

Power Distribution for Test and Evaluation Applications

Manufacturing Inline Test, Maintenance/Failure Evaluation, Design Verification Test

The Technology of Power Distribution

With Marway's ability to create PDUs for unique applications, the PDU becomes an ideal place to consolidate many power management needs of electrical platforms. This includes conditioning incoming power to minimize noise, converting available power to other forms, adding controls for safety and operator convenience, and integrating monitoring to display power conditions and status.

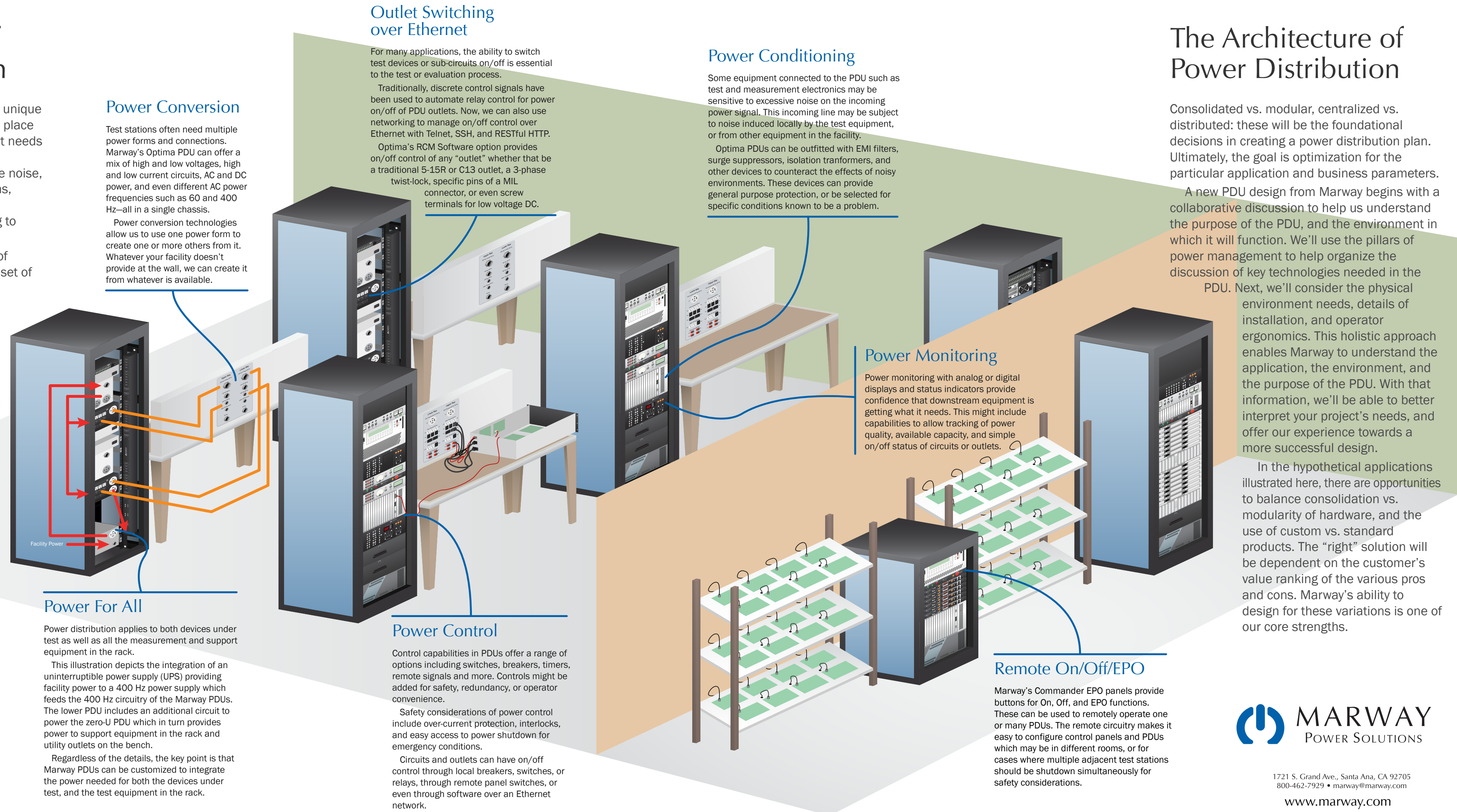
We call these capabilities the Pillars of Power Management. Each represents a set of features which build upon the power distribution foundation to create a uniquely optimized solution.

