

New!

Model 53800

Kintex UltraScale FPGA Coprocessor- 3U VPX



Model 5380 COTS (left) and rugged version



General Information

Model 53800 is a member of the Jade™ family of high-performance 3U VPX boards. The Jade architecture embodies a new streamlined approach to FPGA based boards, simplifying the design to reduce power and cost, while still providing some of the highest performance FPGA resources available today.

Designed to work with Pentek's new Navigator™ Design Suite of tools, the combination of Jade and Navigator offers users an efficient path to developing and deploying FPGA-based data processing IP.

In addition to supporting PCI Express Gen. 3 as a native interface, the Model 53800 includes optional high-bandwidth serial and parallel connections to the Kintex UltraScale FPGA for custom digital I/O.

The Jade Architecture

Evolved from the proven designs of the Pentek Cobalt and Onyx families, Jade raises the processing performance with the new flagship family of Kintex UltraScale FPGAs from Xilinx. As the central feature of the board architecture, the FPGA has access to all data and control paths. The Jade architecture organizes the FPGA as a container for data-processing applications where each function exists as an intellectual property (IP) module.

Each member of the Jade family is delivered with factory-installed applications ideally matched to the board's interfaces. The 53800 factory-installed functions include a test signal generator, a metadata generator, a DDR4 SDRAM controller, and DMA engines for moving data on and off the board.

Extendable IP Design

For applications that require specialized functions, users can install their own custom IP for data processing. The Pentek Navigator FPGA Design Kits include the board's entire FPGA design as a block diagram that can be edited in Xilinx's Vivado tool suite.

In addition to the block diagrams, all source code and complete IP core documentation is included. Developers can integrate their own IP along with the wide range of IP functions contained in the Navigator IP library, or use the Navigator kit to completely replace the Pentek IP with their own.

Xilinx Kintex UltraScale FPGA

The Kintex UltraScale FPGA site can be populated with a range of FPGAs to match the specific requirements of the processing task, spanning the KU035 through KU115.

The KU115 features 5520 DSP48E2 slices and is ideal for modulation/demodulation, encoding/decoding, encryption/decryption, and channelization of the signals between transmission and reception. For applications not requiring large DSP resources or logic, a lower-cost FPGA can be installed.

Option -104 connects 24 pairs of LVDS connections between the FPGA and the VPX P2 connector for custom I/O.

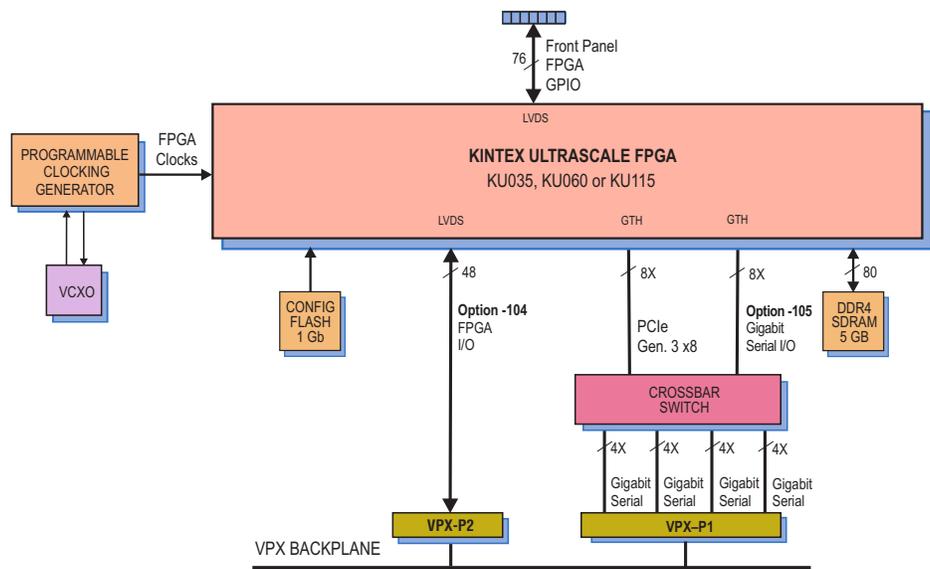
Option -105 connects an 8X gigabit serial link from the FPGA to the VPX P1 connector to support serial protocols.

