Grizzly
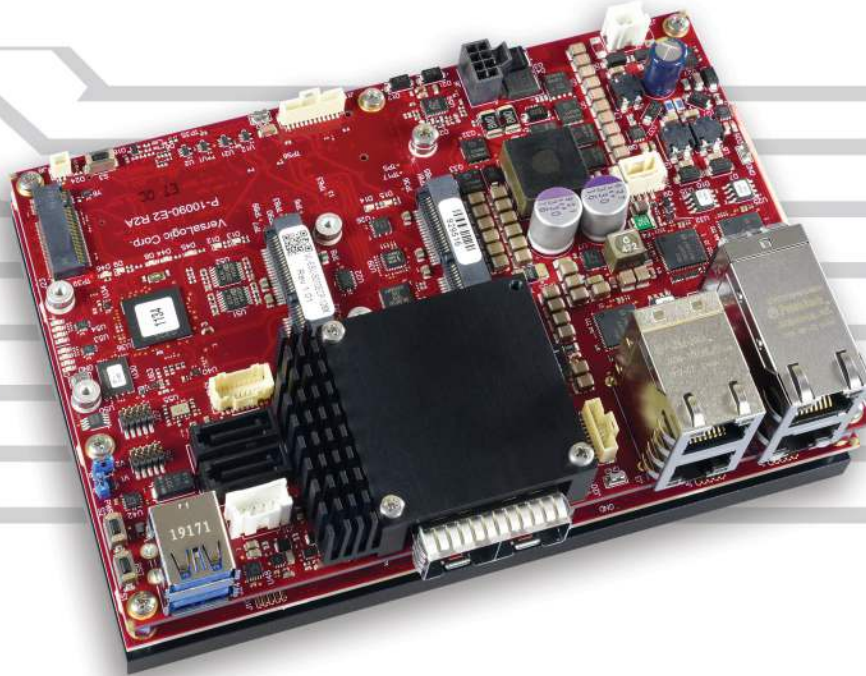## Embedded Server Unit

Overview

The Grizzly is a rugged embedded server unit (ESU) featuring an Intel 8, 12, or 16-core processor, full -40°C to +85°C operation, two 10 Gigabit Ethernet SFP+ ports, four Gigabit Ethernet ports, up to 128 GB of ECC memory and Intelligent Platform Management Interface (IPMI 2.0) functionality. Typical power consumption is as low as 27.6 W. This combination makes it ideal for edge server, network appliance and IoT applications requiring multi-core processing and high data bandwidth within the constraints of a tight power budget. Additionally, two Mini PCIe sockets and a PCIe x4 M.2 site provide for on-board I/O expansion and high speed / high-capacity on-board storage. The Grizzly also contains additional interfaces including USB, serial and digital I/O, and SATA.

The capability of the Grizzly makes it ideal for situations where data gathering, processing, and storage need to be kept local for security or latency reasons, or to provide local cloud capability. A processor with up to 16 cores coupled with up to 128 GB of ECC memory supports the use of hypervisors for running of virtual machines. The 10 Gigabit SFP+ ports permit very high speed connectivity. Networks can be created using plug-in copper, short-reach fiber, or long-reach fiber transceivers.

Highlights

- **Embedded server**
  Intel® 8, 12, or 16-core server-class processor and IPMI 2.0 capability

- **-40° to +85°C Operation**
  Designed for challenging environments

- **Up to 128 GB of ECC memory**
  Industry leading capacity and error correcting RAM

- **10 Gigabit Ethernet (SFP+)**
  Supports two high speed copper or fiber connections

- **Compact size.**
  Only 110 x 155 mm (4.4 x 6.1")

- **On-board data storage**
  M.2 expansion site supports up to 2 TB of storage

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C O R P O R A T I O N

Overview *...continued*

The Grizzly is based on the COM Express Extended form-factor, but it is delivered as an assembled and tested, production-ready embedded computer. For hostile environments, the Grizzly is designed and tested for full industrial temperature operation (-40° to +85°C) and meets MIL-STD-202H specifications for shock and vibration.

