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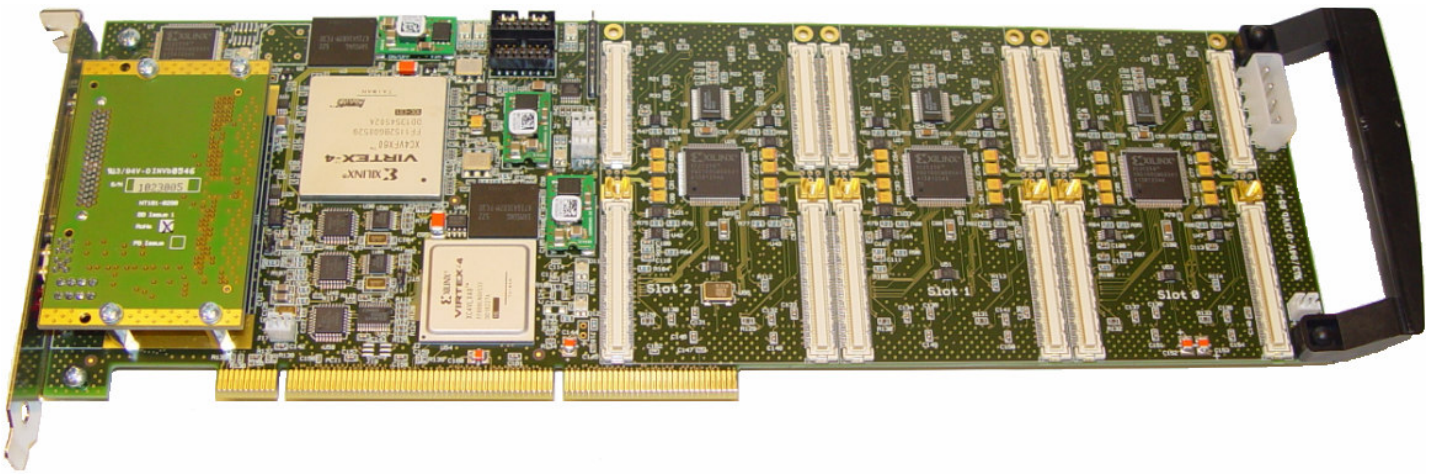
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BenNUEY-PCI-X-V4

PCI-X FPGA Computing Processor Card



PCI-X FPGA Computing solution for the development and deployment of high performance applications

Key Features

- PCI-X form factor
- On-board Virtex-4 FX User FPGA
- 64bit / 133MHz PCI interface
- 3 DIME-II module expansion slots
- Xilinx Virtex-4, Virtex-II Pro and Virtex-II supported on DIME-II modules
- Digital I/O via PCI back-plate
- Windows® and Linux® support
- Includes FUSE FPGA Computing Runtime Software

