

ELECTRONICS

Abaco Systems | AMETEK

Facilitating product innovation through tools, processes, and people

Products

Xpedition, HyperLynx, Valor

Challenges

Geographically dispersed team

Increased board complexity

Compression of design cycles

Keys to success

Xpedition EDM library and design data management

Teamwork and collaboration

Siemens simulation and validation tools

Results

Reduced design cycles

Product differentiation with increased board density

Operational efficiency

The integrated Siemens toolset enhances efficiency and speeds time to market.

30+ years of development experience

AMETEK's expansive portfolio of market-leading products serves a diverse set of markets across all areas of manufacturing. AMETEK acquired Abaco Systems in 2021, which traces its lineage back to GE Fanuc Intelligent Platforms, Radstone, Plessy, and VMIC.

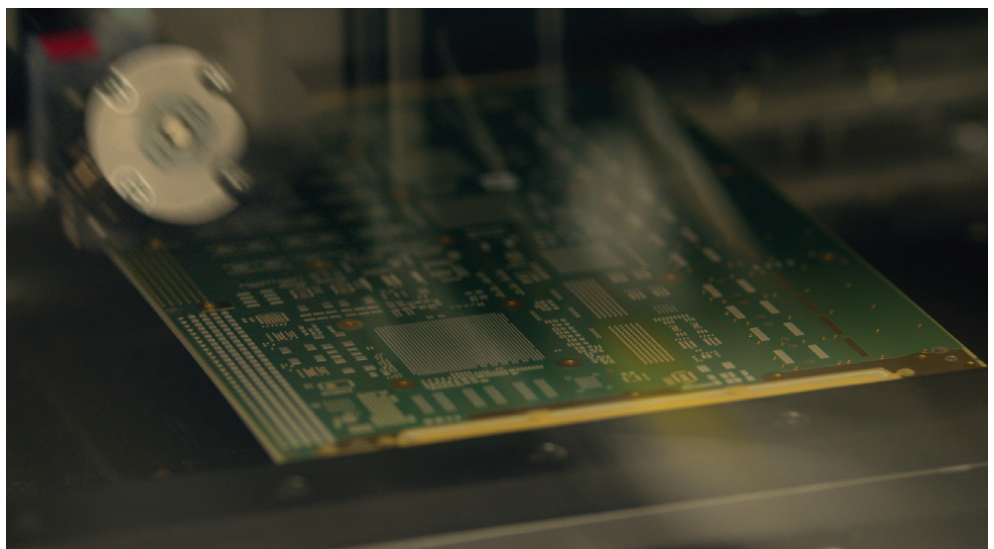
Abaco Systems focuses on defense and aerospace applications with rugged, embedded computing products. They produce a broad portfolio of single board computers, graphic and video processors, network switching devices, high-end digital signal processing, FPGA based processing boards, avionics, and flight certified hardware for critical autonomous systems and ground stations.

A global team connected by integrated tools

Abaco Systems engineers operate across three different continents and have expertise in mechanical design, electrical design, and software development.

