Fanto*Vision 40* Edge Computer

40 Gb/s image acquisition and processing on FPGA & GPU

September 2021

Key Features

- 4 x 10GigE-Vision or up to 4 x 12.5 G
- 4 x CoaXPress 2.0
- Computer: Nvidia Jetson Xavier NX (Option for Jetson Nano/TX2 NX)
- FPGA: Arria 10 – 160/270/660
- Small body: 134 x 90 x 60 mm^3 (5.28″ x 3.54″ x 2.36″)
- GPU-FPGA interconnectivity: PCIe Gen 3 x4 @ up to 20 Gb/s
- Image processing:
  - On Jetson – supported by Nvidia JetPack SDK
  - On FPGA – supported by Gidel ProcVision suite
- FPGA interfaces: 4 x SFP+, PoCXP, 8 x RS422 (IN), 4 x Opto-Isolators (IN), 2 x High-Voltage Drivers (OUT), JTAG
- Host interfaces: 1GbE, USB 3.1/2.0, USB 2.0, USB Recovery, HDMI, UART, Recovery, Restart
- Jetson computer resources:
  - Up to 6-core Nvidia ARM CPU
  - GPU: up to 384 cores + 48 Tensor Cores (Nvidia Volta)
  - Up to 21 TOPS AI computation
  - Up to 8 GB LPDDR4 @ 51.2 GB/s
  - H.264/5, VP9 encoding/decoding
- FPGA resources:
  - 160K/270K/660K LEs
  - 2GB – 10GB DDR4 @ up to 25.6 GB/s
  - Up to 2,133 M20Ks
  - Up to 3,374 18 x 19 multipliers
  - Up to 16 I/O PLLs
- Max. power consumption : 15-40 W (dependent on system configuration)
- NVMe (optional) high-capacity SSD
- uSD (optional for Jetson Nano)
- Passive or active cooling

Video, Machine Vision and AI Inferences on the Edge

Gidel's Fanto*Vision 40™* is a pioneering compact computer enabling image acquisition and processing from 4 x 10GigE and from 4 x CoaXPress 2.0 cameras. The FantoVision's innovative architecture merges high-end image acquisition with real-time image processing and/or compression using Nvidia Jetson™ embedded computer with optional pre-processing/compression on Intel Arria 10™ FPGA. The Jetson boasts up to 21 TOPS AI compute capability using Nvidia's comprehensive libraries. The GPU and FPGA interconnect via 4-lane PCIe capable of up to 20 Gb/s. With up to Tera Byte+ SSD, the system can perform demanding real-time processing, compression, and recording. The FPGA is fortified with up to 10 GB DDR4 @ 200 Gb/s.

Open Customizable Image Processing

The Fanto*Vision* is also distinct in its open architecture enabling embedded AI/image processing on GPU and FPGA. Software engineers can program their algorithms on GPU using CUDA C/C++ and NVIDIA's AI libraries. In addition, developing and deploying optional pre-processing block on FPGA is simple and fast using Gidel's novel ProcVision ™ Suite.

Scalable Solution

The Fanto*Vision* opens the way for new compact, cost-effective, scalable vision and imaging solutions for high-bandwidth, low-latency applications. Multi-Fanto*Vision* units can be interconnected to provide unique and scalable topologies. Using Gidel's InfiniVision ™ open frame grabber flow, 1000+ sensors can be synchronized and processed simultaneously.

