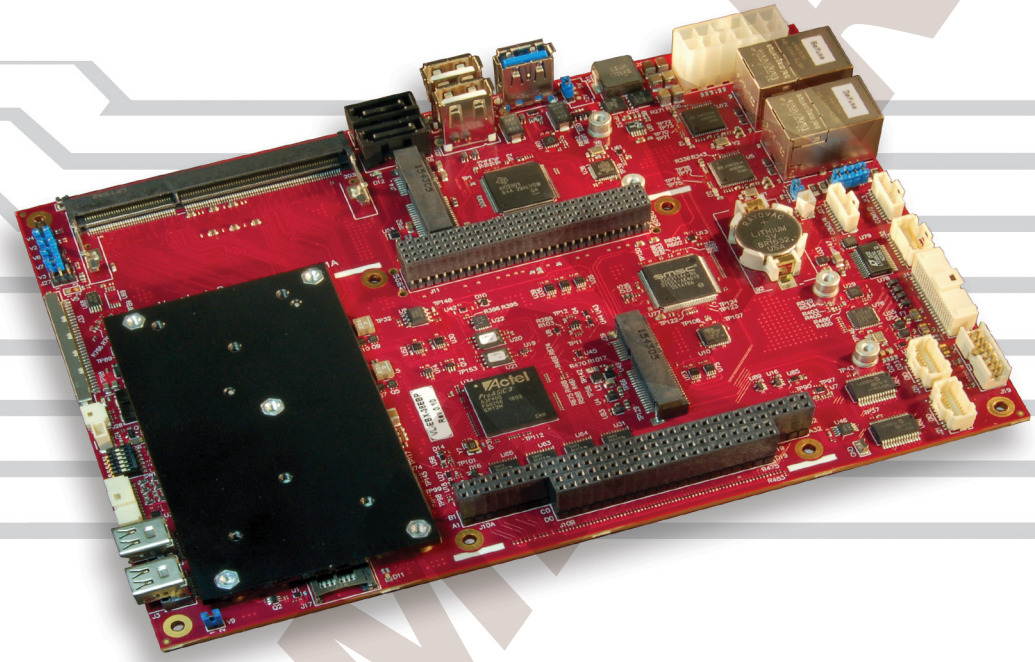
Viper

EBX Single Board Computer



Overview

The Viper is a low power / high-performance single board computer (SBC) which combines Intel's advanced Bay Trail processor, with a traditional PC/104-*Plus*™ expansion interface. This combination makes it easy to upgrade existing systems to a powerful 4th generation Atom processor, while preserving plug-in expansion to existing specialty I/O boards. In addition, it also contains a full complement of on-board I/O interfaces, including USB 3.0, mini PCIe expansion socket, TPM chip, A/D, D/A, and 32-bits of digital I/O.

Driven by a low power E3800 (Bay Trail) processor, with clock rates up to 1.9 GHz, the Viper features quad-, dual-, and single-core processor options.

Viper is built on the industry-standard EBX form factor. It includes legacy ISA and PCI connectors to interface directly with PC/104-Plus expansion boards.

As with all VersaLogic products, the Viper is designed to support OEM applications where high reliability and long-term availability are required. Viper is backed by a 5-year warranty, 5-year minimum off-the-shelf availability guarantee, and expert US-based technical support. From application design-in support, to its 10+ year extended life programs, the Viper provides a durable embedded computer solution with an excellent cost of ownership.

Highlights PRELIMINARY

- -40° to +85°C Operating Temperature
- Shock & vibration per MIL-STD-202G
- EBX™ form factor
- PC/104-*Plus* expansion
- On board power conditioning. 9 to 15 volt input
- Fanless versions
- 4th Generation Intel® Atom™ processor ("Bay Trail") Quad-, dual-, and single-core models.
- TPM (Trusted Platform Module) security chip
- Up to 16 GB RAM
- Low power draw
- Dual Gigabit Ethernet
- VGA, DisplayPort, and LVDS video output
- Mini PCIe expansion sockets
- USB 3.0 and 2.0 ports
- Serial I/O (RS-232/422/485)
- I2C, SPI / SPX
- Digital I/O (32 lines)
- Analog Input (8 chan.)
- Analog Output (4 chan.)
- VersaAPI software support

VERSALOGIC CORPORATION

Features PRELIMINARY

1 Intel Atom "Bay Trail" Processor
Up to 1.9 GHz clock rate. Quad-, dual-, or single-core options. Low power consumption.