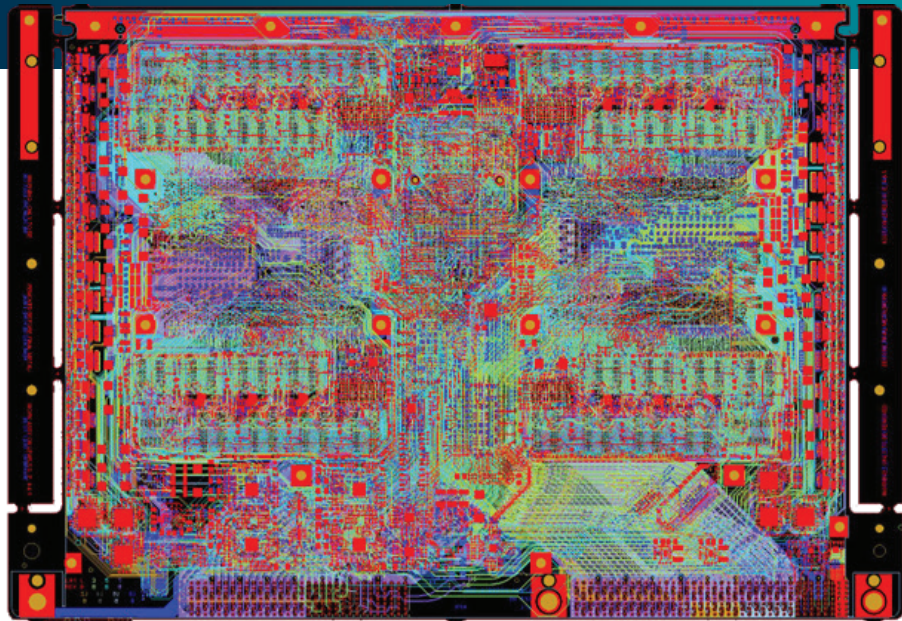
"We have engineers literally working around the clock in multiple time zones. It's an integrated engineering team, so we're not pocket designing a particular board at one location," said Mike Underwood, Division Vice President and Business Unit Manager, Abaco Systems. The HPC2812, a product that won best overall board design in the Siemens Xcelerator Technology Innovation Awards in 2023, was developed during the COVID-19 pandemic.

"That was a testament to our agility in that we could bring a product to market at a time



"We're also using the 3D tools inside of Xpedition for visualizations and a real-time understanding of what issues are going on in a design at a given time."

Rob Savage
PCB Engineering Manager
Abaco Systems



of not necessarily working together in the same location, by utilizing engineering resources around the world," said Underwood, "and that's a unique ability that provides us an advantage in time to market."

"We learned from the pandemic experience that product design can be done in a virtual environment. During the COVID-19 we used software such as the Xpedition tools from Siemens with a common library to synchronize on a day-to-day basis," said James McDonald, Hardware Design Engineer at Abaco Systems.

Today they continue to use Xpedition to access schematics and PCB designs from any location. Its concurrent design capability allows their engineers to edit and collaborate on one design at the same time.

"The multi-use functionality of Xpedition allows us to have multiple engineers contributing to the design process simultaneously. This greatly reduces design time and further increases time to market," said Cameron Vandiver, Director of Hardware Development for the US, Abaco Systems.

"We use Xpedition EDM as our vaulting system for non-restricted products, and we are able to work very closely with FPGA development teams in the US, as well as software teams at various sites, including Edinburgh and Towcester in the UK," said Rob Savage, PCB Engineering Manager at Abaco Systems.

Xpedition also facilitates collaboration between the PCB engineering team and the mechanical and thermal teams. "We're

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Cameron Vandiver
Director of Hardware Development for the US
Abaco Systems



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Andrew Valko
Vice President of Technology
Abaco Systems

continually sending data back and forth between them, and we’re also using the 3D tools inside of Xpedition for visualizations and a real-time understanding of what issues are going on in a design at a given time,” said Savage.

“You need these kinds of collaborative common tools to put a system together and make sure there aren’t interference issues, or incompatibility and connection issues,” said Andrew Valko, vice president of technology for Abaco Systems.

AMETEK’s differentiated edge

Differentiation in an open standards world of SOSA, MOSA, MORA, FACE, and VICTORY, can be challenging. Everyone has access to the same silicon, the same complex devices, so what does Abaco Systems do differently?

“It’s the compute density, the security features, the high-speed data planes, and our software and thermal management approach,” said Underwood.

To operate in robust environments with a very high-power draw, heat must be designed out of the system. Abaco Systems uses sophisticated, patented processes on their various designs to ensure that heat is removed from the system. An example of their success is again the HPC2812.