Gidel
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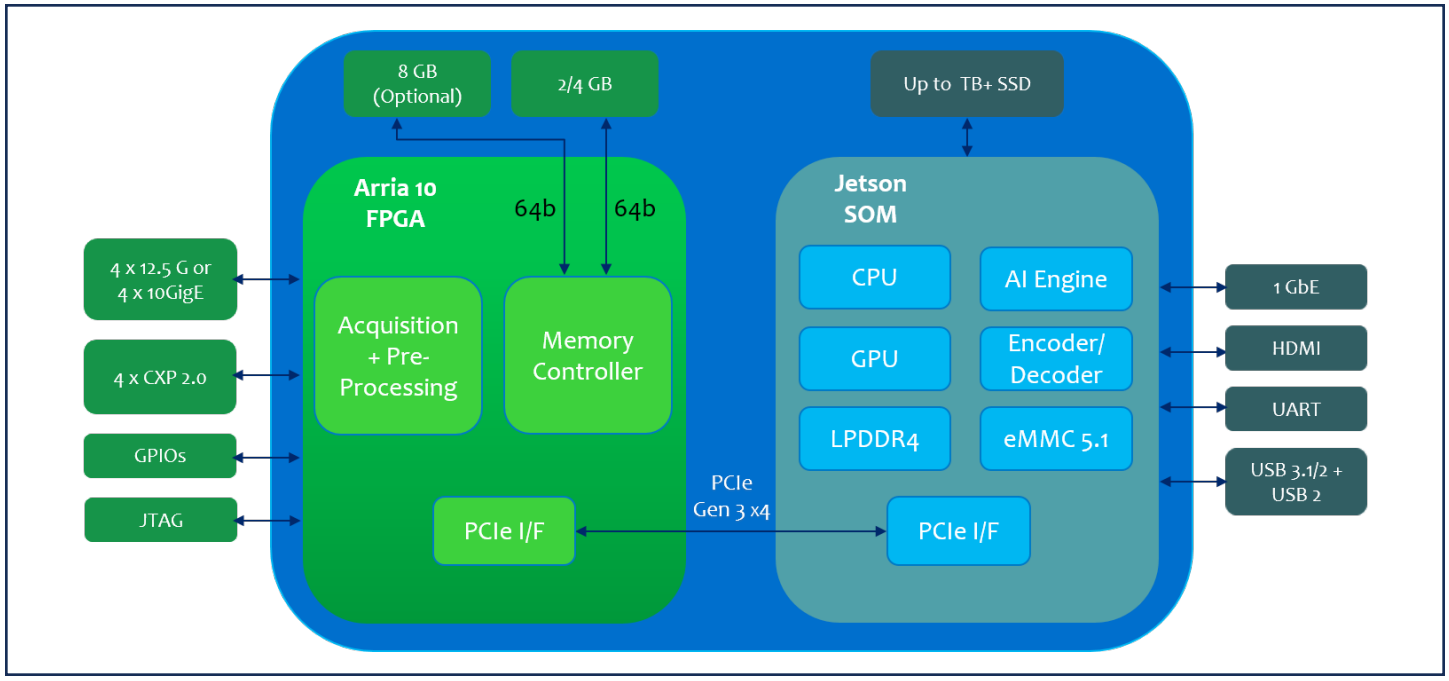

FantoVision 40 System Block Diagram

FPGA Options			
FPGA	Arria 10 160 GX	Arria 10 270 GX	Arria 10 660 GX
DRAM Throughput	12.8 GB/s	25.6 GB/s	19 GB/s
On-board DDR4	2 or 4 GB	10 GB	9 GB
Max Band-width/SFP+	Up to 12.5 Gb/s	Up to 12.5 Gb/s	Up to 12.5 Gb/s
FPGA Resources:			
Logic Elements	160K	270K	660K
M20K	440	750	2,133
18x19 MAC	312	1,660	3,374
I/O PLL	6	8	16

Embedded Computer Options			
Model	Jetson Nano	Jetson TX2 NX	Jetson Xavier NX
AI Perfor-mance	472 GFLOPS	1.33 TFLOPS	21 TOPS
NVIDIA GPU	128-core Maxwell™ GPU	256-core Pascal™ GPU	384-core Volta™ GPU with 48 Tensor Cores
CPU	Quad-core ARM® Cor-tex®-A57 MPCore processor	Dual-core Denver 2 64-bit CPU and quad-core ARM® Cortex®-A57 MPCore processor	6-core NVIDIA Carmel ARM®v8.2 64-bit CPU 6MB L2 + 4MB L3
Memory	4 GB @ 25.6 GB/s	4 GB @ 51.2 GB/s	8 GB @ 51.2 GB/s
Storage	16 GB eMMC 5.1	16 GB eMMC 5.1	16 GB eMMC 5.1
Video Encode	1x 4Kp30 2x1080p60 4x1080p30 4x720p60 9x720p30 (H.265 & H.264)	1x 4Kp60 3x 4Kp30 4x 1080p60 8x 1080p30 (H.265 & H.264)	2x 464 MP/s 2x 4Kp30 6x 1080p60 14x 1080p30 (H.265 & H. 264)
Video Decode	1x 4K60 2x 4K30 4x 1080p60 8x 1080p30 (H.265 & H.264)	2x 4Kp60 4x 4Kp30 7x 1080p60 14x 1080p30 (H.265 & H.264)	2x 690 MP/s 2x 4Kp60 4x 4Kp30 12x 1080p60 32x 1080p30 (H.265)
Jetson to FPGA	PCIe x4 Gen. 2	PCIe x2 Gen. 2	PCIe x4 Gen. 3

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