E3800 Family
The Latest Low Power Platform

Low Power
High Performance
Wide Temperature
Innovation
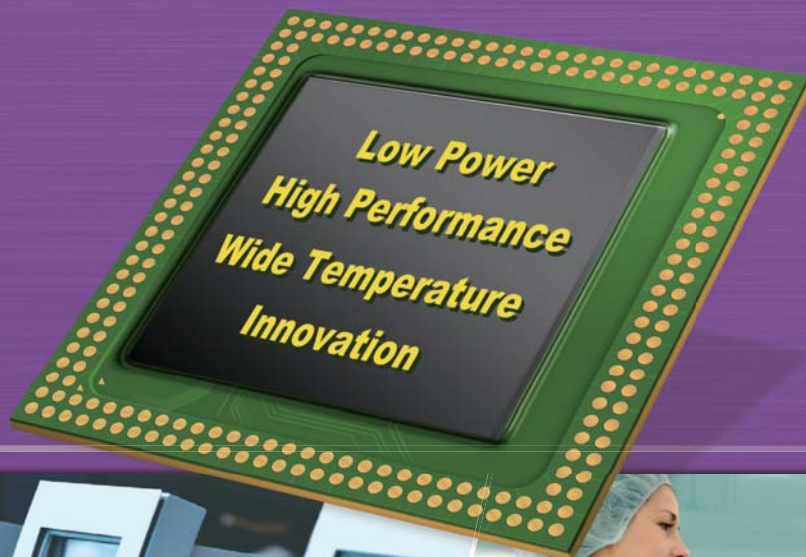
While designed to be a true test of Intel's performance in the ultra mobile space, Silvermont is the first true architecture update to Intel's Atom processor since its introduction in 2008. Leveraging Intel's first 22nm process and a very low power-micro architecture, Silvermont aims squarely at the latest Krait cores from Qualcomm and ARM's Cortex A15. Based on Silvermont, Intel® introduces E3800 product family, a series of system on chip (SoC) designed for low-power, feature-rich and highly-capable applications.

E3800 product family takes up to four Silvermont cores, and for the first time in an ultra mobile Intel SoC, is paired with Intel's own graphics IP. In other words, rather than using a GPU block from Imagination Technologies, E3800 product family leverages the same GPU architecture as the 3rd generation Intel Core processors (codenamed Ivy Bridge).
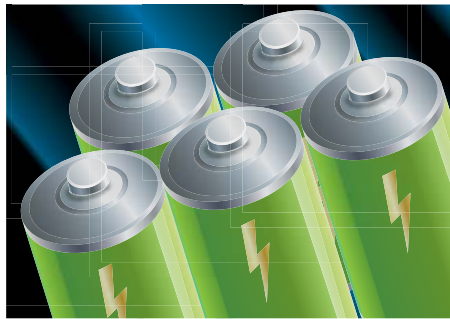
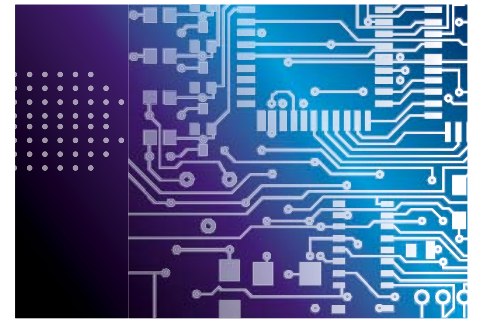## Silvermont Core Highlights

Better Performance
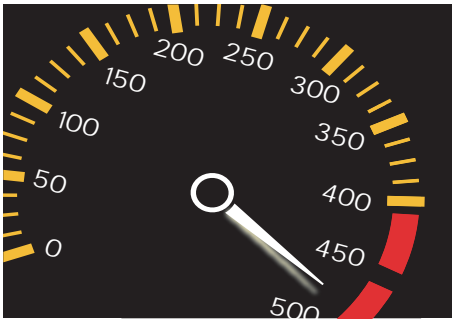
- Out-of-order execution engine
- New multi-core and system fabric architecture
- New IA instructions extensions (Intel Core Westmere Level)

Better Power Efficiency

- Wider dynamic operating range
- Enhanced active and idle power management

22nm Architecture

- 3D Tri-gate transistors tuned for SoC products
- Architecture and design co-optimized with the process

Bay Trail: Not just for Atoms anymore

Memory
DDR3 L Mem Down/ SO-DIMM
Up to 2 Channels ranks

Bay Trail SoC
- Quad Core 22nm CPU
- Integrated Graphics & Memory controller
- Integrated 10's

Display
eDP
DP/HDMI

E3800 product family combines a CPU based on Intel's new Silvermont architecture with a GPU that is architecturally similar to (but less powerful than) the HD 4000 graphics engine integrated in the 3rd generation Intel® Core processors launched in early 2012. These core components are combined with dedicated I/O blocks and media encoding and decoding to make one system-on-a-chip, which is then manufactured on the 22nm process (and the 3D tri-gate transistors) currently being used for both the 3rd and 4th generation Intel® Core processors.

