



FORCING

the hand of
electronics design

Companies that don't take note of how design is changing may make the **WRONG BET...**



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THE NECESSITY OF CREATING

and maintaining leadership in technology innovation has never been more essential to survive today's business climate. Economic downtrends are aggressively challenging electronics companies to consider dramatic solutions within a market that is also becoming more complex. Employing cost-effective strategies such as outsourcing for lower design costs and manufacturing partners are only just the beginning. Old design philosophies are being left behind, unable to deliver the sustainable differentiation and innovation required for the future.

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It used to be that electronic product design companies could rely on deeply entrenched market presence to keep a competitive edge. They now find themselves reevaluating every part of their organizations. Beneficial strategies such as using new design approaches and creating more effective engineering environments are being incorporated by electronics companies into product design at every level. As a result, it's changing the shape that design models are likely to have in the future.

SOFT DESIGN IS NEXT GENERATION TECHNOLOGY

Since the arrival of cost-effective microprocessors, electronic products have advanced in device intelligence exponentially. This programmed intelligence or 'soft' part of the design is what is really responsible for the product's value today – the true differentiator for gaining market advantage rather than the physical platform it's sitting on. In comparison, board geometries have become faster and smaller but creating custom board designs has evolved to become the more significant and time-consuming challenge of product development. As a result, there is a diminishing return of investment on this part of the design.

Relying then on traditional ways that put the physical hardware first in light of current market changes and drivers seems risky. Designing electronics isn't straightforward anymore as the boundaries between traditional disciplines of hardware and software become increasingly blurred. Dealing with design elements independently and using yesterday's methodologies and point tools treats the design process as a fragmented collection of approaches. It doesn't put device intelligence, the most valuable part, at the center. Effectively, this pushes our focus towards managing increasing design complexity and away from innovation.

It's a design model that has disillusioned many electronic product companies as being far from ideal.

Instead, soft elements should be first in the development process. This shift creates a dramatic change of focus. In separating function from the fixed physical hardware, key elements of design can be moved into the soft domain. No longer locked into the hard domain, they can be abstracted to a higher design level. An engineer can suddenly approach a design task from the customer's point of view rather than having to make a decision about hardware configuration before it's even been decided what the product will do. A single view of the design covering all aspects of electronics design is created then and not just one isolated part of it.

The potential for more of the design process to be soft increases with using high capacity programmable devices, and at costs relatively lower than traditional counterparts. More importantly a design approach where device intelligence is placed at the center is realized, unifying design methodologies instead of fragmenting them.

A soft design approach allows additional advantages over traditional models based largely on vendor-specific hardware platforms such as complete design synchronization and reuse. What was once manufactured into a device as part of the physical hardware and usually performed by a highly specialized engineer can suddenly be programmed. At the most fundamental level, FPGA-hosted soft processors can deliver unprecedented architectural flexibility plus reduced complexity with the end result of smaller, simpler boards – compelling large-scale business advantages. And by bringing as much hardware as possible into



A unified approach frees designers to focus on creativity and innovation – where product value really lies.

the soft, programmable realm, iterative approaches that allow experimentation of ‘what if’ scenarios without increasing design times can be explored.

More companies feel they can't afford to ignore alternative approaches for riding the changes that new and emerging technologies will bring. Soft design is making a lot of sense and progressively coming into its own. Considering external pressures, hardware-based design is too constrained and clearly not cutting it. Business strategies need to actively plan for internal changes that include innovation as well as return on investment (ROI) because the market is changing too quickly to know if long-term plans will be enough.

STRATEGIES FOR INNOVATION, NOT INVESTMENT

Strategies then that focus on innovation for achieving product differentiation are just as important as those for ROI, and in certain respects more important. Distinct advantages need to be evident and realized immediately and not just in five years time. Companies need to re-evaluate existing design strategies and decide if they can accomplish more with a new design philosophy. Whether or not current strategies can effect the necessary changes for innovation can be easily determined.

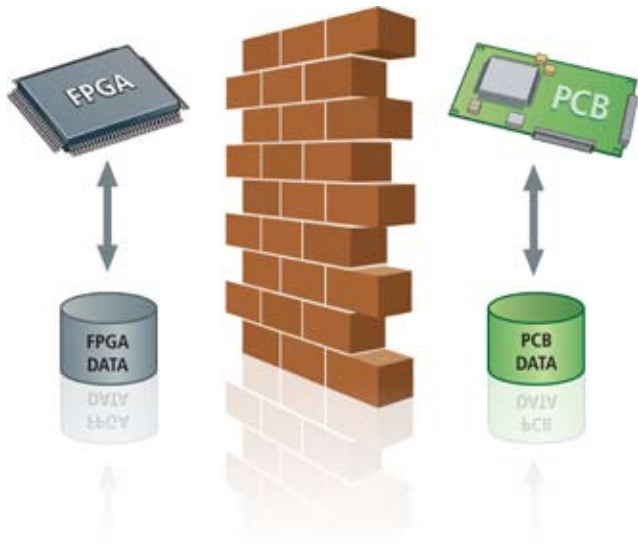
Does the existing strategy include the ownership of intellectual property (IP)? This is a big one. A traditional model where many people collaborate throughout the design process makes the claim of ownership tenuous. In a market where

products can be reverse-engineered as fast as they are created, the majority of effort should be on creating functionality and not just hardware. If improving product differentiation forms the basis of sustaining innovation and longevity of board design, then ownership is everything!

