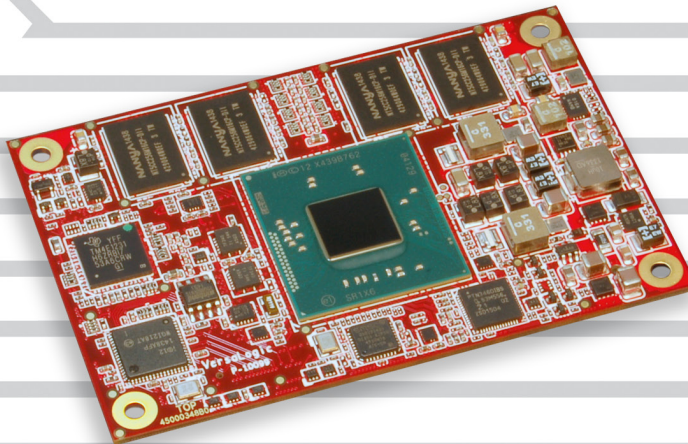


# VL-COMm-33

## COM Express Mini CPU Module



55 x 84 mm

(2.17 x 3.31")

## Overview

The VL-COMm-33 is an extremely small and rugged Computer on Module (COM) based on the industry-standard COM Express mini form factor. Roughly the size of a credit card, the VL-COMm-33 has been engineered to meet the requirements of aviation, defense, industrial control, and medical applications while adhering to stringent regulatory standards. The VL-COMm-33 is manufactured to IPC-A-610 Class 2 standards. Equipped with an Intel Atom "Bay Trail" E38xx processor, it is designed to withstand extreme temperature, impact, and vibration.

Available in single, dual, and quad core versions, the COMm-33 provides extreme performance for its size. It does so at moderate power consumption (3.5 to 7.25W typical), in a very small package. The COMm-33 provides compatibility with a broad range of standard x86 application development tools for reduced development time.

The VL-COMm-33 utilizes advanced Intel technologies to maximize performance. Intel Virtualization Technology allows one VL-COMm-33 system to function as multiple "virtual" platforms. This enables computing activities to be isolated into separate partitions for increased application flexibility and reliability. Intel 64 architecture delivers 64-bit computing when combined with supporting software.

## Highlights

- Intel® Atom™ Bay Trail E38xx processor
- Extremely small COM Express™ mini form factor
- Industrial temp. (-40° to +85°C)
- Wide input voltage (4.75V–20V)
- On-board RAM
- On-board eMMC Flash storage (optional)

## Overview *...continued*

The integrated Intel Gen-7 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 SDVO output supports a variety of signaling interfaces including VGA and DVI.

The standard COM Type 10 pin-out provides industry-standard system interfaces that include Gigabit Ethernet with network boot capability, a single USB 3.0/2.0 and six USB 2.0 ports, two serial ports, Intel High-Definition Audio (HDA), LPC, I2C, SPI, and SMBus to the carrier board. A dual SATA 3 Gb/s interface supports high-capacity storage. Optional on-board eMMC memory supports up to 8 GB of Flash.

Designed and tested for industrial temperature (-40° to +85°C) operation, the rugged VL-COMm-33 also meets MIL-STD-202G specifications for shock and vibration. Soldered-down RAM provides additional ruggedization for use in extremely harsh environments.

The VL-COMm-33 is supported by a variety of thermal heat dissipation solutions, including a standard heat plate, heat sink, fan for heat sink, heat pipe, and other cooling / mounting solutions.

A wide input voltage range of 4.75 to 20 volts simplifies system power supply requirements. It is fully compatible with 12V automotive-type power systems.

The VL-COMm-33 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.

The VL-COMm-33 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 conformal coating, splash screen configuration, application-specific testing, BOM revision locks, special labeling, etc.

A compatible carrier card is required for operation of this COM module. Contact VersaLogic for custom designed carrier boards that meet your exact requirements. Please contact a VersaLogic Sales Engineer for more information. ■

## Features

### 1 Intel Atom “Bay Trail” Processor

High performance CPU in quad-, dual- or single-core versions. Low power consumption.

### 2 RAM

Up to 4 GB soldered-down RAM.

### COM Express Mini Form Factor

Extremely small (55 mm x 84 mm) with Type 10 pin-out.

### Industrial Temperature Operation

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

### MIL-STD-202G

Qualified for high shock/vibration environments.

