



- Intel® Core™2 Duo processor (2.26 GHz)
- High-performance video
- Dual gigabit Ethernet
- DDR3 RAM (up to 8 GB)
- USB 2.0 (6 ports)
- Serial I/O (4 ports)
- SATA (2 ports)
- Analog + Digital I/O
- HD audio
- PCIe Mini Card socket
- Industrial temp. version
- SPX™ I/O expansion

## Highlights

### EBX Form Factor

Industry-standard format with PC/104-Plus™ expansion.

### Intel Core 2 Duo Processor

Very high performance.

### High-performance Video

3D video acceleration (Gen 5.0). Analog and LVDS flat panel outputs.

### Network Support

Dual gigabit Ethernet with remote boot support.

### System RAM

Up to 8 GB DDR3 RAM.

### USB I/O

Six USB 2.0 ports support keyboard, mouse, and other devices.

### Device I/O

Four serial ports, two SATA ports, and HD audio.

### Analog + Digital I/O

On-board data acquisition support. Eight analog inputs + four analog outputs + thirty-two digital I/O on standard models. Additional analog channels in custom configurations.

### Mini Card Socket

Supports plug-in Wi-Fi modems, GPS receivers, flash data storage, and other cards.

### Flash Memory

eUSB interface for plug-in flash storage. Other flash options available in custom configurations.

### Industrial Temperature Version

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

### MIL-STD-202G

Qualified for high shock/vibration environments.

### SPX Expansion

Add additional analog, digital, or CANbus modules.

## Overview

The Mamba is an embedded single board computer (SBC) featuring a high-performance Intel Core 2 Duo processor. Based on the EBX industry-standard form factor, the Mamba supports PC/104-Plus stackable expansion boards. With its combination of very high performance (up to 2.26 GHz), mid-range power consumption (18.5W typ.), and extensive on-board I/O capabilities, the Mamba is an ideal embedded computer solution for medical, security, defense, transportation, and industrial applications that rely on fast on-board processing of large amounts of data.

Like all VersaLogic products, the Mamba is designed to support OEM applications where high reliability and long-term availability are required. From application design-in support, to its 5+ year production life guarantee, the Mamba provides a durable embedded computer solution with an excellent cost of ownership. The Mamba is manufactured and tested to the highest quality standards and is fully RoHS compliant. Customization is available, even in low OEM quantities.

## Details

Driven by a 2nd generation Intel Core 2 Duo processor designed specifically for embedded applications, the Mamba runs at up to 2.26 GHz. Enhanced Intel SpeedStep® technology provides dynamic processor frequency scaling to meet instantaneous performance needs while minimizing power draw and heat dissipation. This allows users to fine-tune the balance between power conservation and performance to suit their application needs.

Intel's GM45 + ICH9M chipset offers graphics core speeds up to 533 MHz for high-end graphics, advanced 3D rendering, high-definition video playback, and media acceleration for video CODECs. A dual-channel LVDS flat panel interface and an analog VGA video interface support a wide range of display configurations.

Mamba's standard on-board features include dual gigabit Ethernet, two SO-DIMM sockets for up to 8 GB DDR3 RAM, six USB 2.0 ports, four serial ports, two SATA ports, HD audio, and eUSB flash storage. On-board data acquisition features include up to sixteen analog inputs, up to eight analog outputs, and thirty-two digital I/O lines. The PC/104-Plus expansion site provides plug-in access to industry-standard expansion modules. Additional system expansion and communications flexibility is available via the on-board PCI Express Mini Card socket which can accommodate plug-in Wi-Fi modems, GPS receivers, and more. VersaLogic's SPX expansion interface creates additional access to cost-effective plug-in I/O including analog, digital, and CANbus solutions.

Available in both industrial (-40° to +85°C) and commercial (0° to +60°C) temperature versions; the Mamba meets MIL-STD-202G specifications for shock and vibration. Transient voltage suppression

(TVS) devices on critical I/O ports provide enhanced electrostatic discharge (ESD) protection for the system.

The Mamba features an embedded BIOS with OEM enhancements from Phoenix Technologies. The field-reprogrammable BIOS supports custom defaults and the addition of firmware applications for security processes, remote booting, and other pre-OS software functions. The Mamba is compatible with a variety of popular operating systems including Windows, Windows Embedded, Linux, VxWorks, and QNX.

