Sabertooth AI

GPU-Enabled Embedded Computer

90 x 96 x 63 mm
(3.5 x 3.8 x 2.5")

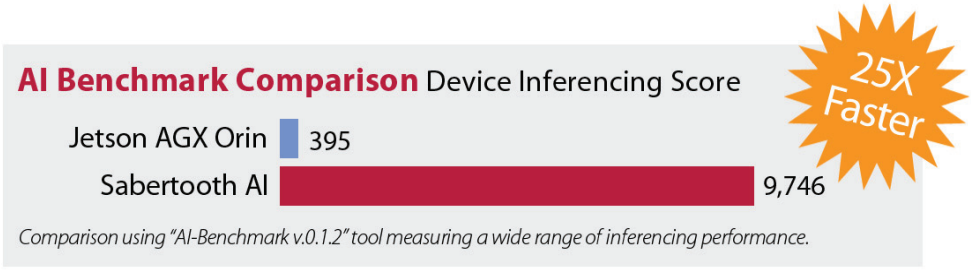
Overview

The Sabertooth AI system is a very compact, rugged embedded computer that supports AI and 3D rendering workloads in harsh environments. It is powered by a hex-core Intel Xeon-E CPU and the NVIDIA RTX 2000 ADA GPU for high-performance AI inferencing.

The Sabertooth AI features TPM 2.0 security, 32 GB error-correcting memory, high-speed SSD Storage (NVMe), and lots of computing power in a compact 90 x 96 x 63 mm package. It supports NVIDIA CUDA programming and Lovelace Architecture.

Designed and tested for full industrial temperature operation (-40° to +85°C) and MIL-STD-202H specifications for shock and vibration, the Sabertooth AI system is ideal for embedded computing needs in challenging environments.

VersaLogic's 10+ year product life support ensures long-term availability. Long lifecycle products avoid expensive upgrades and redesigns that come from shorter lifecycle products.



Highlights

- **Extreme AI Performance**
  25X Faster inferencing than Jetson AGX Orin
- **NVIDIA RTX 2000 ADA GPU**
  Supports NVIDIA CUDA Programming and Lovelace Architecture
- **High-Performance Hex-Core Xeon-E Processor**
  9th Generation Coffee Lake Processor
- **-40° to +85°C Operation**
  Operates in harsh environments
- **5x Mini DP++**
  Up to 8K Video for multi-screen applications

VERSALOGIC CORPORATION

Features

1 NVIDIA RTX 2000 ADA GPU
Supports NVIDIA CUDA programming.

2 4k Mini DP++ Connectors
Enable multi-screen applications.

3 Network
Two Gigabit Ethernet (GbE) ports.

4 Storage
On-board fast read/write bootable 128 GB NVMe SSD. Larger capacities available.

6 Gb/s SATA port supports bootable SATA hard drive. Dual-port option available.

5 Industrial I/O
Two USB 3.1 ports (**5a**) and four USB 2.0 ports (**5b**) support video cameras, keyboard, mouse, and other devices.

Two RS-232/422/485 serial ports (**5c**). Three 8254 timer/counters. I2C support (**5d**).

6 Digital I/O
Eight TTL I/O Lines 3.3V. Independently configurable.

7 On-Board Power Conditioning
10V–15VDC input for nominal 12V power sources

8 Thermal Solution
Built-in heat plates support direct attachment to a thermal bulkhead, or attachment to other thermal options (heat sink, heat pipe adaptor, etc).

9 Expansion Power
Power output for any expansion boards added to the system.

Intel Xeon "Coffee Lake Refresh" Processor *(not shown)*
Hex-core, up to 4.2 GHz turbo clock rate.

RAM *(not shown)*
32 GB ECC DDR4 RAM

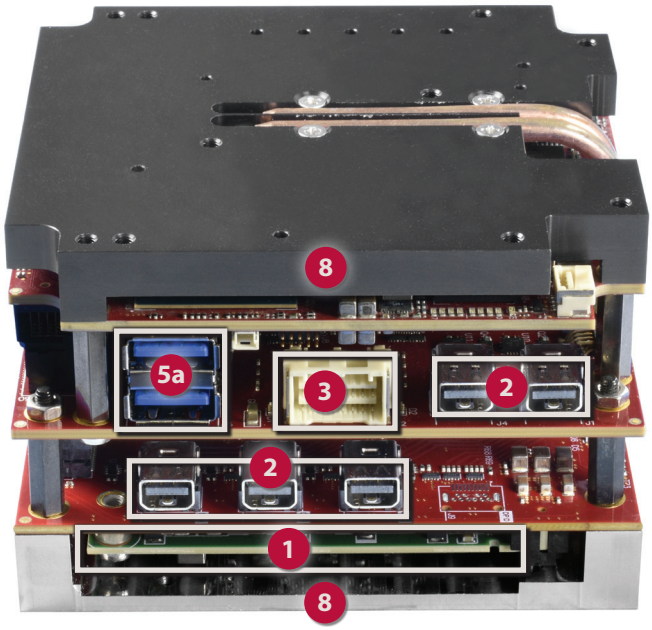
Trusted Platform Module *(not shown)*
On-board TPM 2.0 security chip can lock out unauthorized hardware and software access.

