

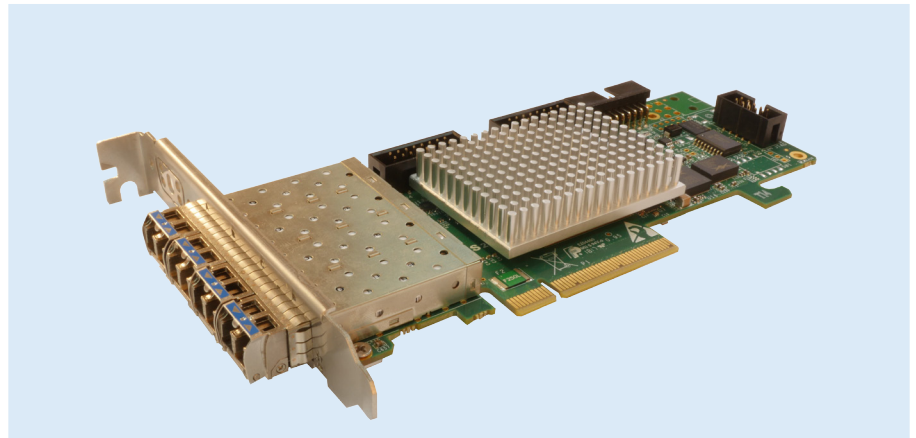
HawkEye

20/40 Gbps Arria 10 FPGA Computation Accelerators



Key Features

- Altera Arria 10 FPGA, 160, or 480
- PCIe x8 Gen. 3 Express or stand-alone
- Form factor: low-profile
- Low-power, starting at less than 12W
- Up to 4 SFP+ cages
- MTBF > million hours
- Cost-effective starting at < \$1,000
- Dedicated features that enable tailoring to vertical markets
- Up to 1.2 GFLOPS processing capability
- Multi-level memory structure (18+ GB)
Sustained throughput of 128+ TB/s for internal memories and ~16 GB/s for on-board memory as follows:
 - Enhanced MLAB (640-bit) SRAM blocks
 - Up to 28,620 M20K (20K-bit) SRAM blocks (572 Mb) at a throughput of up to 128 TB/s at 450 MHz
 - 2 GB DDR4 on-board memory at a maximum sustained throughput of 5.4 GB/s
 - 8-16 GB DDR4 ECC SoDIMM Bank for maximum sustained throughput of 10.8 GB/s (480 device only)
 - On board user flash (optional)
- Typical system freq: 150-450 MHz
- Flexible clocking system
- Supported by Gidel's OpenCL BSP and HLS (I++) ASP based on Intel's SDK (for Arria 10 480 only)
- Supported by Gidel's Developer's Kit
 - Simultaneous acceleration of multiple applications or processes
 - Unmatched HDL design productivity
 - Simple integration with software applications



The HawkEye is low profile PCIe accelerator based on Altera's Arria 10 FPGAs (Altera is now part of Intel). The platform boasts up to 18 GB DDR4 on-board memory, up to 4 SFP+ links for a maximum of 56 Gb/s, and a PCIe x8 Gen. 3 host interface. The Arria 10 FPGA provides up to 480K LEs and IEEE floating-point capability. The HawkEye's memory scheme comprises embedded SRAM memory with a throughput capability of up to ~128 TB/s, 1-2 GB DDR4, and up to 16 GB of DDR4 SoDIMM (only for boards with 480 devices). The DDR memory may be accessed via up to 48 parallel ports simultaneously.

The HawkEye accelerator board exhibits an impressive power efficiency, starting at less than 12W. The board is fortified by abundant I/O interface possibilities, including RS422, Opto-coupler, external clock, LVDS, LVTTL (3V), and 30V/0.9A output. The HawkEye can operate as a PCIe-based platform or as a stand-alone compute accelerator. The system has been designed for exceptional high reliability with an MTBF beyond 1 million hours.

The HawkEye is supported by Gidel's unique proprietary tools for developing on FPGA. These tools offer a solution that is unique in the market and can be used together with Intel's design tools to achieve unmatched development efficacy and efficiency. The Gidel development tools suite includes Gidel's Developer's kit as well as OpenCL BSP and HLS (i++) ASP based on Intel's SDK.