Since Silvermont is the first major overhaul of the Atom CPU architecture since it was introduced in 2008, the main performance improvement will come from the CPU's new out-of-order (OoO) execution engine, which allows the CPU to process different instructions as soon as resources to execute them are available. On the graphics side, E3800 product family's GPU uses the same Intel® execution units (EUs) as the 3rd generation Intel Core processors' HD 4000, which gives them support for most of the same APIs and features: DirectX 11, OpenGL 4.0 (and OpenGL ES 3.0 on mobile, provided the drivers support it), and OpenCL 1.2 support are all present on the API side, and dual-display support for panels up to 2560×1440 (or 1080p over HDMI) as well as via Intel's Wireless Display feature will please multi-monitor fans.
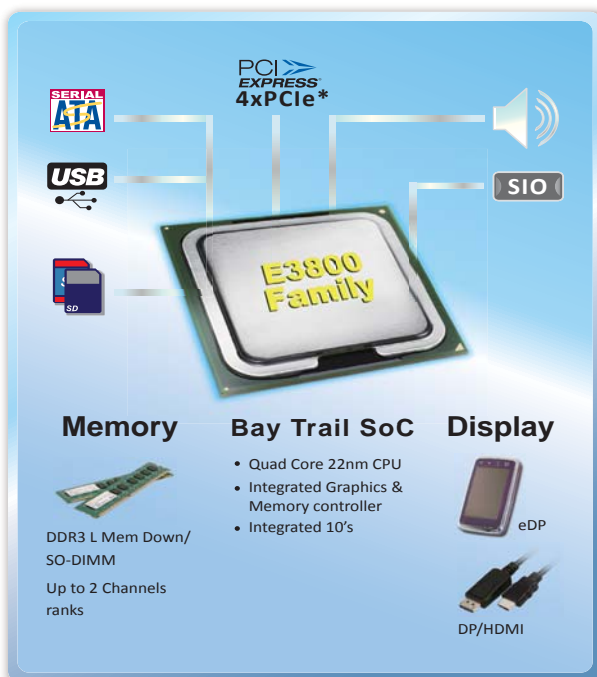
Extended beyond Atom Processors

E3800 product family contains the Silvermont CPU cores, and there can be up to four of them, sharing a total of 2 MB L2-cache. The CPU cores are supported by the Intel-developed HD Graphics GPU with 4 execution units. That's different with Atom, because Atom chips usesthe PowerVR GPUs from Imagination Technologies. An integrated power controller distributes the available power between the CPU and GPU cores. In addition to a GPU, E3800 product family also has an integrated image processor that will be used for things like processing images from tablet cameras.

The integrated memory controller supports dual-channel LP-DDR3-1066 or single-channel DDR3L-RS-1333. There can be a maximum of 2 GB per channel, which means the dual-channel versions can have a maximum of 4 GB RAM.

The SoC is equipped with USB 3.0 controllers for peripheral devices, along with energy-efficient SPI and I2C busses commonly used in mobile devices. Storage support comes in the form of eMMC flash and SD cards. Same as the previous generation Atom, E3800 product family has no SATA controller.