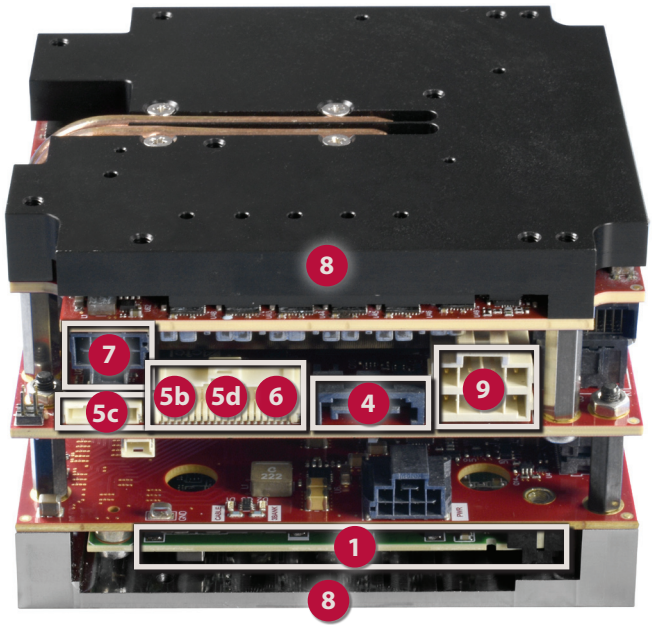
Compact Size
Industry standard form factor (90 x 96 mm).

Industrial Temperature Operation
-40° to +85°C operation for harsh environments.

MIL-STD-202H
Qualified for high shock/vibration environments.

Software Support
Compatible with a variety of popular x86 operating systems including Windows, Linux, and Windows Server.





Modify This System to Your Exact Requirements

COTS modifications are available in quantities as low as 100 pieces.

- Conformal Coating
- Connector Changes
- I/O Changes
- Custom Testing
- Custom Labeling
- BGA Underfill
- BIOS Modifications
- Software and Drivers
- Revision Locks
- Custom Screening
- Larger Storage Device
- Software Pre-load
- Etc.

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Specifications

General				
Size	90 x 96 x 63 mm (3.5 x 3.8 x 2.5") PC104 compatible			
Weight	680 grams (24 oz.) including heat plates			
Processor (CPU)	*Processor*	*Cache*	*Intel vPro®*	
	Xeon E-2276ML	12 MB	Yes	
	Intel 64-bit instructions, Secure Key, Intel Trusted Execution Technology, Intel Enhanced SpeedStep® Technology, Intel Turbo Boost Technology, Intel Virtualization Technology, AES New Instructions.			
Processor (GPU)	NVIDIA RTX 2000 Ada Generation Embedded GPU. NVIDIA Ada Lovelace architecture. 3072 CUDA cores. 96 Tensor cores. 24 RT Cores. Floating point performance 12.99 TFLOPS. Core Clock (MHz) Base= 1635 / Boost= 2115.			
Battery	Connection for 3.0V RTC backup battery			
Power Requirements (@ 12V) †	*Model*	*Idle*	*Average*	*Max.*
	VL-ASM51-2AE	16W	60W	119W
Input Voltage	10 – 15VDC			
System Reset and Hardware Monitors	All voltage rails monitored. Watchdog timer with programmable timeout. Push-button sleep, reset, and power.			
Regulatory Compliance	RoHS (EU 2015/863), Conflict Minerals compliant.			

