



BY BONNIE BAKER

## Finalizing hardware before you should

**F**inalizing hardware before its time can delay a project. Improper planning of long hardware leadtimes may prompt you too early to finalize the hardware portion of your design. This poor planning can happen before the product definition, firmware design, or hardware-prototype testing is complete. If you then discover that you need more functions, such as an additional temperature sensor or an extra key for the keypad, your project may be at a point at which changes may be difficult or impossible to implement. Can you recuperate from these hardware deficiencies? The answer is yes, but doing so requires either a little attention at the beginning of the design or a lot of time on the back end.

There's more than one way to skin a cat, but your predesign work is critical. At the front end of your project, defining the end product and design nuances is vital. Here, you set expectations concerning all of the elements of your product development. Engineers, managers, or both often overlook or poorly implement details in this project-definition stage. Some of the reasons for this oversight include a shortage of resources or, worse, the perception of a lack of time. Sometimes, managers, firmware engineers, or hardware engineers think this step in the development phase slows down the project so that it misses its time-to-market plans.

A perfect example of when adopting this cavalier attitude occurs is when an organization spins the same design several times, each time with a slight improvement. If you skip the planning stage, the details of the numerous changes eventually impact hardware re-spins, validation, testing, and—worst of all—customer satisfaction. But, if you spend a little extra time planning before the design phase starts, you usually quickly complete the end product, send it to market faster, and make it closer to customer requirements. Don't get caught singing the “re-spin-due-to-oversight” blues. If you look at the big picture, the benefits of planning are vast.

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entire product-development organization. Be leery of “islands of excellence.” Such islands occur when communication between groups is less than ideal, but each group does an excellent job within its area of expertise. The classic example is when the hardware design operates perfectly, but it is not feasible to mass-produce the design in manufacturing because of a logistics problem

on the manufacturing floor. For instance, a designer requires testing the product at five or six temperatures. Manufacturing engineers know that this scenario is no way to mass-produce anything.

As part of the definition and planning stage, you define prototyping, validation, and testing strategies. One prototyping option might be to inject processes into your development flow. You are all familiar with the appropriate CAD tools for the systems you develop, but you can also use other PC programs to simulate your end-product features. You can create innovative prototypes that answer end-user-interface questions. As an example, rather than wait for the arrival of a custom LCD with a long leadtime, you can emulate the LCD function on a PC-based prototype. Because custom LCDs are also expensive, do this step before you order the long-leadtime part. If you take time to clearly define the system requirements, you can easily modify errors in the development of the LCD portion of the application in firmware.

I do a lot of traveling and am often waylaid in an unfamiliar airport and told that my plane is delayed because of mechanical problems. My immediate response is to relax and exclaim to the imaginary technicians in the terminal: “Take all the time you need. And please plan your strategy well. Make sure you get it right the first time!” It is better to be on the ground and wish you were in the air than be in the air and wish you were on the ground. **EDN**

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