Benefits

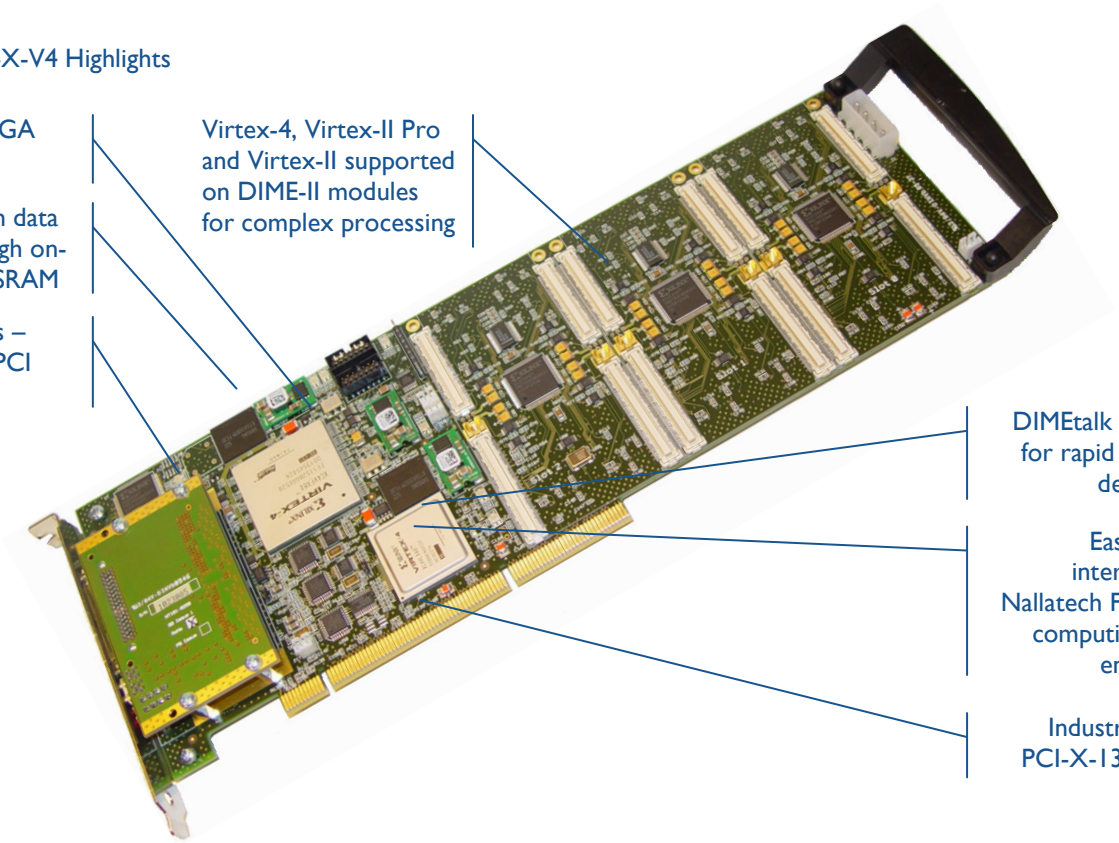
- **PCI-X Form Factor**
  Industry-standard for systems deployment
- **Virtex-4 capability**
  Meets the demands of leading edge applications
- **Compatible with multiple FPGA design flows**
  Easier application development, enhanced functionality
- **Modular Expansion**
  Scalability with up to 7 user FPGAs plus IO options

NALLATECH
The High Performance FPGA Solutions Company

BenNUEY-PCI-X-V4

PCI-X FPGA Computing Processor Card

BenNUEY-PCI-X-V4 Highlights



Hardware Overview

The BenNUEY-PCI-X-V4 FPGA Computing card provides a powerful platform for high-performance systems development and deployment in production environments across a variety of applications including signals intelligence, seismic processing, software defined radio and medical imaging.

An on-board Virtex-4 FX FPGA provides the ideal balance of resources for processing and system management, whilst three DIME-II expansion slots allow users to optimize system resources to meet processing, memory and I/O requirements. The BenNUEY-PCI-X-V4 can support multiple analog and digital I/O interfaces, memory types and up to seven user FPGAs on a single PCI-X card.

Applications requiring data storage benefit from 16MBytes of DDR-II SRAM connected to the Virtex-4 FX user FPGA, which can be used for storing algorithmic data or for buffering data around the multi-FPGA architecture.

Software integration with the BenNUEY-PCI-X-V4 is made easy through the PCI-X-133 interface, offering up to 800MBytes/s sustained bandwidth to the host processor. FPGA applications can control the PCI-X bus through the PCI-X interface, providing access to other resources in the system.

System-level communications with other Nallatech cards or third-party equipment can also be implemented through the PCI back-plate, where 66-bits of digital I/O can be used in single-ended or LVDS setup.

Combined with DIMEtalk for easy connectivity implementation and FUSE for host integration, the BenNUEY-PCI-X-V4 offers a professional, easy to use and low risk solution for a range of end markets.

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BenNUEY-PCI-X-V4

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Systems Integration

The BenNUEY-PCI-X-V4 is pre-configured with Nallatech's PCI-X interface, providing straightforward integration with users' systems. In addition to offering exceptional sustained bandwidth performance up to 800MBytes/s, users benefit from bus mastering capability and support for multi-level interrupts, allowing the BenNUEY-PCI-X-V4 to fit perfectly into multi-card systems with other BenNUEY-PCI-X-V4 cards or third party equipment, where it can comfortably operate as either bus master or slave.

In systems where alternative communications paths are required, the BenNUEY-PCI-X-V4 provides either single-ended or LVDS digital I/O.

FUSE FPGA Computing Runtime Software

FUSE FPGA Computing Runtime Software provides control, configuration and communication capabilities for Nallatech FPGA Computing systems. FUSE runs upon standard PC/server or computer operating systems. Standard options are available for Windows® and Linux® with VxWorks® support available on request.

FUSE functionality is offered through GUI based tools, in addition to APIs for C, C++ and scripting language support for TCL. The FUSE Toolbox for MATLAB®, extends the functionality of FUSE to the popular MATLAB software environment.