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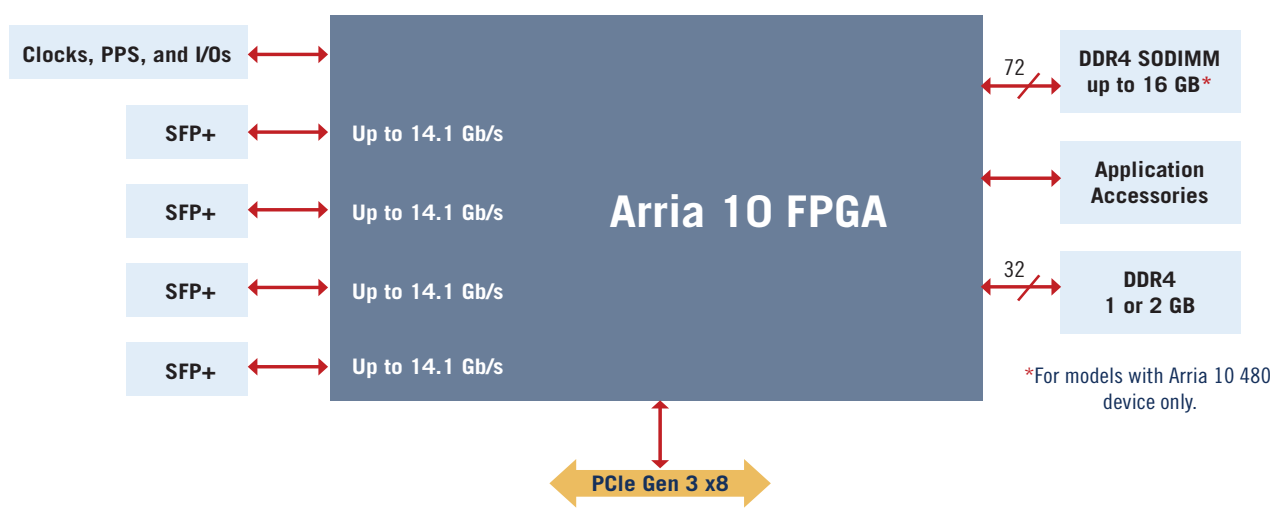
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FEATURE	SPECIFICATIONS
FPGA	<ul style="list-style-type: none"> Intel Arria 10 GX 160K or 480K Logic Elements Embedded 18x19 Multipliers Embedded M20K and MLAB blocks Up to 4x 12.5/14.1 Gb/s transceivers 1.6 Gb/s LVDS performance
Memory	<ul style="list-style-type: none"> Embedded MLAB (640-bit) SRAM blocks M20K (20K-bit) SRAM blocks Up to 16 GB DDR4 SDRAM (SoDIMM) On board 2GB DDR4 SDRAM
Processing Performance	<ul style="list-style-type: none"> Up to 1,431 M20K blocks @ 450 MT/s for total of ~128 TB/s MLAB blocks @ 450 MT/s Up to 2 GB DDR4 SDRAM for total of 5.6 GB/s Up to 16 GB DDR4 SDRAM for a total of 10.8 GB/s Up to 2,736 18x19 Multipliers
MTBF	> million hours

FEATURE	SPECIFICATIONS
Form Factor	PCIe low-profile
Host Interface	PCIe x8 Gen.3
I/O	1x, 2x, and 4x SFP+
GPIO	<ul style="list-style-type: none"> RS422 Opto-coupler LVDS and LVTTTL (3V) 30V/0.9A output driver External clock
Development Tools	<ul style="list-style-type: none"> OpenCL BSP based on Intel's SDK HLS ASP for use with Intel's HLS compiler Gidel ProDev Kit for HDL design flow: <ul style="list-style-type: none"> Generation of dedicated application driver. Splitting of physical on-board memories into logical memories with independent parallel access to/from user logic. Generation of environment FPGA code, including all board/IP constrains and user logic wrapper Intel Tools: Quartus Prime Pro including QSys and DSP builder



HawkEye System Block Diagram



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