BittWare
a **molex** company

IA-640i
PCIe FPGA Card

Agilex™ FPGA card with 400GbE and PCIe Gen5 x16
Hard Crypto Blocks and CXL Support

BittWare's IA-640i is an Intel® Agilex™ I-series FPGA card designed to address security challenges for data center, networking and edge compute workloads. The FPGA features optional hardened, high-speed cryptographic engines. The standard-height, half-length card provides a balance of I/O and memory using the Agilex chip's unique tiling architecture with a QSFP-DD (400GbE), DDR4 SDRAM, and PCIe Gen5 x16 with CXL support for a variety of applications.
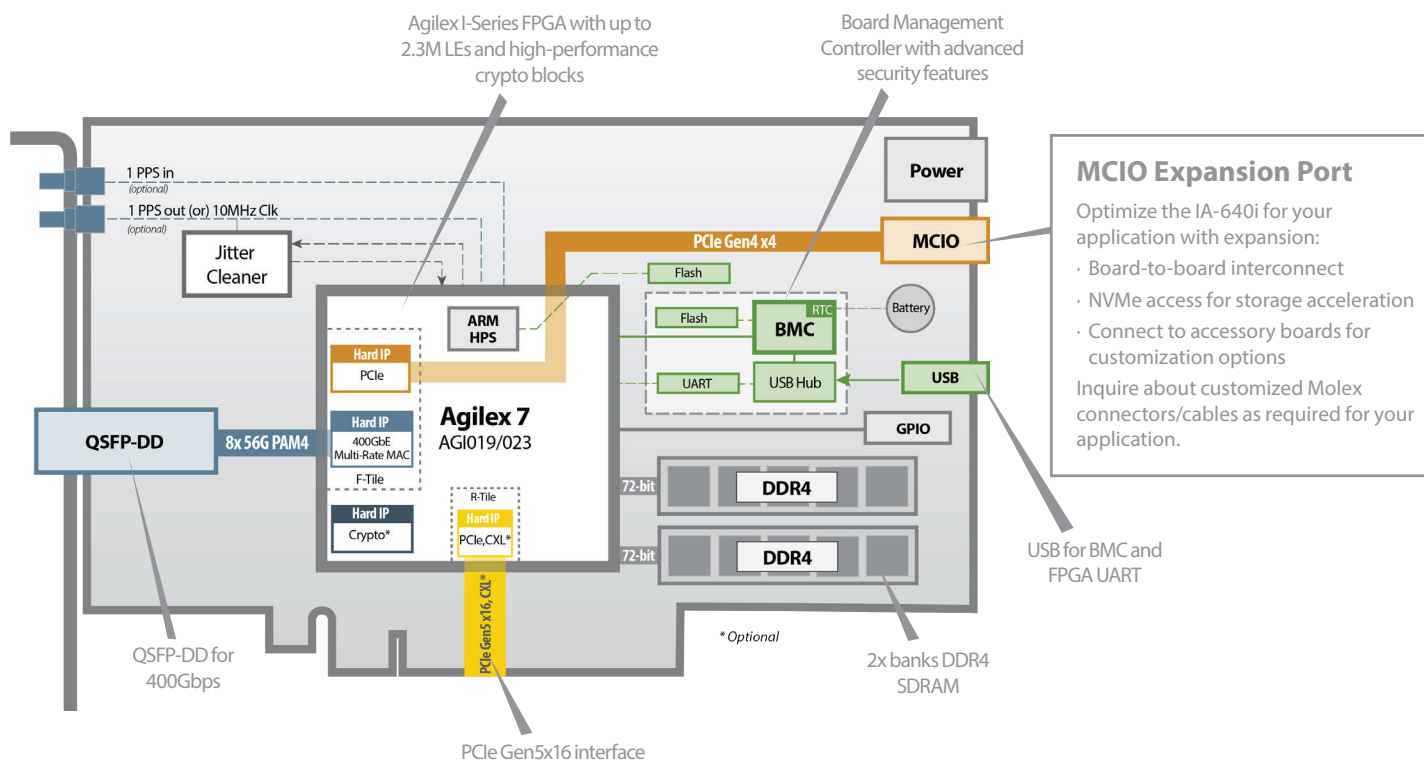
CXL Compute Express Link™

