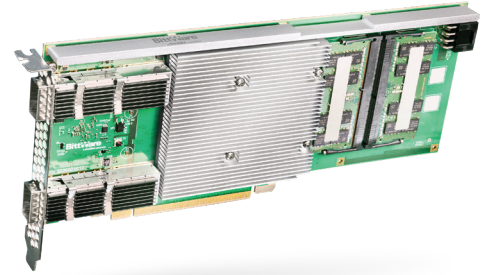


# BittWare IA-780i PCIe Card

The BittWare 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.



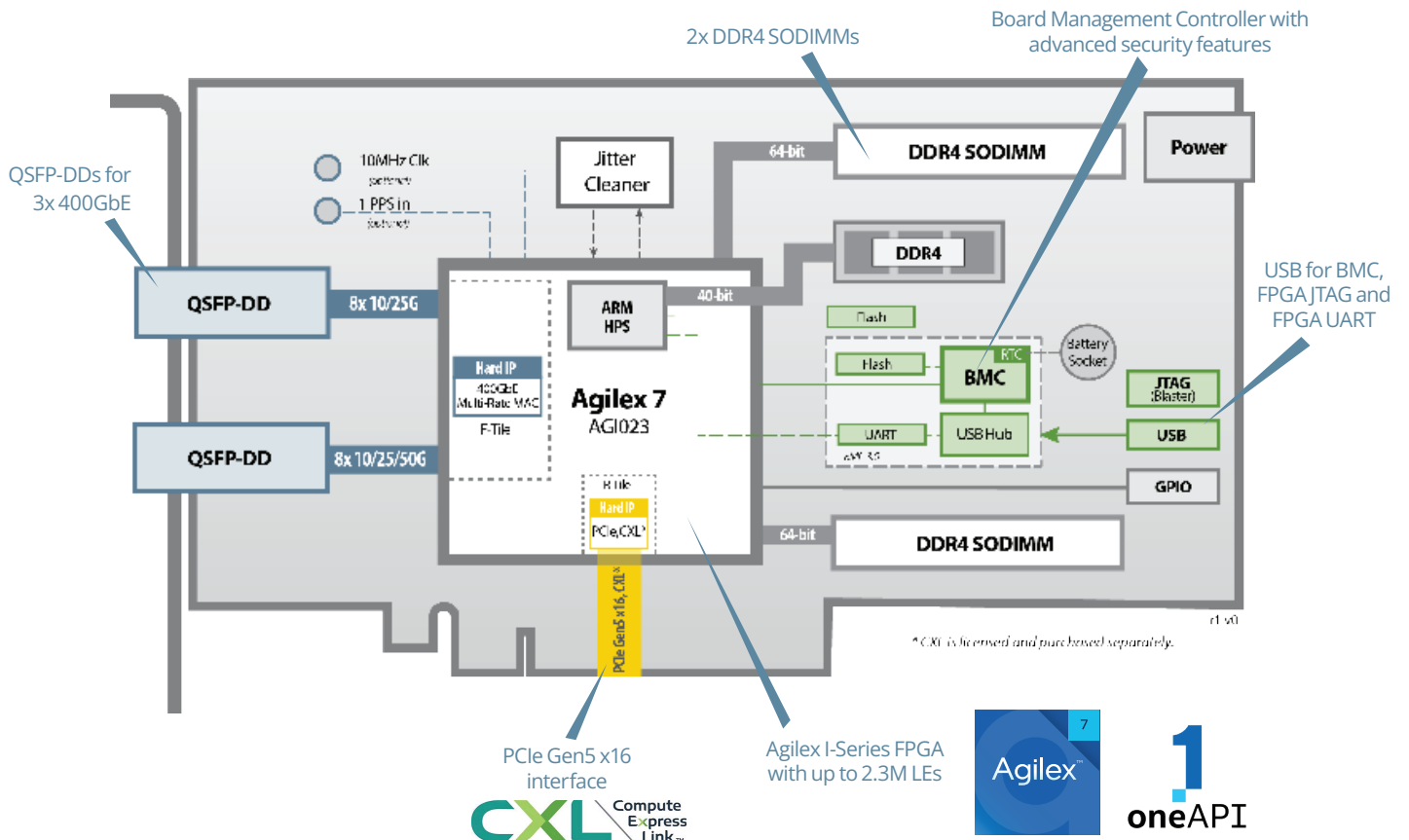
## FEATURES AND ADVANTAGES

**1x 400G or 4x 100G**  
Ideal for network-intensive applications

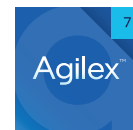
**PCIe Gen5 with CXL support**  
High-speed, low-latency host interface

**Altera Agilex I-Series FPGA**  
Powerful FPGA resources with 2.3m LEs

**Single width**  
Ideal for SmartNICs or other accelerators



Agilex I-Series FPGA with up to 2.3M LEs



# BittWare IA-780i PCIe Card

## BOARD SPECIFICATIONS

- FPGA**
  - Altera Agilinx 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 us)
- 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
- 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 JTAG requires accessory cables. Cables are sold separately.

<b>USB-only cable</b>	Pico-lock to USB A cable Part number: RS-PL05-UAP-83 Designed for deployment in servers
<b>JTAG-only cable</b>	Pico-lock to JTAG cable Part number: RS-PL06-JTB-13 Recommended for development

## DEVELOPMENT TOOLS

### System development

BittWare SDK including 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 [bittware-molex.com](http://bittware-molex.com)