

# Module Platform Solution Guide





# Table of Contents

## COMPUTER OF MODULE

|      |     |                   |
|------|-----|-------------------|
| PAGE | 1-2 | Table of Contents |
|      | 3   | About Portwell    |
|      | 4-5 | Module            |

|   |              |
|---|--------------|
| 6 | Intellegence |
| 7 | Technology   |

|      |                |
|------|----------------|
| 8-09 | PCOM/Interface |
|------|----------------|

|       |                     |
|-------|---------------------|
| 10-12 | PCOM Solution Guide |
|-------|---------------------|



### 13-14 PCOM-BA00

Intel Atom® E3800 series SoC based on Type 10 Mini COM-Express® module with DDR3L SDRAM, NANDrive and USB 3.0



### 15-16 PCOM-BA01

Intel Atom® E3900 series SoC based on Type 10 Mini COM-Express® module with LPDDR4 SDRAM, eMMC and USB 3.0



### 17-18 PCOM-BA02GL

Intel Atom® x6000 series SoC based on Type 10 mini COM Express® module with LPDDR4 SDRAM



### 19-20 PCOM-B632VG

Intel Atom® Bay Trail series SoC based on Type 6 COM Express® module with DDR3L 1x SO-DIMM Socket



### 21-22 PCOM-B638VG

Intel® Core™ Kaby Lake-U/Skylake-U i7/i5/i3 series processor based on Type 6 Compact COM-Express® module with 2x DDR4 SD-DIMM Socket



### 23-24 PCOM-B641VG

Intel Atom® Apollo Lake series SoC based on Type 6 Compact COM Express® module with 2x DDR3L SO-DIMM Socket



### 25-26 PCOM-B645VGL

Intel Atom® Elkhart Lake series SoC based on Type 6 Compact COM Express® module with 2x DDR4 SO-DIMM Socket



### 27-28 PCOM-B653VGL

Intel® Whiskey Lake-U Core™ Processor based on Type VI COM Express module with dual DDR4 SO-DIMM, DDI, eDP, Gigabit Ethernet, SATA 3.0, and USB 3.1



### 29-30 PCOM-B654GL

Intel® Coffee Lake-S Core™ Processor based on Type VI COM Express module with dual DDR4 SO-DIMM, DDI, LVDS, VGA, Gigabit Ethernet, SATA III, and USB 3.2 Gen2



### 31-32 PCOM-B655VGL

Intel® Comet Lake-S Core™ Processor based on Type VI COM Express module with dual DDR4 SO-DIMM, DDI, LVDS, VGA, Gigabit Ethernet, SATA III, and USB 3.2 Gen2



### 33-34 PCOM-B656VGL

Intel® Tiger Lake-UP3 Core™ Processor based on Type VI COM Express module with dual DDR4 SO-DIMM, DDI, eDP, Gigabit Ethernet, SATA 3.0, and USB 3.2



### 35-36 PCOM-B657VGL

COM Express Type-VI Basic module with Intel® 11<sup>th</sup> Gen H Processor DDR4 SO-DIMM, DDI, PCIe Gen 4.0, USB 3.2 Gen2x1, 2.5 Gigabit TSN Ethernet, discrete TPM 2.0, eDP/LVDS, SATA III and VGA



### 37-38 PCOM-B700G-NS

Intel® Xeon® D-1600 series SoC based on Type 7 Basic COM Express® module



### 39-40 PCOM-B701GT

Intel® Atom® Denverton, Denverton refresh series SoC based on Type 7 Basic COM-Express® module with 3x DDR4 ECC SO-DIMM Socket



#### 41-42 PCOM-B702G

Intel Atom® processor C3000 Series with DDR4 ECC up to 64GB 2133 MT/s on Two SO-DIMM Sockets with up to 12 HSIO Lanes, 4x KR to support 10G, NC-SI Interface, SATA III, USB 2.0 and 3.0



#### 49-50 PCOM-C605

Mini-ITX Form Factor Evaluation Carrier Board for Type 6 Com-Express® Rev 2.1 Module



#### 43-44 PCOM-B704GT

COM Express Type 7 Basic module with Intel® Xeon® D-1700 series Processor (Ice-Lake-D LCC)



#### 45-46 PCOM-CA00

Micro-ATX Form Factor Evaluation Carrier Board for Type 10 Com-Express® Rev 3.0 Module



#### 51-52 PCOM-C615

PCOM-C615 is PICMG 1.3 Full Size Form Factor Evaluation Carrier Board for COM Express® Revision 2.0 Type VI Module. PCOM-C615 follows standard PICMG 1.3 golden finger pin definition and let customer save system total cost for easily upgrading modules



#### 47-48 PCOM-C60B

ATX Form Factor Evaluation Carrier Board for Type 6 Com-Express® Rev 3.0 Module



#### 53-54 PCOM-C701

ATX Form Factor Evaluation Carrier Board for COM Express Revision 3.0 Type VII Module with 4x 10GbE Support with Inphi CS4227 PHY

|    |   |    |   |
|----|---|----|---|
| 55 | Signal integrity is tested and assured                            | 61 | Silence is a signature of our modules                       |
| 56 | Power & energy use confirmed stable and efficient                 | 62 | The noise emission meet ISO Standards                       |
| 57 | Our modules are resistant to rapidly changing electrical currents | 63 | Breaking the module to be stronger                          |
| 58 | Our modules are compliant with EMS standards                      | 64 | Super-aging our modules to unveil weaknesses                |
| 59 | A farm of chambers for module testing                             | 65 | Undergo shipping simulation to ensure intact transportation |
| 60 | Bringing thermal validation expertise to module development       | 66 | Portwell superior service                                   |





# About Portwell

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 not only resulted in strong growth in market shares and revenue but established Portwell as a major worldwide supplier of specialty computing application platforms and services. Portwell, Inc. is an Associate member of the Intel® Partner Alliance. From modular components to market-ready systems,

Intel® and the 250+ global member companies of the Intel® Partner Alliance, provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics. Portwell, Inc. is also a member of the selected group of Intel® Applied Computing Platform Providers (IACPP), as well as Advanced Telecom Computing Architecture (ATCA) and an executive member of PCI Industrial Computer Manufacturing group (PICMG).



**Portwell Engine (PE) Building**

Portwell, Inc. has worldwide operations in the U.S.A., Taiwan, Japan, Korea, China, Netherlands, United Kingdom, Germany and India. Whether you are working on a computer board or turnkey system, Portwell is the perfect partner to help you deliver your products to the market on time as well as maintain longevity of product. With 28 years experience in the design and manufacturing 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 services to suit your needs.

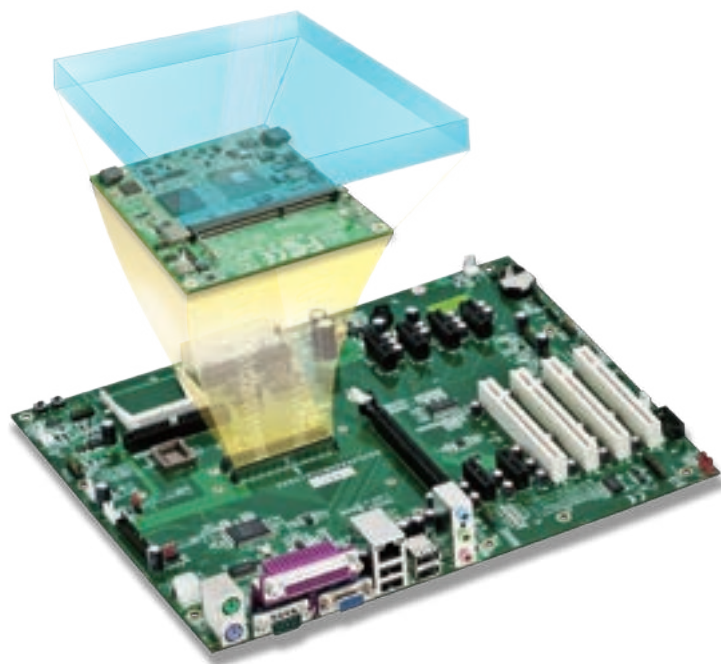
Portwell OEM and ODM solutions satisfy your needs in retail automation, medical equipment, industrial automation, infotainment, communication, and network security markets. Encouraged by our flexible business

support, manufacturing excellence, and compliance with high quality and environmental standards such as ISO 14001/13485/9001/45001/28000, OHSAS and RoHS, customers have taken advantage of our dedicated and sophisticated engineering resource 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, again, the perfect partner to help you deliver your products to the market on time and stay one step ahead of the competition.

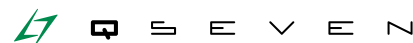


# Focus on your core competencies

## Design for Extreme Reliability Time To Market



**COM**   
**Express**

 Q S E V E N

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

 **SMARC**

### 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 — **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.

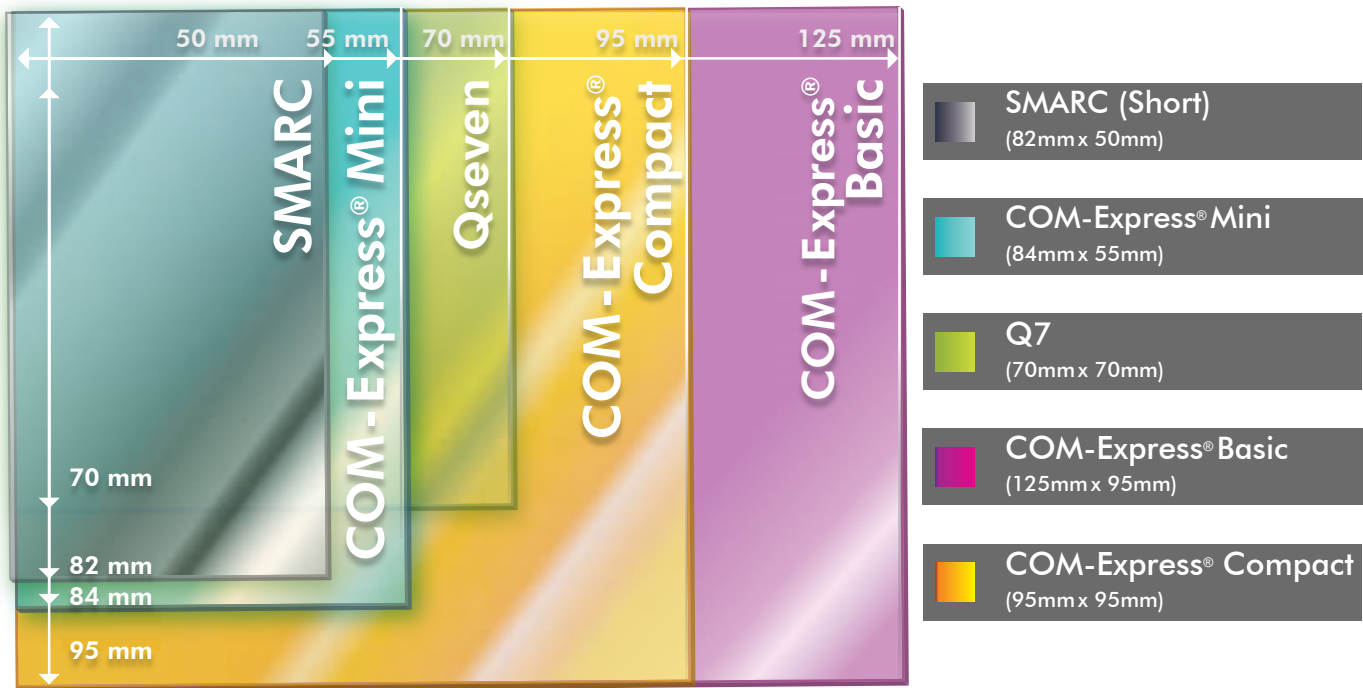
COMs are not only highly integrated component SBCs that support system expansion and application-specific customizations but also improving form, fit and function, minimizing current and future design risks. As well as providing lower product lifecycle costs through module scalability and interchangeability.

# Module



# 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.

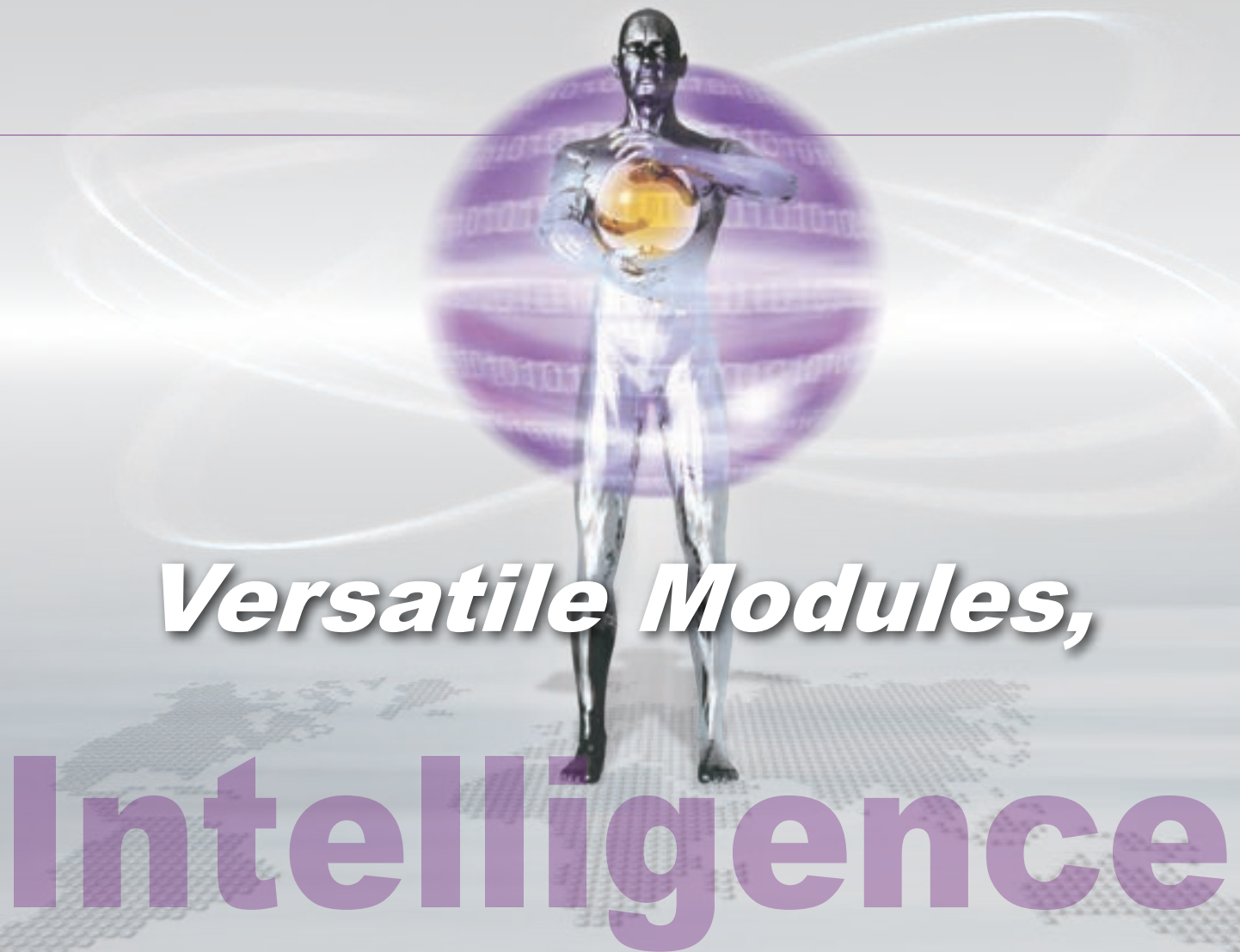
## Qseven® —

This 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.



## **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.



# PCOM Interface

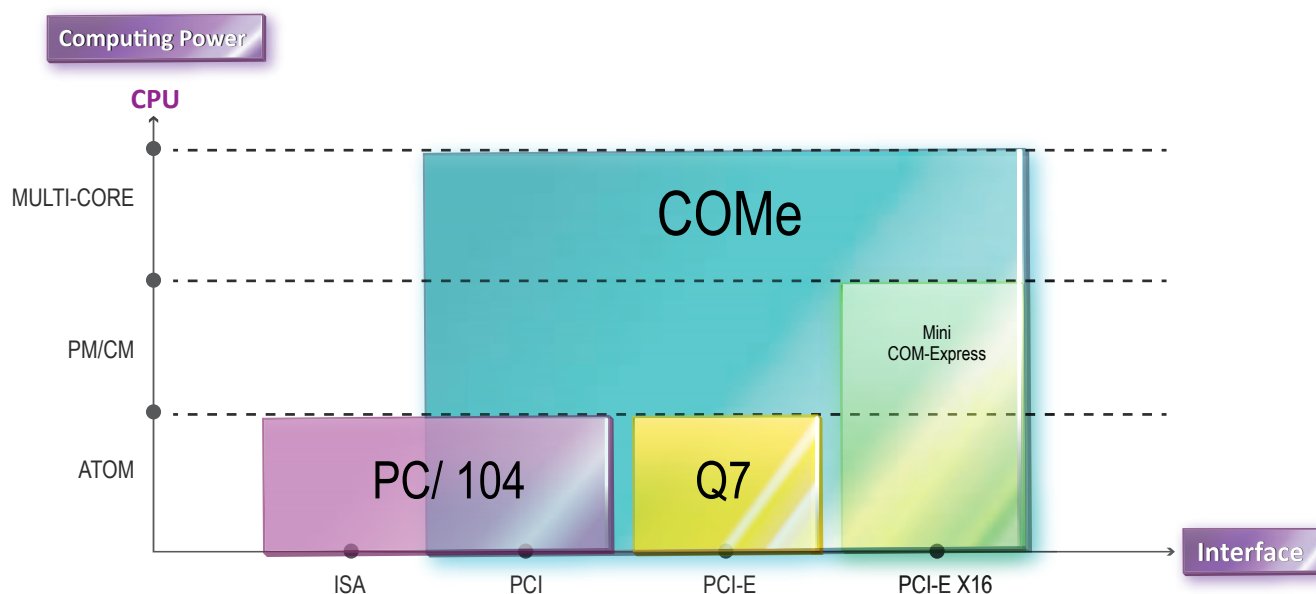
COM Express® specification adopted in July, 2005, redefined electrical, mechanical and thermal requirements for a highly integrated Computer On Module (COM) supporting rich combinations of high-speed I/O interfaces while keeping key legacy interface technologies enabling a smooth migration of interface technologies at once. The primary new technology behind COM Express® R3.0 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 |
| 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                 |
|                      |                | 7 Type 7 Pin-Out                 |
|                      |                | A Type 10 Pin-Out                |

| PCOM Series             | PCOM                           | Portwell COM Express |
|-------------------------|--------------------------------|----------------------|
| Serial Number           | X <sub>3</sub> ~X <sub>4</sub> | 0-9 TBD              |
| 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





# 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<br>LVDS/eDP<br>PEG<br>3x DDI |
| Type 7  | AB & CD        | Up to 32    | NA  | 2          | 1x GbE<br>4x 10GbE | 4             | 4             | NA                               |
| Type 10 | AB             | Up to 4     | NA  | 2          | 1x GbE             | 8             | 2             | LVDS/eDP<br>1x DDI               |

## System I/O

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

## System I/O

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

## System Management

SDIO  
GPIO  
SMBUS  
I2C  
Watchdog Timer  
Speaker Out  
Reset

## Power Management

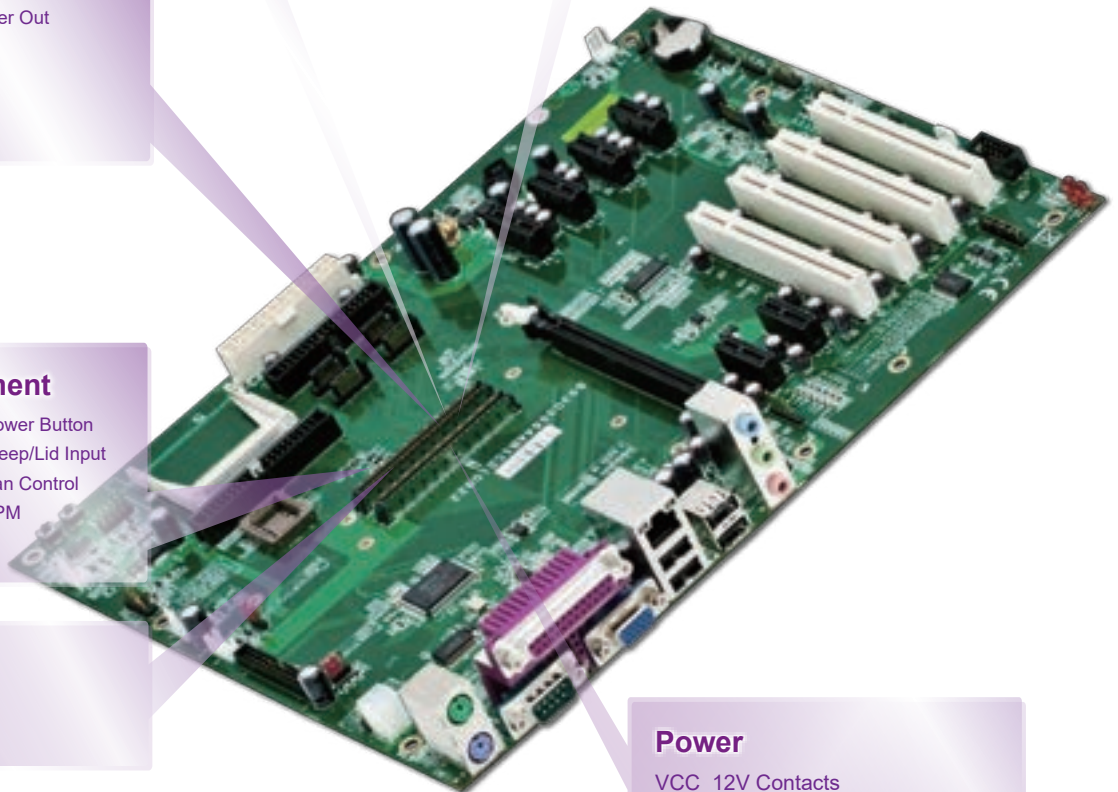
Thermal Protection  
Low Battery Alarm  
Suspend/Wake Signals  
Optimal Power  
VCC\_5V\_SBY Contacts  
Power Button  
Sleep/Lid Input  
Fan Control  
TPM

## Power

VCC\_12V Contacts

## Power

VCC\_12V Contacts



# PCOM Solution Guide



|                    | PCOM-BA00   | PCOM-BA01   | PCOM-BA02   | PCOM-B632VG  | PCOM-B638VG  | PCOM-B641VG   | PCOM-B645   |
|--------------------|---|---|---|--|--|---|---|
| Form Factor (mm)   | COM Express® Mini (84 x 55mm)   | COM Express® Mini (84 x 55mm)   | COM Express® Mini (84 x 55mm)   | 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 Type           | Type 10   | Type 10   | Type 10   | Type 6   | Type 6   | Type 6  | Type 6  |
| CPU/ Clock/ Cache  | <ul style="list-style-type: none"> <li>* Intel® E3845/ E3827/ E3825/ E3815 / E3805</li> <li>* 1.33 GHz to 1.91 GHz</li> <li>* 1MB to 2MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® E3950/ E3940/ E3930/ N4200/ N3350</li> <li>* 1.80 GHz to 2.50 GHz (Turbo)</li> <li>* 2MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel Atom® Embedded level series</li> <li>* Intel Atom® x6211E</li> <li>* Intel® Atom® x6413E</li> <li>* Intel Atom® x6425E</li> <li>* Up to 3.00 GHz turbo frequency</li> <li>* 1.5MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® E3845/ E3827/ 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® Core™ i7-7600U</li> <li>* Intel® Core™ i5-7300U</li> <li>* Intel® Core™ i3-7100U</li> <li>* Intel® Core™ i7-6600U</li> <li>* Intel® Core™ i5-6300U</li> <li>* Intel® Core™ i3-6100U</li> <li>* Intel® Celeron® Processor 3965U</li> <li>* Intel® Celeron® Processor 3955U</li> <li>* 3.00 GHz to 3.90 GHz (Turbo)</li> <li>* 2MB to 4MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® E3950/ E3940/ E3930/ N4200/ N3350</li> <li>* 1.80 GHz to 2.50 GHz (Turbo)</li> <li>* 2MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel Atom® x6000 series/ Pentium® N, J Series Processors</li> <li>* J6426</li> <li>* x6211E</li> <li>* x6413E</li> <li>* x6425E</li> <li>* x6425RE</li> <li>* Up to 4 CPU cores</li> <li>* 1.3GHz to 3.0GHz</li> <li>* 1.5MB cache</li> </ul> |
| Chipset            | SoC   | SoC   | SoC   | SoC  | SoC  | SoC   | SoC   |
| Memory             | <ul style="list-style-type: none"> <li>* DDR3L 1067/1333 MT/s</li> <li>* Non-ECC/ ECC</li> <li>* Single Channel</li> </ul>                                | <ul style="list-style-type: none"> <li>* LPDDR4 2133 MT/s</li> <li>* Non-ECC</li> <li>* Dual Channel</li> </ul>   | <ul style="list-style-type: none"> <li>* LPDDR4 3200 MT/s</li> <li>* Non-ECC/ECC</li> <li>* Dual Channel</li> <li>* Support In Band ECC</li> </ul>  | <ul style="list-style-type: none"> <li>* DDR3L 1067/1333 MT/s</li> <li>* Non-ECC</li> <li>* Single Channel</li> </ul>                              | <ul style="list-style-type: none"> <li>* DDR4 SO-DIMM up to 32GB 2133 MT/s</li> <li>* Non-ECC</li> <li>* Dual Channel</li> </ul>   | <ul style="list-style-type: none"> <li>* DDR3L 1866 MT/s</li> <li>* Non-ECC</li> <li>* Dual Channel</li> </ul>  | <ul style="list-style-type: none"> <li>* DDR4 3200 MT/s</li> <li>* In-Band ECC(selected skus)</li> <li>* Dual Channel, up to 32GB in total</li> </ul>   |
| USB                | 1x USB 3.0<br>4x USB 2.0  | 2x USB 3.0<br>8 x USB 2.0, (Option 1 x OTG)   | 2x USB 3.2 Gen2<br>8x USB 2.0   | 1x USB 3.0<br>4x USB 2.0   | 4x USB 3.0 8x USB 2.0  | 2x USB 3.0<br>8 x USB 2.0, (Option 1 x OTG)   | 2x USB 3.2 Gen2(optional up to 4x)<br>8x USB 2.0  |
| PCI Express        | 3 x PCIe 2.0 x 1<br>(Option 4 x PCIe 2.0 x1)  | 4 x PCIe 2.0 x 1  | 4x PCIe 3.0 x 1   | 3x PCIe 2.0 x1   | 4x PCIe 3.0 x 1<br>5x PCIe 3.0 x 1   | 4 x PCIe 2.0 x 1  | 6x PCIe 3.0 x1<br>(2x PCIe 3.0 x 1 can be configure to 2x USB 3.2 Gen2)   |
| Ethernet           | Intel® I210IT   | Intel® I210IT/ AT   | PHY GPY-215 supported 1.0/2.5 GbE   | Intel® I210IT  | I219LM   | Intel® I210IT   | MaxLinear GPY215  |
| Sound              | Intel® High Definition Audio  | Intel® High Definition Audio  | Intel® High Definition Audio  | Intel® High Definition Audio   | HD Audio   | Intel® High Definition Audio  | Intel® High Definition Audio  |
| Graphic Controller | Intel® HD Graphics  | <ul style="list-style-type: none"> <li>* Intel® HD Graphics 505</li> <li>* Intel® HD Graphics 500</li> </ul>  | Intel® HD Graphics  | Intel® HD Graphic  | HD Audio   | <ul style="list-style-type: none"> <li>* Intel® HD Graphics 505</li> <li>* Intel® HD Graphics 500</li> </ul>  | Intel® UHD Graphics Gen 11th  |
| Carrier Board      | PCOM-CA00 (Type 10)   | PCOM-CA00 (Type 10)   | PCOM-CA00 (Type 10)   | PCOM-C60B (Type 6)   | PCOM-C605 (Mini-ITX)<br>PCOM-C60B (ATX)  | PCOM-C60B (Type 6)  | PCOM-C60B (Type 6)  |