Power-Saving and Management

Aside from the shrink to 22nm, Intel® is employing a few of the same tricks in E3800 product family as it does in Intel® 4th Generation platform to increase battery life without unduly impacting performance. First up is Turbo Boost, which can increase the speed of both CPU and GPU cores as long as there is thermal (and power) headroom available. The idea behind this technology is that most common computing tasks are "burst-y"—they require short bursts of activity followed by longer idle stretches. Turbo Boost is designed to get those short bursts out of the way more quickly so that the SoC can return to a low-power idle state more quickly. E3800 product family employs Turbo Boost in both its CPU and GPU cores,
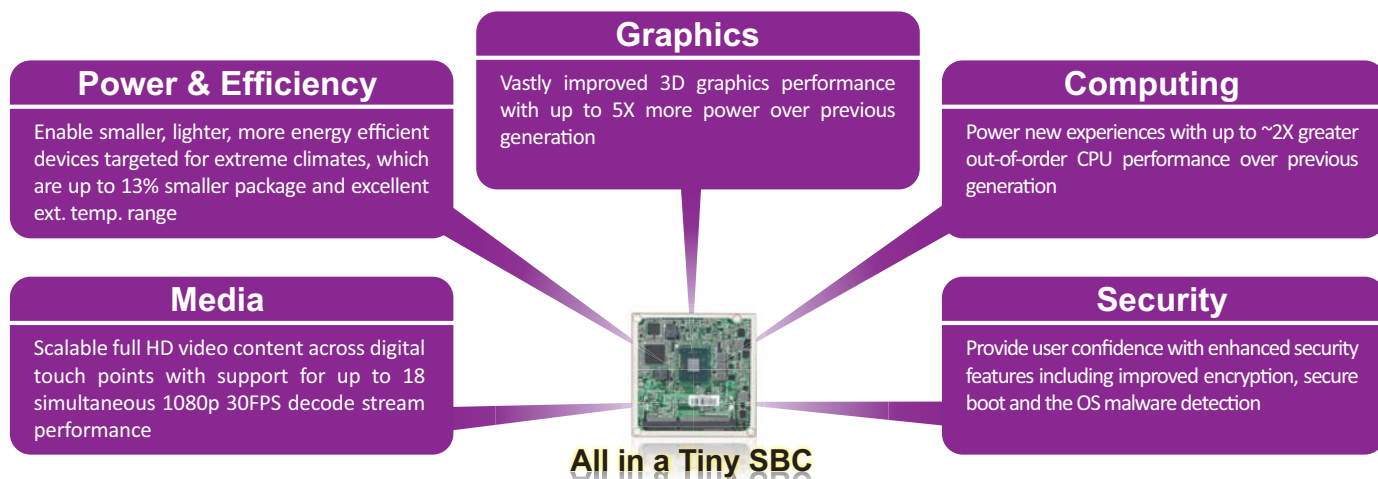
and the two different blocks will communicate to make sure they've achieved the best balance of CPU and GPU performance. That "active idle" feature from Clover Trail and Intel® 4th Generation Platform, which reduces the amount of time the computer needs to enter and exit these idle states, is also included in E3800 product family.

A useful power-saving feature is called Display Power Saving Technology (DPST) 6.0. The backlight of a screen saves the most power in laptops and tablets. DPST can save power by applying a clever combination of image processing and backlight adjusting, basically increasing the brightness of the incoming visuals and dimming the backlight.

The other feature highlighted is power gating, which shuts off unused parts of the SoC entirely and only keeps the parts of the chip awake that have to be. This is nothing new in CPUs, but the Intel-provided heat map of the E3800 product family SoC shows just how completely those parts of the chip can be turned off when they're not being used.
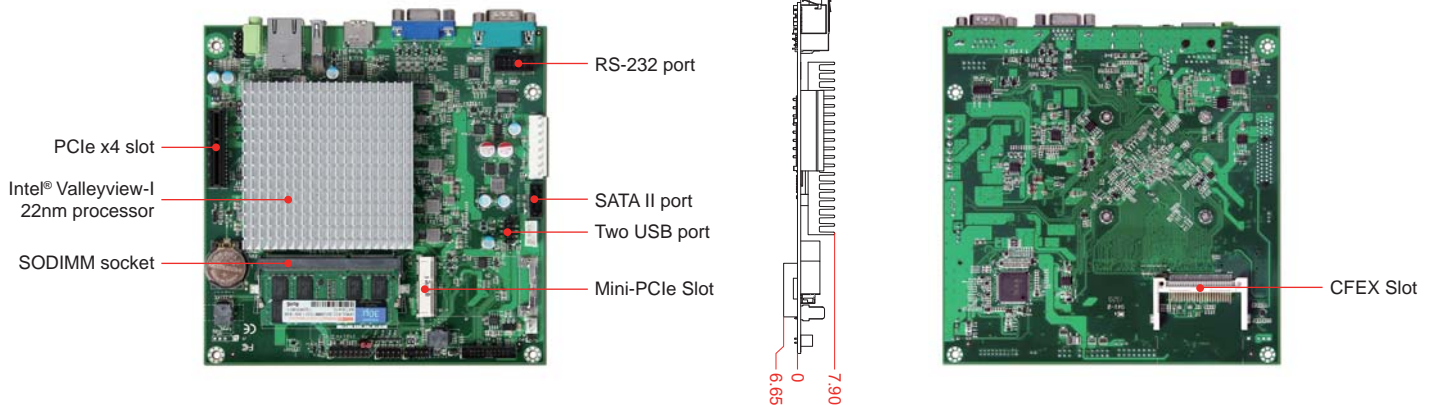
Extended Temperature

In the past, Intel® platform operates from 0°C to 90°C, or from 0°C to 100°C, as a standard range of temperature depending on the model of platform. E3800 product family is the first Intel CPU that supports extended range of temperature, operating from -40°C to +110°C, for harsh environment. It comes with 1, 2 or 4 CPU cores. Entry-level SKU has 1 CPU core, 146 GHz clock rate, and TDP 5W. Mid-class SKU has 2 cores, 1.33 GHz - 1.75 GHz clock rate, and TDP 6W ~8W. High-end SKU has 4 cores, 1.91 GHz clock rate, and TDP 10W. Integrated memory controller on entry-level and mid-classSKUs will have only one channel, whereas high-end and premium SKUs will have two memory channels. They incorporate AES instructions and work with ECC memory.

