BittWare, Inc.

Customer Success Story

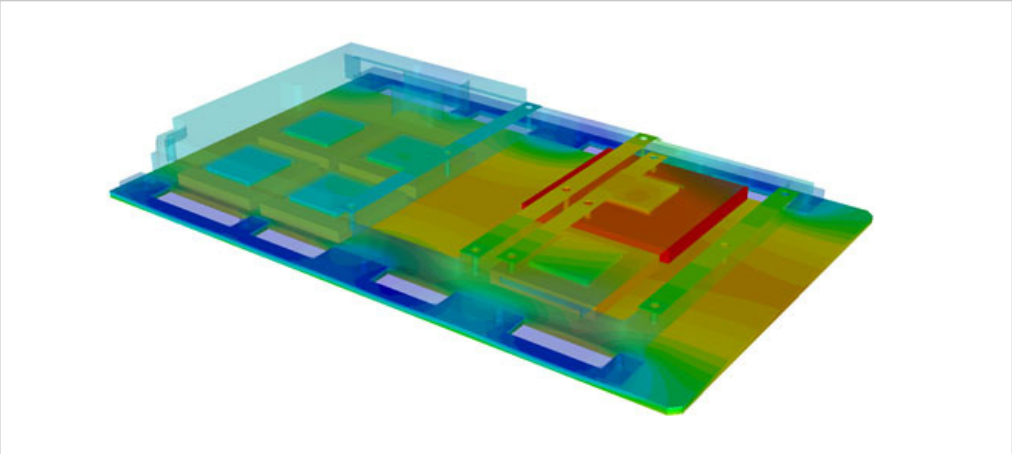
Autodesk® Simulation CFD

When we do the physical environmental testing in a thermal chamber, it's usually just to verify what we've already calculated in Autodesk Simulation CFD.

—Andy Buonviri
Mechanical Engineer
BittWare

Maximizing small spaces.

BittWare uses Autodesk Simulation CFD to find best way to cool ruggedized processing boards.



Thermal plot in Autodesk Simulation CFD shows maximum heat generated at FPGA chip. Image courtesy of BittWare.

BittWare, Inc. is a leading designer and manufacturer of field-programmable gate array (FPGA) computing and hybrid signal processing board-level solutions. The Concord, New Hampshire-based company relies on Autodesk® Simulation CFD to help it find the right balance of power, conductivity, weight, size, and ruggedness for its products.

Recently, Autodesk Simulation CFD played an integral role in BittWare's development of a ruggedized 3U cPCI processing board, known as the GT3U. The principal challenge in designing the GT3U was finding a way to cool the 10-watt FPGA chip underneath the mezzanine of the frame, which provided only a small amount of space for cooling. Additionally, BittWare had to select the best thermal materials to maximize conductivity for the gap pad positioned between the processing board's metal and non-metal surfaces.

"I started with a default design that represented the simplest, least expensive solution," explains Andy Buonviri, lead mechanical engineer for BittWare's GT3U project.

Integration between Autodesk Simulation CFD and 3D CAD design software, Dassault Systèmes SolidWorks®, allows BittWare to set up and conduct iterative design studies without any translation, conversion, or data loss. Volumes, void-filling, boundary conditions, and material properties are assigned automatically. In addition, associativity of all geometry is maintained as the part or assembly moves between Autodesk Simulation CFD and SolidWorks.

Automatic meshing in Autodesk Simulation CFD eliminates the need to fine-tune the mesh in order to make all the elements correct—a process that takes too much time in traditional computational fluid dynamics (CFD). "With automatic meshing, I can open a SolidWorks model with dozens of different component shapes and sizes and have it meshed in about 30 seconds," explains Buonviri.

The first look at the GT3U in Autodesk Simulation CFD revealed where temperature rises were likely to be most extreme. BittWare's engineers then went back and forth between Autodesk Simulation CFD and SolidWorks to optimize the design. They developed about 20 iterations, changing the model and its material properties, adjusting power dissipation of components, making power supply changes, and working to identify the best material for the gap pad. The solution: to wrap the frame around the edges of the card so it makes contact with the chassis cold wall on both the top and bottom surfaces.

Because the biggest rise in temperature occurred in the gap pad, Buonviri selected the best-performing thermal materials for that component. "Using Autodesk Simulation CFD gives us a lot of confidence in the quality of the final design," says Buonviri. "When we do the physical environmental testing in a thermal chamber, it's usually just to verify what we've already calculated in Autodesk Simulation CFD. It's one set of tests without the need to adjust things as you go, which saves time and money."

To learn more about Autodesk Simulation CFD, visit **www.autodesk.com/simulationcfd**.

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