2 Trusted Platform Module
On-board TPM security chip can lock out unauthorized hardware and software access.

3 High-performance Video
Integrated Intel Gen 7 graphics core supports DirectX 11, OpenGL 4, and H.264, MPEG-2 encoding/decoding. Analog (VGA) (**3a**), Mini DisplayPort (**3b**), and LVDS video outputs (**3c**). DisplayPort supports HD audio output.

4 Network
Dual Gigabit Ethernet (GbE) with remote boot support.

5 Memory
Up to two SO-DIMM sockets. Up to 8 or 16 GB DDR3L memory model dependent (**5a on front and 5b on back**).

6 SATA
Dual 3 Gb/s SATA ports. Supports rotating or solid state SATA drives.

7 Mini PCIe Card Sockets
Dual full-sized sockets. Supports Wi-Fi modems, GPS, MIL-STD-1553, Ethernet, flash data storage, and other mini PCIe modules (**7a and 7b**).

8 MicroSD Socket
Supports removable microSD card solid-state drives.

9 Industrial I/O
One USB 3.0 port (**9a**) and six USB 2.0 ports (**9b**) support keyboard, mouse, and other devices.

Four RS-232/422/485 serial ports (**9c**), three 8254 timer/counters, and I2C support.

10 Analog and Digital I/O
On-board data acquisition support. Eight analog inputs, four analog outputs, and thirty-two 3.3V digital I/O lines.

11 SPI Interface
Supports SPI and SPX devices, including low cost analog and digital modules.

12 Power Input
Wide input 9 to 15V or regulated 5V. Jumper selectable.

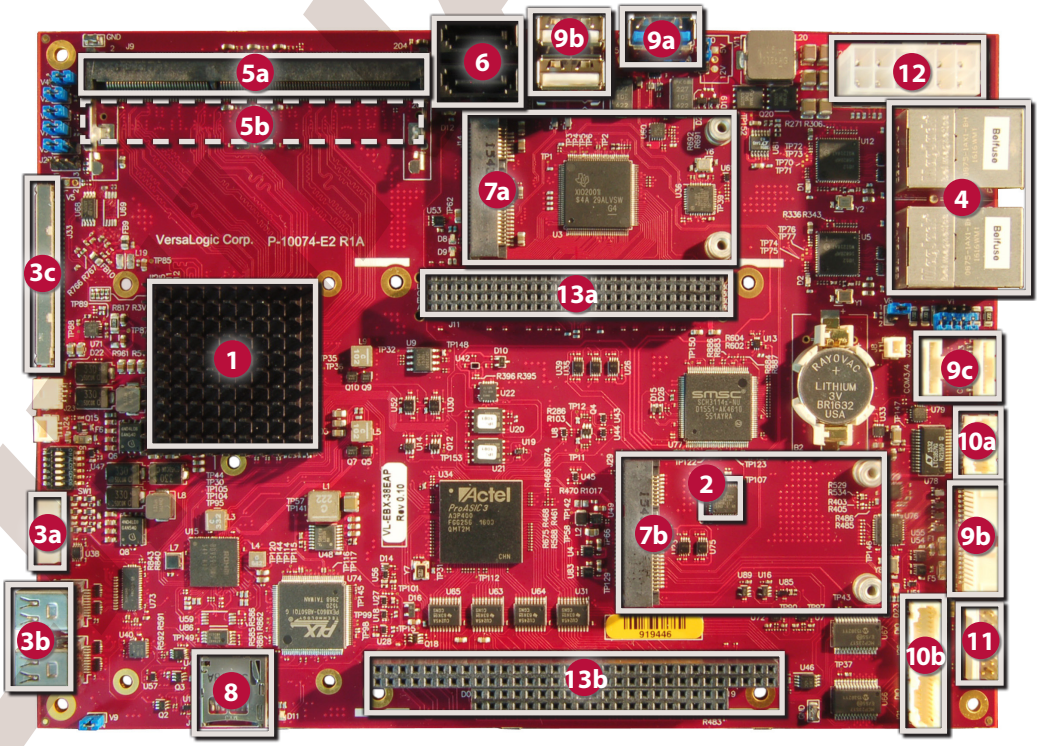
13 PC/104-Plus Expansion
Legacy PCI and ISA connectors

Fanless Operation
No moving parts required for CPU cooling in most configurations.

