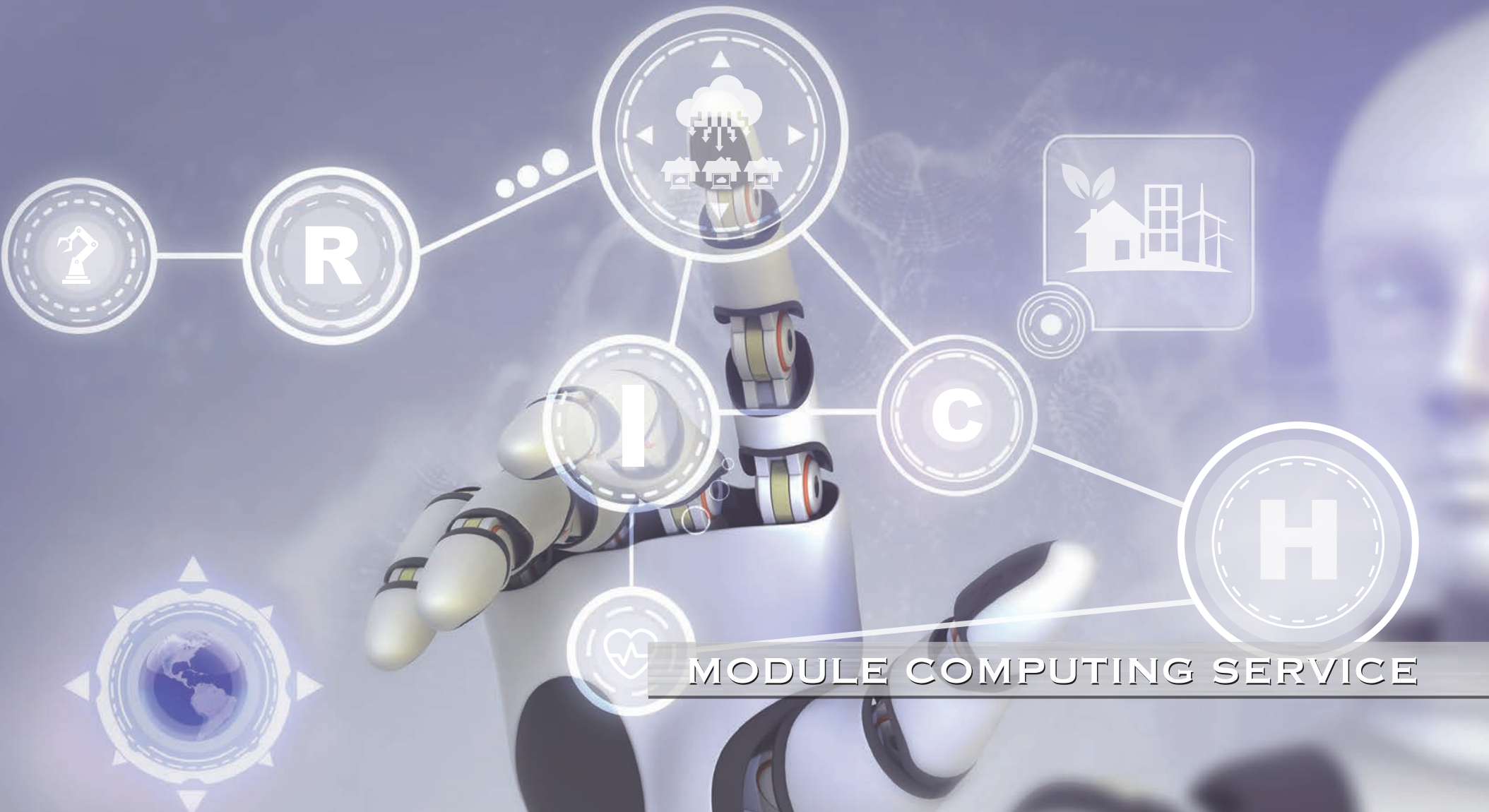


# Module Platform Solution Guide



MODULE COMPUTING SERVICE

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# About Portwell

Portwell Engine (PE) Building



Portwell, Inc. was founded in 1993 and entered the Industrial PC market in 1995 by developing single-board computers. Today, our continuous development of leading-edge products has resulted in strong growth in market shares and revenue, a firm place on the Taipei stock exchange (TAISDAQ), and has established Portwell as a major worldwide supplier of specialty computing application platforms and services.

Portwell, Inc. is not only a member of the selected group of Intel® Applied Computing Platform Providers (IACPP) but also a Premier Member of Intel® Intelligent Systems Alliance and an executive member of the PCI Industrial Computer Manufacturing Group (PICMG).

Portwell, Inc. has worldwide operations in the U.S.A., Taiwan, Japan, China, Netherlands, Germany, United Kingdom, and India. Whether you need a computer board or a turnkey system, Portwell is the perfect partner to help you deliver your products to market on time as well as maintain longevity of your product.

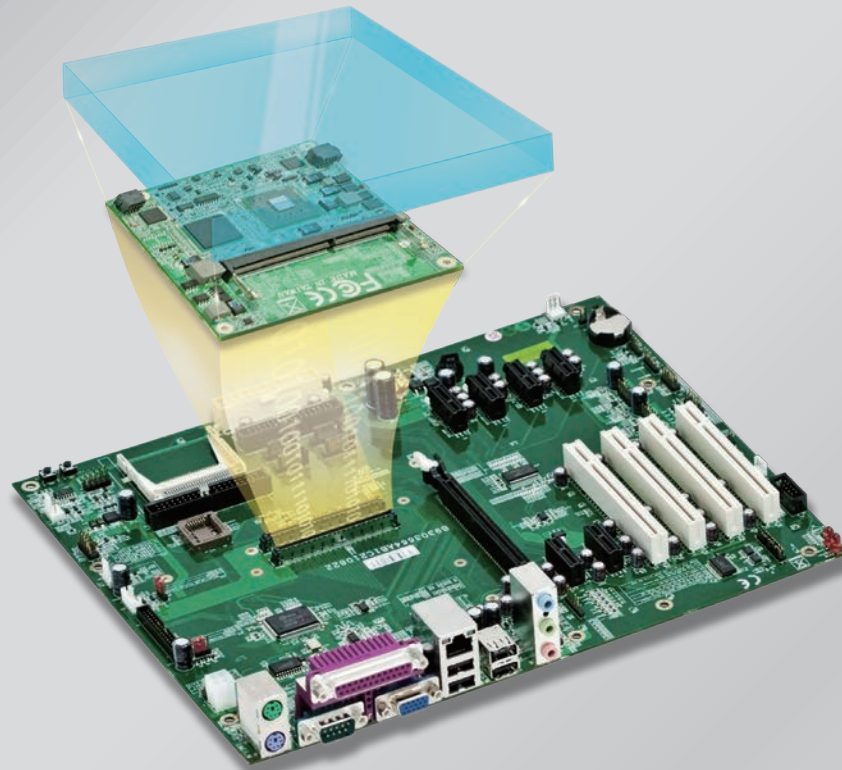
With 24 years experience in the design and manufacture of specialty computer boards and systems, Portwell not only provides a one-stop resource for off-the-shelf products, but also supplies custom-built solutions and a global logistics service to suit your needs.

Portwell EMS and DMS solutions can satisfy your needs in retail automation, medical equipment, industrial automation, infotainment, communication, and network security markets. Encouraged by our flexible business support, manufacturing excellence, and compliance with high quality and environmental standards such as ISO 9001 / 14000 / 13485, OHSAS and RoHS, customers have taken advantage of our dedicated and sophisticated engineering resources to satisfy their requirements for the design, manufacturing and logistics of application-specific computer boards, customized computer chassis, and specific computer system configurations. Whether you are working on a Medical Single Board Computer or Internet Security Appliance, Portwell is the perfect partner to help you deliver your products to market on time and stay one step ahead of the competition.

# Focus on your core competencies

## Design for Extreme Reliability

## Time To Market



### Module — Solutions That Grow With You

The CPU module delivers the core functionality while all of the application-specific features are designed into the baseboard creating a semi-custom embedded PC solution.

How to enable faster time-to-market and cost-effective customization alternatives? COM (Computer-On-Module) is the answer.

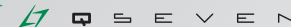
COMs are not only highly integrated component SBCs that support system expansion and application-specific customizations but also improving form, fit and function, minimizing current and future design risks. As well as providing lower product lifecycle costs through module scalability and interchangeability.

### Baseboard — SAFE, RELIABLE, SECURE

Portwell designs competence for your market! As a worldwide technology leader in the embedded industry and also a leading outsourcing partner for OEMs in different markets, Portwell's boards can give you the most dependable, powerful and economic basis to meet your carrier board design. You may take a big step forward into a successful future with our proactive project management and ISO 9001:2000 certificate. Portwell provides one-stop shopping so that you can get to the markets faster with complete assemblies including housings and keep your products available for many years with life cycle management.

# Module

**COM**   
**Express**



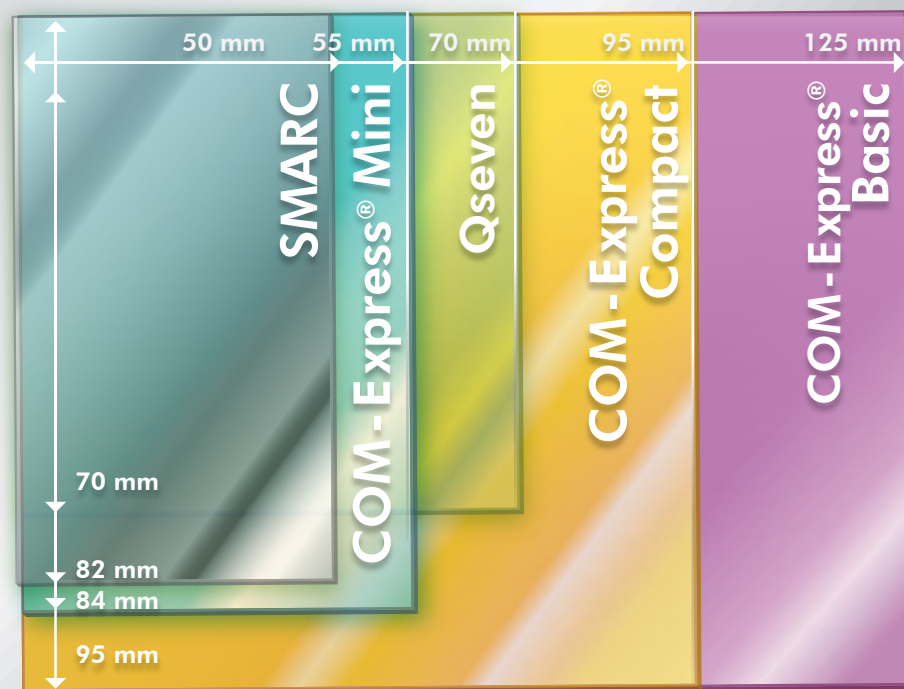
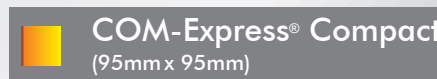
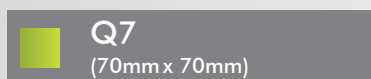
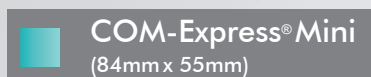
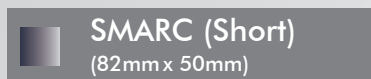
**ETX<sup>®</sup> 3.0**  
Long Term Support

 **SMARC**



# Computer-On-Module

Various off-the-shelf core module with additional functionality that is required for specific applications



## COM-Express® —

COM Express® defines standardized form factors and pin-outs for Computer-on-Modules. The standard includes the mini form factor (84 x 55mm), the compact form factor (95 x 95mm) and the basic form factor (125 x 95mm). To serve industry requirements, the Digital Display Interfaces (DisplayPort, HDMI) and super-fast USB 3.0 were recently added to the pin-out definitions for COM Express® modules.

## Qseven® —

This new standard platform has been developed with performance and flexibility in mind, allowing various processor configurations to maximize passive cooling technology. With a maximum power consumption of around 12W specified in the standard, the new form factor is expected to appeal to manufacturers of applications that require fanless operation.

## SMARC—

The SMARC ("Smart Mobility ARChitecture") is a versatile small form factor computer Module definition targeting applications that require low power, low costs, and high performance. Module sizes are defined: 82mm x 50mm and 82mm x 80mm with 314 edge fingers that mate with a low profile 314 pin 0.5mm pitch right angle connector.



### **What Portwell Distributed Intelligence?**

Portwell provides remote technology to oversee the world. Portwell distributed intelligence is essential for increasing the capabilities – Remote diagnostic and repair , helping to increase equipment availability. Software reliability by isolating application code and helping to prevent dangerous interactions and security by preventing any node from executing malicious software.

### **Start-Up Intelligent Technology by Portwell Computer-On-Module Solution**

With energy demand growing, the smart grid provides opportunities for utility operators to transform their electrical networks. By using Portwell technologies, which provide higher levels of scalability, performance, energy-efficiency and serviceability, next-generation equipment can offer utilities improved energy management and lower operating costs.

# Intelligence



# Technology

## Flexible and Scalable Modular Platforms

Each element on the grid will demand a particular set of features; however, most elements can often be designed using a single-processor architecture with exceptional scalability, upgradeability and flexibility.

- Large processor selection: With a wide choice of processors, it's straightforward to scale designs to meet the right price-performance.
- Single code base: Equipment manufacturers can easily upgrade designs when the processor family is completely code compatible.
- I/O flexibility: Open modular systems, supporting multiple standard busses, allow designers to satisfy a wide range of I/O requirements.
- Reliable supplier: Chip manufacturers, with a reputation for delivering long life cycle products, help preserve equipment manufacturers' development investments.

## Easy to increase Embedded Computing Requirements

Regulatory and market realities are requiring a new way of thinking for utilities, and the use of standards-based building blocks to build out the grid will drive greater plant efficiency, higher renewable energy production and more advanced conservation programs.

***Versatile Modules,  
Instant Solution!***

**Intelligent  
Start!!**

# PCOM Interface

COM Express® specification adopted in July, 2005, redefined electrical, mechanical and thermal requirements for a highly integrated Computer On Module (COM) supporting rich combinations of high-speed I/O interfaces while keeping key legacy interface technologies enabling a smooth migration of interface technologies at once. The primary new technology behind COM Express® R2.1 is the support of a few new interfaces such as USB 3.0 and Digital Display Interfaces (DDI). The new technology also provides additional PCI Express lanes, high definition audio, and SPI for BIOS access. The new PCOM Interface has additional pin definitions such as Pulse Width Modulation (PWM) for fan control and TPM support for security and management. The evolution of the PCOM Module has adopted a Mini module of 84 x 55mm which is also more energy efficient under 12W.

## Naming Guide - Line of Portwell Com Express

PCOM Series	PCOM	Portwell COM Express
Carrier or Module	X <sub>1</sub>	B Module Board, Portwell Design
		C Carrier board, Portwell Design
		D Module Board, Out Sourcing
		E Carrier board, Out sourcing
COM Express Pin Type	X <sub>2</sub>	1 Type 1 Pin-Out
		2 Type 2 Pin-Out
		3 Type 3 Pin-Out
		4 Type 4 Pin-Out
		5 Type 5 Pin-Out
		6 Type 6 Pin-Out
		A Type 10 Pin-Out
Form Factor	X <sub>3</sub>	0 Others
		1 Basic Form Factor (125mm x 95mm)
		2 Extend Form Factor (155mm x 95mm)
		3 Micro Form Factor (95mm x 95mm)
		4 Nano Form Factor (55mm x 84mm)
		5-9 TBD
Serial Number	X <sub>4</sub>	0/1/2/3-9/A/B/C-Z
VGA support	Y <sub>5</sub>	V VGA support
		L LVDS support
Ethernet	Y <sub>6</sub>	G Gigabit Ethernet
		L Fast Ethernet
TPM support	Y <sub>7</sub>	T TPM support
Customized abbreviation	YY	

EX: PCOM-X<sub>1</sub>X<sub>2</sub>X<sub>3</sub>X<sub>4</sub>Y<sub>5</sub>Y<sub>6</sub>Y<sub>7</sub>-YY

### System I/O

PCI-E Lanes  
Serial  
SATA/SAS  
USB 2.0  
LAN  
LVDS/VGA  
TV-Out/DDI  
Express Card  
HDA  
LPC

### System Management

SDIO  
GPIO  
SMBUS  
I2C  
Watchdog Timer  
Speaker Out  
Reset

### Power Management

Thermal Protection  
Low Battery Alarm  
Suspend/Wake Signals  
Optimal Power  
VCC\_5V\_SBY Contacts  
Power Button  
Sleep/Lid Input  
Fan Control  
TPM

### Power

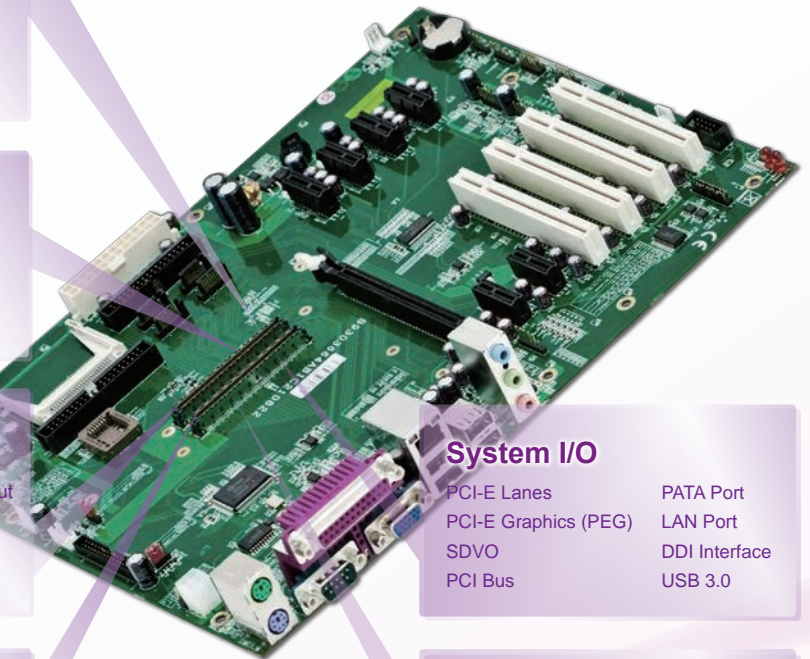
VCC\_12V Contacts

### System I/O

PCI-E Lanes  
PCI-E Graphics (PEG)  
SDVO  
PCI Bus  
PATA Port  
LAN Port  
DDI Interface  
USB 3.0

### Power

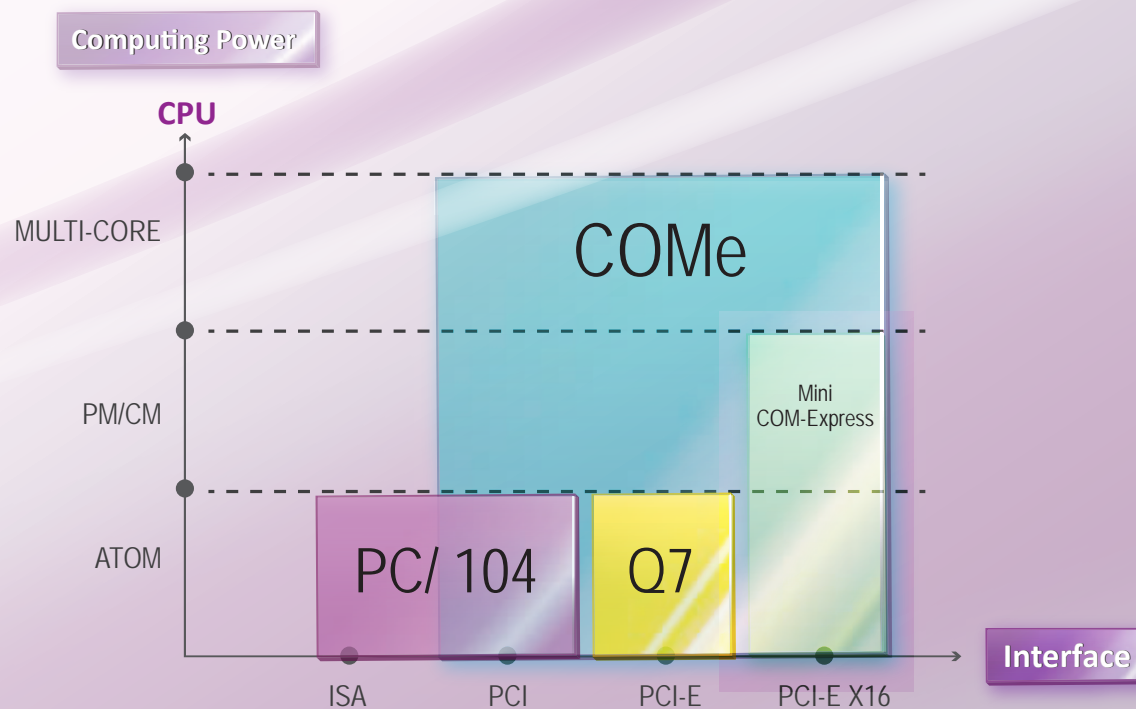
VCC\_12V Contacts





# COM Express<sup>®</sup> Standard

Types	Connector Rows	PCI Express	PEG	SATA Ports	LAN Ports	USB 2.0 Ports	USB 3.0 Ports	Display Interface
Type 6	AB & CD	Up to 24	1	4	1x GbE	8	4	VGA LVDS/eDP PEG 3x DDI
Type 7	AB & CD	Up to 32	NA	2	1x GbE 4x 10GbE	4	4	NA
Type 10	AB	Up to 4	NA	2	1x GbE	8	2	LVDS/eDP 1x DDI



# PCOM Solution Guide



	PCOM-B700G	PCOM-B639VG	PCOM-B638VG	PCOM-B637VG	PCOM-B636VG	PCOM-B635VG	PCOM-B634VG
Form Factor (mm)	COM Express® Basic (125 x 95mm)	COM Express® Basic (125 x 95mm)	COM Express® Compact (95 x 95mm)	COM Express® Basic (125 x 95mm)	COM Express® Compact (95 x 95mm)	COM Express® Basic (125 x 95mm)	COM Express® Basic (125 x 95mm)
COM Type	Type 7	Type 6	Type 6	Type 6	Type 6	Type 6	Type 6
CPU/ Clock/ Cache	<ul style="list-style-type: none"> <li>* Intel® Xeon® D-1577 (24M Cache, 1.30 GHz)</li> <li>* Intel® Xeon® D-1557 (18M Cache, 1.50 GHz)</li> <li>* Intel® Xeon® D-1548 (12M Cache, 2.00 GHz)</li> <li>* Intel® Xeon® D-1539 (12M Cache, 1.60 GHz)</li> <li>* Intel® Xeon® D-1537 (12M Cache, 1.70 GHz)</li> <li>* Intel® Xeon® D-1527 (6M Cache, 2.20 GHz)</li> <li>* Intel® Pentium® D1519 (6M Cache, 1.50 GHz)</li> <li>* Intel® Pentium® D1517 (6M Cache, 1.60 GHz)</li> <li>* Intel® Pentium® D1508 (3M Cache, 2.20 GHz)</li> <li>* Intel® Pentium® D1507 (3M Cache, 1.20 GHz)</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 6<sup>th</sup> Generation Core™</li> <li>* i7-6820EQ/i7-6822EQ/i5-6440EQ/i5-6420EQ/i3-6100E/i3-6102E/G3900E/G3902E</li> <li>* Up to 4 Cores</li> <li>* Smart Cache 2MB to 8MB</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 6<sup>th</sup> Generation Core™ ULT</li> <li>* Celeron 3955U/i3-6100U/i5-6300U/i7-6600U</li> <li>* Up to 2 CPU Cores</li> <li>* Smart Cache 2MB to 4MB</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 6<sup>th</sup> Generation Core™ 35W Desktop processor</li> <li>* i7-6700TE/i5-6500TE/i3-6100TE</li> <li>* Up to 4 CPU Cores</li> <li>* Smart Cache 4MB to 8MB</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® N3010/N3060/N3160/N3710</li> <li>* 2.08GHz to 2.40GHz</li> <li>* 2M L2 Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 5<sup>th</sup> Generation Core™ i7-5850EQ/5700EQ processor</li> <li>* Up to 4 CPU Cores</li> <li>* 6M L2 Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® Pentium® D Processor</li> <li>* D1577/D1548/D1539/D1527/D1519/D1517/D1508</li> <li>* Up to 16 CPU Cores</li> <li>* 12M L2 Cache</li> </ul>
Chipset	SoC	QM170/HM170/CM236	SoC	Q170/H110/C236	SoC	QM87	SoC
Memory	<ul style="list-style-type: none"> <li>* DDR4 2400 MT/s</li> <li>* Non-ECC/ ECC</li> <li>* 3 SO-DIMMs</li> <li>* 2 Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR4 2133 MT/s</li> <li>* Non-ECC/ ECC</li> <li>* 2 Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR4 2133 MT/s</li> <li>* Non-ECC</li> <li>* 2 Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR4 2133 MT/s</li> <li>* Non-ECC/ ECC</li> <li>* 2 Memory channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L 1600 MT/s</li> <li>* Non-ECC</li> <li>* 1 Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L 1600 MT/s</li> <li>* ECC</li> <li>* 2 Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR4 2400 MT/s</li> <li>* 3 SO-DIMMs</li> <li>* Non-ECC/ ECC</li> <li>* 2 Memory Channel</li> </ul>
USB	<ul style="list-style-type: none"> <li>4x USB 3.0</li> <li>4x USB 2.0</li> </ul>	<ul style="list-style-type: none"> <li>4x USB 3.0</li> <li>8x USB 2.0</li> </ul>	<ul style="list-style-type: none"> <li>3x USB 3.0</li> <li>8x USB 2.0</li> <li>(One Optional OTG)</li> </ul>	<ul style="list-style-type: none"> <li>4x USB 3.0</li> <li>8x USB 2.0</li> </ul>	<ul style="list-style-type: none"> <li>4x USB 3.0</li> <li>8x USB 2.0</li> </ul>	<ul style="list-style-type: none"> <li>4x USB 3.0</li> <li>8x USB 2.0</li> </ul>	<ul style="list-style-type: none"> <li>4x USB 3.0</li> <li>8x USB 2.0</li> </ul>
PCI Express	<ul style="list-style-type: none"> <li>1x PCIe 3.0 x16</li> <li>1x PCIe 3.0 x4</li> <li>2x PCIe 2.0 x1</li> </ul>	<ul style="list-style-type: none"> <li>1 PCIe 3.0 x16</li> <li>8 PCIe 3.0 x1</li> </ul>	<ul style="list-style-type: none"> <li>1x PCIe 3.0 x4</li> <li>5x PCIe 3.0 x1</li> </ul>	<ul style="list-style-type: none"> <li>1x PCIe 3.0 x16</li> <li>8x PCIe 3.0 x1</li> </ul>	<ul style="list-style-type: none"> <li>3x PCIe 2.0 x1</li> <li>(Optional to 4 x1)</li> </ul>	<ul style="list-style-type: none"> <li>1x PCIe 3.0 x16</li> <li>8x PCIe 2.0 x1</li> </ul>	<ul style="list-style-type: none"> <li>1x PCIe 3.0 x16</li> <li>8x PCIe 2.0 x1</li> </ul>
Ethernet	Intel® I210IT	Intel® I219LM	Intel® I219LM	Intel® I219LM	Intel® I210IT	Intel® I218LM	Intel® I210IT
Sound	NA	Intel® High definition Audio	Intel® High definition Audio	Intel® High definition Audio	HD 5:1 Audio codec	Intel® High definition Audio	N/A
Graphic Controller	NA	* Intel® HD Graphics 530	* Intel® HD Graphics 520	* Intel® HD Graphics 530	* Intel® HD Graphics Gen8	* Intel® Iris™ Pro Graphics 6200	* SM750
Carrier Board	PCOM-C700 (Type 7)	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-C609 (Type 6)





