

Custom Power is Dead. Long Live Custom Power.

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The traditional approach to designing and developing a power solution is still prevalent today: it is designed and built from scratch. Such an approach is usually easy to justify when high quantities are involved, because the high initial expense can be amortized over many units. Moreover, the design can be optimized for the specific application, designing in only what's needed and nothing more. However, engineering design resources are becoming increasingly scarce, expensive and specialized, which is making this approach less attractive every day. In the end, it will not be economically viable in this age of fast time to market, lower prices, high availability, and high reliability.

The power system needs of electronic OEMs have been and will continue to be unique. Systems need different combinations of voltages, power levels and features to be supplied from a variety of input sources. A new paradigm is needed. At the least, it must give power designers the inputs and outputs they need in the configurations that fit their applications. Perhaps most importantly, however, it must be accomplishable without imposing the financial penalties and long lead times typical of traditional custom power supplies.

The new paradigm is mass customization. Mass customization is already on the move in many industries and areas around the globe, reinforcing the expectations of customers that they can get what they want the way they want it — and when they want it. (Dell computers, Motorola pagers, Black & Decker tools and Levi jeans are just a few examples of the many products now using some degree of mass customization.)

In the power world, the enabling technologies are already available. The power train technology is mature. The investments in expert software-based systems have been made, and years of experience have been logged. The computer-integrated manufacturing facilities have an established track record. The Internet is an efficient, functioning entity, and the business models and strategies are in place.

Power designers can use the Internet at any time to enter their own specifications — such as the input voltage range, the output voltage set-point, and the maximum output power of the module, along with operating temperature and mechanical specifications — for exactly the DC-DC converter they need. A patented expert system accepts these

user-defined converter specifications and, in conjunction with a full database of qualified components available to automated manufacturing lines, generates an optimal design. This design is downloaded directly into the computer-integrated manufacturing system.

Power system designers can not only specify exactly the module that they require, they can verify its feasibility, place an order and have prototype quantities manufactured in six weeks or less—all on the Internet from their own computer.

It is important to understand that the system is not simply examining all the existing products and finding the closest one; nor is it tweaking an existing design. The expert software system is actually designing the module — with, for example, an offbeat 92 to 135V input and an 8.7V output at 420W — from scratch using a set of algorithms distilled from the intelligence and engineering experience of multitudinous previous designs. The system can create as many as 2,000 unique designs that meet the designer's requirements and then it selects the best one based on programmable rating criteria. It is all done by the expert system. The product is then built on the automated manufacturing line and qualified by an experienced engineer using specialized ATE. From the ground up, it is a custom part.

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