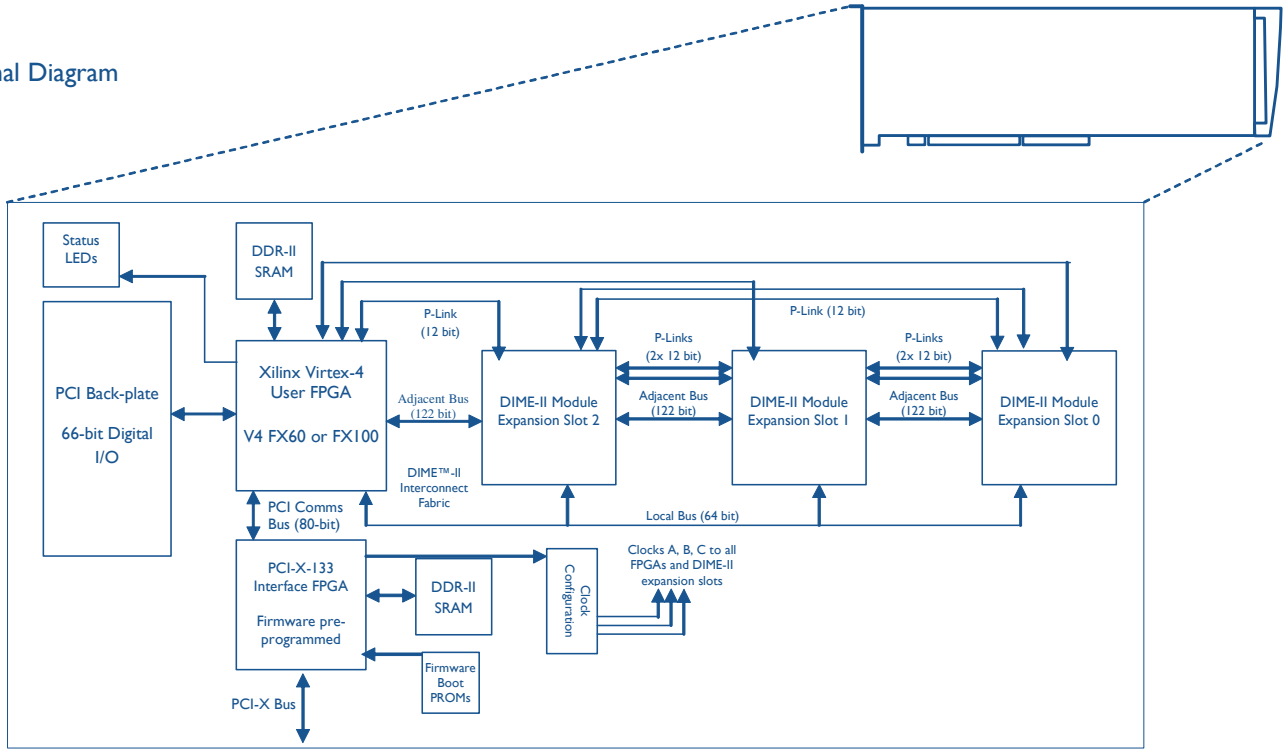
Scalable Expansion Options

Expansion of the BenNUEY-PCI-X-V4 base capability is easy, using any of Nallatech COTS FPGA computing modules to optimize hardware resources to meet users exact system requirements. Nallatech's DIME-II modules offer a variety of FPGA, memory, are available in four series:

- Dual FPGA Series
- Memory Series
- Analog I/O Series
- Digital I/O Series

Users can add Virtex-4, Virtex-II Pro and Virtex-II FPGAs to supplement the processing resource on the BenNUEY-PCI-X-V4, whilst additional memory and I/O are also readily available through the DIME-II modules.

Functional Diagram



NALLATECH
The High Performance FPGA Solutions Company

BenNUEY-PCI-X-V4

PCI-X FPGA Computing Processor Card

Full Specification

Form Factor

» PCI-X-133 Form Factor

Host Interface

» 64-bit / 133 MHz PCI-X Bus
» PCI 64-bit / 33MHz compatible

Processing

» On-board Virtex-4 FX user FPGA. Standard options:
- Virtex 4 FX60-10
- Virtex 4 FX100-11
- FX60-11 available Q3 2006

» 1 to 7 additional user FPGAs available on DIME-II expansion modules
- Virtex-4, Virtex-II Pro and Virtex-II FPGAs supported