	PCOM-B633VG	PCOM-B632VG	PCOM-B219VG	PCOM-B641VG	PCOM-BA01	PCOM-BA00
Form Factor (mm)	COM Express® Compact (95 x 95mm)	COM Express® Compact (95 x 95mm)	COM Express® Compact (95 x 95mm)	COM Express® Compact (95 x 95mm)	COM Express® Mini (84 x 55mm)	COM Express® Mini (84 x 55mm)
COM Type	Type 6	Type 6	Type 6	Type 6	Type 10	Type 10
CPU/ Clock/ Cache	<ul style="list-style-type: none"> <li>* Intel® 5650U/5350U/5010U</li> <li>* 1.8Ghz to 2.2Ghz</li> <li>* 3MB ~ 4MB L2 Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® E3845/E3827/E3826/E3825/E3815</li> <li>* 1.33GHz up to 1.91GHz</li> <li>* 1MB to 2MB cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 3615QE/3612QE/3555LE/3517UE/3610ME/3120ME/3217UE</li> <li>* 1.60 GHz up to 3.30GHz</li> <li>* x4 DMI</li> <li>* 3MB~6MB Shared Last Level Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 6<sup>th</sup> Generation</li> <li>* Intel® Pentium® N4200 (2M Cache, up to 2.5 GHz)</li> <li>* Intel® Celeron® N3350 (2M Cache, up to 2.4 GHz)</li> <li>* Intel® Atom™ x7-E3950 (2M Cache, up to 2.00 GHz)</li> <li>* Intel® Atom™ x5-E3940 (2M Cache, up to 1.80 GHz)</li> <li>* Intel® Atom™ x5-E3930 (2M Cache, up to 1.80 GHz)</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® 6<sup>th</sup> Generation</li> <li>* Intel® Pentium® Processor N4200 (2M Cache, up to 2.5 GHz)</li> <li>* Intel® Celeron® Processor N3350 (2M Cache, up to 2.4 GHz)</li> <li>* Intel® Atom™ x7-E3950 Processor (2M Cache, up to 2.00 GHz)</li> <li>* Intel® Atom™ x5-E3940 Processor (2M Cache, up to 1.80 GHz)</li> <li>* Intel® Atom™ x5-E3930 Processor (2M Cache, up to 1.80 GHz)</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® E3845/E3827/E3825/E3815</li> <li>* 1.33 GHz to 1.91GHz</li> <li>* 1MB to 2MB cache</li> </ul>
Chipset	SoC	SoC	QM77	SoC	SoC	SoC
Memory	<ul style="list-style-type: none"> <li>* DDR3L 1600 MT/s</li> <li>* Non-ECC</li> <li>* 1 Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L 1067/1333 MT/s</li> <li>* Non-ECC</li> <li>* 1 Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3 1333/1600 MT/s</li> <li>* ECC</li> <li>* 2 Channels</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L 1866 MT/s</li> <li>* 2 SODIMMs</li> <li>* 16GB Max</li> </ul>	<ul style="list-style-type: none"> <li>* LPDDR4 2133 MT/s</li> <li>* 8GB Max</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L 1067/1333 MT/s</li> <li>* Non-ECC/ ECC</li> <li>* 1 Channel</li> </ul>
USB	2x USB 3.0 8x USB 2.0	1x USB 3.0 4x USB 2.0	4x USB 3.0 8x USB 2.0	3x USB 3.0 8x USB 2.0 OTG x 1 port (Optional)	3x USB 3.0 8x USB 2.0 OTG x 1 port (Optional)	1x USB 3.0 4x USB 2.0
PCI Express	1x PCIe 2.0 x4 3x PCIe 2.0 x1 (Optional to 4 x1)	3x PCIe 2.0 x1	1 PCIe 3.0 x16 7 PCIe 3.0 x1	1x PCIe 2.0 x4	1x PCIe 2.0 x4	3x PCIe 2.0 x1 (Optional to 4 x PCIe x1)
Ethernet	Intel® I218LM	LAN I210IT	LAN 82579LM	LAN I210-IT	LAN I210-IT	LAN I210-IT
Sound	Intel® High definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High definition Audio	Intel® High definition Audio	Intel® High Definition Audio
Graphic Controller	* Intel® HD Graphics 6000, Support DirectX 11.1, Graphic frequency up to 1Ghz	* Intel® HD Graphic	* Intel® HD Graphics 4000 supports DX11, OpenGL 3.0	* Intel® HD Graphics 505 * Intel® HD Graphics 500	* Intel® HD Graphics 505 * Intel® HD Graphics 500	* Intel® HD Graphic
Carrier Board	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-C605 (Type 6)	PCOM-CA00 (Type 10)	PCOM-CA00 (Type 10)

# PCOM-B700G

COM Express® Rev3.0 Basic Type 7 module, 10GbE KR Ethernet, Intel® micro server Xeon® SoC processor



Portwell 1<sup>st</sup> COM Express® Type 7 modular product, with Xeon® 16 cores SoC processor and 10GbE Ethernet interface. The first three SO-DIMMs memory socket supports up to 48GB SDRAM.

Portwell PCOM-B700G is designed with Intel® new Xeon® processor with 16 CPU cores, 10GbE Ethernet KR interface and three DDR4 ECC



SO-DIMM support which provide high CPU computing, excellent Ethernet performance. Extend PCIe Gen3 ports in PCOM- B700 supports high speed IO card for more applications.

## FEATURES

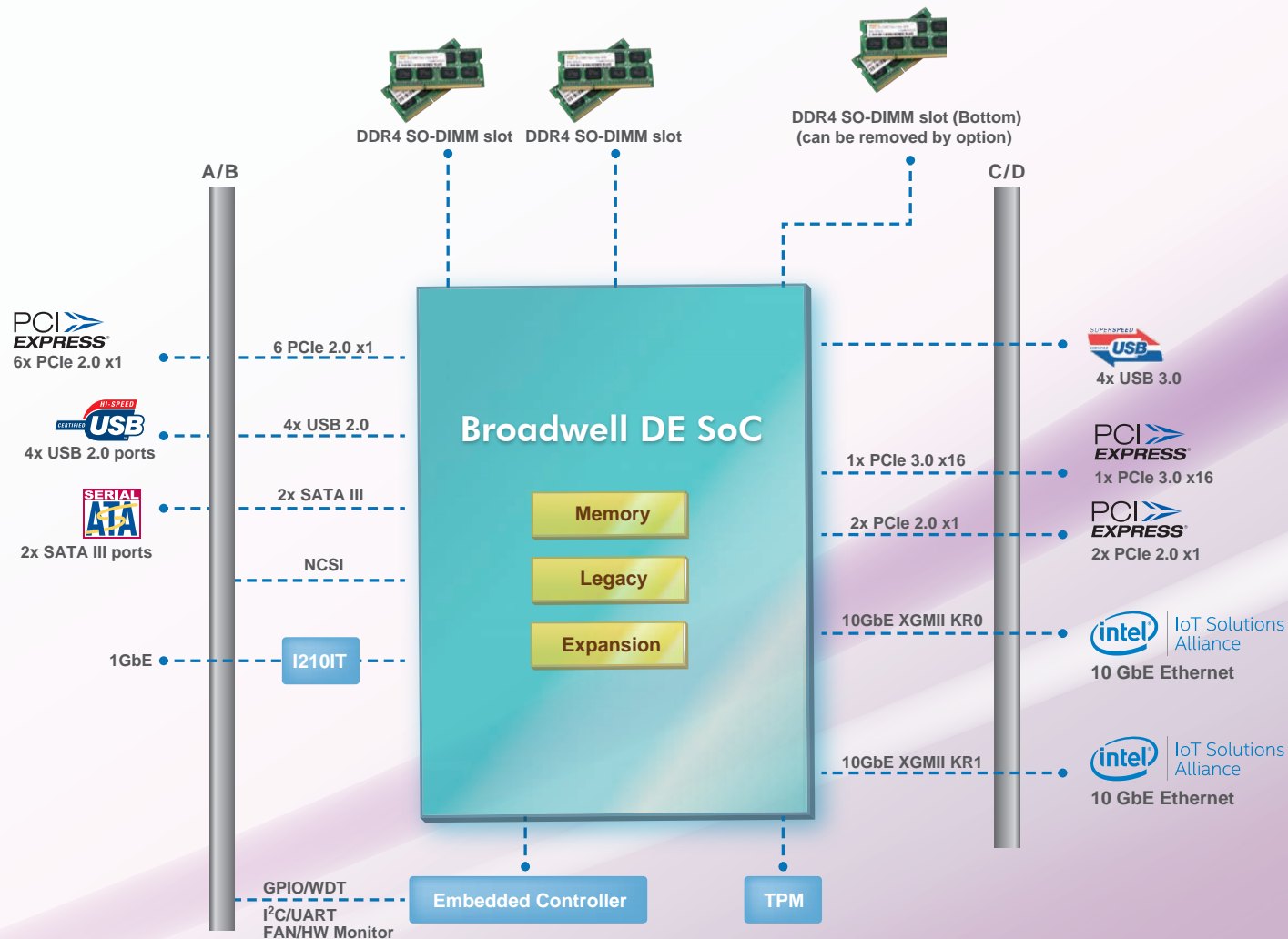
- COM Express® Rev3.0 Basic Type 7
- Intel® (former codename Broadwell-DE)Pentium®/Xeon® processors
- 2/4/8/12/16 Cores processor
- 10GbE KR interface
- -40°C to +85°C wide temperature

## ORDERING GUIDE

AB1-3F18Z

(R).PCOM-B700G. TYPE VII. Basic Form Factor.  
COM Express® Module. Intel® Broadwell-DE/DDR4  
SO-DIMM





### Processor Core

- ◆ Intel® (former codename Broadwell-DE)Pentium®/Xeon® processors
- ◆ 2/4/8/12/16 Cores processor

### Highlights

- ◆ 3 SO-DIMM sockets
- ◆ Support 2x 10GbE XGMII

### Memory

- ◆ 3 SO-DIMM sockets
- ◆ Dual channel
- ◆ DDR4 - 2400MT/s
- ◆ Up to 48GB

### Platform Thermal Design Power

	CPU	D1559	D1537	D1508
W <sub>att</sub>		45W	35W	25W

# PCOM-B639VG

Data protection is more and more important in real world since big data rising. Portwell adopts new Intel® platform to provide highest secure logic. It helps customer earn trust and business by securing important information anytime. The new generation of CPU and DDR4 support give customer higher performance and computing power



Intel® Skylake-H Core™ i7/i5/i3 processor based on Type VI COM Express® module with DDR4 SDRAM, VGA, LVDS, Gigabit Ethernet, SATA 3.0 and USB

PCOM-B639VG brings three important factors, DDR4 memory support, Gen 3 PCIe support, and good graphic performance. The DDR4 is trend and it supports both ECC and Non-ECC with the same pin definition. In other words, customer can use both ECC and Non-ECC memories depending their application and demand. In order to achieve that, all the PCH SKUs are considered in development stage to make sure that customer has various models to meet different requirements in cost, performance, and memory type. Gen3 PCIe provides fast speed and enable your PCIe expansion card consequently even better performance. It is suitable for Networking and Medical related applications. The enhanced graphic performance brings 4K support.

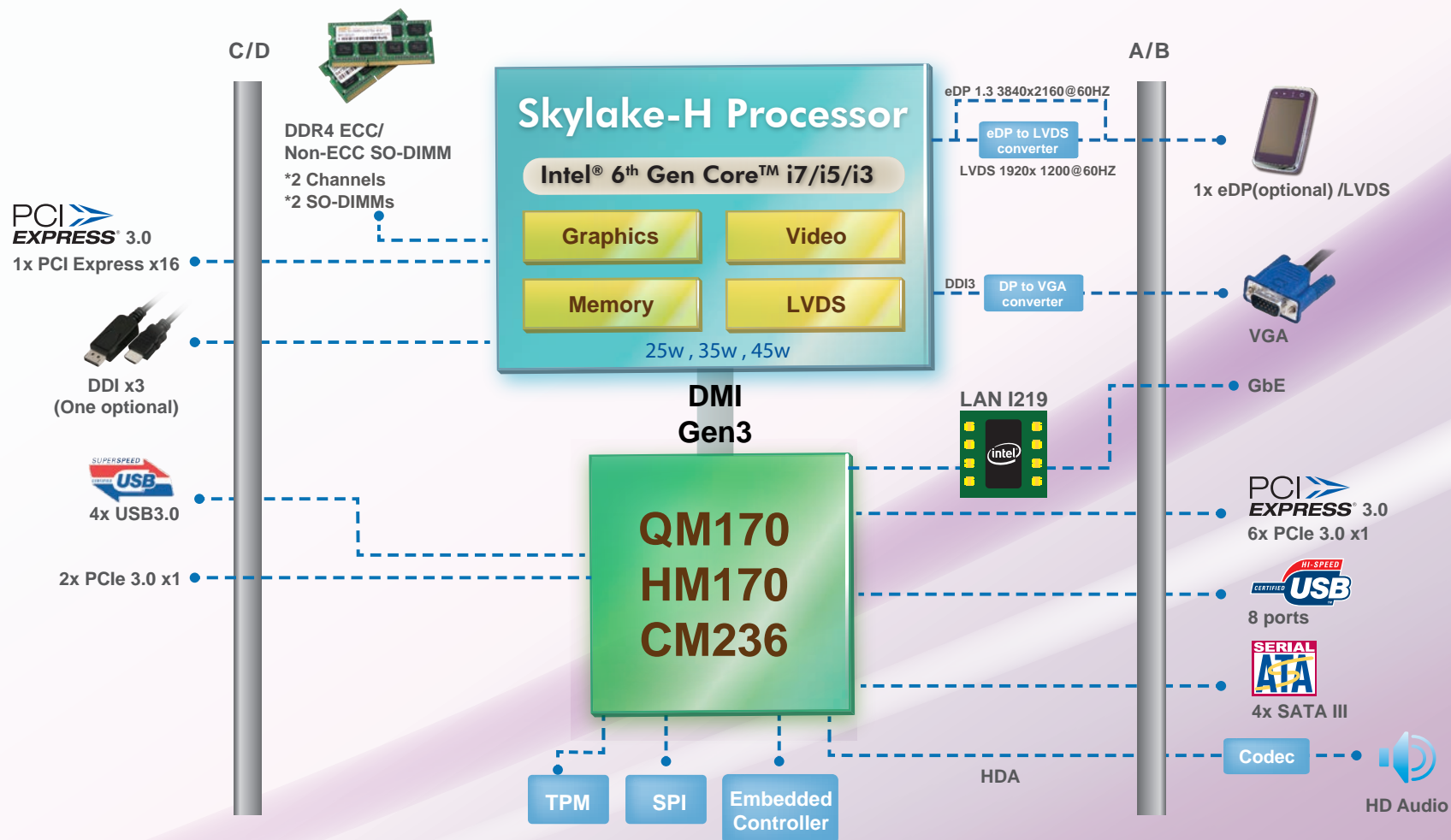
## FEATURES

- Intel® 6<sup>th</sup> Generation Core™ Skylake-H i7, i5 and i3 Processors
- Support DDR4-2133MT/s ECC/Non-ECC SDRAM on two SO-DIMM slots, up to 32GB
- One VGA, three DDI(One default optional) and one embedded Display port
- Support USB 2.0/3.0, SATA, 8 PCIe x1 and 1 PCIe x16
- Wide voltage support, from 6V to 18V

## ORDERING GUIDE

AB1-3E31Z	(R).PCOM-B639VG-6820EQ
AB1-3E30Z	(R).PCOM-B639VG-6822EQ
AB1-3E29Z	(R).PCOM-B639VG-6440EQ
AB1-3E28Z	(R).PCOM-B639VG-6442EQ
AB1-3E27Z	(R).PCOM-B639VG-6100E
AB1-3E26Z	(R).PCOM-B639VG-6102E
AB1-3E25Z	(R).PCOM-B639VG-G3900E
AB1-3E35Z	(R).PCOM-B639VG-G3902E





### Processor Core

- ◆ Skylake-H is the 6<sup>th</sup> Generation Intel® Core™ Processor with 14nm
- ◆ Turbo mode
- ◆ SMT: 4~8 threads/core

### Highlights

- ◆ DDR 4 memory support
- ◆ Gen 3 PCIe support 1x 16, 2 x8, 1x4 configuration

### Memory

- ◆ DDR4 2133 MT/s
- ◆ 2 Channels
- ◆ up to 32GB/s in 2 SO-DIMM

### Platform Thermal Design Power

CPU	i7-25/35/45W	i5-25/35/45W	i3-25/35W
PCH	QM170 5.8W	QM170 5.8W	QM170 5.8W
W <sub>att</sub>	50.8W	50.8W	40.8W

# PCOM-B638VG

Comparing to the previous generation, the Skylake-U can provide not only flexible performance power with efficient energy usage and real time CPU computing, but also more powerful and longer battery life. The enhanced Graphic performance and High Speed I/O can give customers better PCIe and SATA speed. The DDR4 support brings more performance too



Intel® Skylake-U Core™ i7/i5/i3 processor based on Type VI Compact COM Express® module with DDR4 SDRAM on SO-DIMM slot, VGA, LVDS, Display-port, Gigabit Ethernet, PCIe, SATA, USB, OTG



PCOM-B638VG brings three important factors, DDR4 memory support, Gen3 PCIe support, and good graphic performance. Gen3 PCIe provides fast speed and enable your PCIe expansion card consequently even better performance. It is suitable for Networking and Medical related applications. The enhanced graphic performance brings 4K support. The OTG gives customer more flexibilities on developing new applications in different usages

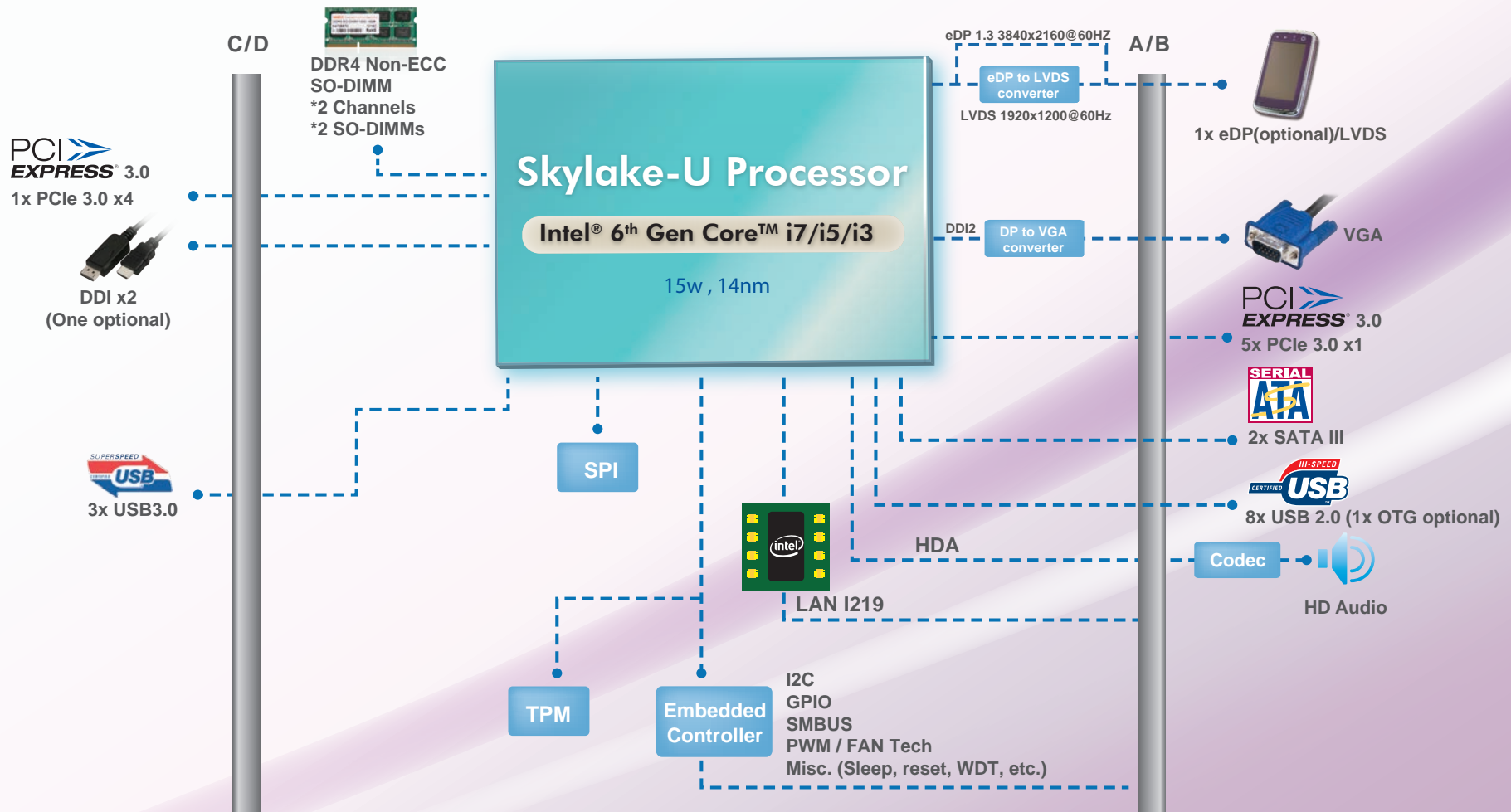
## FEATURES

- Intel® 6<sup>th</sup> Generation Skylake-U series Core™ i7, i5 and i3 15W Processors
- Two SO-DIMM slots, up to 32GB
- Support DDR4-2133 MT/s Non-ECC SDRAM on one SO-DIMM slots, up to 16GB
- One VGA, two DDI(One default optional) and LVDS
- Support USB 2.0/3.0, SATA, 5 PCIe x1 and 1 PCIe x4
- Wide voltage support, from 6V to 18V

## ORDERING GUIDE

AB1-3E39Z	(R).PCOM-B638VG-6600U
AB1-3E38Z	(R).PCOM-B638VG-6300U
AB1-3E32Z	(R).PCOM-B638VG-6100U





### Processor Core

- ◆ Skylake-U is the 6<sup>th</sup> Generation Intel® Core Processor with 14nm
- ◆ Turbo mode
- ◆ SMT: 2~4 threads/core

### Highlights

- ◆ DDR 4 memory support
- ◆ Gen 3 PCIe support
- ◆ OTG support

### Memory

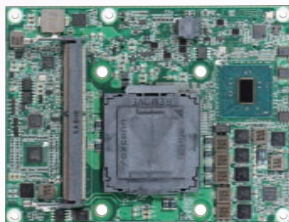
- ◆ DDR4 2133 MT/s
- ◆ 2 Channels
- ◆ up to 32GB in 2 SO-DIMM

### Platform Thermal Design Power

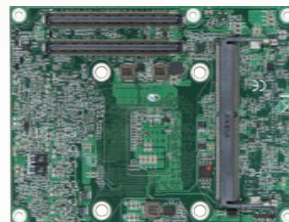
CPU	i7-6600U	i5-6300U	i3-6100U
Watt	15W	15W	15W

# PCOM-B637VG

The desktop CPU SKU on module is a brand new idea which has never been seen in the market. It's perfect for 1U network system. High-end server can handle more business and information. Multiple-Processors, Hardware-base Raid & Remote control functions are always in high-end server



Intel® Skylake-S Core™ i7/i5/i3 processor based on Type VI COM Express® module with DDR4 SDRAM, VGA, LVDS, Gigabit Ethernet, SATA 3.0 and USB



PCOM-B637VG brings three important factors, DDR4 memory support, Gen 3 PCIe support, and good graphic performance. The DDR4 is trend and it supports both ECC and Non-ECC with the same pin definition. In other words, customer can use both ECC and Non-ECC memories depending their application and demand. In order to achieve that, all the PCH SKUs are considered in development stage to make sure that customer has various models to meet different requirements in cost, performance, and memory type. Gen3 PCIe provides fast speed and enable your PCIe expansion card consequently even better performance. It is suitable for Networking and Medical related applications. The enhanced graphic performance brings 4K support.

