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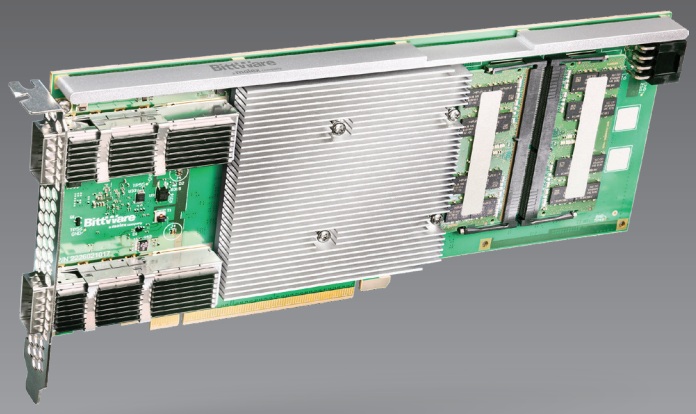
IA-780i
PCIe FPGA Card



Agilex™ FPGA card with PCIe Gen5 x16

BittWare's IA-780i is an Altera Agilex™ 7 I-series FPGA card designed for building SmartNICs or other accelerators requiring a powerful FPGA in a single-slot form factor. The standard-height, 3/4-length card provides a balance of I/O and memory using the Agilex chip's unique tiling architecture with two QSFP-DDs, DDR4 SDRAM SODIMMs, and PCIe Gen5 x16 with CXL support for a variety of applications. The IA-780i has support for Intel oneAPI™, which enables an abstracted development flow for dramatically simplified code re-use across multiple architectures.