VersaLogic's 10+ year product life support ensures long-term availability. This avoids expensive upgrades, redesigns, and migrations that come from shorter lifecycle products. ∎

Features

Intel Server-Class Processor
8, 12, or 16-core processor.

RAM
Up to 128 GB socketed ECC memory (Four SO-DIMMs).

1 10 Gigabit Ethernet
Dual SFP+ cages supporting 10 GbE copper or fiber modules.

2 Ethernet
Dual 1 GbE ports with Power Over Ethernet (**2a**).
Dual 1 GbE ports (**2b**).

3 Serial I/O
Two Host USB 3.0 (**3a**), Dual RS-232 (including console access) (**3b**).

4 Digital I/O
Fourteen 3.3V digital I/O lines.

5 Storage
M.2 expansion site. Add Terabytes of on-board data storage (**5a**).
Two 6 Gb/s SATA ports. Supports rotating or solid-state SATA drives (**5b**).

6 Two Mini PCIe sockets
One full-size + one half-size. Supports Wi-Fi modems, GPS receivers, flash data storage with auto-detect mSATA flash storage support, and other mini PCIe modules.

7 On-board Power Conditioning
10V to 30V input for standard 12V, 24V, and 28V power sources.

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

Intelligent Platform Management Interface (IPMI 2.0)
Out-of-band monitoring and configuration independent of the operating system.

Standard Mounting
COM Express Extended mounting holes.
Only 110 x 155 mm (4.33 x 6.1").

MIL-STD-202H
Qualified for high shock and vibration operation.
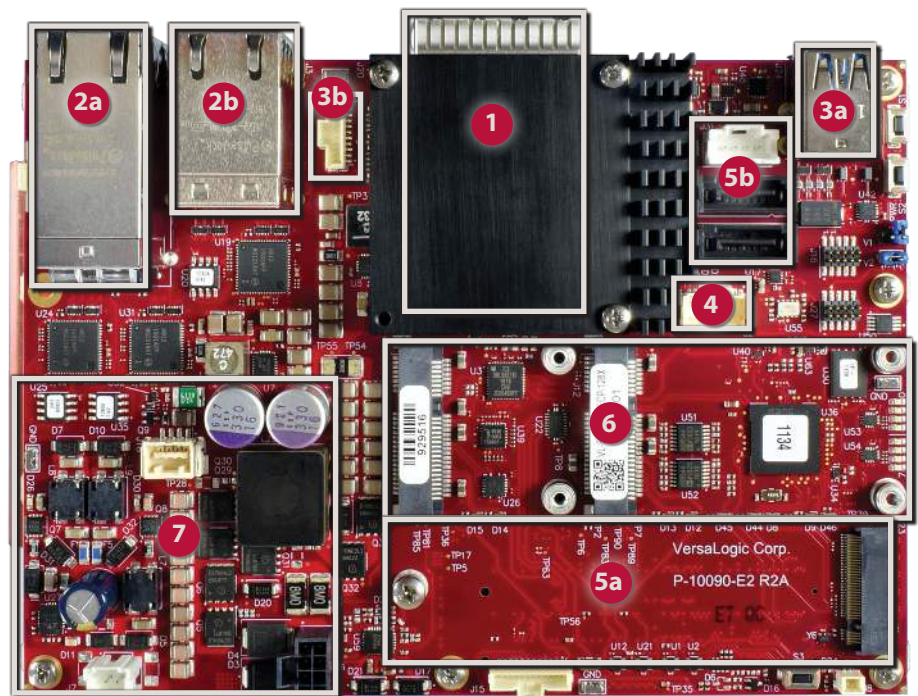
Modify Grizzly to Your Exact Requirements

COTS modifications 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
- Storage device installation
- Software pre-load
- Etc.