Front Panel Digital I/O Interface

The 53800 includes an 80-pin front panel connector that provides 38 LVDS pairs connected to the FPGA. With user IP, these can be utilized for a control and status interface to other components of the system or as a data path.

Features

- Hi-performance coprocessor platform
- Supports Xilinx Kintex UltraScale FPGAs
- Front panel digital I/O can be used as a status and control or data interface
- PCI Express (Gen. 1, 2 & 3) interface up to x4
- Optional LVDS and gigabit serial connections to the FPGA for custom I/O
- Ruggedized and conduction-cooled versions available



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Interfaces and Memory

The Model 53800 includes an industry-standard interface fully compliant with PCI Express Gen. 1, 2 and 3 bus specifications. Supporting PCIe links up to x8, the interface includes multiple DMA controllers for efficient transfers to and from the board.

The 53800 architecture supports a 5 GB bank of DDR4 SDRAM memory. User-installed IP along with the Pentek-supplied DDR4 controller core within the FPGA can take advantage of the memory for custom applications.

Crossbar Switch

The 53800 features a unique high-speed switching configuration. A fabric-transparent crossbar switch bridges numerous interfaces and components on the board using gigabit serial data paths with no latency. Programmable input equalization and output pre-emphasis settings enable optimization.

SPARK Development Systems

The SPARK Development Systems are fully-integrated platforms for Pentek Cobalt, Onyx, Jade and Flexor boards. Available in a PCIe rackmount (Model 8266), a 3U VPX chassis (Model 8267), or a 6U VPX chassis (Model 8264), they were created to save engineers and system integrators the time and expense associated with building and testing a development system.



Ordering Information

Model	Description
53800	Kintex UltraScale FPGA Coprocessor - 3U VPX

Options:

-084	XCKU060-2 FPGA
-087	XCKU115-2 FPGA
-104	LVDS FPGA I/O
-105	Gigabit serial FPGA I/O
-702	Air cooled, Level L2
-713	Conduction cooled, Level L3

Contact Pentek for complete specifications of rugged and conduction-cooled versions

Specifications

Front Panel Digital I/O

- Connector Type:** 80-pin connector, mates to a ribbon cable connector
- Signal Quantity:** 38 pairs
- Signal Type:** LVDS

Field Programmable Gate Array

- Standard:** Xilinx Kintex UltraScale XCKU035-2
- Option -084:** Xilinx Kintex UltraScale XCKU060-2
- Option -087:** Xilinx Kintex UltraScale XCKU115-2

Custom I/O

- Option -104** connects 24 pairs of LVDS connections between the FPGA and the VPX P2 connector for custom I/O.
- Option -105** connects an 8X gigabit serial link from the FPGA to the VPX P1 connector to support serial protocols.

Memory

- Type:** DDR4 SDRAM
- Size:** 5 GB
- Speed:** 1200 MHz (2400 MHz DDR)

PCI-Express Interface

- PCI Express Bus:** Gen. 1, 2 or 3: x4 or x8

Environmental

- Standard:** L0 (air cooled)
- Operating Temp:** 0° to 50° C
- Storage Temp:** -20° to 90° C

Option -702: L2 (air cooled)

- Operating Temp:** -20° to 65° C
- Storage Temp:** -40° to 100° C

Option -713: L3 (conduction cooled)

- Operating Temp:** -40° to 70° C
- Storage Temp:** -50° to 100° C

Relative Humidity in all options: 0 to 95%, non-condensing

Size: 3U VPX card 3.937 in x 6.717 in (100.00 mm x 149.00 mm)

VPX Families

Pentek offers two families of 3U VPX products: the 52xxx and the 53xxx. For more information on a 53xxx product, please refer to the product datasheet. The table below provides a comparison of their main features.

VPX Family Comparison

	52xxx	53xxx
Form Factor	3U VPX	
# of XMCs	One XMC	
Crossbar Switch	No	Yes
PCIe path	VPX P1	VPX P1 or P2
PCIe width	x4	x8
Option -104 path	24 pairs on VPX P2	
Option -105 path	Two x4 or one x8 on VPX P1	Two x4 or one x8 on VPX P1 or P2
Lowest Power	Yes	No
Lowest Price	Yes	No

	XCKU035	XCKU060	XCKU115
System Logic Cells	444,000	726,000	1,451,000
DSP Slices	1,700	2,760	5,520
Block RAM (Mb)	19.0	38.0	75.9