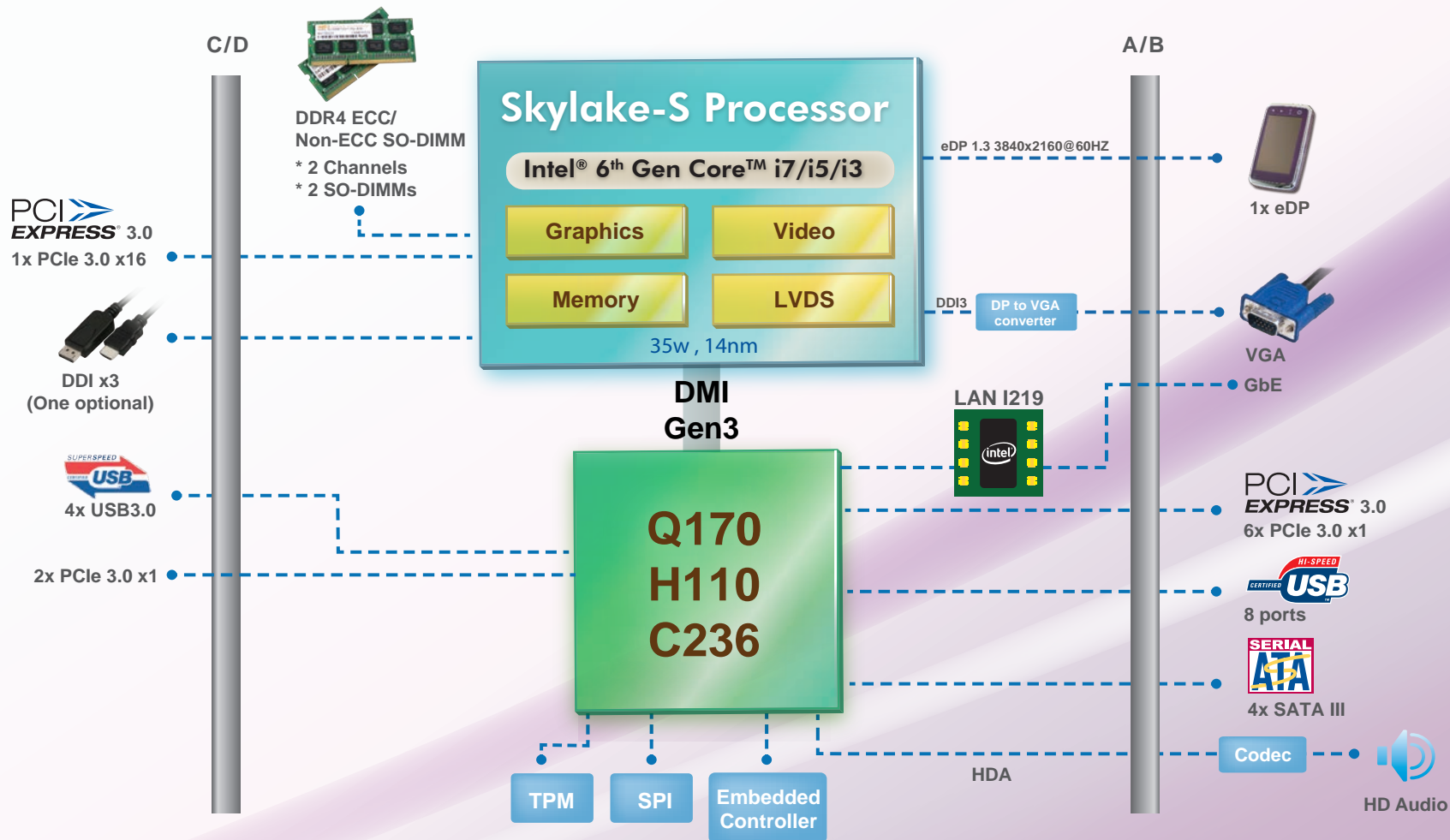
## FEATURES

- Intel® 6<sup>th</sup> Generation Skylake-S series Core™ i7, i5 and i3 35W Processors
- Support DDR4-2133 MT/s ECC/Non-ECC SDRAM on two SO-DIMM slots, up to 32GB
- One VGA, three Displayport
- Support USB 2.0/3.0, SATA III, 7x PCIe 3.0 x1 and 1x PCIe 3.0 x16
- Wide voltage support, from 6V to 18V

## ORDERING GUIDE

AB1-3E37Z	(R).PCOM-B637VG-Q170
AB1-3E34Z	(R).PCOM-B637VG-H110
AB1-3E36Z	(R).PCOM-B637VG-C236





### Processor Core

- ◆ Skylake-S is the 6<sup>th</sup> Generation Intel® Core™ Processor with 14nm
- ◆ Turbo mode
- ◆ SMT: 4~8 threads/core

### Highlights

- ◆ DDR 4 memory support
- ◆ Gen 3 PCIe support 1x16, 2x8, 1x4 configuration

### Memory

- ◆ DDR4-2133 MT/s
- ◆ 2 Channels
- ◆ up to 32GB in 2 SO-DIMM

### Platform Thermal Design Power

CPU	i3/i5/i7 35W	i3/i5/i7 35W	i3/i5/i7 35W
PCH	C236 5.8W	Q170 5.8W	H110 5.8W
W <sub>att</sub>	40.8W	40.8W	40.8W

# PCOM-B636VG

M2M business is growing up due to IoT and Indutrail 4.0 application. Portwell provides new COM Express® product based on Intel® N3000 series to enable stable and real time function for communication and control system. With low power and EMC design of PCOM-B636, it helps customer to develop fanless and reliability system



Intel® Atom™ N3000 series based TypeVI COM Express with DDR3L SDRAM, VGA, LVDS, USB 3.0, PCIE and surround design.

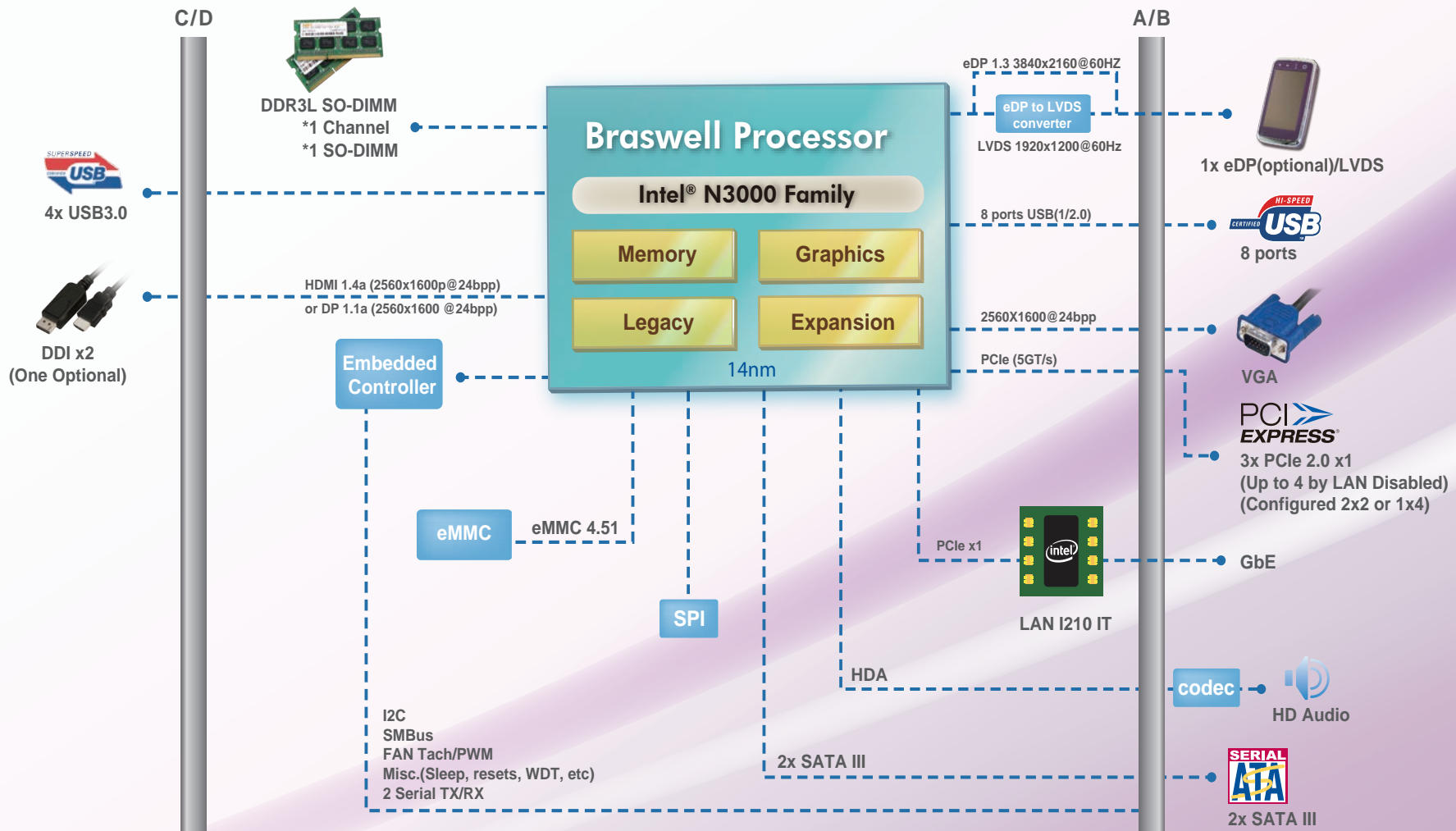
PCOM-B636VG COM Express® Type VI module with Intel® Atom™ N300 series SoC. Implementation of applications used for national security and cyber warfare require high intelligence systems capable of operating in remote conditions and under stringent conditions, more so than industrial computers.

## FEATURES

- The latest Intel® Atom™ N3000 series embedded processor provides cost-effective solutions with low power and quad core processor technology
- Supports up to four PCIe lanes, four x 1 lanes can be configured to one x 4 lane
- Supports one DDR3L 1600/1333MT/s SDRAM, up to 8GB
- Supports four USB3.0
- Support eMMC storage

## ORDERING GUIDE

AB1-3E73	(R).PCOM-B636VG-N3710.TYPE VI. Atom N3710 Quad Core 1.6GHz.Compact Form Factor.COM Express Module/EC
AB1-3E74	(R).PCOM-B636VG-N3160.TYPE VI. Atom N3160 Quad Core 1.6Hz.Compact Form Factor.COM Express Module/EC/LVDS
AB1-3F40	(R).PCOM-B636VG-N3060.TYPE VI. Atom N3060 DualCore 1.6GHz.Compact Form Factor.COM Express Module/EC/LVDS
AB1-3F41	(R).PCOM-B636VG-N3010.TYPE VI. Atom N3010 DualCore 1.04GHz.Compact Form Factor.COM Express Module/EC/LVDS



### Processor Core

- ◆ Intel® N3010/N3060/N3160/ N3710
- ◆ 2M L2 Cache

### Highlights

- ◆ Surround grounding design
- ◆ Integrated Native PCIe x1 and x4
- ◆ VGA/LVDS/DDI support
- ◆ eMMC storage support

### Memory

- ◆ DDR3L 1600 MT/s
- ◆ 1 Memory Channel
- ◆ up to 8GB

### Platform Thermal Design Power

	CPU	N3710	N3160	N3060	N3010
Watt		6W	6W	6W	4W

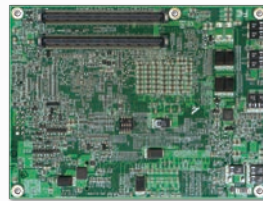


# PCOM-B635VG

Data protection is more and more important in real world since big data rising. Portwell adopt new Intel platform to provide highest secure logic. It help customer earn trust and business by securing important information anytime



Intel® 5<sup>th</sup> Generation Core™ i7/i5/i3 processor based on Type VI Basic COM Express® Rev 2.1 module with DDR3L ECC SDRAM on Dual SO-DIMM slots, VGA, Display-port, Gigabit Ethernet, SATA and USB



The basic PCOM-B635VG COM Express® module supports up to 16GB ECC DDR3L 1333/1600 MT/s SDRAM on two 204-pin SO-DIMM sockets making it faster than its predecessor. Its expansion interface supports one PCI Express x16 Gen3 (8.0GT/s) with three controllers integrated into processor for enhanced video performance and enhance capabilities to be configurable to 2 x8-lane or 1 x8-lane and 2 x4-lane PCI Express ports.

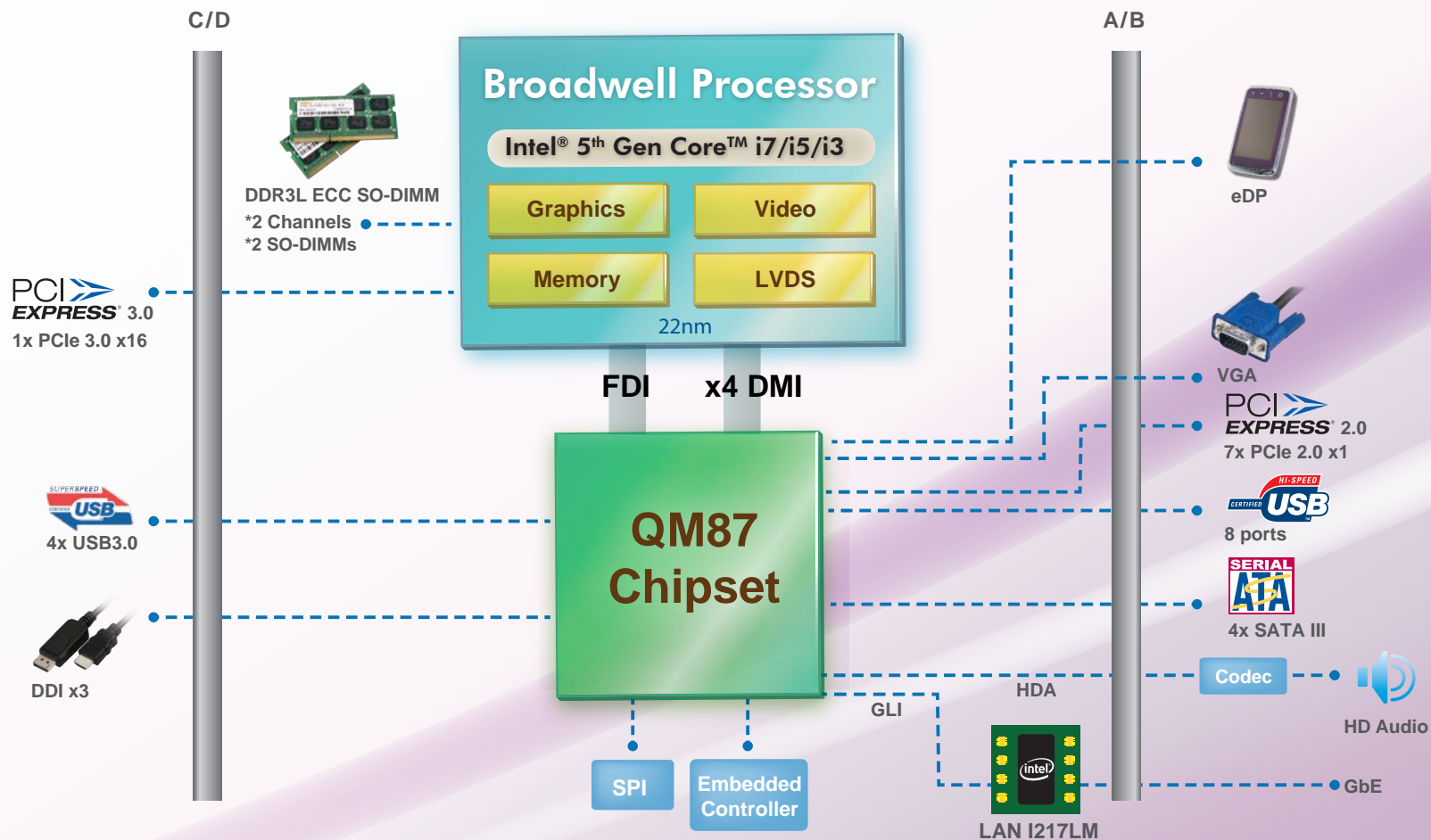
The module supports three independent displays, DP (Display Port), HDMI or DVI and VGA with up to double greater 3D performance compared to its previous generation.

## FEATURES

- Intel® 5<sup>th</sup> Generation Core™ i7, i5 and i3 Processors
- Support DDR3L-1600/1333 ECC SDRAM on two SO-DIMM slots, up to 16GB
- One VGA, three Display-port and one embedded Display port.
- Support USB 2.0/3.0, 4x SATA III, 7x PCIe 2.0 x1 and 1x PCIe 3.0 x16
- Wide voltage support, from 6V to 18V

## ORDERING GUIDE

AB1-3C53	(R).PCOM-B635VG. TYPE VI. Basic Form Factor.COM Express Module.Broadwell/PCH
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### Processor Core

- ◆ Intel® 5th Generation Core™ i7/i5/i3 processor to 6MB Cache
- ◆ SMT:4~8 threads/core
- ◆ Turbo Mode

### Highlights

- ◆ GT3 Graphic with eDRAM
- ◆ Integrated Native PCIe x16 Gen3
- ◆ 25% lower TDP than previous version

### Memory

- ◆ DDR3L 1600 MT/s
- ◆ 2 Memory Channels

### Platform Thermal Design Power

	i7/GT3	i7/GT2
CPU	47W	47W
PCH	QM87 2.7W	QM87 2.7W
Watt	49.7W	49.7W



# PCOM-B634VG

In the time of big data, the most important business is that data analysis. Portwell provide highest CPU computing power by Intel® new Xeon® on COM Express® module. By new thermal solution, the system can keep working 24x7 with PCOM-B634. It help customer get most important information in Big data



Intel® Pentium® D Series Processor based on Type VI Basic COM Express 2.0 module with DDR4 ECC SDRAM on Three SO-DIMM slots, VGA, HDMI, PCIe x16, 10GbE, SATA and USB



Portwell PCOM-B634VG is designed with Intel® new XEON® processor with 16 CPU cores, 10GbE Ethernet KR/KR interface interface and DDR4 ECC SO-DIMM support which provide high CPU computing, excellent Ethernet performance. Extend PCIe Gen3 ports in PCOM-B634 can support high speed IO card for more application. With VGA and legacy interface support, customer can upgrade system fast and easily.

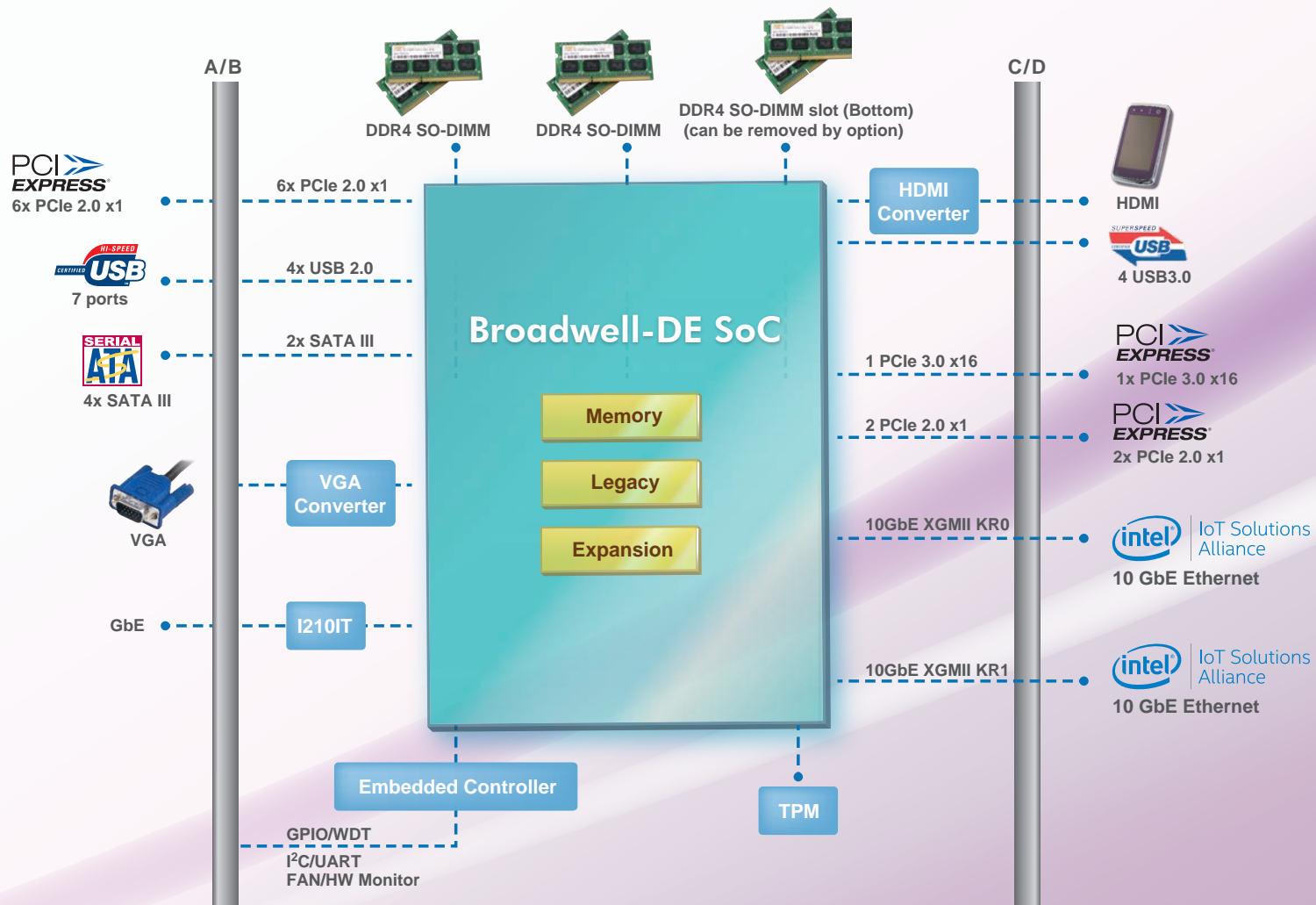
## FEATURES

- Intel® Pentium® D Series Processor on 14nm process
- Support DDR4-2400MT/s ECC/non-ECC SDRAM on three SO-DIMM slots, up to 48GB
- One VGA and HDMI, 10GbE interface
- Support 7x USB 2.0, 4x USB 3.0, 4x SATA III, 8x PCIe 2.0 x1 and 1x PCIe 3.0 x16

## ORDERING GUIDE

AB1-3C91Z	(R.)PCOM-B634VG. TYPE VI. Basic Form Factor.COM Express® Module Broadwell-DE/PCH
AB1-3E09Z	(R.)PCOM-B634VG-D1537.TYPE VI. Basic Form Factor.COM Express® Module.Intel® D1537/VGA/DDR4 SO- DIMM
AB1-3D98Z	(R.)PCOM-B634VG-D1517.TYPE VI. Basic Form Factor.COM Express® Module.Intel® D1517/VGA/DDR4 SO- DIMM
AB1-3D99Z	(R.)PCOM-B634VG-D1508.TYPE VI. Basic Form Factor.COM Express® Module.Intel® D1508/VGA/DDR4 SO- DIMM





### Processor Core

- ◆ Intel® New Xeon®
- ◆ Up to 16 CPU Cores
- ◆ Optional for Wide-temperature

### Highlights

- ◆ Support 10GbE XGMII
- ◆ Support VGA/HDMI Display
- ◆ Support 3 DDR4 ECC SO-DIMM slots

### Memory

- ◆ DDR4 2400 MT/s ECC/Non-ECC SO-Dimm
- ◆ 2 Memory Channels

### Platform Thermal Design Power

CPU	D1559	D1537	D1508
W <sub>att</sub>	45W	35W	25W

# PCOM-B633VG

Flexible performance power can provide efficient energy usage and real time CPU computing. It can make portable more powerful and longer system life with battery. With excellent EMC and thermal design, the system can work anywhere



Intel® Broadwell-ULT Core™ i7/i5/i3 processor based on Type VI Compact COM Express® Rev 2.1 module with DDR3L SDRAM on SO-DIMM slots, VGA, LVDS, Display-port, Gigabit Ethernet, PCIe, SATA and USB

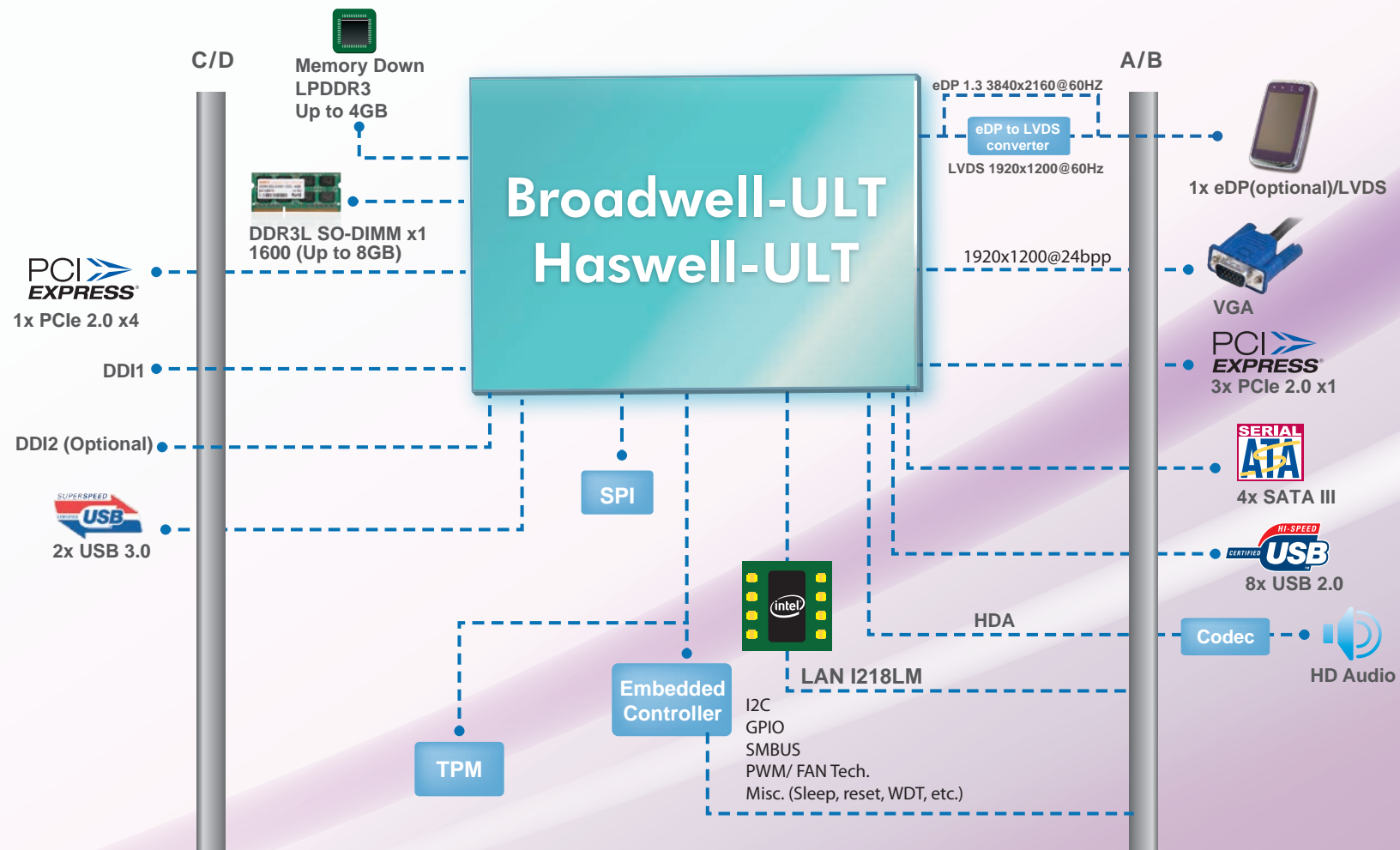
Portwell PCOM-B633VG is designed with Intel® Broadwell-ULT Core™ i7/i5/i3 ultra low power processor with turbo-boost, SOL, IDER, iAMT 10.0 remote control which offer high speed and accurate responses suitable for medical healthcare systems and military applications.

## FEATURES

- Intel® 5<sup>th</sup> Generation Core™ i7, i5 and i3 Processors ULT
- Support DDR3L-1600/1333MT/s SDRAM on SO-DIMM slots, up to 8GB
- Support DDR3L memory-down, up to 4GB
- Support VGA, LVDS and Display-port interface
- Support USB 2.0/3.0, 4x SATA III, 4x PCIe 2.0 x1 and 1x PCIe 2.0 x4

## ORDERING GUIDE

AB1-3C62	(R).PCOM-B633VG-5650U.TYPE VI. Compact COM Express Module.i7- 5650U, VGA/LVDS/Display-ports
AB1-3C61	(R).PCOM-B633VG-5350U.TYPE VI. Compact COM Express Module.i5- 5350U, VGA/LVDS/Display-ports
AB1-3C60	(R).PCOM-B633VG-5010U.TYPE VI. Compact COM Express Module.i3- 5010U, VGA/LVDS/Display-ports
AB1-3C39	(R).PCOM-B633VG-4650U.TYPE VI. Compact COM Express Module. i7-4650U, VGA/LVDS/Display-ports
AB1-3C58	(R).PCOM-B633VG-4300U.TYPE VI. Compact COM Express Module. i5-4300U, VGA/LVDS/Display-ports
AB1-3C59	(R).PCOM-B633VG-4010U.TYPE VI. Compact COM Express Module. i3-4010U, VGA/LVDS/Display-ports
AB1-3C38	(R).PCOM-B633VG-2980U.TYPE VI. Compact COM Express Module. Celeron 2980U, VGA/LVDS/ Display-ports



### Processor Core

- ◆ Intel® 5650U/5350U/5010U
- ◆ Dual Cores
- ◆ 3MB ~ 4MB L2 Cache
- ◆ SMT: w threads/core
- ◆ Turbo mode

### Highlights

- ◆ Surround grounding design
- ◆ Integrated Native PCIEx1 and x4
- ◆ VGA/LVDS/DDI support

### Memory

- ◆ DDR3L 1600 MT/s
- ◆ 1 Memory Channel
- ◆ up to 8GB
- ◆ On-board LPDDR3 support
- ◆ up to 4GB

### Platform Thermal Design Power

CPU	i7-5650U 2C 2.2Ghz	i5-5350U 2C 1.8Ghz	i3-5010U 2C 2.1Ghz
Watt	15W	15W	15W



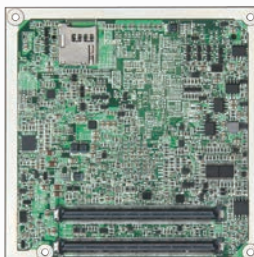
# PCOM-B632VG

Implementation of applications used for national security and cyber warfare require high intelligence systems capable of operating in remote conditions and under stringent conditions, more so than industrial computers



Intel® Atom™ E3800 series based Type VI COM Express® module with DDR3L SDRAM, VGA, eDP, HDMI, Gigabit Ethernet and 3Gbps SATA.