“The density and thermal management are differentiators that many competitors can’t match because of the capabilities that we employ into the product design,” said Underwood.

“The number of constraints in the HPC2812 design specifically was huge,” said Mike Tapp, PCB Designer, Abaco Systems.

The engineering team used design constraint templates within Xpedition, so they could generate them once, make a template out of that, and then apply that template to all the memory interfaces. This saved them significant time in the design process.

They also implemented informal design reuse. “Being able to copy large chunks of circuitry, placements, routing, planes—the whole lot—and place that down was very, very useful,” said Tapp. “The HPC2812 has eight memory interfaces, so being able to do one interface, copy it, place it down, and then just tweak things where it doesn’t quite fit saved an enormous amount of time.”

Striving for operational excellence

"Operational excellence means having the right tools and processes in place to accelerate the development of the skills of your people," said Valko.

Avoiding simple mistakes during board design can be a challenge. Implementing upfront design, testability, and manufacturability reviews helps mitigate these challenges and is a key example of operational excellence. Simple mistakes like misconnects, interferences, mirroring of parts, or pin-to-pin incompatibilities can be avoided, so engineers can spend their time on solving bigger issues like maximizing signal-to-noise ratios and power matching, impedance matching for power delivery, and matching trace geometry for phase coherence.

"It's those kinds of issues that you want the engineers to be working on, and you really want to take a lot of the lower end, more administrative type errors out of the process. That's the point we are at now.



We have world-class engineers designing boards," said Valko. "They're looking at signal integrity. They're looking at how closely they can pack traces together without creating crosstalk and where they don't get any kind of coupling, yet still give the data the path it needs to get to the next processing element."

The electrical engineering team uses HyperLynx to do board-level simulations and signal integrity analysis, which greatly reduces design errors.

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Rob Savage
PCB Engineering Manager
Abaco Systems

Solutions/services

Xpedition Enterprise
[siemens.com/xpedition-enterprise](https://www.siemens.com/xpedition-enterprise)

Xpedition EDM
[siemens.com/xpedition-edm](https://www.siemens.com/xpedition-edm)

HyperLynx
[siemens.com/hyperlynx](https://www.siemens.com/hyperlynx)

Valor NPI
[siemens.com/valor-npi](https://www.siemens.com/valor-npi)

Customer's primary business

Abaco Systems products and solutions can be found in many high profile military/aerospace sea, land and air programs, as well as in commercial and industrial organizations in which rugged reliability is mission-critical.
www.abaco.com

Customer location

Huntsville, Alabama
USA



An integrated toolset from Siemens accelerates time to market

"With the integrated toolset, the PCB design process is much more efficient," said Vandiver. "In recent years, we have released many 3U and 6U single-board computers and DSP FPGA boards that enable our customers to create complex systems that supply and support the DOD and aerospace markets."

Abaco Systems uses several of the tools inside the Siemens portfolio, including Xpedition for design authoring and library management, HyperLynx for signal and power integrity analysis, and Valor for DFM validation.

"We push the Siemens tools very hard," said Savage. "The tools themselves are a very important aspect of what we do here. It may be that a lesser tool could be employed but the time scales involved in that would just be horrific. We need the fastest most efficient tools that we can have to get our very complex designs to market on time. We get that from the Siemens tools."

"These kinds of tools from Siemens," said Valko, "leverage the strengths of our people to help us make leading-edge world-class products."

Abaco Systems envisions a future where they continue to be a leading technology provider that can pack the most circuitry and the most density on a board to get the highest processing power.

"We are doing things at the cusp of the technology," said Underwood. "You can do all that with the right tools, the right processes, and the right people. With the Siemens electronic system design tools, we can do powerful things."



For more information on **Xpedition, HyperLynx, or Valor**, please contact us at: **949.481.3267** | info@saratech.com | [saratech.com](https://www.saratech.com)

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Europe 00 800 70002222
Asia-Pacific 001 800 03061910
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