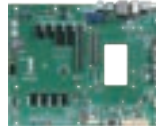


# PCOM Solution Guide



|                    | PCOM-B653VGL  | PCOM-B654GL  | PCOM-B655VGL   | PCOM-B656VGL  | PCOM-B657VGL  | PCOM-B700G-NS   | PCOM-B701GT  |
|--------------------|---|--|--|---|---|---|--|
| Form Factor (mm)   | COM Express® Compact (95 x 95mm)  | 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® Basic (125 x 95mm)   | COM Express® Basic (125 x 95mm)  |
| COM Type           | Type 6  | Type 6   | Type 6   | Type 6  | Type 6  | Type 7  | Type 7   |
| CPU/ Clock/ Cache  | <ul style="list-style-type: none"> <li>* Intel® 8<sup>th</sup> Generation Core™ ULT i7-8665UE i5-8365UE i3-8145UE Celeron® 4305UE</li> <li>* Up to 4 CPU cores</li> <li>* 2MB to 8MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® 8<sup>th</sup> Generation Core™ 35W Desktop processor i7-8700T i5-8500T i3-8100T</li> <li>* Celeron® G4900T</li> <li>* Up to 6 CPU cores</li> <li>* 2MB to 12MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® 10<sup>th</sup> Generation Core™ 35W Desktop processor i9-10900TE i7-10700TE i5-10500TE i3-10100TE</li> <li>* Up to 10 CPU cores</li> <li>* 6MB to 20MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® 11<sup>th</sup> Generation Core™ i7-1185GRE/ i7- 1185G7E i5-1145GRE/ i5-1145G7E i3-1115GRE/ i3-1115G4E</li> <li>* Celeron® 6305E</li> <li>* Up to 4 CPU cores</li> <li>* 4MB to 12MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* 11<sup>th</sup> Generation Intel® Core™ i7 Processors</li> <li>* Core™ i7-11850HE</li> <li>* Core™ i5-11500HE</li> <li>* Core™ i3- 11100HE</li> <li>* Celeron® 6600HE</li> <li>* Xeon® W-11865MRE</li> <li>* Xeon® W-11555MRE</li> <li>* Xeon® W-11155MRE</li> <li>* Xeon® W-11865MLE</li> <li>* Xeon® W-11555MLE</li> <li>* Xeon® W-11155MLE</li> <li>* Up to 8 CPU cores</li> <li>* 8MB to 24MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel® Xeon® D-1600 Series Processor D-1649N D-1633N D-1623N D-1627</li> <li>* Up to 8 CPU cores</li> <li>* 6MB to 12MB cache</li> </ul> | <ul style="list-style-type: none"> <li>* Intel Atom® Processor C3308 C3508 C3538 C3708 C3758 C3808</li> <li>* Up to 12 CPU cores</li> <li>* 4MB to 16MB cache</li> </ul> |
| Chipset            | SoC   | Q370/C246  | Q470E/W480E  | SoC   | QM580E/RM590E   | SoC   | SoC  |
| Memory             | <ul style="list-style-type: none"> <li>* DDR4 2400MT/s</li> <li>* Non-ECC</li> <li>* Dual Channel</li> </ul>  | <ul style="list-style-type: none"> <li>* DDR4 2400MT/s</li> <li>* Non-ECC/ECC</li> <li>* Dual Channel</li> </ul>   | <ul style="list-style-type: none"> <li>* DDR4 2933MT/s</li> <li>* Non-ECC/ECC</li> <li>* Dual Channel</li> </ul>   | <ul style="list-style-type: none"> <li>* DDR4 3200 MT/s</li> <li>* Non-ECC</li> <li>* Dual Channel</li> </ul>   | <ul style="list-style-type: none"> <li>* DDR4 3200MT/s</li> <li>* Non-ECC/ECC</li> <li>* Dual Channel</li> </ul>  | <ul style="list-style-type: none"> <li>* DDR4 2400MT/s</li> <li>* Non-ECC/ECC</li> <li>* Dual Channel</li> </ul>  | <ul style="list-style-type: none"> <li>* DDR4 1866/2133/2400 MT/s</li> <li>* Non-ECC/ECC</li> <li>* Single/Dual Channel</li> </ul>                                       |
| USB                | 4x USB 3.1 Gen2 8x USB 2.0  | 4x USB 3.2 Gen2 8x USB 2.0   | 4x USB 3.2 Gen2 8x USB 2.0   | 4x USB 3.1 Gen2 8x USB 2.0  | 4x USB 3.2 Gen2 8x USB 2.0  | 4 x USB 3.2 Gen1/ USB 2.0   | 4x USB 3.0 4x USB 2.0  |
| PCI Express        | 1x PCIe 3.0 x4 (PEG)<br>1x PCIe 3.0 x4<br>1x PCIe 3.0 x1<br>1x PCIe 3.0 x1(optional)  | 1x PCIe 3.0 x16<br>8x PCIe 3.0 x1  | 1x PCIe 3.0 x16<br>8x PCIe 3.0 x1  | 1x PCIe Gen3 x4<br>2x PCIe Gen3 x2  | 1x PCIe 4.0 x16<br>8x PCIe 3.0 x1   | 8x PCIe 2.0<br>24x PCIe 3.0   | Up to 1x PCIe Gen3 x8<br>3x PCIe Gen3 x2<br>3x PCIe Gen3 x1<br>3x PCIe Gen2 x1   |
| Ethernet           | Intel® I219LM   | Intel® I219LM  | Intel® I219LM  | Intel® I210IT   | Intel® I225LM/IT  | Intel® I210AT/IT Up to 4x KR (10GbE)  | Intel® I210IT Up to 4x KR (10GbE)  |
| Sound              | Intel® High Definition Audio  | Intel® High Definition Audio   | Intel® High Definition Audio   | Intel® High Definition Audio  | Intel® High Definition Audio  | N/A   | N/A  |
| Graphic Controller | <ul style="list-style-type: none"> <li>* Intel® UHD Graphics 620</li> <li>* Intel® UHD Graphics 610</li> </ul>  | <ul style="list-style-type: none"> <li>* Intel® UHD Graphics 630</li> <li>* Intel® UHD Graphics 610</li> </ul>   | <ul style="list-style-type: none"> <li>* Intel® UHD Graphics 630</li> </ul>  | <ul style="list-style-type: none"> <li>* Intel® Iris® Xe Graphics</li> <li>* Intel® UHD Graphics</li> </ul>   | Intel® UHD Graphics for 11 <sup>th</sup> Gen Intel® Processors  | N/A   | N/A  |
| Carrier Board      | PCOM-C60B (Type 6)  | PCOM-C60B (Type 6)   | PCOM-C60B (Type 6)   | PCOM-C60B (Type 6)  | PCOM-C60B (Type 6)  | PCOM-C701 PCOM-C701-BMC (Type 7)  | PCOM-C701 PCOM-C701-BMC (Type 7)   |

# PCOM Solution Guide



| PCOM-B702G  | PCOM-B704GT  | PCOM-CA00                            | PCOM-C60B                     | PCOM-C605  | PCOM-C615   | PCOM-C701  |
|---|--|--------------------------------------|-------------------------------|--|---|--|
| COM Express® Compact<br>(95 x 95mm)   | COM Express® Basic<br>(125 x 95mm)   | Micro-ATX<br>(244 x 244 mm)          | ATX<br>(305 x 244mm)          | Mini-ITX<br>(170 x 170mm)                          | PICMG 1.3<br>(338.5 x 126.39mm)                                     | ATX<br>(305 x 244mm)                                   |
| Type 7  | Type 7   | Type 10                              | Type 6                        | Type 6   | Type 6  | Type 7   |
| * Intel Atom® Processors<br>C3308<br>C3338<br>C3508<br>C3558<br>* Up to 4 CPU cores<br>* 4MB to 8MB cache | * Intel® Xeon® D-1700 Series Processor<br>D-1746TER<br>D-1735TR<br>D-1732TE<br>D-1715TER<br>D-1712TR<br>* Up to 10 CPU cores<br>* 10MB to 15MB cache | Depends on Module                    | Depends on Module             | Depends on Module                                  | Depends on Module   | Depends on Module                                      |
| SoC   | N/A  | Depends on Module                    | N/A                           | N/A  | N/A   | N/A  |
| * DDR4 1866/2133 MT/s<br>* Non-ECC/ECC<br>* Single/Dual Channel   | * DDR4 2933MT/s<br>* Non-ECC/ECC<br>* Dual Channel   | Depends on Module                    | Depends on Module             | Depends on Module                                  | Depends on Module   | Depends on Module                                      |
| 2x USB 3.0<br>4x USB 2.0  | 4 x USB 3.2 Gen1<br>USB 2.0  | 2x USB 3.0 ports<br>8x USB 2.0 ports | 4x USB 3.1 Gen2<br>8x USB 2.0 | 4x USB 3.0<br>4x USB 2.0                           | 2 x USB3.1 Gen2<br>2 x USB3.1 Gen1<br>4 x USB2.0(through backplane) | 4x USB 3.0<br>4x USB 2.0                               |
| Up to<br>1x PCIe Gen3 x4<br>4x PCIe Gen3 x1   | 16x PCIe 3.0<br>16x PCIe 4.0   | 4x PCIe 3.0 x 1                      | 1x PCIe x16<br>8x PCIe x1     | 1 x PCIe x 16 (Gen3)<br>2 x PCIe x 1 Golden Finger | 1x PCIe x16<br>4x PCIe x1   | 1x PCIe Gen3 x16<br>3x PCIe Gen3 x4<br>4x PCIe Gen3 x1 |
| Intel® I210IT<br>Up to 4x KR (10GbE)  | Intel® I210IT<br>Up to 4x KR (10GbE)   | 1x LAN port supported 1.0/2.5 GbE    | 1x GbE                        | 2 x GbE  | 2x GbE  | Inphi CS4227<br>1x GbE, 4x 10GbE SFP+                  |
| N/A   | N/A  | N/A                                  | N/A                           | N/A  | N/A   | N/A  |
| N/A   | N/A  | N/A                                  | N/A                           | N/A  | N/A   | N/A  |
| PCOM-C701<br>PCOM-C701-BMC (Type 7)   | PCOM-C701<br>PCOM-C701-BMC (Type 7)  | N/A                                  | N/A                           | N/A  | N/A   | N/A  |



## FEATURES

- Intel Atom® Processor E3800 Series (Bay Trail)
- On Board DD3L SDRAM up to 4GB, On Board SSD up to 64GB
- Low Power Consumption (3 to 10W)
- Supports Wide Operating Temperature and Wide Voltage
- Support VGA, LVDS, DP, eDP and USB 3.0



PCOM-BA00, a Type 10 Mini COM Express® (84 x 55 mm) module which based on Intel® Bay Trail Atom® E3800 series SoC. In this architecture, it could provide VGA, LVDS, eDP and DP multiple displays, and expandability I/O interfaces, including 3 x PCIe 2.0 x 1, 1 x USB 3.0, 4 x USB 2.0, 2 serial ports and 2 x SATA II devices. With ultra low power consumption(3 to 10W), wide-temp support, it could provide very energy saving and high effective performance. Portwell want to promotes PCOM-BA00 as vertical solution to aim in the different versatile applications.

## General

|                                |  |          |          |          |          |
|--------------------------------|--|----------|----------|----------|----------|
| Product                        | PCOM-BA00  |          |          |          |          |
| Form Factor                    | Type 10, Mini Form Factor COM-Express® ( 84 x 55 mm)                         |          |          |          |          |
| Processor                      | Intel®   |          |          |          |          |
|                                | E3845  | E3827    | E3825    | E3815    | E3805    |
| Core                           | 4  | 2        | 2        | 1        | 2        |
| Freq.                          | 1.91 GHz   | 1.75 GHz | 1.33 GHz | 1.46 GHz | 1.33 GHz |
| Turbo                          | N/A  |          |          |          |          |
| Cache                          | 2MB  | 1MB      | 1MB      | 512KB    | 1MB      |
| Processor Graphics             | Intel® HD Graphics for Intel Atom® Processor Z3700 Series, not Include E3805 |          |          |          | N/A      |
| Graphics Base Frequency        | 542 MHz  | 542 MHz  | 533 MHz  | 400 MHz  | 533 MHz  |
| Graphics Max Dynamic Frequency | 792 MHz  | 792 MHz  | 533 MHz  | 400 MHz  | 533 MHz  |
| HW Encoding                    | H.264 and MPEG2  |          |          |          |          |
| HW Decoding                    | H.264, MPEG2, MVC, VC-1, WMV9, JPEG/MKPEG, VP8                               |          |          |          |          |
| HW Acceleration                | Gen7LP, DirectX 11, OpenGL 3.2, OpenCL 1.2, OGL ES Haili/2.0/1.1             |          |          |          |          |
| Processor TDP                  | 10W  | 8W       | 6W       | 5W       | 3W       |
| BIOS                           | AMI BIOS   |          |          |          |          |
| ECC Memory Supported           | YES  |          |          |          |          |
| Memory                         | On board DDR3L SDRAM up to 4GB 1333 MT/s                                     |          |          |          |          |

## I/O Interface

| I/O Interface |  |                           |                         |
|---------------|--|---------------------------|-------------------------|
| SATA          | 2x SATA II                                   |                           |                         |
| USB           | 1 x USB 3.0<br>4 x USB 2.0                   |                           |                         |
| Ethernet      | Intel® Ethernet Controller I210T             |                           |                         |
| Serial I/O    | GPIO   | 8 GPIO                    |                         |
|               | I²C  | Baud Rate: 400KHz         |                         |
|               | SMBus  | Baud Rate: 100KHz         |                         |
|               | UART   | 2 Serial Port (Tx/Rx)     |                         |
| PEG           | N/A  |                           |                         |
| PCI Express   | 3 x PCIe 2.0 x 1<br>(Option 4 x PCIe 2.0 x1) |                           |                         |
| Display       | Default                                      | Options                   | Resolution              |
|               | DP   | DP                        | up to 2560x 1600 @ 60Hz |
|               |  | VGA                       | up to 2560x 1600 @ 60Hz |
|               |  | HDMI                      | up to 1920x 1080 @ 60Hz |
|               | eDP  | eDP                       | up to 2560x 1600 @ 60Hz |
|               |  | LVDS(24bit, dual channel) | up to 1920x 1200 @ 60Hz |
| Security      | Intel® AES                                   |                           |                         |



## MECHANICAL & ENVIRONMENT

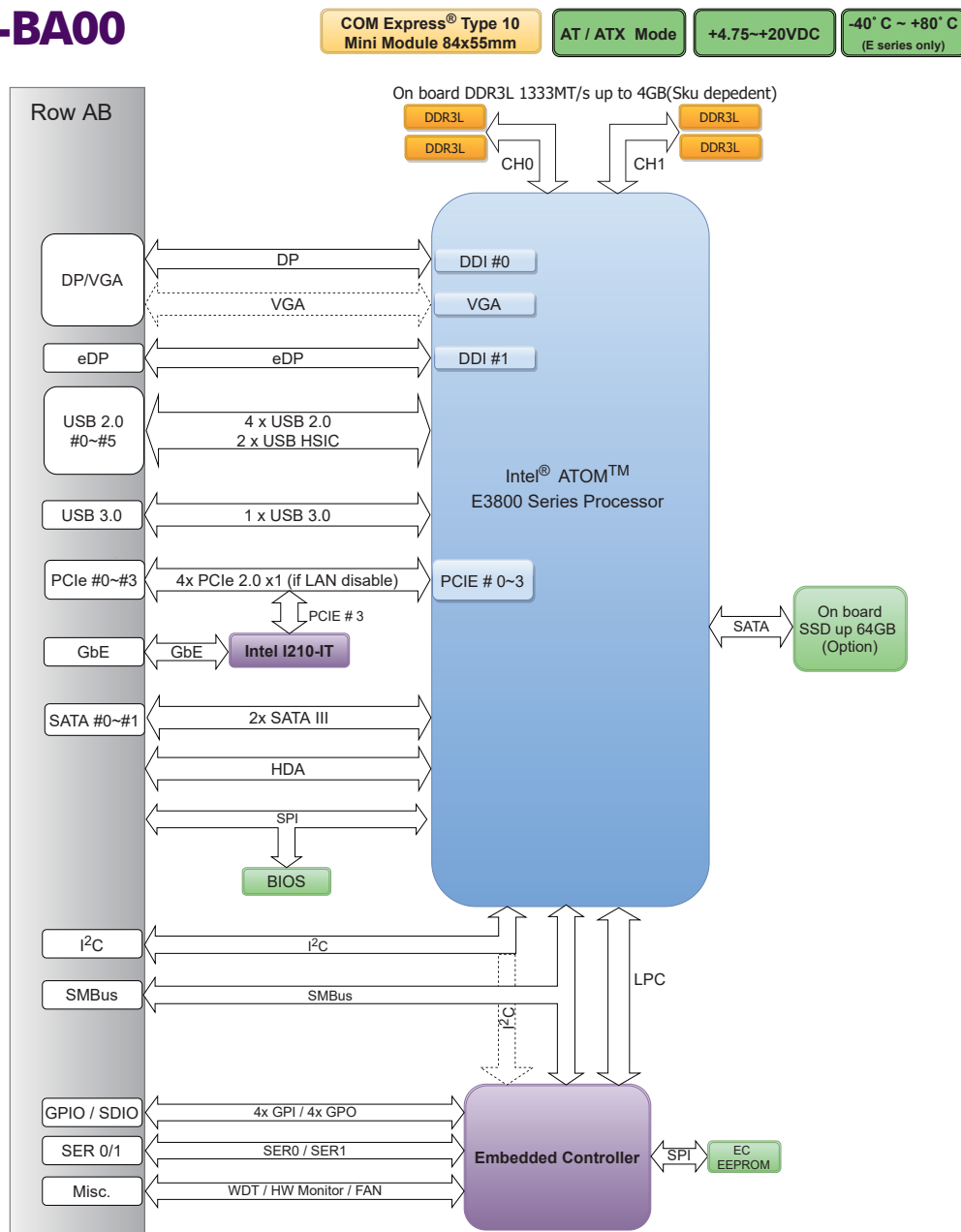
|                       |  |
|-----------------------|--|
| Dimension             | 84 x 55 mm   |
| Power DC IN           | +4.75VDC to +20VDC, AT/ATX Mode  |
| Storage Temperature   | -40°C to 80°C  |
| Operation Temperature | -40°C to 80°C  |
| Certification         | Contact us   |
| MTBF                  | Over 120,000 hours at 40°C   |
| Vibration             | Contact us   |
| OS                    | Windows 7, WEST/8, Embedded Compact7<br>Linux Fedora/Tizen/Yocto<br>RTOS Windriver |

## ORDERING GUIDE

| Product                           | Ordering P/N | Status    |
|-----------------------------------|--------------|-----------|
| PCOM-BA00-E3845-2G                | AB1-3B51     | Available |
| PCOM-BA00-E3827-2G                | AB1-3B50     | Available |
| PCOM-BA00-E3825-2G                | AB1-3B47     | Available |
| PCOM-BA00-E3815-2G                | AB1-3B49     | Available |
| PCOM-BA00-E3805-2G                | AB1-3C19     | Available |
| PCOM-BA00-E3845-4G                | AB1-3B48     | Available |
| Accessory                         | Ordering P/N | Status    |
| Heat Spreader                     | B8306940     | Available |
| PCOM-CA00<br>(uATX Carrier Board) | AB1-3917     | Available |

## BLOCK DIAGRAM

### PCOM-BA00



# PCOM-BA01

Intel Atom® E3900 series SoC based on Type 10 Mini COM-Express® module with LPDDR4 SDRAM, NANDrive and USB 3.0



## FEATURES

- Intel Atom® Processor E3900 Series (Apollo Lake)
- On Board LPDDR4 SDRAM up to 8GB, On Board eMMC up to 64GB
- Low Power Consumption (6 to 12W)
- Supports Wide Operating Temperature and Wide Voltage
- Support LVDS, eDP, DP, HDMI and Turbo mode up to 2.5GHz



PCOM-BA01, a Type 10 Mini COM Express® (84 x 55 mm) module which based on Intel® Apollo Lake Atom® E3900 series SoC. In this architecture, it could provide VGA, LVDS, and high quantity HDMI, eDP, DP with 4K resolution. And it also provide turbo mode up to 2.5GHz, with extending 4 x PCIe 2.0 x 1, 2 x USB 3.0, 8 x USB 2.0, and 2 x SATA III devices. With ultra low power consumption(6 to 12W), wide-temp support, it could provide very energy saving and high effective performance. Portwell want to promotes PCOM-BA01 as vertical solution to aim in the different versatile applications.

## General

|                                |  |                        |                        |                        |                        |
|--------------------------------|--|------------------------|------------------------|------------------------|------------------------|
| Product                        | PCOM-BA01  |                        |                        |                        |                        |
| Form Factor                    | Type 10, Mini Form Factor COM-Express® ( 84 x 55 mm)             |                        |                        |                        |                        |
| Processor                      | Intel® Atom®   |                        |                        | Intel® Pentium®        | Intel® Celeron®        |
|                                | E3950  | E3940                  | E3930                  | N4200                  | N3350                  |
| Core                           | 4  | 4                      | 2                      | 4                      | 2                      |
| Freq.                          | 1.60 GHz   | 1.60 GHz               | 1.30 GHz               | 1.10 GHz               | 1.10 GHz               |
| Turbo                          | 2.00 GHz   | 1.80 GHz               | 1.80 GHz               | 2.50 GHz               | 2.40 GHz               |
| Cache                          | 2MB  | 2MB                    | 2MB                    | 2MB                    | 2MB                    |
| Processor Graphics             | Intel® HD Graphics 505   | Intel® HD Graphics 505 | Intel® HD Graphics 500 | Intel® HD Graphics 505 | Intel® HD Graphics 500 |
| Graphics Base Frequency        | 500 MHz  | 400 MHz                | 400 MHz                | 200 MHz                | 200 MHz                |
| Graphics Max Dynamic Frequency | 650 MHz  | 600 MHz                | 550 MHz                | 750 MHz                | 650 MHz                |
| HW Encoding                    | HEVC/H.265, H.264, MVC, VPS, VP9, JPEG/MJPEG                     |                        |                        |                        |                        |
| HW Decoding                    | HEVC/H.265, H.264, MVC, VPS, MPEG2, VC-1, WMV9, JPEG/MJPEG       |                        |                        |                        |                        |
| HW Acceleration                | Gen9LP, DirectX 12, OpenGL 4.3, OpenCL 1.2, PAVP 2.0, OGL ES 3.0 |                        |                        |                        |                        |
| Processor TDP                  | 12W  | 9.5W                   | 6.5W                   | 6W                     | 6W                     |
| BIOS                           | AMI BIOS   |                        |                        |                        |                        |
| ECC Memory Supported           | No   |                        |                        |                        |                        |
| Memory                         | On board LPDDR4 SDRAM up to 8GB 2133 MT/s                        |                        |                        |                        |                        |

## I/O Interface

|             |  |                           |                         |
|-------------|--|---------------------------|-------------------------|
| SATA        | 2 x SATA III                                 |                           |                         |
| USB         | 2 x USB 3.0<br>8 x USB 2.0, (Option 1 x OTG) |                           |                         |
| Ethernet    | Intel® Ethernet Controller I210T             |                           |                         |
| Serial I/O  | GPIO   |                           | 8 GPIO                  |
|             | I²C  |                           | Baud Rate: 400KHz       |
|             | SMBus  |                           | Baud Rate: 100KHz       |
|             | UART   |                           | 2 Serial Port (Tx/Rx)   |
| PEG         | N/A  |                           |                         |
| PCI Express | 4 x PCIe 2.0 x 1, or 1 x PCIe 2.0 x 4        |                           |                         |
| Display     | Default                                      | Options                   | Resolution              |
|             | DP   | DP                        | up to 4096x 2160 @ 60Hz |
|             |  | HDMI                      | up to 3840x 2160 @ 30Hz |
|             | eDP  | LVDS(24bit, dual channel) | up to 1920x 1200 @ 60Hz |
|             |  | eDP                       | up to 4096x 2160 @ 60Hz |
| Security    | Intel® AES                                   |                           |                         |

