Addressing the Business Challenges in Today’s Electronic Systems Market

In today’s marketplace, systems companies must do more than just employ cost-cutting measures to succeed. To position themselves for growth, they need to build highly differentiated products; reduce time to market; and focus on compliant, environmentally aware designs. This paper discusses four technology focus/initiative design strategies targeting these challenges—including Miniaturization and Complexity, Reducing Design Cycles, Faster Data Throughput, and Environmental Concerns—and introduces the need for new design techniques, processes, and methodologies to employ the strategies.

Introduction

Systems companies today are grappling with shrinking markets as well as potential customers who generally have less money available and less interest in purchasing new or the latest electronic products. The ramifications of this macro-economic environment include declining sales, deep discounting, and longer sales cycles. Consequently, many companies are making expense reductions, cancelling new or advanced projects, and reducing overhead through workforce reductions. All of these measures are, of course, necessary in order for a business to maintain its viability. But these cost-cutting actions alone will not drive growth, whether bottom line revenue or market share. Instead, system companies increasingly recognize the need to focus on number of key challenges, which if addressed successfully can help them weather this period of uncertainty and return to growth. At a macro level the three most common challenges are shown in figure 1 below:
Building Differentiated Products

Differentiated products enable a systems company to quickly penetrate a market to take a leadership position and effectively counter or displace any competition. Clear differentiation also allows a superior value proposition, which will translate into a stronger position on pricing with less need to succumb to eroding ASPs.

Every electronics company strives to get products to market in a timely, efficient, productive manner. This requires using a predictable methodology in order to avoid costly project delays, overruns and under-estimated resource requirements/loads. A sound methodology further ensures the ability to do this repeatedly and accurately, and can yield better profit margins or allow for more attractive pricing.

Almost all companies today have a strategy, position, and/or messaging regarding their roadmap and initiatives for being or becoming environmentally conscious, or “green.” Today’s global concern about depletion of non-renewable energy sources, pollution, harmful or toxic chemical usage or waste has given rise to a number of regional and/or global regulatory compliance initiatives that must be adhered to if electronic products are to be sold in the countries covered by the regulation(s).

Therefore, each of these three common business challenges drives multiple design strategies that can fully, or partially, address the driving business challenges. So let’s peel off another layer and examine these design strategies used in high technology electronic products and their effects.

One common approach to addressing the first business challenge, “building differentiated products,” is by making your products smaller, faster, higher capacity, and more stylish and appealing than the current market competitors. Achieving this can avoid average selling price (ASP) erosion and leapfrog your product into a market leadership position with high customer demand and high perceived value and differentiation. A great example of such an approach and strategy is the Apple iPhone, a product from a new market segment player that entered a hotly contended consumer handheld wireless market and immediately took a leadership position, while achieving and maintaining a high ASP. Now everyone has witnessed the explosion in functionality--of which the iPhone is again a great example--which is now available in today’s consumer-orientated products and is being achieved without any major increase in the physical size of the products.

Such increases in functional density and capacity are achieved through design miniaturization techniques. Improved performance and capacity requires throughput or speed, and this is most obviously achieved by using the latest advanced nanometer node silicon for increased capability and capacity without excessive or even no increase in size. It also requires substantial increases in data speed through the usage of gigabit-speed interface protocols that allow for the creation and movement of increasing data volumes at the performance levels desired.
Of course, this capability may not offer any business viability unless the results can be delivered to market in a timely and cost-effective, reliable, and repeatable manner. For this to happen, the design environment and infrastructure must itself provide and enable the levels of designer productivity, accuracy and design process and methodology repeatability and predictability. Here designer and design team productivity and efficiency are key requirements, along with a methodology and design process/flow that is reliable, predictable, and repeatable.

Building Environmentally Aware Products

“Environmentally Aware” in its most basic form means designing for regulatory compliance so that you can market products into global or geographic markets where regulations on materials used or contained in products exist. Everyone has heard of RoHS initiative that started in Europe where new electrical and electronic equipment cannot contain more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE) flame retardants. RoHS was just the first of such environmental regulation initiatives. Being able to understand, track, and manage the impact of these initiatives on designs and their contents provides an ability to design-in, or re-target an existing design, for a new market or a new initiative in a timely and cost-efficient manner and avoid product compliance failures. The other globally common environmentally aware issue is low-power design. In the IC design space this has become a common and often over-hyped capability claim, and is usually associated with helping to keep the chip size down, preventing thermal issues, and, of course, increasing battery life in portable devices. However as we see more people, societies and countries become concerned about global warming, pollution, and natural resource depletion, the focus has quickly shifted to consuming less energy, becoming carbon neutral and reducing one’s own carbon footprint. Electronic systems companies are focusing on designing for lower overall product power consumption as a way to address these issues and appeal to the more ecologically aware consumer market. Designing better power-optimized products reduces electricity running costs, which in turn reduces power station fossil fuel consumption, which in turn reduces Co2 emissions, which in turn reduces pollution and greenhouse gas effects.
So when it comes to the electrical product/systems design architects and design teams these business challenge driven design strategies can be distilled into four overarching technology focus/initiative areas (figure 3) that can be categorized as Miniaturization and Complexity, Reducing Design Cycles, Faster Data Throughput, and finally, Environmental Concerns. In order to address each of these focus/initiative areas, the design team will need to employ multiple design techniques, new process and methodologies, and require that their design environment and infrastructure is capable of enabling, supporting, and efficiently delivering the capabilities required.

Each of these four initiatives will be explored in detail in subsequent papers, with a focused look at the technology solutions and techniques that can be applied and the design methodologies and processes and how design tools can help, and in many cases enable the efficient adoption of new technologies.