

Nallatech's DIME-II Modular Architecture Goes Pro

Nallatech's second-generation modular DIME-II architecture has been designed to maximize Virtex-II Pro Platform FPGA performance and bandwidth.



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Typical data handling and processing systems require a combination of high-performance capabilities. Until now, these capabilities could only be achieved through combining various programmable logic architectures and processor technologies to handle complex control algorithms.

The release of the Xilinx® Virtex-II Pro™ Platform FPGAs, however, now gives us a single, integrated package for manipulating complex control algorithms. As many as four IBM® PowerPC™ 405 processors can be embedded deeply in the Virtex-II Pro programmable logic fabric.

In order to create final systems based on Virtex-II Pro devices – and to harness maximum power from these devices – appropriate hardware architecture is critical. The DIME™ and DIME-II™ architectures are open modular standards from Nallatech that create the framework for scalable systems. A small, dedicated FPGA-based system can be easily scaled to create high-end high-speed DSP applications through the DIME-II plug-and-play capability. This architecture provides support for processor integration within FPGA-based systems, including the

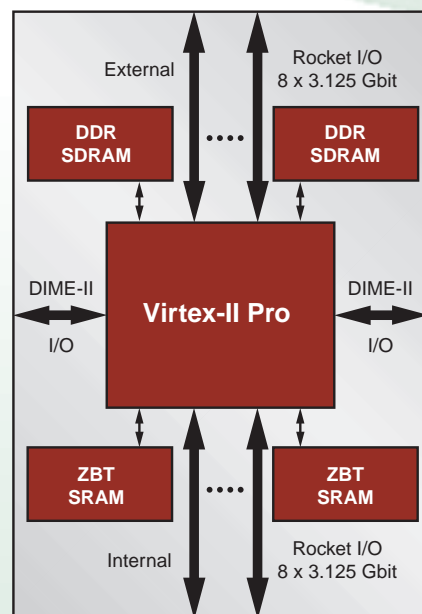


Figure 1 - BenPRO block diagram

use of ICE (in-circuit emulation) debuggers, remote booting, and configuration.

BenPRO Module

The BenPRO™ module from Nallatech provides maximum scalability and maximum communications bandwidth. The BenPRO™ module will be available with all Virtex-II Pro devices that have embedded PowerPC processors. In this configuration, a single DIME-II module can have up to four hard processors and up to four million system gates of logic for computational and interfacing tasks.

By utilizing up to 16 Rocket I/O™ transceivers on a single Virtex-II Pro, and standard I/O interfaces offered by DIME-II technology, you can get an I/O bandwidth in the order of 100 gigabits per second

To support onboard data and program storage, four high-speed memory banks are built into the BenPRO module. As shown in Figure 1, DDR SDRAM and ZBT SRAM enable suitable memory architectures to be designed for tight integration with the algorithm or platform architecture required.

Controlling Virtex-II Pro Systems

Nallatech's FUSE™ (field upgradeable systems environment) software supplies the reconfigurable computing operating system for FPGA-based systems. The powerful API (application programming interface) enables rapid development of systems and applications based on FPGAs, either with or without, embedded processors. FUSE system software is portable and supports multiple operating systems, such as Linux, VXWorks®, and Windows® systems.

Additionally, FUSE software supports a wide range of languages, including C/C++, Java™, MATLAB™ and DIMEscript™, Nallatech's own dedicated language for controlling reconfigurable computing environments.

FUSE software also supports multiple embedded processors, including the IBM PowerPC hard processor and the MicroBlaze™ soft processor from Xilinx – both of which can be embedded in one Virtex-II Pro Platform FPGA. The power of

FUSE system software provides for high-speed booting and data communication, as well as system control. The FUSE capability allows full integration with high-level design tools from Xilinx, industry-standard protocols, and user application software.

Figure 2 shows the relationship among FUSE, DIME-II, and Virtex-II Pro components.