Specifications

General

General	
Board Size	COMe Extended Compliant: 110 x 155 mm (4.33 x 6.1"). 49.7 mm (1.96") tall with Heat Plate.

Weight	*Model*	*Weight*
	VL-ESU-5070EAP-32X	812 grams (28.6oz.)
	VL-ESU-5070EBP-64X	813 grams (28.7 oz.)
	VL-ESU-5070ECP-00	699 grams (24.7 oz.)
	VL-ESU-5070ECP-32X	812 grams (28.6 oz.)
	VL-ESU-5070ECP-64X	813 grams (28.7 oz.)
	VL-ESU-5070ECP-128X	845 grams (29.8 oz.)

General	
Processor	Intel C3958 (16-core), C3808 (12-core) or C3708 (8-core) server-class processor. 12 or 16 MB cache. Supports Intel 64-bit instructions, AES New Instructions, Secure Key, Execute Disable Bit, Secure Boot, Virtualization Technology, and Integrated QuickAssist Technology.
RTC Battery	Connector for optional external 3.0V RTC backup battery.

Power Requirements (+12V) †	*Model*	*Idle*	*Typical*	*Max.*
	VL-ESU-5070EAP-32X	24.0 W	27.6 W	31.2 W
	VL-ESU-5070EBP-64X	25.2 W	31.2 W	37.2 W
	VL-ESU-5070ECP-32X	23.8 W	34.7 W	45.6 W
	VL-ESU-5070ECP-64X	23.8 W	34.9 W	45.9 W
	VL-ESU-5070ECP-128X	26.2 W	37.6 W	49.0 W

General	
Input Voltage	10V to 30V input with on-board power conditioner. Accepts standard 12V, 24V, and 28V power input.
Board Management	Board Management Controller (BMC) IPMI 2.0 compliant Out-of-band BMC connectivity via SFP+ 10 Gigabit Ethernet port **-** Out of band remote power and reset control **-** Monitor and log thermal sensors **-** Monitor major voltage rails and log out-of-bound conditions **-** High reliability watchdog **-** System event log Serial over LAN provides terminal access to BIOS and OS
Regulatory Compliance	RoHS (EU 2015/863), Conflict Minerals compliant.

Environmental

Environmental	
Cooling Options	Heat plate (included), heat sink with fan, heat pipe adapter plate.

Operating Temperature ◊	*Model*	*Heat Plate*	*Fan Sink*	*Heat Pipe Adapter*
	All models	-40° to +85°C	-40° to +70°C	-40° to +85°C
	Ranges shown assume 90% CPU utilization. For detailed thermal information, refer to the VL-ESU-5070 Reference Manual. Heat plate must be kept below 80°C.			

Environmental	
Airflow Requirements	0.5 linear m/s.
Storage Temperature	-40° to +85°C

Altitude*	Operating*	To 4,570m (15,000 ft.)
	Storage	To 12,000m (40,000 ft.)

Environmental	
Thermal Shock	5°C/min. over operating temperature
Humidity	Mil-STD-202H method 103 – Humidity steady state
Vibration, Sinusoidal Sweep ¤	MIL-STD-202H method MIL-STD-202-204, Condition A: 2g
Vibration, Random ¤	MIL-STD-202H method MIL-STD-202-214, Condition A: 5.35g rms
Mechanical Shock ¤	MIL-STD-202H method MIL-STD-202-213, Condition G: 20g half-sine

Security

Security	
TPM	Intel Trusted Platform Module 2.0 device

Memory

Memory	
System RAM	Four SO-DIMM sockets. Up to 128 GB DDR4 (1.2V) ECC SDRAM.
Memory Speed	Up to 2133 MHz

Mass Storage

Mass Storage	
Rotating Drives / Flash / Solid-State Drives	Two SATA (Revision 3.0) ports (with data and power). Latching connectors. Bootable.
	mSATA module (SATA signaling). Bootable.
	One M.2 module (either M-key or B & M-key 2280 socket). PCIe Gen 3 x4 NVMe SSD compatible. Bootable.