PCOM-B632VG is designed to offer good EMC protection by latest mobile platform, SoC(System-On-Chip) integrated remote technology and embedded controller. Also PCOM-B632VG provides high performance for various display, eDP and HDMI.



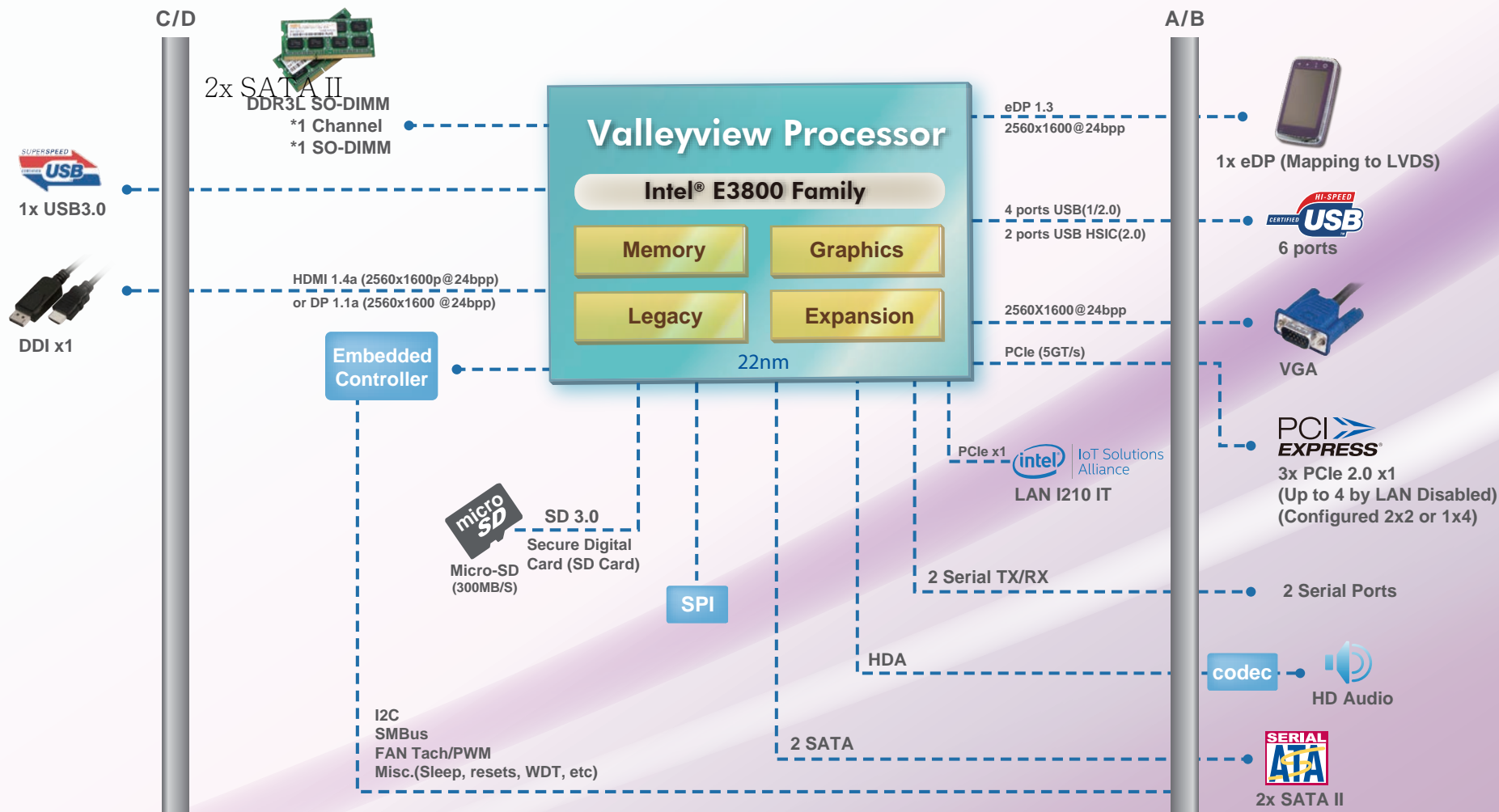
The PCOM-B632VG COM Express® module has been enhanced by Portwell in response to market demand for an even lower power platform to take advantage of the Intel® Atom™ processor's already compact design. In fact, since its initial inception, Portwell's expanding Intel Atom processor-based COM Express® product portfolio has now grown to include industrial temperature range support. Portwell's versatile COM Express® modules adapt to these changes by enabling designers to partition commodity host-processors from proprietary baseboards, thereby minimizing current and future design risks during the initial phase of development.

## FEATURES

- Latest Intel® Valleyview embedded processor provides cost effective solutions with low power and quad core processor technology
- Supports up to four PCIe lanes, four x 1 lanes can be configured to one x 4 lane
- Supports one DDR3L 1066/1333 MT/s SDRAM, up to 4GB
- Supports one 1x USB 3.0

## ORDERING GUIDE

AB1-3A35	(R).PCOM-B632-E3825, ATOM™ E3825 Dual Core with MOQ
AB1-3A34	(R).PCOM-B632-E3826, ATOM™ E3826 Dual Core with MOQ
AB1-3A33	(R).PCOM-B632-E3827, ATOM™ E3827 Dual Core
AB1-3A36	(R).PCOM-B632-E3845, ATOM™ E3845 QUAD Core
AB1-3A40	(R).PCOM-B632-E3815, ATOM™ E3845 Uni Core



### Processor Core

- ◆ BayTrail-I Core™ (22nm) E3845, E3827, E3826 and E3825 for multi-core; E3815 for Uni-core SKUs
- ◆ Up to 2M, Shared Last Level Cache
- ◆ SMT: 4 threads/core

### Highlights

- ◆ Integrated micro-SD on module
- ◆ Integrated PET (Portwell Engineering Toolkit) GUI
- ◆ 1x USB 3.0 port support
- ◆ Up to 4x PCI-Express x1 which support 1x4, 4x1 configurations

### Memory

- ◆ DDR3L 1067/1333MT/s
- ◆ 1 Memory Channel
- ◆ Up to 17GB/s for Industry SKU

### Platform Thermal Design Power

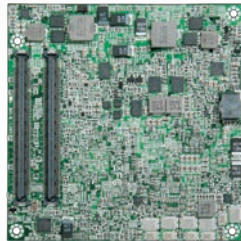
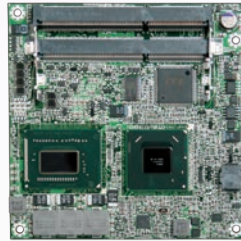
CPU	E3845 4C 1.9GHz	E3827 2C 1.75GHz	E3815 1C 1.46GHz
Watt	10W	8W	5W





# PCOM- B219VG

Military application computers face more stringent conditions than industrial computers which must withstand vibration, shock, humidity, and harsh environment. In addition, the performances is also required for high speed and accurate responses



3<sup>rd</sup> Generation Intel® Core™ processor family based Type VI Com Express with DDR3 SDRAM, VGA, LVDS, Gigabit Ethernet, 6Gbps SATA, and USB3.0

The Portwell PCOM-B219VG is designed with the Intel® QM77 express chipset which offers high computing power with the 3<sup>rd</sup> generation Intel® Core™ family. This provides turbo-boost, vPro, Hyper Threading, 3D Tri-gate Transistors, USB 3.0 and all the other materials necessary of withstanding wide temperature ranges necessary for harsh environment.

The new Intel® Ivy Bridge platform provides this flexibility of cross-platform CPU selection. Its compact size and rugged design can withstand a wide temperature range of -40 to 80 degree Celsius while providing high speed and accurate responses from command centers to remote stations such as missile launchers, radar stations, and unmanned vehicles.

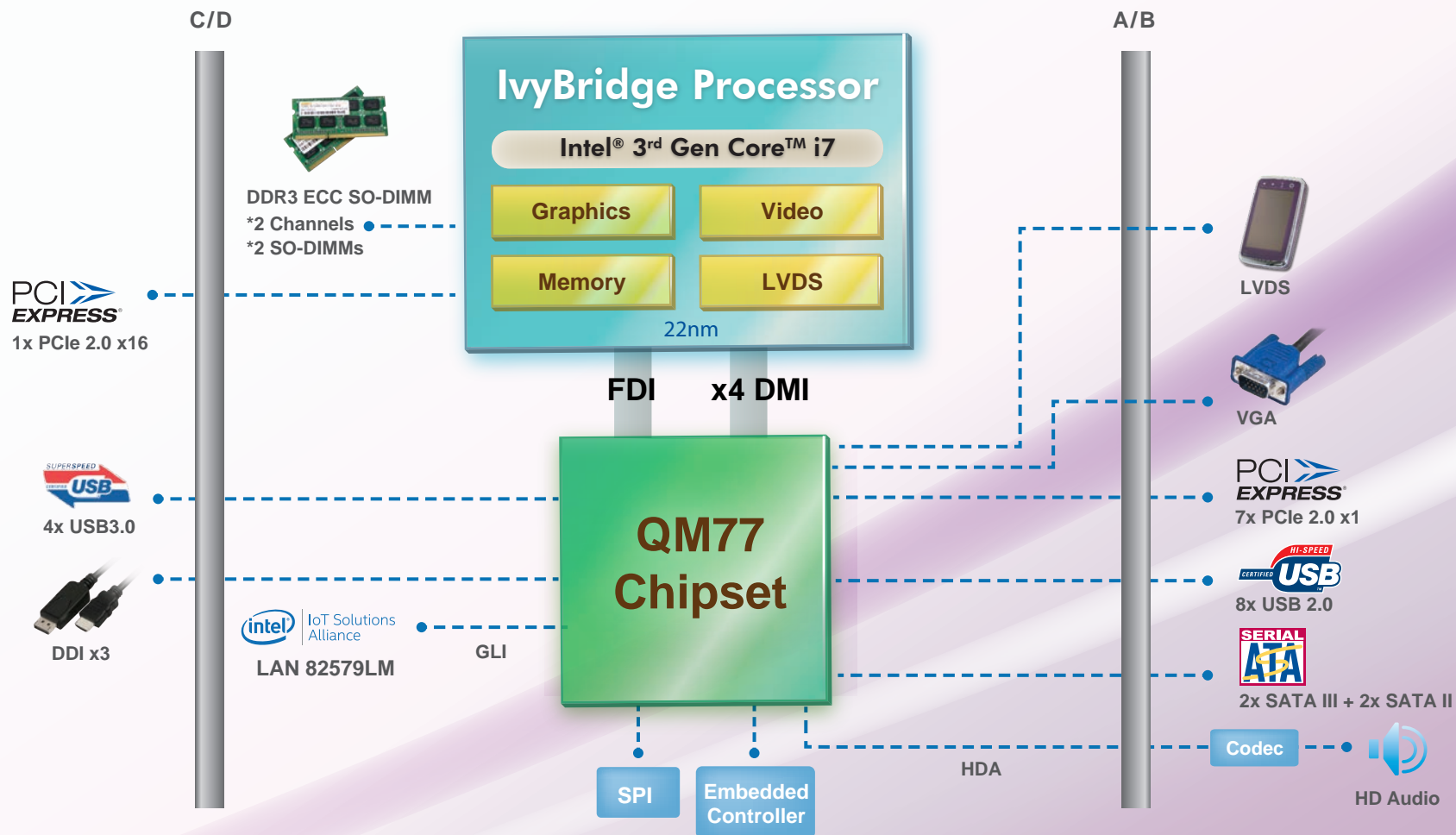
## FEATURES

- 3<sup>rd</sup> Generation Intel® Core™ processor family and mobile Intel® QM77 Express chipset provide more performance at same or lower TDP.
- Supports faster I/O interfaces on seven PCIe lanes (four x1 can be configured to one x4 lane)
- Supports four SATA ports include two 6Gbp ports and two 3Gbp ports
- Power sharing technology between CPU and Graphics engine to maximize performance.
- Display Port (DP), HDMI, DVI supported, up to 50% 3D performance increase, 1.8X HD to HD transcode performance.
- 4x USB 3.0 ports supported

## ORDERING GUIDE

AB1-3828	(R).PCOM-B219VG-VI-3615QE
AB1-3829	(R).PCOM-B219VG-VI-3612QE with MOQ
AB1-3830	(R).PCOM-B219VG-VI-3555LE
AB1-3831	(R).PCOM-B219VG-VI-3517UE with MOQ
AB1-3832	(R).PCOM-B219VG-VI-3610ME with MOQ
AB1-3833	(R).PCOM-B219VG-VI-3120ME
AB1-3834	(R).PCOM-B219VG-VI-3217UE with MOQ





### Processor Core

- ◆ IvyBridge Core (22nm) QC, DC & Uni-core SKUs
- ◆ 6MB, 4MB, 3MB Shared Last Level Cache
- ◆ SMT: 4~8 threads/core
- ◆ Turbo Mode

### Highlights

- ◆ Integrated Memory Controller: 2 Channels of Native DDR3 support ECC
- ◆ Integrated Native PCI-E Gen 3 supports 1x16, 2x8, 1x4, 6x1 configurations

### Memory

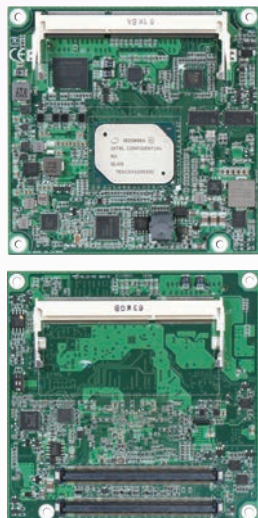
- ◆ DDR3 1067/1333/1600 MT/s, up to 16GB
- ◆ 2 Channels
- ◆ 25.6 GB/s Peak Memory Bandwidth

### Platform Thermal Design Power

	i7-3615QE	i7-3517UE	i5-3120ME
<b>CPU</b>	45W	17W	35W
<b>PCH</b>	QM77 4.1W	QM77 4.1W	QM77 4.1W
<b>Watt</b>	49.1W	21.1W	39.1W

# PCOM-B641VG

Portwell PCOM-B641VG is designed with Intel® Atom™ E3900 Series ultra low power processor with higher memory performance and advance graphic controller for Automation, Healthcare and Thin Client Systems



Intel® Atom™ E3900 Series Processor based on Type VI COM Express module with DDR3L SDRAM, VGA, LVDS, Gigabit Ethernet, SATA 3.0, USB3.0, TPM, and eMMC

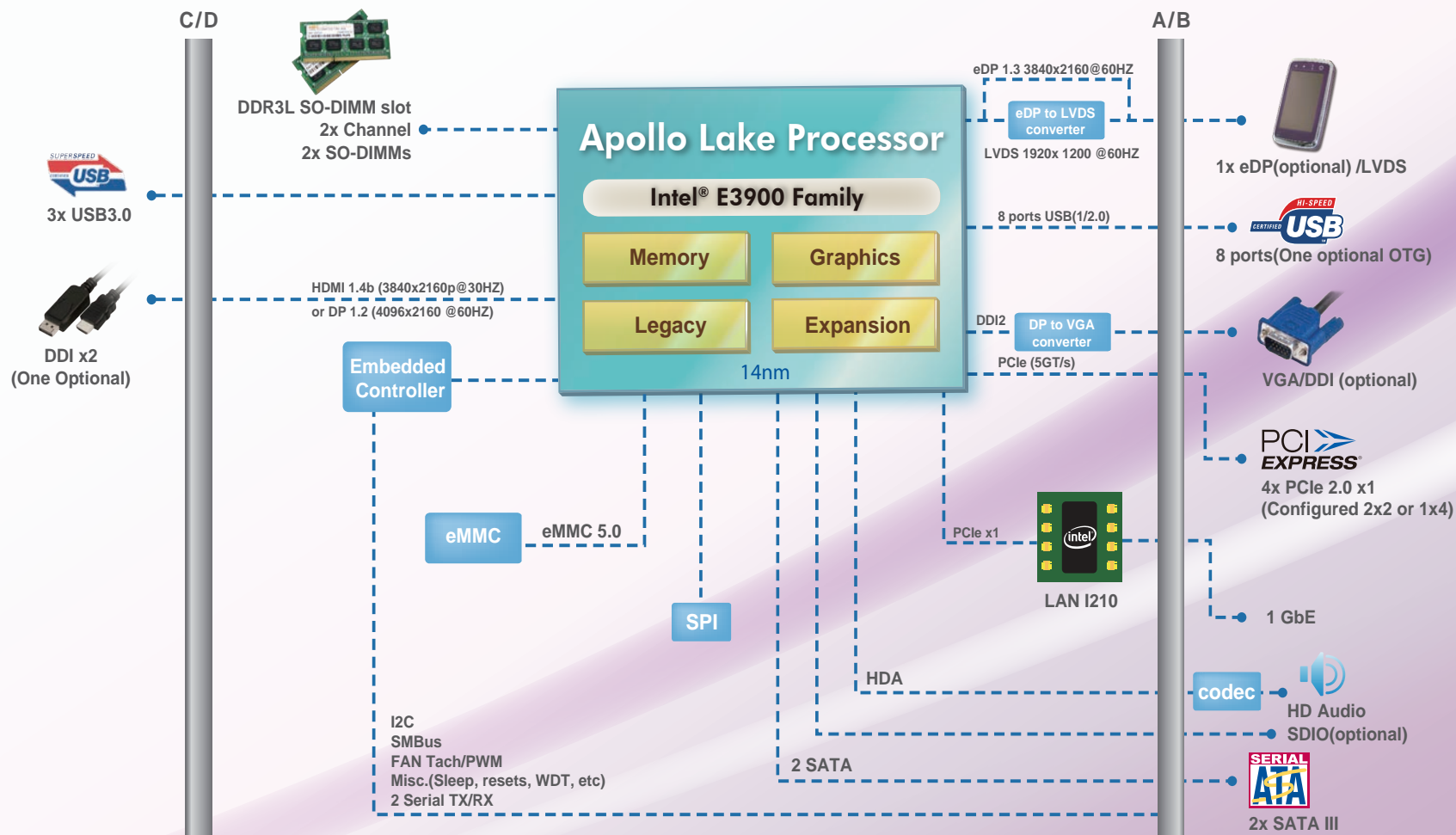
PCOM-B641VG, a Type 6 COM Express® Compact (95mm x 95mm) module based on the 14nm Intel® Atom™ processor E3900 product family (6W~12W). The compact PCOM-B641VG COM Express module supports up to 16GB DDR3L 1600/1866 MT/s SDRAM on two 204-pin SODIMM sockets, making it faster than its predecessor.

## FEATURES

- Intel® Atom™ E3900 Series ultra low power processor
- Support up to 16GB DDR3L 1600/1866 MT/s SDRAM on two 204-pin SODIMM sockets
- Support VGA, LVDS and Display-port interface
- Support USB 2.0/3.0, 2x SATA III, 4x PCIe 2.0 x1 or 1x PCIe 2.0 x4
- Support eMMC storage, and I2C/Smart Battery function
- Support -40°C to +85°C wide temperature

## ORDERING GUIDE

AB1-3E08Z	(R).PCOM-B641VG.TYPE VI.Apollo-Lake.Compact Form Factor.Com Express Module.Non-ECC.DDR3L
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### Processor Core

- ◆ Intel® Atom™-X5-E3930
- ◆ Intel® Atom™-X5-E3940
- ◆ Intel® Atom™-X7-E3950

### Highlights

- ◆ Wide-Temp Support
- ◆ On Board eMMC Support
- ◆ TPM Support

### Memory

- ◆ DDR3L x2 SO-DIMMs
- ◆ 2 Channels
- ◆ Up to 16GB

### Platform Thermal Design Power

CPU	X5-E3930	X5-E3940	X7-E3950
Core Frequency	2 1.8Ghz	4 1.8Ghz	4 2.0Ghz
Watt	6W	9W	12W



# PCOM-BA01

New generation low power processors on COM Express® Rev3.0 Mini form factor, enhanced Graphic performance for 4K and triple display



PCOM-BA01, Portwell's brand new COM Express® Mini size low power module, with display up to 4K digital display resolution. Wide temperature operation targeting for extreme environment

PCOM-BA01, a Type 10 COM Express® Compact (84mm x 55mm) module based on the 14nm Intel® Atom™ processor E3900 product family (6W~12W).



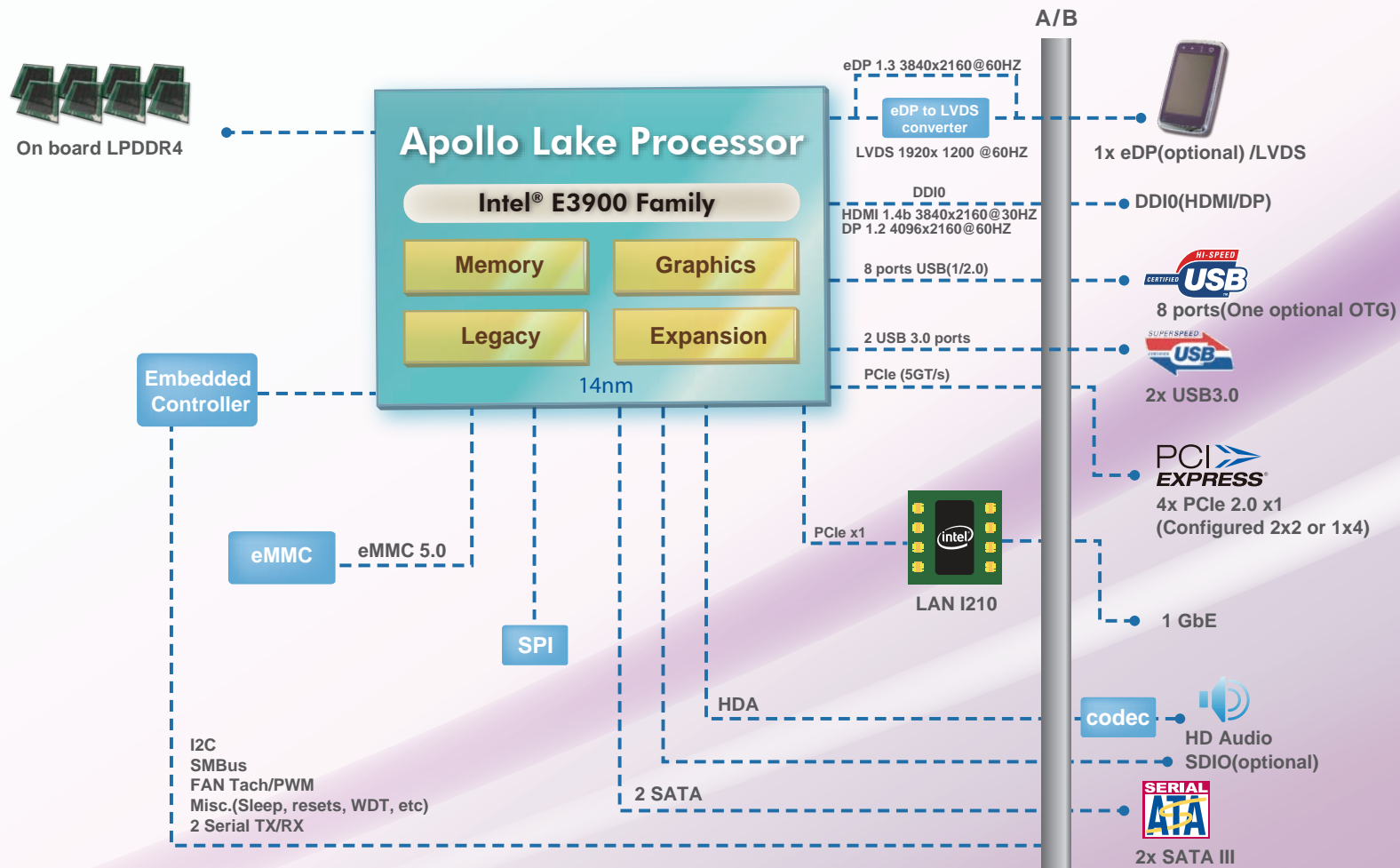
The Mini form factor PCOM-BA01 COM Express® module supports on board LPDDR4 SDRAM, making it faster than its predecessor

## FEATURES

- COM Express Rev3.0 Mini Type 10
- Intel® (former codename Apollo Lake)Pentium®/Celeron®/Atom™ processors
- Low power consumption TDP 6W
- 1 DDI, LVDS/eDP display interface
- 4K resolution (\*HDMI 3840x2160 @30Hz)
- Support -40°C to +85°C wide temperature

## ORDERING GUIDE

Contact us	(R).PCOM-BA01. TYPE 10. Mini Form Factor.COM Express® Module. Intel® Apollo Lake
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### Processor Core

- ◆ Intel® Pentium®/Celeron®/Atom™ SoC processors
- ◆ 2 Cores / 2 Threads
- ◆ 4 Cores / 4 Threads
- ◆ 2 MB L2 Cache

### Highlights

- ◆ 12~18 Graphic Execution Units
- ◆ On board eMMC storage
- ◆ Wide temperature and input voltage

### Memory

- ◆ On board LPDDR4 2133 MT/s
- ◆ 8GB Max

### Platform Thermal Design Power

CPU	X5-E3930	X5-E3940	X7-E3950
Core Frequency	2 1.8Ghz	4 1.8Ghz	4 2.0Ghz
Watt	6W	9W	12W

# PCOM-BA00

Type 10 module based on COM Express® Rev 2.1 is designed as fan-less system solution (eg. tablet device, industrial thin client system, etc.), also as flexible embedded solution for versatile vehicle markets



Intel® Atom™ E3800 series SoC based on type 10 Mini COM Express® module with DDR3L SDRAM, NANDrive, DDI support, USB3.0



PCOM-BA00 is the latest Mini COM Express® by 84mm x 55mm with Intel® Bay Trail E3800 series SoC supports PCI Express, dual display, NANDrive storage features.

By low power consumption, wide-temp support, better computing, Portwell promotes with confidence PCOM-BA00 as vertical solution to aim at versatile applications, such as Automation, Military, Networking, Transportation, and so on.