Distributed Parallel Processing

Although a single Virtex-II Pro device can have as many as four processors, DIME-II technology can scale systems far beyond this. For example, DIME-II interconnect technology will enable you to tightly couple four BenPRO modules on a BenERA™ cPCI card, thus providing 16 PowerPC processors on a single card, as illustrated in Figure 3. With FUSE system control software, you can expand connectivity to multiple cPCI cards, leading to a virtually unlimited array of processors within the overall system.

To benefit from this capability, the tools need to be in place for handling this distributed parallel processing system. Nallatech is enhancing its system design products to deliver the tools and communications infrastructure to support distributed parallel processing. Once in place, the combined DIME-II and Virtex-II Pro technologies will enable you to create a diverse range of system topologies that can take advantage of the high communications bandwidths now available – and in the future.

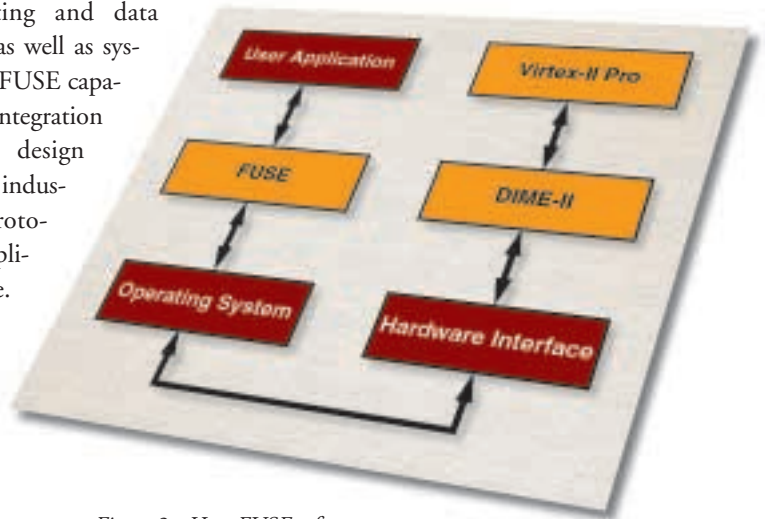


Figure 2 - How FUSE software control works with Virtex-II Pro logic devices

Conclusion

Today, system designers require suitable software tools, development platforms, and modular hardware to efficiently create complex high-performance systems. With DIME-II hardware system architecture and the FUSE reconfigurable computing operating system, you can not only harness the full power of Virtex-II Pro Platform FPGAs, but you can also use Nallatech's advanced engineering to bundle multiple devices within a system – taking system designs to unprecedented levels of complexity and functionality. ✕

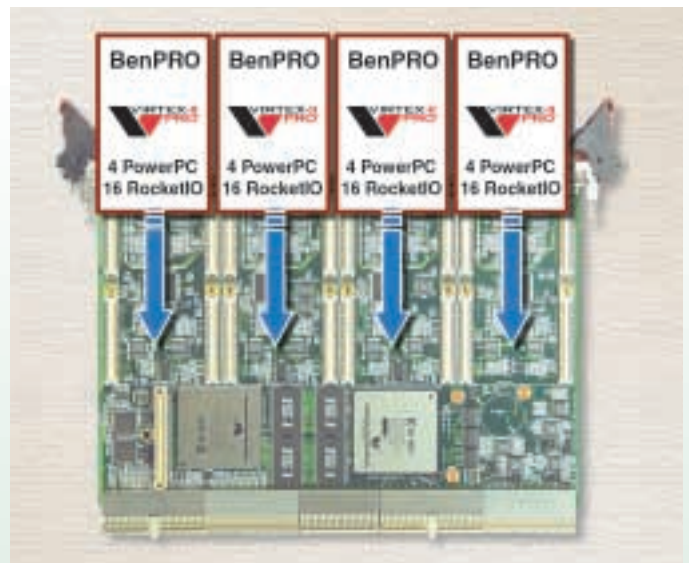


Figure 3 - BenERA cPCI card with four Virtex-II Pro FPGAs on BenPRO modules