User FPGAs are available exclusively for implementation of users' applications

On-Card FPGA Specifications

	V4FX60	V4FX100
Logic Cells	56,880	94,896
Embedded Multipliers	128	160
kbits Block RAM	4,176	6,768
PowerPC™ Blocks	2	2

Memory

» 16MBytes DDR-II SRAM
» Connected directly to Virtex-4 FX user FPGA
» Maximum data rate = 500Mbps
» Total bandwidth = 2GBytes/s
» DDR-II SRAM Controller IP core provided

Host Interface Performance (PCI-X)

» Up to 800MByte/s sustained bandwidth
» Bus mastering capability
» Supports multiple interrupts
» Performance levels are affected by a number of factors including operating system, host SBC (processor, chipset, PCI bridges)
» Backwards compatible with standard 64-bit / 33MHz PCI

External Interfaces (Digital I/O)

» 66-bit digital I/O
» Provides connectivity between BenNUEY-PCI-X-V4 cards or third party equipment
» Supports single-ended or LVDS
» Additional external interfaces, including high-speed serial, analogue and digital connectivity available on DIME-II expansion modules (available separately)

Expansion

» 3 *DIME-II* Expansion module slots provided to add additional processing and I/O capabilities

DIME-II Interconnect Fabric

» *DIME-II* Interconnect Fabric connects together on-board user FPGA and all *DIME-II* module slots
» Interconnect consists of point-to-point links and can be utilized directly by the user application, or used to form links within a *DIMEtalk* network
» Adjacent Buses – 122-bit LVTTL / 200MHz module-module, 80MHz on-card FPGA-module / bi-directional, half-duplex
» Local Bus – 64-bit LVTTL / 64MHz / bi-directional, half-duplex
» P-Link Buses – 64-bit LVTTL / 200MHz / bi-directional, half-duplex
» Performance figures below

DIME-II Interconnect Fabric Performance

» Adjacent Buses: 24.2Gbits/s (module-module, half-duplex)
» Adjacent Buses: 9.7.Gbits/s (on-card FPGA-module, half-duplex)
» Local Bus: 4.2.Gbits/s (half-duplex)
» P-Link Buses: 2.4.Gbits/s (half-duplex)
» All figures are for sustained transfers

FPGA Programming

Embedded SelectMAP and/or JTAG programming via *FUSE* software functions (dependent on module support)

Electrical

» On-card power derived from +5V and +3.3V supply from PCI bus. All user FPGA power derived from 3.3V supply.
» FPGA power dissipation - application dependent
» Four power supplies for each DIME-II module slot. Up to 15A per supply, voltage automatically configured upon the configuration.

Thermal

» TBC (application dependent)

Quality

» Standard configurations of BenNUEY-PCI-X-V4 are manufactured and delivered to meet IPC610-Class 3 standard.
» Special order BenNUEY-PCI-X-V4 units are manufactured and delivered to meet IPC610-Class 2/3 standard depending upon the configuration.

Software

» Nallatech *FUSE* system software for runtime FPGA programming, hardware control and application communication, in conjunction with DIMEtalk network.
» *FUSE* includes applications and develop
» *DIMEtalk* API enables direct communication to module in runtime when utilizing optional *DIMEtalk* development software

Application Development Software

» BenNUEY-PCI-X-V4 is compatible with Nallatech *DIMEtalk* Connectivity software.
» *DIMEtalk* networks can be embedded within the FPGAs, communicating data between FPGAs on card/modules and host system via PCI bus, across the *DIME-II* interconnect Fabric.
» Supports multiple design flows including VHDL, Verilog®, System Generator, Handel-C™, ImpulseC™, Mitrion-C and AccelWare®.
» Compatible with all major synthesis design flows
» Compatible with Xilinx ISE Implementation software

Ordering Information

Order Codes

BENNUEY-PCI-X-V4-X-Y-B

X = Virtex-4 User FPGA Device Type:	FX60 or FX100
Y = User FPGA Speed Grade:	-10 (FX60) or -11 (FX100)
B = Operating System Support	W = Windows or L = Linux

Example
BENNUEY-PCI-X-V4-100-11-L:

BenNUEY-PCI-X-V4 with Virtex-4 FX100-11 FPGA supplied with FUSE API for Linux

Availability

Please contact Nallatech for pricing and lead-time information.

Contact us today for more information:

North America

Phone: +1(877) 44-NALLA (Toll free)
Email: contact@nallatech.com

EMEA, APAC & ROW

Phone: +44 (0)1236 789500
Email: contact@nallatech.com

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