## MECHANICAL & ENVIRONMENT

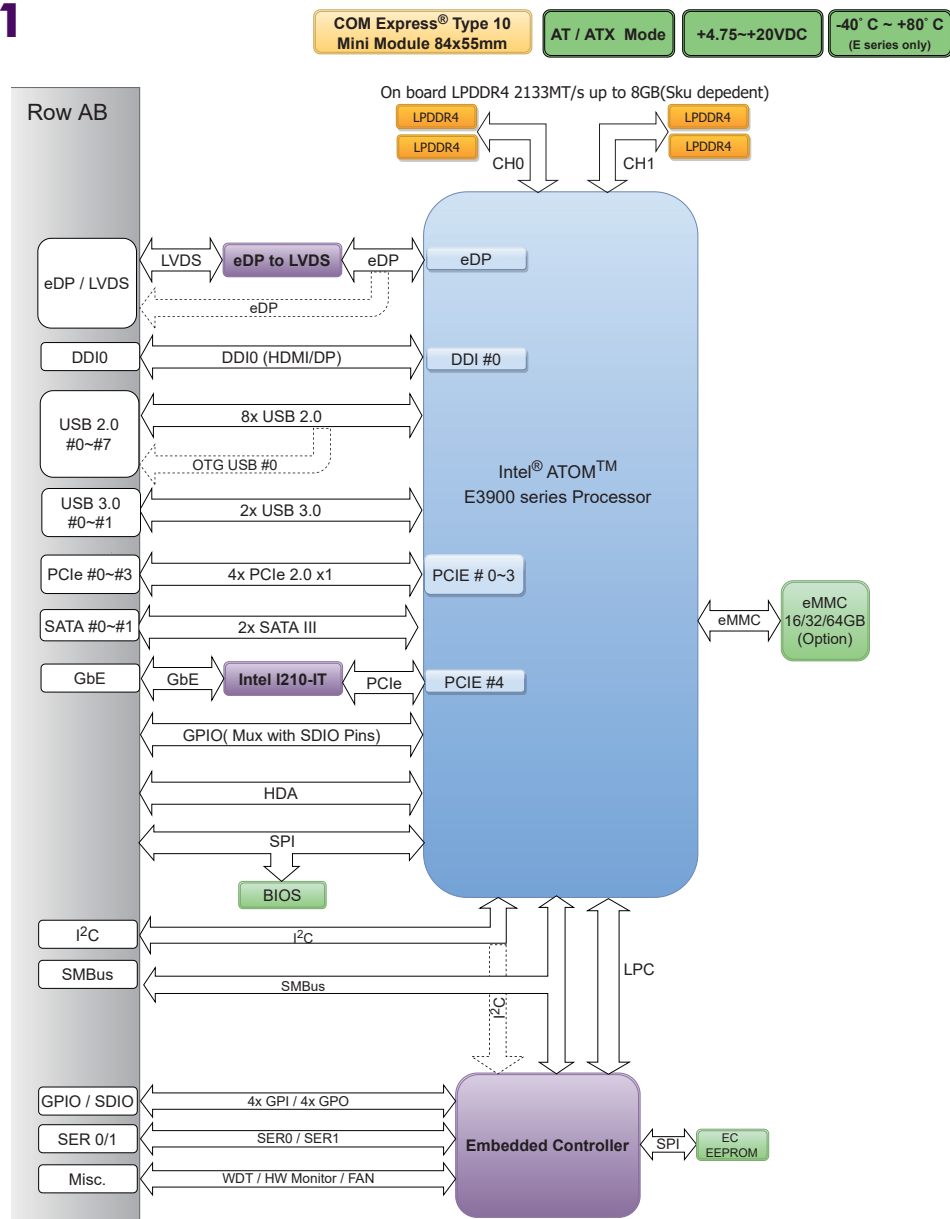
|                       |  |
|-----------------------|--|
| Dimension             | 84 x 55 mm   |
| Power DC IN           | +4.75VDC to +20VDC, AT/ATX Mode                                    |
| Storage Temperature   | -40°C to 80°C  |
| Operation Temperature | -40°C to 80°C  |
| Certification         | Contact us   |
| MTBF                  | Over 120,000 hours at 40°C   |
| Vibration             | Contact us   |
| OS                    | Windows 7/10, WES7/8<br>Linux Fedora/Tizen/Yocto<br>RTOS Windriver |

## ORDERING GUIDE

| Product                           | Ordering P/N | Status    |
|-----------------------------------|--------------|-----------|
| PCOM-BA01-E3950-4G                | AB1-3G73     | Available |
| PCOM-BA01-E3940-4G                | AB1-3G74     | Available |
| PCOM-BA01-E3930-4G                | AB1-3H32     | Available |
| PCOM-BA01-N4200-4G                | AB1-3H13     | Available |
| PCOM-BA01-N3350-4G                | AB1-3K20     | Available |
| PCOM-BA01-E3950-8G                | AB1-3F36     | Available |
| PCOM-BA01-E3940-8G                | AB1-3K21     | Available |
| PCOM-BA01-E3930-8G                | AB1-3G27     | Available |
| PCOM-BA01-N4200-8G                | AB1-3H91     | Available |
| PCOM-BA01-N3350-8G                | AB1-3K22     | Available |
| Accessory                         | Ordering P/N | Status    |
| Heat Sink (E-sku)                 | B8309590     | Available |
| Heat Sink (N-sku)                 | B8309960     | Available |
| PCOM-CA00<br>(uATX Carrier Board) | AB1-3917     | Available |

## BLOCK DIAGRAM

### PCOM-BA01





# PCOM-BA02GL

Intel Atom® x6000 series SoC based on Type 10 mini COM-Express® module with LPDDR4 SDRAM



## FEATURES

- Intel Atom® Processor x6000 Series (Elkhart Lake)
- On board LPDDR4 SDRAM up to 8GB  
On board eMMC up to 64GB
- Low Power Consumption (6W to 12W), 4K Resolution
- Support wide temperature -40°C ~ 85°C (Selected SKU)
- Support Intel® TCC/TSN with 2.5GbE



PCOM-BA02GL, a Type 10 Mini COM Express® (84 x 55 mm) module which based on Intel® Elkhart Lake Atom® x6000 and Pentium® N and J Series Processors. In this architecture, it could provide LVDS, and high quantity HDMI, eDP, DP with 4K resolution. And it also provides turbo mode up to 3.0GHz, with extending 4x PCIe 3.0 x1, 2x USB 3.2 Gen2, 8x USB 2.0, and 2x SATA III devices. With ultra low power consumption(6W to 12W), wide-temp support, it could provide very energy saving and high effective performance. Portwell want to promotes PCOM-BA02GL as vertical solution to aim in the different versatile applications, such as automation, military, hospitality, transportation and so on.

## General

|                                |  |                |               |               |               |               |
|--------------------------------|--|----------------|---------------|---------------|---------------|---------------|
| Product                        | PCOM-BA02GL  |                |               |               |               |               |
| Form Factor                    | Type 10, Mini Form Factor COM-Express® ( 84 x 55 mm)           |                |               |               |               |               |
| Processor                      | Intel® Pentium   | Intel® Celeron | Intel® Atom   |               |               |               |
|                                | J6426  | N6211          | x6211E        | x6413E        | x6425E        | x6425RE       |
| Core                           | 4  | 2              | 2             | 4             | 4             | 4             |
| Freq.                          | 2.0 GHz  | 1.2 GHz        | 1.3 GHz       | 1.5 GHz       | 2.0 GHz       | 1.9 GHz       |
| Turbo                          | 3.0 GHz  | 3.0 GHz        | 3.0 GHz       | 3.0 GHz       | 3.0 GHz       | N/A           |
| Cache                          | 1.5MB  | 1.5MB          | 1.5MB         | 1.5MB         | 1.5MB         | 1.5MB         |
| Processor Graphics             | Intel® UHD Graphics for 10 <sup>th</sup> Gen Intel® Processors |                |               |               |               |               |
| Graphics Base Frequency        | 400 MHz  | 250 MHz        | 350 MHz       | 500 MHz       | 500 MHz       | 400 MHz       |
| Graphics Max Dynamic Frequency | 850 MHz  | 750 MHz        | 750 MHz       | 750 MHz       | 750 MHz       | N/A           |
| HW Encoding                    | H.264, H.265/HEVC, VP9, JPEG/MPEG                              |                |               |               |               |               |
| HW Decoding                    | H.264, MPEG2, V1-1/WMV9, H.265/HEVC, VP8/9, JPEG/MPEG          |                |               |               |               |               |
| HW Acceleration                | Gen 11 LP, DirectX 12, OpenGL4.5, OpenGL ES 3.2, Vulkan        |                |               |               |               |               |
| Processor TDP                  | 10W  | 6.5W           | 6W            | 9W            | 12W           | 12W           |
| BIOS                           | AMI BIOS   |                |               |               |               |               |
| In-Band ECC                    | N/A  | N/A            | Yes           | Yes           | Yes           | Yes           |
| Memory (on board LPDDR4)       | 8GB 3200 MT/s  | 4GB 3200 MT/s  | 4GB 3200 MT/s | 8GB 3200 MT/s | 8GB 3200 MT/s | 8GB 4267 MT/s |
| Storage (on board eMMC)        | 32GB   | 16GB           | 16GB          | 16GB          | 32GB          | 16GB          |
| Temperature Range              | 0 ~ 60 °C  | 0 ~ 60 °C      | -40 ~ 85 °C   | -40 ~ 85 °C   | -40 ~ 85 °C   | -40 ~ 85 °C   |

## I/O Interface

|             |   |                           |                         |
|-------------|---|---------------------------|-------------------------|
| SATA        | 2 x SATA III  |                           |                         |
| USB         | 2 x USB 3.2 Gen2/2.0 + 6 x USB 2.0                            |                           |                         |
| Ethernet    | 2.5 GbE with GPHY215 (x6425RE SKU additional support TSN/TCC) |                           |                         |
| Serial I/O  | GPIO  |                           | 8 GPIO                  |
|             | I <sup>2</sup> C  |                           | Baud Rate: 400KHz       |
|             | SMBus   |                           | Baud Rate: 100KHz       |
|             | UART  |                           | 2 Serial Port (Tx/Rx)   |
| PEG         | N/A   |                           |                         |
| PCI Express | 4 x PCIe 3.0 x 1  |                           |                         |
| Display     | Default   | Options                   | Resolution              |
|             | DDI   | DP                        | up to 4096x 2160 @ 60Hz |
|             |   | HDMI                      | up to 4096x 2160 @ 60Hz |
|             | LVDS  | LVDS(24bit, dual channel) | up to 2560x 1600 @ 60Hz |
|             |   | eDP                       | up to 4096x 2160 @ 60Hz |
| Security    | TPM 2.0, Intel®AES  |                           |                         |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 84 x 55 mm                                  |
| Power DC IN           | 4.75V to 20V, AT/ATX Mode                   |
| Storage Temperature   | -40°C to 85°C                               |
| Operation Temperature | 0°C to 60°C<br>-40°C to 85°C (Selected SKU) |
| Certification         | TBD   |
| MTBF                  | TBD   |
| Vibration             | TBD   |
| OS                    | Win 10 IoT Enterprise<br>Ubuntu , Yocto     |

## ORDERING GUIDE

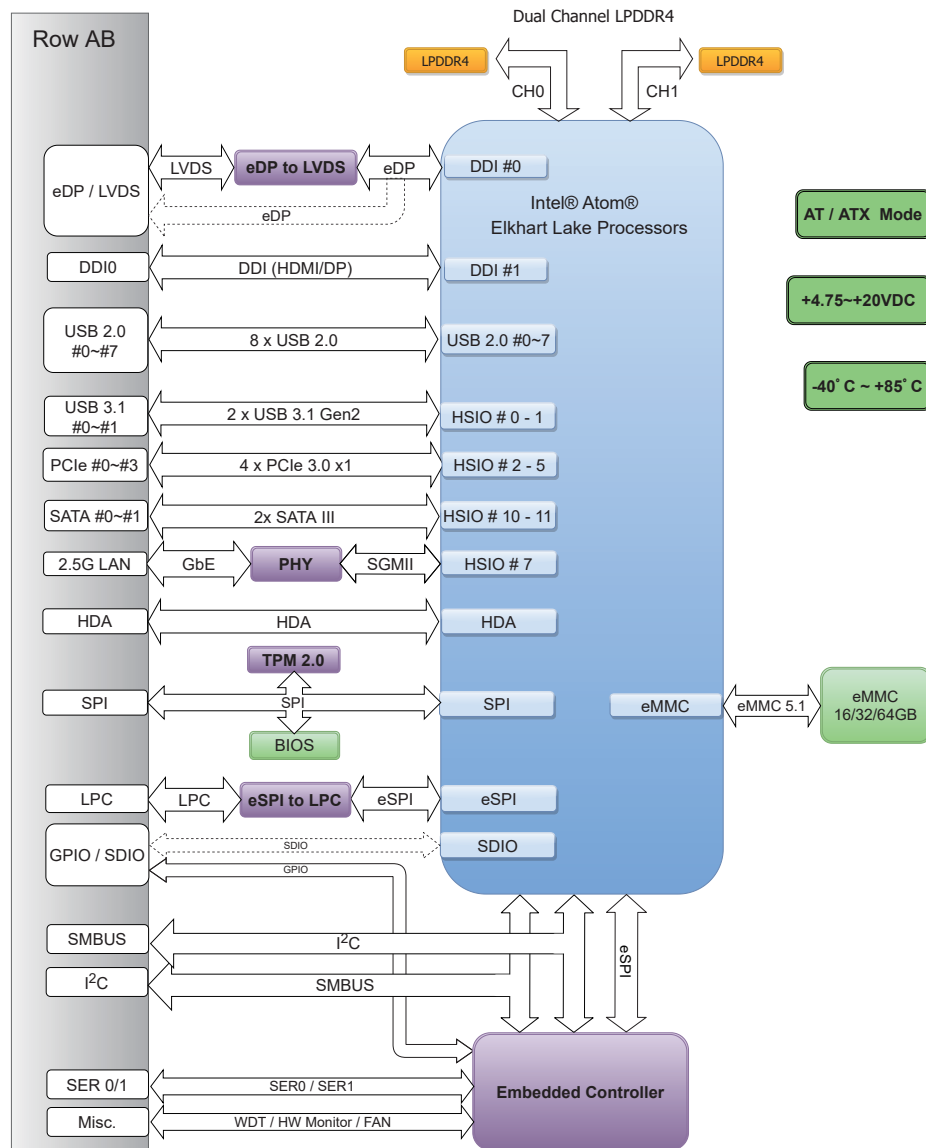
| Product                    | Ordering P/N | Status     |
|----------------------------|--------------|------------|
| PCOM-BA02GL-J6426-8G-32G   | AB1-3L78     | Contact us |
| PCOM-BA02GL-N6211-4G-16G   | AB1-3L77     | Contact us |
| PCOM-BA02GL-x6211E-4G-16G  | AB1-3L79     | Contact us |
| PCOM-BA02GL-x6413E-8G-16G  | AB1-3L76     | Contact us |
| PCOM-BA02GL-x6425E-8G-32G  | AB1-3K47     | Contact us |
| PCOM-BA02GL-x6425RE-8G-16G | AB1-3L75     | Contact us |

| Accessory                          | Ordering P/N | Status    |
|------------------------------------|--------------|-----------|
| Heatsink (Atom)                    | B830B480     | Available |
| Heatsink (Pentium/Celeron)         | B830B490     | Available |
| Heatspreader (Atom)                | B830B500     | Available |
| Heatspreader (Pentium/Celeron)     | B830B510     | Available |
| PCOM-CA00(Micro-ATX Carrier board) | AB1-3917     | Available |

## BLOCK DIAGRAM

### PCOM-BA02GL

COM Express® Type 10  
Mini Module 84x55mm



# PCOM-B632VG

Intel Atom® Bay Trail series SoC based on Type 6 COM Express® module with DDR3L 1x SO-DIMM Socket



## FEATURES

- Intel Atom® Bay Trail E3800 series processors
- DDR3L SO-DIMM up to 4GB 1333 MT/s
- Multiple Displays VGA, eDP, DP, HDMI
- Support Industrial temperature -40 °C to 85 °C
- Support low power consumption (5 to 10W), USB 3.0, SD Card



PCOM-B632VG, a type 6 compact COM Express® (95 x 95 mm) module which was based on Intel Atom® Bay Trail E3800 series SoC. In this architecture, it could provide VGA, eDP and DP multiple displays, and expandability I/O interfaces, included 3x PCIe 2.0 x 1, 1x USB 3.0, 4x USB 2.0, 2x serial ports and 2x SATA II devices. With ultra low power consumption design (5 to 10W), wide-temp support, it could provide very energy saving solution to different market, such as retail, transportation and automation.

## General

|                                |  |          |          |          |          |
|--------------------------------|--|----------|----------|----------|----------|
| Product                        | PCOM-B632VG  |          |          |          |          |
| Form Factor                    | Type 6, Compact Form Factor COM Express® ( 95 x 95 mm)           |          |          |          |          |
| Processor                      | Intel® Atom®   |          |          |          |          |
|                                | E3845  | E3827    | E3826    | E3825    | E3815    |
| Core                           | 4  | 2        | 2        | 2        | 1        |
| Freq.                          | 1.91 GHz   | 1.75 GHz | 1.46 GHz | 1.33 GHz | 1.46 GHz |
| Turbo                          | N/A  |          |          |          |          |
| Cache                          | 2MB  | 1MB      | 1MB      | 1MB      | 512KB    |
| Processor Graphics             | Intel® HD Graphics for Intel Atom® Processor Z3700 Series        |          |          |          |          |
| Graphics Base Frequency        | 542 MHz  | 542 MHz  | 533 MHz  | 533 MHz  | 400 MHz  |
| Graphics Max Dynamic Frequency | 792 MHz  | 792 MHz  | 667 MHz  | 533 MHz  | 400 MHz  |
| HW Encoding                    | H.264 and MPEG2  |          |          |          |          |
| HW Decoding                    | H.264, MPEG2, MVC, VC-1, WMV9, JPEG/MKPEG, VP8                   |          |          |          |          |
| HW Acceleration                | Gen7LP, DirectX 11, OpenGL 3.2, OpenCL 1.2, OGL ES Haili/2.0/1.1 |          |          |          |          |
| Processor TDP                  | 10W  | 8W       | 7W       | 6W       | 5W       |
| BIOS                           | Phoenix BIOS   |          |          |          |          |
| ECC Memory Supported           | No   |          |          |          |          |
| Memory                         | DDR3L SO-DIMM up to 4GB 1333 MT/s                                |          |          |          |          |

## I/O Interface

| I/O Interface |   |                       |                         |
|---------------|---|-----------------------|-------------------------|
| SATA          | 2x SATA II                                  |                       |                         |
| USB           | 1x USB 3.0<br>4x USB 2.0                    |                       |                         |
| Ethernet      | Intel® Ethernet Controller I210T            |                       |                         |
| Serial I/O    | GPIO  | 8 GPIO                |                         |
|               | I²C   | Baud Rate: 400KHz     |                         |
|               | SMBus                                       | Baud Rate: 100KHz     |                         |
|               | UART  | 2 Serial Port (Tx/Rx) |                         |
| PEG           | N/A   |                       |                         |
| PCI Express   | 3x PCIe 2.0 x 1<br>(Option 4x PCIe 2.0 x 1) |                       |                         |
| Display       | Default                                     | Options               | Resolution              |
|               | VGA   | VGA                   | up to 2560x 1600 @ 60Hz |
|               | DDI0  | DP                    | up to 2560x 1600 @ 60Hz |
|               |   | HDMI                  | up to 1920x 1080 @ 60Hz |
|               | DDI1  | eDP                   | up to 2560x 1600 @ 60Hz |
| Security      | Intel®AES                                   |                       |                         |

## MECHANICAL & ENVIRONMENT

|                       |  |
|-----------------------|--|
| Dimension             | 95 x 95 mm   |
| Power DC IN           | Normal : +12V<br>Wide Range : +8VDC - +16VDC<br>AT/ATX Mode                        |
| Storage Temperature   | -40°C to 85°C  |
| Operation Temperature | -40°C to 85°C  |
| Certification         | Contact us   |
| MTBF                  | Over 120,000 hours at 40°C   |
| Vibration             | Contact us   |
| OS                    | Windows 7, WES7/8, Embedded Compact7<br>Linux Fedora/Tizen/Yocto<br>RTOS Windriver |

## ORDERING GUIDE

| Product                           | Ordering P/N | Status     |
|-----------------------------------|--------------|------------|
| PCOM-B632VG-E3845                 | AB1-3A36     | Available  |
| PCOM-B632VG-E3827                 | AB1-3A33     | Available  |
| PCOM-B632VG-E3826                 | AB1-3A34     | Available  |
| PCOM-B632VG-E3825                 | AB1-3A35     | Available  |
| PCOM-B632VG-E3815                 | AB1-3A40     | Available  |
| Accessory                         | Ordering P/N | Status     |
| Heat Sink                         | B8308040     | Available  |
| Heat Spreader                     | B8307650     | Available  |
| PCOM-C605(Mini-ITX Carrier Board) | AB1-3998     | Available  |
| PCOM-C60B(ATX Carrier Board)      | AB1-3G22Z    | Contact us |

## BLOCK DIAGRAM

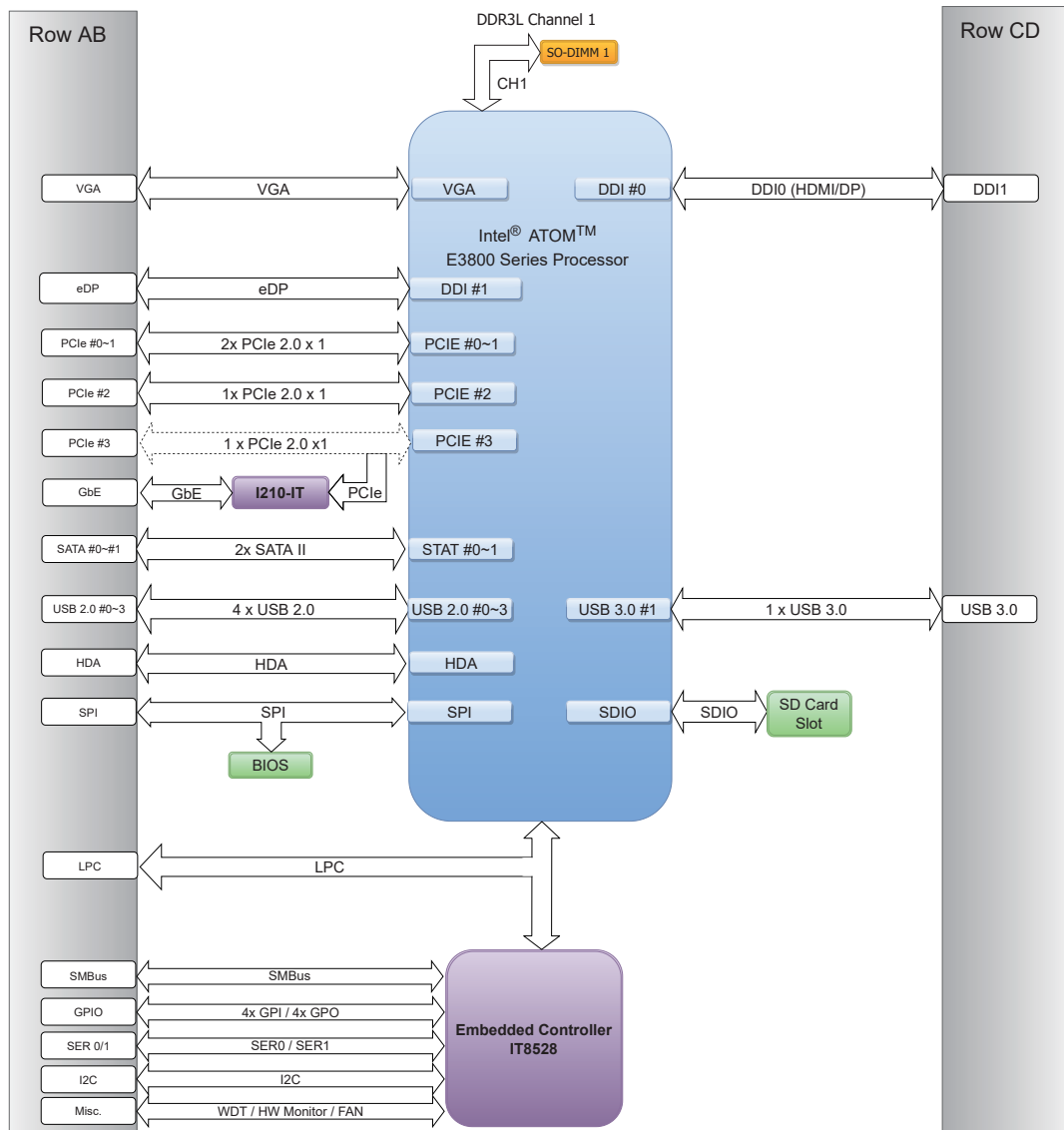
### PCOM-B632VG

COM Express® Type 6  
Compact Module 95x95mm

AT / ATX Mode

12 VDC

-40° C ~ +85° C





# PCOM-B638VG

Intel® Core™ Kaby Lake-U/Skylake-U i7/i5/i3 series processor based on Type 6 Compact COM-Express® module with 2x DDR4 SD-DIMM Socket



## FEATURES

- Intel® Core™ Kaby Lake-U/Skylake-U i7/i5/i3 7000, 6000 series processors
- DDR4 SDRAM up to 32GB 2133 MT/s
- Multiple Displays VGA, LVDS/eDP, DP, HDMI
- Widely voltage support 6V to 18V



PCOM-B638VGL, a type 6 compact COM Express® (95 x 95 mm) module which based on Intel® Kaby Lake-U/Skylake-U® i7/i5/i3 and Celeron® processors. In this architecture, PCOM-B638VG could provide VGA, LVDS, and high quantity HDMI, eDP, DP displays, also included turbo mode up to 3.4GHz, and expandability I/O interfaces such as 5x PCIe 3.0 x 1, 4x USB 3.0, 8x USB 2.0, and 3x SATA III devices. With this ultra low power consumption required (15W), PCOM-B638VG could provide a very energy saving solution to different vertical market, such as automation, healthcare, transportation and retails.

