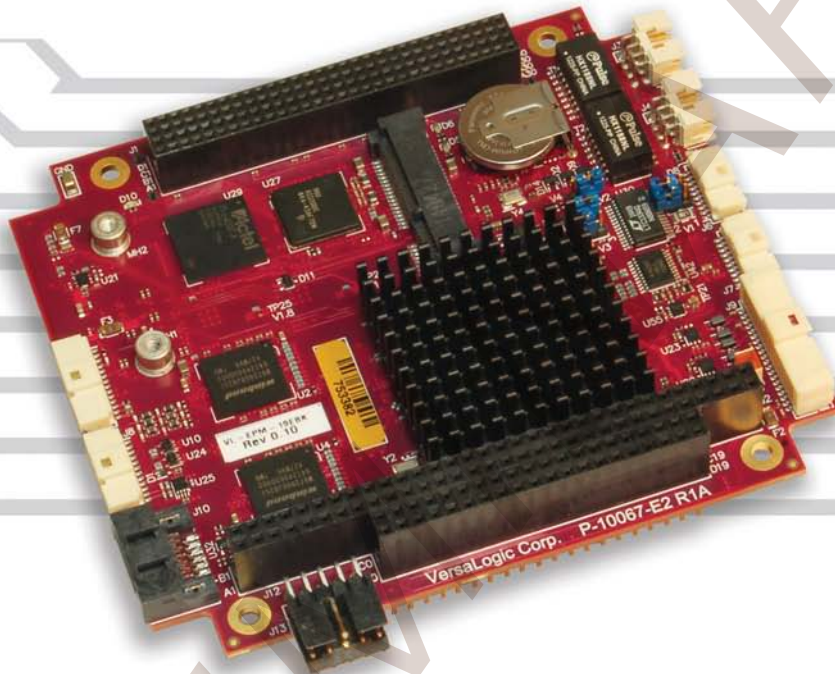# Fox
PC/104-*Plus* Single Board Computer

Overview

The Fox is a low power embedded computer designed around the PC/104-Plus standard. It is powered by a DMP Vortex86DX2 processor that enables the entire board to typically use less than 5.5W of power. Several I/O interfaces, multiple expansion buses, and thermal management options provide system designers with flexibility and low overall system cost.

Fox was designed with no moving parts, soldered-on RAM, and tested so it can withstand extreme temperatures, high-impact, and vibration. This single board computer is an ideal choice for applications that require moderate performance, low-power draw, high quality, and long product life.

As with all VersaLogic products, the Fox is backed by a five-year warranty, 5+ year off-the-shelf availability guarantee, and expert US-based technical support. Product Life Extension options support availability through the year 2025.
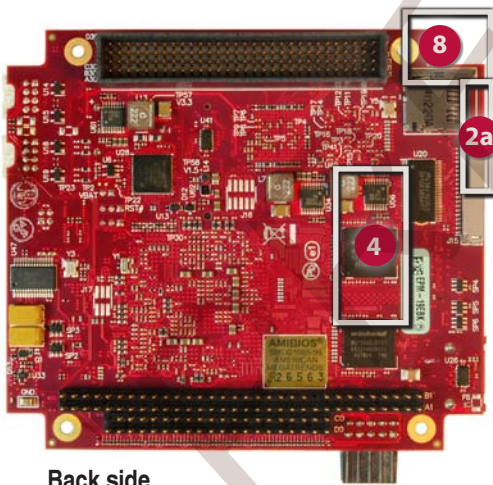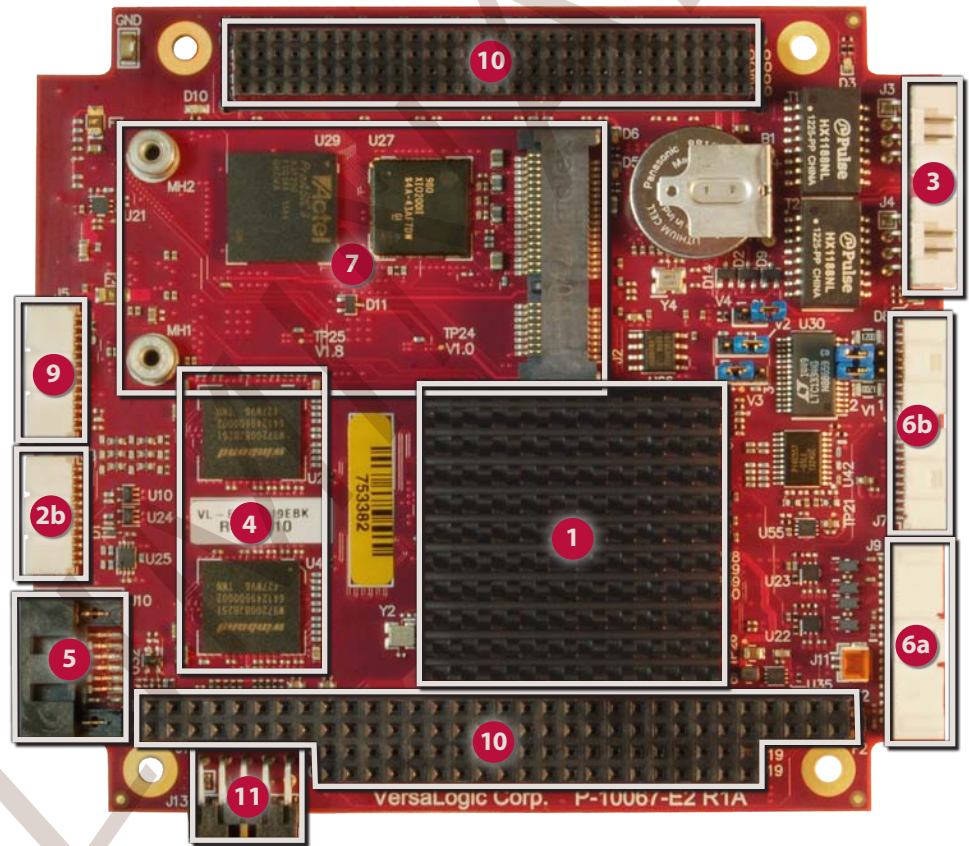
Highlights