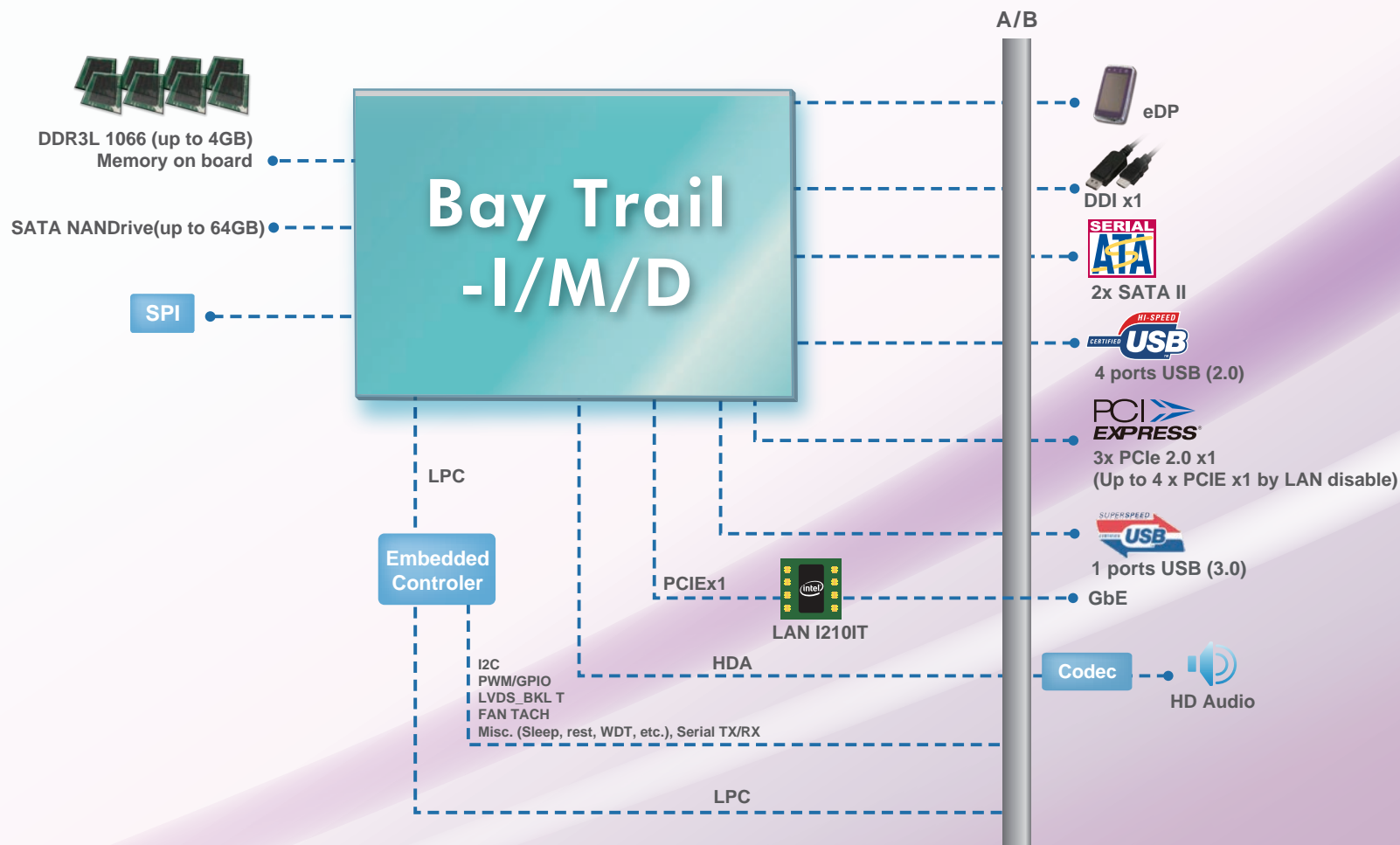
## FEATURES

- Atom™ Bay Trail SoC E3800 series processor with industrial support
- Up to 4GB DDR3L memory-down
- Three PCIe lanes (optional to Four)
- Support 1x USB 3.0, 4x USB 2.0
- Support NANDrive storage by SATA channel

## ORDERING GUIDE

AB1-3B48	(R).PCOM-BA00-E3845-4G with MOQ
AB1-3B51	(R).PCOM-BA00-E3845-2G
AB1-3B50	(R).PCOM-BA00-E3827-2G
AB1-3B47	(R).PCOM-BA00-3825-2G with MOQ
AB1-3B49	(R).PCOM-BA00-3815-2G





### Processor Core

- ◆ Atom™ Bay Trail (SoC) with QC, DC, & Uni core SKUs
- ◆ 512KB~2MB Shared Last Level Cache
- ◆ SMT: 1 threads/core

### Highlights

- ◆ Integrated Memory Controller: 1 Channels of Native DDR3L support
- ◆ Integrated Native PCI Express, option to 4
- ◆ USB 3.0 x1
- ◆ NANDrive support
- ◆ Wild-temp support

### Memory

- ◆ DDR3L 1066/1333 MT/s
- ◆ Up to 4GB 512x8
- ◆ Memory on board

### Platform Thermal Design Power

	E3845	E3827	E3815
CPU	4C	2C	1C
Watt	10W	8W	5W

# PCOM-C640

PCOM-C640 is NANO-ITX carrier board with triple display, Gigabit Ethernet, Audio, USB 3.0, SATA. It's a powerful carrier which is suitable for system. Portwell can provide COM Express® carrier design guide for your own carrier board development as a reference



## NANO-ITX Form Factor Evaluation Carrier Board for Type VI module

Portwell PCOM-C640 is a NANO-ITX form factor carrier with COM Express® Type VI row connectors. It's suitable for evaluation testing of Portwell's Type VI COM Express® modules for 1U Server system. We also provide carrier board design guide for your own carrier board development as a reference.



With PCOM-C640 carrier board, Portwell now has various carriers in different form factors to help customers on developing new platform for both board and system perspectives. Customers can easily begin to develop on new application with Portwell's COM Express® Type VI module.

### FEATURES

- COM Express® carrier board is compatible with the Portwell Type VI COM Express® modules
- NANO-ITX form factor can meet most standard mounting spaces and provide more expansions and displays
- Support Rear I/O, DP, RJ45, USB 2.0 & 3.0

### ORDERING GUIDE

AB1-3D18Z

(R).PCOM-C640.Support TYPE VI.  
NANO-ITX Form Factor.COM Express Carrier  
Board

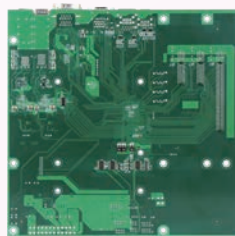


IoT Solutions  
Alliance



# PCOM-C609

PCOM-C609 carrier offers powerful and reliable solution to customer who has demand of high speed 10 Gigabit Ethernet. It is the first carrier with 10 Gigabit Ethernet with carrier board design guide which can be provided to customer



## Micro-ATX Form Factor Evaluation Carrier Board for COM Express® Rev 2.1 Type VI Module.

Portwell PCOM-C609 is designed with Micro-ATX form factor with COM-Express® Type IV row connectors; it's suitable for evaluation testing of Portwell's Type 6 COM Express® modules with USB 3.0, PCI-E, HDMI, VGA, SATA, TPM and 10 Gigabit Ethernet support. Portwell is able to provide carrier board design guide for customer to design their carrier board as a reference.

PCOM-C609 is the first carrier board which can support 10 Gigabit Ethernet function. This can shorten customer's carrier board developing time and make the development quickly and easily. The PCOM-C609 provides COM Express® Type 6 support in addition to suit wide range of device connectivity for prototype and flexibility.

### FEATURES

- COM Express® carrier board is compatible with the Portwell Type VI COM Express® modules
- Micro-ATX form factor meets most standard mounting spaces and provides more expansions displays
- Support 2x 10 Gigabit Ethernet & 1x Gigabit Ethernet

### ORDERING GUIDE

AB1-3D19

(R).PCOM-C609.Support TYPE VI.  
Micro-ATX Form Factor.COM Express Carrier Board

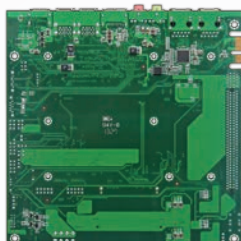


IoT Solutions Alliance



# PCOM-C605

COM Express® Type VI Carrier, PCOM-C605 provides the fast compatibility evaluation process with PCOM Modules. Mini-ITX form factor with PEG and CFEX, two GbE Ethernet ports



## Mini-ITX Form Factor Evaluation Carrier Board for both Type VI Module

Portwell PCOM-C605 is designed with Mini-ITX form factor with COM Express® Type VI row connectors, suitable for evaluation testing of Portwell's Type VI COM Express® modules on PCI-E, PEG, VGA/LVDS, USB, SATA, and CFEX with SATA and SPI interface. We also provide carrier board design guides for your own carrier board development reference.

This new version of the PCOM-C605 Reference Carrier Board is 100% compatible with the recently released PICMG COM Express® Carrier Design Guide and provides a full complement of I/O interfaces, debugging tools, and peripheral devices such as Super I/O and audio code that may be required on the custom carrier board. The full schematics and mechanical drawings of the PCOM-C605 are available for testing to allow customers to immediately begin their own carrier board design effort. A complete Starter Kit is also available, which includes the COM Express® module of choice, the PCOM-C605 reference carrier board, thermal solution, documentation.

## FEATURES

- COM Express® carrier board is compatible with the Portwell Type VI COM Express® modules
- Mini-ITX form factor meets most standard mounting spaces and provides more expansions slots

## ORDERING GUIDE

AB1-3998	(R).PCOM-C605. Support TYPE VI. Mini-ITX Form Factor.COM Express Carrier Board
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SATA 3.0



USB 3.0



Giga LAN



Watch DOG



GPIO

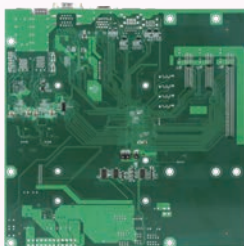


IoT Solutions  
Alliance



# PCOM-C700

PCOM-C700 Carrier supports COM Express® Rev3.0 Type 7 specification, offering high bandwidth 10GbE and NC-SI interfaces, PCI Express expanded up to 32 lanes



Portwell's 1<sup>st</sup> COM Express® Rev3.0 Type 7 Carrier which supports four 10GbE optical and fiber phys, NC-SI interface and up to 32 PCI Express lanes.

Portwell PCOM-C700 is designed with Micro-ATX form factor with COM Express® Type VII row connectors; it's suitable for evaluation testing of Portwell's Type 7 COM Express® modules with USB 3.0, PCI-Express, SATA, TPM and 10 Gigabit Ethernet support. Portwell is able to provide carrier board design guide for customer to design their carrier board as a reference.

PCOM-C700 is the first carrier board which can support 10 Gigabit Ethernet function. This can shorten customer's carrier board developing time and make the development quickly and easily. The PCOM-C700 provides COM Express® Type 7 support in addition to suit wide range of device connectivity for prototype and flexibility.

## FEATURES

- COM Express® Rev3.0 Type 7 Carrier
- Micro-ATX form factor
- 2x 10 Gigabit Ethernet ports & 1 Gigabit Ethernet port

## ORDERING GUIDE

Contact us

(R).PCOM-C700. TYPE VII. Micro-ATX Form Factor.  
COM Express® Carrier Board



SATA 3.0



USB 3.0



Giga LAN



Watch DOG



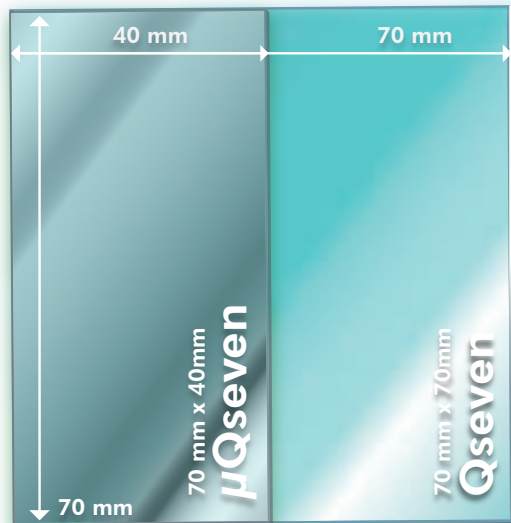
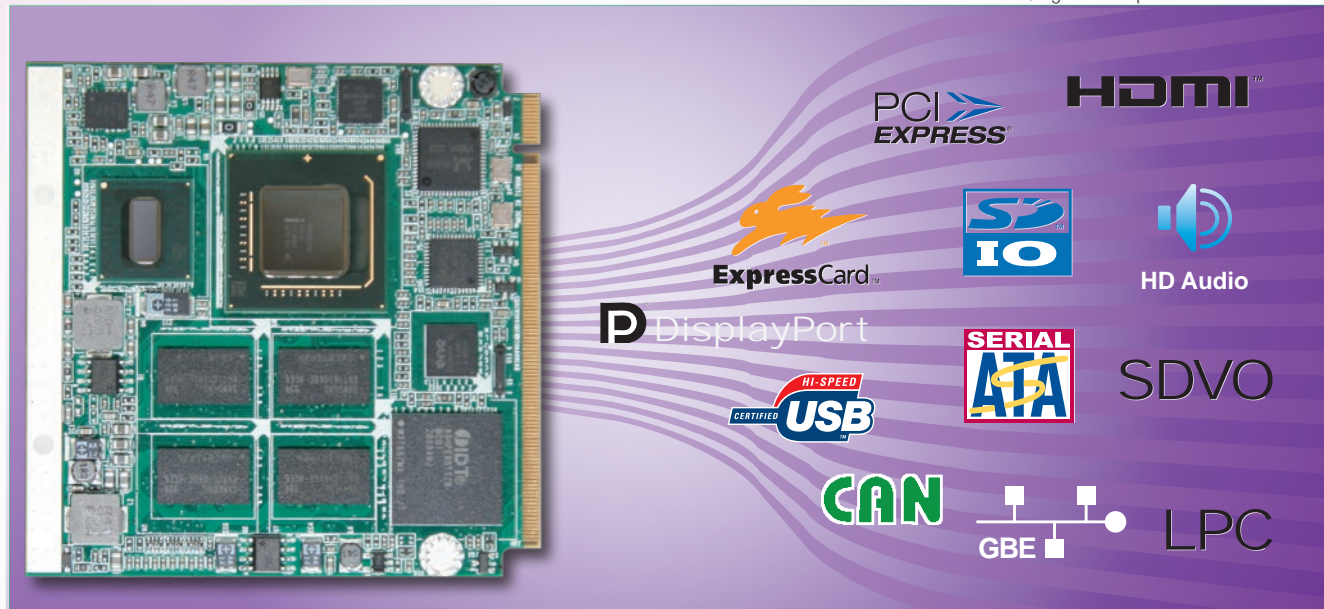
GPIO



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Alliance

# PQ7 Interface

■ Board actual Size, right description use Portwell icon



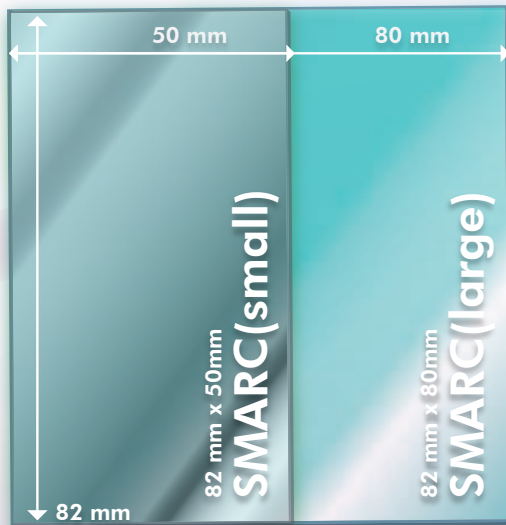
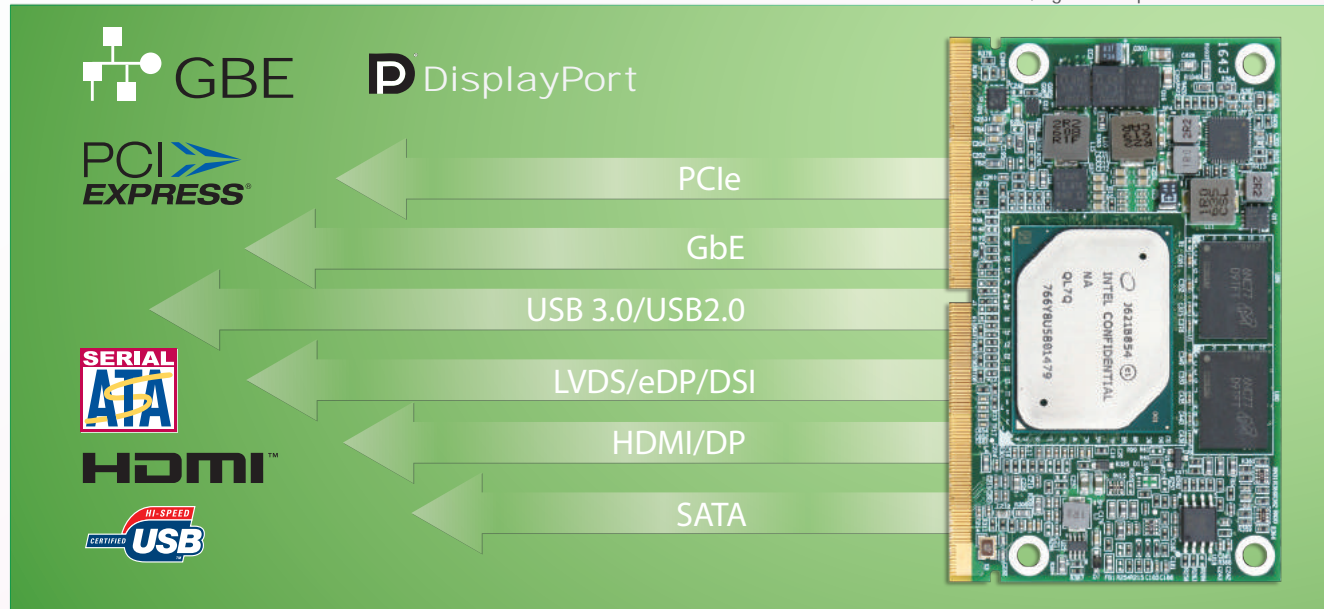
The name Qseven® (Q7) is derived from “quadratic” as noted by the Q and seven refers to the 7 x 7 cm<sup>2</sup> (70 x 70mm) size of the module. With evolution technology built upon a smaller size footprint mobile processor and chipset. The Q7 standard provides high performance and low power consumption interfaces for mobile and battery operated applications with standard power consumption equal to or less than 12W which matches application requirements for fan-less operations by way of heat spreader mechanical interfaces.

Unlike other module standards, Q7 does not require an expensive board-to-board connector. It utilizes a very affordable MXM card slot with 230 pins in a 0.5 mm configuration. This slot is already being used for graphics cards in laptop computers, so it is capable of high speed PEG (PCI Express Graphics) data transfers.



# PSMC Interface

■ Board actual Size, right description use Portwell icon



The SMARC ("Smart Mobility ARChitecture") is a versatile small form factor computer Module definition targeting applications that require low power, low costs, and high performance. The Modules will typically use ARM SOCs similar or the same as those used in many familiar devices such as tablet computers and smart phones. Alternative low power SOCs and CPUs, such as tablet oriented X86 devices and other RISC CPUs may be used as well. The Module power envelope is typically under 6W.

Two Module sizes are defined: 82mm x 50mm and 82mm x 80mm. The Module PCBs have 314 edge fingers that mate with a low profile 314 pin 0.5mm pitch right angle connector (the connector is sometimes identified as a 321 pin connector, but 7 pins are lost to the key).

# PSMC Interface

## Low Power Consumption (6W~12W)

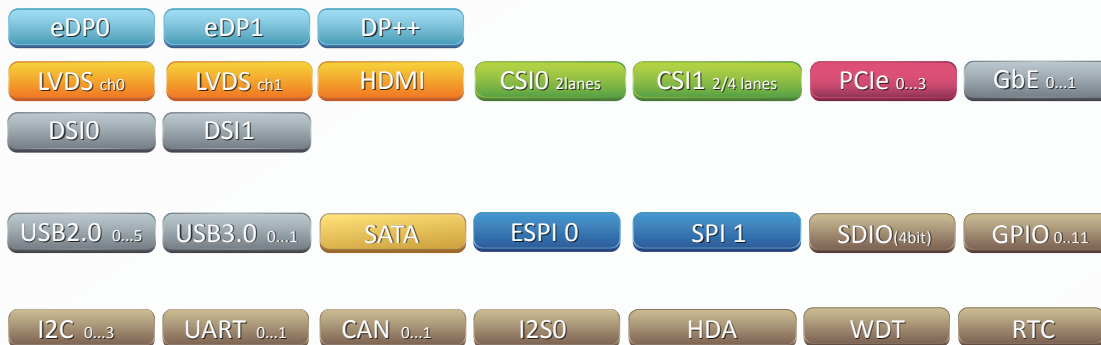
- + 3.3V and 5V power input pin definition
- + Efficient use for power saving
- + Battery-driven application

## Wide Operating Temperature(-40~85°C)

- + Provide rock-solid, industrial-grade performance
- + Meet flexible environmental requirements

## 314 pins MXM3 connector

- + Camera interface
- + Extra signals for triple display output
- + Rugged, vibration resistant, higher security
- + "Alternate Function Block" for flexibility between modules



- The new SMARC® 2.0 specification uses all 314 pins of the connector and represents an enhanced credit-card size computer-on-module standard

The Modules are used as building blocks for portable and stationary embedded systems. The core CPU and support circuits, including DRAM, boot flash, power sequencing, CPU power supplies, GbE and a single channel LVDS display transmitter are concentrated on the Module. The Modules are used with application specific Carrier Boards that implement other features such as audio CODECs, touch controllers, wireless devices, etc. The modular approach allows scalability, fast time to market and upgradability while still maintaining low costs, low power and small physical size.



# PQ7 Solution Guide



	PQ7-M105IT	PQ7-M106	PQ7-M107	PQ7-M108
Form Factor (mm)	Qseven 70 x 70 mm	Qseven 70 x 70 mm	Qseven 70 x 70 mm	Qseven v2.1 70 x 70 mm
CPU/ Clock/ Cache	<ul style="list-style-type: none"> <li>* Intel® E680T/E660T/E640T</li> <li>* 1.00 GHz up to 1.60GHz</li> <li>* 2500 MHz PCI-E</li> <li>* 512KB Shared Last Level Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® E3845/E3827/E3825/E3815</li> <li>* 1.33GHz to 1.91GHz</li> <li>* 1 to 2 MB Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® N3710/N3160/N3060/N3010</li> <li>* 2.24GHz to 2.56GHz</li> <li>* 2MB Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Intel® E3950/E3940/E3930/N4200/N3350</li> <li>* 2.24GHz to 2.56GHz</li> <li>* 1.8GHz to 2.5GHz</li> <li>* 2MB Cache</li> </ul>
Chipset	EG20T Chipset	N/A	N/A	N/A
Memory	<ul style="list-style-type: none"> <li>* DDR2-800 MT/s</li> <li>* 1 Memory Channel</li> <li>* 6.4GB/s Peak Memory Bandwidth</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L-1066/1333 MT/s</li> <li>* Dual Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* DDR3L-1600/1333 MT/s</li> <li>* Dual Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* LPDDR4-2133/2400 MT/s</li> <li>* Dual Memory Channel</li> </ul>
USB	7x USB 2.0	1x USB 3.0 6x USB 2.0	2x USB 3.0 4x USB 2.0	3x USB 3.0 (Opt.) 4x USB 2.0
PCI Express	4x PCIe 2.0 x1	3x PCIe 2.0 x1 (Option to 4)	3x PCIe 2.0 x1 (Option to 4)	4x PCIe 2.0 x1
Ethernet	LAN 82574IT	LAN I210IT	LAN I210AT	LAN I210IT
Sound	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio
Graphic Controller	* Intel® Atom™ Processor E6xx integrated Graphic Media Accelerator 600, up to 400MHz	* Intel® HD Graphic	* Intel® HD Graphic	* Intel® HD Graphic
Carrier Board	PQ7-C100XL	PQ7-C201	PQ7-C201	PQ7-C202
Extend Temperate (-40~85 Celsius)	YES	YES	NO	YES

# PQ7 Solution Guide



	PQ7-M640F	PQ7-C100ARM	PQ7-C100XL-CAN	PQ7-C201
Form Factor (mm)	SMARC 82 x 50 mm	Mini-ITX 170 x 170 mm	3.5" ESB Carrier (146 x 105mm)	Mini-ITX 170 x 170 mm
CPU/ Clock/ Cache	<ul style="list-style-type: none"> <li>* Freescale i.MX6 Family</li> <li>* ARM™ Cortex® - A9, single/ dual/ quad core processor</li> <li>* 1GHz to 1.2GHz</li> <li>* 1MB L2 Cache (dual/quad core)</li> </ul>	N/A	N/A	N/A
Chipset	N/A	N/A	N/A	N/A
Memory	* on board DDR3L up to 2GB	N/A	N/A	N/A
USB	2x USB 2.0 Host 1x USB OTG	4x USB 2.0 Host 1x USB OTG	7x USB 2.0	1x USB 3.0 4x USB 2.0
PCI Express	1x PCIe 2.0 x1	1x Mini-PCIe slot	1x Mini-PCIe slot	1x PCIe x4
Ethernet	1x GbE	1x RJ45	1 x RJ45	1 x RJ45
Sound	Intel® High Definition Audio	1x MIC-In 1x Line-Out	1 x MIC-In 1 x Line-Out	1 x MIC-In 1 x Line-Out
Graphic Controller	Intel® HD Graphic	N/A	N/A	N/A
Carrier Board	PQ7-C100ARM	N/A	N/A	N/A
Extend Temperate (-40~85 Celsius)	YES (By request)	N/A	YES	N/A



# PSMC Solution Guide



	PSMC-M101	PSMC-M310T	PSMC-M640F	PSMC-C300ARM
Form Factor (mm)	SMARC v2.0 82 x 50 mm	SMARC 82 x 50 mm	SMARC 82 x 50 mm	Mini-ITX 170 x 170 mm
CPU/ Clock/ Cache	<ul style="list-style-type: none"> <li>* Intel® E3950/E3940/E3930/N4200/N3350</li> <li>* 1.8GHz~2.5GHz</li> </ul>	<ul style="list-style-type: none"> <li>* TI™ AM3354</li> <li>* ARM™ Cortex®-A8, single core processor</li> <li>* 800MHz up to 1GHz</li> <li>* 64KB L1 cache (single core)</li> <li>* 256KB L2 cache (single core)</li> </ul>	<ul style="list-style-type: none"> <li>* Freescale™ i.MX6 Family,</li> <li>* ARM™ Cortex®-A9, single/dual/quad core processor</li> <li>* 1MB L2 cache (dual/quad core)</li> <li>* 512KB L2 cache (single core)</li> <li>* 1GHz up to 1.2GHz</li> </ul>	N/A
Chipset	N/A	N/A	N/A	N/A
Memory	<ul style="list-style-type: none"> <li>* LPDDR4-2133/2400 Dual Memory Channel</li> </ul>	<ul style="list-style-type: none"> <li>* on board DDR3 512MB</li> </ul>	<ul style="list-style-type: none"> <li>* on board DDR3L up to 2GB</li> </ul>	N/A
USB	<ul style="list-style-type: none"> <li>1x USB 3.0</li> <li>5x USB 2.0</li> <li>2x USB OTG</li> </ul>	<ul style="list-style-type: none"> <li>2x USB 2.0 Host</li> <li>1x USB OTG</li> </ul>	<ul style="list-style-type: none"> <li>4x USB 2.0 Host</li> <li>1x USB OTG</li> </ul>	<ul style="list-style-type: none"> <li>2x USB 2.0 Host</li> <li>1x USB OTG</li> </ul>
PCI Express	4x PCIe 2.0 x1	N/A	1x PCIe 2.0 x1	1 x Mini-Card
Ethernet	LAN I210IT	1x Gigabit Ethernet Interface	1x Gigabit Ethernet Interface	1 x RJ45
Sound	Intel® High Definition Audio	I2S Audio Interface	AC'97 Audio interface	<ul style="list-style-type: none"> <li>1 x MIC-In</li> <li>1 x Line-Out</li> </ul>
Graphic Controller	<ul style="list-style-type: none"> <li>* Intel® HD Graphic</li> </ul>	<ul style="list-style-type: none"> <li>* SGX530 3D Graphics Engine</li> <li>* Direct3D Mobile, OpenGL® ES1.1 &amp; 2.0 3D and OpenVG™, OpenMax</li> </ul>	<ul style="list-style-type: none"> <li>* Integrated graphics accelerators for 2D, OpenGL® ES2.0 3D and OpenVG™</li> <li>* Supports up to 4 independent displays</li> </ul>	N/A
Carrier Board	PSMC-C301	PSMC-C300ARM	PSMC-C300ARM	PSMC-C300ARM
Extend Temperate (-40~85 Celsius)	YES	N/A	Yes	N/A

# PQ7- M108

Qseven® module by Qseven® 2.1 based on Intel® Atom™ / Pentium® / Celeron® processors (Apollo Lake) with LPDDR4 SDRAM up to 8GB, 24bit LVDS, DP/HDMI



PQ7-M108 is designed with Intel® Atom™ / Pentium® / Celeron® processors ("APOLLO LAKE") which featured with higher graphic performance and wider memory bandwidth than the previous platform.