## General

|                                |   |                        |                        |                        |
|--------------------------------|---|------------------------|------------------------|------------------------|
| Product                        | PCOM-B638VG   |                        |                        |                        |
| Form Factor                    | Type 6, Compact Form Factor Com Express (95 x 95mm) |                        |                        |                        |
| Processor                      | Intel® Celeron®                                     | Intel® Core™           |                        |                        |
|                                | 3955U   | i3-6100U               | i5-6300U               | i7-6600U               |
| Core                           | 2   | 2                      | 2                      | 2                      |
| Freq.                          | 2.00 GHz  | 2.30 GHz               | 2.40 GHz               | 2.60 GHz               |
| Turbo                          | N/A   | N/A                    | 3.00 GHz               | 3.4 GHz                |
| Cache                          | 2MB   | 3MB                    | 3MB                    | 4MB                    |
| Processor Graphics             | Intel® HD Graphics 510                              | Intel® HD Graphics 520 | Intel® HD Graphics 520 | Intel® HD Graphics 520 |
| Graphics Base Frequency        | 300 MHz   | 300 MHz                | 300 MHz                | 300 MHz                |
| Graphics Max Dynamic Frequency | 900 MHz   | 1.00 GHz               | 1.00 GHz               | 1.05 GHz               |
| HW Encoding                    | HEVC, VP8, VP9, VDENC                               |                        |                        |                        |
| HW Decoding                    | HEVC, VP8, VP9, VDENC                               |                        |                        |                        |
| HW Acceleration                | DX11/12, OCL 2.x, OGL 4.3/4.4, ES 2.0               |                        |                        |                        |
| Processor TDP                  | 15W   | 15W                    | 15W                    | 15W                    |
| BIOS                           | AMI BIOS  |                        |                        |                        |
| ECC Memory Supported           | NO  |                        |                        |                        |
| Memory                         | DDR4 SDRAM up to 32GB 2133 MT/s                     |                        |                        |                        |

## I/O Interface

| I/O Interface |                                      |                           |                         |
|---------------|--------------------------------------|---------------------------|-------------------------|
| SATA          | 2x SATA III<br>1x SATA III(Optional) |                           |                         |
| USB           | 4x USB 3.0<br>8x USB 2.0             |                           |                         |
| Ethernet      | Intel® Ethernet Controller I219LM    |                           |                         |
| Serial I/O    | GPIO                                 | 8 GPIO                    |                         |
|               | I²C                                  | Baud Rate : 400KHz        |                         |
|               | SMBus                                | Baud Rate : 100KHz        |                         |
|               | UART                                 | 2 Serial Port (Tx/Rx)     |                         |
| PEG           | 4x PCIe 3.0 x 1                      |                           |                         |
| PCI Express   | 5x PCIe 3.0 x 1                      |                           |                         |
| Display       | Default                              | Options                   | Resolution              |
|               | eDP                                  | LVDS(24bit, dual channel) | up to 2560x 1600 @ 60Hz |
|               |                                      | eDP                       | up to 4096x 2304 @ 24Hz |
|               | DDI1                                 | DP                        | up to 3840x 2160 @ 24Hz |
|               |                                      | HDMI                      | up to 4096x 2160 @ 24Hz |
|               | DDI2                                 | VGA                       | up to 2560x 1600 @ 60Hz |
|               |                                      | DP                        | up to 3840x 2160 @ 24Hz |
|               |                                      | HDMI                      | up to 4096x 2160 @ 24Hz |
| Security      | TPM 2.0, Intel®AES                   |                           |                         |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 95 x 95mm   |
| Power DC IN           | Normal : +12V<br>Wide range : +6VDC - +18VDC<br>AT/ATX Mode   |
| Storage Temperature   | -20°C to 85°C   |
| Operation Temperature | 0°C to 60°C   |
| Certification         | Contact us  |
| MTBF                  | Over 100,000 hours at 40° C   |
| Vibration             | Random 5Hz to 2KHz, 7.7 grms, 10min in each of 3 axes   |
| OS                    | Windows 7/ 8/ 8.1/ 10/<br>Microsoft Windows 2008 R2 SP1/ 2012/ 2012 R2<br>Linux Fedora 22/ Ubuntu 15.04 |

## BLOCK DIAGRAM

## ORDERING GUIDE

| Product           | Ordering P/N | Status    |
|-------------------|--------------|-----------|
| PCOM-B638VG-6600U | AB1-3E39     | Available |
| PCOM-B638VG-6300U | AB1-3E38     | Available |
| PCOM-B638VG-6100U | AB1-3E32     | Available |
| PCOM-B638VG-3955U | AB1-3E77     | Available |
| PCOM-B638VG-7600U | AB1-3G88     | Available |
| PCOM-B638VG-7300U | AB1-3G87     | Available |
| PCOM-B638VG-7100U | AB1-3G86     | Available |
| PCOM-B638VG-3965U | AB1-3G85     | Available |

| Accessory                        | Ordering P/N | Status     |
|----------------------------------|--------------|------------|
| Cooler                           | B9971380     | Available  |
| Heat Sink                        | B8308660     | Available  |
| Heat Spreader                    | B8308500     | Available  |
| PCOM-C605(Min-ITX Carrier board) | AB1-3998     | Available  |
| PCOM-C60B(ATX Carrier board)     | AB1-3G22Z    | Contact us |

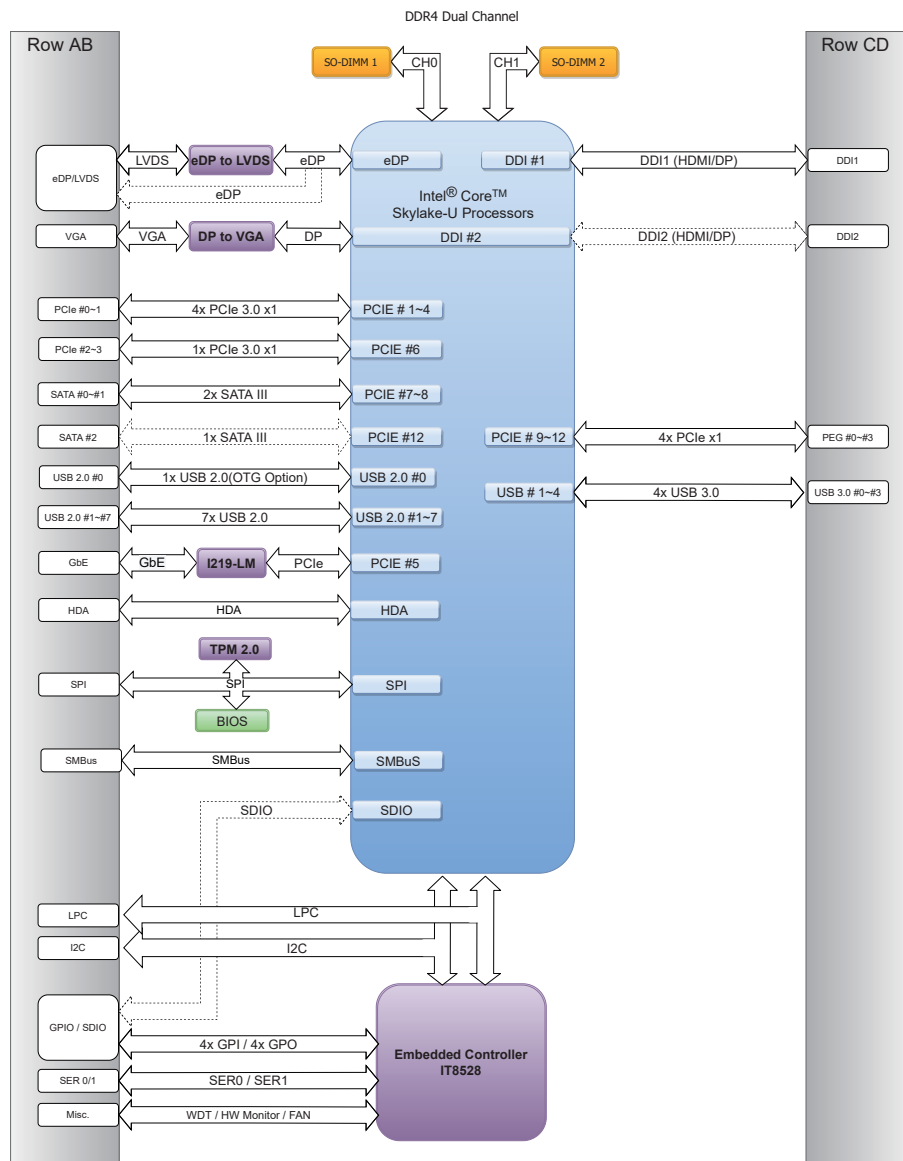
## PCOM-B638VG

COM Express® Type 6  
Compact Module 95x95mm

AT / ATX Mode

12 VDC

0° C ~ +60° C



# PCOM-B641VG

Intel Atom® Apollo Lake series SoC based on Type 6 Compact COM Express® module with 2x DDR3L SO-DIMM Socket



## FEATURES

- Intel Atom® Apollo Lake E3900 series processors
- DDR3L SO-DIMM up to 16GB 1866 MT/s
- Multiple Displays VGA, LVDS/eDP, DP, HDMI
- Support Industrial temperature -40°C to 85°C
- Support low power consumption(6 to 12W), TPM 2.0



PCOM-B641VG, a type 6 compact COM Express® (95 x 95 mm) module which based on Intel Atom® Apollo Lake E3900 series SoC. In this architecture, it could provide VGA, LVDS, and high quantity HDMI, eDP, DP with 4K resolution, and three independent displays. PCOM-B641VG also provides turbo mode up to 2.5GHz, including extended 4x PCIe 2.0 x 1, 3x USB 3.0, 8x USB 2.0, and 2x SATA III devices. With ultra low power consumption design(6 to 12W), wide-temp support, PCOM-B641VG could provide very energy saving and high effective performance. Portwell planned to promote PCOM-B641VG as vertical solution to aim in the different versatile applications, such as Automation, Military, Networking, Transportation and so on.

## General

| PCOM-B641VG                    |   |                        |                        |                        |                        |
|--------------------------------|---|------------------------|------------------------|------------------------|------------------------|
| Product                        | PCOM-B641VG   |                        |                        |                        |                        |
| Form Factor                    | Type 6, Compact Form Factor COM Express® ( 95 x 95 mm)            |                        |                        |                        |                        |
| Processor                      | Intel® Celeron®   | Intel® Pentium®        | Intel® Atom®           |                        |                        |
|                                | N3350   | N4200                  | E3930                  | E3940                  | E3950                  |
| Core                           | 2   | 4                      | 2                      | 4                      | 4                      |
| Freq.                          | 1.10 GHz  | 1.10 GHz               | 1.30 GHz               | 1.60 GHz               | 1.60 GHz               |
| Turbo                          | 2.40 GHz  | 2.50 GHz               | 1.80 GHz               | 1.80 GHz               | 2.00 GHz               |
| Cache                          | 2MB   | 2MB                    | 2MB                    | 2MB                    | 2MB                    |
| Processor Graphics             | Intel® HD Graphics 500  | Intel® HD Graphics 505 | Intel® HD Graphics 500 | Intel® HD Graphics 505 | Intel® HD Graphics 505 |
| Graphics Base Frequency        | 200 MHz   | 200 MHz                | 400 MHz                | 400 MHz                | 500 MHz                |
| Graphics Max Dynamic Frequency | 650 MHz   | 750 MHz                | 550 MHz                | 600 MHz                | 650 MHz                |
| HW Encoding                    | HEVC/H.265, H.264, MVC, VPS, VP9, JPEG/MJPEG                      |                        |                        |                        |                        |
| HW Decoding                    | HEVC/H.265, H.264, MVC, VPS, MPEG2, VC-1, WMV9, JPEG/MJPEG        |                        |                        |                        |                        |
| HW Acceleration                | Gen9LP, DirectX 12, OpenGL 4.3, OpenCL 1.2, PAVP 2.0, OGL ES 3.0, |                        |                        |                        |                        |
| Processor TDP                  | 6W  | 6W                     | 6.5W                   | 9.5W                   | 12W                    |
| BIOS                           | AMI BIOS  |                        |                        |                        |                        |
| ECC Memory Supported           | No  |                        |                        |                        |                        |
| Memory                         | DDR3L SO-DIMM up to 16GB 1866 MT/s                                |                        |                        |                        |                        |

## I/O Interface

|             |   |                           |                         |
|-------------|---|---------------------------|-------------------------|
| SATA        | 2 x SATA III                              |                           |                         |
| USB         | 3x USB 3.0<br>8x USB 2.0, (1x OTG Option) |                           |                         |
| Ethernet    | Intel® Ethernet Controller I210T          |                           |                         |
| Serial I/O  | GPIO                                      | 8 GPIO                    |                         |
|             | I²C                                       | Baud Rate: 400KHz         |                         |
|             | SMBus                                     | Baud Rate: 100KHz         |                         |
|             | UART                                      | 2 Serial Port (Tx/Rx)     |                         |
| PEG         | N/A                                       |                           |                         |
| PCI Express | 4x PCIe 2.0 x 1                           |                           |                         |
| Display     | Default                                   | Options                   | Resolution              |
|             | eDP                                       | LVDS(24bit, dual channel) | up to 1920x 1200 @ 60Hz |
|             |   | eDP                       | up to 4096x 2160 @ 60Hz |
|             | DDI0                                      | DP                        | up to 4096x 2160 @ 60Hz |
|             |   | HDMI                      | up to 3840x 2160 @ 30Hz |
|             | DDI1                                      | VGA                       | up to 1920x 1200 @ 60Hz |
|             |   | DP                        | up to 3840x 2160 @ 30Hz |
| Security    | TPM 2.0, Intel®AES                        |                           |                         |

## MECHANICAL & ENVIRONMENT

|                       |  |
|-----------------------|--|
| Dimension             | 95 x 95mm  |
| Power DC IN           | Normal : +12V<br>Wide range : +9VDC - +18VDC<br>AT/ATX Mode        |
| Storage Temperature   | -40°C to 85°C  |
| Operation Temperature | -40°C to 85°C  |
| Certification         | Contact us   |
| MTBF                  | Over 120,000 hours at 40°C   |
| Vibration             | Contact us   |
| OS                    | Windows 7/10, WES7/8<br>Linux Fedora/Tizen/Yocto<br>RTOS Windriver |

## ORDERING GUIDE

| Product         | Ordering P/N | Status    |
|-----------------|--------------|-----------|
| PCOM-B641-E3950 | AB1-3F71     | Available |
| PCOM-B641-E3940 | AB1-3F39     | Available |
| PCOM-B641-E3930 | AB1-3F38     | Available |
| PCOM-B641-N4200 | AB1-3F28     | Available |
| PCOM-B641-N3350 | AB1-3F72     | Available |

| Accessory                          | Ordering P/N | Status     |
|------------------------------------|--------------|------------|
| Heat Sink (N-sku)                  | B9971521     | Available  |
| Heat Sink (E-sku)                  | B8308491     | Available  |
| Heat Spreader (N-sku)              | B8308911     | Available  |
| Heat Spreader (E-sku)              | B8308901     | Available  |
| PCOM-C605 (Mini-ITX Carrier Board) | AB1-3998     | Available  |
| PCOM-C60B (ATX Carrier Board)      | AB1-3G22Z    | Contact us |

## BLOCK DIAGRAM

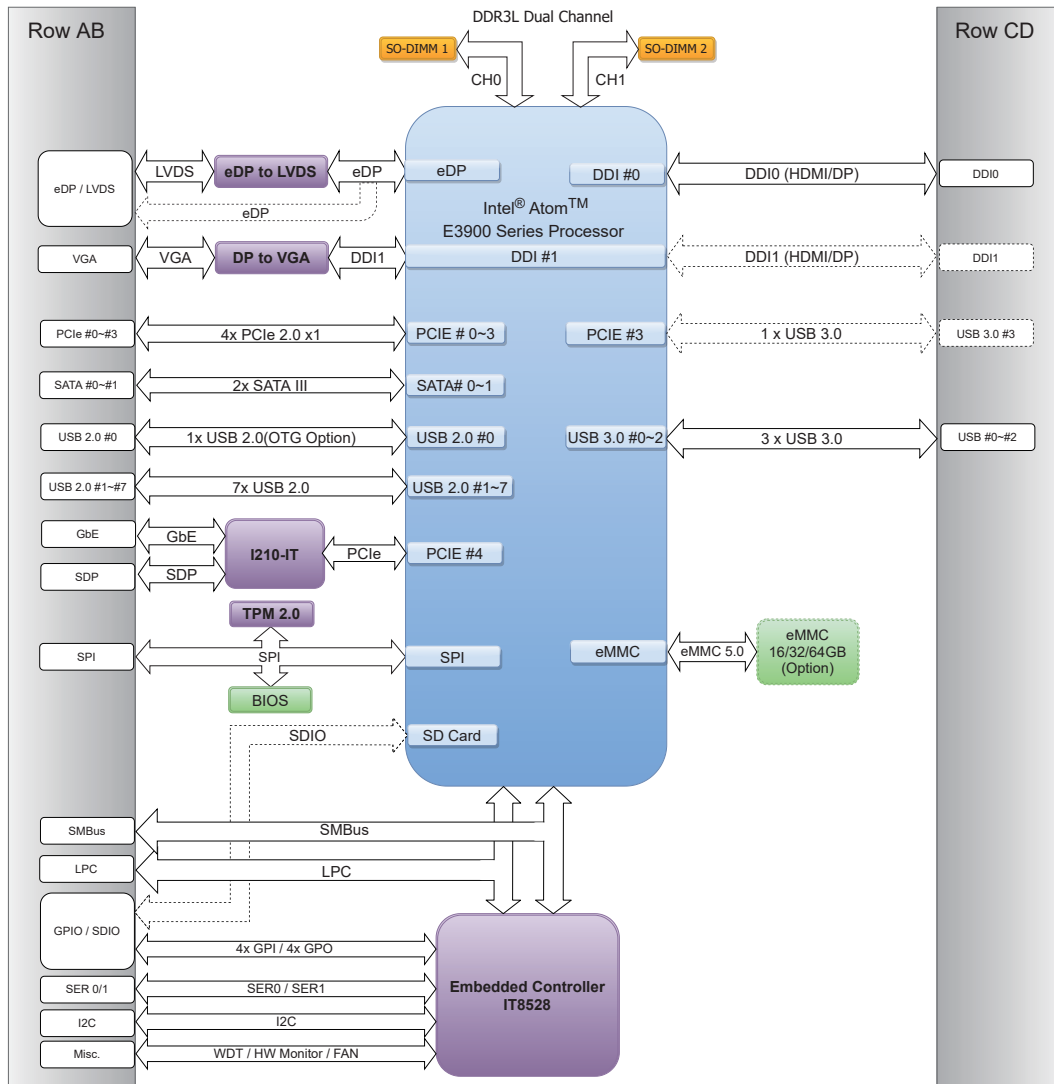
## PCOM-B641VG

COM Express® Type 6  
Compact Module 95x95mm

AT / ATX Mode

12 VDC

-40° C ~ +85° C





# PCOM-B645VGL

Intel Atom® Elkhart Lake series SoC based on Type 6 Compact COM Express® module with 2x DDR4 SO-DIMM Socket



## FEATURES

- Intel Atom® Elkhart Lake x6000 series processors
- DDR4 SO-DIMM up to 32GB 3200 MT/s with In-Band ECC
- Multiple Displays VGA, LVDS/eDP, DP, HDMI
- Support Industrial temperature -40°C to 85°C
- Support Intel® TCC/TSN with 2.5GbE



PCOM-B645VGL, a type 6 compact COM Express® (95 x 95 mm) module which is based on Intel Atom® Elkhart Lake x6000, Pentium® N, J Series processors. In this architecture, PCOM-B645VGL provides VGA, LVDS, and eDP, DP, HDMI with 4K resolution, and supports three independent displays. And it also provides turbo mode up to 3.0GHz, with extending 6x PCIe 3.0, 2x USB 3.2 Gen2, 8x USB 2.0, and 2x SATA III. With ultra low power consumption(4.5 to 12W), wide-temp support, it could provide very energy saving and high efficient performance. PCOM-B645VGL aims in different versatile applications, such as automation, healthcare, retail, transportation.

## General

|                                |  |              |         |         |         |
|--------------------------------|--|--------------|---------|---------|---------|
| Product                        | PCOM-B645VGL   |              |         |         |         |
| Form Factor                    | Type 6, Compact Form Factor COM Express® ( 95 x 95 mm)         |              |         |         |         |
| Processor                      | Intel® Pentium   | Intel® Atom® |         |         |         |
|                                | J6426  | x6211E       | x6413E  | x6425E  | x6425RE |
| Core                           | 4  | 2            | 4       | 4       | 4       |
| Freq.                          | 2.0 GHz  | 1.3 GHz      | 1.5 GHz | 2.0 GHz | 1.9 GHz |
| Turbo                          | 3.0 GHz  | 3.0 GHz      | 3.0 GHz | 3.0 GHz | N/A     |
| Cache                          | 1.5MB  | 1.5MB        | 1.5MB   | 1.5MB   | 1.5MB   |
| Processor Graphics             | Intel® UHD Graphics for 11 <sup>th</sup> Gen Intel® Processors |              |         |         |         |
| Graphics Base Frequency        | 400 MHz  | 350 MHz      | 500 MHz | 500 MHz | 400 MHz |
| Graphics Max Dynamic Frequency | 850 MHz  | 750 MHz      | 750 MHz | 750 MHz | N/A     |
| HW Encoding                    | H.264, H.265/HEVC, VP9, JPEG/MPEG                              |              |         |         |         |
| HW Decoding                    | H.264, MPEG2, V1-1/WMV9, H.265/HEVC, VP8/9, JPEG/MPEG          |              |         |         |         |
| HW Acceleration                | Gen 11 LP, DirectX 12, OpenGL4.5, OpenGL ES 3.2, Vulkan        |              |         |         |         |
| Processor TDP                  | 10W  | 6W           | 9W      | 12W     | 12W     |
| BIOS                           | AMI BIOS   |              |         |         |         |
| In-Band ECC                    | No   | Yes          | Yes     | Yes     | Yes     |
| Memory                         | 2x DDR4 SO-DIMM 3200 MT/s up to 32GB in total                  |              |         |         |         |

## I/O Interface

|             |  |                           |                         |
|-------------|--|---------------------------|-------------------------|
| SATA        | 2 x SATA III   |                           |                         |
| USB         | 2x USB 3.2 Gen2(optional up to 4x), 8x USB 2.0                       |                           |                         |
| Ethernet    | GPY215   |                           |                         |
| Serial I/O  | GPIO   | 8 GPIO                    |                         |
|             | I <sup>2</sup> C   | Baud Rate: 400KHz         |                         |
|             | SMBus  | Baud Rate: 100KHz         |                         |
|             | UART   | 2 Serial Port (Tx/Rx)     |                         |
| PEG         | N/A  |                           |                         |
| PCI Express | 6x PCIe 3.0<br>(2x PCIe 3.0 x 1 can be configure to 2x USB 3.2 Gen2) |                           |                         |
| Display     | Default  | Options                   | Resolution              |
|             | DDI0   | LVDS(24bit, dual channel) | up to 1920x 1200 @ 60Hz |
|             |  | eDP                       | up to 4096x 2160 @ 60Hz |
|             | DDI1   | DP                        | up to 4096x 2160 @ 60Hz |
|             |  | HDMI                      | up to 4096x 2160 @ 60Hz |
|             | DDI2   | VGA                       | up to 1920x 1200 @ 60Hz |
|             |  | DP                        | up to 4096x 2160 @ 60Hz |
|             |  | HDMI                      | up to 4096x 2160 @ 60Hz |
| Security    | TPM 2.0, Intel®AES   |                           |                         |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 95 x 95 mm  |
| Power DC IN           | Normal : +12V<br>AT/ATX Mode                                |
| Storage Temperature   | -40°C to 85°C   |
| Operation Temperature | -40°C to 85°C   |
| Certification         | Contact us  |
| MTBF                  | TBD   |
| Vibration             | TBD   |
| OS                    | Windows 10/Windows 10 IoT Enterprise<br>Linux/Yocto/Android |

## ORDERING GUIDE

| Product              | Ordering P/N | Status    |
|----------------------|--------------|-----------|
| PCOM-B645VGL-J6426   | AB1-3L84     | Available |
| PCOM-B645VGL-x6211E  | AB1-3L83     | Available |
| PCOM-B645VGL-x6413E  | AB1-3L82     | Available |
| PCOM-B645VGL-x6425E  | AB1-3K43     | Available |
| PCOM-B645VGL-x6425RE | AB1-3L81     | Available |

| Accessory                    | Ordering P/N | Status     |
|------------------------------|--------------|------------|
| Heat Sink (J/N-sku)          | B830B390     | Available  |
| Heat Sink (X-sku)            | B830B380     | Available  |
| Heat Spreader (J/N-sku)      | B830B460     | Available  |
| Heat Spreader (X-sku)        | B830B470     | Available  |
| PCOM-C60B(ATX Carrier board) | AB1-3G22Z    | Contact us |

## BLOCK DIAGRAM

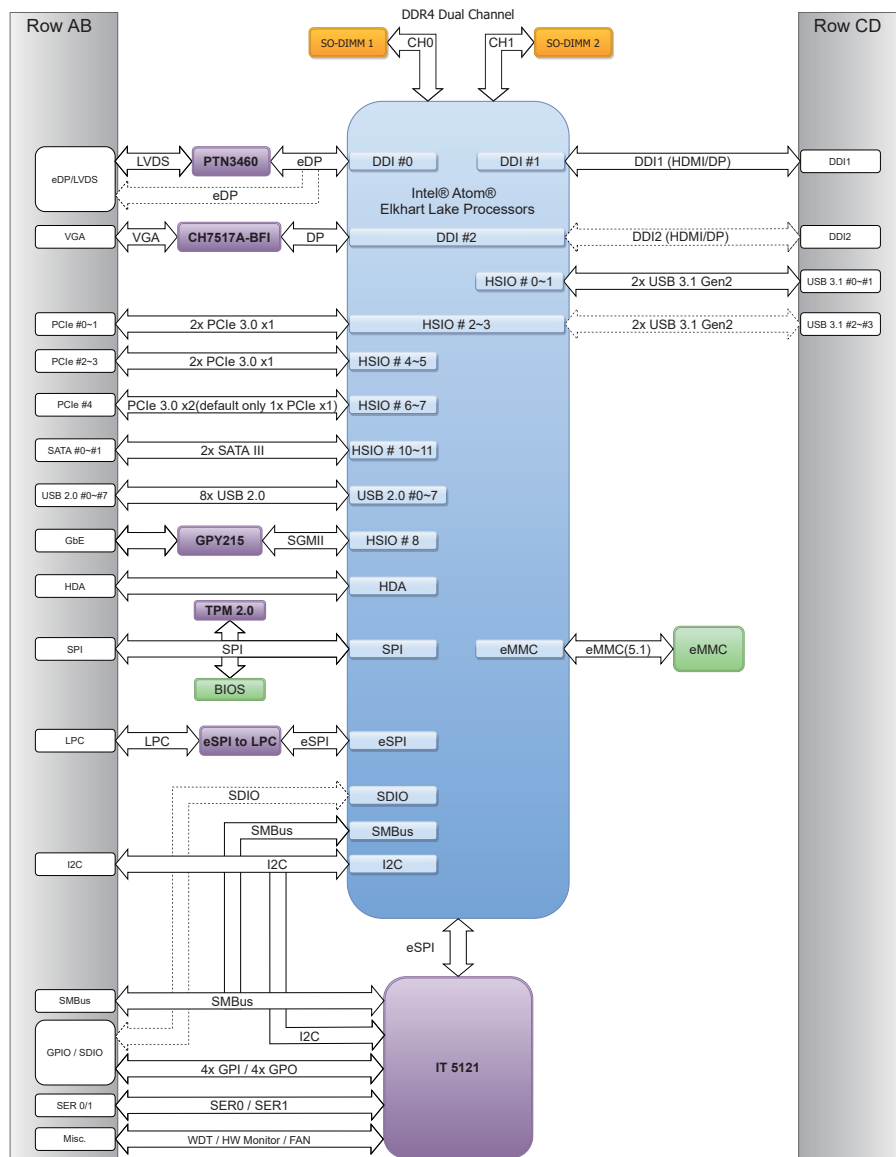
### PCOM-B645VGL

COM Express® Type 6  
Compact Module 95x95mm

ATX Mode

12V DC

-40 ~ +85° C



# PCOM-B653VGL

**Intel® Whiskey Lake-U Core™ Processor**  
based on Type VI COM Express module with dual  
DDR4 SO-DIMM, DDI, eDP, Gigabit Ethernet,  
SATA 3.0, and USB 3.1



## FEATURES

- Intel® Core™ i3/i5/i7/Celeron Processors 14nm process(Whiskey Lake U)
- Support 2xDDR4-2400 Non-ECC SO-DIMMs, up to 32G
- Support USB2.0/3.1, 2x SATAIII, 10x PCIe 3.0 LANEs
- Support VGA, LVDS/eDP, and Display port



Portwell PCOM-B653VGL is designed with Intel® Whiskey Lake-U processor with Type 6 pin definition. It brings three important factors including DDR4 memory support, PCIe Gen3 support, and USB 3.1 Gen2 support. Extend PCIe Gen3 ports in PCOM-B653VGL can support high speed IO card for more applications. In the meantime, it's compatible with COMe 3.0 Type 6 carrier board.