Environmental			
Thermal Management	Heat plates included. Optional heat sink, fan, and other thermal accessories available.		
Operating Temperature ◊	*Heat Plate*	*Heat Pipe Adapter kit*	*Heat Sink + Fan*
	-40° to +85°C	-40° to +85°C	-40° to +60°C
	Ranges shown assume 90% CPU and typical GPU utilization. For detailed thermal information and exceptions, refer to the VL-ASM51-2AE Reference Manual.		
Airflow Requirements	1 Linear Meter per Second at or below +85°C		
Fan Connectors	1x		
Storage Temperature	-40° to +85°C		
Altitude*	Operating	To 4,570m (15,000 ft.)	
	Storage	To 15,000m (50,000 ft.)	
Vibration, Sinusoidal Sweep ¤	MIL-STD-202H method MIL-STD-202-204, Condition A: 2g		
Vibration, Random ¤	MIL-STD-202H method MIL-STD-202-214, Condition A: 5.35g rms		
Mechanical Shock ¤	MIL-STD-202H method MIL-STD-202-213, Condition G: 20g half-sine		

† Represents operation at +25°C and +12V supply running Windows 11 with DisplayPort display, GbE, and USB keyboard/mouse. Average power computed as the mean value of Idle and Maximum power specifications. Maximum power measured with 95% CPU utilization in Turbo mode and 100% GPU utilization in inferencing mode.

◊ Derate -1.1°C per 305m (1,000 ft.) above 2,300m (7,500 ft.)

* Extended altitude specifications available upon request

‡ TVS protected port (enhanced ESD protection)

§ Power pins on this port are overload protected

€ Bootable storage device capability

¥ Up to 4k 12-bit HDR at 240Hz with DP1.4a+DSC. Up to 8k 12-bit HDR at 60Hz with DP 1.4a+DSC or HDMI2.0+DSC. With dual DP1.4a+DSC, up to 8K HDR at 120Hz. HDCP 1.2/1.4. (eDP, LVDS, VGA, USB-C display output are not supported)

¤ MIL-STD-202H shock and vibe levels are used to illustrate the extreme ruggedness of this product in general. Testing at higher levels and/or different types of shock or vibration methods can be accommodated per the specific requirements of the application. Contact VersaLogic Sales for further information.

Security	
TPM	Infineon Trusted Platform Module 2.0 discrete device

Memory	
System RAM	32 GB DDR4 SDRAM with ECC (error correction)
GPU Memory	8GB GDDR6

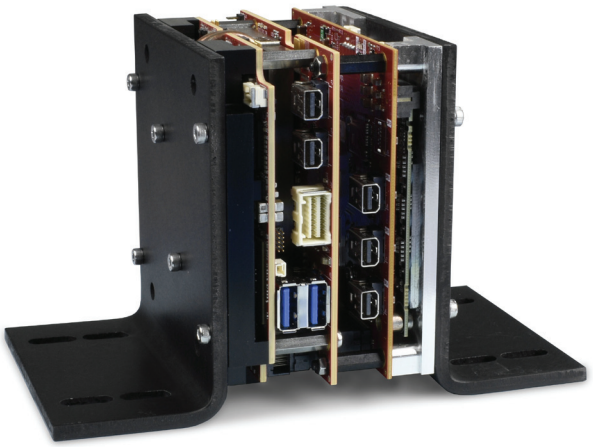
Video	
General	Integrated Intel UHD Graphics (P)630 supports DirectX 12 and OpenGL 4.5, Quick Sync Video, Clear Video HD Technology, 4K
CPU Acceleration	Video acceleration with HEVC (10-bit), VP8, VP9, and MPEG2 encoding/decoding and VC-1 decoding
DisplayPort Interface §	Five Mini DisplayPort++ outputs. 24-bit: 3x up to 7680 x 4320 8K support at 60 Hz.¥, 2x up to 3840 x 2160 at 30 Hz. 4K support at 60 Hz. Supports DisplayPort and HDMI signaling (Video and Audio outputs).
GPU Acceleration	NVIDIA RTX 2000 Ada Generation Embedded GPU.

Mass Storage	
Rotating/SSD Drive €	SATA 6 Gb/s port. Latching SATA connector. Optional dual non-latching connector.
Flash/SSD €	Soldered-down 128 GB NVMe. Supports Data at Rest security functions. Capacities to 1 TB supported.

Network Interface	
Ethernet ‡	Two AutoDetect 10BaseT/100BaseTX/1000BaseT ports. (Additional two 10,000 Base T available depending on model.) Latching connector. One port with network boot option.

Device I/O	
USB ‡§	Two USB 3.1 / 2.0 ports. Four USB 2.0 host ports.
COM Interface ‡	Two RS-232/422/485 selectable. 16C550 compatible. 1 Mbps max.
Digital I/O	Eight TTL I/O Lines 3.3V. Independently configurable.
I2C	Single I2C interface
Counter/Timers	Three 8254 compatible Programmable Interval Timers (PITs).

Software	
BIOS	UEFI based on Phoenix SecureCore Tiano™
Sleep Mode	ACPI 3.0. Support for S0, S3, S4, S5 states.
Operating Systems	Compatible with most x86 operating systems including Windows 10/11, Linux, and Windows Server.



