



10 Ways to Reduce Cost in Outsourced Prototyping

Many original equipment manufacturers (OEMs) are faced with insufficient internal product development resources, while at the same time an increased workload. It happens when recession dictates cost cutting and it happens when growth outpaces recruiting capacity. All the while, technology advancements continue to drive new engineering challenges and there is convergence in what used to be distinct engineering disciplines. On top of that, engineers are also expected to handle more of the administrative tasks such as documentation, components sourcing and prototyping for the products they build. The end result can be a reactionary product development process where deadlines slip and costs creep simply because workload exceeds the resources left to handle it.

So, how can product development teams regain control of the process and actually cut costs? Here are 10 areas on which to focus:

Tip #1 – Define Your Team’s Core Competencies

Administrative and lower level technical resources are often the first to be cut from a product development team. The end result can be false economy: engineers and managers spending the bulk of their time doing lower level tasks instead of the engineering functions they were hired to perform. The job of a good prototype house isn’t simply building boards. Instead, it is helping product development teams meet their deadlines on time and on budget. The selected suppliers should be able to fill your team’s gaps. Look for suppliers capable of sourcing components, handling pcb fabrication and transforming the file set into a documentation package.

Tip #2 – Fill Technical Resource Gaps on Your Engineering Team

A good prototyping partner can be an extension of your technical team. When filling gaps, consider your team’s technical weaknesses compared with supplier capabilities. Is on-call engineering support an option? For example, when dealing with RF or mixed-signal designs, competent layout advice can be the difference between a week-long migraine headache vs. a prototype that works. The same is true for very small componentry in advanced packages. A quick phone call to a prototype house with expertise in small form-factor components may be all that is needed. Good prototype houses see a far greater range of technical challenges than your team will likely see. Leveraging this shared expertise can cut your product development time and cost.

Tip #3 – Buy What You Need

Product service offerings are changing with changes in demand. Quickturn prototypes carry premium pricing that is driven by turnaround time. Consider your required turn time when buying services. At Screaming Circuits, we surveyed our customer base and found that over 30% were purchasing quickturn prototyping services to support low volume end-production needs. They were doing it because they found it preferable to trying to outsource a short-run of production boards in a traditional EMS

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environment. They were also trying to avoid excessive tooling or non-recurring engineering (NRE) charges. Our solution was to offer a lower cost hybrid service with a simplified project launch and a longer turn time than found in the quickturn prototyping realm.

Tip #4 – Understand the Pros and Cons of Modular and Open Architecture

Consider starting complex designs with open source hardware or modular subsections. Rather than designing a complex on-board switching power supply, consider a pre-built point of load module instead. Rather than starting from scratch with a new advanced microcontroller, consider open source hardware or open architecture reference designs as a starting point.

For example, to promote faster adoption of the new OMAP 3530 ARM Cortex A8 processor, Texas Instruments created a group that developed the Beagleboard (www.beagleboard.org). The Beagleboard is a powerful and versatile embedded processor board that showcases the processor in a world-class design. The Beagleboard group released the schematic, pcb layout and all of the other design files as open source, allowing a development team to get a head start by using some or all of the pre-made design.

The open source implementation not only allows a designer to skip mundane but difficult and time-consuming phases, such as the escape routing of fine-pitch BGAs, but it also creates a community of engineers willing to assist with other design challenges with implementation of this processor and supporting chips.

Tip #5 – Look for Good DFM/DFT Expertise

Your prototype supplier should be able to provide design for manufacturability/testability (DFM/DFT) guidelines or a helpline to assist with component footprints not in your CAD library, best layout options for odd form components or other resources that can be tapped to speed your internal layout efforts. For example, PCB fabricator Sunstone Circuits offers PCB123, a schematic and pc board layout CAD system that has built-in design rules. PCB123 has an extensive library for NXP components which can save significant time early on in the layout process.

Tip #6 – Consider Your Long-Term Objectives

While an immediate objective may be finding the cheapest source for the prototypes you needed yesterday, taking a longer-term view may lower total cost. Is your prototype supplier a standalone resource or a partner who can bridge the gaps between your design efforts and your volume production facility? Can you automate parts of your ordering process or set up standard practices that simplify continuing orders? Can developing one or two strategic prototype sources get you better pricing than randomly bidding every new product as a standalone project?

Tip #7 – Customer Service Will Save You Money

In another of our customer surveys, 21% of respondents said that the most difficult part of getting prototypes built was coordinating the overall process. Another 10% said it was getting the order placed.

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Look for suppliers with systems in place that take the work out of ordering and coordination. For example, we've teamed with Sunstone Circuits to make it easy to one stop shop for both printed circuit board fabrication and prototype assembly through either company. We've added an on-line quote calculator to our web-based ordering system to make it easy for customers with simple requirements to get a quick quote. We also offer telephone ordering for companies who prefer to talk with a customer support representative. With a downsized engineering team, time is money. Look for suppliers who help streamline the process.

Tip #8 – Take Advantage of Free Resources

Blogs, white papers, articles and design guidelines are just a few of the resources out there to help your team avoid making time-consuming costly mistakes. Check your prototype suppliers' websites to see what free resources are offered in this area. Join open source communities and read, listen and contribute.

Open source projects such as the Beagleboard can save weeks on the initial a design and reduce headaches later without giving up proprietary IP or jeopardizing design integrity. And it goes for both the hardware and the software. Fewer designs these days are hardware only. With a broad community of like engineers, it's quite likely that someone else has already solved that nagging timing issue or sleep mode control issue taking all of your time.

Tip #9 – Ask for Ideas

The days of prototype suppliers simply building boards are long gone. Part of the service at most good prototype houses is helping organize and rationalize the product development process. Don't be afraid to ask your prototype supplier for ways you can work with them more efficiently. Tap their engineers for ideas on better layout or component selection.

Tip #10 – Listen to Advice

Good prototype houses don't want to make money on your inefficiencies. If they identify ways you can save money and time by changing your process, take their advice. Our white paper, *The Top 10 Issues that Cause Bad Prototypes* is one way we help educate our customer base. We also offer specific recommendations when we see issues developing in individual projects. While changing your process may seem like added work you don't have time for, setting up a robust partnering process with your key prototype suppliers will reduce both your workload and cost long-term.

The Screaming Circuits blog <http://blog.screamingcircuits.com/> regularly discusses the issues listed here in greater detail. Feel free to visit and learn more.

Screaming Circuits (www.screamingcircuits.com) is an industry pioneer in the online quick-turn prototype pc board assembly market. Located in Canby, OR, the company offers assembly, prototype and short-run production pc boards in as little as 24 hours for short runs with such advanced technology as 0201 passives, QFNs, micro BGAs, package-on-package and flex assembly. Screaming Circuits is a

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subsidiary of the Milwaukee Electronics Corporation, which also offers full service contract manufacturing through facilities in Wisconsin, Oregon and Mexico, and design services through its subsidiary, MEC Innovation.