Network Interface

Network Interface	
Ethernet‡	Two SFP+ cages compatible with copper or fiber (SR and LR) 10 GbE modules. Backward compatible with 1 GbE modules. Four autodetect 10BaseT/100BaseTX/1000BaseT ports, two with Power Over Ethernet. On-board status LEDs and external LED header. IEEE 1588/802.1AS precision time synchronization supported.
Network Boot	Supported on 10 GbE and 1 GbE ports.

Device I/O

Device I/O	
USB‡ §	Two USB 3.0 host ports with Type A connectors.
Serial ‡	Two RS-232.
Digital I/O	Fourteen TTL I/O lines (3.3V). Independently configurable.

Other I/O

Other I/O	
Mini PCIe/Sockets	One full-, one half-length Mini PCIe socket. Supports Wi-Fi modems, GPS receivers, non-volatile flash data storage (auto-detect mSATA support), and other plug-in modules.

Software

Software	
VersaAPI	VersaLogic Application Programming Interface to support on-board I/O devices.
Operating Systems	Compatible with most x86 standard and server operating systems including Windows, Linux, and VMWare.

† Represents operation at +25°C with +12V supply running Windows Server 2019. Typical power computed as the mean value of Idle and Maximum power specifications. One SFP+ optical network adaptor installed. One M.2 NVME 256 GB solid state drive installed. MPEe-V5E Mini PCIe VGA video adaptor installed. USB keyboard and mouse connected. Maximum power is measured with 95% CPU utilization.

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

* Extended altitude specifications available upon request

‡ TVS protected port (enhanced ESD protection)

§ Power pins on this port are overload protected

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

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Ordering Information

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

Model	Processor	Cores	Speed	Cache	Installed Memory	Max Memory**	Operating Temp.	Cooling
VL-ESU-5070EAP-32X	C3708	8	1.7 GHz	16 MB	32 GB ECC	96 GB ECC	-40° to +85°C	Heat Plate
VL-ESU-5070EBP-64X	C3808	12	2.0 GHz	12 MB	64 GB ECC	128 GB ECC	-40° to +85°C	Heat Plate
VL-ESU-5070ECP-00	C3958	16	2.0 GHz	16 MB	None	64 GB ECC	-40° to +85°C	Heat Plate
VL-ESU-5070ECP-32X	C3958	16	2.0 GHz	16 MB	32 GB ECC	96 GB ECC	-40° to +85°C	Heat Plate
VL-ESU-5070ECP-64X	C3958	16	2.0 GHz	16 MB	64 GB ECC	128 GB ECC	-40° to +85°C	Heat Plate
VL-ESU-5070ECP-128X	C3958	16	2.0 GHz	16 MB	128 GB ECC	128 GB ECC	-40° to +85°C	Heat Plate

** Maximum total memory possible after additional customer installed memory.

Accessories

Part Number	Description
Cable Kit	
VL-CKR-GRIZZLY	ESU-5070 Grizzly Eval. Cable kit. Includes VL-CBR-0812, 0203, 2005, 0206, 0702, 0407, and 1014
VL-CBR-0812	Power cable, 10 to 30V, high-power. 8 Pin Molex Nano-fit to fork terminals. 12"
VL-CBR-0203	6" 2-pin Latching Battery Module
VL-CBR-2005	20-pin DIO Cable Assy, Cbl and Pdl Bd, RoHS
VL-CBR-0206	POE Power Cable, 2.00mm Pitch MicroClasp to wires. 12"
VL-CBR-0702	SATA Cable, 19.75", latching
VL-CBR-0407	SATA Power Cable , 19.75"
VL-CBR-1014	12" 1 mm 10-pin Pico-Clasp to two DB-9 Cable
Cables	
VL-CBR-0503	USB 2.0 Male A to Male Micro-B Cable, 0.5 m
Thermal Options	
VL-HDW-421	Heat Sink with Fan (for development use)
VL-HDW-422	Heat Pipe Adapter Kit
Memory	
VL-MM10-8EDN	8 GB SODIMM DDR4-2133, ET, ECC
VL-MM10-16EDN	16 GB SODIMM DDR4-2133, ET, ECC
VL-MM10-32EDN	32 GB SODIMM DDR4-2133, ET, ECC
VL-MM10-8EBN	8 GB SODIMM DDR4-2133, ET
VL-MM10-16EBN	16 GB SODIMM DDR4-2133, ET
VL-MM10-32EBN	32 GB SODIMM DDR4-2133, ET
Storage	
VL-F30-240EBN	240 GB NVMe Solid State Drive, M.2 2280, M Key PCIe, ET
Hardware	
VL-HDW-111	Half- to Full-Size MiniPCIe Adapter kit. Metal adapter and 2x screws.

