



Streamliners

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I'd be a fool not to...

What would you do if we told you that you could hire Core Source for free? If you were to believe us, you'd probably say "I'd be a fool not to." Well, that isn't going to happen, but sometimes things work out that way anyway.

Often, the decision to move forward with a new generation of an existing product is difficult. Many factors, such as the cost of the development effort, the size of the market opportunity, and the change in the cost and sell price of the new product affect the decision. It would be easy if these factors were all known with great accuracy, but they are all too often based on gut feelings.

Other times, it's a slam-dunk and the numbers, even if wrong by a good margin, make the choice obvious. Core Source is now finishing such a project with one of our customers. With an opportunity to reduce the cost in half by combining two products (that are always used together), the decision to go ahead with the project was easy. What wasn't easy for this customer was finding the engineering resources within the company to complete the project. With a very mature and functional prototype in hand, this customer paid a visit to Core Source. *(Continued on page 3)*



New CST Facility

"With a very mature and functional prototype in hand, this customer paid a visit to Core Source"

Special points of interest:

- Rapid prototyping pays for itself
- PCB hub of product development
- New facility enables engineering team-based approach to projects through work center clusters
- Designing for the global market

PCB Design 101: The CST Way of Addressing Design

Printed Circuit Board (PCB) Design resides, in many ways, at the hub of product development. Involvement from the very early concept stages through production is critical to the effective launch of a new product.

At the concept stage, and as the first pages of schematic are completed, it is often helpful to do a "parts splatter" on the targeted mechanical outline in the PCB Layout CAD tool.

From this early database, an IDF3 output to the Mechanical CAD tool can produce a 3-D model, which can be imported into the mechanical enclosure for a fit check and to look at serviceability, assembly costs, ergonomics, safety, EMI, and thermal issues. By evolving the model as the schematics progress, the density of the board can be assessed and component choices can match the available space early on. *(Continued on page 2)*

PCB Design 101: The CST Way of Addressing Design (cont. from page 1)



PCB Design—the Core Source Way

Efficient use of the PCB Fabrication panel is critical—especially for higher volume products. Sometimes reducing the dimension in one direction can mean fitting six PC boards on a panel instead of just four. Since the area used of the panel is typically the most significant cost factor, a 50% increase in boards per panel can make a big difference.

Choosing the right mix of technologies for each printed circuit board is also critical. If only a small portion of a circuit requires expensive RF material, it often makes more sense to keep the 4- or 6-layer RF circuit on a separate board from the 14-layer digital circuit to keep costs down. In other cases, combining circuits may minimize the number of connectors needed and reduce overall tooling costs. In certain applications a flex board might be the right answer.

“Choosing the right mix of technologies for each printed circuit board is also critical.”

Considering the technical mix and coordinating activities can also help to capture additional time and cost efficiencies, for example:

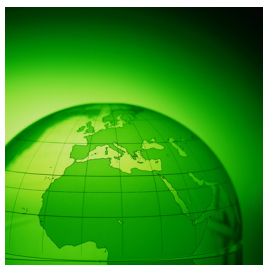
- Schedule parallel activities to avoid delays when it makes sense.
 - Have the PCB Fabrication House ship directly to the PCB Assembly House.
 - Supply Solder Paste Stencil files to the PCB Assembly House ahead of time and approve ordering the stencils so they are ready when the boards arrive.
- Ask the Assembly House to combine solder paste stencils for small boards into one frame instead of paying for two, this can save you \$400.
- Plan for how many boards will be assembled at one time prior to obtaining a quote. It will often make more sense to build small boards on a sub-panel (for example, in groups of four)

to make handling easier for pick and place equipment and for the surface mount oven. This implementation needs to be coordinated between the quoting and the documentation processes for both fabrication and assembly.

- Target specific suppliers to get feedback about technology trade-offs and incorporating their recommendations into the fabrication and assembly drawings will minimize delays as the product is built and will reduce variability going to the next board revision.

Ultimately, the PCB Designer needs to responsibly involve each member of the entire design team as critical milestones are reached for decision making. This includes Supply Chain Management, Mechanical Engineering, Compliance Engineering, Manufacturing Engineering, Design Engineers, and Project Management. Careful planning will avoid unnecessary delays.

