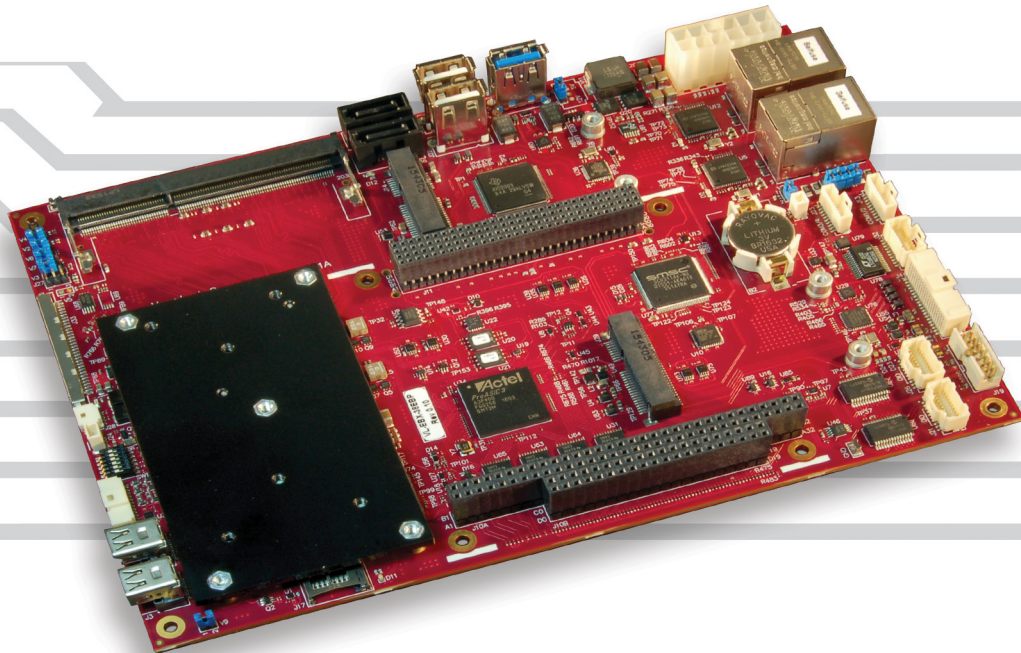


# Viper

## 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

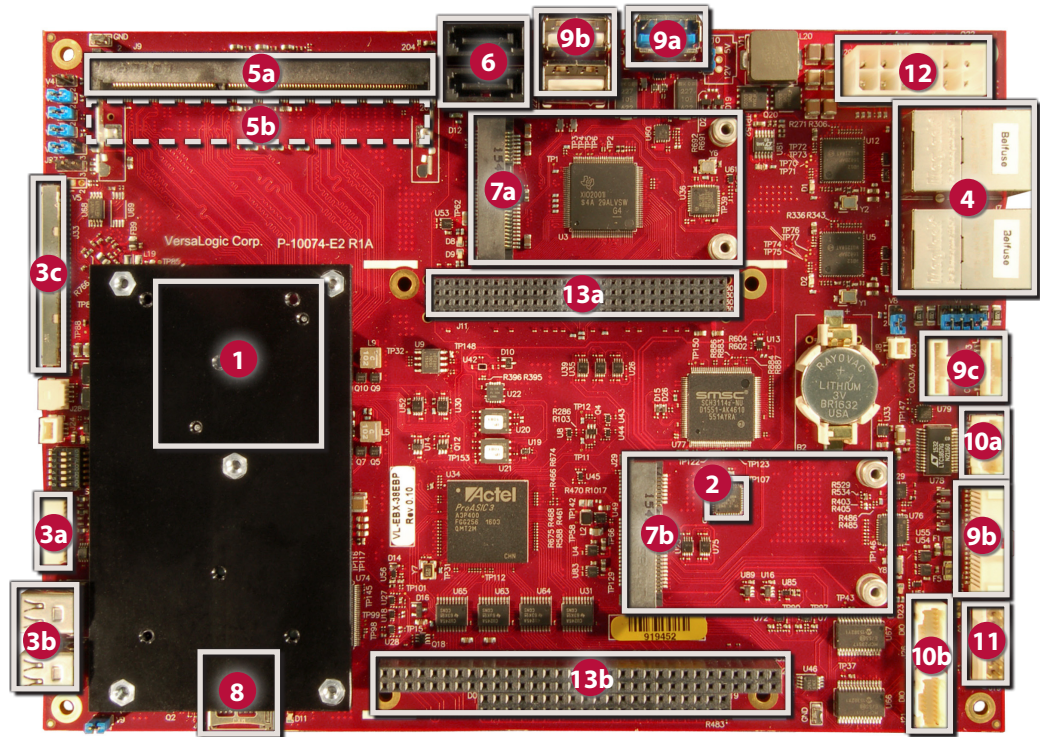
- -40° to +85°C Operating Temperature
- Shock and vibration per MIL-STD-202G
- EBX™ form factor
- PC/104-Plus expansion
- On board power conditioning. 9 to 15 volt input
- Fanless versions
- 4th Generation Intel® Atom™ processor ("Bay Trail") Quad-, dual-, and single-core models.
- TPM (Trusted Platform 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 (40 lines)
- Analog Input (8 chan.)
- Analog Output (4 chan.)
- VersaAPI software support