1 oneAPI

intel. **AGILEX**™ **7**

key features

1x 400G, 4x 100G, or 8x 10/25/50G

PCIe Gen5 Single-Width

Intel Agilex™ FPGA with **CXL v1.1** support

Agilex I-Series FPGA with up to 2.3M LEs and high-performance crypto blocks

Board Management Controller with advanced security features

1 PPS in *(optional)*
1 PPS out (or) 10MHz Clk *(optional)*

Power

MCIO

PCIe Gen4 x4

Jitter Cleaner

Flash

Flash   RTC   Battery

ARM HPS

BMC

Hard IP PCIe

UART   USB Hub

USB

Agilex 7 AGI019/023

GPIO

QSFP-DD   8x 56G PAM4

Hard IP 400GbE Multi-Rate MAC
F-Tile

72-bit   DDR4

Hard IP Crypto*

R-Tile
Hard IP PCIe, CXL*

72-bit   DDR4

PCIe Gen5 x16, CXL*

QSFP-DD for 400Gbps

* Optional

PCIe Gen5x16 interface

2x banks DDR4 SDRAM

MCIO Expansion Port

Optimize the IA-640i for your application with expansion:
· Board-to-board interconnect
· NVMe access for storage acceleration
· Connect to accessory boards for customization options

Inquire about customized Molex connectors/cables as required for your application.

USB for BMC and FPGA UART

Additional Services
Take advantage of BittWare's range of design, integration, and support options
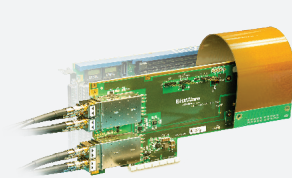
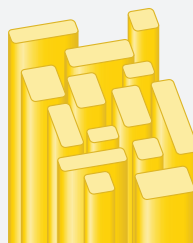### Customization
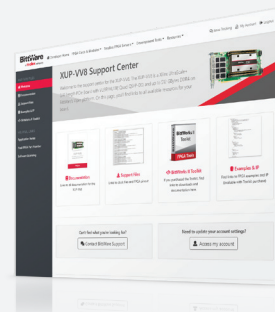Additional specification options or accessory boards to meet your exact needs.

Server Integration
Available pre-integrated in our TeraBox servers in a range of configurations.

IP and Solutions
Our portfolio of IP and solutions reduce risk for development and deployment.

Service and Support
BittWare Developer Site provides online documentation and issue tracking.

Board Specifications

FPGA	• Intel Agilex 7 I-Series: AGI019 or AGI023
	  • AGI019: Core speed grade -2: XCVR speed grade -1
	  • AGI023: Core speed grade -1: XCVR speed grade -1
	  • XCVR speed grade -1 supports CXL (CXL IP is licensed and purchased separately)
	  • FPGA includes ARM HPS
	• Other Agilex FPGA options are available, including
	  • Hard crypto blocks

On-board Flash	• 2Gbit Flash memory for booting FPGA
External memory	• 2x banks on-board DDR4, up to 32GB each
Host interface	• x16 Gen5 interface direct to FPGA, connected to PCIe hard IP • CXL v1.1 (CXL IP is licensed and purchased separately)
QSFP-DD cage	• 400 Gbps (8x 50Gbps PAM4) • PAM4: 1x 400GbE, 2x 200GbE, 4x 100GbE, 8x 50GbE • NRZ: 1x 200GbE, 2x 100GbE, 4x 50GbE, 8x 10/25 GbE • Multi-rate hard MAC supports all combinations • Jitter cleaner for network recovered clocking
MCIO	• 1x 4-lane edge connector @ up to 25G per lane • Hard IP support for PCIe Gen4 x4 (default is root port)
GPIO	• 4x GPIO
External clocking	• 1 PPS and 10MHz ref clk front panel inputs (optional)
USB	• USB access to BMC, USB-UART

Board Management Controller	• Power sequencing and reset
	• Voltage, current, temperature monitoring
	  • Protection shut-down
	• Clock configuration
	• Low bandwidth BMC-FPGA comms with SPI link
	• USB 2.0
	• PLDM support
	• Card-level security
	  • BMC Root of Trust
	  • BMC and FPGA secure boot
	  • BMC and FPGA secure upgrade
	  • Key management

Cooling	• Standard: single-width passive heatsink
Electrical	• On-board power derived from PCIe slot and external power connector • Power dissipation is application dependent • Max power consumption 125W
Environmental	• Operating temperature: 5°C to 35°C
Quality	• Manufactured to IPC-A-610 Class 2 • RoHS compliant • CE, FCC and ICES approvals
Form factor	• Standard-height, half-length, single-slot PCIe card • Size: 111.15mm x 167.65mm (4.376in x 6.600in)

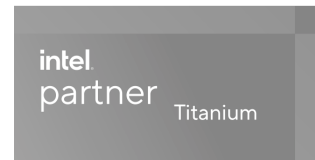## Development Tools

System development	BittWare SDK including PCIe driver, libraries, and board monitoring utilities
Application development	Supported design flows - Intel FPGA oneAPI Base Toolkit, Intel High-Level Synthesis (C/C++) and Quartus Prime Pro (HDL, Verilog, VHDL, etc.)

To learn more, visit **www.BittWare.com**

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