Power & Efficiency

Enable smaller, lighter, more energy efficient devices targeted for extreme climates, which are up to 13% smaller package and excellent ext. temp. range

Graphics

Vastly improved 3D graphics performance with up to 5X more power over previous generation

Computing

Power new experiences with up to ~2X greater out-of-order CPU performance over previous generation

Media

Scalable full HD video content across digital touch points with support for up to 18 simultaneous 1080p 30FPS decode stream performance

Security

Provide user confidence with enhanced security features including improved encryption, secure boot and the OS malware detection

All in a Tiny SBC

WADE-8078

Intel® Valleyview-I SoC based Mini-TX. Board with VGA, HDMI, Gigabit Ethernet, Audio, USB 3.0, SATA and CFEX

- PCIe x4 slot
- Intel® Valleyview-I 22nm processor
- SODIMM socket
- RS-232 port
- SATA II port
- Two USB port
- Mini-PCIe Slot
- CFEX Slot

WADE-8078 is the first Portwell off-the-shelf Mini-ITX embedded board product based on the Intel® Atom™ processor E3800 product family with memory and PCI Express controller integrated to support one-channel DDR3L memory and PCI Express 2.0 lanes.Portwell has taken advantage of such technology to furnish a series of products that meets multiple industrial requirements for cost effectiveness, reliable performance and a high level of data integrity and uptime.

REAR I/O
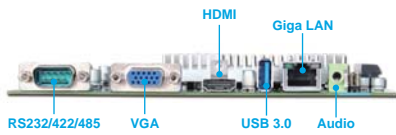
- HDMI
- Giga LAN
- RS232/422/485
- VGA
- USB 3.0
- Audio

FEATURES

- Latest Intel® Atom embedded processor provides cost effective solutions with low power and quad core processor technology
- Supports PCIe x4 slot (with PCIe x2 Lanes)
- Supports one DDR3L ECC 1066/1333MT/s SDRAM, UP to 4GB
- Supports one USB3.0 port

ORDERING GUIDE

AB1-3A41Z	WADE-8078-E3845 (R).WADE-8078-1900.Mini-ITX ESB.Intel® Bay Trail(Valleyview-I QC 1.9GHz processor) on Board .w/DDR3L SO-DIMM/VGA/HDMI/GbE Lan/COM/Audio/USB
AB1-3A42Z	WADE-8078-E3826 (R).WADE-8078-1460.Mini-ITX ESB.Intel® Bay Trail(Valleyview-I DC 1.46GHz processor) on Board .w/DDR3L SO-DIMM/VGA/HDMI/GbE Lan/COM/Audio/USB
AB1-3A43Z	WADE-8078-E3815 (R).WADE-8078- SC1460.Mini-ITX ESB.Intel® Bay Trail(Valleyview-I SC 1.46GHz processor) on Board .w/DDR3L SO-DIMM/VGA/HDMI/GbE Lan/COM/Audio/USB

PACKING LIST

One WADE-8078 motherboard
One Driver CD
One SATA cable

GENERAL

Processor	- Intel® Valleyview-I 22nm processor - Cache up to 2MB (for Quad Core) - DPM (Defect Per Million devices) <50 - Support Intel® VT-x techology
BIOS	- Phoenix EFI BIOS
Memory	- Support up to 4GB DDR3L -ECC 1066/1333 SDRAM on one 204pin SO-DIMM
Storage Devices	- One SATA 2.0 - One CFEX(optional) - One Mini-PCIe(optional)
Watchdog Timer	- Programmable by embedded controller
Expansion Interface	- Supports PCIe x4 slot (with PCIe x2 Lanes)

I/O INTERFACE

Audio	- HDA controller integraded in SoC
Ethernet	- Onboard Intel I210AT
Serial Port	- Two series RX/TX supported from onboard EC (embedded controller)
USB	- 2 ports USB2.0 - 1 port USB3.0
Keyboard & Mouse	- KBC controller integraded in embedded controller
GPIO	- 8bit congfigurable controlled by embedded controller