## Ordering Information

| Model      | Processor        | Speed    | Operating Temp. |
|------------|------------------|----------|-----------------|
| VL-EBX-37A | Intel Core 2 Duo | 2.26 GHz | 0° to +60°C     |
| VL-EBX-37F | Intel Core 2 Duo | 1.2 GHz  | -40° to +85°C   |

## Accessories

| Part Number        | Description   |
|--------------------|---|
| VL-CKR-MAMBA       | Development cable kit. <i>Includes bold items below.</i>          |
| <b>VL-CBR-0401</b> | <b>6.25" ATX to SATA power adapter cable</b>                      |
| <b>VL-CBR-0701</b> | <b>19.75" SATA cable</b>  |
| <b>VL-CBR-0803</b> | <b>12" 8-pin latching / two 3.5 mm stereo line in / out cable</b> |
| <b>VL-CBR-1201</b> | <b>12-pin 2 mm latching / 15-pin VGA adapter cable</b>            |
| <b>VL-CBR-2022</b> | <b>ATX to 10-pin power cable</b>                                  |
| <b>VL-CBR-4004</b> | <b>I/O cable and paddleboard</b>                                  |
| <b>VL-CBR-5009</b> | <b>Primary breakout cable and paddleboard</b>                     |
| <b>VL-HDW-105</b>  | <b>0.6" standoff package (metric thread)</b>                      |
| VL-CBR-0201        | Wi-Fi antenna adapter cable                                       |
| VL-CBR-0702        | 19.75" SATA cable, latching                                       |
| VL-CBR-1401        | Cable assembly for two SPX modules                                |
| VL-CBR-1402        | Cable assembly for four SPX modules                               |
| VL-CBR-2010        | 20" 18-bit LVDS flat panel cable (Hirose)                         |
| VL-CBR-2011        | 20" 18-bit LVDS flat panel cable (JAE)                            |
| VL-CBR-2012        | 20" 24-bit LVDS flat panel cable (Hirose)                         |
| VL-CBR-2014        | LVDS to VGA adapter board   |
| VL-CBR-ANT01       | Wi-Fi (802.11n) antenna   |
| VL-CFA-2A          | CompactFlash adapter (SATA)                                       |
| VL-ENCL-5C         | Development enclosure   |
| VL-F15-xxxx        | eUSB module (USB)   |
| VL-F23-xxxx        | MiniBlade™ module (USB)   |
| VL-TBD-xxxx        | Disk on Module (SATA)   |
| VL-HDS35-xxx       | 3.5" hard drive (SATA)  |
| VL-HDW-106         | 0.6" standoff package (English thread)                            |
| VL-HDW-107         | PCI Express Mini Card mounting hardware kit                       |
| VL-MM7-xxxx        | DDR3 SDRAM module   |
| VL-PS200-ATX       | Development power supply  |
| VL-SPX-x           | SPX expansion modules   |
| VL-WD10-CBN        | PCI Express Mini Card: 802.11g/n wireless                         |

\* Power specifications represent operation at +25°C with +5V supply running Windows XP with 1 GB RAM, dual Ethernet, keyboard, and mouse. Typical power computed as the mean value of Idle and Maximum power specifications. Maximum power is measured with 95% CPU utilization.

† TVS protected port (enhanced ESD protection)

