COM Express Module Upgradeability Serves Military Applications

Case Study

radisys®

Industry/Market

Military equipment manufacturer.

The Challenge

Offer military customers a straight forward way to increase computing performance.

The Business Environment

The transition to network-centric warfare requires systems with more performance to support high bandwidth communications, advanced data processing and improved quality graphics.

The Solution

Nolam Embedded Systems provides an easy upgrade path to very high performance Intel® Core™ 2 Duo processors using Radisys COM Express modules.

The Benefits

Military customers can boost system performance by simply swapping in the Procelerant® CEGM4T2-T94 module, no carrier board or software changes required.

Customer Profile

The equipment manufacturer supplies cost-effective, full turn-key computing and embedded systems, supported with in-house hardware and software design and integration capabilities.

The implementation of network centric warfare is driving the demand for a higher level of intelligence from every node on the network. This transition makes it necessary for a wide range of systems, such as navigation, radar and unmanned, to share large amounts of information with ground stations and command centers in real-time. Consequently, military customers are looking for a quick and easy upgrade path for legacy equipment in order to keep up with escalating compute and I/O processing requirements.

Boosting performance is especially challenging for designers of small form factor systems who face stringent space and power constraints. It's also difficult to keep up with the design churn associated with implementing new processor generations and increasingly complex design rules. As a result, military system developers are turning to COM Express boards, which remove the processor, chipset and memory from the rest of the design. Adopting this approach, Nolam Embedded Systems enables their customers to dial-in the right amount of performance by selecting from a wide assortment of available computing modules.

Radisys provided the highest performance with the first COM Express module, the Procelerant CEGSXT, supporting 2.26 GHz Intel® Core™ 2 Duo processors, 4GB RAM and 1066 MHz processor bus speeds.

Benjamin Nakache Vice President of Sales at Nolam Embedded Systems

The Need for Speed

Nolam Embedded Systems is a full service provider of complex systems, closely following their customers' requirements from pre-engineering studies to sub-system production and deployment. They design and manufacture commercial, off-the-shelf (COTS) and custom solutions, including single board computers, I/O products and enclosures.

One of their specialties is COM Express carrier board design, and they leverage their broad experience and strong capabilities to deliver a 'total solution.' Working closely with military customers deploying radar systems, Nolam Embedded Systems learned the importance of performance upgrades first hand. As a result, the company wanted to offer its customers the first COM Express modules based on mobile Intel® Core™ 2 Duo processors, which provided a compelling performance-per-watt advantage over previous generation processors.

First to Market

Satisfying the need for higher performance, Radisys extended its line of Procelerant CEGM45 modules with the Intel® Core™ 2 Duo processor T9400, running at 2.53 GHz/1066MHz front side bus, integrating 6 MB cache and dissipating just 35 watts. This module enabled Nolam Embedded Systems' NES STORMBRINGER single board computer to deliver an even faster radar system to the military without requiring requalification. During the selection process, Radisys satisfied the following key criteria:

- **Computing Power:** Industry-leading performance in a COM Express form factor.
- **Time to Market:** First COM Express module with the high-end Intel® processor.
- **Extended/Industrial Temperature:** Availability of modules supporting extended temperature.
- **Support:** Close working relationship with Radisys technical teams.

Less Inventory

By developing COM Express-based solutions, Nolam Embedded Systems can offer its customers a family of systems, based on different compute modules, without carrying a lot of inventory. That's because the company orders modules as they need them from Radisys' extensive COM Express product portfolio. The savings is significant, since there tends to be numerous military projects ordering small quantities, and carrying reserves for each project would be prohibitively expensive.

I/O and Graphics Upgradability

Nolam Embedded Systems has years of experience developing embedded, real-time systems based on VME, PCI, PC/104, CompactPCI, COM Express and other standard form factor specifications. However, it's getting harder to work with the older specifications, such as PC/104, as network-centric military systems raise the bar on compute, I/O and graphics performance. For example, a standard PC/104 connector doesn't support some of the newer I/O, memory and video interfaces, whereas the COM Express connector does, giving customers more upgrade options.

The difference in I/O support is historical, where modern processors and chipsets integrate much more I/O and graphics than devices that were available when PC/104 was conceived. Hence, PC/104 has no means to bring more recent I/O out, whereas COM Express comprehends the modern day I/O and graphics integration and supports these interfaces natively.

For example, a PC/104 computing board using a chipset's integrated graphics must commit valuable space to one or more video connectors, because it can't transmit video signals to another board. Conversely, the COM Express connector supports various video interfaces, such as DisplayPort, HDMI and SDVO, that can send signals to the carrier board, which can have more space for connectors. COM Express carrier boards also provide more freedom to layout external connectors because they aren't constrained to the dimensions of the PC/104 stack.

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