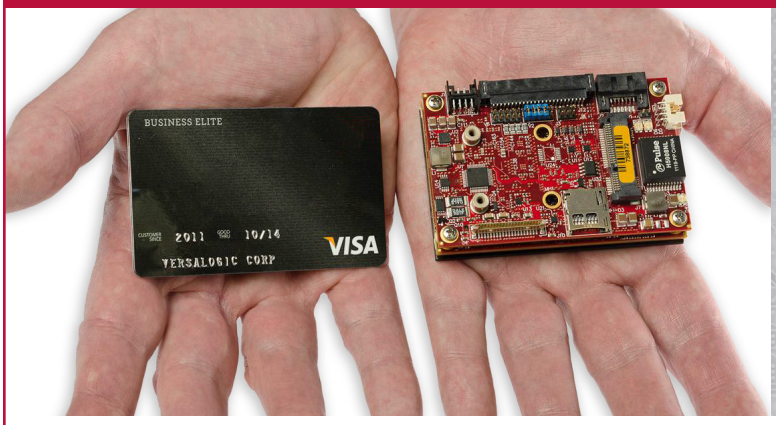
VERSALOGIC CORPORATION

Falcon

Embedded Processing Unit



- A complete x86 embedded computer!
- Intel® Atom™ E6x0T processor
- Industrial temp. (-40° to +85°C)
- Wide input voltage (8V–17V)
- Extremely small
- Mini PCIe expansion socket
- Trusted Platform Module (optional)

Highlights

Embedded Processing Unit
A complete embedded computer in an extremely small/rugged format.

Intel Atom E6x0T Processor
1.6 GHz performance. Low power consumption.

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

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

Fanless Operation
No moving parts required for CPU cooling.

Wide Input Voltage Range
Accepts 8 to 17 volts (12V typ.).

High-performance Video
Graphics core supports MPEG-4/H.264 and MPEG-2 encoding and decoding.

Network
Gigabit Ethernet (GbE) with remote boot support.

RAM
Up to 2 GB soldered-on DDR2 RAM.

SATA
Supports SATA hard drives and mSATA flash storage options.

Mini PCIe Card Socket
Supports Wi-Fi modems, GPS, MIL-STD-1553, Ethernet, solid-state storage, and other plug-in devices.

Device I/O
Four serial ports, four USB ports, Intel High-Definition Audio.

Trusted Platform Module (optional)
On-board security option defends against attacks from unauthorized hardware and software.

RoHS

Overview

The Falcon is an extremely small and rugged embedded computer. It has been engineered and tested to meet the Military and Medical industries' evolving requirements to develop smaller, lighter, and lower power embedded systems while adhering to stringent regulatory standards. Roughly the size of a credit card and less than one inch thick, the Falcon is the embedded industry's smallest, lightest, ultra-rugged embedded x86 computer. This embedded computer, equipped with an Intel Atom E6x0T processor, is designed to withstand extreme temperature, impact, and vibration.

Details

Driven by an Intel Atom E6x0T processor, the Falcon provides a lot of performance, lower power consumption (9–11W typical), and a very compact package. The Falcon provides compatibility with a broad range of standard x86 application development tools for reduced development time.

The integrated Intel GMA600 graphics core provides hardware-accelerated MPEG-4/H.264 and MPEG-2 video encoding and decoding. A standard LVDS output supports flat panel displays. An optional adapter converts the LVDS output to VGA.

Industry-standard system interfaces include Gigabit Ethernet with network boot capability, four USB 2.0 ports, four serial ports, and Intel High-Definition Audio (HDA). A SATA 3 Gb/s interface supports high-capacity storage. Dual microSD sockets and a Mini PCIe socket with mSATA support provide flexible solid-state drive (SSD) options. The Mini PCIe socket also accommodates plug-in Wi-Fi modems, GPS receivers, MIL-STD-1553, Ethernet, Firewire, and other mini cards. The Falcon supports an optional Trusted Platform Module (TPM) for applications that require enhanced hardware-level security functions.

Designed and tested for industrial temperature (-40° to +85°C) operation, the rugged Falcon also meets MIL-STD-202G specifications for shock and vibration. Soldered-on RAM and latching SATA, Ethernet, power, and main I/O connectors provide additional ruggedization for use in extremely harsh environments. Heat sink or heat plate versions provide fanless heat dissipation. Falcon is manufactured to IPC-A-610 Class 2 (modified) standards. For extremely-high-reliability applications, IPC-A-610 Class 3 versions are available.