### High-performance Video

Integrated Intel Gen 7 graphics core supports DirectX 11, OpenGL 4.0, and H.264, MPEG-2 encoding/decoding. LVDS video output.

### Network

Gigabit Ethernet (GbE) with remote boot support.

### Wide Input Voltage Range

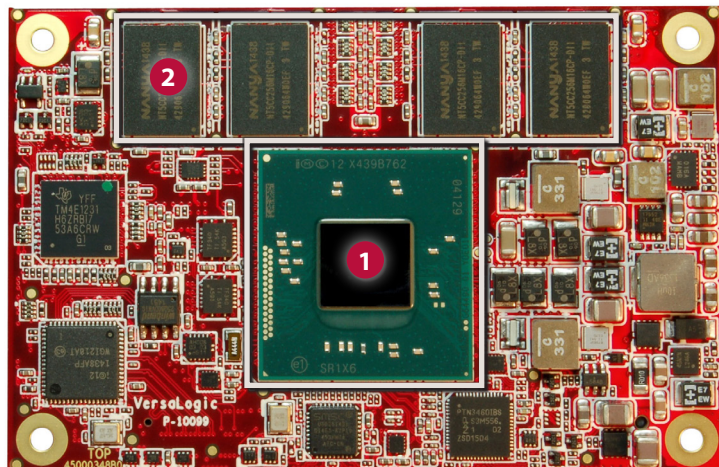
Accepts 4.75 to 20 volts (nominal 12V input)

### I/O Interfaces

SATA, PCIe, USB 3.0, USB 2.0, GPIO, serial, HD audio, LPC, SMBus SPI, and I2C.

### Flash Memory

Up to 8 GB of on-board eMMC flash storage.



## Specifications

| General                          |                                                                                                                                               |                         |         |       |      |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------|-------|------|
| Form Factor                      | COM Express mini (Type 10)                                                                                                                    |                         |         |       |      |
| Board Size                       | 55 mm x 84 mm (2.17" x 3.31")                                                                                                                 |                         |         |       |      |
| Weight                           | 31 grams (1.09 oz.)                                                                                                                           |                         |         |       |      |
| Processor                        | Intel Atom E38xx platform. 512K 8-way L2 cache per core. Intel 64-bit instructions, Virtualization Technology (VT), and new AES instructions. |                         |         |       |      |
| Power Requirements<br>(@ +12V) § | Model                                                                                                                                         | Idle                    | Typical | Max.  | S3   |
|                                  | VL-COMm-33EAP                                                                                                                                 | 2.5W                    | 3.5W    | 4.5W  | 0.4W |
|                                  | VL-COMm-33EBP                                                                                                                                 | 3.5W                    | 5.6W    | 8.0W  | 0.4W |
|                                  | VL-COMm-33EDP                                                                                                                                 | 3.5W                    | 7.3W    | 11.0W | 0.4W |
| Input Voltage                    | 4.75V–20V (nominal 12V operation)                                                                                                             |                         |         |       |      |
| System Reset & Hardware Monitors | Voltage rails monitored. Watchdog timer with programmable timeout (1 µS to 10 min.).                                                          |                         |         |       |      |
| Manufacturing Standards          | IPC-A-610 Class 2                                                                                                                             |                         |         |       |      |
| Regulatory Compliance            | RoHS (2002/95/CE)                                                                                                                             |                         |         |       |      |
| Environmental                    |                                                                                                                                               |                         |         |       |      |
| Operating Temperature            | -40° to +85°C. Derate -1.1°C per 305m (1,000 ft.) above 2,300m (7,500 ft.). □ CPU die must be kept below 90°C                                 |                         |         |       |      |
| Storage Temperature              | -40° to +85°C                                                                                                                                 |                         |         |       |      |
| Cooling                          | Thermal solution required. CPU die must be kept below 90°C. See heat plate, heat sink, fan, and heat pipe options.                            |                         |         |       |      |
| Airflow                          | All models: 100 LFM (30 LMM)<br>LFM = Linear Feet per Minute<br>LMM = Linear Meters per Minute                                                |                         |         |       |      |
| Altitude □                       | Operating                                                                                                                                     | To 4,570m (15,000 ft.)  |         |       |      |
|                                  | Storage                                                                                                                                       | To 12,000m (40,000 ft.) |         |       |      |
| 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                                                                |                         |         |       |      |
| Memory                           |                                                                                                                                               |                         |         |       |      |
| System RAM                       | 2 GB or 4 GB of soldered-on DDR3L SDRAM. 1333 MT/s.                                                                                           |                         |         |       |      |