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

MIL-STD-202G
Qualified for high shock and vibration environments.

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



Tailor Viper to Your Exact Requirements

Customization options are available in quantities as low as 100 pieces.

- Conformal Coating
- Custom Cabling
- Connector & I/O Changes
- Custom Testing
- Custom Labeling
- BGA Underfill
- BIOS Modifications
- Software and Drivers
- Revision Locks
- Custom Screening
- Application-Specific Testing
- And more –

Specifications PRELIMINARY

General	
Board Size	EBX standard: 146 mm x 203 mm (5.75" x 8")
Processor	Intel 4th Generation Atom E3845 (quad core), E3826 (dual core), or E3815 (single core). 512K L2 cache per core. Supports Intel 64-bit instructions, AES Instructions, Execute Disable Bit, and Virtualization Technology.
Input Voltage	5V +/- 5% or wide input: 9 to 15V (12V nominal). Jumper selectable.

Power Requirements § ESTIMATED	*Model*	*Idle**	*Typical**	*Max.**
	EBX-38EAP	5.0W	5.5W	6.0W
	EBX-38EBP	5.5W	6.0W	6.0W
	EBX-38ECP	6.0W	7.0W	9.0W

System Reset & Hardware Monitors	All voltage rails monitored. Watchdog timer with programmable timeout. CPU temperature and fan speed monitoring. Push-button reset and power.
Stackable Bus	PC/104-*Plus* format. ISA and PCI connectors.
RoHS	Compliant

Environmental				
Cooling Options	Bolt-on heat plate standard. Optional Heat sink, Heat sink with fan, heat pipe, and other adaptors available.			
Operating Temperature ◊	*Model*	*Heat Plate***	*Heat Sink*	*Heat Sink + Fan*
	All Models	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C
	Ranges shown assume 90% CPU utilization. For detailed thermal information, refer to the VL-EBX-38 Reference Manual. **Heat plate must be kept below 90°C			
Airflow Requirements	Refer to the VL-EBX-38 Reference Manual for detailed airflow requirements.			
Storage Temperature	-40° to +85°C			
Altitude	Operating*	To 4,570m (15,000 ft.)		
	Storage	To 12,000m (40,000 ft.)		
Thermal Shock	5°C/min. over operating temperature			
Humidity	Less than 95%, noncondensing			
Vibration, Sinusoidal Sweep ¤	MIL-STD-202G, Method 204, Modified Condition A: 2g constant acceleration from 5 to 500 Hz, 20 min. per axis			
Vibration, Random ¤	MIL-STD-202G, Method 214A, Condition A: 5.35g rms, 5 min. per axis			
Mechanical Shock ¤	MIL-STD-202G, Method 213B, Condition G: 20g half-sine, 11 ms duration per axis			

Security	
TPM	Trusted Platform Module 1.2 device. Atmel - AT97SC3204-U2MA-20

Memory	
System RAM	VL-EBX-38EBP and VL-EBX-38ECP models support two SO-DIMM sockets, each socket supports up to 8 GB DDR3L (1.35V) SDRAM. Max memory up to 16 GB. VL-EBX-38EAP has one SO_DIMM socket, max memory up to 8 GB.
Memory Speed	1066 MHz or 1333 MHz, CPU dependent

§ Represents operation at +25°C and +12V running Windows 7 with on-board, VGA display, SATA, Ethernet, COM, and USB keyboard/mouse. Typical power computed as the mean value of Idle and Maximum power specifications. Maximum power measured with 95% CPU utilization.

‡ TVS protected port (enhanced ESD protection)

Power pins are overload protected

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

* For extended altitude information contact VersaLogic Sales Dept.

¤ MIL-STD-202G shock and vibe levels were used to illustrate the overall ruggedness of this product. Certification at higher levels or different types of shock or vibration methods per the specific requirements of the application is available. Contact a VersaLogic Sales Engineer for further information.