## General

|                                |   |                         |                         |                         |
|--------------------------------|---|-------------------------|-------------------------|-------------------------|
| Product                        | PCOM-B653VGL  |                         |                         |                         |
| Form Factor                    | COM Express® Type 6 Compact Form Factor (95 x 95mm) |                         |                         |                         |
| Processor                      | Intel® Core™  |                         |                         | Intel® Celeron®         |
|                                | i7-8665UE   | i5-8365UE               | i3-8145UE               | 4305UE                  |
| Core                           | 4   | 4                       | 2                       | 2                       |
| Freq.                          | 1.70 GHz  | 1.60 GHz                | 2.20 GHz                | 2.00 GHz                |
| Turbo                          | 4.40 GHz  | 4.10 GHz                | 3.90 GHz                | 2.00 GHz                |
| Cache                          | 8MB   | 6MB                     | 4MB                     | 2MB                     |
| Processor Graphics             | Intel® UHD Graphics 620                             | Intel® UHD Graphics 620 | Intel® UHD Graphics 620 | Intel® UHD Graphics 610 |
| Graphics Base Frequency        | 300 MHz   | 300 MHz                 | 300 MHz                 | 300 MHz                 |
| Graphics Max Dynamic Frequency | 1.15 GHz  | 1.05 GHz                | 1.00 GHz                | 1.00 GHz                |
| HW Encoding                    | H.264 AVC, MPEG2, HEVC, VP8/9, JPEG                 |                         |                         |                         |
| HW Decoding                    | H.264 AVC, VC1, MPEG2, VP8/9, JPEG                  |                         |                         |                         |
| HW Acceleration                | DX 11.3/12, OpenGL 4.5, OpenCL 2.1                  |                         |                         |                         |
| Processor TDP                  | 15W   | 15W                     | 15W                     | 15W                     |
| BIOS                           | AMI BIOS  |                         |                         |                         |
| ECC Memory Supported           | NO  |                         |                         |                         |
| Memory                         | 2x SO-DIMM DDR4 up to 32GB 2400MHz                  |                         |                         |                         |

## I/O Interface

|             |  |                           |                           |
|-------------|--|---------------------------|---------------------------|
| SATA        | 2 x SATA III (Port 0/1)  |                           |                           |
| USB         | 4x USB 3.1 Gen2 (Port 0~3)<br>8x USB 2.0 (Port 0~7)            |                           |                           |
| Ethernet    | Intel® I219LM  |                           |                           |
| Serial I/O  | GPIO   | 8 bit GPIO                |                           |
|             | I²C  | Baud Rate : 400KHz        |                           |
|             | SMBus  | Baud Rate : 100KHz        |                           |
|             | UART   | Only RX/TX signal         |                           |
| PEG         | 1x PCIe Gen3 x4  |                           |                           |
| PCI Express | 1x PCIe Gen3 x4<br>1x PCIe Gen3 x1<br>1x PCIe Gen3 x1 (Option) |                           |                           |
| Display     | Default  | Options                   | Resolution                |
|             | VGA  | VGA                       | Up to 1920x1200 @ 60Hz    |
|             |  | DDI2                      | DP up to 4096x2160 @ 60Hz |
|             | LVDS   | eDP                       | Up to 3840x2160 @ 60Hz    |
|             |  | 24bit dual channel LVDS   | Up to 1920x1200 @ 60Hz    |
| DDI-DP      | DP1.2  | DP up to 4096x2160 @ 60Hz |                           |
| Security    | TPM 2.0(Infineon SLB9670), Intel® AES                          |                           |                           |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 95 x 95mm   |
| Power DC IN           | Normal: +12V DC<br>Wide range: +6VDC~ +18VDC<br>AT/ATX mode |
| Storage Temperature   | -20°C to 80°C   |
| Operation Temperature | 0°C to 60°C   |
| Certification         | Contact us  |
| MTBF                  | Over 100,000 hours at 40°C                                  |
| Vibration             | Contact us  |
| OS                    | Windows 10<br>Red Hat, Ubuntu, CentOS                       |

## ORDERING GUIDE

| Product             | Ordering P/N | Status    |
|---------------------|--------------|-----------|
| PCOM-B653VGL-8665UE | AB1-3K06     | Available |
| PCOM-B653VGL-8365UE | AB1-3K04     | Available |
| PCOM-B653VGL-8145UE | AB1-3K05     | Available |
| PCOM-B653VGL-4305UE | AB1-3K19     | Available |

| Accessory                             | Ordering P/N | Status    |
|---------------------------------------|--------------|-----------|
| PCOM-C605<br>(Mini-ITX Carrier Board) | AB1-3998     | Available |
| Cooler                                | B9971820     | Available |

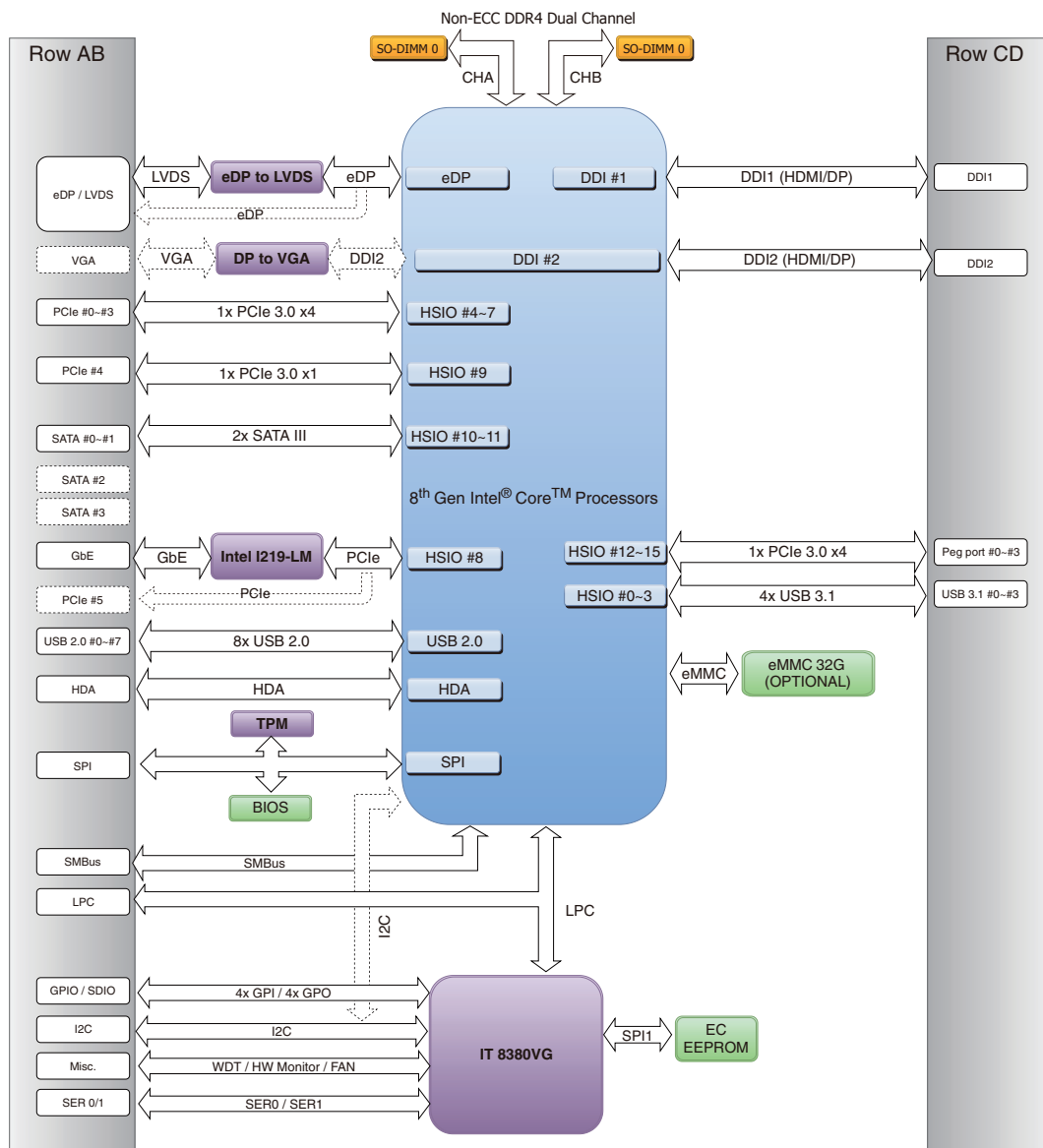
## BLOCK DIAGRAM

### PCOM-B653VGL

COM Express® Type 6  
Compact Module 95x95mm

AT / ATX  
Mode

0°C ~ +60°C





# PCOM-B654GL

**Intel® Coffee Lake-S Core™ Processor**  
based on Type VI COM Express module with dual  
DDR4 SO-DIMM, DDI, LVDS, Gigabit Ethernet,  
SATA III, and USB 3.2 Gen2



## FEATURES

- Intel® Core™ i7/i5/i3/Celeron 14nm process(Coffee Lake-S)
- Support 2x DDR4-2400 Non-ECC/ECC SO-DIMMs, up to 2x 16GB  
(The bottom side SO-DIMM thickness is 5.2mm, no support 5.0mm carrier connector)
- Support USB2.0/3.2 Gen2, 4x SATAIII, 1x PCIe 3.0 x16, and 8x PCIe 3.0 x1
- Support LVDS, and 3x Display port/HDMI



PCOM-B654GL is Intel® Coffee Lake-S platform COM Express module. It is compatible with COMe 3.0 Type 6 carrier board. The desktop CPU on module offers customer higher computing power but lower cost comparing to mobile solutions. PCOM-B654GL supports both ECC and Non-ECC DDR4 by different PCH SKUs(Q370/C246), which can be adapted to different applications. This module provides one PCIe x16, eight PCIe x1 (Option to one PCIe x4), four USB 3.2 Gen2, and four SATA III.

## General

| General                        |   |                         |                         |                         |
|--------------------------------|---|-------------------------|-------------------------|-------------------------|
| Product                        | PCOM-B654GL   |                         |                         |                         |
| Form Factor                    | COM Express Type 6 Basic module (125 X 95mm)                  |                         |                         |                         |
| Processor                      | Intel® Core™  |                         |                         | Intel® Celeron®         |
|                                | i7-8700T  | i5-8500T                | i3-8100T                | G4900T                  |
| Core                           | 6   | 6                       | 4                       | 2                       |
| Freq.                          | 2.40 GHz  | 2.10 GHz                | 3.10 GHz                | 2.90 GHz                |
| Turbo                          | 4.00 GHz  | 3.50 GHz                | --                      | --                      |
| Cache                          | 12MB  | 9MB                     | 6MB                     | 2MB                     |
| Processor Graphics             | Intel® UHD Graphics 630                                       | Intel® UHD Graphics 630 | Intel® UHD Graphics 630 | Intel® UHD Graphics 610 |
| Graphics Base Frequency        | 350 MHz   | 350 MHz                 | 350 MHz                 | 350 MHz                 |
| Graphics Max Dynamic Frequency | 1.20 GHz  | 1.10 GHz                | 1.10 GHz                | 1.00 GHz                |
| HW Encoding                    | H.264/AVC, H.265/HEVC, MPEG2, JPEG, VP8, VP9                  |                         |                         |                         |
| HW Decoding                    | H.264/AVC, VP8, VP9, H.265/HEVC, MPEG2, JPEG/MJPEG, VC-1/WMV9 |                         |                         |                         |
| HW Acceleration                | DirectX 11/12/OpenGL 4.5/OpenCL 2.1                           |                         |                         |                         |
| Processor TDP                  | 35 W  | 35 W                    | 35 W                    | 35 W                    |
| BIOS                           | AMI BIOS  |                         |                         |                         |
| ECC Memory Supported           | NO  |                         | YES(only with C246 PCH) |                         |
| Memory                         | 2x SO-DIMM DDR4 up to 32GB 2400MT/s                           |                         |                         |                         |

\*PCOM-B654GL only supports Intel® 8<sup>th</sup> Generation 35W processors

## I/O Interface

| I/O Interface |  |                                       |                      |
|---------------|--|---------------------------------------|----------------------|
| SATA          | 4 x SATA III (Port 0~3)                              |                                       |                      |
| USB           | 4x USB 3.2 Gen2 (Port 0~3)<br>8x USB 2.0 (Port 0~7)  |                                       |                      |
| Ethernet      | Intel® I219LM  |                                       |                      |
| Serial I/O    | GPIO   | 8 bit GPIO (default 4 input/4 output) |                      |
|               | I²C  | Baud Rate : 400KHz                    |                      |
|               | SMBus  | Baud Rate : 100KHz                    |                      |
|               | UART   | TX/RX signal only                     |                      |
| PEG           | 1x PCIe Gen3 x16 (can be configured to 2x8,1x8. 2x4) |                                       |                      |
| PCI Express   | 8x PCIe Gen3 x1 (ocan be configured to x2, x4)       |                                       |                      |
| Display       | Default  | Options                               | Resolution           |
|               | LVDS   | LVDS (24bit, dual channel )           | up to 1920x1200@60Hz |
|               | DDI  | DP 1.2                                | up to 4096x2304@60Hz |
|               |  | HDMI 1.4                              | up to 4096x2304@24Hz |
| Security      | TPM 2.0(Infineon SLB9670), Intel® AES                |                                       |                      |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 125 x 95mm  |
| Power DC IN           | Normal: +12V DC<br>Wide range: +9VDC~ +18VDC<br>AT/ATX mode |
| Storage Temperature   | -20°C to 80°C   |
| Operation Temperature | 0°C to 60°C   |
| Certification         | Contact us  |
| MTBF                  | Over 100,000 hours at 40°C                                  |
| Vibration             | Contact us  |
| OS                    | Windows 10<br>Red Hat, Ubuntu, CentOS                       |

## ORDERING GUIDE

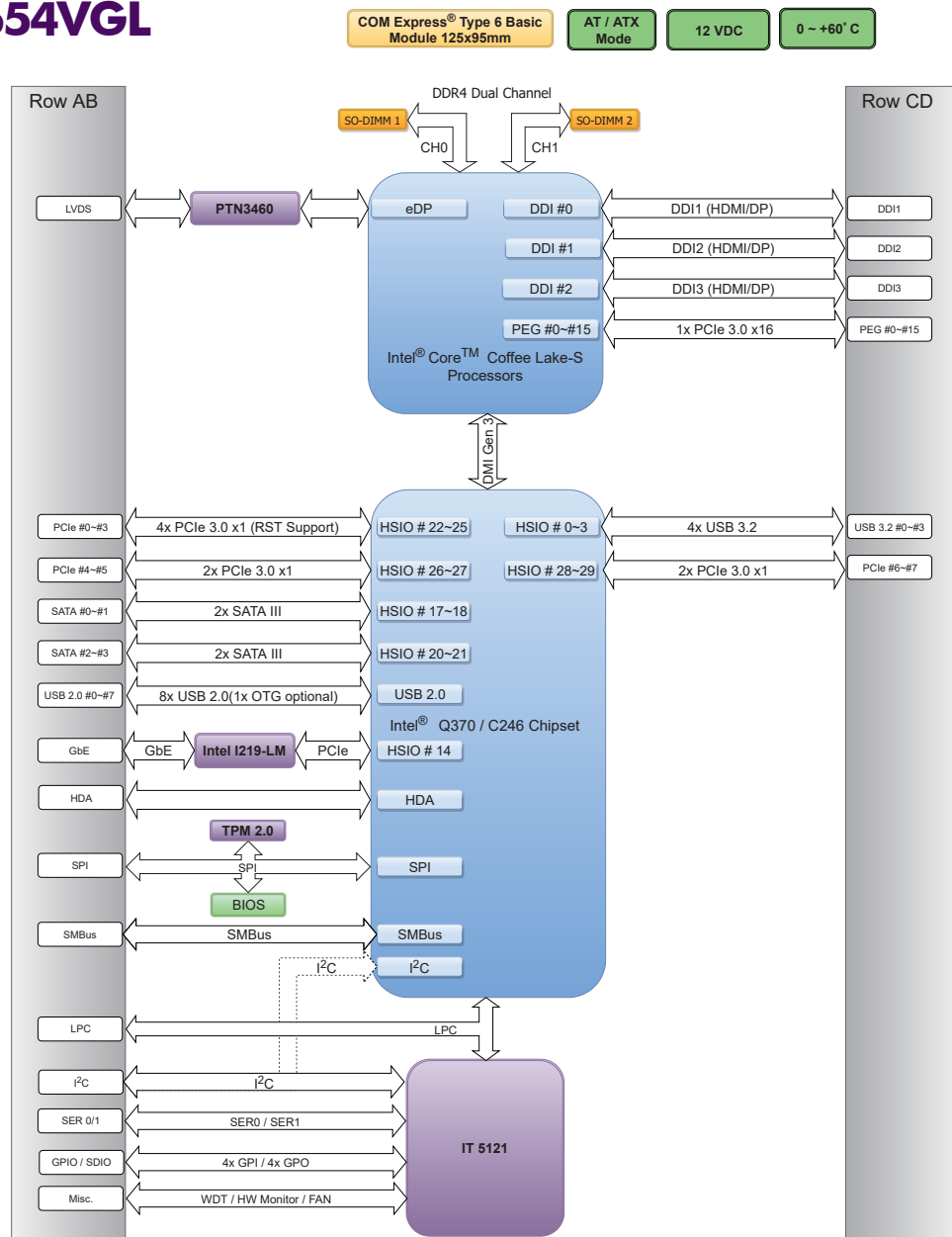
| Product          | Ordering P/N | Status    |
|------------------|--------------|-----------|
| PCOM-B654GL-C246 | AB1-3J46     | Available |
| PCOM-B654GL-Q370 | AB1-3J47     | Available |

| Accessory                             | Ordering P/N | Status     |
|---------------------------------------|--------------|------------|
| PCOM-C605<br>(Mini-ITX Carrier Board) | AB1-3998     | Available  |
| PCOM-C60B<br>(ATX Carrier Board)      | AB1-3G22Z    | Contact us |
| Cooler                                | B9971811     | Available  |

## BLOCK DIAGRAM

### PCOM-B654VGL



# PCOM-B655VGL

Intel® Comet Lake-S Core™ Processor based on Type VI COM Express module with dual DDR4 SO-DIMM, DDI, LVDS, VGA, Gigabit Ethernet, SATA III, and USB 3.2 Gen2



## FEATURES

- Intel® Core™ i9/i7/i5/i3 14nm process(Comet Lake-S)
- Support 2x DDR4-2933 Non-ECC/ECC SO-DIMMs, up to 2x 32GB (The bottom side SO-DIMM thickness is 5.2mm, no support 5.0mm carrier connector)
- Support USB2.0/3.2 Gen2, 4x SATAIII, 1x PCIe 3.0 x16, and 8x PCIe 3.0 x1
- Support LVDS, VGA, and 3x Display port/HDMI



PCOM-B655VGL is Intel® Comet Lake-S platform COM Express module. It is compatible with COMe 3.0 Type 6 carrier board. The desktop CPU on module offers customer higher computing power but lower cost comparing to mobile solutions. PCOM-B655VGL supports both ECC and Non-ECC DDR4 by different PCH SKUs(Q470E/W480E), which can be adapted to different applications. This module provides one PCIe16, eight PCIe1 (Option to one PCIe4), four USB 3.2 Gen2, and four SATA III.

## General

|                                |   |                          |                                   |                          |
|--------------------------------|---|--------------------------|-----------------------------------|--------------------------|
| Product                        | PCOM-B655VGL  |                          |                                   |                          |
| Form Factor                    | COM Express Type 6 Basic module (125 X 95mm)                  |                          |                                   |                          |
| Processor                      | Intel® Core™  |                          |                                   |                          |
|                                | i9-10900TE  | i7-10700TE               | i5-10500TE                        | i3-10100TE               |
| Core                           | 10  | 8                        | 6                                 | 4                        |
| Freq.                          | 1.80 GHz  | 2.00 GHz                 | 2.30 GHz                          | 2.30 GHz                 |
| Turbo                          | 4.50 GHz  | 4.40 GHz                 | 3.70 GHz                          | 3.60 GHz                 |
| Cache                          | 20 MB Intel® Smart Cache                                      | 16 MB Intel® Smart Cache | 12 MB Intel® Smart Cache          | 6 MB Intel® Smart Cache  |
| Processor Graphics             | Intel® UHD Graphics 630                                       | Intel® UHD Graphics 630  | Intel® UHD Graphics 630           | Intel® UHD Graphics 630  |
| Graphics Base Frequency        | 350 MHz   | 350 MHz                  | 350 MHz                           | 350 MHz                  |
| Graphics Max Dynamic Frequency | 1.20 GHz  | 1.15 GHz                 | 1.15 GHz                          | 1.10 GHz                 |
| HW Encoding                    | H.264/AVC, H.265/HEVC, MPEG2, JPEG, VP8, VP9                  |                          |                                   |                          |
| HW Decoding                    | H.264/AVC, VP8, VP9, H.265/HEVC, MPEG2, JPEG/MJPEG, VC-1/WMV9 |                          |                                   |                          |
| HW Acceleration                | DirectX 11/12/OpenGL 4.5/OpenCL 2.1                           |                          |                                   |                          |
| Processor TDP/cTDP             | 35 W  | 35 W                     | 35 W                              | 35 W                     |
| BIOS                           | AMI BIOS  |                          |                                   |                          |
| ECC Memory Supported           | NO  |                          |                                   | YES(only with W480E PCH) |
| Memory                         | DDR 4 SO-DIMM up to 64GB 2933MT/s                             |                          | DDR 4 SO-DIMM up to 64GB 2666MT/s |                          |

\*PCOM-B655VGL only supports Intel® 10<sup>th</sup> Generation 35W processors

## I/O Interface

|             |   |                                       |                  |
|-------------|---|---------------------------------------|------------------|
| SATA        | 4 x SATA III (Port 0~3)                               |                                       |                  |
| USB         | 4x USB 3.2 Gen2 (Port 0~3)<br>8x USB 2.0 (Port 0~7)   |                                       |                  |
| Ethernet    | Intel® I219LM   |                                       |                  |
| Serial I/O  | GPIO  | 8 bit GPIO (default 4 input/4 output) |                  |
|             | I²C   | Baud Rate : 400KHz                    |                  |
|             | SMBus   | Baud Rate : 100KHz                    |                  |
|             | UART  | TX/RX signal only                     |                  |
| PEG         | 1x PCIe Gen3 x16 (can be configured to 2x8, 1x8, 2x4) |                                       |                  |
| PCI Express | 8x PCIe Gen3 x1 (can be configured to x2, x4)         |                                       |                  |
| Display     | Default   | Options                               | Resolution       |
|             | LVDS  | LVDS (24bit, dual channel )           | 1920 x 1200@60Hz |
|             |   | eDP                                   | 2880 x 1800@60Hz |
|             | DDI   | DP 1.2                                | 4096 x 2304@60Hz |
|             |   | HDMI 1.4                              | 4096 x 2160@30Hz |
|             | VGA   | VGA                                   | 1920 x 1200@60Hz |
| Security    | TPM 2.0(Infineon SLB9670), Intel® AES                 |                                       |                  |

## MECHANICAL & ENVIRONMENT

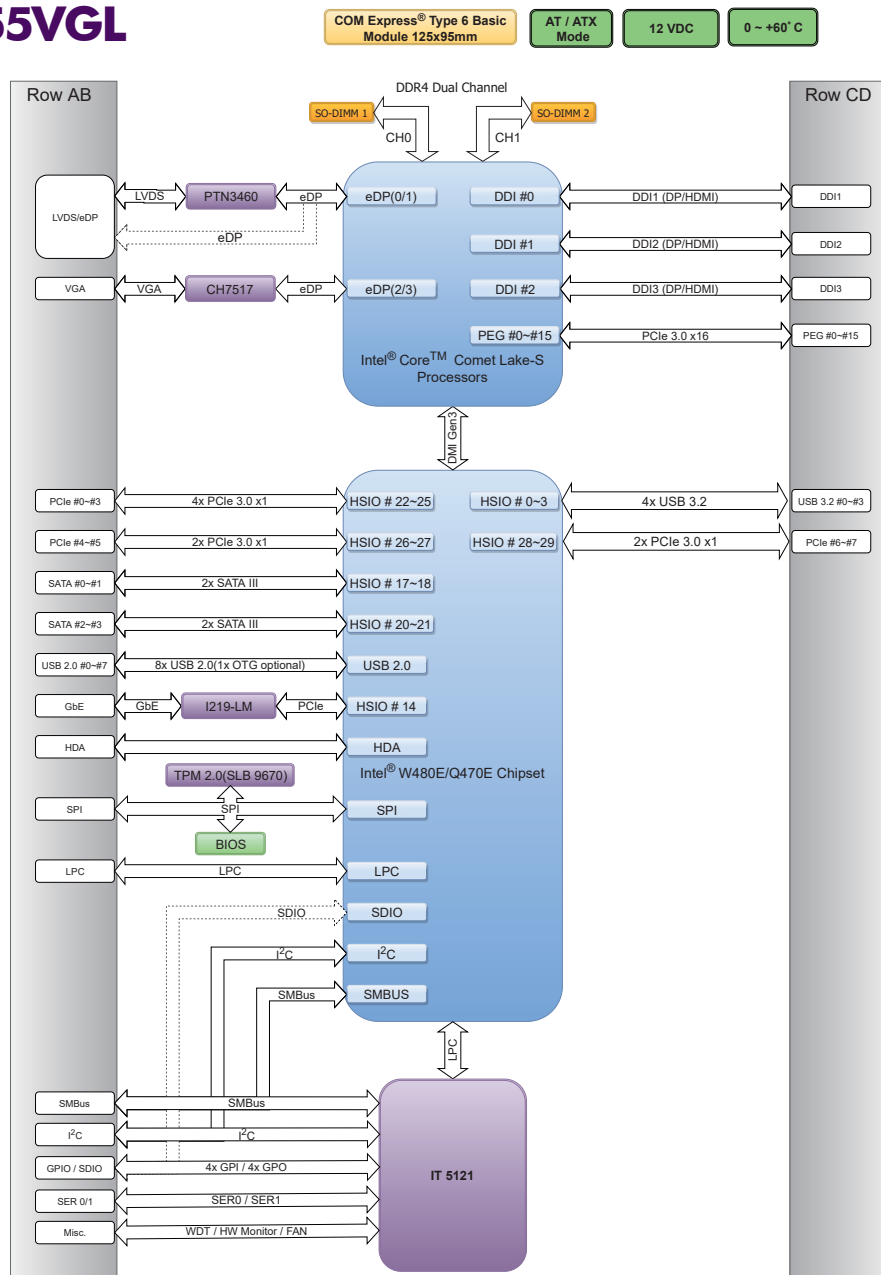
|                       |                                |
|-----------------------|--------------------------------|
| Dimension             | 125 x 95mm                     |
| Power DC IN           | Normal: +12V DC<br>AT/ATX mode |
| Storage Temperature   | -20°C to 80°C                  |
| Operating Temperature | 0°C to 60°C                    |
| Certification         | Contact us                     |
| MTBF                  | TBD                            |
| Vibration             | TBD                            |
| OS                    | Windows 10<br>Ubuntu, CentOS   |

## ORDERING GUIDE

| Product                          | Ordering P/N | Status     |
|----------------------------------|--------------|------------|
| PCOM-B655VGL-W480E               | AB1-3K44     | Contact us |
| PCOM-B655VGL-Q470E               | AB1-3K80     | Contact us |
| Accessory                        | Ordering P/N | Status     |
| PCOM-C60B<br>(ATX Carrier Board) | AB1-3G22Z    | Contact us |
| Cooler                           | B9971950     | Contact us |

## BLOCK DIAGRAM

### PCOM-B655VGL





# PCOM-B656VGL

Intel® Tiger Lake-UP3 Core™ Processor based on Type VI COM Express module with dual DDR4 SO-DIMM, DDI, eDP, Gigabit Ethernet, SATA 3.0, and USB 3.2



## FEATURES

- Intel® Core™ i3/i5/i7/Celeron Processors 10nm process(Tiger Lake UP3)
- Support 2xDDR4-3200 Non-ECC SO-DIMMs, up to 32G per DIMM
- Support USB2.0/3.2, 2x SATAIII, 1x PCIe4.0 x4 and 5x PCIe 3.0 LANES
- Support Display Port, HDMI, VGA, and LVDS/eDP



Portwell PCOM-B656VGL is designed with Intel® Tiger Lake-UP3 processor with Type 6 pin definition. It brings three important factors including DDR4 memory, PCIe Gen4, and USB 3.2 Gen2 x1 support. Extend PCIe Gen3 ports in PCOM-B656VGL can support high speed I/O card for more applications. In the meantime, it's compatible with COMe 3.0 Type 6 carrier board.