- Industrial temp. (-40° to +85°C) versions
- Shock & vibration per MIL-STD-202G
- PC/104™ form factor
- Low power draw
- Fanless Operation
- DMP Vortex CPU
- Up to 1 GB soldered-on RAM

- PC/104-*Plus* expansion interface
- Dual 10/100 Ethernet
- VGA and LVDS video
- Mini PCIe / mSATA socket
- USB 2.0 ports
- Serial I/O (RS-232/422/485)
- SATA port
- MicroSD card socket
- VersaAPI software support

VERSALOGIC
C O R P O R A T I O N

Features PRELIMINARY

1 **DMP Vortex86DX2 32-bit Processor**

Vortex86DX2 x86 low power processor with integrated I/O and 2D graphics engine.

2 **Video Output**

LVDS video output for flat panel displays (2a *on back side*).
Standard analog VGA output (2b).
Simultaneous output from both ports.

3 **Network Support**

Dual Ethernet interfaces, autodetect 10BaseT / 100BaseTX with network boot capability.

4 **RAM** *(on front and back sides)*

Up to 1 GB soldered-on memory.

5 **SATA**

One SATA 1.5 Gb/s port supports high-capacity storage (solid-state drives or rotating media).

6 **Device I/O**

Four USB 2.0 ports support keyboard, mouse, and other devices (6a). Two RS-232/422/485 and two RS-232 serial ports, three 8254 timer/counters, and audio support (6b).

7 **Mini PCIe / mSATA Socket**

Supports Wi-Fi modems, Ethernet, Analog I/O, Serial ports, GPS, MIL-STD-1553, Ethernet, solid-state mSATA drives, and other plug-in devices

8 **MicroSD Socket** *(on back side)*

Supports removable microSD card solid-state drives

9 **SPI Interface**

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

10 **PC/104-***Plus* **Expansion**

Industry-standard ISA and PCI expansion connectors.

11 **Main Power Input**

5V Input ±5%

● **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, and Linux.
Includes VersaAPI software support for onboard I/O devices.

Back side

Tailor Fox 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	PC/104 standard: 108 mm x 96 mm (4.23" x 3.77")
Processor	DMP Vortex86DX2 32-bit
Input Voltage	5V +/- 5%

ESTIMATED Power Requirements	Model	Idle*	Typical*	Max.*
	VL-EPM-19SAK	5.3W	5.5W	5.8W
	VL-EPM-19SBK	5.3W	5.6W	5.9W
	VL-EPM-19EAK	5.0W	5.3W	5.7W
	VL-EPM-19EBK	5.0W	5.4W	5.8W

System Reset & Hardware Monitors	Major voltage rails monitored. Watchdog timer with programmable timeout. CPU temperature monitoring. Push-button reset.
Stackable Bus	PC/104-*Plus* expansion site
Manufacturing Standards	IPC-A-610 Class 2 modified
RoHS	Compliant

Environmental		
Operating Temperature	*See Ordering Information for Specific Models*	
Storage Temperature	-40° to +85°C	
Altitude	Operating*	To 4,570m (15,000 ft.)
	Storage	To 12,000m (40,000 ft.)
Airflow Requirements	*Temp. Range*	*Airflow Requirements*
	Standard 0° to +60°C	0.5 Linear Meters per Second (100 Linear Feet per Minute)
	Extended -40° to +85°C	0.5 Linear Meters per Second (100 Linear Feet per Minute)
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	

‡ TVS protected port (enhanced ESD protection)

Power pins are overload protected

* 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.

