GVC1001

Ultra-High Performance Graphics, Vision and AI Computer

The GVC1001 is an ultra-high performance graphics, vision and AI computer based around NVIDIA® Jetson AGX Xavier™ Deep Learning enabled SoM. With 512 CUDA™ cores with 64 Tensor cores and dual DLA (Deep Learning Accelerators) providing up to 11 TFLOPS (HP16) performance, the GVC1001 provides the foundation to meet the demands and challenges of low size, weight and power (SWaP) graphics, vision, AI and sensory computing applications.

Aimed at SWaP-sensitive platforms primarily within defense and aerospace markets, example applications include 360° situational awareness, autonomous vehicles, EO/IR processing, non-Cert Degraded Visual Environment (DVE), display processing, moving map, wide-area persistent surveillance, hyperspectral sensor fusion, IED detection, synthetic aperature radar processing and many more.

These types of compute, data and image intensive applications are now requiring AI, deep learning techniques and inferencing engines which the NVIDIA® Jetson AGX Xavier™ SoM delivers. This new level of processing is required for advanced digital maps, image recognition, image segmentation, object localization, image fusion, image stabilization, object tracking and image correction within the target applications.

The GVC1001 is based on the NVIDIA® Jetson AGX Xavier™ SoM which features 512 Volta class cores with Tensor cores and an 8-core ARM® v8.2 64-bit CPU, 8MB L2 and 4MB L3. In total, the Jetson Xavier can provide up to 11 TFLOPS (HP16) or up to 22 TOPS (int8) peak performance, achieving an overall AI performance of 32 TOPS.

This is backed up by 32GB LPDDR4 capable of 137GB/s for very high bandwidth movement of data in and out of the GPU and 32GB eMMC 5.1.

The GVC1001 leverages the NVIDIA® Jetson AGX Xavier™ SoM functionality and performance by combining it with an I/O-rich host card and packages it in a low SWaP form factor. Dual SFP+ (fiber) 10 Gigabit Ethernet data plane ports (e.g. for multiple GigE camera aggregation), dual 1 Gigabit Ethernet control/data plane ports, dual DisplayPort™ 1.4 or dual SL-DVI ouput connectivity, dual CANbus ports and dual USB 3.1 Gen 1 are among the interfaces available on the GVC1001. Bulk storage is provided by the onboard 256 GB NVMe SSD, allowing the GVC1001 to accomodate very large data sets.

The GVC1001 is supported with the NVIDIA JetPack™ SDK and Linux for Tegra as well as Abaco's AXIS ImageFlex for image processing and manipulation. Additionally, to enable rapid application development, the GVC1001 is code compatible with desktop environments such as CUDA® and MATLAB®, allowing easy porting of applications and algorithms onto the deployable platform.

FEATURES:

- NVIDIA® Jetson AGX Xavier™ SoM
  - Up to 11 TFLOPS (FP16)
  - Up to 22 TOPS (int8)
  - AI Performance 32 TOPS
- 2x DisplayPort 1.4 outputs or 2x SL-DVI outputs
- 2x SFP+ (fiber) 10 Gigabit Ethernet ports
- 2x 1 Gigabit Ethernet ports
- 2x USB 3.1 Gen 1 ports
- 4x USB 2.0 ports
- 2x CANbus ports
- 3x UARTs
- Audio I/O
- GPIO
- 256 GB NVMe SSD
- NVIDIA JetPack™ SDK
- Abaco AXIS ImageFlex
- Abaco AXIS EventView
- Low SWaP
- -40C to +71C (base-plate cooled)