## General

|                                |  |                          |                          |                     |
|--------------------------------|--|--------------------------|--------------------------|---------------------|
| Product                        | PCOM-B656VGL   |                          |                          |                     |
| Form Factor                    | Type 6, Compact Size Form Factor Express® (95 X 95mm)          |                          |                          |                     |
| Processor                      | Intel® Core™   |                          |                          | Intel® Celeron®     |
|                                | i7-1185G7E<br>i7-1185GRE                                       | i5-1145G7E<br>i5-1145GRE | i3-1115G4E<br>i3-1115GRE | 6305E               |
| Core                           | 4  | 4                        | 2                        | 2                   |
| Base Freq. @ TDP/cTDP          | 2.8/1.8/1.2 GHz  | 2.6/1.5/1.1 GHz          | 3.0/2.2/1.7 GHz          | 1.80 GHz            |
| Turbo                          | 4.4 GHz  | 4.1 GHz                  | 3.9 GHz                  | N/A                 |
| Cache                          | 12MB   | 8MB                      | 6MB                      | 4MB                 |
| Processor Graphics             | Intel® Iris® Xe Graphics                                       | Intel® Iris® Xe Graphics | Intel® Iris® Xe Graphics | Intel® UHD Graphics |
| Graphics Max Dynamic Frequency | 1.35 GHz   | 1.30 GHz                 | 1.25 GHz                 | 1.25 GHz            |
| HW Encoding                    | VP9 8/10 bit, H.265/HEVC 8/10 bit, H.264/AVC, MPEG2            |                          |                          |                     |
| HW Decoding                    | AV1, VP9 8/10/12 bit, H.265/HEVC 8/10/12 bit, H.264/AVC, MPEG2 |                          |                          |                     |
| Processor TDP/cTDP             | 28/15/12W  | 28/15/12W                | 28/15/12W                | 15W                 |
| BIOS                           | AMI BIOS   |                          |                          |                     |
| ECC Memory Supported           | NO   |                          |                          |                     |
| Memory                         | 2x SO-DIMM DDR4 up to 32GB 3200MHz per DIMM                    |                          |                          |                     |

## I/O Interface

|             |  |                         |                               |
|-------------|--|-------------------------|-------------------------------|
| SATA        | 2 x SATA III (Port 0~1)  |                         |                               |
| USB         | 4x USB 3.2 Gen2 (Port 1~4)<br>8x USB 2.0 (Port 0~7)  |                         |                               |
| Ethernet    | Intel® I225LM 0°C to 60°C up to 2500BASE-T<br>Intel® I225IT -40°C to 70°C up to 2500BASE-T<br>Intel® I225IT -40°C to 85°C up to 1000BASE-T   |                         |                               |
| Serial I/O  | GPIO   | 4x GPI & 4x GPO         |                               |
|             | I²C  | Baud Rate : 400KHz      |                               |
|             | SMBus  | Baud Rate : 100KHz      |                               |
|             | UART   | Only RX/TX signal       |                               |
| PEG         | 1x PCIe Gen4 x4  |                         |                               |
| PCI Express | 1x PCIe Gen3 x4 / 2x PCIe Gen3 x2 / 4x PCIe Gen3 x1 / 1x PCIe Gen3 x2 + 2x PCIe Gen3 x1 (Port 0~3)<br>1x PCIe Gen3 x1 (Port 4) with I225 LAN<br>1x PCIe Gen3 x2 / 2x PCIe Gen3 x1 (Port 6,7) w/o USB 3.2 |                         |                               |
| Display     | Default  | Options                 | Resolution                    |
|             | DDI1   | DP1.4                   | Up to 5120x3200 @ 60Hz 24 bpp |
|             |  | HDMI                    | Up to 4096x2304 @ 60Hz 24 bpp |
|             | DDI2   | DP1.4                   | Up to 5120x3200 @ 60Hz 24 bpp |
|             |  | HDMI                    | Up to 4096x2304 @ 60Hz 24 bpp |
|             | LVDS   | eDP                     | Up to 4096x2304 @ 60Hz 24 bpp |
|             |  | 24bit dual channel LVDS | Up to 1920x1200 @ 60Hz        |
| VGA         | VGA  | Up to 1920x1200 @ 60Hz  |                               |
| Security    | TPM 2.0(Infinion SLB9670), Intel® AES  |                         |                               |

## MECHANICAL & ENVIRONMENT

|                       |  |
|-----------------------|--|
| Dimension             | 95 x 95mm                                      |
| Power DC IN           | Normal: +12V DC, +5VSB DC<br>AT/ATX mode       |
| Storage Temperature   | -40°C to 85°C                                  |
| Operating Temperature | 0°C to 60°C<br>-40°C to 85°C (Selection Model) |
| Certification         | Contact us                                     |
| MTBF                  | Over 100,000 hours at 40°C                     |
| Vibration             | Contact us                                     |
| OS                    | Windows 10<br>Red Hat, Ubuntu, CentOS          |

## ORDERING GUIDE

| Product                          | Ordering P/N | Status    |
|----------------------------------|--------------|-----------|
| PCOM-B656VGL-1185G7E             | AB1-3L45     | Available |
| PCOM-B656VGL-1185GRE             | AB1-3L28     | Available |
| PCOM-B656VGL-1145G7E             | AB1-3L47     | Available |
| PCOM-B656VGL-1145GRE             | AB1-3L48     | Available |
| PCOM-B656VGL-1115G4E             | AB1-3L49     | Available |
| PCOM-B656VGL-1115GRE             | AB1-3L46     | Available |
| PCOM-B656VGL-6305E               | AB1-3L50     | Available |
| Accessory                        | Ordering P/N | Status    |
| PCOM-C60B<br>(ATX Carrier Board) | AB1-3G22     | Available |
| Cooler                           | B9972040     | Available |
| Heat Sink                        | B830B270     | Available |
| Heat Spreader                    | B830B280     | Available |

## BLOCK DIAGRAM

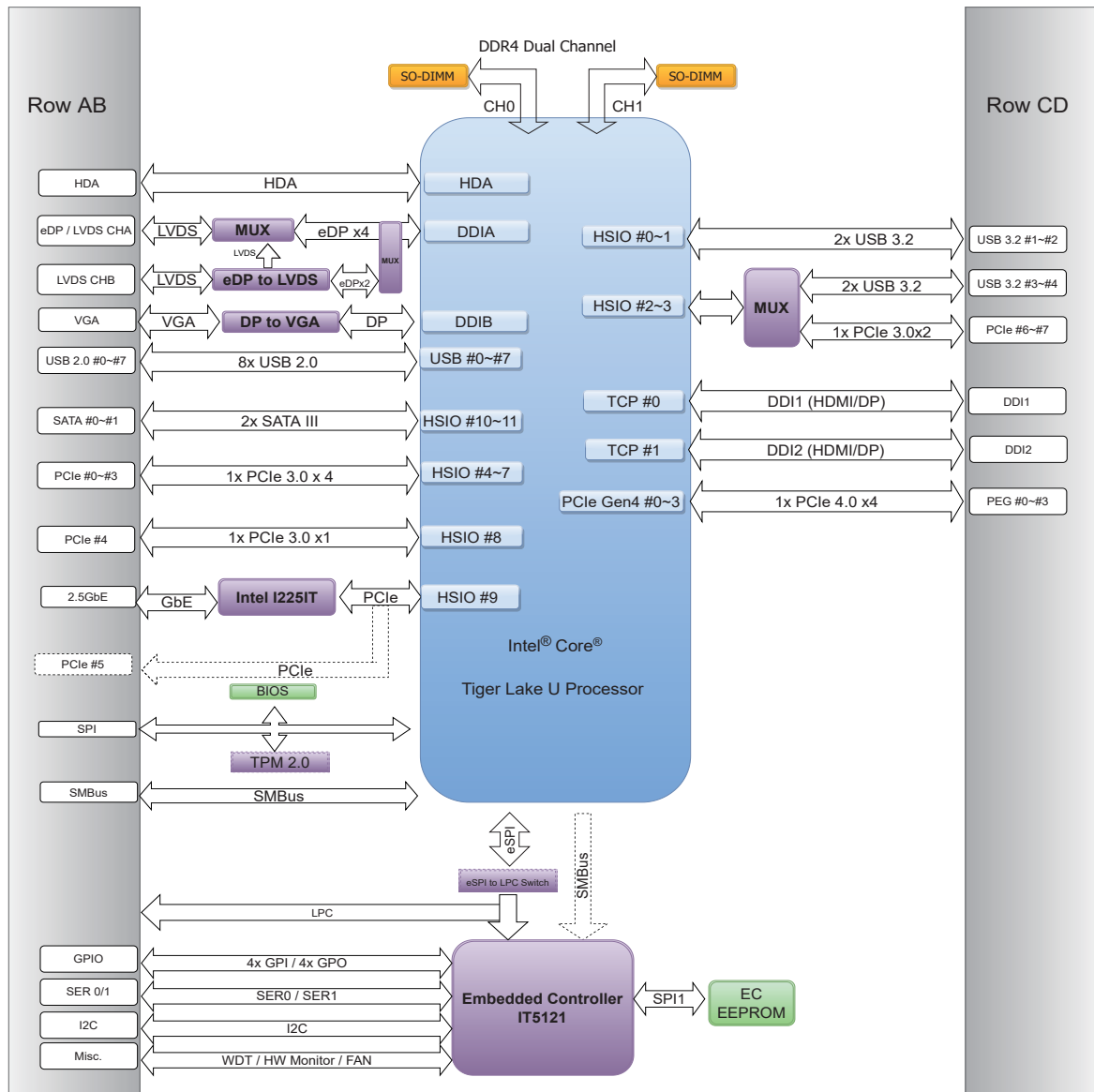
### PCOM-B656VGL

COM Express® Type 6  
Compact Module 95x95mm

AT / ATX Mode

+12VDC  
+5VSB

-40°C ~ +85°C  
For Selection model



# PCOM-B657VGL

COM Express Type-VI Basic module with Intel® 11<sup>th</sup> Gen H Processor DDR4 SO-DIMM, DDI, PCIe Gen 4.0, USB 3.2 Gen2x1, 2.5 Gigabit TSN Ethernet, discrete TPM 2.0, eDP/LVDS, SATA III and VGA



## FEATURES

- 11 Gen Intel® Core™, Celeron®, and Xeon® W-11000E Series processors in 10nm Super Fin Process technology
- AI/DL Instruction sets (Intel® VNNI, AVX-512, INT8, FP16), Up to 8C/16T@45W and 25W with wide temperature SKUs support
- 2x DDR4-3200 ECC/Non-ECC SO-DIMMs, up to 2x 32GB and 1x PCIe Gen 4.0 x16, and 8x PCIe Gen 3.0 x1
- 4x USB2.0/3.2 Gen 2x1, 4x USB2.0, 4x SATAIII, 3x DDI, eDP/LVDS, and VGA Support



PCOM-B657VGL is COM Express module based on Intel® 11<sup>th</sup> Gen H Processor. It is compatible with COMe 3.0 standard. The platform adopt 10nm++ process and VNNI instruction set, offers advance computing power with 45~25W thermal and industrial use condition for wide range applications. PCOM-B657VGL supports PCIe Gen 4.0 x16, and both ECC and Non-ECC DDR4 by different SKUs, which is best for mission critical use conditions and AI edge computing with TSN enabled. This module provides 8x PCIe x1 (Option to 2x PCIe x4 and support PCIe storage), four USB 3.2 Gen2 x1, and four SATA III. The fully integrated and flexible I/O capacity also mapped to wide range of industrial applications.

## General

| Product             | PCOM-B657VGL Series (Embedded / Industrial SKUs)                          |            |            |                |   |            |            |                              |            |            |
|---------------------|---|------------|------------|----------------|---|------------|------------|------------------------------|------------|------------|
| Form Factor         | COM Express Type 6 Basic Module (125 X 95mm)                              |            |            |                |   |            |            |                              |            |            |
| SKU Type            | General Embedded (0°C to 60°C)  |            |            |                | Industrial 45W/35W (-40°C to 85°C)  |            |            | Industrial 25W (0°C to 60°C) |            |            |
|                     | i7-11850HE  | i5-11500HE | i3-11100HE | Celeron 6600HE | W-11865MRE  | W-11555MRE | W-11155MRE | W-11865MLE                   | W-11555MLE | W-11155MLE |
| Cores/Threads       | 8C/16T  | 6C/12T     | 4C/8T      | 2C/2T          | 8C/16T  | 6C/12T     | 4C/8T      | 8C/16T                       | 6C/12T     | 4C/8T      |
| Freq.               | 2.6 GHz   | 2.6 GHz    | 2.4 GHz    | 2.6 GHz        | 2.6 GHz   | 2.6 GHz    | 2.4 GHz    | 1.5 GHz                      | 1.9 GHz    | 1.8 GHz    |
| Turbo/1C            | 4.70 GHz  | 4.50 GHz   | 4.40 GHz   | N/A            | 4.70 GHz  | 4.50 GHz   | 4.40 GHz   | 4.50 GHz                     | 4.40 GHz   | 3.1 GHz    |
| Intel® Smart Cache  | 24 MB   | 12 MB      | 8 MB       | 8 MB           | 24 MB   | 12 MB      | 8 MB       | 24 MB                        | 12 MB      | 8 MB       |
| Intel® UHD Gfx EU   | 32 EU   | 32 EU      | 16 EU      | 16 EU          | 32 EU   | 32 EU      | 16 EU      | 32 EU                        | 32 EU      | 16 EU      |
| Graphics Base Freq. | 350 MHz   |            |            |                |   |            |            |                              |            |            |
| Graphics Max Freq.  | 1350 MHz  |            | 1250 MHz   | 1100 MHz       | 1350 MHz  |            | 1250 MHz   | 1350 MHz                     |            | 1250 MHz   |
| HW Encoding         | One VEDBox:H.264/AVC, H.265/HEVC, JPEG, VP9                               |            |            |                |   |            |            |                              |            |            |
| HW Decoding         | Two VDBoxes:H.264/AVC, VP9, H.265/HEVC, AV1, VC1, MPEG2, JPEG/MPEG, MPEG2 |            |            |                |   |            |            |                              |            |            |
| HW Acceleration     | DirectX 11/12, Open GL 4.5, OpenCL 2.1                                    |            |            |                |   |            |            |                              |            |            |
| Processor TDP       | 45W / 35W   |            |            | 35W            | 45W / 35W   |            |            | 25W                          |            |            |
| PCH                 | QM580E  |            |            |                | RM590E  |            |            |                              |            |            |
| Ethernet            | Intel® I225LM   |            |            |                | Intel® I225IT<br>-40°C to 70°C up to 2500BASE-T<br>-40°C to 85°C up to 1000BASE-T |            |            | Intel® I225LM                |            |            |
| ECC Memory Support  | No  |            |            |                | Yes   |            |            |                              |            |            |
| BIOS                | AMI BIOS  |            |            |                |   |            |            |                              |            |            |
| Memory Type/Speed   | DDR 4 SO-DIMM up to 64GB 3200MT/s   |            |            |                |   |            |            |                              |            |            |

## I/O Interface

|             |  |                             |                                       |
|-------------|--|-----------------------------|---------------------------------------|
| SATA        | 4 x SATA III (Port 0~3)  |                             |                                       |
| USB         | 4x USB 3.2 Gen 2 x1 (Port 0~3)<br>8x USB 2.0 (Port 0~7)  |                             |                                       |
| Serial I/O  | GPIO   |                             | 8 bit GPIO (default 4 input/4 output) |
|             | I <sup>2</sup> C   |                             | Baud Rate: 400KHz                     |
|             | SMBus  |                             | Baud Rate: 100KHz                     |
|             | UART   |                             | TX/RX signal only                     |
| PEG         | 1x PCIe Gen 4.0 x16 (can be configured to 1 x16, 2 x8 or 1 x8 + 2 x4)  |                             |                                       |
| PCI Express | 8x PCIe Gen 3.0 x1 (can be configured to 8 x1, 4 x1 + 1 x4, or 2 x4)<br>Support Intel® RST for PCIe Storage for both x4 Link |                             |                                       |
| Display     | Default  | Options                     | Resolution                            |
|             | LVDS / eDP (Default LVDS)  | LVDS (24bit, dual channel ) | 1920 x 1200 @60Hz                     |
|             |  | eDP 1.4b HBR3               | 2880 x 1800 @60Hz                     |
|             | DDI  | DP 1.4 HBR3                 | 7680 x 4320 @30Hz                     |
|             |  | HDMI 2.0b                   | 3840 x 2160 @60Hz                     |
|             | VGA  | VGA                         | 1920 x 1200 @60Hz                     |
| Security    | TPM 2.0 (Infineon SLB9670), Intel® AES-NI, Intel® SHA Extensions, Intel® DAL   |                             |                                       |

## MECHANICAL & ENVIRONMENT

|                                      |   |           |
|--------------------------------------|---|-----------|
| Dimension                            | 125 x 95mm  |           |
| Power DC IN                          | Normal: +12V DC<br>AT/ATX mode  |           |
| Storage Temperature                  | -40°C to +85°C  |           |
| Operation Temperature                | 0°C to 60°C (General Embedded SKU)<br>0°C to 60°C (Industrial 25W SKU)<br>-40°C to +85°C (Industrial 45W/35W SKU) |           |
| Certification                        | Contact us  |           |
| MTBF                                 | TBD   |           |
| Vibration                            | TBD   |           |
| OS                                   | Windows 10<br>Ubuntu, CentOS, Yacto   |           |
| Accessory                            | Ordering P/N  | Status    |
| Cooler (spring loaded copper slog)   | B9972030  | Available |
| Cooler (Aluminum)                    | B9972050  | Available |
| Heatsink (spring loaded copper slog) | B830B680  | Available |
| Heatsink (Aluminum)                  | B830B670  | Available |

## ORDERING GUIDE

| Product                           | Ordering P/N | Status     |
|-----------------------------------|--------------|------------|
| PCOM-B657VGL-11850HE              | AB1-3L58     | Available  |
| PCOM-B657VGL-11500HE              | AB1-3L67     | Available  |
| PCOM-B657VGL-11100HE              | AB1-3L65     | Available  |
| PCOM-B657VGL-6600HE               | AB1-3L66     | Available  |
| PCOM-B657VGL-11865MRE             | AB1-3L57     | Available  |
| PCOM-B657VGL-11555MRE             | AB1-3L64     | Available  |
| PCOM-B657VGL-11155MRE             | AB1-3L63     | Available  |
| PCOM-B657VGL-11865MLE             | AB1-3L59     | Available  |
| PCOM-B657VGL-11555MLE             | AB1-3L62     | Available  |
| PCOM-B657VGL-11155MLE             | AB1-3L61     | Available  |
| Accessory                         | Ordering P/N | Status     |
| Heatspreader(whole copper)        | B830B650     | Contact Us |
| Heatspreader (Aluminum)           | B830B660     | Contact Us |
| Carrier (Mini-ITX)PCOM-C605       | AB1-3998     | Available  |
| Evaluation Carrier (ATX)PCOM-C60B | AB1-3G22     | Available  |

## BLOCK DIAGRAM

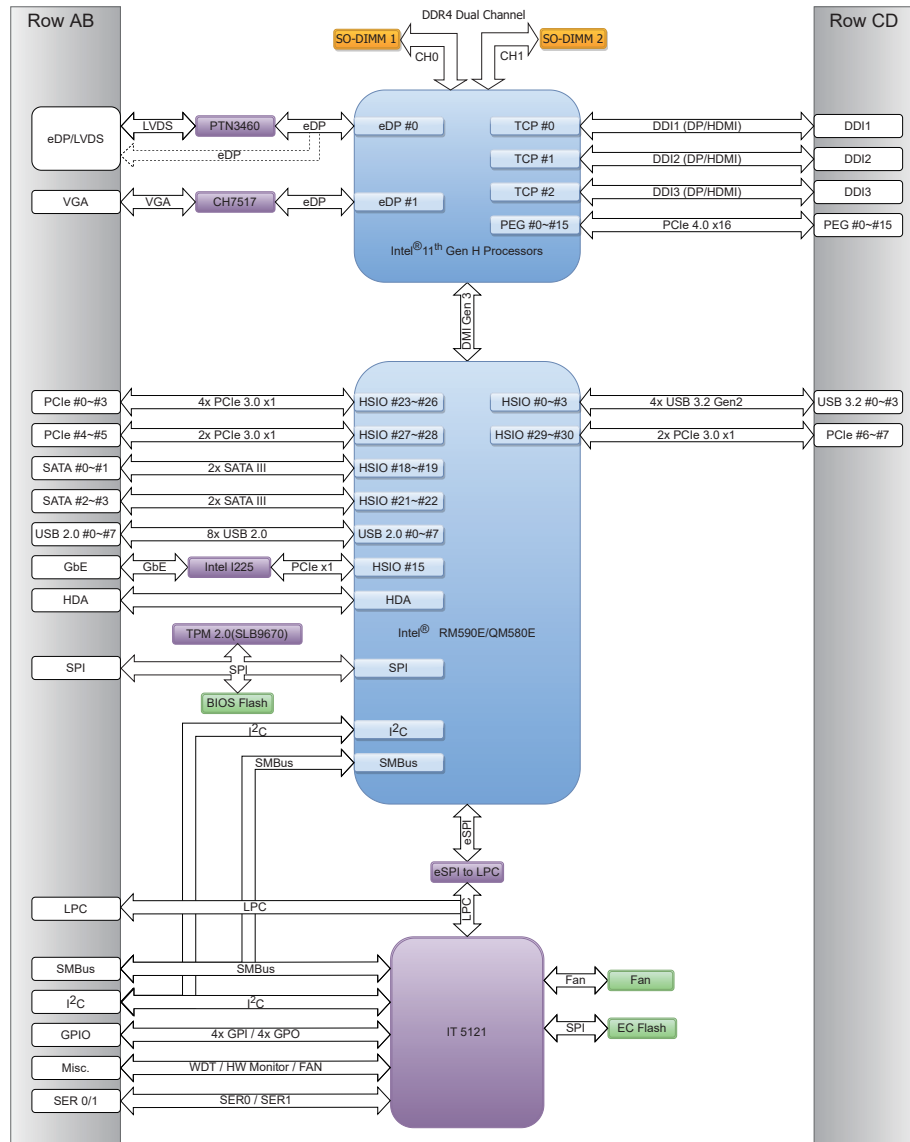
### PCOM-B657VGL

COM Express® Type 6 Basic  
Module 125x95mm

AT / ATX  
Mode

+12VDC  
+5VSB

-40° C ~ +85° C



# PCOM-B700G-NS

Intel® Xeon® D-1600 series SoC based on Type 7 Basic COM Express® module



## FEATURES

- Intel® Xeon® D-1600 Series Processor (Hewitt Lake)
- 3x DDR4 SO-DIMM
- TDP 35w to 45w consumption
- Support -40°C to 85 °C wide temperature(Selected SKU)
- Support Intel® QuickAssist Technology (Intel® QAT)



PCOM-B700G-NS, a Type 7 COM Express® basic size(125 x 95 mm) module which based on Intel® Hewitt Lake Xeon® D-1600 series processors. In this architecture, it could provide up to 8 cores and up to 16 threads processors within the TDP from 35w to 45w, and 4x 10G KR ports and up to 30 Gbps of cryptography offload with Intel® QuickAssist Technology (Intel® QAT), it's also extending 24x PCIe 3.0 and 8x PCIe 2.0 lanes, 4x USB 3.2 Gen1, and 2x SATA III ports. A selected SKU (D-1649N) support wide-temperature range. PCOM-B700G-NS offer an effective upgrade path for solutions already using the previous D-1500 COM Express modules. Portwell want to promotes PCOM-B700G-NS as vertical solution to aim in the different versatile applications, such as edge computing, automation, military, transportation and so on.