A wide input voltage range of 8 to 17 volts (12V typ.) simplifies system power supply requirements. It is fully compatible with 12V automotive applications.

Falcon is compatible with a variety of popular x86 operating systems including Windows, Windows Embedded, Linux, and VxWorks.

Product customization is available, even in low quantities. Options include a Trusted Platform Module, conformal coating, BGA underfill, IPC Class 3 assembly, BIOS/splash screen configuration, application specific testing, BOM revision locks, labeling, etc.

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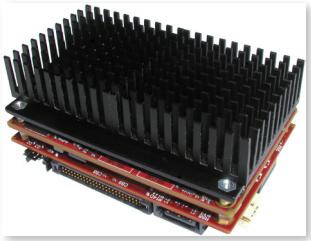
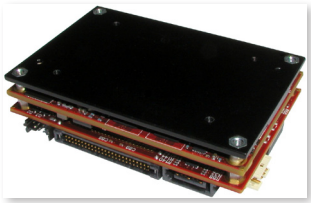


Heat sink models



Heat plate models

Ordering Information

Model	Processor	Speed	RAM	Main I/O Connector	Cooling
VL-EPU-2610-EBPN	Atom E640T	1.0 GHz	1 GB	Non-latching	Heat plate
VL-EPU-2610-ECPN	Atom E680T	1.6 GHz	1 GB	Non-latching	Heat plate
VL-EPU-2610-EDPN	Atom E680T	1.6 GHz	2 GB	Non-latching	Heat plate
VL-EPU-2610-EBKN	Atom E640T	1.0 GHz	1 GB	Non-latching	Heat sink
VL-EPU-2610-ECKN	Atom E680T	1.6 GHz	1 GB	Non-latching	Heat sink
VL-EPU-2610-EDKN	Atom E680T	1.6 GHz	2 GB	Non-latching	Heat sink
VL-EPU-2610-EBPL¤	Atom E640T	1.0 GHz	1 GB	Rugged latching	Heat plate
VL-EPU-2610-ECPL¤	Atom E680T	1.6 GHz	1 GB	Rugged latching	Heat plate
VL-EPU-2610-EBKL¤	Atom E640T	1.0 GHz	1 GB	Rugged latching	Heat sink
VL-EPU-2610-ECKL¤	Atom E680T	1.6 GHz	1 GB	Rugged latching	Heat sink

¤ *Special order*

Accessories

Part Number	Description
Cables	
VL-CKR-FALC-N	Falcon cable kit. Includes VL-CBR-0701, 0804, 0807, 2014, 2015, and 5013.
VL-CKR-FALC-L	Falcon cable kit – rugged latching. Includes VL-CBR-0702, 0804, 0807, 2014, 2015, and 5014.
VL-CBR-0804	12" Ethernet cable - rugged latching
VL-CBR-0807	12" power adapter cable. ATX12 to Falcon.
VL-CBR-2014	LVDS to VGA adapter board
VL-CBR-2015	20" 24-bit LVDS cable (Hirose)
VL-CBR-2016	20" 18-bit LVDS cable (JAE)
VL-CBR-5013	System I/O paddleboard
VL-CBR-5014	System I/O paddleboard – rugged latching
VL-CBR-0201	12" Wi-Fi antenna interface cable
VL-CBR-0701	20" SATA cable
VL-CBR-0702	20" SATA cable - rugged latching
Solid-State Storage (flash memory)	
VL-F29-xxxx	mSATA module (SATA), industrial temp.
VL-F41-xxxx	microSD card (SDIO), SLC, industrial temp.
Rotating Drives	
VL-HDS35-xxx	3.5" hard drive (SATA)
Mini PCIe Expansion Cards	
VL-WD10-CBN	802.11g/n Wi-Fi transceiver module
Hardware	
VL-HDW-107	Mini PCIe/mSATA hardware kit (metric thread)
VL-HDW-405	Secondary mounting plate. Simplifies installation in many situations. Attaches to heat sink or heat plate models.
VL-PS-ATX12-300A	ATX development power supply
Miscellaneous	
VL-CBR-ANT01	802.11n Wi-Fi antenna
VL-HDW-401	Thermal compound paste

§ Represents operation at +25°C and +12V supply running Windows 7 with LVDS display, SATA, GbE, 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.