Going Global



Taking your product to the global market place

You know you have a product that fills a needed niche in the domestic market, and you're sure you'll be taking it globally in the near future. Right now, however, your primary focus is to beat the competition to the domestic marketplace. Taking your product globally is a definite goal, but you'll worry about that in the next phase. This reasoning sounds logical enough, but this can be a costly mistake in both time and dollars.

If there is a possibility of taking a product to the global marketplace, developing the product for international distribution should begin in the design phase. If the product includes software or use of icons on the hardware, you'll want to make sure that it communicates to a global audience and can be easily translated. For example, the user interface allows for text expansion and icons are not offensive in illustration or color. You'll also want to

make sure that the product meets the country's requirements for proper certification. Considering translation in the design phase will help you avoid costly redesign of hardware, software, and documentation.

When developing technical information, it should begin with translation in mind. (Continued on page 4)

Core Source Has Landed

In our Q1 newsletter we announced that Core Source would be moving to a new location. I am pleased to announce that our move has taken place and with as much grace as could be expected. The CST team was able to make the move and have our business infrastructure in place and operational within a 48-hour period. This achievement echoes the level of dedication and knowledge that CST provides to all of our customers. (I like to say that we practice what we preach.) Through a well planned and executed move our customers realized minimal to no down time on current projects.

With this move, Core Source space has increased to meet new and challenging customer requirements, including the ability to

customize our lab space to meet security and project related directives. This gives us the opportunity to support short-run pilot and production builds, along with our current prototype and development support. Our engineering environment has grown as well. Our new facility will enable us to support a team-based approach to projects through work center clusters if needed. All of these physical capabilities stay close to one of our major strategic objectives—flexibility. Our goal has always been to optimize our space, internal and external communications, while providing the best work environment possible. I believe we have achieved this.

Core Source Technologies has also made the decision to remain in Montgomery County within

the 270 Technology Corridor. This decision emphasizes our dedication to providing true local outsourcing solutions to our current and future customer-base from Philadelphia to Charlotte, NC. With this move, we continue our partnership with Mantaro Networks. This relationship provides a true “full turn-key” product development solution for our customers without the logistical nightmares of working with multiple engineering groups or companies. This is not only a full turn-key opportunity, but also a win-win solution for our customers. With our new facility and continued partnership with Mantaro, Core Source Technologies can provide an even higher level of quality and value to our customers.



CST's new facility—just off the I-270 Technology Corridor.

I'd be a fool not to... (cont. from page 1)

This particular product is an electronic device packaged in an injection-molded housing. After some brainstorming, Core Source came up with a design approach that would reduce the number of unique injection-molded parts from the anticipated 5 or 6, to just 3 by taking advantage of the symmetry that was inherent in the design concept. After a design cycle (closely collaborating with our customer), a partial rapid prototype was produced to

evaluate a troublesome part of the design. After incorporating refinements to the design, a full-scale rapid prototype was produced for our customer to evaluate and test. Further refinements have been identified and incorporated, but the design has been very well received by a number of end users.

What's the point? The reduction in anticipated tooling cost resulting from the Core Source approach to the redesign more than paid for the rapid prototypes and

our fee. And in production, the increased volume of the molded parts (two identical parts are used where two different parts were contemplated) will further reduce unit cost.

So the next time you are faced with a product design or redesign, consider the impact that talented and experienced engineers and designers can have on both the non-recurring and recurring costs of your product. And then call Core Source.

“The Core Source approach to the redesign more than paid for the rapid prototypes and our fee.”



“Considering translation in the design phase will help you avoid costly redesign of hardware, software, and documentation.”

Going Global (cont. from page 2)

You'll want to use proper tools for ease of translation. Design must be considered to allow for text expansion and international page size, date formats, and weights and measures. A glossary will be needed that contains company and industry-specific terms, as well as terms that should not be translated. If you do not have templates, style guides, and glossary, these tools should be developed during the products' design phase. This will ensure that the writing tools are ready when it's time to begin writing about the product and that you do not

have to redevelop, redesign, or rewrite information before sending it to the translator.

Finally, you'll want to consider liability and clearly specify what will and will not be translated. Nancy Hoft explains in *International Technical Communication* that Boeing made the decision not to translate maintenance manuals because of liability—if a bad repair is made to an airplane due to an inaccurate translation, Boeing could be liable for damages and injuries. This illustrates how a manual is not just an

information and operation function, but is a serious business decision. It also illustrates the need for clear processes that specify ownership and responsibility for reviewing instructions in the source language as well as the target language.