Video		
General	Integrated high-performance video. Intel Gen-7 graphics core with 4 Execution Units and Turbo Boost. Supports 2 independent displays. Supports DirectX 11, OpenGL 4.0, VP8, MPEG2, H.264, VC1, 2 HD streams (1080p@30fps), Flash and WMP support.	
	Hardware Based	*Format*
	Decode	H.264, MPEG2,, MPEG4, MVC, VC-1, WMV9, VP8, MJPEG
	Encode	H.264, MPEG2, MVC
	Analog and dual mini DisplayPort, and LVDS video interfaces support Extended Desktop, Clone, and Twin display modes.	
VRAM	Up to 224 MB shared DRAM	
Desktop Display Interface ‡	Standard analog output (VGA). 24-bit. Up to 2560 x 1600 (60 Hz).	
DisplayPort Interface §	Dual Mini DisplayPort outputs supports DP++ and HDMI signaling (Video and Audio outputs). 24-bit. Up to 2560 x 1600.	
OEM Flat Panel Interface #	Single- or Dual-channel LVDS interface. Up to 1920 x 1200 18/24-bit.	
LVDS Panel Power	3.3V or 5V supply for Panel (4A max) Jumper Selectable	

Mass Storage	
Rotating or Solid-State Drives	Dual SATA (Revision 2.0) port. Latching connectors
Flash storage	mSATA (mini-PCIe) socket (SATA signaling, bootable)
Flash storage	MicroSD socket. Supports up to 32 GB. Bootable

Network Interface	
Ethernet ‡	Two autodetect 10BaseT/100BaseTX/1000BaseT ports with status LEDs. IEEE 1588 Precision Time Protocol (PTP) compatible.
Network Boot Option	Via BIOS extension

Device I/O	
USB # ‡	One USB 3.0 host port and six USB 2.0 host ports.
COM	Four RS-232/422/485 selectable. 16C550 compatible. 460 Kbps.
Analog Input	Eight 12-bit channels. Single-ended and/or differential. 100 Ksps. 0 to 5V, ±5V, 0 to +10V, and ±10V.
Analog Output	Four channels. 12-bit single-ended. 100 Ksps.
Digital I/O	Thirty-two TTL I/O lines (3.3V). Independently configurable.
Audio	Optional. Use VL-ADR-01 audio interface.
Counter/Timers	Three 8254 16-bit timers

Other I/O	
Mini PCIe / mSATA Socket	Two full-size Mini PCIe sockets. One with mSATA signaling support. Supports Wi-Fi modems, GPS receivers, solid state mSATA drives, and other plug-in modules.
SPI Interface	Supports SPI and SPX devices. Supports up to four SPX modules.

Software	
BIOS	Phoenix Technologies UEFI BIOS. Field reprogrammable. Support for USB keyboard/mouse and USB boot. User-configurable CMOS defaults.
VersaAPI	VersaLogic Application Programming Interface to support on-board I/O devices.
Sleep Mode	ACPI 3.0. Support for S3 and S4 suspend states and C1 processor state.
Operating Systems	Compatible with most x86 operating systems including Windows, Windows Embedded, Linux, VxWorks, and QNX.

Ordering Information PRELIMINARY

Model	Processor	Cores	Speed	Maximum Memory	DDR Max Speed	Graphics Frequency (Normal/Boost)	Operating Temp.	Cooling
VL-EBX-38EAP	Atom E3815	Single	1.46 GHz	8 GB	1066 MHz	400 MHz / none	-40° to +85°C	Heat plate
VL-EBX-38EBP	Atom E3826	Dual	1.46 GHz	16 GB	1066 MHz	533 MHz/ 667 MHz	-40° to +85°C	Heat plate
VL-EBX-38ECP	Atom E3845	Quad	1.91 GHz	16 GB	1333 MHz	542 MHz/ 792 MHz	-40° to +85°C	Heat plate

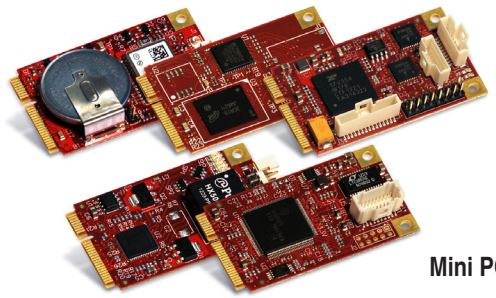
Other configurations are possible. Please contact VersaLogic Sales at (503) 747-2261 to discuss requirements!