‡ Power pins on this port are overload protected

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## Specifications

| General           |  | Board Size                       | EBX standard: 5.75" x 8" (146 mm x 203 mm)  |                                   |              |              |
|-------------------|--|----------------------------------|---|-----------------------------------|--------------|--------------|
|                   |  | Processor                        | Intel Core 2 Duo (P8400). Up to 1066 MHz FSB. 3 MB L2 cache. Temperature protected.   |                                   |              |              |
|                   |  | Chipset                          | GM45 + ICH9M  |                                   |              |              |
|                   |  | Power Requirements *             | Model   | Idle                              | Typical      | Max          |
|                   |  |                                  | VL-EBX-37A  | 2.4A (12.0W)                      | 3.7A (18.5W) | 5.0A (25.0W) |
|                   |  |                                  | VL-EBX-37F  | 2.2A (11.0W)                      | 2.9A (14.3W) | 3.5A (17.5W) |
|                   |  | System Reset & Hardware Monitors | Major voltage rails monitored. Watchdog timer with 20 ms resolution.  |                                   |              |              |
|                   |  | Stackable Bus                    | PC/104-Plus: PCI, ISA   |                                   |              |              |
|                   |  | Other I/O Expansion              | PCI Express Mini Card socket. SPX interface.  |                                   |              |              |
|                   |  | RoHS                             | RoHS (2002/95/CE) compliant   |                                   |              |              |
| Environmental     |  | Operating Temperature            | Model   | Operating Temperature             |              |              |
|                   |  |                                  | VL-EBX-37A  | 0° to +60°C                       |              |              |
|                   |  |                                  | VL-EBX-37F  | -40° to +85°C                     |              |              |
|                   |  | Storage Temperature              | -40° to +85°C   |                                   |              |              |
|                   |  | Airflow Requirements             | Free air from -40° to +85°C   |                                   |              |              |
|                   |  | 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 minutes per axis  |                                   |              |              |
|                   |  | Vibration, Random                | MIL-STD-202G, Method 214A, Condition A: 5.35g rms, 5 minutes per axis   |                                   |              |              |
|                   |  | Mechanical Shock                 | MIL-STD-202G, Method 213B, Condition G: 20g half-sine, 11 ms duration per axis  |                                   |              |              |
| Memory            |  | System RAM                       | Two SO-DIMM sockets. Up to 8 GB DDR3 SDRAM.   |                                   |              |              |
| Video             |  | General                          | Integrated high-performance video. Intel GMA 4500 MHD graphics core. Optional video adapter card converts LVDS output to VGA for dual VGA operation.                                |                                   |              |              |
|                   |  | VRAM                             | Up to 512 MB shared DRAM  |                                   |              |              |
|                   |  | Desktop Display Interface †      | Standard analog output (VGA)  |                                   |              |              |
|                   |  | OEM Flat Panel Interface         | Dual-channel LVDS interface. 18/24-bit. CMOS-selectable TFT panel types. Up to 1920 x 1200 (24 bits).   |                                   |              |              |
| Mass Storage      |  | Hard Drive                       | Two SATA (Revision 2.0) ports   |                                   |              |              |
|                   |  | Flash                            | Standard  | eUSB (USB signaling)              |              |              |
|                   |  |                                  | Custom  | MiniBlade (USB or SATA signaling) |              |              |
|                   |  |                                  |   | SATA DOM (SATA signaling)         |              |              |
| Network Interface |  | Ethernet †                       | Two autodetect 10BaseT/100BaseTX/1000BaseT ports  |                                   |              |              |
|                   |  | Network Boot Option              | Intel boot agent (downloadable) supports PXE protocol. Argon Managed Boot Agent (optional with royalty fee) supports PXE, RPL, NetWare, TCP/IP (DHCP, BOOTP) remote boot protocols. |                                   |              |              |
| Device I/O        |  | USB †‡                           | Six USB 2.0/1.1 ports   |                                   |              |              |
|                   |  | COM 1/2 Interface †              | RS-232. 16C550 compatible. 115 Kbps.  |                                   |              |              |
|                   |  | COM 3/4 Interface †              | RS-232/422/485 selectable. 16C550 compatible. 460 Kbps.   |                                   |              |              |
|                   |  | Analog Input                     | Standard  | Eight channels                    |              |              |
|                   |  |                                  | Custom  | Sixteen channels                  |              |              |
|                   |  |                                  | 12-bit. Single-ended. 100 Ksps. Per-channel input ranges of 0 to +5V, ±5V, 0 to +10V, and ±10V.   |                                   |              |              |
|                   |  | Analog Output                    | Standard  | Four channels                     |              |              |
|                   |  |                                  | Custom  | Eight channels                    |              |              |
|                   |  |                                  | 12-bit. Single-ended. 100 Ksps. 0 to +4.096V.   |                                   |              |              |
|                   |  | Digital I/O                      | Thirty-two TTL I/O lines (3.3V). Independently configurable.  |                                   |              |              |
|                   |  | Audio †                          | Digital HD audio in/out   |                                   |              |              |
|                   |  | Counter / Timers                 | Three general-purpose timer inputs  |                                   |              |              |
|                   |  | Other                            | PS/2 keyboard and mouse   |                                   |              |              |
| Software          |  | BIOS                             | Phoenix Technologies Embedded BIOS with OEM enhancements. Field reprogrammable. User-configurable CMOS defaults.  |                                   |              |              |
|                   |  | Operating Systems                | Compatible with most x86 operating systems including Windows, Windows Embedded, Linux, VxWorks, and QNX   |                                   |              |              |