ASK THE EXPERT

Customized laser modules can be the most cost-effective option

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For many design applications, when considering technology choices, the tradeoff between custom and off-the-shelf solutions quite often is viewed as "high cost" versus "economical," respectively. The time and effort involved in customizing technology to meet requirements is perceived as a cost driver which could be avoided by simply plugging in an existing system.

However, such perceptions can be counterintuitive to reality. Take for instance the specification of laser modules for industrial applications including machine vision, industrial alignment, 3D scanning, etc. In such uses, an off-the-shelf solution may not have specific features needed to optimize system performance, as well as not meet long term goals and flexibility for future functionality.

Here, Jeremy Lane, Managing Director for ProPhotonix, explains how a customized laser module can be the most cost-effective answer in meeting application needs. ProPhotonix manufactures laser, LED, and UV-curing products with 25 years of history in producing solutions to customer requirements. Lane has over 12 years experience in custom laser specification and manufacturer.

Q: What is the major misconception surrounding the design and cost of customized laser modules?

A: It's that because a custom solution is specialized, it will be more expensive. The opposite is the case. Standard, off-the-shelf products aren't necessarily cheaper because, with a "one size fits all" approach, many of the functions built into a standard product for a wide range of applications are not needed by the customer. These can include: unnecessary electronic control functions; higher power; excessive stability; or a too long or short lifetime. And very often the customer requires something different—either a minor or major change.

With a custom approach, the customer has the flexibility to choose the exact functions needed—and this can bring down the overall cost. While customization may imply the use of "more expensive" engineering resources, being able to balance parameters and fine tune electronics, etc. will better met customer requirements.

Q: So, a customized product can be cheaper and more cost-effective, but how does the custom design process work, and how might that impact cost?

A: The process does not have to be long and protracted—it can be quite seamless. In a partnership approach—from specification, to development, to postproduction—we can design and manufacture high-performance laser modules that are tailored to the customer's needs.

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We partner with a customer as closely and transparently as possible to understand their application and process. This determines what is important to them, what they want to solve, and what value we can add. Our engineering team then surveys the thousands of installations we've developed previously—leveraging and perhaps modifying a design, or determining if a new customized design is warranted. If the latter, it is tailored around performance requirements and budget. We not only team with a customer's technical people but supply chain managers and even their owners.

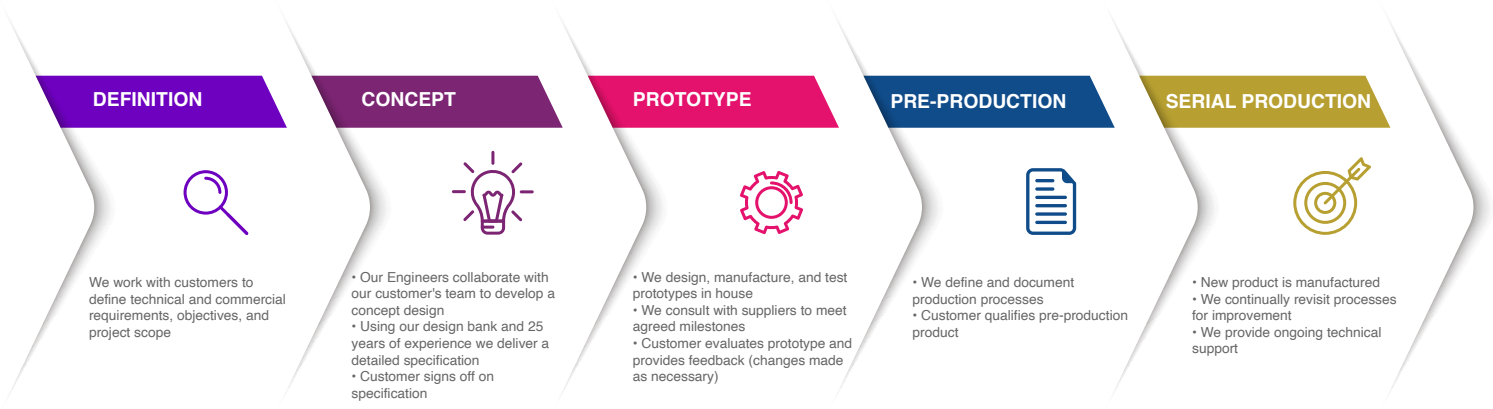
Being able to draw from such extensive product design experience gives us the understanding to arrive at a solution quickly—which is cost effective in balancing acquisition and operating costs while meeting performance goals. In most cases, we can even get a product from our extensive range quickly into a customer's hands to give them a demonstration. This enables further understanding of requirements in arriving at a customized solution, or it could lead to deciding a previous design meets their needs with modification, such as optimizing mechanical features or changing the lifetime of the laser diode. Customers often want something slightly different after such a demonstration.

Q: Any examples of what may change in the design process after such a demonstration?

A: After testing some lasers, the optical performance, and beam quality and shape might be adjusted. For instance, the quality of a laser line output might be modified so there are no interfering reflections or diffraction effects that would impact a given imaging system. Or a spot laser may need beam quality changes with optics adjustments (such as lens position) or a change in the number of lenses.

Q: We've talked about the design process, but what factors impact cost and performance after the design is completed?

A: Another key factor in making cost-effective products is our long established global supply chain, allowing us to draw from world-wide sources in minimizing component cost while hitting performance goals. After components, our manufacturing, assembly techniques, and automation—developed over a quarter century in business—allow fast, volume fabrication to hit production cost targets.



Q: Can you provide a case history as an example highlighting the overall design process for a cost-effective laser diode system?

A: A significant development was designing an accident prevention system for one of the world's leading, consumer products distribution companies in their fulfillment centers. The task was to assure that robots picking and moving goods to the persons doing the actual packaging did not interfere with each other, warehouse facilities, or personnel. An infrared laser module was chosen with the necessary high reliability and beam quality—but because it would be such a high volume, world-wide order, the customer was very sensitive to overall system and production costs—which we were able to optimize.

Q: What tools do you have to help customers participate in the system design and configuration process?

A: Our website has a Module Selector tool that can help zero in on what choices should be considered for a given application. The site also has a library of white papers to provide background in understanding application requirements, as well as aid in the selection and design processes.

Q: Finally, what do you see as trends to look for in laser module technology and future developments?

A: The laser diode industry and market is relatively mature. Over the last couple of decades new wavelengths and diodes have gone from only red to green, blue, and infrared for wider applications. Recent developments in scanning infrared "fencing" will not only be used for guiding industrial robots but see use in autonomous automotive applications.