

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

BittWare's IA-440i 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 NIC-sized 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. The IA-440i has support for Intel oneAPI™, which enables an abstracted development flow for dramatically simplified code re-use across multiple architectures.

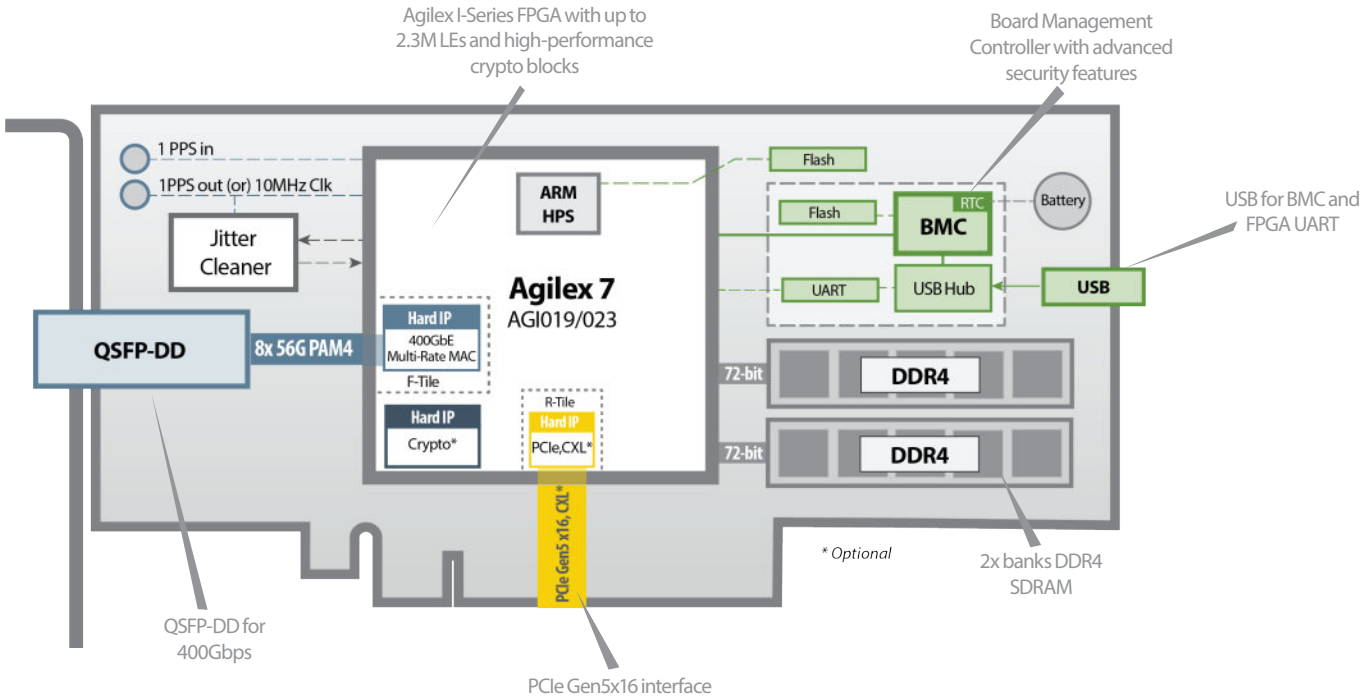


## key features

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

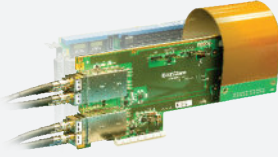
**PCIe Gen5**  
with support for  
**CXL**

Intel Agilex™ I-Series  
FPGA with  
**Hard Crypto Blocks**



# Additional Services

Take advantage of BittWare's range of design, integration, and support options



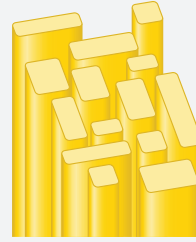
## Customization

[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	<ul style="list-style-type: none"> <li>Intel Agilex 7 I-Series AGI019 or AGI023</li> <li>AGI019: Core speed grade -2: XCVR speed grade -1</li> <li>AGI023: Core speed grade -1: XCVR speed grade -1</li> <li>XCVR speed grade -1 supports CXL (CXL IP is licensed and purchased separately)</li> <li>FPGA includes ARM HPS</li> <li>Other Agilex FPGA options are available, including</li> <li>Hard crypto blocks</li> </ul>
On-board Flash	<ul style="list-style-type: none"> <li>2Gbit Flash memory for booting FPGA</li> </ul>
External memory	<ul style="list-style-type: none"> <li>2x banks on-board DDR4, up to 32GB each</li> </ul>
Host interface	<ul style="list-style-type: none"> <li>x16 Gen5 interface direct to FPGA, connected to PCIe hard IP</li> <li>CXL v1.1 (CXL IP is licensed and purchased separately)</li> </ul>
QSFP-DD cage	<ul style="list-style-type: none"> <li>400 Gbps (8x 50Gbps PAM4)</li> <li>PAM4: 1x 400GbE, 2x 200GbE, 4x 100GbE, 8x 50GbE</li> <li>NRZ: 1x 200GbE, 2x 100GbE, 4x 50GbE, 8x 10/25 GbE</li> <li>Multi-rate hard MAC supports all combinations</li> <li>Jitter cleaner for network recovered clocking</li> </ul>
External clocking	<ul style="list-style-type: none"> <li>1 PPS and 10MHz ref clk inputs (in-board)</li> </ul>
USB	<ul style="list-style-type: none"> <li>USB access to BMC, USB-UART</li> </ul>

### 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
- Power dissipation is application dependent
- Max power consumption 75W

### 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

- Low profile (half-height, half-length) PCIe slot card
- Size: 68.90mm x 167.65mm (2.713in x 6.600in)

## Development Tools

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

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**BittWare**  
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