## General

|                     |   |              |              |              |                                  |
|---------------------|---|--------------|--------------|--------------|----------------------------------|
| Product             | PCOM-B700G-NS   |              |              |              |                                  |
| Form Factor         | Type 7, Basic Form Factor COM-Express® ( 125 x 95 mm) |              |              |              |                                  |
| Processor           | Intel® Xeon®  |              |              |              |                                  |
|                     | D-1649N   | D-1633N      | D-1623N      | D-1627       | D-1649N (wide-temp)              |
| Core                | 8   | 6            | 4            | 4            | 8                                |
| Freq.               | 2.3 GHz   | 2.5 GHz      | 2.4 GHz      | 2.9 GHz      | 2.3 GHz                          |
| Turbo               | 3.0 GHz   | 3.2 GHz      | 3.2 GHz      | 3.2 GHz      | 3.0 GHz                          |
| Cache               | 12 MB   | 9 MB         | 6 MB         | 6 MB         | 12 MB                            |
| Processor Graphics  | N/A   |              |              |              |                                  |
| Graphics Base Freq. | N/A   |              |              |              |                                  |
| Ethernet            | 4x 10G KR<br>1x GbE LAN (I210AT)                      |              |              |              | 4x 10G KR<br>1x GbE LAN (I210IT) |
| Intel® QAT (Gbps)   | 20 Gbps   | 10 Gbps      | 10 Gbps      | N/A          | 20 Gbps                          |
| Processor TDP       | 45 W  | 45 W         | 35 W         | 45 W         | 45 W                             |
| BIOS                | AMI BIOS  |              |              |              |                                  |
| Memory              | 3x DDR4 SO-DIMM                                       |              |              |              |                                  |
| Temperature Range   | 0°C to 60 °C  | 0°C to 60 °C | 0°C to 60 °C | 0°C to 60 °C | -40°C to 85 °C                   |

## I/O Interface

|             |                                     |                       |
|-------------|-------------------------------------|-----------------------|
| SATA        | 2 x SATA III                        |                       |
| USB         | 8 x USB 2.0<br>4 x USB 3.2 Gen1     |                       |
| Ethernet    | 4x 10G KR<br>1x GbE LAN (I210AT/IT) |                       |
| Serial I/O  | GPIO                                | 8 GPIO                |
|             | I²C                                 | Baud Rate: 400KHz     |
|             | SMBus                               | Baud Rate: 100KHz     |
|             | UART                                | 2 Serial Port (Tx/Rx) |
| PCI Express | 24x PCIe 3.0<br>8x PCIe 2.0         |                       |
| Display     | N/A                                 |                       |
| Security    | TPM 2.0, Intel®AES                  |                       |

# PCOM-B700G-NS

PCOM

## MECHANICAL & ENVIRONMENT

|                       |  |
|-----------------------|--|
| Dimension             | 125 x 95mm   |
| Power DC IN           | 12v ±5%  |
| Storage Temperature   | -40°C to 85°C  |
| Operation Temperature | 0°C to 60°C<br>( selected SKU -40°C to 85 °C )                 |
| Certification         | Contact us   |
| MTBF                  | TBD  |
| Vibration             | TBD  |
| OS                    | Windows 10<br>Linux Wind River7/Ubuntu/Yocto<br>RTOS Windriver |

## ORDERING GUIDE

| Product                 | Ordering P/N | Status     |
|-------------------------|--------------|------------|
| PCOM-B700G-NS-D1649N    | AB1-3K99     | Contact us |
| PCOM-B700G-NS-D1633N    | AB1-3L02     | Contact us |
| PCOM-B700G-NS-D1623N    | AB1-3L00     | Contact us |
| PCOM-B700G-NS-D1627     | AB1-3L01     | Contact us |
| PCOM-B700G-NS-D1649N-WT | AB1-3L89     | Contact us |
| Accessory               | Ordering P/N | Status     |
| Cooler                  | B9972000     | Available  |
| Heat Sink               | B830B350     | Available  |
| Heat Spreader           | B830B360     | Contact us |

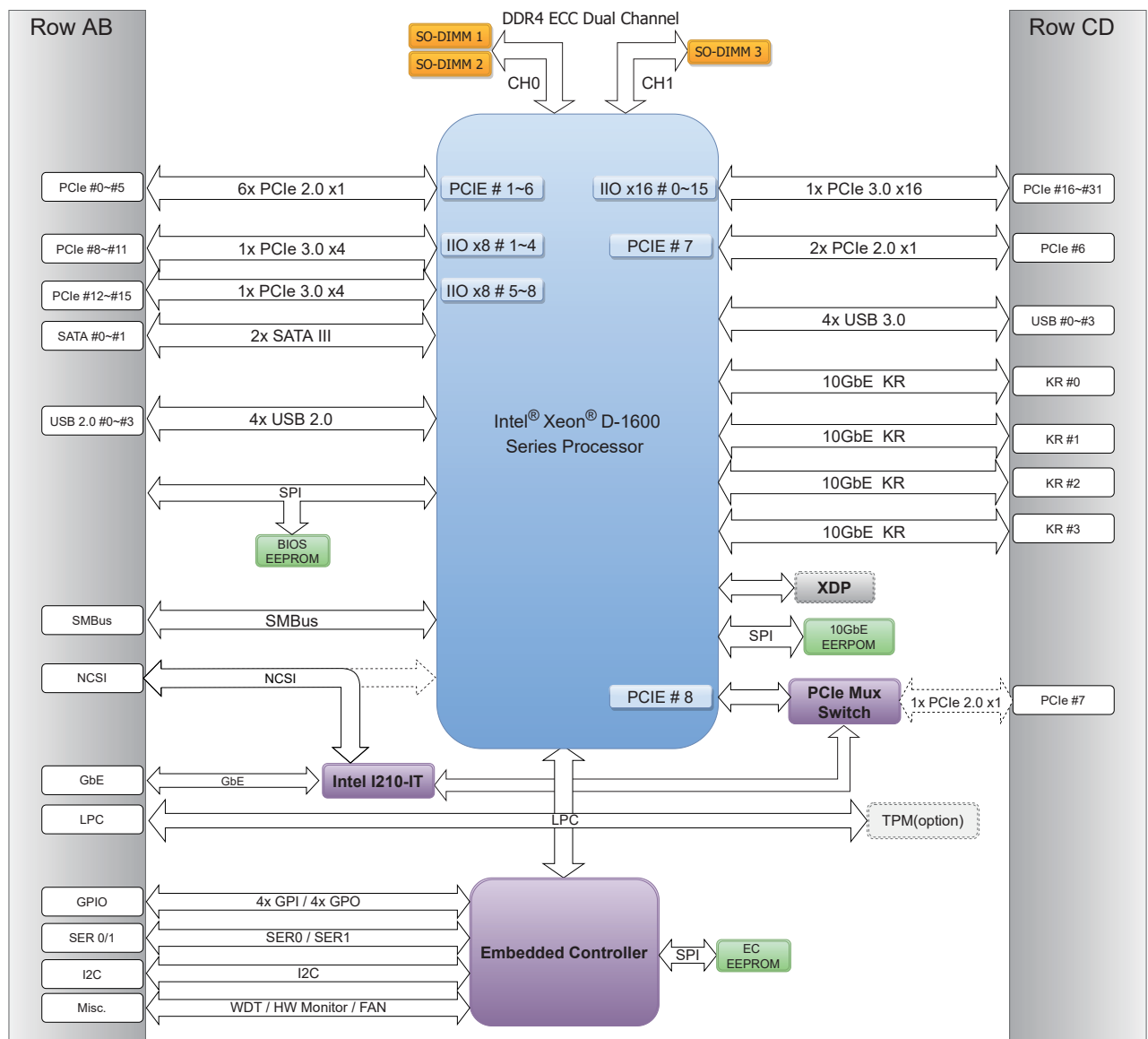
## BLOCK DIAGRAM

### PCOM-B700G-NS

COM Express® Type 7  
Basic Size 125x95mm

AT / ATX Mode

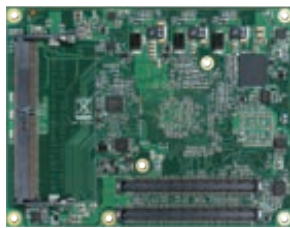
-40° C ~ +85° C  
(Selected SKUs)





# PCOM-B701GT

Intel® Atom® Denverton, Denverton refresh series SoC based on Type 7 Basic COM-Express® module with 3x DDR4 ECC SO-DIMM Socket



## FEATURES

- Intel® Atom® Denverton C3000, C3000R series processors
- DDR4 ECC SDRAM up to 96GB 2400 MT/s
- Support 4x high speed KR up to 10G, 1x 2.5GbE ethernet
- Support Industrial temperature -40°C to 85°C
- Support Intel® QAT Technology



PCOM-B701GT, a type 7 COM Express® module which was developed by Intel® Atom® Denverton C3000, C3000R series processors. In this platform, PCOM-B701GT could provide 4x high speed KR, 4x PCIe 3.0 x 2, 2x USB 3.0, 4x USB 2.0, and 2x SATA III I/O expansion, it also support Intel® QuickAssist Technology (Intel® QAT), and extended temperature (-40°C to 85°C), so it could provide a very saving and high effective performance for different versatile. Portwell want to promote PCOM-B701GT as vertical solution in different applications, such as network, cloud server and workstation.

## General

|                                |   |         |                                      |                                      |                                     |         |
|--------------------------------|---|---------|--------------------------------------|--------------------------------------|-------------------------------------|---------|
| Product                        | PCOM-B701GT   |         |                                      |                                      |                                     |         |
| Form Factor                    | Type 7, Basic Form Factor COM-Express® ( 125 x 95 mm) |         |                                      |                                      |                                     |         |
| Processor                      | Network and Enterprise ( 0°C to 70°C)                 |         | Extended Temperature (-40°C to 85°C) |                                      |                                     |         |
|                                | C3558R  | C3758R  | C3308                                | C3508                                | C3708                               | C3808   |
| Core                           | 4   | 8       | 2                                    | 4                                    | 8                                   | 12      |
| Freq.                          | 2.4 GHz   | 2.4 GHz | 1.6 GHz                              | 1.6 GHz                              | 1.7 GHz                             | 2.0 GHz |
| Turbo                          | 2.1 GHz   |         |                                      | N/A                                  |                                     |         |
| Cache                          | 8MB   | 16MB    | 4MB                                  | 8MB                                  | 12MB                                | 16MB    |
| Processor Graphics             | N/A   |         |                                      |                                      |                                     |         |
| Graphics Base Frequency        |   |         |                                      |                                      |                                     |         |
| Graphics Max Dynamic Frequency |   |         |                                      |                                      |                                     |         |
| HW Encoding                    |   |         |                                      |                                      |                                     |         |
| HW Decoding                    |   |         |                                      |                                      |                                     |         |
| HW Acceleration                |   |         |                                      |                                      |                                     |         |
| Processor TDP                  | 17W   | 26W     | 9.5W                                 | 11.5W                                | 17W                                 | 24W     |
| BIOS                           | AMI BIOS  |         |                                      |                                      |                                     |         |
| ECC Memory Supported           | Yes   |         |                                      |                                      |                                     |         |
| Memory                         | 3x SO-DIMM DDR4 up to 96GB 2400 MT/s                  |         | 1x SO-DIMM DDR4 up to 96GB 1866 MT/s | 3x SO-DIMM DDR4 up to 96GB 1866 MT/s | 3x SO-DIMM DDR4 up to 96GB 2133MT/s |         |

## I/O Interface

|             |                                       |                                       |                                       |                                       |                                       |                                       |
|-------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| SATA        | 2x SATA III                           | 2x SATA III                           | 1x SATA II<br>1x SATA III             | 1x SATA II<br>1x SATA III             | 2x SATA III                           | 2x SATA III                           |
| USB         | 2x USB 3.0<br>4x USB 2.0              | 2x USB 3.0<br>4x USB 2.0              | 4x USB 2.0                            | 1x USB 3.0<br>4x USB 2.0              | 2x USB 3.0<br>4x USB 2.0              | 2x USB 3.0<br>4x USB 2.0              |
| Ethernet    | Intel® I226LM                         |                                       | Intel® I226IT                         |                                       |                                       |                                       |
| Serial I/O  | GPIO                                  |                                       | 8 GPIO                                |                                       |                                       |                                       |
|             | I <sup>2</sup> C                      |                                       | Baud Rate: 400KHz                     |                                       |                                       |                                       |
|             | SMBus                                 |                                       | Baud Rate: 100KHz                     |                                       |                                       |                                       |
|             | UART                                  |                                       | 2 Serial Port (Tx/Rx)                 |                                       |                                       |                                       |
| PEG         | N/A                                   | 1x PCIe 3.0x 8                        | N/A                                   |                                       | 1x PCIe 3.0x 8                        |                                       |
| PCI Express | 3x PCIe 3.0x 2<br>1x PCIe 3.0x 2(LAN) | 3x PCIe 3.0x 2<br>1x PCIe 3.0x 2(LAN) | 3x PCIe 3.0x 2<br>1x PCIe 3.0x 2(LAN) | 3x PCIe 3.0x 2<br>1x PCIe 3.0x 2(LAN) | 3x PCIe 3.0x 2<br>1x PCIe 3.0x 2(LAN) | 3x PCIe 3.0x 2<br>1x PCIe 3.0x 2(LAN) |
| Security    | TPM 2.0                               |                                       |                                       |                                       |                                       |                                       |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 125 x 95mm  |
| Power DC IN           | Normal : +12V<br>Wide range : +9VDC - +18VDC<br>AT/ATX Mode |
| Storage Temperature   | -40°C to 85°C   |
| Operating Temperature | -40°C to 85°C   |
| Certification         | Contact us  |
| MTBF                  | TBD   |
| Vibration             | TBD   |
| OS                    | Windows 10 Pro<br>CentOS 7, 6                               |

## ORDERING GUIDE

| Product            | Ordering P/N | Status     |
|--------------------|--------------|------------|
| PCOM-B701GT-C3808  | AB1-3H90     | Available  |
| PCOM-B701GT-C3708  | AB1-3H89     | Available  |
| PCOM-B701GT-C3508  | AB1-3H86     | Available  |
| PCOM-B701GT-C3308  | AB1-3J01     | Available  |
| PCOM-B701GT-C3758R | AB1-3P54     | Contact us |
| PCOM-B701GT-C3558R | AB1-3P55     | Contact us |

| Accessory                            | Ordering P/N | Status     |
|--------------------------------------|--------------|------------|
| Cooler                               | TBD          | Contact us |
| Heat Sink                            | TBD          | Contact us |
| Heat Spreader                        | TBD          | Contact us |
| PCOM-C701<br>(ATX Carrier board)     | AB1-3J61Z    | Available  |
| PCOM-C701-BMC<br>(ATX Carrier board) | AB1-3K14Z    | Contact us |

## BLOCK DIAGRAM

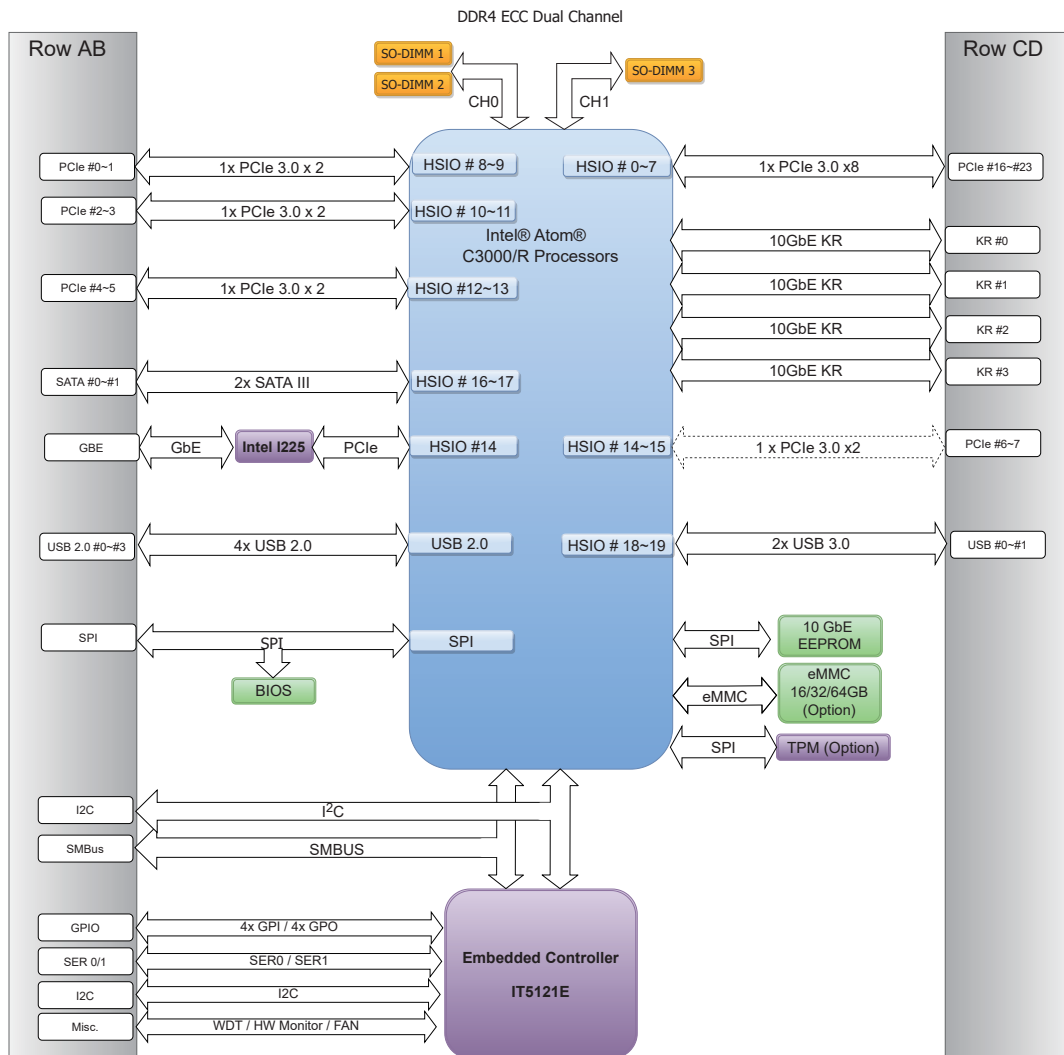
### PCOM-B701GT R1

COM Express® Type 7  
Compact Module 125x95mm

AT / ATX Mode

12V

-40°C ~ +85°C



# PCOM-B702G

**Intel Atom® processor C3000 Series with DDR4 ECC up to 64GB 2133 MT/s on Two SO-DIMM Sockets with up to 12 HSIO Lanes, 4x KR to support 10G, NC-SI Interface, SATA III, USB 2.0 and 3.0**



## FEATURES

- Intel Atom® Processors C3000 Series (Denverton)
- DDR4 1866/2133 MT/s ECC up to 64GB
- Up to 12 HSIO Lanes (based on CPU sku)
- High-speed Ethernet, 4x 10GbE (based on CPU sku) and 1x GbE interfaces
- Wide-Temp (-40°C to 85°C by selected sku) Support



PCOM-B702G, a Type 7 COM Express module, is designed with Intel Atom® processor. Based on the COM Express 3.0 Type 7 pinout definition, when compared to the Type 6 pinout, trades all the graphic interfaces for 10 GbE ports and more PCIe lanes, makes PCOM-B702G ideal for applications in networking, micro server and the like, requiring low power consumption while supporting high computing performance and communication throughput.

PCOM-B702G features four 10GbE LAN interfaces (based on CPU sku) and DDR4 ECC SO-DIMM up to 64GB. It is compatible with Type 7 carrier board.

## General

|                                |   |          |                                      |                                      |
|--------------------------------|---|----------|--------------------------------------|--------------------------------------|
| Product                        | PCOM-B702G  |          |                                      |                                      |
| Form Factor                    | Type 7, Compact Size Form Factor COM Express® (95 X 95mm) |          |                                      |                                      |
| Processor                      | Intel® Atom®  |          |                                      |                                      |
|                                | C3308   | C3338    | C3508                                | C3558                                |
| Core                           | 2   | 2        | 4                                    | 4                                    |
| Freq.                          | 1.60 GHz  | 1.50 GHz | 1.60 GHz                             | 2.20 GHz                             |
| Turbo                          | 2.10 GHz  | 2.20 GHz | 1.60 GHz                             | 2.20 GHz                             |
| Cache                          | 4MB   | 4MB      | 8MB                                  | 8MB                                  |
| Processor Graphics             | N/A   |          |                                      |                                      |
| Graphics Base Frequency        |   |          |                                      |                                      |
| Graphics Max Dynamic Frequency |   |          |                                      |                                      |
| HW Encoding                    |   |          |                                      |                                      |
| HW Decoding                    |   |          |                                      |                                      |
| HW Acceleration                |   |          |                                      |                                      |
| Processor TDP                  | 9.5W  | 8.5W     | 11.5W                                | 16W                                  |
| BIOS                           | AMI BIOS  |          |                                      |                                      |
| ECC Memory Supported           | YES   |          |                                      |                                      |
| Memory                         | 1x SO-DIMM DDR4 up to 32GB 1866 MT/s                      |          | 2x SO-DIMM DDR4 up to 64GB 1866 MT/s | 2x SO-DIMM DDR4 up to 64GB 2133 MT/s |

## I/O Interface

| I/O Interface |  |   |
|---------------|--|---|
| SATA          | 1x SATA III (2x SATA III for C3558)  |   |
| USB           | 1x USB 3.0 (2x USB 3.0 for C3338 and C3558)<br>4x USB 2.0  |   |
| Ethernet      | Intel® I210IT  |   |
| Serial I/O    | GPIO   | 8 bit GPIO (4 in, 4 out)                        |
|               | I²C  | Frequency:100kHz (Default) / 400kHz (available) |
|               | SMBus  | Frequency:100kHz (Default) / 400kHz (available) |
|               | UART   | 2x UART   |
| PCI Express   | C3308: 4x PCIe Gen3 x1<br>C3338: 1x PCIe Gen3 x4 & 3x PCIe Gen3 x1<br>C3508: 1x PCIe Gen3 x4 & 2x PCIe Gen3 x1<br>C3558: 1x PCIe Gen3 x4 & 3x PCIe Gen3 x1 |   |
| Security      | N/A  |   |

## MECHANICAL & ENVIRONMENT

|                       |                            |
|-----------------------|----------------------------|
| Dimension             | 95 x 95mm                  |
| Power DC IN           | 12V DC IN<br>AT mode       |
| Storage Temperature   | -40°C ~ 85°C               |
| Operating Temperature | -40°C ~ 85°C               |
| Certification         | Contact us                 |
| MTBF                  | Contact us                 |
| Vibration             | Contact us                 |
| OS                    | Windows 10 Pro, CentOS 7.6 |

## ORDERING GUIDE

| Product          | Ordering P/N | Status    |
|------------------|--------------|-----------|
| PCOM-B702G-C3558 | AB1-3H49     | Available |
| PCOM-B702G-C3508 | AB1-3J40     | Available |
| PCOM-B702G-C3338 | AB1-3H46     | Available |
| PCOM-B702G-C3308 | AB1-3H45     | Available |

| Accessory                            | Ordering P/N | Status     |
|--------------------------------------|--------------|------------|
| Cooler                               | TBD          | Contact us |
| Heat Sink                            | B830A920     | Available  |
| Heat Spreader                        | TBD          | Contact us |
| PCOM-C701(ATX Carrier board)         | AB1-3J61Z    | Available  |
| PCOM-C701-BMC<br>(ATX Carrier board) | AB1-3K14Z    | Contact us |

## BLOCK DIAGRAM

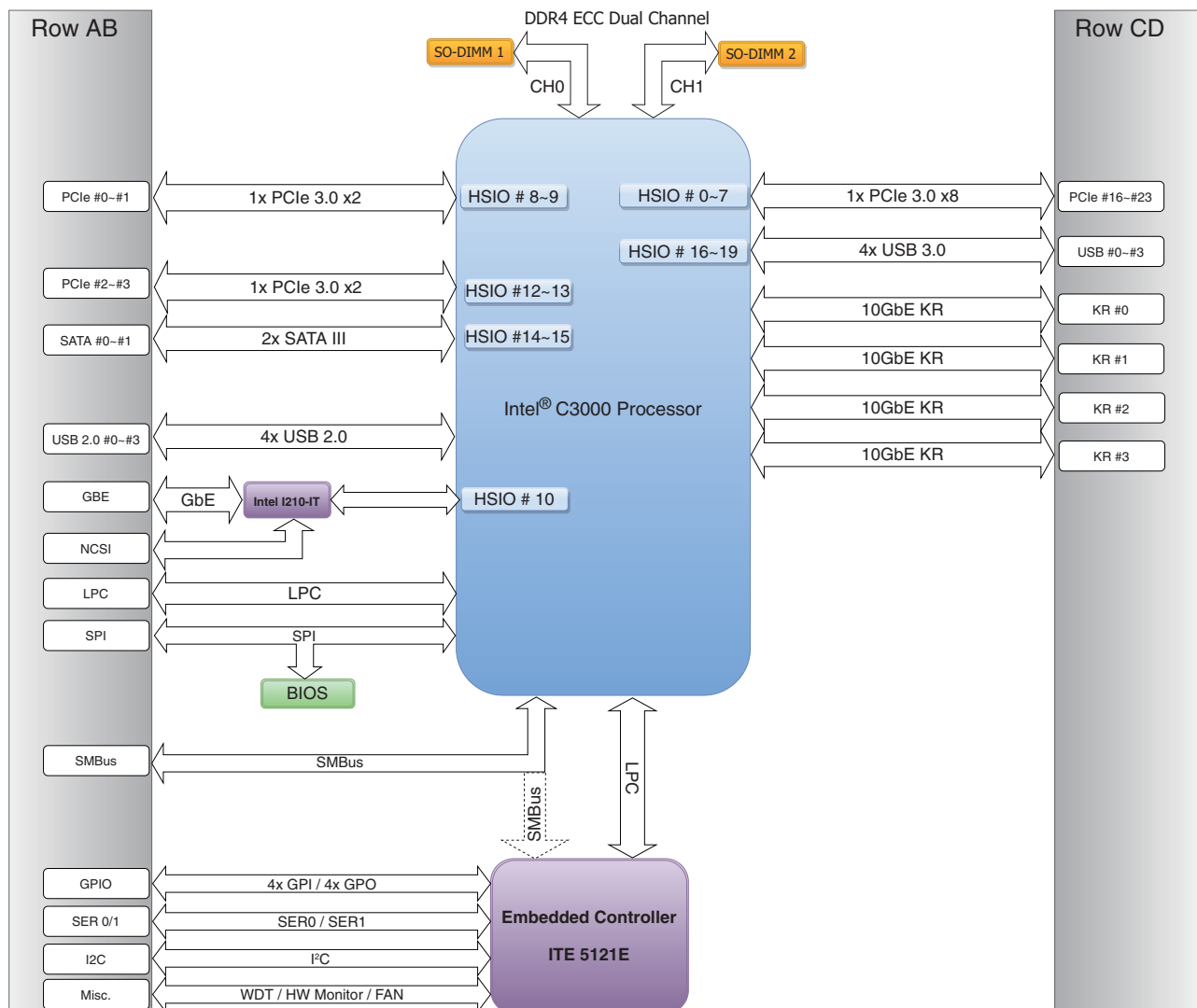
### PCOM-B702G

COM Express® Type 7  
Compact Module 95x95mm

AT Mode

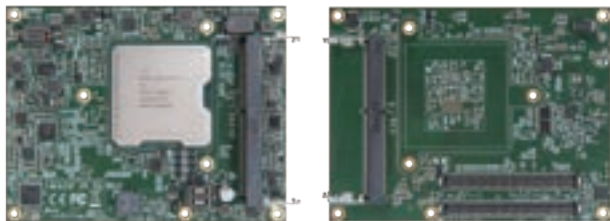
12VDC+/-20%

-40° C ~ +85° C  
(Selected SKUs)



# PCOM-B704-GT

COM Express Type 7 Basic module with Intel® Xeon® D-1700 series Processor (Ice-Lake-D LCC)



## FEATURES

- Intel® Xeon® D-1700 Series Processor (Ice-Lake-D LCC)
- AI/Deep Learning Accelerate Data Analytics with Intel® AVX-512 and VNNI
- 4x USB2.0/3.2 Gen 2x1, 2x SATAIII, 4x 10G KR, 2x UART
- TDP 40w to 67w consumption
- Selected SKU support -40°C to 85°C wide temperature



PCOM-B704GT, a Type 7 COM Express® basic size(125 x 95 mm) module which based on Intel® Xeon® Ice-Lake-D LCC D-1700 series processors. It is compatible with COMe 3.0 standard. In this architecture, it could provide up to 10 cores processors within the TDP from 40w to 67w. A selected SKU support wide-temperature range. PCOM-B704GT features four 10GbE KR LAN interfaces, 16 PCIe 4.0 lanes and 16 PCIe 3.0 lanes, TPM 2.0 and two DDR4 SO-DIMM up to 64GB in total. Portwell wants to promote PCOM-B704GT as a vertical solution to aim in the different versatile applications, such as edge computing, automation, military, transportation and so on.