Benefit from Intel® Apollo Lake industrial grade processor design, the operating temperature supports -40°C to 85°C. With qualified industrial-grade components selecting, PQ7-M108 is aimed to be widely applied on automation, security, transportations and so to different kinds of harsh environmental applications.

## FEATURES

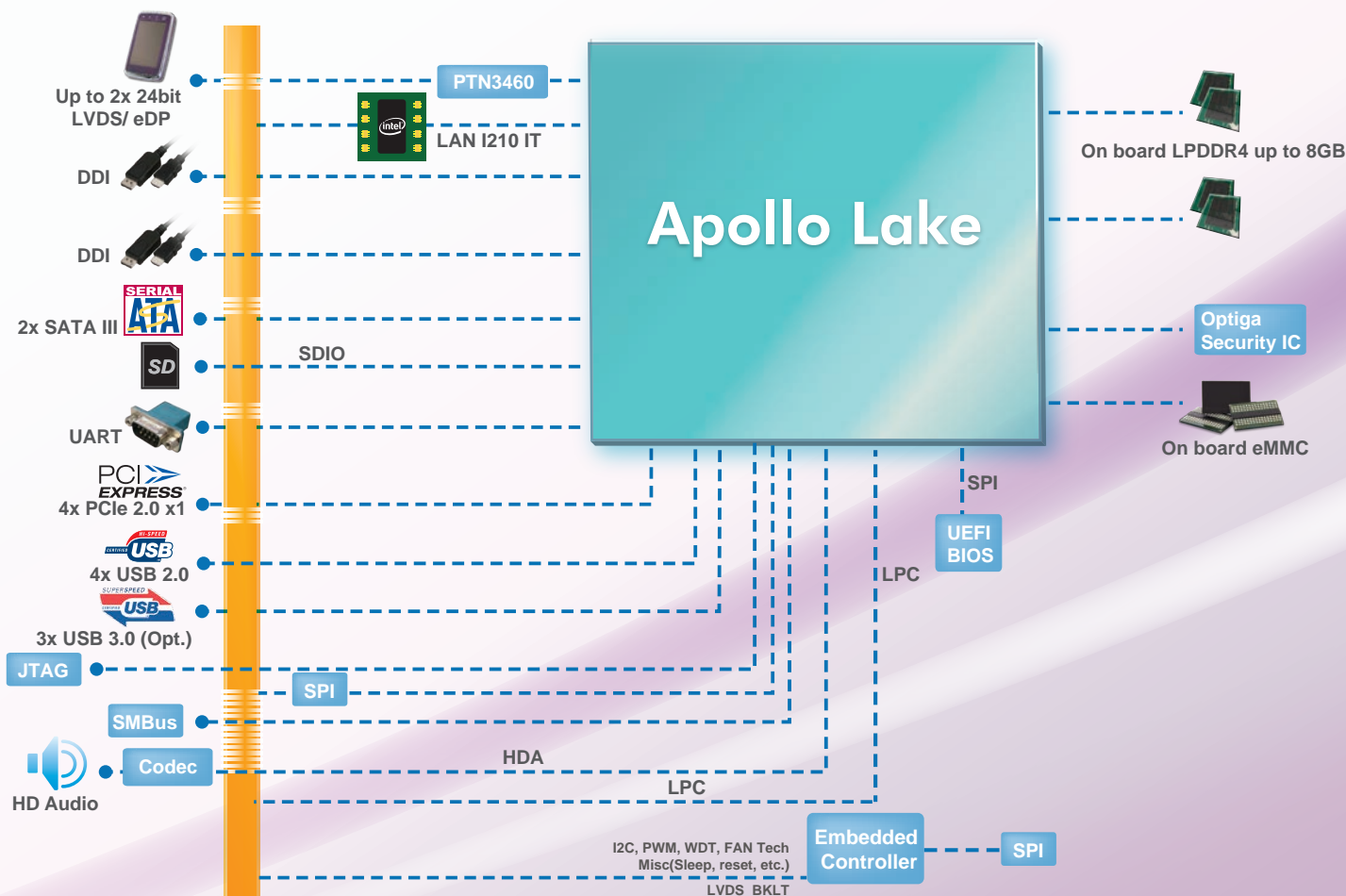
- Intel® Atom™ / Pentium® / Celeron® processors (Apollo Lake)
- On Board LPDDR4 DRAM and up to 8GB
- On Board eMMC 5.0 up to 64GB(Optional)
- Support 24-bit LVDS, HDMI/DP output
- 4x PCIe 2.0 x1, 3x USB 3.0 or 4x USB 2.0
- Operating Temperature: -40°C~+85°C

## ORDERING GUIDE

AB7-3019Z	(R). PQ7-M108-N3350-8G-8G. Celeron N3350 Dual Core 2.4 GHz. Qseven Module/EC/LVDS
AB7-3054Z	(R). PQ7-M108-N4200-8G-8G. Pentium N4200 Quad Core 2.5 GHz. Qseven Module/EC/LVDS
AB7-3046Z	(R). PQ7-M108-E3950-8G-16G. Atom E3950 Quad Core 2.0 GHz. Qseven Module/EC/LVDS
Contact us	(R). PQ7-M108-Exxx-xG-xG. With chosen memory and eMMC capacity



## Qseven® 2.1 MXMII connector



## Processor Core

- ◆ Intel® Atom™ Processor x7-E3950/x5-E3940/x5-E3930
- ◆ Intel® Pentium® Processor N4200
- ◆ Intel® Celeron® Processor N3350
- ◆ 1.8GHz to 2.5GHz
- ◆ 2MB Cache

## Highlights

- ◆ Optiga Trust security IC on board option
- ◆ 4 PCIe x1
- ◆ eDP to LVDS support
- ◆ EC design for flexible control

## Memory

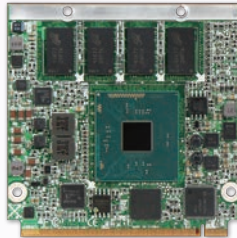
- ◆ LPDDR4 2133/2400 MT/s
- ◆ Dual Memory Channel support
- ◆ up to 8GB

## Platform Thermal Design Power

	CPU	E3950	E3940	E3930	N4200	N3350
W <sub>att</sub>		12W	9.5W	6.5W	6W	6W

# PQ7-M107

Qseven Module Based on Intel® Atom™ Processor N3000 Series with DDR3L SDRAM, LVDS/DP and eMMC



PQ7-M107 is designed with Intel® Atom™ N3000 series processor features low power than previous Atom platforms

PQ7-M107 could be implemented in manufactory, transportation and automation applications. Better graphics performace, higher memory bandwidth are improved compared to BayTrail. In addition, HD Camera with MIPI CSI 2.0, 4k x 2k resolution and three independent displays are designed on PQ7-M107

## FEATURES

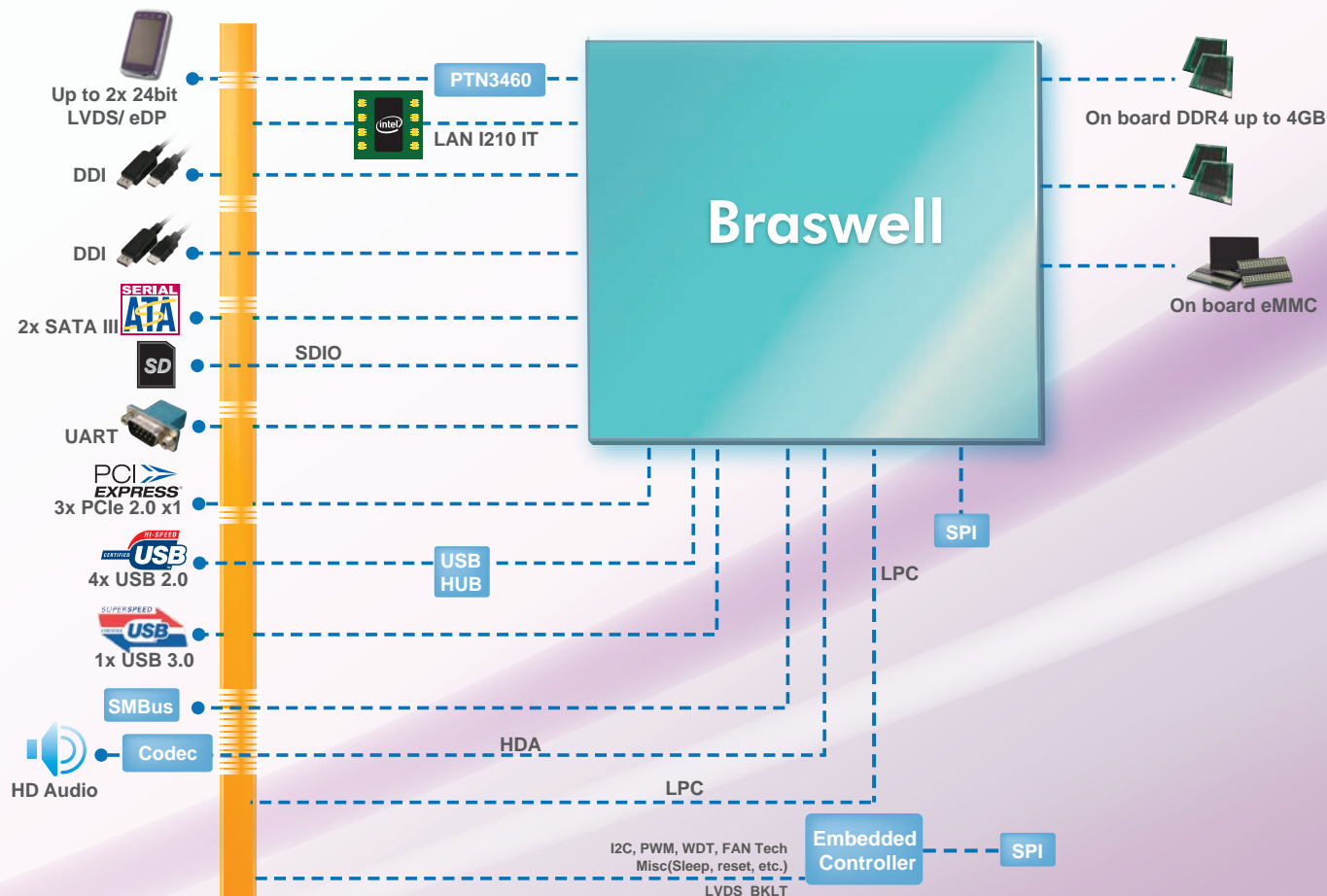
- Intel® Atom™ Processor N3000 series (Braswell)
- On Board DDR3L DRAM up to 4GB
- On Board eMMC up to 64GB
- Support LVDS and Display-port interface
- 3x PCIe 2.0 x1 (Up to 4x1), USB 2.0/3.0, 2x SATA III, I2C/Smart Battery function

## ORDERING GUIDE

AB7-3050Z	(R).PQ7-M107-N3710-4G-8G. (4C. 2M. 1.6GHz. 6watts)QSeven Module Board. Atom Braswell CPU. DDR3L
Contact us	(R).PQ7-M107-N3xxx-xG-xG. With chosen memory and eMMC capacity



## Qseven® 2.0 MXMII connector



### Processor Core

- ◆ Intel® Atom™ Processor N3000 Series SoC
- ◆ 2M Cache

### Highlights

- ◆ Integrated Memory Controller. 2 Channels of Native DDR3L support
- ◆ Integrated Native PCI Express option to 4
- ◆ eDP to LVDS support
- ◆ EC design for flexible control

### Memory

- ◆ DDR3L 1600 MT/s
- ◆ Dual memory channel
- ◆ up to 8GB

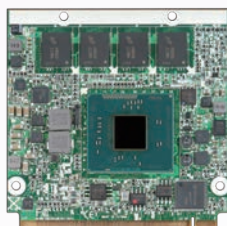
### Platform Thermal Design Power

CPU	N3710	N3160	N3060	N3010
W <sub>att</sub>	6W	6W	6W	4W

# PQ7-M106



Qseven® Module Based on Intel® Atom™ Processor E3800 Series with DDR3L SDRAM, LVDS and eMMC



PQ7-M106 is designed with Intel® 22nm Silvermont Atom™ Processor E3800 Series(Bay Trail) which is designed to give high performance with low power requirements for low-cost systems.

PQ7-M106 is seen as a step up from existing small form factor module with qualified components for wide-temp support and featured with PCI Express interface which can support expansion devices, such as GPS/ GPRS/ Wireless/ Bluetooth/Graphic, etc. This series also supports LVDS, Dual-Channel DDR3L, as well as eMMC soldered on board to be a cost effective collection.

## FEATURES

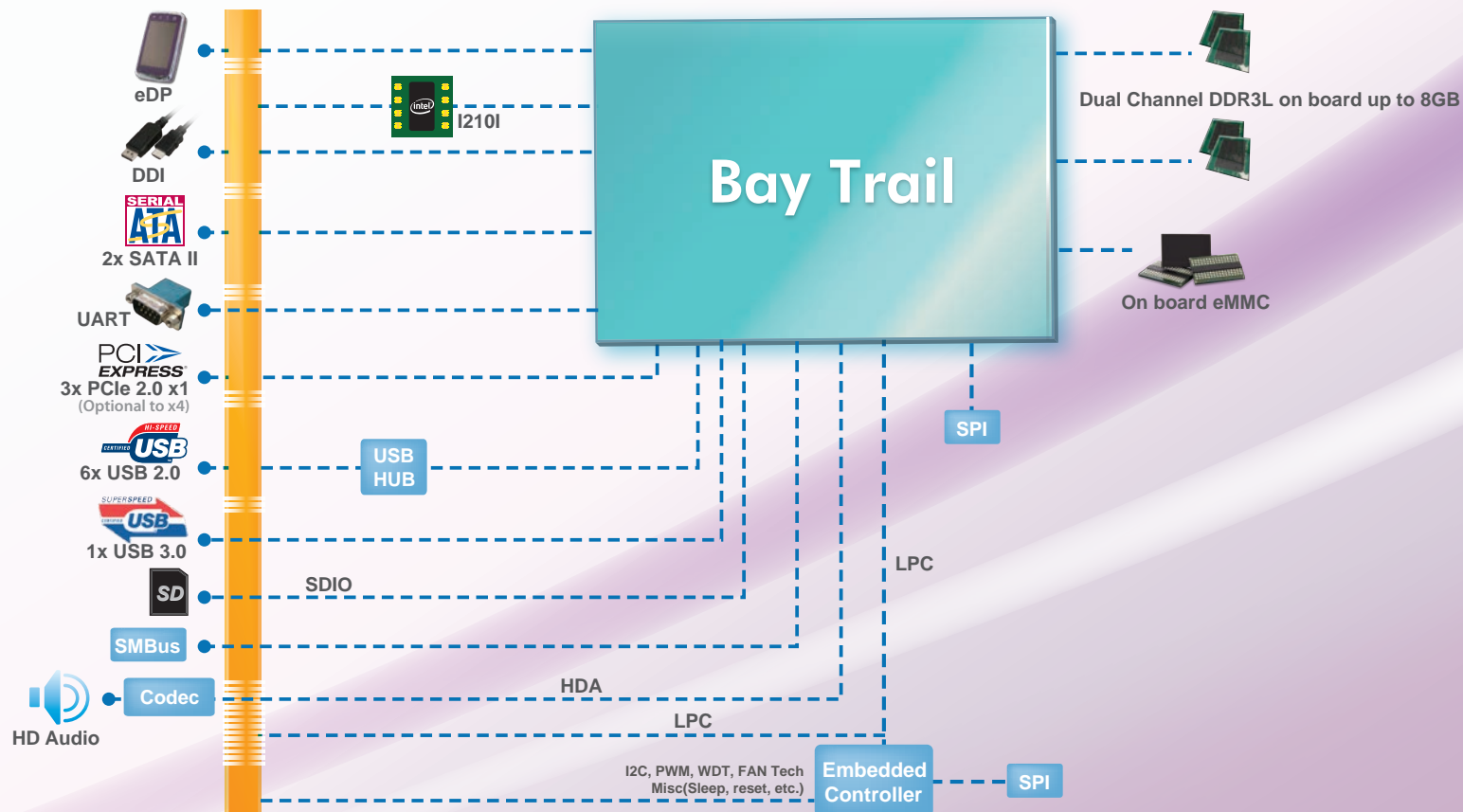
- Intel® Atom™ Processor E3800 Series (Bay Trail)
- On board DDR3L-1333 up to 8GB
- On board eMMC up to 64GB
- Support DP/HDMI and LVDS interface
- 1x GbE, 2x SATA II, 1x USB 3.0, 6x USB 2.0, 3x PCIe 2.0 x1
- Operating Temperature: -40°C~+85°C

## ORDERING GUIDE

AB7-3031Z	(R). PQ7-M106-E3845-4G-8G. 4GB Dual-Channel DDR3L 8GB eMMC
AB7-3038Z	(R). PQ7-M106-E3815-2G-4G. 2GB Single-Channel DDR3L 4GB eMMC
AB7-3045Z	(R). PQ7-M106-E3815-2G-NA. 2GB Single-Channel DDR3L no eMMC
Contact us	(R). PQ7-M106-E38xx-xG-xG. With chosen memory and eMMC capacity



## Qseven® 2.0 MXMII connector



## Processor Core

- ◆ Intel® Atom™ Processor E3800 Series SoC
- ◆ 512KB~2MB Shared Last Level Cache

## Highlights

- ◆ Integrated Memory Controller. 2 Channels of Native DDR3L support
- ◆ Integrated Native PCI Express option to 4
- ◆ eDP to LVDS support
- ◆ EC design for flexible control

## Memory

- ◆ DDR3L 1066/1333 MT/s
- ◆ Dual memory channel
- ◆ up to 8GB

## Platform Thermal Design Power

CPU	E3845	E3827	E3825	E3815
W <sub>att</sub>	10W	8W	6W	5W

# PQ7- M105IT

Transportation and traffic management systems are deeply embedded in our daily lives (eg. Fleet management, signal and control, vehicle entertainment, etc.). And it is critical that these devices withstand the environmental conditions of temperature, humidity and vibration



Qseven® module based on Intel® Atom™ E640T/ E660T/ E680T platform with DDR2 SDRAM, four PCI Express lanes, 24bit LVDS, SDVO, CAN bus, NANDrive

Portwell's PQ7-M105IT is designed with Intel® ultra low power E600 series CPU and EG20T IOH. It features less than 5W power consumption, -40 to +80 degree Celsius resistance, PCI express interface which supports GPS /GPRS /Wireless /Bluetooth devices and SDIO for cost efficient SD/Micro SD storage. Furthermore, the board is compliant with the vibration standard MIL-STD-810F and Method 514.5C with three axes of 5Hz to 500 Hz for maximum duration. The vibration spectrum exceeds 26rms (root mean squared). Portwell's Qseven® also passes function tests with standing 20G of shock for 11ms in 3 axes/6 face direction. The Qseven® is the most suitable and reliable solution for your transportation application development.

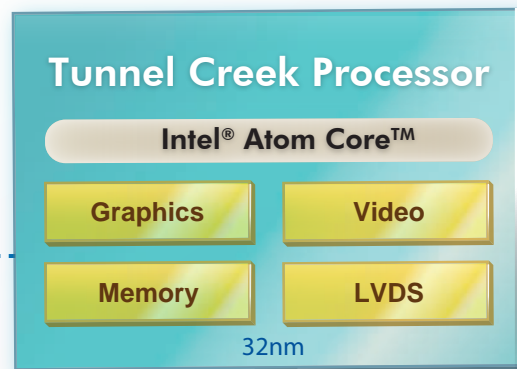
## FEATURES

- Atom™ ultra low power CPU (E640T/ E660T/ E680T) and IOH (EG20T) total TDP is under 5W fan-less application
- Full Hardware acceleration of H.264, MPEG2/4, VC1 and WMV9 supported
- On board 512MB DDR2 supported up to 2GB
- 3x PCIe 2.0 x1 lanes supported
- CAN Bus interface supported
- SATA Solid State Drive, onboard (optional)

## ORDERING GUIDE

AB1-3628	PQ7-M105IT-0600-0512 (commercial) with MOQ
AB1-3629	PQ7-M105IT-1000-1024 (industrial) with MOQ
AB1-3630	PQ7-M105IT-1600-1024 (industrial)
AB1-3722	PQ7-M105IT-1600-2048 (industrial) with MOQ
B8304300	(GP).Heat Spreader. 70x62x8mm for PQ7-M105IT





2500 MHz PCI-E



Qseven® 2.0 MXMII Connector

PCI EXPRESS  
3x PCIe 2.0 x1



Codec  
HD Audio

LPC

SERIAL ATA  
1x SATA II  
1x NAND Drive

USB  
7x USB 2.0

SPI

CAN

## Processor Core

- ◆ Tunnel Creek Core™ (32nm)  
E680T, E660T, E640T Uni-core SKUs
- ◆ 512KB Shared Last Level Cache

## Highlights

- ◆ Integrated Memory Controller: 1 Channels of Native DDR2 support
- ◆ Integrated Native PCI-E Gen 1 supports 4x1 configurations

## Memory

- ◆ DDR2 800 MT/s
- ◆ 1 Memory Channel
- ◆ 6.4GB/s Peak Memory Bandwidth

## Platform Thermal Design Power

	E680T	E660T	E640T
CPU	4.5W	3.6W	3.6W
PCH	EG20TW 1.55W	EG20TW 1.55W	EG20TW 1.55W
Watt	6.05W	5.15W	5.15W

# PQ7-M640F

To save valuable customers' development time to market, not only the RISC-based boards, but also the following ECO system which Portwell can provide should be taken into consideration: full functions of CPU Module + Carrier board (Q7, Q7+), ready BSP for Android 4.0 & Linux 3.0.x, QT5 & GTK+ Middleware and advanced Utility (Remote Management, Diagnostic Tool) supported



Qseven® module based on Freescale™ i.MX6 family, ARM™ Cortex-A9, Solo / Dual / Quad core processor with onboard 1GB DDR3 (up to 2GB), PCIe 1-lane interface, VGA, HDMI, single LVDS 1-ch or dual LVDS (18/24-bit) 2-ch and CAN Bus.

Portwell PQ7-M640F (6Q, 6D, 6S) is design as CPU module with series of Qseven form factor. It is based on embedded Freescale™ i.MX6 processor, an ARM® Cortex®-A9 processor, Single-, Dual- and Quad-Core. In connection with external standard IO device, a 80-pin Carrier board PQ7-C100ARM is suggested for the following expansion purpose: 3x UART, 2x I2C, 1x Keypad, 1x CAN bus, interfaces of 1x RGB parallel LCD, 1x MIPI-DSI, 2x MIPI-CSI for camera, 1x SPDIF, 1x ESAI audio and 4x PWM.

