

# Utilitek Uses Design Concurrency to Meet Aggressive Schedules

*Two extremely complex boards were designed significantly quicker by employing Mentor concurrent design tools.*

Glenn Ball was concerned. Glenn, founder of long time service bureau Utilitek, was asked by a large aerospace company to work on two extremely complex designs with a very tight schedule. In the past he handled such designs by having his staff work double shifts and weekends. This time Glenn was unsure if he could complete the work using that approach given the time constraints.

## Background

Glenn Ball was doing IC and PCB design with GE Aerospace when he realized there was a need for an independent design house that knew how to complete projects on time, worked properly, and were designed within the client's budget. In response he formed Utilitek Systems in 1986 and selected tools from Mentor Graphics. He adopted a unique business strategy: most of the designers he hired were EEs,

***“Without Mentor’s concurrent design environment, we could not have done these projects.”***

Glenn Ball  
President  
Utilitek Systems

*The Utilitek design team worked concurrently on two very complex designs, sharing expertise and skills.*



which provided a significant advantage to Utilitek's customers. For the entire existence of Utilitek, they have employed tools from Mentor Graphics.

### Concurrency to Tackle Complex Projects

Glenn then remembered a paper given at a recent user group meeting that talked about design concurrency with the Mentor toolset. Mentor's unique client-server based architecture provides a system where teams of people can connect to, and work on the design data at the same time. He contacted the local Mentor office for advice and had a concurrent environment up and running in a day or two.

Individually, the two board projects were very complex and dense. But doing them together added another dimension to the project. Glenn had used Mentor's Xtreme product before, allowing multiple designers to work on the board layout at the same time, but

this was his first time to have a team of designers working on all aspects of the project. Glenn told the customer about the concurrent environment and that he could have 4-5 designers work on a project at the same time. That gave the customer confidence that the designs could be completed on the tight schedule.

The two boards were extremely complex with one board having 11,500 connections and 2,500 components; the other had 13,000 connections and 3,300 components. Both also had several large BGA parts that would have to be broken out and routed. In addition there were numerous differential pairs and mixed signals that comprised analog, digital, high speed memory, and power supply functions.

### Concurrent Design Results

In addition to the advantages offered by Xtreme, the entire project had to be designed at the same time. The board design

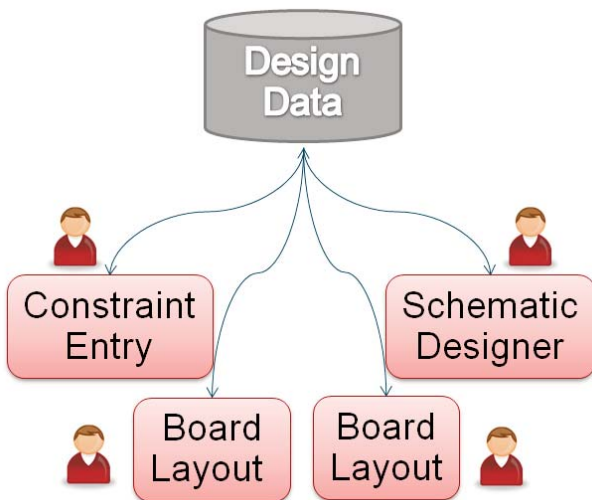
**"We have used Mentor tools for HDI many times and we did not worry about it...it was just a given that they would work properly."**

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began even before the customer had the entire schematic entered. "That is unusual in the industry and for us," noted Glenn. "We are more accustomed to a serial design approach."

Glenn leveraged his designers between the two designs to keep both moving forward on schedule, and on budget. "We had one designer do the memory layout and constraints on project 1, then move over to project 2. We rotated designers this way to ensure maximum productivity. "Without Mentor's concurrent design environment, we could not have done this," he said.

The entire design went well, with the customer engineers building the schematic, adding pages, and returning to Utilitek.



*Utilitek took advantage of Mentor's unique client-server based architecture to have a team of designers work on the project at the same time*

They then used the Constraint Editing System (CES) from Mentor Graphics to add constraints as they received new schematic pages. At times, there was significant change between iterations. Then, it was back to the customer where simulations verified that the constraints had been properly defined.

## Very High Density

The designs' very high density virtually dictated that advanced techniques, including High Density Interconnect (HDI) be used.

"We couldn't have done these boards without HDI. The density was so high that we couldn't have even placed, let alone routed the board with the available space," said Glenn. "We have used Mentor tools for complex HDI many times before and we did not worry about it ... it was just a given that they work properly."

Using HDI made other issues easier to deal with beyond the layout and routing. Because of the lower inductance offered by HDI, the high speed performance was much easier to achieve than using through-hole vias.

Employing HDI also aided in the BGA breakout task. They employed a number of techniques

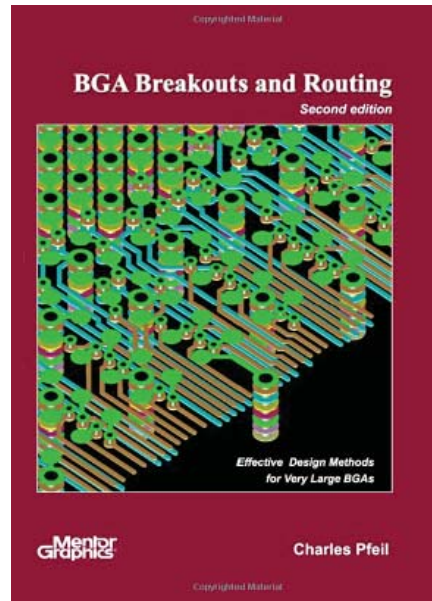
from Mentor's BGA routing expert Charles Pfeil's book (available at <http://www.mentor.com/products/pcb-system-design/resources/bga-breakouts-routing/>). "Charles' techniques were quite heavily used with these large, fine-pitch BGAs," acknowledged Glenn.

## The Spoils of Success

Utilitek began the project in December 2009, and finished both designs in August of 2010... on time and to the satisfaction of the customer. Unquestionably, the concurrent processes that Glenn's designers employed made the dif-

ference. Not only were the Utilitek designers working concurrently, but the customer's engineers were remotely collaborating during schematic entry and simulation. The common Mentor tools, including Xtreme made the project possible.

"We mixed our people and the customer's people. We both used Xtreme. Without concurrent collaborative design, we would have taken substantially longer to complete. We would have had to do everything in series and could not have come close to their required schedule," commented Glen, summarizing the projects.



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**Glenn Ball  
President  
Utilitek Systems**

**For more information, contact 1-800-547-3000 (503-685-8000) or visit us on the web at [www.mentor.com/pcb](http://www.mentor.com/pcb)**

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