| Video                                                |                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General</b>                                       | Integrated high-performance video. Intel Gen-7 graphics core with 4 Execution Units and Turbo Boost. Supports DirectX 11, OpenGL 4.0, VP8, MPEG2, H.264, and VC1.                                                                                                                                                       |
| <b>VRAM</b>                                          | Up to 224 MB shared DRAM                                                                                                                                                                                                                                                                                                |
| <b>Desktop Display Interface</b> Δ                   | 1x DDI (Digital Display Interface) with support for <ul style="list-style-type: none"> <li>▪ 1.1. Multiplexed with HDMI/DVI ports. Supports Hot-Plug detect.</li> <li>▪ Multiplexed with DisplayPort (DP)/DVI. Supports Hot-Plug detect</li> <li>▪ Multiplexed with HDMI/DP ports. Supports Hot-Plug detect.</li> </ul> |
| <b>OEM Flat Panel Interface</b> Δ                    | Single-channel LVDS interface. 18/24-bit. Up to 1920 x 1200 (60 Hz).                                                                                                                                                                                                                                                    |
| Mass Storage                                         |                                                                                                                                                                                                                                                                                                                         |
| <b>Rotating Drive / Flash / Solid-State Drives</b> ‡ | Two SATA 3 Gb/s ports Δ<br>Optional eMMC 4.5 onboard flash up to 8 GB MLC                                                                                                                                                                                                                                               |
| Network Interface                                    |                                                                                                                                                                                                                                                                                                                         |
| <b>Ethernet</b> † Δ                                  | One autodetect 10BaseT/100BaseTX/1000BaseT port. Network boot option.                                                                                                                                                                                                                                                   |
| Type 10 I/O Interfaces                               |                                                                                                                                                                                                                                                                                                                         |
| <b>USB 3.0/2.0</b> ‡ Δ                               | One host port                                                                                                                                                                                                                                                                                                           |
| <b>USB 2.0</b> ‡ Δ                                   | Six host ports                                                                                                                                                                                                                                                                                                          |
| <b>COM 1 / 2</b> Δ                                   | Two-wire, CMOS levels. 16C550 compatible.                                                                                                                                                                                                                                                                               |
| <b>GPIO</b> Δ                                        | 4 lines multiplexed with the SD card interface                                                                                                                                                                                                                                                                          |
| <b>Audio</b> Δ                                       | High Definition Audio (HDA)/digital audio interface with support for multiple codecs.                                                                                                                                                                                                                                   |
| <b>PCIe</b> Δ                                        | Three PCIe (Gen 2) lanes                                                                                                                                                                                                                                                                                                |
| <b>SMBus</b> Δ                                       | 1 MHz                                                                                                                                                                                                                                                                                                                   |
| <b>LPC</b> Δ                                         | 33 MHz                                                                                                                                                                                                                                                                                                                  |
| <b>SPI</b> Δ                                         | Supports alternative BIOS flash device only.                                                                                                                                                                                                                                                                            |
| <b>I2C</b> Δ                                         | Fast mode multi-master I <sup>2</sup> C Bus                                                                                                                                                                                                                                                                             |
| <b>Control</b> Δ                                     | Wake, reset, and power                                                                                                                                                                                                                                                                                                  |
| Software                                             |                                                                                                                                                                                                                                                                                                                         |
| <b>BIOS</b>                                          | AMI Aptio UEFI BIOS with OEM enhancements. Field reprogrammable.                                                                                                                                                                                                                                                        |
| <b>Sleep Mode</b>                                    | ACPI 3.0. Support for S3 suspend state.                                                                                                                                                                                                                                                                                 |
| <b>Operating Systems</b>                             | Compatible with most x86 operating systems including Windows, Windows Embedded, Linux, and VxWorks                                                                                                                                                                                                                      |

§ Represents operation at +25°C and +12V supply running Windows XP 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

Δ Available via Type 10 I/O connector

□ 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 to 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.