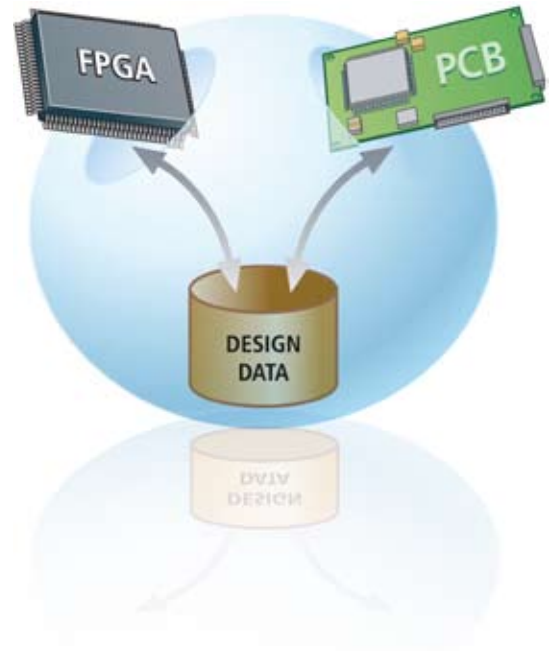
Embracing every aspect of board-level design is another important strategy, taking full advantage of the growing requirement for engineers to be multifaceted. Engineers are expected to be able to do more and balance more aspects of the design process than before. As an example, the 2008 Embedded Market Study from Tech Insights/Embedded Systems Design reports that the average number of software engineers to hardware engineers has more than doubled – a revealing statistic about the changing role of engineers in today's design process! Not only do companies need to provide environments that engage their engineering talent in differing design approaches, but they also need to do so in such a way that allows them to be fully focused creating device intelligence. This in turn helps engineers diversify from conventional roles by building skill sets which ultimately feed back to the company as both short and long-term gains.

Having design unified as a single process makes team communication and workflows easier. The traditional model relies heavily on a silo form of communication where groups of people work independently of each other and have no visibility or knowledge of the needs of another group. When close cross-

OLD WAY



NEW WAY



Most design tools today are still based on the integration of various point tools which don't focus on device intelligence.

collaboration is required, communicating this way can be slow and inefficient. It might eventually result in a better board design, but it's hardly the ideal approach needed for continuous innovation and getting to market faster.

Lastly, being able to reconfigure soft processors offers product delivery advantages such as having multiple points of contact with customers, making updates at any time and licensing flexibility. These are of particular value to internet and wireless technologies. Reprogrammable devices also let engineers 'see' what they develop as an instant proof of concept. This allows exploring different ways of achieving results that are cost-effective without being committed to a specific form of implementation. At each point in the development process, the company has tangible ownership which translates into definable value and increased options. It may even open up additional business avenues later.

Only minimal effort then is required to move the final design to production which brings products to market quicker. Strategies that include off-the-shelf, reconfigurable hardware platforms as part of the deployment mechanism avoid the need for full, custom board designs except when necessary.

STAYING AHEAD IN THE GAME

Many design approaches still rely on integrating various point tools instead of putting mutual-interest technologies into a single solution. But going with these puts you back in

the old design school-silo model and it doesn't focus on device intelligence. These approaches can't keep you ahead in the innovation game. In today's market, it's important to do more than just survive and continue managing complexity. Strategies need to put innovation first in the design process which then achieves real ROI.

A company can boost their mainstream development significantly by allowing all aspects of electronic product development to be designed and managed within a single system. This effectively speeds the transition from design to production. A unified approach allows designers to focus on higher-level applications, see the product as they are building it and reuse both their existing work and third-party technology. All of which is without sacrificing innovation or increasing design times.

Market drivers are compelling us to make choices about how we will deal with changes and may well force the issue. Current economic downtrends can be seen as more of an opportunity to break away from a piecemeal approach and towards one that is viable for continuous and sustained innovation in electronics design. It's a situation where companies that don't take note of how design is changing and continue falling back onto old philosophies are more likely to end up with the losing hand to those who do. ●

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