## FEATURES

- Ultra low power consumption: 2W (Single core) ~ 6W (Quad core)
- Longevity support more than 10 years
- Support Q7+ function (3x UART, CAN, MIPI interface, 2nd LCD interface, GPIO)
- Built-in H/W Graphics accelerators, Open GL ES2.0, Open VG1.1 supported
- 4x independent displays supported. Multi-format of encode & decode
- Portwell ARM ECO system to save customers' development time to market

## ORDERING GUIDE

AB1-3A50Z	PQ7-M640F, CPU Module board (Quad core)
AB9-3243Z	PQ7-C100ARM, I/O carrier board
By project	PQ7-M620F, CPU Module board (Dual core)
By project	PQ7-M610F, CPU Module board (Single core)



SATA 2.0



USB 2.0



Giga LAN



Watch DOG



H/W Monitor

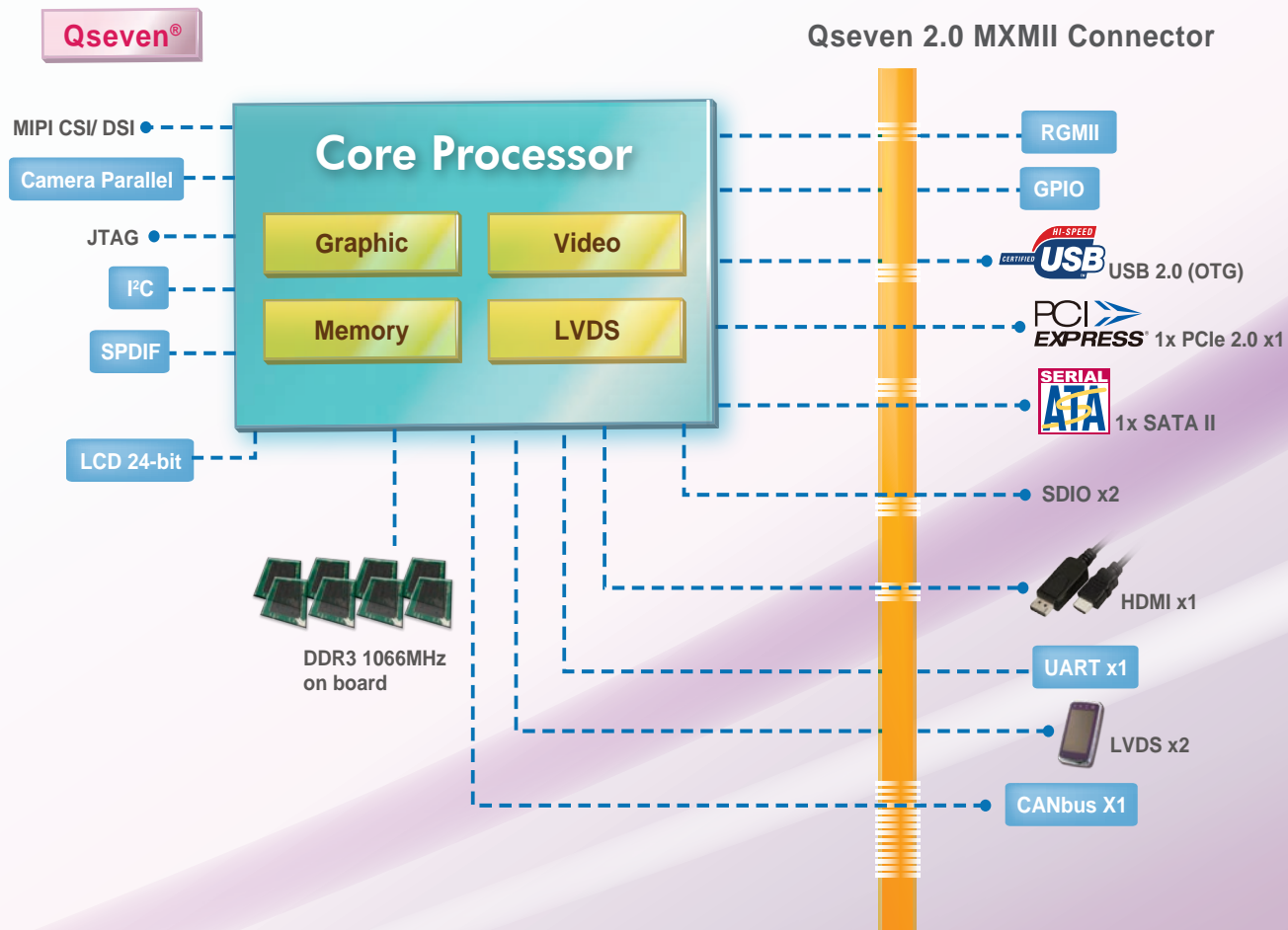


I/O  
GPIO



IoT Solutions  
Alliance





### Processor Core

- ◆ Freescale™ i.MX6 Family, ARM™ Cortex®-A9, Single/Dual/Quad core processor

### Highlights

- ◆ More than 10 years longevity support
- ◆ Ultra low power 2W~6W
- ◆ Rich connectivity for expansion such as 1x CAN bus, interfaces of 1x MIPI-DSI, 2x MIPI-CSI for camera, 1x SPDIF, 1x ESAI audio and 4x PWM.

### Memory

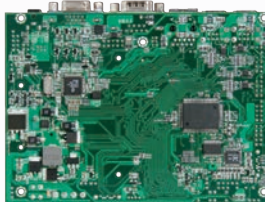
- ◆ Onboard DDR3 1GB support up to 2GB

### Platform Thermal Design Power

CPU	i.MX6 Solo 2W	i.MX6 Dual 4W	i.MX6 Quad 6W
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# PQ7-C100XL-CAN

More and more places utilize some form of a kiosk, e.g. airports, museums, ATMs, etc. This module comes equipped with a single DVI interface for high resolution. Its D/C input reduces the power use while the Mini PCI Express make upgrades simpler



## 3.5" ESB Form Factor Carrier Board for Qseven® Module

Portwell PQ7-C100XL-CAN is designed with a Qseven® 2.0 specification and 230pin card edge MXM connector; suitable for initial evaluation testing based on Portwell's Qseven modules with Mini PCI-E, VGA/LVDS, SATA, LAN, AUDIO, SDIO, LPC, CAN etc interfaces.

PQ7-C100XL-CAN has CAN bus for vehicle application. In addition, 3.5" board size can fix in thin client system with Qseven module. Furthermore, for speeding up developing stage, Portwell provides carrier board design guides as well for customer's own carrier board development reference.

## FEATURES

- Qseven® carrier board is compatible with Portwell Qseven® modules
- 3.5" ESB form factor for embedded applications
- On Board DC to DC circuit for DC in application
- Mini-PCIe support
- Supports boot from SD (SDIO 1.1)

## ORDERING GUIDE

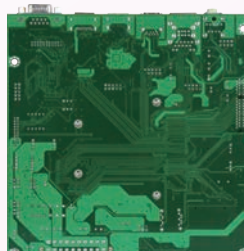
AB1-3326	PQ7-C100XL 3.5" QSEVEN Carrier Board
AB1-3667	PQ7-C100XL-CAN 3.5" QSEVEN Carrier Board with CAN Bus





# PQ7- C201

Automation could be described as an increase in productivity, and/or quality beyond that human labor levels. With the PQ7-C201, the greater PCIe interface enables greater motor control and its UART presence allows for a comport for Legacy components



## Mini-ITX Form Factor Carrier Board for Qseven® Module with Triple Displays and One GbE

Portwell's PQ7-C201 is designed with Qseven® 230pin card edge MXM connector, and support Portwell's Qseven® modules for initial evaluation testing on PCIe x4, LVDS, DP, HDMI, SATA, USB, LAN, AUDIO, SDIO, LPC function, etc.

PQ7-C201 offers rich I/O ports for expansion demand, also simultaneously supports SATA and SD card functions. Furthermore, Portwell can provide carrier board design guides for your own carrier board development reference to shorten developing stage.

### FEATURES

- Qseven® carrier board is compatible with Portwell Qseven® modules
- Mini-ITX form factor for embedded applications
- 1x GbE Port
- 2x SATA Ports and 1x SD Socket
- 1x PCIe x4 expansion slot
- DP, HDMI, and LVDS support

### ORDERING GUIDE

AB1-3B45Z	PQ7-C201.Mini-ITX QSeven Carrier Board
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# PQ7-C100ARM

Besides original Q7 feature, Q7 Plus function with extra 80-pin enables customers to enhance expansion possibility



## Mini-ITX Form Factor Carrier Board for Qseven® Module with GbE, HDMI, VGA and dual LVDS

Portwell's PQ7-C100ARM carrier board is designed with Qseven® 230 pins card edge MXM connector, suitable for initial evaluation testing of PQ7-M640F. It can help save valuable customers' precious development time to market because the following effort has been made by Portwell.



- Porting Ready as Development Kit to Serve Prior Evaluation Purpose
  - OS ( Linux 3.x / Android 4.x )
  - BSP Ready
  - Middleware Qt5 Ready
- Saving Development Time at least 6~8 weeks

## FEATURES

- Mini-ITX form factor for embedded applications
- Plus with extra 80-pin on PQ7-C100ARM for expansion purpose: 3x UART, 2x I2C, 1x CAN bus, interfaces of 1x RGB parallel LCD, 1x MIPI-DSI, 2x MIPI-CSI for camera, 1x SPDIF, and PWM

## ORDERING GUIDE

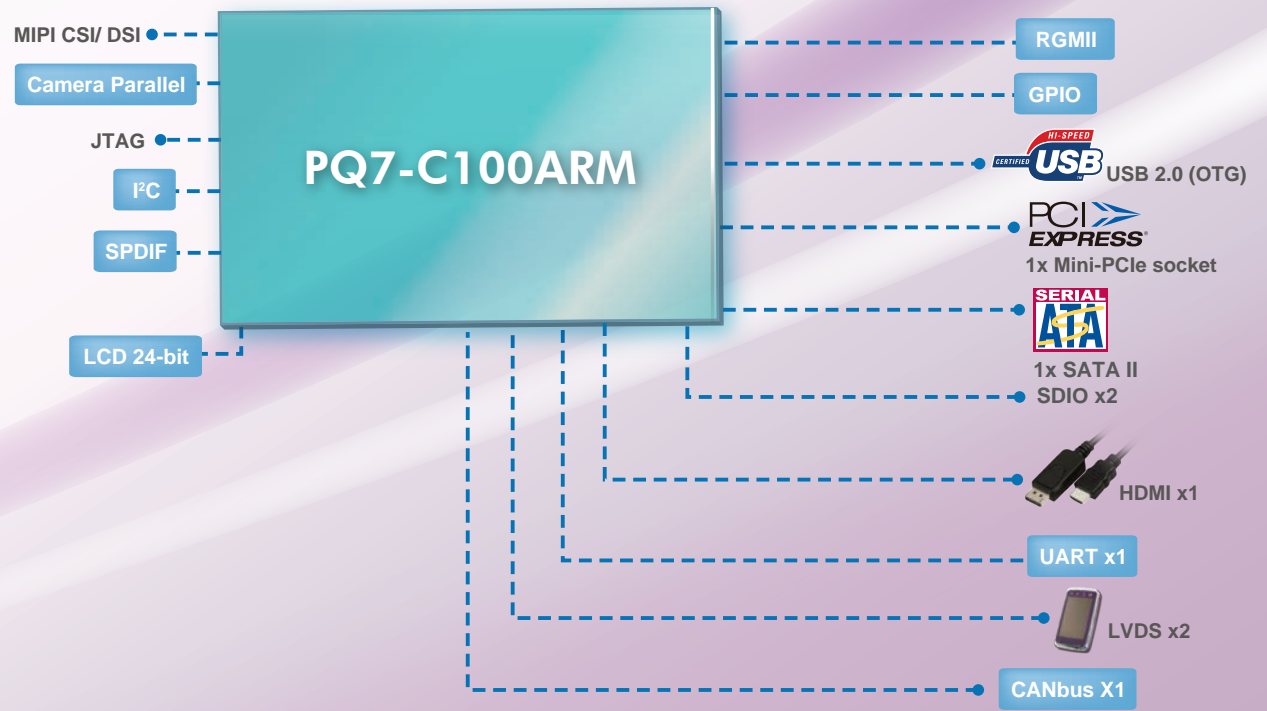
AB9-3243Z

PQ7-C100ARM, Mini-ITX, Qseven Carrier Board



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# PSMC-M101

SMARC module by SMARC 2.0 based on Intel® Atom™ / Pentium® / Celeron® processors (Apollo Lake) with LPDDR4 SDRAM up to 8GB, 24bit LVDS, DP, HDMI



PSMC-M101 is designed with Intel® Atom™ / Pentium® / Celeron® processors ("APOLLO LAKE") processors featured with higher graphic performance and wider memory bandwidth than the previous platform.

Based on Intel® Apollo Lake industrial grade processor support, industrial components selecting, and with wide-voltage input design adding on board, PSMC-M101 not only aims at various applications(i.e. automation, fire security, transportations), but is also set to support kinds of harsh environment with a stable power input.

## FEATURES

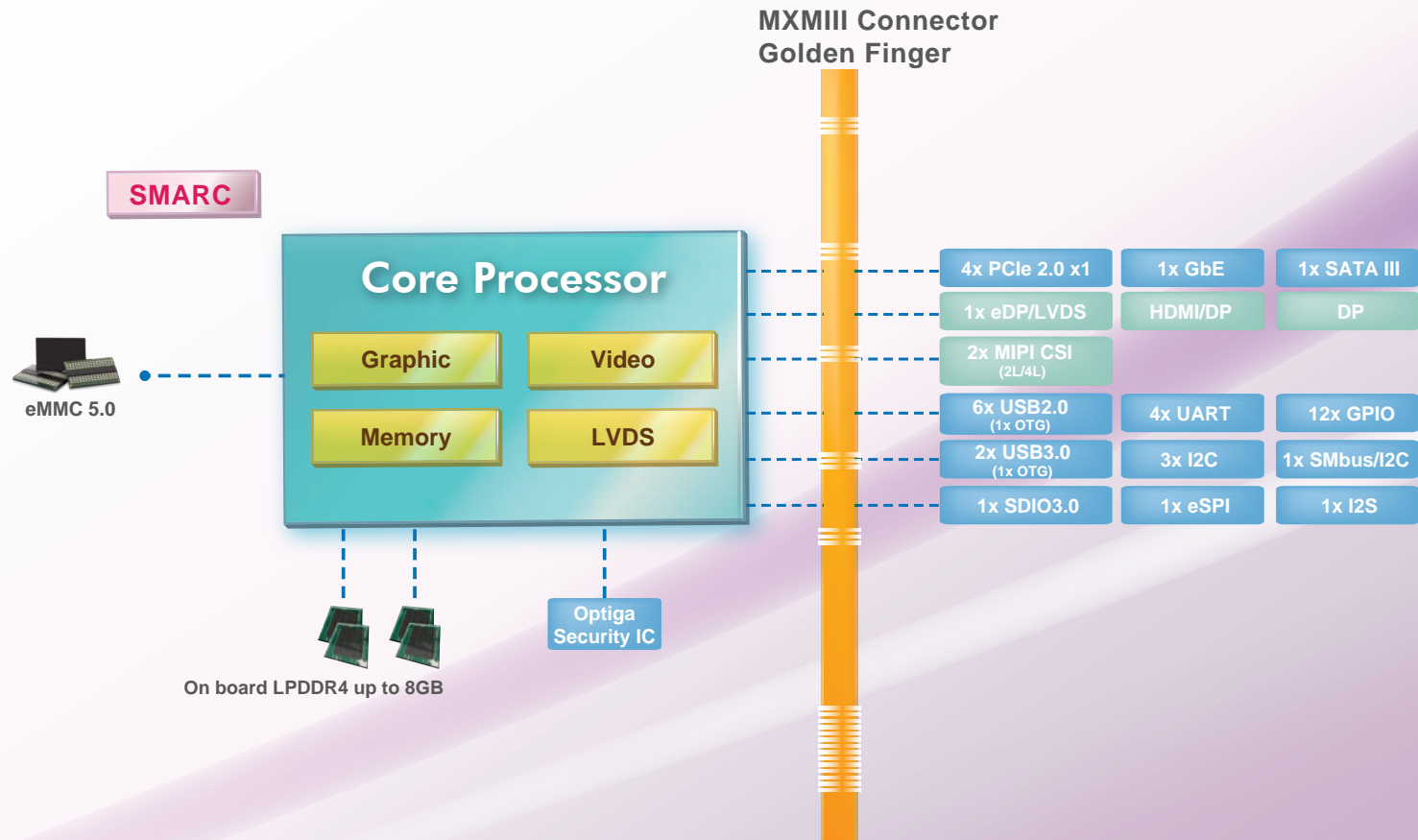
- Intel® Atom™ / Pentium® / Celeron® processors ("Apollo Lake")
- On Board LPDDR4 DRAM up to 8GB
- On Board eMMC 5.0 up to 64GB(Optional)
- Support 24-bit LVDS, HDMI and DP output
- 4x PCIe 2.0 x1, 2x USB 3.0 and 6x USB 2.0
- Operating Temperature: -40°C~+85°C

## ORDERING GUIDE

AB7-3051Z	(R). PSMC-M101-E3950-4G-8G. Atom E3950 Quad Core 2.0 GHz. SMARC Module/EC/LVDS
Contact us	(R). PSMC-M101-N3350-4G-8G. Celeron N3350 Dual Core 2.4 GHz. SMARC Module/EC/LVDS
Contact us	(R). PSMC-M101-N4200-4G-8G. Pentium N4200 Quad Core 2.5 GHz. SMARC Module/EC/LVDS
Contact us	(R). PSMC-M101-Exxx-xG-xG. With chosen CPU, memory and eMMC







### Processor Core

- ◆ Intel® Atom™ Processor x7-E3950/x5-E3940/x5-E3930
- ◆ Intel® Pentium® Processor N4200
- ◆ Intel® Celeron® Processor N3350
- ◆ 1.8GHz to 2.5GHz
- ◆ 2MB Cache

### Highlights

- ◆ Optiga Trust security IC on board option
- ◆ 4x PCIe 2.0 x1
- ◆ eDP to LVDS support
- ◆ EC design for flexible control

### Memory

- ◆ LPDDR4 2133/2400 MT/s
- ◆ Dual Memory Channel support
- ◆ up to 8GB

### Platform Thermal Design Power

CPU	E3950	E3940	E3930	N4200	N3350
Watt	12W	9.5W	6.5W	6W	6W

# PSMC-M640F



To save valuable customers' development time to market, not only the RISC-based boards, but also the following ECO system which Portwell can provide should be taken into consideration: full functions of CPU Module + Carrier board (SMARC form factor, "Smart Mobility ARChitecture"), ready BSP for Android 4.0 & Linux 3.0.x, QT5 & GTK+ Middleware and advanced Utility (Remote Management, Diagnostic Tool) supported



PSMC-M640F is design as CPU module series with SMARC form factor. It is based on embedded NXP i.MX6 processor, an ARM® Cortex®-A9 processor, Single, Dual and Quad-Core.

The SMARC ("Smart Mobility ARChitecture"), small form factor of lower power, cost concern, and high performance, is used as building blocks for portable and stationary embedded systems. The SMARC pin-out is optimized for the features common to ARM® CPUs and not common to the x86 PC world. The modular approach allows scalability, fast time to market and upgradability while still maintaining cost performance, low power and small physical size.

## FEATURES

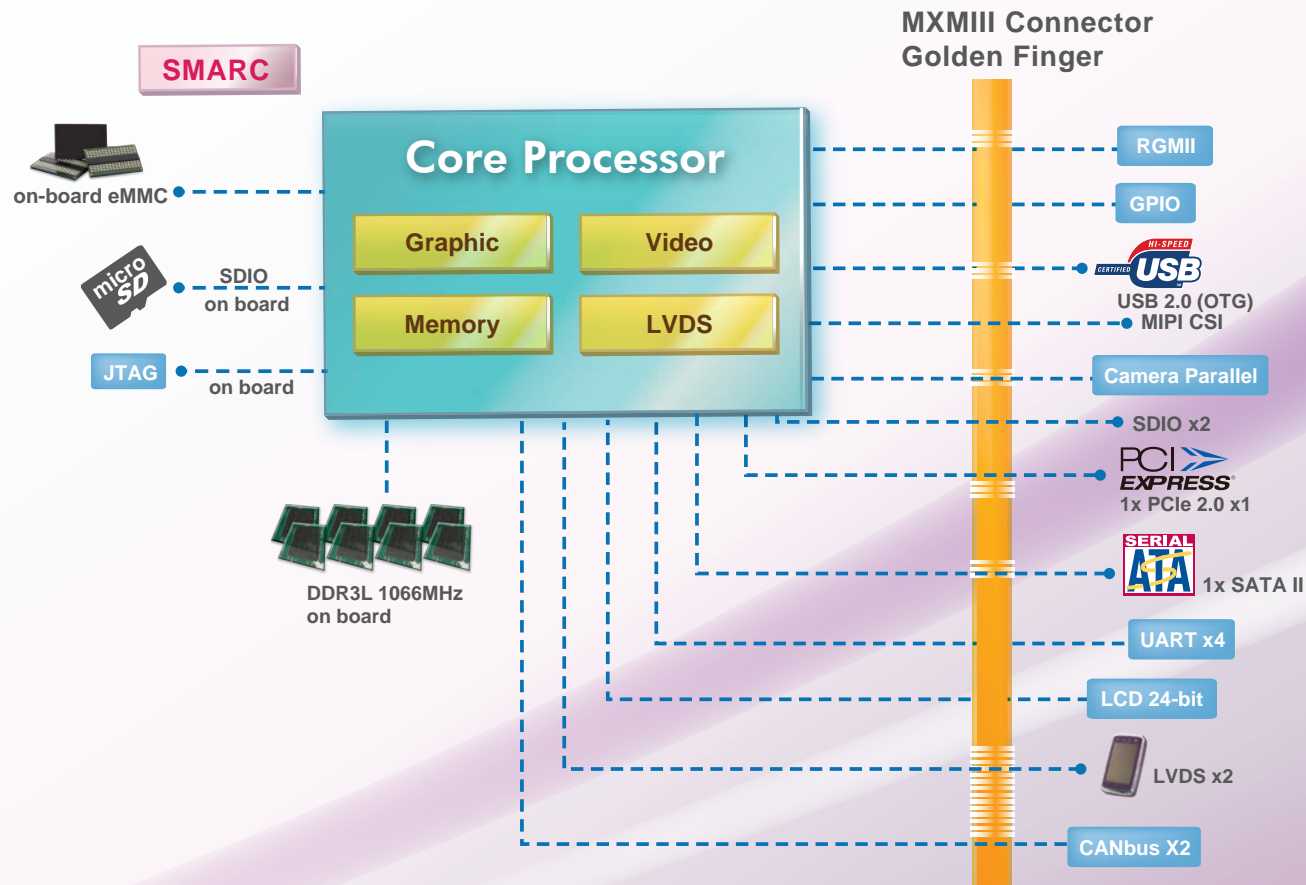
- NXP i.MX6 Cortex® A9 processor, Single / Dual / Quad core SKU
- Ultra low power consumption: 2W (Single core) ~ 6W (Quad core)
- Longevity support more than 10 years
- Built-in H/W Graphics accelerators, Open GL ES2.0, Open VG1.1 supported
- 4 independent displays supported. Multi-format of encode & decode.
- Parallel LCD display interfaces
- Serial and parallel camera input provisions
- Multiple I2C, I2S and serial port options
- USB client / host mode (OTG) operation
- SD and eMMC card operation

## ORDERING GUIDE

AB7-3062Z	PSMC-M640F, CPU Module board (Quad core)
AB7-3064Z	PSMC-M620F, CPU Module Board (Dual core)
AB7-3063Z	PSMC-M610F, CPU Module Board (Single core)
Contact us	PSMC-C300ARM, I/O carrier board







### Processor Core

- ◆ Freescale™ i.MX6 Family, ARM™ Cortex®-A9, Single/Dual/Quad core processor

### Highlights

- ◆ More than 10 years longevity support
- ◆ Ultra low power 2W~6W
- ◆ Rich connectivity for expansion such as 2 CANbus bus, interfaces of 1x MIPI-DSI, 2x MIPI-CSI for camera, 1x SPDIF, and PWM

### Memory

- ◆ Onboard DDR3L 1GB support up to 2GB

### Platform Thermal Design Power

CPU	i.MX6 solo	i.MX6 Dual	i.MX6 Quad
	2W	4W	6W

# PSMC-C300ARM

The pin-out of PSMC-C300ARM is optimized for the features specifically common to ARM® processors. The modular approach allows scalability, fast time to market and upgradability while still maintaining low power and cost performance



## Mini-ITX Form Factor Carrier Board for SMARC Module with GbE, HDMI, VGA and dual LVDS

Portwell's PSMC-C300ARM carrier board is designed with SMARC 314 pins card edge MXM connector, suitable for initial evaluation testing of PSMC-M640F and PSMC-M310T. It can help save valuable customers' precious development time to market because the following effort has been made by Portwell.

- Porting Ready as Development Kit to Serve Prior Evaluation Purpose
  - OS ( Linux 3.x / Android 4.x )
  - BSP Ready
  - Middleware Qt5 Ready
- Saving Development Time at least 6~8 weeks

### FEATURES

- Mini-ITX form factor for embedded applications
- Multiple Display interfaces
- MIPI (DSI, CSI) interface for camera is reserved

### ORDERING GUIDE

Contact us	PSMC-C300ARM, Mini-ITX, SMARC Carrier Board
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## PSMC-C300ARM

### MXMIII Connector Gold Finger

RGMI

GPIO

  
USB 2.0 (OTG)

• MIPI CSI

Parallel Camera

• SDIO x2

  
1x PCIe x1

  
1x SATA II

UART x4

LCD 24-bit

 LVDS x2

CANbus X1

# Signal Integrity is tested and assured

The Signal Integrity Lab (SI) concentrates its efforts on ensuring reliable quality of our PCB design. With advanced software, Portwell can repair discrepancies via Signal Integrity (SI), Power Integrity (PI) and EMI (Electromagnetic Interference) before gerber out. The benefits of SI not only reduces re-spin versions but also minimizes cost to achieve a faster time-to-market.

The Mission of SIL is as follows.

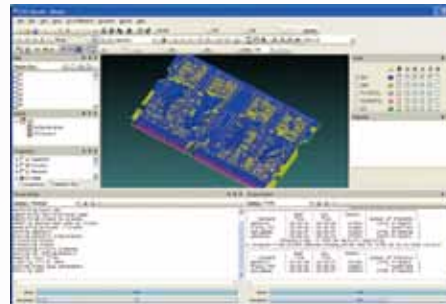
- Ensure high-speed signal quality.
- Reduce PCB turn-around time to fix SI, PI and EMC issue in advance.
- Minimize cost on board design (size, layer no., stackup, etc ).
- Provide board stack-up design and PCB material selection.
- Export layout guidelines of high-speed signals.
- Signal validation and correlation.
- Sharing SI/PI/EMI knowledge know-how with part-ners by design collaboration.



For better collaboration design with customers, we adopt world leading simulation tools in the industry field. Such as

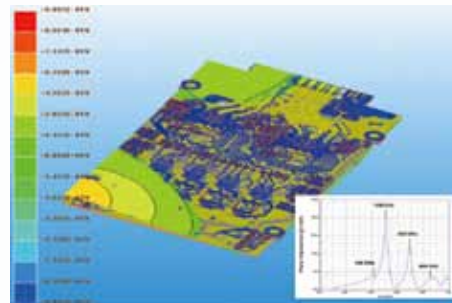
## Anslys (Ansoft) Siwave 5.0

1. Hybrid 2D Full Wave EM Field Solver.
2. Analyze entire PCB and IC packages.
3. ID signal and power integrity problems.



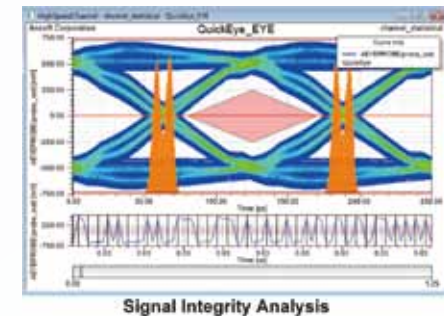
## Anslys (Ansoft) PI Advisor

1. Optimizes power distribution
2. Quickly determines the optimal capacitors
3. Minimizes production costs, non-recurring engineering costs, and time to market.



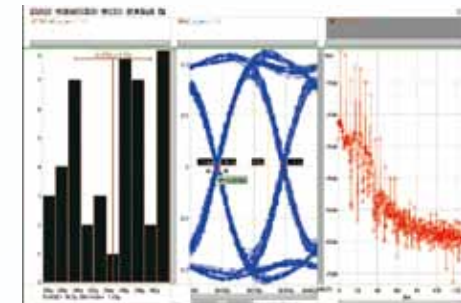
## Anslys (Ansoft) Designer SI 6.0

1. Leverages multiple signal integrity simulation methods.
2. Utilizes optimization algorithms, Design of Experiments, tuning and post-processing for key comp.
3. Utilizes electromagnetic simulation and circuit tools.



## Synopsys HSPICE

1. Uses the Gold Standard for accurate circuit simulation.
2. Provides Yield-Process variability and device reliability simulation.
3. Applies high speed simulation with harmonic balance and shooting algorithms.