Accessories PRELIMINARY

Part Number	Description
Cable Kit	
VL-CKR-VIPER	Development Cable kit for EBX-38. Includes: EBX-38 Viper cable kit. Includes VL-4005, 0702, 1014 x2, 1204, 2004, 2005 x2, 2022, HDW-401, and 105 x2.
VL-CBR-4005	I/O Cable Assy, Cbl & Pdl Bd, RoHS
VL-CBR-2022	ATX 5V power adapter cable 6.5"
VL-CBR-2005 (x2)	12" 1 mm 20-pin to 20-pin DIO Cable, RoHS
VL-CBR-2004	12" 1 mm 20-pin to 20-pin Analog Cable, RoHS
VL-CBR-1204	12" VGA Interface Cable, 12-pin PicoClasp Cable to 15-pin VGA
VL-CBR-0702	20" SATA cable – rugged latching
VL-CBR-1014 (x2)	12" 1 mm 10-pin Pico-Clasp to two DB-9 Cable, RoHS
VL-HDW-105 (x2)	0.6" standoff package (metric thread)
VL-HDW-401	Thermal compound pates. For attaching heat plates and sinks
Thermal Options	
VL-HDW-406	Passive Heat Sink to mount on product heat plate.
VL-HDW-407	Cooling fan for HDW-406 passive heatsink.
VL-HDW-408	Heat Pipe system to mount on product heat plate.
Cables	
VL-CBR-0404	4-pin Pico-Clasp / 4-pin IDE Power to 6-pin 12V LED Back Light, .5m
VL-CBR-1203	ATX12V to 12-pin 12V Power Adapter Cable 12"
VL-CBR-1401	6" 14-pin cable assembly for (2) SPX modules
VL-CBR-1402	12" 14-pin cable assembly for (4) SPX modules
VL-CBR-2031	miniDisplayPort to MiniDisplayPort, 36"
VL-CBR-2032	miniDisplayPort to VGA adapter, 6"
VL-CBR-2033	miniDisplayPort to HDMI adapter, requires DP++ port, 6"
VL-CBR-3001	2-Ch LVDS 30-pin JAE to 30-pin JAE, 20"
VL-CBR-3002	1-Ch LVDS 30-pin JAE to 20-pin Hirose, 20"
VL-CBR-3003	1-Ch LVDS 30-pin JAE to 20-pin JAE, 20"
Audio	
VL-ADR-01	USB to Audio Adapter
Solid-State Storage (flash memory)	
VL-F41-xxxx	microSD card (SDIO), SLC, industrial temp.
Drives	
VL-HDS35-xxx	3.5" hard drive (SATA)
Hardware	
VL-PS-ATX12-300A	Bench-top / development power supply
VL-HDW-106	0.6" standoffs, English thread (four per kit)
VL-HDW-108	Mini PCIe / mSATA hardware kit (metric thread) 2.5 mm
Miscellaneous	
VL-HDW-111	Half to Full Size Mini PCIe Adapter kit. Metal adapter and screws (2)
VL-HDW-203	PC/104 extractor tool (metal)

Expansion Modules PRELIMINARY

Part Number	Description	Form Factor
Network		
VL-MPEe-W2E	Wi-Fi 802.11 a/b/g/n	Mini PCIe
VL-MPEe-E3E	Gigabit Ethernet adapter	Mini PCIe
VL-MPEe-FW1E	FireWire adapter	Mini PCIe
Serial I/O		
VL-MPEe-U2E	Quad serial plus twelve GPIOs	Mini PCIe
Analog & Digital I/O		
VL-SPX-1	Analog Input Module 8-Channels	SPX
VL-SPX-2	Digital I/O Module 16-lines	SPX
VL-SPX-4	Analog Output Module 4-channels 12-bit	SPX
VL-SPX-5	Solid State Switch Module 8-channel	SPX
GPS		
VL-MPEu-G2E	GPS receiver	Mini PCIe
Video		
VL-EPM-V7E	Video Expansion Module: VGA and LVDS	PC/104-*Plus*
VL-MPEe-V5E	VGA and LVDS Interface	Mini PCIe
Solid-State Storage (flash memory)		
VL-MPEs-F1Exx	mSATA module (4/16/32 GB) (SATA)	Mini PCIe
Adapters		
VL-MPEs-S3E	SATA adapter	Mini PCIe



Mini PCIe Modules

Take the Risk out of Embedded Computing

Whether it's selecting the optimum solution for your application, sharing expertise 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 us today to learn more.

ISO 9001:2008 Certified