Specifications are subject to change without notification. Intel and Atom are trademarks of Intel Corp. microSD is a trademark of SD-3C, LLC. Embedded Processing Unit is a trademark of VersaLogic Corp. All other trademarks are the property of their respective owners.

## Tailor COMm-33 to Your Exact Requirements

Customization options are available in quantities as low as 100 pieces.

- Conformal Coating
- Custom Testing
- Custom Labeling
- BIOS Modifications
- Software and Drivers
- Revision Locks
- Environmental Screening
- Application-Specific Testing
- And more –

## Ordering Information

| Model        | Processor  | CPU Cores | Speed    | RAM  | eMMC Flash |
|--------------|------------|-----------|----------|------|------------|
| VL-COMm-33EA | Atom E3815 | 1         | 1.46 GHz | 2 GB | None       |
| VL-COMm-33EB | Atom E3827 | 2         | 1.75 GHz | 2 GB | 4 GB       |
| VL-COMm-33ED | Atom E3845 | 4         | 1.91 GHz | 4 GB | 8 GB       |

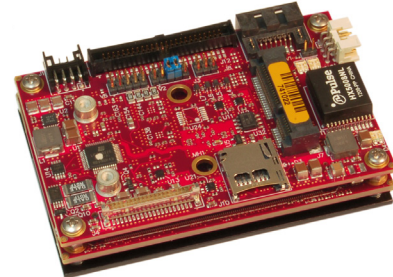
## Accessories

| Part Number     | Description                                                                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hardware</b> |                                                                                                                                                                |
| VL-HDW-410A     | 55 x 84 x 6 mm Heat plate to mount to VL-COMM-33 module. Includes thermal interface material, mounting screws (4), and thermal compound paste (Arctic Silver). |
| VL-HDW-410B     | 55 x 84 x 6 mm Heat plate that mounts to VL-COMM-33 module. Includes thermal interface material. Does not include thermal paste or mounting screws.            |
| VL-HDW-406      | 55 x 84 x 15.5 mm Passive heat sink. Mounts to HDW-410 heat plate.                                                                                             |
| VL-HDW-411      | 12V Cooling fan for optional use with HDW-406 heat sink.                                                                                                       |
| VL-HDW-405      | 75 x 84 x 2 mm Mounting adaptor plate, flat. Simplifies installation in many situations. Attaches to HDW-410 heat plate.                                       |
| VL-HDW-408      | Heat pipe connector plate. Mounts to HDW-410 heat plate.                                                                                                       |
| VL-HDW-401      | Thermal compound paste (Arctic Alumina)                                                                                                                        |

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

## Bay Trail Computer

**A Complete Embedded Processing Solution – Available Off-the-Shelf! –**



Based on the VL-COMm-33, the Hawk is an extremely small and rugged complete embedded computer—available fully assembled and tested off-the-shelf! Roughly the size of a credit card and less than one inch thick, the Hawk is the embedded industry's smallest, lightest, ultra-rugged embedded x86 computer. This complete embedded computer is designed to withstand extreme temperature, impact, and vibration.

| Model           | Processor  | CPU Cores | Speed    | RAM  | eMMC Flash | Cooling    |
|-----------------|------------|-----------|----------|------|------------|------------|
| VL-EPU-3310-EAP | Atom E3815 | 1         | 1.46 GHz | 2 GB | None       | Heat plate |
| VL-EPU-3310-EBP | Atom E3827 | 2         | 1.75 GHz | 2 GB | 4 GB       | Heat plate |
| VL-EPU-3310-EDP | Atom E3845 | 4         | 1.91 GHz | 4 GB | 8 GB       | Heat plate |

## Highlights

- A complete x86 embedded computer
- -40° to +85°C Operating Temperature
- Extremely small (55 x 84 x 22 mm)
- Shock & vibration per MIL-STD-202G
- 4th Generation Intel® Atom™ processor ("Bay Trail")
  - E3845 (quad core) or
  - E3827 (dual core) or
  - E3815 (single core)
- Up to 4GB DDR3L soldered-on RAM
- Gigabit Ethernet
- LVDS video output
- Mini PCIe Socket / with mSATA support
- USB 2.0 ports
- Serial I/O
- SATA
- Wide Input Voltage Range - 8 to 17 volts
- Fanless operation

For more information, visit: [www.versalogic.com/hawk](http://www.versalogic.com/hawk)

## 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 9001:2008 Certified

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High Value Auditing™