# Features

- 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. Three 8254 timer/counters, and I2C support.  
  
Four RS-232/422/485 serial ports (9c).
- 10 Analog and Digital I/O**  
On-board data acquisition support. Eight analog inputs, four analog outputs (10a), and forty 3.3V digital I/O lines (10b).

- 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

|   |   |             |                |             |
|---|---|-------------|----------------|-------------|
| <b>General</b>                              |   |             |                |             |
| <b>Board Size</b>                           | EBX standard: 146 x 203 mm (5.75 x 8")  |             |                |             |
| <b>Processor</b>                            | 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. |             |                |             |
| <b>Input Voltage</b>                        | 5V +/- 5% or wide input: 9 to 15V (12V nominal). Jumper selectable.   |             |                |             |
| <b>Power Requirements</b> §                 | <i>Model</i>  | <i>Idle</i> | <i>Typical</i> | <i>Max.</i> |
|   | EBX-38EAP   | 5.5W        | 6.0W           | 6.5W        |
|   | EBX-38EBP   | 6.0W        | 7.0W           | 8.0W        |
|   | EBX-38ECP   | 6.0W        | 7.7W           | 9.5W        |
| <b>System Reset &amp; Hardware Monitors</b> | All voltage rails monitored. Watchdog timer with programmable timeout. CPU temperature and fan speed monitoring. Push-button reset and power.   |             |                |             |
| <b>Stackable Bus</b>                        | PC/104-Plus format. ISA and PCI connectors.   |             |                |             |
| <b>RoHS</b>                                 | Compliant   |             |                |             |

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

|                 |  |
|-----------------|--|
| <b>Security</b> |  |
| <b>TPM</b>      | Trusted Platform Module 1.2 device. Atmel - AT97SC3204-U2MA-20 |

|                     |  |
|---------------------|--|
| <b>Memory</b>       |  |
| <b>System RAM</b>   | 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 16 GB. VL-EBX-38EAP has one SO-DIMM socket, max memory up to 8 GB. |
| <b>Memory Speed</b> | 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.

□ MIL-STD-202G shock and vibration 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 VersaLogic Sales for further information.

Specifications are subject to change without notification. EBX and PC/104-Plus are trademarks of the PC/104 Consortium. All other trademarks are the property of their respective owners.

|                                    |   |
|------------------------------------|---|
| <b>Video</b>                       |   |
| <b>General</b>                     | 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. |
|                                    | <i>Hardware Based</i> <i>Format</i>   |
| 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.  |
| <b>VRAM</b>                        | Up to 224 MB shared DRAM  |
| <b>Desktop Display Interface</b> ‡ | Standard analog output (VGA). 24-bit. Up to 1920 x 1080 (60 Hz).  |
| <b>DisplayPort Interface</b> ‡     | Dual Mini DisplayPort outputs. One supports DP++ and HDMI signaling (Video and Audio outputs). 2nd Mini DisplayPort supports DP only (no Audio output). 24-bit. Up to 2560 x 1600.  |
| <b>OEM Flat Panel Interface</b> #  | Single- or Dual-channel LVDS interface. Up to 1920 x 1200 18/24-bit.  |
| <b>LVDS Panel Power</b>            | 3.3V (1A max) supply for Panel.   |

|                                       |   |
|---------------------------------------|---|
| <b>Mass Storage</b>                   |   |
| <b>Rotating or Solid-State Drives</b> | Dual SATA (Revision 2.0) ports. Latching connectors |
| <b>Flash storage</b>                  | mSATA (mini-PCIe) socket (SATA signaling, bootable) |
| <b>Flash storage</b>                  | MicroSD socket. Bootable                            |