CXL Compute Express Link™

oneAPI

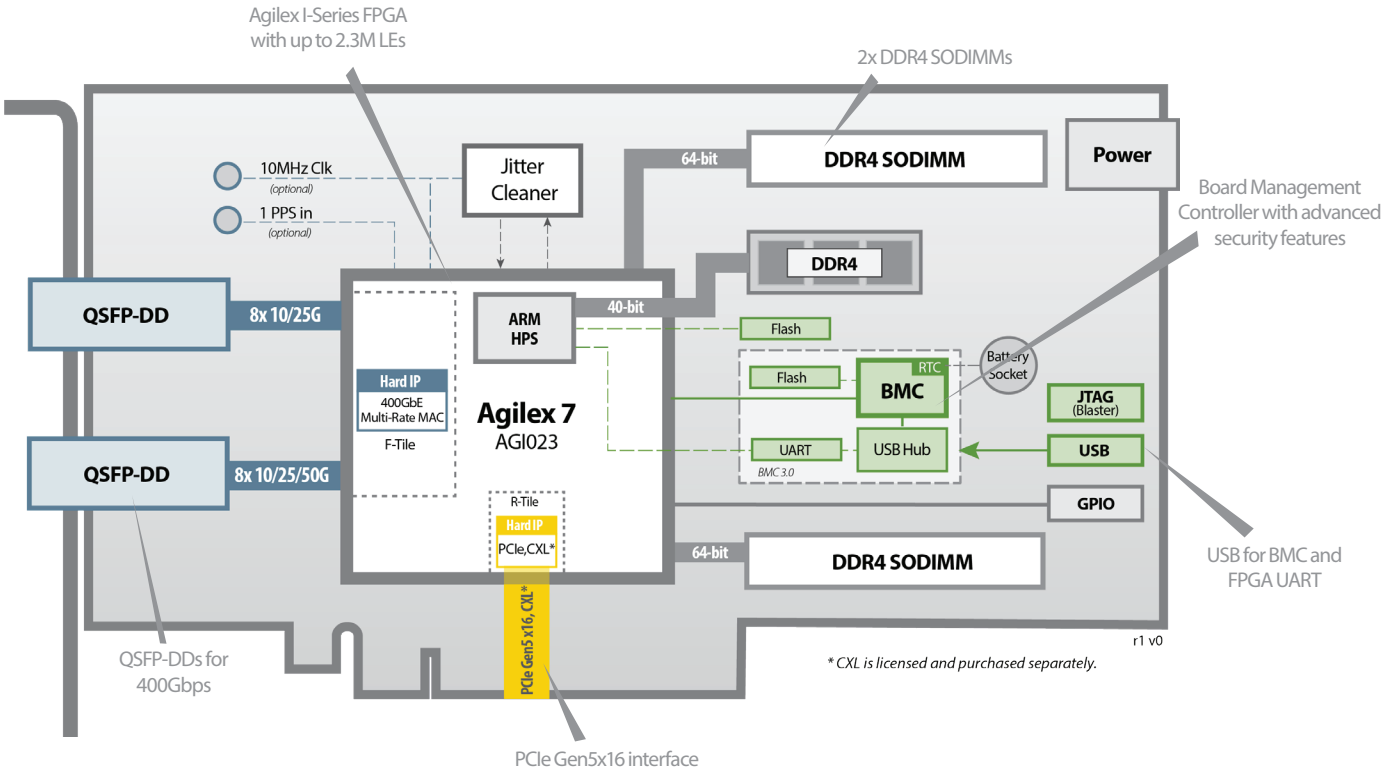
intel AGILEX 7

key features

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

PCIe Gen5 with support for **CXL**

Single Width

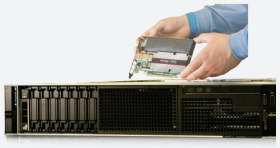


Additional Services

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

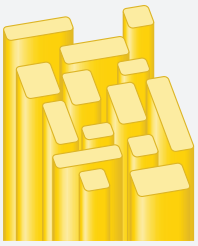
Customization

Additional specification options or accessory boards to meet your exact needs.



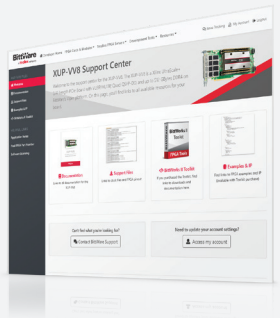
Server Integration

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	• Altera Agilex 7 I-Series: AGI023
	  • Core speed grade -1: I/O speed grade -1 for CXL (CXL IP is licensed and purchased separately)
	  • FPGA includes ARM HPS

ARM HPS	• Dedicated 40-bit DDR4 • Dedicated Flash memory for booting ARM • Optional 1GbE interface (contact BittWare)
On-board Flash	• 2Gbit Flash memory for booting FPGA
External memory	• 2x SODIMM slots, each supporting up to 32GB (default 16GB) DDR4 SDRAM modules (up to 64GB total; no ECC support)
Host interface	• x16 Gen5 interface direct to FPGA, connected to PCIe hard IP • CXL support (CXL IP is licensed and purchased separately)

QSFP-DD cages	• QSFP-DD cages supporting a total of:
	  • 1x 400GbE, or 2x 200/100/50/25/10GbE, or
	  • 4x 100GbE or 16x 10/25GbE with breakout cables
	• Multi-rate hard MAC supports all combinations
	• Jitter cleaner for network recovered clocking

GPIO	• 4x GPIO
External clocking	• 1 PPS and 10MHz ref clk inputs (in-board)
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
	• RTC with battery backup

Cooling	• Standard: single-width passive heatsink • Optional: dual-width passive heatsink
Electrical	• On-board power derived from PCIe slot and external power connector • Power dissipation is application dependent • Max power consumption 180W
Environmental	• Operating temperature: 5°C to 35°C
Quality	• Manufactured to IPC-A-610 Class 2 • RoHS compliant • CE, FCC, UKCA & ICES approvals
Form factor	• Standard-height, 3/4-length, single-slot PCIe card (optional dual-width configuration) • Size: 111.15mm x 254.00mm (4.376in x 10.000in)

Accessory Cables

Access to USB and/or JTAG requires accessory cables. **Cables are sold separately.**

USB-only cable	Pico-lock to USB A cable BittWare part number: RS-PL05-UAP-83 Designed for deployment in servers
JTAG-only cable	Pico-lock to JTAG cable BittWare part number: RS-PL06-JTB-13 Recommended for development

Development Tools

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

Safety & Compliance

- FCC (USA) 47CFR15.107 / 47CFR15.109
- CE (Europe) EN 55032:2015/A11:2020 / EN 55035:2017/A11:2020 / EN 61000-3-2:2014 / EN 61000-3-3:2013
- UKCA (United Kingdom) BS EN 55032:2015/A11:2020 / BS EN 55035:2017/A11:2020 / BS EN 61000-3-2:2014 / BS EN 61000-3-3:2013
- ICES (Canada) ICES-003 Issue 7 October 2020
- Safety EN IEC 62368-1:2018 / EN IEC 62368-1:2020 / EN IEC 62368-1:2020/A11:2020 / CB Scheme Certificate No. DK-151710-UL
- Safety (UK) BS EN IEC 62368-1:2018 / BS EN IEC 62368-1:2020 / BS EN IEC 62368-1:2020/A11:2020 / CB Scheme Certificate No. DK-151710-UL
- RoHS compliant to the 2011/65/EU + 2015/863 directive

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

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