DISPLAY

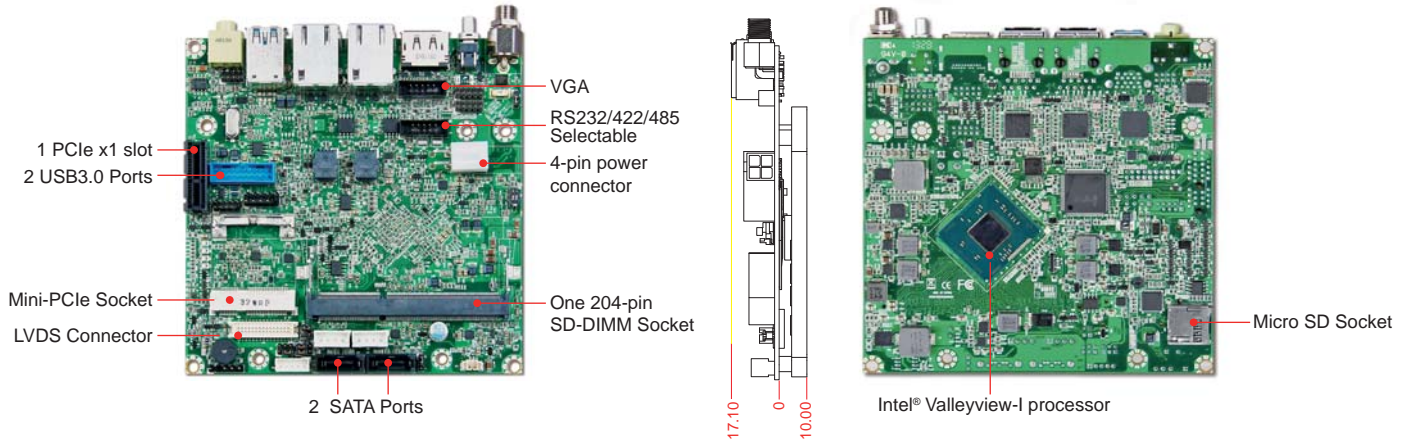| Graphic Controller	- Intel® Gen 7 graphic egine supports DirectX 11, OGL 4.0 - Video decode hardware acceleration supports for H.264, MPEG2, MVC, VC-1, WMV9 and VP8 formats
Display Interface	- VGA: resolution up to 2560x1536@24bpp - HDMI: resolution up to 1920x1080@24bpp

Mechanical & Environment

| Dimension	- 170mm(L) x 170mm(W) x 1.6mm(H)
Power Supply	- ATX (support non-5V satdby)
Environment	- Operation temperature: 0~60°C - Storage temperature: -40~80°C - Relative humidity : 5~95%, non-condensing
MTBF	- Over 100,000hrs at 40°C

NANO-6060

- 1 PCIe x1 slot
- 2 USB3.0 Ports
- Mini-PCIe Socket
- LVDS Connector
- VGA
- RS232/422/485 Selectable
- 4-pin power connector
- One 204-pin SD-DIMM Socket
- 2 SATA Ports
- Micro SD Socket
- Intel® Valleyview-I processor

NANO-6060 build with Intel® Atom™ processor E3800 family that not only outputs under 10W for fan-less applications, but also supports a wide industrial temperature from -40ºC to 85ºC. With its superior up to Quad Core processing power and high capability. Portwell have taken advantage of such technology to furnish a series of products that can meet multiple industrial requirements such as fanless, cost-effective of CPU performance or compact systems.

REAR I/O

- Power Button
- USB 3.0
- DC 12V
- DP
- Giga Lan
- Audio
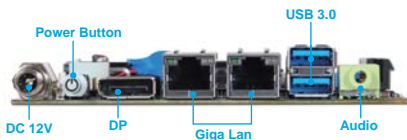
FEATURES

- Intel® Valleyview-I SoC based platform
- One 204-pin SODIMM supports DDR3L up to 4GB
- Multiple display by VGA, DP, dual channel 24 bit LVDS
- Supports two SATA 2.0 ports, one micro SD socket, and four USB 3.0 ports
- One Mini-PCIe socket and PCIe x1 slot for expansion
- Supports DC 12V input

ORDERING GUIDE

AB1-3A45Z	(R).NANO-6060-E3815. Nano-ITX ESB. Intel® ATOM E3815 1.46GHz Single Core.w/DDR3L SDRAM/ VGA/24bit LVDS/DP/dual GbE LAN/micro SD
AB1-3A46Z	(R).NANO-6060-E3827. Nano-ITX ESB. Intel® ATOM E3827 1.75GHz Dual Core.w/DDR3L SDRAM/ VGA/24bit LVDS/DP/dual GbE LAN/micro SD
AB1-3A47Z	(R).NANO-6060-E3845. Nano-ITX ESB. Intel® ATOM E3845 1.91GHz Quad Core.w/DDR3L SDRAM/ VGA/24bit LVDS/DP/dual GbE LAN/micro SD