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

|                       |  |
|-----------------------|--|
| <b>Device I/O</b>     |  |
| <b>USB</b> # ‡        | One USB 3.0 host port and six USB 2.0 host ports.  |
| <b>COM</b>            | Four RS-232/422/485 selectable. 16C550 compatible. 460 Kbps.   |
| <b>Analog Input</b>   | Eight 12-bit channels. Single-ended and/or differential. 100 Ksps. 0 to ±5V, ±5V, 0 to +10V, and ±10V. |
| <b>Analog Output</b>  | Four channels. 12-bit single-ended. 100 Ksps. 0 to +4.096V.  |
| <b>Digital I/O</b>    | Forty TTL I/O lines (3.3V). Independently configurable.  |
| <b>Audio</b>          | Optional. Use VL-ADR-01 audio adapter.   |
| <b>Counter/Timers</b> | Three 8254 16-bit timers   |

|                                 |   |
|---------------------------------|---|
| <b>Other I/O</b>                |   |
| <b>Mini PCIe / mSATA Socket</b> | 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. |
| <b>SPI Interface</b>            | Supports SPI and SPX devices. Supports up to four SPX modules.  |

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

## Ordering Information

| 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 |

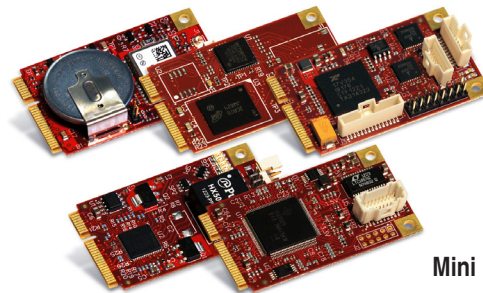
Other configurations are possible. Please contact VersaLogic Sales at (503) 747-2261 to discuss requirements!

## Accessories

| Part Number                               | Description  |
|---|--|
| <b>Cable Kit</b>                          |  |
| VL-CKR-VIPER                              | Development Cable kit for EBX-38. Includes: EBX-38 Viper cable kit. Includes VL-CBR-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 (20-pin ATX) 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 paste. For attaching heat plates and sinks  |
| <b>Thermal Options</b>                    |  |
| 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.   |
| <b>Cables</b>                             |  |
| VL-CBR-0404                               | 4-pin Pico-Clasp / 4-pin IDE Power to 6-pin 12V LED Back Light, .5m  |
| VL-CBR-1203                               | ATX 12V (24-pin ATX) to 12-pin 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 active adapter, 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"  |
| <b>Audio</b>                              |  |
| VL-ADR-01                                 | USB to Audio Adapter   |
| <b>Solid-State Storage (flash memory)</b> |  |
| VL-F41-xxxx                               | microSD card (SDIO), SLC, industrial temp.   |
| <b>Memory</b>                             |  |
| VL-MM9-xxEBN                              | DDR3 PC3-12800 SO-DIMM memory module (1.35v)   |
| <b>Hardware</b>                           |  |
| VL-PS200-ATX                              | 200 watt 5V Bench-top / development power supply (20-pin ATX connector)  |
| VL-PS-ATX12-300A                          | 300 watt 12V Bench-top / development power supply (24-pin ATX connector)   |
| VL-HDW-106                                | 0.6" standoffs, English thread (four per kit)  |
| VL-HDW-108                                | Mini PCIe / mSATA hardware kit (metric thread) 2.5 mm  |
| <b>Miscellaneous</b>                      |  |
| 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

| Part Number                               | Description                              | Form Factor |
|---|--|-------------|
| <b>Network</b>                            |  |             |
| VL-MPEe-E4E                               | Gigabit Ethernet over Fiber adapter      | Mini PCIe   |
| VL-MPEe-E3E                               | Gigabit Ethernet adapter                 | Mini PCIe   |
| VL-MPEe-FW1E                              | FireWire adapter                         | Mini PCIe   |
| <b>Serial I/O</b>                         |  |             |
| VL-MPEe-U2E                               | Quad serial plus twelve GPIOs            | Mini PCIe   |
| <b>Analog &amp; Digital I/O</b>           |  |             |
| 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         |
| <b>GPS</b>                                |  |             |
| VL-MPEu-G2E                               | GPS receiver                             | Mini PCIe   |
| VL-MPEu-G3E                               | Advanced GPS receiver                    | Mini PCIe   |
| <b>Video</b>                              |  |             |
| VL-EPM-V7E                                | Video Expansion Module: VGA and LVDS     | PC/104-Plus |
| VL-MPEe-V5E                               | VGA and LVDS Interface                   | Mini PCIe   |
| <b>Solid-State Storage (flash memory)</b> |  |             |
| VL-MPEs-F1Exx                             | mSATA module (4/16/32 GB) (SATA)         | Mini PCIe   |
| <b>Adapters</b>                           |  |             |
| VL-MPEs-S3E                               | SATA adapter                             | Mini PCIe   |
| VL-EPM-P2E                                | PC/104-Plus Mini PCIe socket x2 Adapter. | PC/104-Plus |



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 9001:2015 Certified

