Agilex™ FPGA card with QSFP-DD and MCIO
3x 200GbE with up to 128GB DDR4 SDRAM

BittWare’s IA-840f is an Intel® Agilex™-based FPGA card designed to deliver up to 40% higher performance for data center, networking and edge compute workloads. BittWare maximized I/O features on the card using the Agilex chip’s unique tiling architecture with three QSFP-DDs (3x 200G), PCIe Gen4 x16, and two MCIO PCIe expansion ports for diverse applications. The card also supports Intel oneAPI™, which enables an abstracted development flow for dramatically simplified code re-use across multiple architectures.

**key features**

- **QSFP-DDs** for 3x 200G
- **Intel OneAPI support**
- **Intel Agilex™ FPGA** with up to 2.6M Logic Elements

**MCIO Expansion Ports**
Optimize the IA-840f for your application with PCIe expansion:
- 4 Gen4 x4 root ports
- 1 Gen4 x16 root port
Inquire about customized Molex connectors/cables as required for your application.
## Board Specifications

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FPGA</strong></td>
<td>• Intel Agilex 7 F-Series</td>
</tr>
<tr>
<td></td>
<td>• AGF027 in an R2S81A package</td>
</tr>
<tr>
<td></td>
<td>• Core speed grade -2: I/O speed grade -2</td>
</tr>
<tr>
<td></td>
<td>• Contact BittWare for other Agilex FPGA options</td>
</tr>
<tr>
<td><strong>On-board Flash</strong></td>
<td>• 2Gbit Flash memory for booting FPGA</td>
</tr>
<tr>
<td><strong>External memory</strong></td>
<td>• 2x 288-pin DIMM slots, each supporting up to 32GB (default 16GB) DDR4 SDRAM modules (up to 64GB total)</td>
</tr>
<tr>
<td></td>
<td>• 2x banks on-board DDR4, up to 32GB each</td>
</tr>
<tr>
<td><strong>Host interface</strong></td>
<td>• x16 Gen4 interface direct to FPGA, connected to PCIe hard IP</td>
</tr>
<tr>
<td><strong>QSFP-DD cages</strong></td>
<td>• 3 QSFP-DD cages on front panel connected directly to FPGA via 24 transceivers</td>
</tr>
<tr>
<td></td>
<td>• User programmable low jitter clocking supporting 10/25/40/100GbE</td>
</tr>
<tr>
<td></td>
<td>• Each QSFP-DD can be independently clocked</td>
</tr>
<tr>
<td></td>
<td>• Jitter cleaner for network recovered clocking</td>
</tr>
<tr>
<td></td>
<td>• Multi-rate hard MAC+FEC for 10/25/100GbE (4x HardIP)</td>
</tr>
<tr>
<td></td>
<td>• Fully backward compatible with QSFP28s</td>
</tr>
<tr>
<td><strong>MCIO</strong></td>
<td>• Two x8 connectors supporting 4x Gen4 x4 PCIe root complexes or 1x Gen4 x16 root complex</td>
</tr>
<tr>
<td><strong>External clocking</strong></td>
<td>• 1 PPS and 10MHz ref clk front panel inputs (optional)</td>
</tr>
<tr>
<td><strong>USB</strong></td>
<td>• USB access to BMC, USB-JTAG, USB-UART</td>
</tr>
</tbody>
</table>

### Board Management Controller
- Voltage, current, temperature monitoring
- Power sequencing and reset
- Field upgrades
- FPGA configuration and control
- Clock configuration
- Low bandwidth BMC-FPGA comms with SPI link
- USB 2.0
- PLDM support
- Voltage overrides

### Cooling
- Standard: dual-slot passive heatsink
- Optional: dual-slot liquid cooling

### Electrical
- On-board power derived from PCIe slot 12V and two AUX connectors
- Power dissipation is application dependent
- Typical max power consumption TBD

### 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, dual-slot PCI Express card
- 111.15mm x 266.70mm (4.376in x 10.500in)

### 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](http://www.BittWare.com)