PACKING LIST

One NANO-6060 NANO-ITX Main Board
One passive Heatsink
One Installation CD

GENERAL

Processor	- Intel® Valleyview-I 22nm processor - Cache up to 2MB (for Quad Core) - DPM (Defect Per Million devices) <50 - Support Intel® VT-x techology
BIOS	- Phoenix EFI BIOS
Memory	- Support up to 4GB DDR3L 1066/1333 SDRAM on one 204pin SO-DIMM
Storage Devices	- Two SATA 2.0 - One Micro-SD socket
Watchdog Timer	- Programmable by embedded controller
Hardware Monitoring	- Temperature (CPU & System) - Voltage (CPU Vcore,12V, 5V, 3.3V, 1.35V)
Expansion Interface	- 1x PCI Expressx1 slot - 1x Mini-PCIe slot

I/O INTERFACE

Audio	- HDA controller integrated in Intel® SoC - Realtek ALC892 HDA codec, 7.1+2 channels Audio Jack on rear I/O with Line-out and on board pin header with Line-in, Line-out and Mic-in
Ethernet	- Dual Intel® I210IT Gigabit Ethernet controller - 2x RJ45 connectors on rear I/O
Serial Port	- 1x RS232/422/485 on board header (selected by bios)
USB	- 2x USB 3.0 ports on rear I/O - 2x USB 2.0 and 2x USB 3.0 ports on board with pitch 2.0 header
GPIO	- 8bit congfigurable controlled by embedded controller

DISPLAY

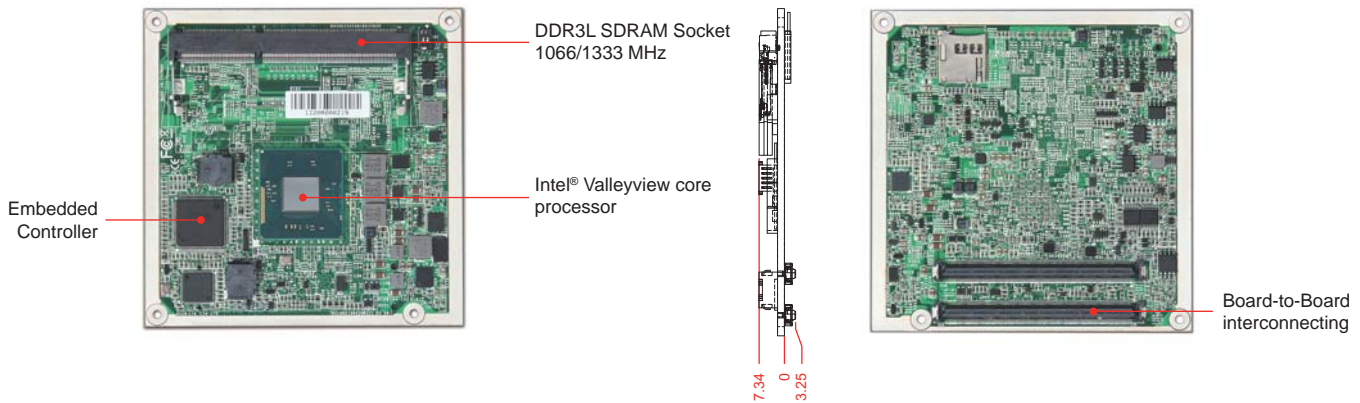| Graphic Controller	- Intel® Gen 7 graphic egine supports DirectX 11, OGL 4.0 - Video decode hardware acceleration supports for H.264, MPEG2, MVC, VC-1, WMV9 and VP8 formats
Display Interface	- LVDS: Dual channel 24bit LVDS on board connector, resolution up to 1920x1200 @60Hz - VGA: resolution up to 2560x1536@24bpp - DP: One DP port on rear I/O, resolution up to 2560x1600

Mechanical & Environment

Dimension	- 120(L) x 120(W)mm; 4.72"(L) x 4.72"(W)
Power Supply	- DC 12V input (support AT mode)
Environment	- Operation temperature: -40~80°C - Storage temperature: -40~80°C - Relative humidity : 5~95%, non-condensing
MTBF	- Over 100,000hrs at 40°C

PCOM-B632VG

New Mobile based Type VI Express module with DDR3L SDRAM, VGA, eDP, HDMI, Gigabit Ethernet and 3Gbps SATA.

DDR3L SDRAM Socket 1066/1333 MHz

Intel® Valleyview core processor

Embedded Controller

Board-to-Board interconnecting

7.34 0 3.25

PCOM-B632VG is designed to offer good EMC protection by latest mobile platform, SoC (System-On-Chip) integrated embedded controller. Also, PCOM-B632VG provides higher performance for various display, eDP and HDMI. The fast PCI-Express interfaces and DDR3L memory capacity also support PCOM-B632VG to support enhance performance than before.

