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Predictable Success

“We found the Synplicity products best in every respect. They're the easiest to use, the fastest, and the best at producing high quality results.”

— Ziv Serlin,
FPGA Team Leader,
Commex



Synplicity®

Simply Better Results

Success with Synopsys' Synplicity® Business Group and Commex Technologies

Synplify Pro®, Synplify® Premier, and Identify® Success Story

Summary

Commex Technologies designs chips that greatly enhance the performance of x86 based multicore systems, and products from Synopsys' Synplicity Business Group are providing vital assistance. Using Synplify Pro software, the company recently achieved 400 MHz clock speed on the world's first design that implements the HyperTransport interface protocol on a Xilinx Virtex®-5 FPGA, double the speed of Virtex-4 based designs. As the next step, Commex expects to take advantage of the Synplify Premier product's optimization powers to reach 600 MHz. Commex also uses another Synplicity tool, the Identify RTL Debugger, to speed up the development effort. Excellent support rounds out Synplicity's assistance in helping Commex achieve its breakthroughs.

Pioneering Use of the Virtex-5 for HyperTransport

Commex Technologies is a startup fabless design company based in Tel Aviv, Israel, whose Thunder chip delivers pioneering architectural enhancements for x86-based multicore servers that dramatically boost their performance. The company's innovations promise profound benefits in many applications including automated trading - where reduced latency can make the difference between healthy profits and millions in losses for investors.

Thunder provides a direct link between 4x10GbE full duplex ports and a server's CPU cores via a 16-lane HyperTransport interface that is designed to ensure very low latency on the physical, data link, and transaction layers. Previous implementations of this technology employed Xilinx Virtex-4 FPGAs and typically used a 200 MHz clock. Commex needed to double that performance, even though higher frequencies make it more challenging to compensate between data and clock alignment. The engineering team developed a design that promised the greater performance the company was seeking but found that it was too large for the Virtex-4. Therefore they targeted the Xilinx Virtex-5, the largest FPGA on the market, using a new dynamic algorithm of data-to-clock alignment compensation on the HyperTransport bus, despite the fact that it had never been used before for a HyperTransport implementation.

Optimizing Runtimes and Performance by Combining Synplicity Synthesis Solutions

The engineers at Commex knew that to maximize the FPGA's performance they needed even stronger synthesis tools than the Synplify product that had served their

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needs well since the company's inception. Therefore they evaluated the latest FPGA synthesis technology from Synplicity as well as alternative solutions. "We found the Synplicity products best in every respect," said Ziv Serlin, FPGA Team Leader for Commex. "They're the easiest to use, the fastest, and the best at producing high quality results."

Commex learned that the best solution of all was not one Synplicity FPGA synthesis solution but two - the Synplify Pro tool and the Synplify Premier product - and therefore acquired them both. As Serlin explained, "Since our design is so large, synthesis runs take a long time even for the fastest tool. So during the portion of the development where design iterations are frequent, we need to minimize run time. Then later, after the design is well established, we care more about maximizing the speed of the synthesized code. The Synplify Pro tool is ideal for the fast-changing earlier period because it does only one place-and-route, and the Synplify Premier tool will be ideal for the final stages because it performs many place-and-route iterations that take more time, but produce optimized results."

Already, using only Synplify Pro software, Commex has reached 400 MHz and verified this performance in its laboratory, and is making progress toward reaching 600 MHz - three times the speed of previous solutions. With the extra boost that the Synplify Premier product will provide and additional features the company is adding to the dynamic algorithm, Serlin is very confident of achieving that goal.

Using the Identify Product to Optimize Designs

Another Synplicity product that Commex employs is the Identify tool for debugging of issues that arise in the design. Again Serlin has experience with competitive tools as well, and offered this comparison: "Only with the Identify product, since it's connected to the RTL, do our people get to see the entire design before synthesis. That makes it possible to easily locate anything they need to see, which is a huge benefit. Other debugging tools operate on post-synthesis results where it's harder to understand what's going on. The Identify tool is better for finding challenging system bugs with fewer synthesis iterations."

Serlin is equally avid about the support Synplicity consistently provides. "Our Synplicity support people are excellent, both technically and in terms of willingness to provide whatever type of help we need," he said. "In fact, our regional support engineer in France is one of the best I've ever encountered in the FPGA field."

Setting the Stage for Future Breakthroughs

With the world's first-ever HyperTransport implementation on a Virtex-5 and by far the fastest port-to-CPU link, Commex is proud of its achievements and positioned well to continue its business success. "Synplicity's products have helped us achieve something that's never been done before," said Serlin in closing. "We're pleased with the progress we've made and grateful for Synplicity's contributions, but there's much more to come. Keep your eye on Commex."

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