Abaco SYSTEMS
AMETEK

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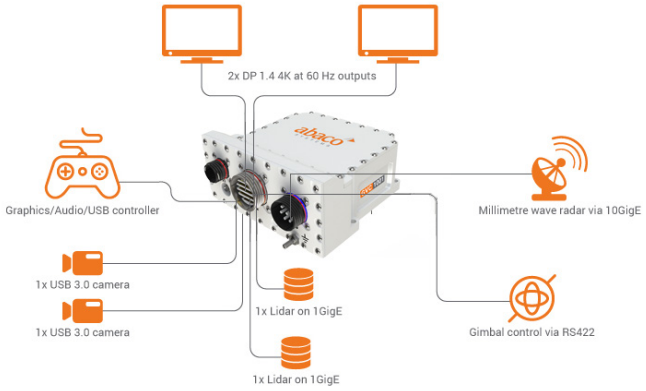
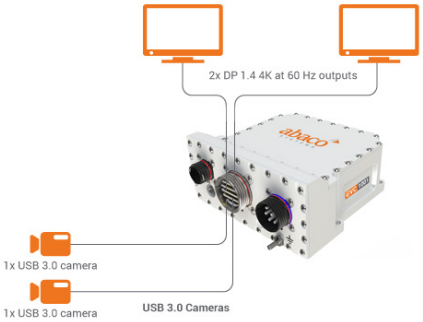
Examples of GVC1001 camera and sensor connectivity

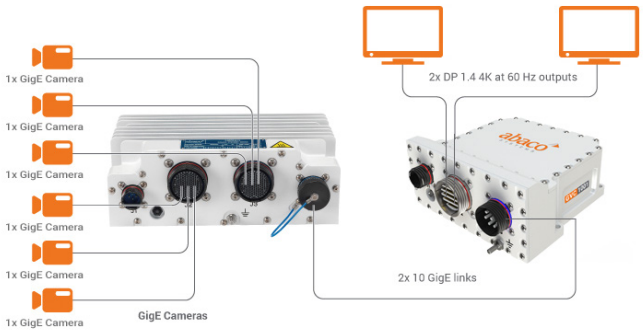
Sensor fusion/Autonomous platform/non-Cert
Degraded Visual Environment (DVE) example:



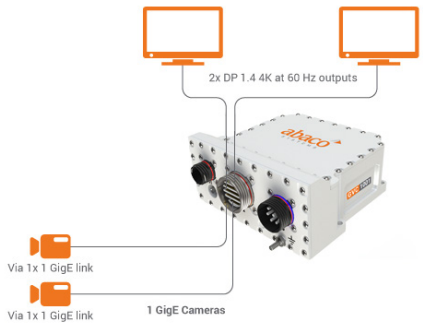
Dual USB 3.0 cameras



Multiple GigE cameras over dual 10 GigE
ports via Abaco's RES3000



Dual GigE cameras



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Specifications

GPU Node:

- NVIDIA® Jetson AGX Xavier™ SoM:
- Up to 22 TOPS (int8)
- Up to 11 TFLOPS (FP16)
- 512-core Volta GPU with Tensor cores
- 8-core ARM v8.2 64-Bit CPU
- 8 MB L2 + 4 MB L3
- 32 GB 256-Bit LPDDR4x Memory
- 32 GB eMMC 5.1 Flash Storage
- (2x) NVDLA DL Accelerator Engines
- 7-Way VLIW Vision Processor
- (2x) 4Kp60 | HEVC Video Encoder
- (2x) 4Kp60 | 12-bit Video Decoder

I/O:

- 2x SL-DVI outputs up to 1920 x 1200 @60Hz
- 2x 10 Gigabit Ethernet ports - SFP+ (fiber) – Data plane
- 2x 1 Gigabit Ethernet ports - Base-T - Control Plane
- 2x CANbus ports
- 2x USB 3.1 Gen 1 ports
- 4x USB 2.0 ports
- 1x UART RS232 Only (Debug Port)
- 2x High Speed UARTs RS232 / RS422 / RS485
- Audio I/O and GPIO

Bulk Storage:

- 256 GB NVMe SSD

Software:

- **SL4T-GVC1001-01M:**
  - Linux for Tegra (L4T) OS support
  - NVIDIA JetPack™ SDK
- **IMAGEPROC-SDK-01M:**
  - Abaco AXIS ImageFlex
  - Abaco AXIS EventView
- **AUTOINOMY-SDK-01M (on demand):**
  - Abaco AXIS ImageFlex
  - Abaco AXIS EventView
  - Autonomy additions package

Environmental:

- -40˚C to +71˚C (baseplate cooled)
- MIL-STD-810H

Dimensions:

- W: 6.54 inches (166 mm)
- H: 3.07 inches (78 mm)
- D: 5.98 inches (152 mm)

Weight:

- 6.0 lbs. (2.72 Kg)

Power Dissipation:

- ~85 Watts

**** Preliminary Datasheet - Specifications are subject to change**

Block diagram