Kintex UltraScale FPGA Coprocessor- XMC

New!

General Information

Model 71800 is a member of the Jade™ family of high-performance XMC modules. The Jade architecture embodies a new stream-lined 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 71800 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 71800 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 installs the P14 PMC connector with 24 pairs of LVDS connections to the FPGA for custom I/O.
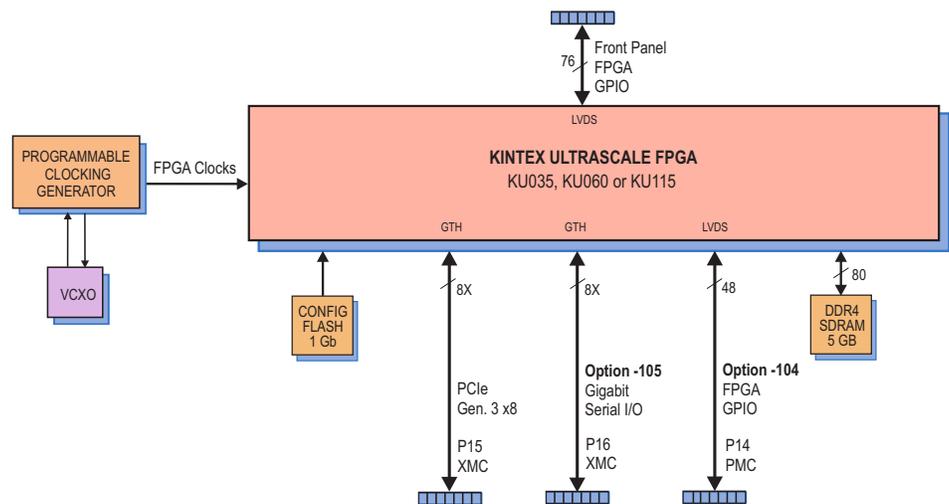
Option -105 installs the P16 XMC connector with an 8X gigabit link to the FPGA to support serial protocols.

Front Panel Digital I/O Interface

The 71800 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 co-processor platform
- Supports Xilinx Kintex Ultra-Scale 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 x8
- VITA 42.0 XMC compatible with switched fabric interfaces
- Optional LVDS and gigabit serial connections to the FPGA for custom I/O
- Ruggedized and conduction-cooled versions available

Front Panel FPGA GPIO
76
LVDS

KINTEX ULTRASCALE FPGA
KU035, KU060 or KU115

GTH *GTH* *LVDS*

PROGRAMMABLE CLOCKING GENERATOR → *FPGA Clocks*

VCXO

CONFIG FLASH 1 Gb

8X
8X
48
80

DDR4 SDRAM 5 GB

PCIe Gen. 3 x8

Option -105
Gigabit Serial I/O

Option -104
FPGA GPIO

P15 XMC
P16 XMC
P14 PMC

Memory Resources

The 71800 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.

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. Each SPARK system is delivered with the Pentek board(s) and required software installed and equipped with sufficient cooling and power to ensure optimum performance.

SPARK
Development Systems

➤ PCI Express Interface

The Model 71800 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.

XMC Interface

The Model 71800 complies with the VITA 42.0 XMC specification. Each of two connectors provides an 8X link with up to 10 Gb/sec per lane. With dual XMC connectors, the 71800 supports x8 PCIe on the first XMC connector leaving the second one free to support user-installed transfer protocols specific to the target application.

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: Installs the PMC P14 connector with 24 LVDS pairs to the FPGA
    Option -105: Installs the XMC P16 connector with an 8X gigabit serial link to the FPGA
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
        Relative Humidity: 0 to 95%, non-condensing
    Option -702: L2 (air cooled)
        Operating Temp: –20° to 65° C
        Storage Temp: –40° to 100° C
        Relative Humidity: 0 to 95%, non-condensing
    Option -713: L3 (conduction cooled)
        Operating Temp: –40° to 70° C
        Storage Temp: –50° to 100° C
        Relative Humidity: 0 to 95%, non-condensing
Size: XMC module 2.910 in x 5.870 in (74.00 mm x 149.00 mm)

Kintex UltraScale FPGA Resources			
	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

Ordering Information

Model	Description
71800	Kintex UltraScale FPGA Coprocessor - XMC

Options:

- 084	XCKU060-2 FPGA
- 087	XCKU115-2 FPGA
- 104	LVDS FPGA I/O through P14 connector
- 105	Gigabit serial FPGA I/O through P16 connector
- 702	Air cooled, Level L2
- 713	Conduction cooled, Level L3

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

KINTEX ULTRASCALE FPGA DATAFLOW DETAIL