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

Memory	
System RAM	Up to 1 GB DDR2 soldered-on memory.

Video	
General	Integrated video controller.
VRAM	Up to 64 MB shared DRAM frame buffer.
Desktop Display Interface ‡	Standard analog output (VGA). Up to 1920 x 1440 (60 Hz). 32-bit. 2 mm IDC connector.
OEM Flat Panel Interface #	LVDS interface. 18/24-bit. Up to 1024 x 768 (60 Hz). 8 bpp. CMOS-selectable TFT panel types. Support for FPD power control.

Mass Storage	
Rotating Drive / Flash / Solid-State Drives	One SATA 1.5 Gb/s port with latching connectors
	One Mini PCIe / mSATA socket (SATA signaling, bootable)
	One microSD socket. Supports up to 32 GB. Bootable.

Network Interface	
Ethernet ‡	Two autodetect 10BaseT/100BaseTX ports with latching pin headers.
Network Boot Option	Via BIOS extension

Device I/O	
USB # ‡	Four USB 2.0 host ports.
COM 1 / 2 ‡	RS-232 16C550 compatible.
COM 3 / 4 ‡	RS-232/422/485 selectable. 16C550 compatible.
Audio	Optional. Use VL-ADR-01 audio interface.
Counter / Timers	Three 8254 16-bit timers

Other I/O	
Mini PCIe / mSATA Socket	Full-size Mini PCIe / mSATA socket. 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 two SPX modules.

Software	
BIOS	AMI BIOS. Support for USB keyboard/mouse and USB boot.
VersaAPI	VersaLogic Application Programming Interface to support on-board I/O devices.
Sleep Mode	None
Operating Systems	Compatible with most x86 operating systems including Windows, Windows Embedded, and Linux.

Ordering Information PRELIMINARY

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

Model	Nominal CPU Speed	Memory Size	Operating Temp. †	Cooling
VL-EPM-19SAK	933 MHz	512 MB	0° to +60°C	Heat Sink
VL-EPM-19SBK	933 MHz	1 GB	0° to +60°C	Heat Sink
VL-EPM-19EAK	800 MHz	512 MB	-40° to +85°C	Heat Sink
VL-EPM-19EBK	800 MHz	1 GB	-40° to +85°C	Heat Sink

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

Accessories PRELIMINARY

Part Number	Description
Cable Kit	
VL-CKR-FOX	Development Cable kit for EPM-19. Includes: VL-CBR-4005, 1014 (x2), 1008, 1204, 0804 (x2), 0702, and HDW-105.
VL-CBR-4005	Primary Breakout Cable: 18" 2mm Latching 40-pin to 40-pin
VL-CBR-1014	12" Pico-Clasp to dual DB-9
VL-CBR-1008	ATX Power Adapter Cable, RoHS
VL-CBR-1204	12" 12-pin Pico-Clasp / 15-pin VGA, RoHS
VL-CBR-0804	12" Latching Ethernet Adapter Cable
VL-CBR-0702	20" SATA cable – rugged latching
VL-HDW-105	0.6" standoff package (metric thread)
Cables	
VL-CBR-0401	6.25" ATX to SATA power cable
VL-CBR-0503	0.5 m USB 2.0 Male A to Male Micro-B Cable (for ADR-01)
VL-CBR-1403	12" 14-pin Pico-Clasp to 14-pin SPX
VL-CBR-2014	LVDS to VGA Adaptor Board, RoHS
VL-CBR-2015	20" 24-bit LVDS Hirose Cable, RoHS
VL-CBR-2016	20" 18-bit LVDS FPD Cable with JAE Connector, RoHS
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-PS200-ATX	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
Serial I/O		
VL-MPEe-U2E	Quad serial plus twelve GPIOs	Mini PCIe
Analog & Digital I/O		
VL-MPEe-A1E	Analog input (12-bit resolution)	Mini PCIe
VL-MPEe-A2E	Analog input (16-bit resolution)	Mini PCIe
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
Memory		
VL-MPEu-K1Exx	AES Encrypted Memory (8 or 32 GB)	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, lending 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.

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