† IEEE 1588 Precision Time Protocol (PTP) compatible

‡ Bootable storage device capability

** Extended altitude specifications available upon request*

¥ MIL-STD-202G 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 a VersaLogic Sales Engineer for further information.

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Specifications

General	Size	Heat plate models: 55 x 84 x 22 mm (2.17 x 3.31 x 0.87") Heat sink models: 55 x 84 x 38.5 mm (2.17 x 3.31 x 1.51")				
	Processor	Intel Atom E6x0T platform. 512K 8-way L2 cache. Intel Hyper-Threading Technology (HT), Virtualization Technology (VT).				
	Chipset	Intel EG20T Platform Controller Hub (PCH)				
	Battery	Connection for 3.0V RTC backup battery				
	Power Requirements (@ +12V) §	Model	Idle	Typical	Max.	S3
		VL-EPU-2610-EBxx	8.2W	9.0W	9.8W	3.4W
		VL-EPU-2610-ECxx	9.7W	10.6W	11.6W	3.4W
		VL-EPU-2610-EDxx	9.7W	10.6W	11.6W	3.4W
	Input Voltage	8V–17V (nominal 12V operation)				
	System Reset & Hardware Monitors	All voltage rails monitored. Watchdog timer with programmable timeout (1 µS to 10 min.). Push-button sleep, reset, and power.				
	Manufacturing Standards	Standard	IPC-A-610 Class 2 modified			
		Custom	IPC-A-610 Class 3 modified			
	Regulatory Compliance	RoHS compliant				
Environmental	Operating Temperature	-40° to +85°C. Derate -1.1°C per 305m (1,000 ft.) above 2,300m (7,500 ft.).*				
	Storage Temperature	-40° to +85°C				
	Cooling	Fanless. Heat sink or bolt-down heat plate.				
	Airflow Requirements	Model	Temp. Range	Airflow		
		Heat plate models	-40° to +85°C *Heat plate must be kept below 90°C*	Zero airflow		
		Heat sink models	-40° to +60°C	Zero airflow		
			+60° to +85°C	300 LFM		
	Altitude*	Operating	To 15,000 ft. (4,570m)			
		Storage	To 40,000 ft. (12,000m)			
	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 (optional)	Optional support for Intel Trusted Platform Module 1.2 devices. Temperature limitation to 70°C max.				
Memory	System RAM	Standard	1 GB or 2 GB			
		Special Order	512 MB			
		Soldered-on DDR2 SDRAM. 800 MT/s.				
Video	General	Intel GMA600 high-performance graphics core. Advanced 2D/3D graphics. Hardware-accelerated video encode and decode.				
	VRAM	Up to 256 MB + 384 MB shared DRAM				
	OEM Flat Panel Interface	Single-channel LVDS interface. 18/24-bit. Up to 1280 x 768 (60 Hz).				
Mass Storage	Rotating Drive ‡	One SATA 3 Gb/s port. Latching SATA connector.				
	Flash/SSD ‡	Two microSD sockets. Support up to 32 GB each.				
		Mini PCIe socket with mSATA support				
Network Interface	Ethernet †	One autodetect 10BaseT/100BaseTX/1000BaseT port. Latching connector. Network boot option.				
Device I/O	USB ‡	Four USB 2.0 host ports				
	COM 1	RS-232/422 selectable. 16C550 compatible. 1 Mbps max. Handshake lines.				
	COM 2/3/4	RS-232/422 selectable. 16C550 compatible. 1 Mbps max.				
	GPIO	Four user I/O lines. Independently configurable.				
	Audio	Intel High-Definition Audio (HDA) CODEC				
Other I/O	Mini PCIe Card Socket	Supports Wi-Fi modems, GPS receivers, MIL-STD-1553, Ethernet channels, non-volatile flash data storage, and other plug-in modules (full or half size). USB, SATA, and PCIe signaling.				
Software	BIOS	AMI Aptio UEFI BIOS with OEM enhancements. Field reprogrammable.				
	Sleep Mode	ACPI 3.0. Support for S3 suspend state.				
	Operating Systems	Compatible with most x86 operating systems including Windows, Windows Embedded, Linux, and VxWorks				

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