



Custom Power Supplies

5 Five Challenges Engineers Face in Power Supply Design

by Alex Karapetian



Electronic system designers, engineers, program managers and original equipment manufacturers (OEMs) must address numerous challenges in the selection or development of an appropriate power supply for their systems. These challenges include a multitude of aspects related to the product development cycle, time-to-market, reliability and warranty, parts availability, and life cycle costs. In some cases, an existing power supply can be readily adapted from a different application. In other cases, it may be necessary to develop a new or custom power supply. Let's examine the five major challenges faced in the design of power supplies and determine the solution.

1 Physical Size

Much as Moore's law observes an increase in the number of components in a decreasing amount of available space, so too have advances in miniaturization technologies had a dramatic impact on the power supply industry. Electronic systems, such as computers, cell phones and televisions—which once occupied large volumes—can now fit in the palm of a hand. The trend in miniaturization requires the shrinking of the power components that keep them running. Older systems that have not been updated for several years tend to use older-generation power supply technology with larger form factors. Depending upon the physical requirements of an application, power

supply designers have had to become increasingly creative to adapt to changing space demands. We have reached a point where "off-the-shelf" supplies might not be enough. We see this, for example, in the healthcare industry, where new sets of power demands are needed for bedside care and personal monitoring devices such as glucose monitors and blood pressure machines.



2 Non-Standard AC & DC Inputs

Today's world is increasingly being run by small microprocessors that are sensitive to even small voltage fluctuations. Many power problems originate in the commercial power grid, which, with its thousands of miles of transmission lines, is subject to numerous power disturbances related to weather conditions, equipment failure, traffic accidents, and switching problems. Some of these problems include transients, interruptions, voltage fluctuations and frequency variations. A robust power supply must reliably operate through input power disturbances in order to ensure the reliable operation of the systems it supports. While most applications require the typical 115 or 230 voltages, new applications call for more unique AC and DC input voltages, and power supply companies are adapting to meet these changing requirements.

3 Non-Standard Output Voltages

Electronic components and systems that operate at "standard" or "generic" voltages (e.g., 5V, 12V, 24V, and 48V) may be inefficient, since the power that is not used produces extra heat in the system, which must be removed if it is to remain within its operating temperature range. Modern electronic components may need to operate at non-standard voltages in an effort to maintain high system efficiency in a reduced size. This poses problems to electronic system designers since it may not be feasible to use an off-the-shelf power supply. This increased demand for non-standard voltages is calling for power supply providers to adjust product offerings to meet custom voltage requirements.



4 Ruggedization

New products, applications and missions exposed to extreme temperature environments or high vibration often require environmental qualification in different, and often harsh, environments. Many older systems do not possess components qualified for such environments, requiring replacement or re-engineering of these components or subsystems. From industries such as mil/aero, healthcare, automotive, energy, water processing equipment and telecommunications, power supply systems must be designed and qualified in accordance with strict manufacturing, environmental and operational specifications. When it comes to the Navy, Air Force, Marines,

Coast Guard, or any other military group, power supplies need to be monitored and

controlled by specific standards.

However, advancements in military technology call for AC to DC and DC to DC ruggedized custom power supplies.

Components need to withstand the extreme environmental

conditions that military groups face.



5 Component Obsolescence

Many older electronic systems may have power supplies that are now obsolete, or the company that made them is no longer in business. The challenge here is in replacing the discontinued products in larger systems. When these systems fail, users must find alternative manufacturers of the power supply that meet the form, fit and function of the older system. When this supply is not readily available, users must develop a new power supply and/or engage in a costly re-design and re-certification of the electronic system for a new power supply.



Acopian, has a long history developing, fabricating and supplying regulated power supplies to many industries, overcoming all of the aforementioned custom power supply challenges.

The Solution

Industry is forcing electronics into smaller, yet more powerful, packages that require the ability to withstand extreme environments and plug-and-play voltages. Short consumer product life cycles and general weakness in the global market have increased the speed at which components are becoming obsolete. For markets with long life cycles, such as military/aerospace electronics, medical and telecommunications, component obsolescence becomes a critical issue, especially when OEMs are required to maintain hardware in the field.



Though many industry sectors face fast development cycles and feel they need to forego the customization process, at many times, it is inevitable. At least now you can achieve, ***“Power Your Way.”***

So what is the solution to these modern-day engineering problems?

Customization.

Manufacturers are aware of the increasing need to provide customization to designers and have been including these capabilities into their offerings. One such company, Acopian, has a long history developing, fabricating and supplying regulated power supplies to many industries, overcoming all of the aforementioned custom power supply challenges. Over the last 60 years, Acopian’s power supplies have been used in ground support for NASA; mission critical test equipment for Boeing, Raytheon, Northrop Grumman; nuclear power plants such as Westinghouse, Duke and Dominion; in major amusement parks to power rides; and in stadiums and arenas to power audio and lighting. Acopian even bailed out the National Football League one year to power the Super Bowl as well as assisted in a New Year’s Eve ball drop!

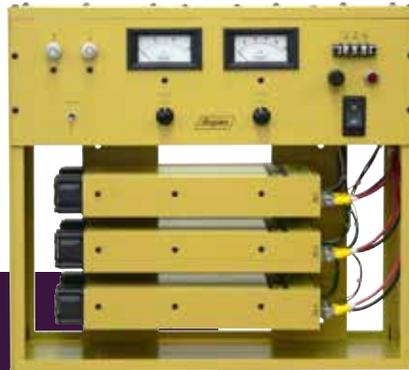


This technical and manufacturing expertise allows the company to simplify the development of customized power supplies, resulting in faster time-to-market, greater reliability and lower development and life cycle costs.

While customization is the answer to all five of the aforementioned challenges, sometimes companies still need a more traditional power supply solution. Acopian also has a wide selection of power supplies that are standard catalog items, shipped within 3 days and built to the standards of several different industries. Its Power Supply Selection Tool enables customers to find an appropriate power supply from an existing catalog of over a million power supplies. When customers can't find what they're looking for, once again customization is probably the solution. Acopian's engineers will quickly tailor an existing power supply to meet the customer's needs or assist in finding the appropriate standard power supply for their application.

Though many industry sectors face fast development cycles and feel they need to forego the customization process, at many times, it is inevitable. At least now you can achieve **"Power Your Way."**





Want to design your own power supply or power system?

Visit Acopian's Custom Power Supply System Builder, which will guide you through the power supply specification and design process. After you have entered your specifications, an Acopian applications engineer will contact you immediately to discuss your design and specifications and quote you the power supply to meet your power needs. Acopian is also proudly made in the USA with facilities in Easton, PA and Melbourne, FL.

GET STARTED
building your
custom power system

Acopian: An ISO 9001:2008 Certified Company

Acopian has been designing and manufacturing power supplies since 1957. Our products include AC-DC power supplies, DC-DC converters; redundant & multiple-output power systems. Capabilities include shipping most models within 3 days and redundant and multiple output systems in 9 days. Standard power supplies are available in all voltages from 0v to 30 kV and up to 1200W. Standard models include single, dual, triple and wide adjust output power supplies; switching, linear, regulated & unregulated power supplies; programmable, high voltage, universal input & mini power supplies; & NEMA 4X Enclosed & UL508 listed configurations. Redundant and multiple-output power systems are available for rack, wall or DIN rail mounting and in modular configurations. Customized solutions are also available to meet special customer requirements. Our products are made in the USA.