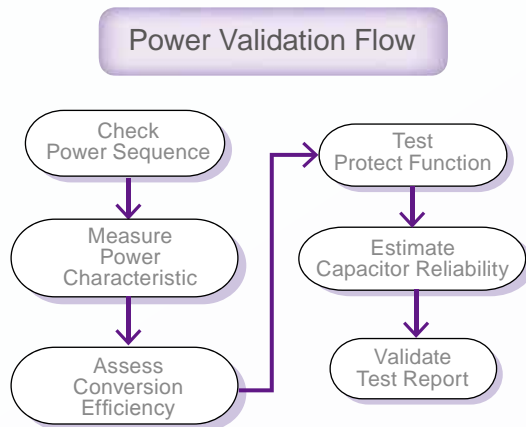




# Power & energy use confirmed stable and efficient

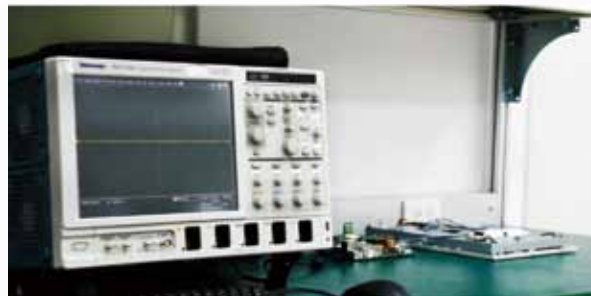
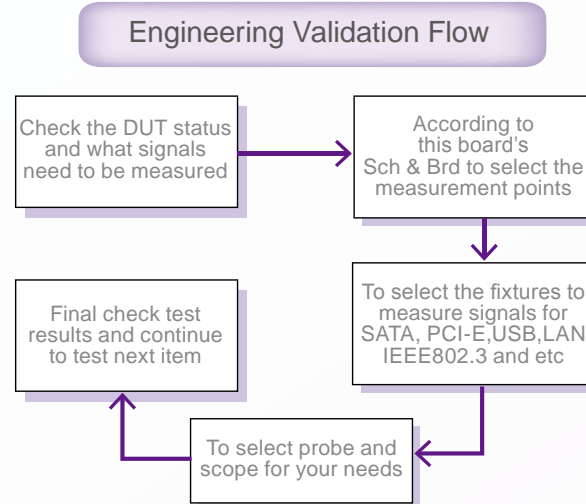
## Power Lab

Since the development of the Industrial PC it has been widely used in communications, medical, aerospace, automation & control applications and more. The power design quality and reliability is very important during product development which may affect the system operation stability and power efficiency consumption. The role of the Power Lab is to help engineers verify the power sequence, measure heat loss, etc. in order to improve the power design.



## Electronic R&D Lab

The Electronic R&D Lab fulfills hardware engineers' needs by utilizing different measurement equipment which help investigate high speed signals required in Data Quality Assurance (DQA) during the test stage to ensure all hardware functionalities are compliant with the design guide.



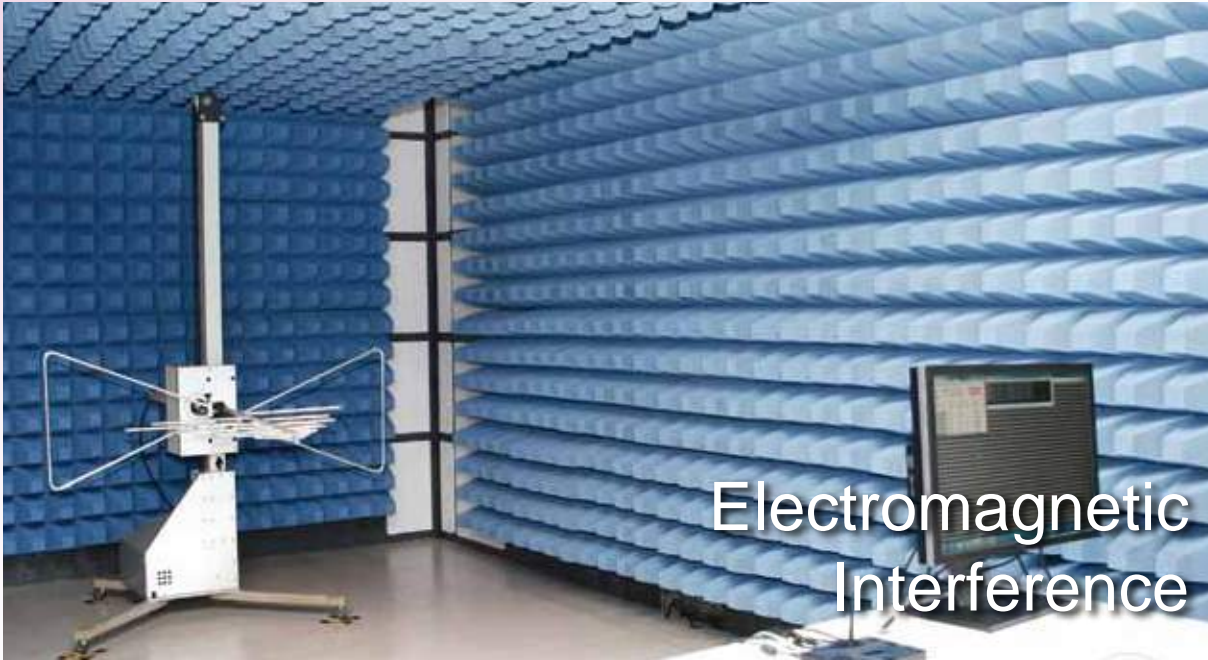
## On / Off Lab

ON/OFF Lab is built to ensure our products are designed with the highest quality. By testing On and Off we can validate the system power sequence which is one of the most important test methods to ensure the reliability and compatibility.

Portwell's On/Off Lab features replay equipment that monitors power input for boards or systems and provides advanced remote control so engineers can monitor the test status of 16 systems via WAN, LAN or the Internet which proves to be an efficient method during project development.



## Our Modules are resistant to rapidly changing electrical currents



### Electromagnetic Interference

Electromagnetic interference (also called radio frequency interference or RFI) is a disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation emitted from an external source. The disturbance may interrupt, obstruct, or otherwise degrade or limit the effective performance of the circuit. The source may be any object, artificial or natural, that carries rapidly changing electrical currents. Problems with EMI can be minimized by ensuring that all electronic equipment is operated with a good electrical ground system. In addition, cords and cables connecting the peripherals in an electronic or computer system should be shielded

to keep unwanted RF energy from entering or leaving. Specialized components such as line filters, capacitors, and inductors can be installed in power cords and interconnecting cables to reduce the EMI susceptibility of some systems.

Placing a large amount of electrical and electronic systems into a very confined space poses the issue of keeping the EMI of these systems from interfering with each other through radiated and conducted emissions. With most systems now fully electronic, the need to contain EMI is more vital than ever starting from the design stage.

### Features of Portwell EMI LAB



The EMI test receiver we utilize combines two instruments into one; measuring EMC disturbances in accordance with the latest standards and also serving as a full-featured spectrum analyzer for diverse lab applications.

### Key Features

- Frequency range from 9 kHz to 3 GHz or 9 kHz to 6 GHz covering almost all commercial EMC standards.
- First-ever combination of an EMI test receiver and spectrum analyzer in the economy class.
- All major functions of an advanced EMI test receiver, including fully automated test sequences.
- Weighting detectors: max./min. peak, average, RMS, quasi-peak as well as average with meter time constant and rms average in accordance with the latest version of CISPR 16-1-1



# Our modules are compliant with IES standards

## EMS

EMS tests including CS & RS are the reliability tests against electric fields, magnetic fields, power cords, control cables, signal cables, ground interference and static electricity discharges, electricity discharge and electromagnetic wave.

2

### **SURGE:**

Surge test generates a sudden rise in power to simulate the effect of lightning shock to the power system. Utilizing this test ensures self-protection and also determines weaknesses during sudden power surges.

**\*Compliance with IEC 61000-4-5 SURGE 4.1KV / 2KA and 61000-4-9 (Magnetic field SURGE)**

3

### **DIPS:**

Dips simulates sudden drops in power and measures the immunity of products to such power interferences. This test allows us to improve upon design flaws by measuring the sustainability to such power drops.

**\*Compliance with IEC 61000-4-11 DIPS / VARIATION, IEC 61000-4-8 (50/60 Hz Magnetic field 50A/m) with the additional MF1000-1 antenna (1x1m)**

1

### **Electrical Fast Transient (EFT) or Burst:**

Every On/Off action with electronic devices generates interference to the whole power system. EFT simulates these possible circumstances to examine the immunity of an operating system in order to make improvements.

**\*Compliance with IEC 61000-4-4 EFT 4.4KV**



4

### **Conducted Susceptibility Test System (CST)**

The CS test examines the immunity in terms of conduction. By sending a high frequency signal, it simulates interference to test the immunity of the power core or signal. By utilizing different voltage level settings, weak points can be determined for design correction.

**\*Compliance with IEC/EN 61000-4-6 (IEC-Frequency range from 150 kHz ~ 80MHz)**

5

### **Conducted Immunity Test System (CIT)**

Conducted Immunity tests are performed to determine the ability of a device to withstand the presence of RF signals on the cables or power cords attached to the device.

**\*Compliance with IEC/EN 61000-4-6**

## ESD

Electrostatic discharge (ESD) is the sudden and momentary electric current that flows between two objects at different electrical potentials. One of the causes of ESD events is static electricity. A system will suffer permanent damage when static electricity is generated through turbo-charging or electrostatic induction that occurs when an electrically charged object is placed near a conductive object isolated from grounding.

## Features of Portwell ESD Facility

- Meets the requirements in EN/IEC 61000-4-2.
- Up to 30KV output in both contact and air discharges.
- A lightweight discharge gun.
- Easily changeable capacitor and resistor units.
- Self-explanatory control panel.
- Optional remote control Windows software offers more comprehensive control than local operation.



# A farm of chambers for module testing



Advanced Chamber Farm

The environmental test is a very important certification to all industrial products needed for mission critical environments. At Portwell, we test all our products, developed or integrated, against these conditions. Our readily available equipment always allows us to meet customer deadlines and provide detailed test results compliant with industrial standards. While there are many applications and choices in the ever-changing IPC industry, Portwell is the most competent and qualified to adapt to these changes and remain as an industrial leader. Though the quantity scale is a concern of our customers, advanced functionalities

satisfies them due to the savings of cost and time. For example, a remote monitoring system enables our customers to conduct environmental tests by way of our equipment. Meanwhile, our experienced engineers can effortlessly help our customers achieve desired results without additional costs.

## Features of Portwell Chamber Zone

As a leading worldwide industrial platform provider, we know the importance of environmental testing. We build our Chamber Zones with the following features.

- Scalable – More than 30 chamber devices can be installed in the zone.
- Independent – Well controlled and separated space for each individual chamber in order to sustain steady operations and security of a project.
- Advanced – 30 check points for every tested object to collect detailed data.
- Green – we recycle and use well-filled water for the environmental test.
- Remote Control & Monitoring
- Manipulation of chambers and testing objects  
Allows instant acquisition of the testing data



## IEC 68-2-X Certification

IEC 68-2-1	Low-temp. Test, 60°C, 96 hrs
IEC 68-2-2	High-temp. Test, -10°C, 96 hrs
IEC 68-2-3	Humidity Test, 40°C, 93+2/-3% R.H., 96 hrs
IEC 68-2-14	Temp. cycle Test, -10°C ~ 60°C, 48 hrs



## Programmable Temperature & Features: Humidity Chamber

Portwell's Programmable Temperature and Humidity Chamber Farm houses 12 programmable constant temperature and humidity testing machines, with the abilities to run from -60°C up to 150°C. Moreover, the air flow control is compliant with IEC 68-2 standard. Portwell vigorously applies these extreme conditions to their products in order to ensure their durability and accuracy while under such conditions. Therefore, Portwell can assure their customers superior and stable performance in any environment.

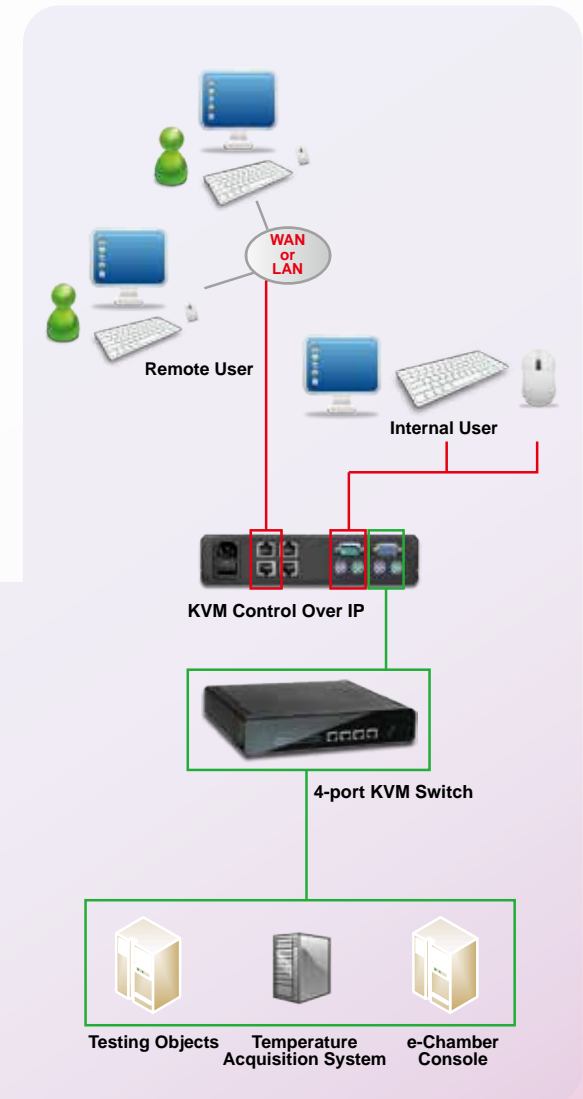
- **Air Flow Control**  
Comply with IEC 68-2 standard, lower wind is under 0.5m/s.
- **With/without Due**  
Available upon request.
- **Humidity Control**  
Can be controlled under 40°C / 10% RH.
- **Web Monitoring**  
Can be arranged by the dedicated program.



## Web Monitoring Console

In order to serve those customers unable to stay at our facility for the environmental test, Portwell developed web-based tests to meet the customer demands via the internet by remote control access.

Provide us with your testing object and our engineers will arrange your object in an assigned chamber and set the remote control console with you. This service allows you to manage your tests right from your computer.



# Silence is a signature of our modules



## Semi-anechoic Chamber

Structure	Semi-anechoic Room
Space	3.95 x 3.95 x 2.5 (m2)
Separated	Floating Ground with Zin plated steel
Material	Polymer Absorption wedge
Door	Fully sealed Pressure Door, Outdoor Open, lock inside
Regulation	ISO 3745
Power filter	1kW 110V
Cable	Belden
Instruments	CRAS Micophone, IEA, analyer and system.

Chamber Type	1/3 Octave Band Frequency( Hz)	Tolerance (dB)
Anechoic Chamber	≤ 630	± 1.5
	800-5,000	± 1.0
	≥6,300	± 1.5
Semi-Anechoic Chamber	≤ 630	± 2.5
	800-5,000	± 2.0
	≥6,300	± 2.5

Anechoic chambers are commonly used in acoustics to conduct experiments in nominally "free field" conditions. All sound energy will be traveling away from the source with almost none reflected back. Common anechoic chamber experiments include measuring the transfer function of a loudspeaker or the directivity of noise radiation from industrial machinery. In general, the interior of an anechoic chamber is very quiet, with typical noise levels in the 10–20 dBA range. Full anechoic chambers aim to absorb energy in all directions. Semi-anechoic chambers have a solid

floor that acts as a work surface for supporting heavy items, such as cars, washing machines, or industrial machinery, rather than the mesh floor grille over absorbent tiles found in full anechoic chambers. This floor is damped and floating on absorbent buffers to isolate it from outside vibration or electromagnetic signals. A recording studio may utilize a semi-anechoic chamber to produce high-quality music, free of outside noise and unwanted echoes.





# The noise emission of our modules meet ISO Standards

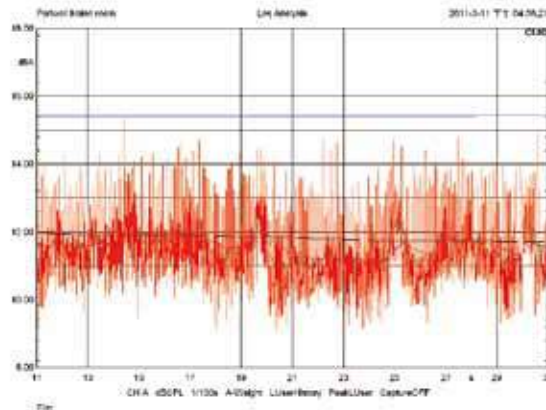
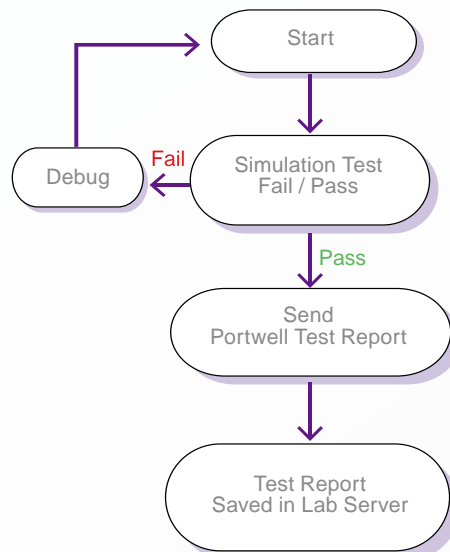
## Goals of Semi-Acoustic Chamber

In Portwell Semi-Acoustic Chamber we follow the simulation procedure demonstrated below to validate our system noise levels. Our method is to provide dimension, space, wedged material, placement of EUT and microphones in the chamber in accordance with ISO 7779 standards which help us verify that the noise levels of our products fall within universal criteria.

Our goals are:

- Ensure medical related products can comply with noise requirements.
- Service customer to verify their products can meet local noise standards.

### Acoustic Simulation Test



Portwell semi-acoustic chamber is based on ISO 3745 which states that indoor background noise remain under 15dB(A) while outside noise is under or equal to 70dB(A); thus we can detect accurate results for product evaluation.

## ISO 3745:1977

Specifies two laboratory methods. First, it establishes requirements for the test room as well as the source location, operating conditions and instrumentation. Secondly, it specifies techniques for obtaining an estimate of the surface sound pressure level from which the weighted sound power level of the source and the sound power level in octave or one-third octave bands may be calculated.

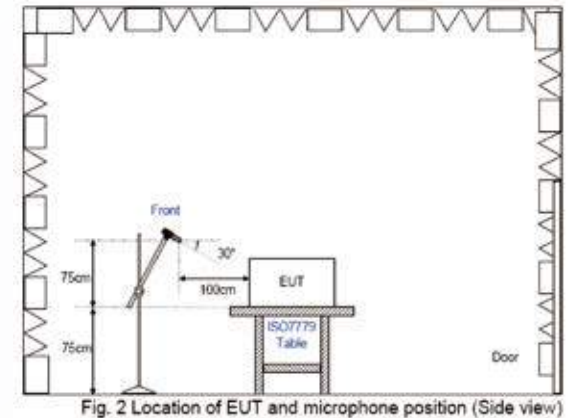


Fig. 2 Location of EUT and microphone position (Side view)

All the dimensions, space, material of wedges, placement of EUT and microphone within our semi-acoustic chamber follow ISO 7779 standards which ensure our products meet universal criteria.

## ISO 3745:1977

ISO 7779:2010 specifies procedures for measuring and reporting the noise emission of information technology and telecommunications equipment. The basic emission quantity is the A-weighted sound power level which may be used for comparing equipment of the same type but from different manufacturers, or for comparing different equipment. Portwell Semi-Acoustic Chamber follows ISO 7779 when determining sound power levels of a machine.

# Breaking the module to build it stronger



## HALT Certification

Typhoon 4.0	
WORK SPACE	UPPER TABLE POSITION : 53.8" w x 54" d x 34.6" h (1366 x 1372 x 879mm)
	LOWER TABLE POSITION : 53.8" w x 54" d x 53.6" h (1366 x 1372 x 1362mm)
OUTER DIMENSIONS	69.2" w x 78.8" d x 103.9" h (1759 x 2003 x 2640mm)
TEMPERATURE RANGE	+200 °C TO -100 °C, +250°C TO -100°C
THERMAL RAMP	70 °C - 100 °C/min average
TABLE SIZE	48" x 48" (1220 x 1220mm)
ACCELERATION	5 - 75 gRMS (Bare Table) TABLE CAPACITY 600 lbs (272kg) Recommended
TABLE CAPACITY	600 lbs (272kg) Recommended
POWER REQUIREMENTS	380V, 400V, 440V, 480V, 3Φ , 50/60Hz, 100A
ACTUATORS	12 Lubricant free



A Highly Accelerated Life Test (HALT), is a stress testing methodology for accelerating product reliability during the engineering development process. It is commonly performed to identify and help resolve design weaknesses with progressively more severe environmental stresses. Another feature of HALT testing is that it characterizes the equipment under stress, and identifies the equipment's safe operating limits and design margins. Some common forms of failure acceleration for industrial products are power cycling, temperature cycling and random vibration. HALT serves to improve the reliability of a product and is an empirical

method used to identify the limiting failure and the stresses at which these failures occur.

The major advantages of HALT are: a) it can be conducted during the development phase of a product in order to weed out design problems and marginal components thereby eliminating costs for warranty returns; b) it also is conducted as internal qualification testing which significantly reduce costs prior to sending the equipment for formal qualification.

During a HALT test the tested equipment has to be functional and operational while monitored so that if the equipment fails while being stressed,

the failure will be detected. The failure may only be present while the stress is applied and may not cause permanent degradation that would be apparent after the stress is removed. All failures during HALT testing are subject to failure analysis and root cause analysis.



# Super-aging our modules to unveil weaknesses



Portwell chooses a Typhoon 4.0 system which is designed specifically for the task of performing Highly Accelerated Stress Screening (HASS) and HALT on large products. With the Lowest Total Cost of Ownership within the AST industry, the 48" x 48" vibration table is capable of supporting hundreds of pounds of products and fixtures, while delivering low frequency ranges necessary to induce failure. For high temperature applications in simulating harsh conditions, this system is available as the Inferno™ which can deliver temperatures up to 250°C.

When validating the HALT test we follow the step by step procedure which helps us to analyze time of failures so that our engineers can make the necessary revisions.

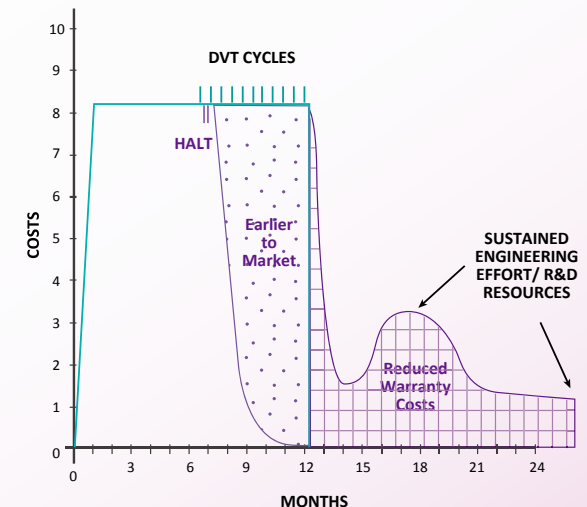


Stresses are delivered in an ordered sequence:

- Thermal Step Stress
  1. Cold Step Stress
  2. Hot Step Stress
- Rapid Thermal Transition Cycling
- Vibration Step Stress
- Combined Environment
  1. Rapid Thermal Transition Cycling and
  2. Vibration Step Stress

## Features of Portwell HALT Lab

- Increase Product Reliability
- Reduce Design Verification Time and Expense
- Remove Costly Manufacturing Defects
- Reduce Warranty Costs
- Increase Sales Revenues with Reputation for Quality



# Our modules undergo shipping simulation to ensure intact delivery

## Vibration

Vibration is capable of damaging electronic components and component soldering. In our Vibration Chamber, we simulate variable vibration conditions that could potentially damage our products during their transportation, installation or operation. Therefore we rigorously test every product and gather accurate statistical analysis as proof of the outstanding level of tolerance and endurance in every Portwell product.

### Vibration tester conducts either Sine or Random vibration.

Sine Vibration complies with IEC-68-2-6 and simulates the product on a ship to verify Resonance Search and Resonance Dwell. Random Vibration complies with IEC-68-2-36 and simulates the product in transportation situations in order to test the packaged product's vibration endurance.



\* Compliance with IEC-68 Comply the IEC-68 environmental regulation. The max magnetic force is 1000kgF.

## Shock

The test purpose is to evaluate whether the limit of the products' strength is consistent with those in the product line. When the tested item is shocked and the mechanically fragile part is found, mechanical R&D engineers can amend the supporting structure and analyze the properties of material to effectively prevent possible damage in the future.

The tested item is unpackaged. Three-axis & 6-face (each face tested 3 times) should be conducted to pass specified shock conditions of 15G peak acceleration and a pulse duration for 11 ms. (3 times for each face under operation condition)



\* Compliance with IEC-68.

## Drop

This test focuses on package design. The drop test is conducted in order to test whether the packaged product remains intact and 100% functional after being dropped. This test simulates the accidents that occur during shipping and handling. Therefore, we also focus on the design of our packages to ensure you receive the product as if it just came off the shelf.



\* Complies with IEC-68.



Both Portwell RDC & SIC are prepared for complete service to our customers & partners. Should you have any requirements or technical issues, please contact us. Our services can be arranged in the following ways.

## Web Service

Please visit us on the web and leave a message. We also provide an on-line consulting service via Skype. And if immediate assistance is needed, contact us by phone.

## Direct Contact

Portwell welcomes our customers to visit our laboratory to witness our regulation tests and design service. This is the best way to answer all your questions and help you find the right solution.

## Extended Visits to PE

Sometimes it is difficult to find the solution in a short period of time. Therefore, Portwell provides a dormitory for our customers and partners to stay until we reach the necessary solutions. Please contact us and our staff will arrange a place for you to stay.

## Completed Technical Service

In order to ensure customers receive fast and appropriate service from Portwell, we offer the following services to meet your needs.



### Consulting Service

Our engineering experts provide a free service to discuss projects or technologies when you need it immediately. Merely visit our website and our on-line team will address any issues you might have.



### Live Chat (Skype)

You can have on-line consulting via Skype if an immediate response is needed.

<http://www.portwell.com.tw/support/LiveChat.php>



### E-Mail

Portwell's technical support department can be reached by e-mail as follows

[TSD@portwell.com.tw](mailto:TSD@portwell.com.tw)



### Product Service

We have experienced product managers who can help you obtain the right products from our inventory while also providing information to help you find solutions.



### Design Service

If our existing products cannot meet your requirements, a customized design service can be arranged to build the exact products that you demand.



### Manufacturing Service

Portwell has the most advanced manufacturing facilities to produce a quality product for your application or business. Please visit our Portwell Engine and discover that we are the solution for you.



### Logistics Service

Our logistic service is not only for scalable or world-grade customers, we also offer services to our partners who need world-wide delivery in order to save time and additional expenses.



### Global Service (Telephone)

In addition, you can get immediate support via telephone. Check the web site for phone numbers.

<http://www.portwell.com.tw/contact/worldwide.html>

[www.portwell.com.tw](http://www.portwell.com.tw)



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