



How to Add Complex Technology: Build it Ourselves or Buy it Off-The-Shelf?

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Page 1

NEW TECHNOLOGY: BUILD IT OR BUY IT?

This age-old question has haunted many a manager: *Should we develop a technology ourselves or rely on a vendor to provide the solution?*

When the technology is the obvious competitive differentiator, the answer is easy: build it and make it The Best. When a supporting technology is considered, sometimes the “we can build it better” philosophy carries through to the detriment of the company’s bottom line and long-term competitiveness. Innovative, successful companies carefully determine whether to build or buy the supporting technology.

In the case of laser-based hardware, a common approach to answering the Build vs. Buy question leads one to estimate the engineering hours required to design a laser driver and temperature controller, sum up the bill of materials, add a bit for a board turn, and then compare that number to the price tag of an Off-The-Shelf (OTS) solution. Unfortunately, this simplistic approach fails to consider broader and more important criteria that affect the success of your product and your ability to compete.

Ultimately, the decision to Build or Buy comes down to this question: If we build it ourselves do we increase our competitive advantage? It’s a simple question, but finding the answer may not be so easy.

QUESTIONS TO ASK UPFRONT

There are five major factors that will impact the decision to Build or Buy:

1. Performance
2. Reliability
3. Time-To-Market
4. Resource Allocation
5. Cost of Goods (COGs) and Cost of Ownership

The Build vs. Buy decision criteria can be delineated into specific questions for each of these criteria. Remember the goal is to determine if building it yourself increases your competitive advantage; these questions may help you to uncover the answer:

Performance of In-House Solutions

- Do we know enough about laser electronics to design a safe and reliable high-performance driver circuit?
- Does an off-the-shelf laser driver exist that meets our functionality requirements?

Reliability

- Laser safety is paramount: do we know how to build a circuit that will protect the laser over a wide range of operating conditions?
- Do we have proven experience designing high-reliability laser control electronics? And can we make our driver more reliable than an OTS solution?
- Keep in mind OEM solutions are usually designed to very high standards. Since the manufacturer makes their living on these products, their drivers have top-notch safety features, output stability, and noise performance—all of which take a good deal of time and experience to perfect.

UPFRONT QUESTIONS, CONTINUED

Time-to-Market

- It can take six to nine months for a dedicated engineering resource to design a high-performance driver with suitable control and safety features. Will the project schedule tolerate such a long time-line?
- What is the schedule impact if specifications change mid-stream and the laser electronics have to be redesigned? Would an OTS solution be more readily adaptable than an in-house designed circuit?
- Is our competitive advantage at risk if product release is delayed?

Resource Allocation and Cost

- What is the opportunity cost of using our engineers to design the laser electronics? How could we better apply the engineering resource?
- The cost of an engineer, including overhead, can easily run over \$100k per year. How does that compare to the long-term cost of an OTS solution?

Cost of Goods and Cost of Ownership

The simple calculation for Cost of Goods includes landed parts cost, assembly labor cost, overhead and amortized development expense. But to evaluate the Cost of Ownership, the price of the unit is just the beginning:

- If we design a specific solution for one product, will modifications be necessary whenever the design is transferred to a new product?
- Are there RMAs and field failures on a home-grown solution? What impact does this have on the company reputation?

POST PRODUCT RELEASE

The Build vs. Buy question may have a simple answer at the prototype stage—usually OTS hardware is the least expensive path. But once the product is released and enters low-rate initial production the question may arise again. Typically the question revolves around cutting manufacturing or material costs.

Many of the same questions apply as before, but now there are some new issues to be concerned with.

- In the case of FDA-certified products, you'll have to recertify if you change the laser driver electronics. The total cost of recertifying can be substantial, in terms of direct cost and time, and likely won't justify the cost savings you might realize by switching to in-house designed hardware. Be sure to communicate with your OTS supplier so they know the product is sensitive to design changes.
- If your reliability testing was conducted with an OTS solution and you change to an in-house solution, your previous test results really no longer apply. A comprehensive requalification should be run.
- If the OTS hardware solution is over-featured, you might try to reduce system cost by designing your own replacement driver. Before heading down that path, it's worth asking the OTS vendor if they can modify their product for your application. Experienced OTS manufacturers who design and build their own products in-house should be able to optimize a solution for you at a very reasonable price.

ADDITIONAL CONSIDERATIONS

Additional and equally important points to consider:

- Design Volatility. If you spin your new product into variations or custom configurations, which solution is most easily adaptable?
- Business Process Bias. Some businesses are biased toward building because “that’s the way it’s always been done.” That attitude fails to consider the question of competitive advantage, and it may be worthwhile to ask if doing it differently will provide greater benefit than doing it the same way as before.

SUMMING IT UP

If you can spare the engineering resources without blurring your focus on the advanced technology that differentiates your system, if you have time to develop the driver and still make your product release date, and if you anticipate your design will remain stable over a long period of time, then designing the driver yourself may prove worthwhile.

But if your engineers are busy developing leading-edge hardware and optics, if the Sales group is banging on your door about time-to-market, and if you need a laser driver with a proven long-term track record of reliable service, then purchasing an off-the-shelf solution is likely the right answer.

Ultimately, one question needs to be answered: What will make us more competitive in the long run? Hopefully by now it’s obvious that getting to the answer is not as simple as looking at a price tag.

KEYWORDS

laser driver, temperature controller, cost of goods, COTS, off-the-shelf, reliability, customization

REVISION HISTORY

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A	Aug '12	Initial Release



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