The PCOM-B632VG COM Express® module offers many valuable features, including a wide range of optional I/O flexibility like Gen2 PCI Express with mature eco-system, enabler for greater media competence like accelerated DRM (Digital Rights Management) for encoding and decoding. The module is also rated to function at less than 50 DPM (defects per million). The PCOM-B632VG is designed to help customers who are currently using COM Express® module products upgrade their systems without having to change existing carrier boards and operating systems. This helps boost system performance with prolonged service life for another 7 years, maximizing customers' return on investment.

FEATURES

- Latest Intel® Atom embedded processor provides cost effective solutions with low power and quad core processor technology
- Supports up to four PCI Express lanes, four x 1 lanes can be configured to one x 4 lane
- Supports one DDR3L 1067MT/s SDRAM, UP to 8GB
- Supports one USB3.0 port

ORDERING GUIDE

AB1-3A33	PCOM-B632. TYPE VI ATOM E3827
AB1-3A34	PCOM-B632. TYPE VI ATOM E3826
AB1-3A35	PCOM-B632. TYPE VI ATOM E3825
AB1-3A36	PCOM-B632. TYPE VI ATOM E3845
AB1-3A40	PCOM-B632. TYPE VI ATOM E3815

PACKING LIST

One PCOM-B632VG COM-Express module
One Driver CD

GENERAL

Processor	- Intel® Valleyview-M/D/I 22nm processor - Cache up to 2MB (for Quad Core) - DPM (Defect Per Million devices) <50 - Support Intel® VT-x techology
BIOS	- Phoenix BIOS
Memory	- Support up to 4GB DDR3L 1066/1333 SDRAM on one 204pin SO-DIMM
Storage Devices	- Two SATA 2.0
Watchdog Timer	- Programmable by embedded controller
Expansion Interface	- Supports up to four PCI Express lanes, four x 1 lanes can be configured to one x 4 lane (default 3x PCI-Express lanes)

I/O INTERFACE

Audio	- HDA controller integraded in SoC
Ethernet	- Onboard Intel I210IT
Serial Port	- Two series RX/TX supported from onboard EC (embedded controller)
USB	- 6 ports USB2.0 - 1 port USB3.0
Keyboard & Mouse	- KBC controller integraded in embedded controller
GPIO	- 8bit congfigurable controlled by embedded controller

DISPLAY

Graphic Controller	- Intel® Gen 7 Graphic Controller
Display Interface	- VGA: resolution up to 2560x1536@24bpp - eDP: resolution up to 2560x1600@24bpp - Display Port: resolution up to 1080p

Mechanical & Environment

Dimension	- 95mm(L) x 95mm(W) x 2.0mm(H)
Power Supply	- DC 6V~16.8V
Environment	- Operation temperature: -40~80°C - Storage temperature: -40~80°C - Relative humidity : 5~95%, non-condensing
MTBF	- Over 180000hrs at 55°C

Rugged DDR 3 USB 3.0 SATA 3Gb GPIO EC Fanless Giga LAN USB 2.0 DP Watch DOG I²C FC CE Microsoft® Windows® Embedded Partner RoHS intel inside

CAD-0225

Key Features

- Intel® Celeron® Processor J1900 (codename Bay trail-D)
- 4x PCIe x1 from CPU directly use Intel® i211-AT
- Support DDR3L-1333 low voltage memory

Full Advantage of Intel 22nm SoC Process Technology

The CAD-0225 with Intel® Celeron® Processor J1900, offering is Intel's smallest-ever package for desktop appliance, making it ideal for smaller form factor system for entry level desktop computing.
The processor is also ideal for vertical usage, including power savings and up to three times faster performance than similar products from Intel.

Intel® Celeron® Processor J1900 is based on Intel's 22nm process technology with 3D tri-gate transistors and a new microarchitecture known as Silvermont. J1900 is the first processor in the BGA (ball-grid array) package to span across entry level market segments, also a family of products that will also include versions for low-cost laptops, desktops branded as Celeron and Pentium. Support better performance, new multi-core, system fabric architecture, new security and virtualization technologies.

Cost effective specification.

CAD-0225 desktop communication/network security appliance is based on the quad-core Intel® Celeron® Processor J1900 (codename Bay Trail-D) at 2.0 GHz. This is a true low power SoC, single package solution. In addition, the CAD-0225 supports four 10/100/1000Mbps Ethernet ports, Dual USB ,one console port and one DDR3L SO-DIMM, up to 4GB.

Total solution to fulfill your demand.

CAD-0225 desktop communication/network security appliance that can be the total solution to fulfill customers' needs for applications in WAN optimization, cloud computing and routers.