Shown with optional mounting brackets

Sabertooth AI

Product Data Sheet | GPU-Enabled Embedded Computer

Ordering Information

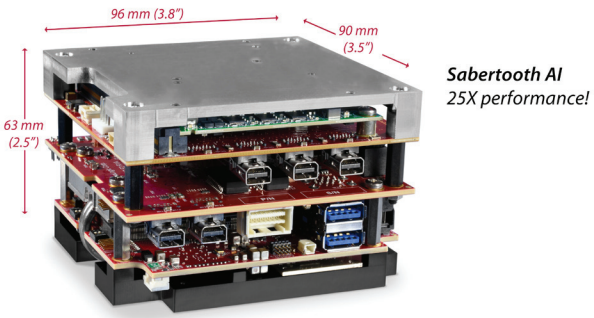
Call VersaLogic Sales at (503) 747-2261 for more information!

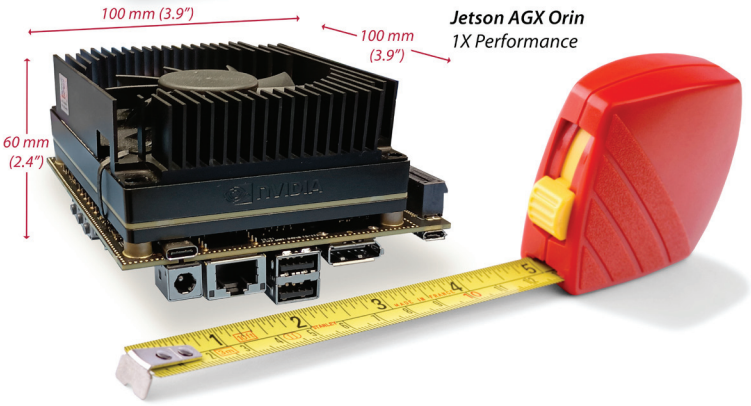
Model	GPU	Processor	Cores	Hyper-Threading / Threads	CPU Clock / Turbo Speed	On-board Storage	SODIMM Memory	Operating Temp.†	Cooling
VL-ASM51-2AE	NVIDIA RTX 2000 Ada Generation	Xeon E-2276ML	6	Yes / 12	2.0 GHz / 4.2 GHz	128 GB NVMe SSD	32 GB ECC	-40° to +85°C	Heat Plates

† Heat plate must be kept below 80°C. Final operating temperature is dependent on customer's thermal solution.

Accessories

Part Number	Description
Cable Kit	
VL-CKR-SABERTOOTH	Sabertooth Eval. cable kit. Includes VL-CBR-4005, 0812, 1604, 0815, 0702, 2033, 1014, 0816, 0817, HDW-105 and 401.
VL-CBR-4005	System I/O paddleboard
VL-CBR-0812	12" 8 pin Nanofit to Fork Terminal, Power Cable
VL-CBR-1604	Dual Ethernet cable, 16-pin Clik-Mate to 2 RJ-45 – rugged latching, 12"
VL-CBR-0815	12" 8-pin Molex Micro-Fit+ to Fork Terminals, 3-Bank Power Cable
VL-CBR-0816	12" ATX 8-pin to 8-pin Molex Nano-Fit
VL-CBR-0817	12" ATX 24-pin to 8-pin Molex Micro-Fit+
VL-CBR-0702	SATA cable – rugged latching, 20"
VL-CBR-2033	Mini DisplayPort to HDMI Active Adapter
VL-CBR-1014	RS232 Dual channel cable 2xDsub (9-pin), Latching, 12"
VL-HDW-105	0.6" Standoff Package, metric thread
VL-HDW-401	Thermal compound paste. For heat sink attachment.
Cables and Adapters	
VL-CBR-0203	2-pin Latching Battery Module, 6"
VL-CBR-2031	36" mDP to mDP Cable
VL-CBR-2032	Mini DisplayPort to VGA Adapter
VL-CBR-0812	12" 8-pin Nano-Fit to Fork Terminals, 12V Power Cable
VL-CBR-0816	12" ATX 8-pin to 8-pin Molex Nano-Fit
Thermal Options	
VL-HDW-424	Heat Sink with Fan
VL-HDW-425	Heat Pipe Adapter Kit
Miscellaneous	
VL-PS-ATX12-300A	ATX development power supply (requires VL-CBR-0816 and VL-CBR-0817)
VL-HDW-116	L mounting brackets for VL-ASM51-2AE & 3AE





Take the Risk out of Embedded Computing

Whether it's selecting the optimum solution for your application, providing expert support during development, or on-time delivery of defect-free products, VersaLogic is here to make sure your project goes smoothly from initial concept through the extended life of your program. Contact VersaLogic today to learn more.

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