Test and Evaluation is a perfect application to take advantage of these capabilities. Test station design is often highly specialized to suit both the devices under test, and the testing being performed. Often, a number of standard power products are used to achieve distribution, conversion, conditioning, control, and monitoring. A custom PDU from Marway which integrates these abilities can save space, equipment cost, installation cost, and provide more efficient operations.

Despite Marway's specialization in customized solutions, there are cases where general purpose products are just fine, and Marway has many of these to ensure we strike the right balance of custom and off-the-shelf solutions.

The application depicted in this illustration is hypothetical. The non-Marway products and components depicted are intended to be generic, and do not specifically represent any particular manufacturer or product model. The Marway products shown are also not intended to represent specific models.

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Power Conversion

Test stations often need multiple power forms and connections. Marway's Optima PDU can offer a mix of high and low voltages, high and low current circuits, AC and DC power, and even different AC power frequencies such as 60 and 400 Hz—all in a single chassis.

Power conversion technologies allow us to use one power form to create one or more others from it. Whatever your facility doesn't provide at the wall, we can create it from whatever is available.

Outlet Switching over Ethernet

For many applications, the ability to switch test devices or sub-circuits on/off is essential to the test or evaluation process.

Traditionally, discrete control signals have been used to automate relay control for power on/off of PDU outlets. Now, we can also use networking to manage on/off control over Ethernet with Telnet, SSH, and RESTful HTTP.

Optima's RCM Software option provides on/off control of any "outlet" whether that be a traditional 5-15R or C13 outlet, a 3-phase twist-lock, specific pins of a MIL connector, or even screw terminals for low voltage DC.

Power Conditioning

Some equipment connected to the PDU such as test and measurement electronics may be sensitive to excessive noise on the incoming power signal. This incoming line may be subject to noise induced locally by the test equipment, or from other equipment in the facility.

Optima PDUs can be outfitted with EMI filters, surge suppressors, isolation transformers, and other devices to counteract the effects of noisy environments. These devices can provide general purpose protection, or be selected for specific conditions known to be a problem.

Power Monitoring

Power monitoring with analog or digital displays and status indicators provide confidence that downstream equipment is getting what it needs. This might include capabilities to allow tracking of power quality, available capacity, and simple on/off status of circuits or outlets.

Power For All

Power distribution applies to both devices under test as well as all the measurement and support equipment in the rack.

This illustration depicts the integration of an uninterruptible power supply (UPS) providing facility power to a 400 Hz power supply which feeds the 400 Hz circuitry of the Marway PDUs. The lower PDU includes an additional circuit to power the zero-U PDU which in turn provides power to support equipment in the rack and utility outlets on the bench.

Regardless of the details, the key point is that Marway PDUs can be customized to integrate the power needed for both the devices under test, and the test equipment in the rack.

Power Control

Control capabilities in PDUs offer a range of options including local switches, breakers, timers, remote signals and more. Controls might be added for safety, redundancy, or operator convenience.

Safety considerations of power control include over-current protection, interlocks, and easy access to power shutdown for emergency conditions.

Circuits and outlets can have on/off control through local breakers, switches, or relays, through remote panel switches, or even through software over an Ethernet network.

Remote On/Off/EPO

Marway's Commander EPO panels provide buttons for On, Off, and EPO functions. These can be used to remotely operate one or many PDUs. The remote circuitry makes it easy to configure control panels and PDUs which may be in different rooms, or for cases where multiple adjacent test stations should be shutdown simultaneously for safety considerations.

The Architecture of Power Distribution

Consolidated vs. modular, centralized vs. distributed: these will be the foundational decisions in creating a power distribution plan. Ultimately, the goal is optimization for the particular application and business parameters.

A new PDU design from Marway begins with a collaborative discussion to help us understand the purpose of the PDU, and the environment in which it will function. We'll use the pillars of power management to help organize the discussion of key technologies needed in the PDU. Next, we'll consider the physical environment needs, details of installation, and operator ergonomics. This holistic approach enables Marway to understand the application, the environment, and the purpose of the PDU. With that information, we'll be able to better interpret your project's needs, and offer our experience towards a more successful design.

In the hypothetical applications illustrated here, there are opportunities to balance consolidation vs. modularity of hardware, and the use of custom vs. standard products. The "right" solution will be dependent on the customer's value ranking of the various pros and cons. Marway's ability to design for these variations is one of our core strengths.



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