Expansion Modules

Part Number	Description	Form Factor
Network		
VL-MPEe-E3E	Gigabit Ethernet Adapter (PCIe signaling)	Mini PCIe
VL-MPEe-E4E	Gigabit Ethernet Over Fiber Optic media (PCIe signaling)	Mini PCIe
VL-MPEe-E5E	Dual Gigabit Ethernet Adapter (PCIe signaling)	Mini PCIe
VL-MPEe-E6E	Gigabit Ethernet (PCIe signaling)	Mini PCIe
VL-MPEe-E6E-P	Gigabit Ethernet with POE+ (PCIe signaling)	Mini PCIe
VL-MPEe-FW1E	1394 Firewire Module (PCIe signaling)	Mini PCIe
VL-MPEu-C1E	Dual Channel CAN Bus Module (USB signaling)	Mini PCIe
Serial I/O		
VL-MPEe-U2E	Quad serial plus twelve GPIOs	Mini PCIe
Analog & Digital I/O		
VL-MPEe-A1E	Analog Input Module, x8 channels, 12-bit resolution (PCIe signaling)	Mini PCIe
VL-MPEe-A2E	Analog Input Module, x8 channels, 16-bit resolution (PCIe signaling)	Mini PCIe
GPS		
VL-MPEu-G2E	GPS Receiver, industrial temperature (USB signaling)	Mini PCIe
VL-MPEu-G3E	Advanced GPS Receiver, industrial temperature (USB signaling)	Mini PCIe
Solid-State Storage (flash memory)		
VL-MPEs-F1Exx	4/16/32 GB mSATA drive, industrial temperature (SATA signaling)	Mini PCIe
Adapters		
VL-MPEs-S3E	SATA Adapter, industrial temperature (SATA signaling)	Mini PCIe
VL-MPEe-V5E	VGA/LVDS Interface (PCIe signaling)	Mini PCIe

Grizzly with Heat Pipe Adapter Kit
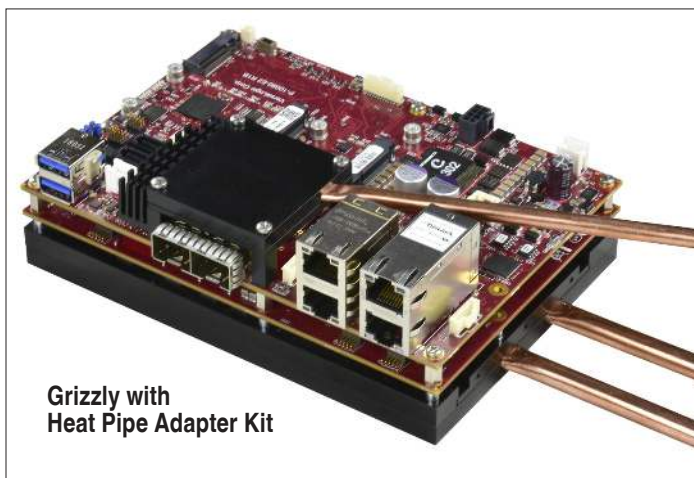
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