Ordering Guide

Model	Part Number	Description
CAD-0225	AI1-5041	(R).CAD-0225-000.CAPB-0225VR-4401- 000.4 RJ45 GbE ports, VGA, Console. Bay Trail-D 2.0GHz.
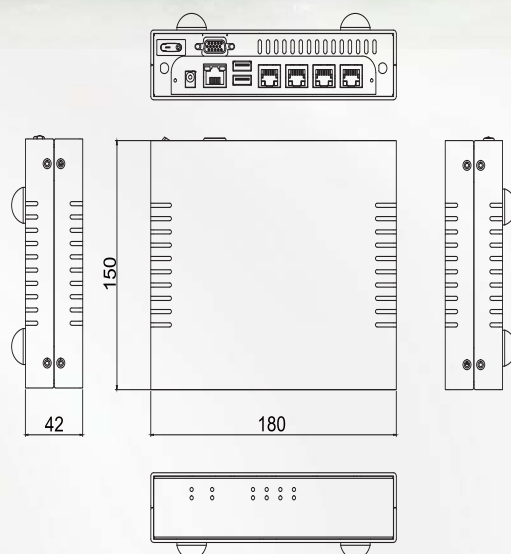
H/W specification

CPU	Bay Trail-D (Intel® Celeron® Processor J1900) 4C @ 2.0 GHz processor
System Memory	1 DDR3L SO-DIMM, up to 4GB.
Ethernet Port	Up to 4 GbE RJ45
Storage Device	1x 2.5" SATA HDD
Serial Port	RJ45 System Console
USB	2x USB
Power	40W 12V Adpater
Dimension	180(W) x 150(D) x 42(H)mm 7.09"(W) x 5.91"(D) x 1.65"(H)
Operating Environment	Temp: 0 to 40°C (32 to 104°F) 20 to 90%RH
Storage Environment	Temp: -10 to 70°C (14 to 158°F) 5 to 95%RH @ 55°C
Certification	CE/FCC

Reference Table

Model	Dimension	Form Factor	Key Feature	Target Application
WADE-8078	170(L) x 170(W)mm	MINI-ITX	▪ Latest Intel® Atom embedded processor provides cost effective solutions with low power and quad core processor technology ▪ Supports PCIe x4 slot (with PCIe x2 Lanes) ▪ Supports one DDR3L ECC 1066/1333MT/s SDRAM, UP to 4GB ▪ Supports one USB3.0 port	- KIOSK - Digital Signage
NANO-6060	120(L) x 120(W)mm	NANO-ITX	▪ Intel® Valleyview-I SoC based platform ▪ One 204-pin SODIMM supports DDR3L up to 4GB ▪ Multiple display by VGA, DP, dual channel 24 bit LVDS ▪ Supports two SATA 2.0 ports, one micro SD socket, and four USB 3.0 ports ▪ One Mini-PCIe socket and PCIe x1 slot for expansion Supports DC 12V input	- Automation
PCOM-B632	170(L) x 170(W)mm	COM Express	▪ Latest Intel® Atom embedded processor provides cost effective solutions with low power and quad core processor technology ▪ Supports up to four PCI Express lanes, four x 1 lanes can be configured to one x 4 lane ▪ Supports one DDR3L 1067MT/s SDRAM, UP to 8GB ▪ Supports one USB3.0 port	- Military - Medical - Protable device
CAD-0225	180(W) x 150(D) x 42(H)mm	desktop	▪ Intel® Celeron® Processor (codename Bay Trail) ▪ 4 x PCI-Ex1 from CPU directly use Intel® I211-AT ▪ Support DDR3L-1333 low voltage memory	- Communication

The Bay Trail Lineup

Bay Trail Family	CPU Core/CPU Freq	TDP	Junction Temp	Sku name	ISG RM
Bay Trail-D	QC 2.00 GHz	10W	0ºC~ 100ºC	J1900	Yes
Bay Trail-M	QC 1.60 GHz	7.5W	0ºC~ 100ºC	N2920	Yes
Bay Trail-I	QC 1.91 GHz	10W	-40ºC ~ 110ºC	E3845	Yes
Bay Trail-I	DC 1.75 GHz	8W	-40ºC ~ 110ºC	E3827	Yes
Bay Trail-I	DC 1.46 GHz	7W	-40ºC ~ 110ºC	E3826	Yes
Bay Trail-I	DC 1.33 GHz	6W	-40ºC ~ 110ºC	E3825	Yes
Bay Trail-I	SC 1.46 GHz	5W	-40ºC ~ 110ºC	E3815	Yes

*All products and company names referred to herein may be trademarks or registered trademarks of their respective companies or mark holders.