## General

|                         |   |             |           |             |             |
|-------------------------|---|-------------|-----------|-------------|-------------|
| Product                 | PCOM-B704GT   |             |           |             |             |
| Form Factor             | Type 7, Basic Form Factor COM-Express® ( 125 x 95 mm) |             |           |             |             |
| Processor               | Intel® Xeon® D-1700 series                            |             |           |             |             |
|                         | D-1712TR  | D-1715TER   | D-1735TR  | D-1732TE    | D-1746TER   |
| Core                    | 4   | 4           | 8         | 8           | 10          |
| Freq.                   | 2.0 GHz   | 2.4 GHz     | 2.2 GHz   | 1.9 GHz     | 2.0 GHz     |
| Turbo                   | 2.5 GHz   | 2.9 GHz     | 2.7 GHz   | 2.4 GHz     | 2.5 GHz     |
| Cache                   | 10MB  | 10MB        | 15MB      | 15MB        | 15MB        |
| Processor Graphics      | N/A   |             |           |             |             |
| Graphics Base Frequency | N/A   |             |           |             |             |
| Ethernet                | Intel® I210IT   |             |           |             |             |
| Processor TDP           | 40W   | 50W         | 59W       | 52W         | 67W         |
| BIOS                    | AMI BIOS  |             |           |             |             |
| ECC Memory Supported    | Yes   |             |           |             |             |
| Memory                  | 2x DDR4 SO-DIMM up to 64GB 2933MT/s                   |             |           |             |             |
| Temperature Range       | 0 ~ 60 °C   | -40 ~ 85 °C | 0 ~ 60 °C | -40 ~ 85 °C | -40 ~ 85 °C |

## I/O Interface

|             |                              |  |
|-------------|------------------------------|--|
| SATA        | 2 x SATA III                 |  |
| USB         | 4 x USB 3.2 Gen1/USB 2.0     |  |
| Ethernet    | 4x 10G KR<br>1x GbE LAN      |  |
| Serial I/O  | GPIO                         | 8 bit GPIO (Default 4 input/4 output)          |
|             | I <sup>2</sup> C             | Frequency:50kHz (Default) / 400kHz (available) |
|             | SMBus                        | Frequency:100kHz (Default) / 1MHz (available)  |
|             | UART                         | 2 Serial Port (TX/RX signal only)              |
| PCI Express | 16x PCIe 3.0<br>16x PCIe 4.0 |  |
| Display     | N/A                          |  |
| Security    | TPM 2.0, Intel®AES           |  |

## MECHANICAL & ENVIRONMENT

|                       |  |
|-----------------------|--|
| Dimension             | 125 x 95 mm  |
| Power DC IN           | Normal: +12V DC<br>AT/ATX mode                       |
| Storage Temperature   | -40 ~ 85 °C  |
| Operating Temperature | -40 ~ 85 °C<br>( Selected SKU 0 ~ 60 °C )            |
| Certification         | Contact us   |
| MTBF                  | Contact us   |
| Vibration             | Contact us   |
| OS                    | Windows 10 IoT Enterprise<br>Windows Server<br>Linux |

## ORDERING GUIDE

| Product              | Ordering P/N | Status         |
|----------------------|--------------|----------------|
| PCOM-B704GT-D1746TER | TBD          | In Development |
| PCOM-B704GT-D1735TR  | TBD          | In Development |
| PCOM-B704GT-D1732TE  | TBD          | In Development |
| PCOM-B704GT-D1715TER | TBD          | In Development |
| PCOM-B704GT-D1712TR  | TBD          | In Development |

| Accessory     | Ordering P/N | Status         |
|---------------|--------------|----------------|
| Cooler        | TBD          | In Development |
| Heat Sink     | TBD          | In Development |
| Heat Spreader | TBD          | In Development |

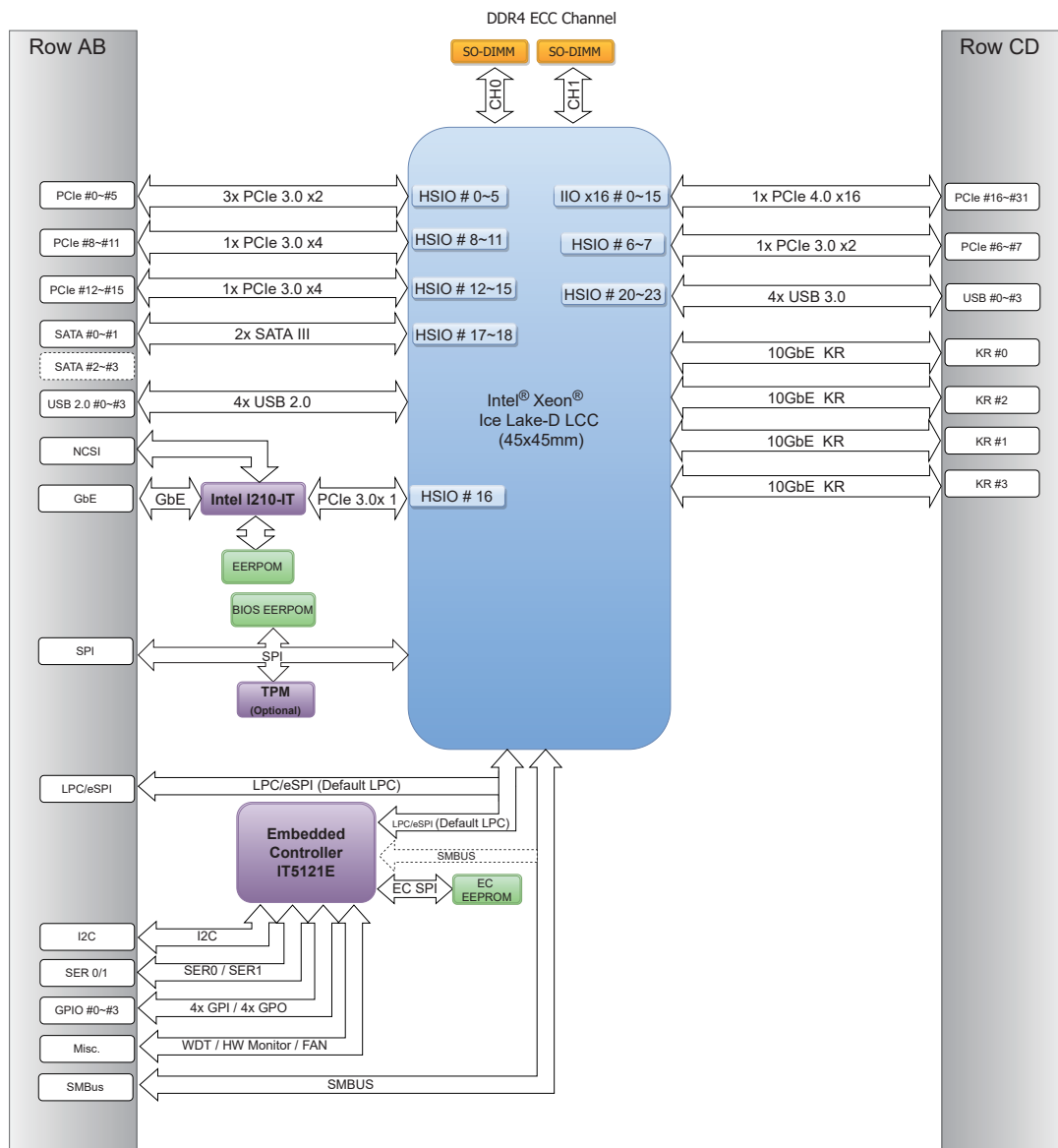
## BLOCK DIAGRAM

### PCOM-B704-GT

COM Express® Type 7  
Basic Module 125x95mm

AT / ATX Mode

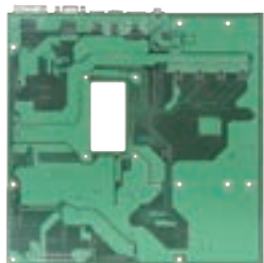
-40°C ~ +85°C  
(Selected SKUs)





# PCOM-CA00

Micro-ATX Form Factor Evaluation Carrier Board for  
Type 10 Com-Express® Rev 3.0 Module



## FEATURES

- COM Express® carrier board is compatible with the Portwell Type 10 COM Express® modules
- Micro-ATX form factor provides extra expansions slot, and follows the standard space mounting
- Supports 2x USB 3.0, 8x USB 2.0, 2x SATAIII, 4x PCIe x1



Portwell PCOM-CA00 provides the COM-Express type 10 connector with Micro-ATX form factor. This carrier board passed all of Portwell evaluation testing. And it supports VGA(via eDP), LVDS and DP display, and multiple I/O interfaces, including 4x PCIe x1, 1x 2.5Gb RJ45, 2x USB 3.0, 8x USB 2.0, 2x serial ports, and 2x SATA III. For more product features, please refer to the user manual or contact your distributor.

## General

|                                |                                   |
|--------------------------------|-----------------------------------|
| Product                        | PCOM-CA00                         |
| Form Factor                    | Type 10, Micro-ATX (244 x 244 mm) |
| Processor                      | Depends on Module                 |
| Core                           |                                   |
| Freq.                          |                                   |
| Turbo                          |                                   |
| Cache                          |                                   |
| Processor Graphics             |                                   |
| Graphics Base Frequency        |                                   |
| Graphics Max Dynamic Frequency |                                   |
| HW Encoding                    |                                   |
| HW Decoding                    |                                   |
| HW Acceleration                |                                   |
| Processor TDP                  |                                   |
| BIOS                           |                                   |
| ECC Memory Supported           |                                   |
| Memory                         |                                   |

## I/O Interface

| I/O Interface |                       |                            |                       |
|---------------|-----------------------|----------------------------|-----------------------|
| SATA          | 2 x SATA III          |                            |                       |
| USB           | 2x USB 3.0, 8x USB2.0 |                            |                       |
| Ethernet      | 1x 2.5Gb RJ45         |                            |                       |
| Serial I/O    | GPIO                  | 8 GPIO                     |                       |
|               | I <sup>2</sup> C      | Baud Rate : 400KHz         |                       |
|               | SMBus                 | Baud Rate : 100KHz         |                       |
|               | UART                  | 2 Serial Port (Tx/Rx)      |                       |
| PEG           | N/A                   |                            |                       |
| PCI Express   | 4 x PCIe x 1          |                            |                       |
| Display       | Default               | Options                    | Resolution            |
|               | LVDS / eDP            | LVDS (24bit, dual channel) | Up to 1920x1200 @60Hz |
|               |                       | eDP to VGA                 | Up to 1920x1200 @60Hz |
|               | DDI                   | DP                         | Up to 1920x1600 @60Hz |
| Security      | N/A                   |                            |                       |

## MECHANICAL & ENVIRONMENT

|                       |                            |
|-----------------------|----------------------------|
| Dimension             | 244 x 244 mm               |
| Power DC IN           | Micro-ATX                  |
| Storage Temperature   | -40°C to 80°C              |
| Operation Temperature | -40°C to 80°C              |
| Certification         | Contact us                 |
| MTBF                  | Over 100,000 hours at 40°C |
| Vibration             | N/A                        |
| OS                    | Depends on module          |

## ORDERING GUIDE

| Product   | Ordering P/N | Status    |
|-----------|--------------|-----------|
| PCOM-CA00 | AB1-3917     | Available |

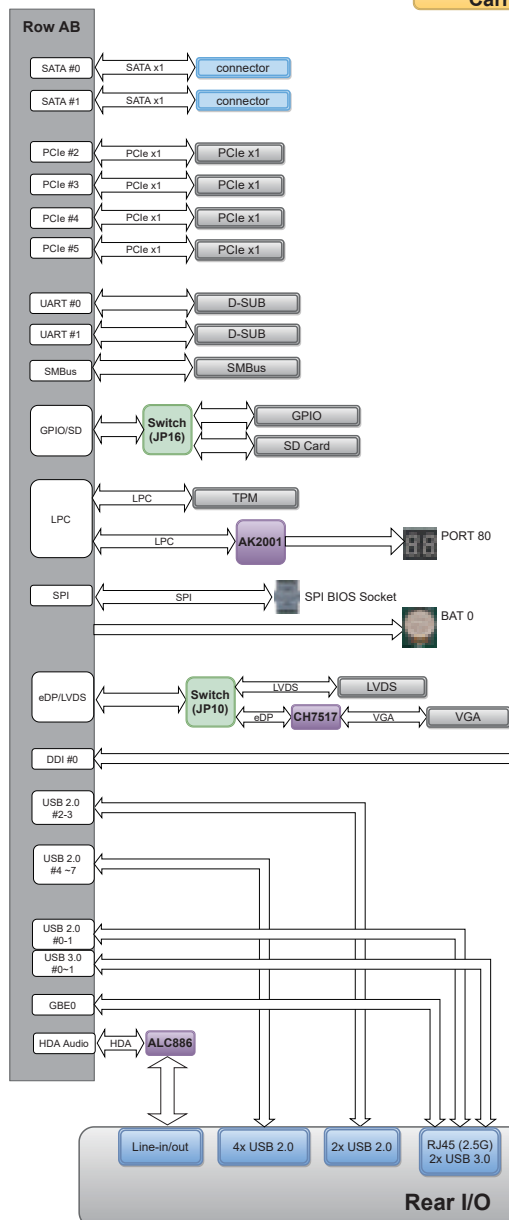
## BLOCK DIAGRAM

### PCOM-CA00

COM Express Type 10  
Carrier Board

ATX Form  
Factor

-40 ~ +80° C



#### Power Connector

|                         |                            |
|-------------------------|----------------------------|
| ATX Power 20P Connector | ATX 4P Connector           |
| CPU Fan Power Connector | System Fan Power Connector |

#### Connectors

|                |     |
|----------------|-----|
| Audio Line out | TPM |
|----------------|-----|

#### Front Panel Header

|              |       |
|--------------|-------|
| SATA ACTION  | RESET |
| Power_ON/OFF |       |

#### Jumpers

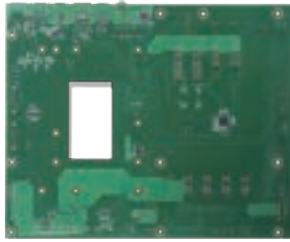
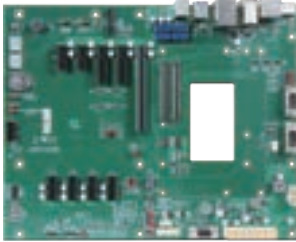
|               |                  |                        |
|---------------|------------------|------------------------|
| SDP           | eDP/LVDS Select  | SD/GPIO Select         |
| LVDS Invertor | LVDS Light Power | Boot Up BIOS Selection |
| LVDS Power    | ATI/ATX Mode     |                        |
| 5VSB          | COMS Setting     |                        |

#### Button LED

|           |                 |
|-----------|-----------------|
| PWR BTN   | Status S3/S4/S5 |
| RST BTN   | 5VSB            |
| SLEEP BTN | VCC             |
| LED BTN   | 12V             |

# PCOM-C60B

ATX Form Factor Evaluation Carrier Board for Type 6 COM-Express® Rev 3.0 Module



## FEATURES

- COM Express® carrier board is compatible with the Portwell Type 6 COM Express® modules
- Support 4x USB 3.2, 8x USB 2.0, 4x SATA III Ports
- Support multiple displays(eDP, DP, VGA, LVDS)
- Support 1x PEG(Gen4), 2x PCIe x4, 6x PCIe x1, 2.5G Ethernet



Portwell PCOM-C60B is designed to as a validation board for most of the Portwell COM-Express 3.0 type 6 modules, this carrier will support VGA, eDP/LVDS, DP displays, and included multiple I/O expansions, for example PEG, PCIe, USB3.2, SATAIII and 2.5G ethernet.

## General

|                                |                          |
|--------------------------------|--------------------------|
| Product                        | PCOM-C60B                |
| Form Factor                    | Type6, ATX (305 X 244mm) |
| Processor                      | Depends on Module        |
| Core                           |                          |
| Freq.                          |                          |
| Turbo                          |                          |
| Cache                          |                          |
| Processor Graphics             |                          |
| Graphics Base Frequency        |                          |
| Graphics Max Dynamic Frequency |                          |
| HW Encoding                    |                          |
| HW Decoding                    |                          |
| HW Acceleration                |                          |
| Processor TDP                  |                          |
| BIOS                           |                          |
| ECC Memory Supported           |                          |
| Memory                         |                          |

## I/O Interface

|             |                                       |                         |                   |
|-------------|---------------------------------------|-------------------------|-------------------|
| SATA        | 4x SATA III                           |                         |                   |
| USB         | 4x USB 3.2 Gen2<br>8x USB 2.0 / 1 OTG |                         |                   |
| Ethernet    | 1x GbE (1G/2.5G)                      |                         |                   |
| Serial I/O  | GPIO                                  | 8 bit GPIO              |                   |
|             | I <sup>2</sup> C                      | base on module design   |                   |
|             | SMBus                                 | base on module design   |                   |
|             | UART                                  | 2 x Serial Port (Tx/Rx) |                   |
| PEG         | 1x PCIe x16 (Gen4)                    |                         |                   |
| PCI Express | 2 x PCIe x 4<br>6 x PCIe x 1          |                         |                   |
| Display     | Default                               | Options                 | Resolution        |
|             | VGA                                   | VGA                     | Depends on module |
|             | LVDS                                  | 24bit dual channel LVDS |                   |
|             |                                       | eDP                     |                   |
|             | DDI0                                  | DP                      |                   |
|             | DDI1                                  | DP                      |                   |
|             | DDI2                                  | DP                      |                   |
| Security    | Depends on module                     |                         |                   |

## ORDERING GUIDE

|                       |                            |
|-----------------------|----------------------------|
| Dimension             | 305 X 244mm                |
| Power DC IN           | Support ATX power supply   |
| Storage Temperature   | -40°C to 80°C              |
| Operation Temperature | -40°C to 80°C              |
| Certification         | Contact us                 |
| MTBF                  | Over 100,000 hours ar 40°C |
| Vibration             | Contact us                 |
| OS                    | Depends on Module          |

| Product    | Ordering P/N | Status         |
|------------|--------------|----------------|
| PCOM-C60B  | AB1-3G2Z2    | In Development |
| Accessory  | Ordering P/N | Status         |
| LVDS Cable | TBD          | In Development |
| eDP Cable  | TBD          | In Development |

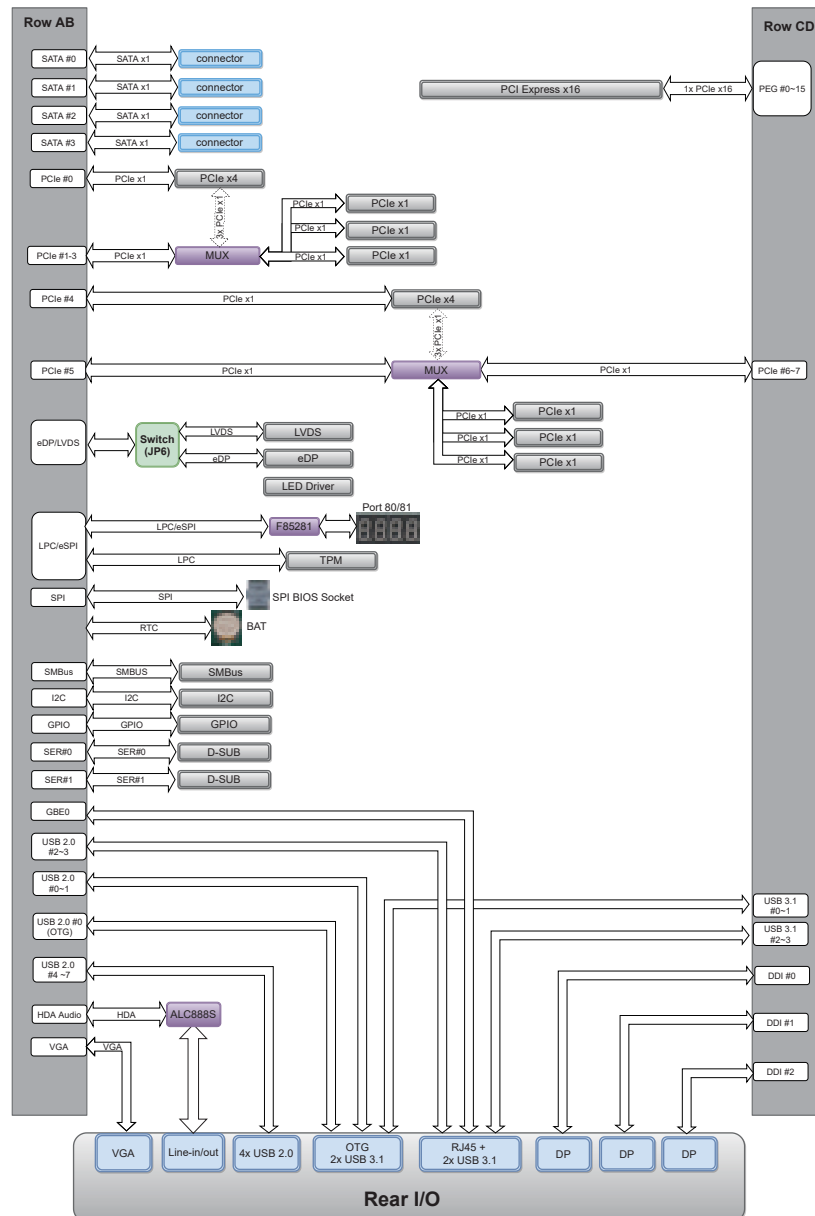
## BLOCK DIAGRAM

# PCOM-C60B<sub>ZR4</sub>

## COM Express Type 6 Carrier Board

**ATX Form  
Factor**

-40 ~ +80° C



# PCOM-C605

Mini-ITX Form Factor Evaluation Carrier Board for Type 6 Com-Express® Rev 2.1 Module



## FEATURES

- COM Express® carrier board is compatible with the Portwell Type 6 COM Express® modules
- Support 4x USB 3.0, 2x USB 2.0, 3x SATA Ports, 1x CFEX
- Support multiple displays(DP, HDMI, VGA, LVDS)
- Support 1 x PEG 2 x PCIe Golden Figer

Portwell PCOM-C605 is designed to as a validation board for most of the Portwell COM-Express 2.1 type 6 modules, this carrier will support VGA, LVDS, DP, HDMI displays, and included multiple I/O expansions, for example PEG, PCIe, USB3.0. SATA III and CFEX.

## General

|                                |                                 |
|--------------------------------|---------------------------------|
| Product                        | PCOM-C605                       |
| Form Factor                    | Type 6, Mini-ITX (170 x 170 mm) |
| Processor                      | Depends on Module               |
| Core                           |                                 |
| Freq.                          |                                 |
| Turbo                          |                                 |
| Cache                          |                                 |
| Processor Graphics             |                                 |
| Graphics Base Frequency        |                                 |
| Graphics Max Dynamic Frequency |                                 |
| HW Encoding                    |                                 |
| HW Decoding                    |                                 |
| HW Acceleration                |                                 |
| Processor TDP                  |                                 |
| BIOS                           |                                 |
| ECC Memory Supported           |                                 |
| Memory                         |                                 |

## I/O Interface

| I/O Interface |                                       |  |                   |
|---------------|---------------------------------------|--|-------------------|
| SATA          | 1 x CFEX<br>1 x SATA III, 2 x SATA II |  |                   |
| USB           | 4 x USB 3.0, 4 x USB2.0               |  |                   |
| Ethernet      | 2 x GbE                               |  |                   |
| Serial I/O    | GPIO                                  | 8 bit GPIO   |                   |
|               | I <sup>2</sup> C                      | Based on module desing                                       |                   |
|               | SMBus                                 | Based on module desing                                       |                   |
|               | UART                                  | 2 x Serial Port (SuperI/O, RS232)<br>1 x Serial Port (Tx/Rx) |                   |
| PEG           | 1 x PCIe x 16 (Gen3)                  |  |                   |
| PCI Express   | 2 x PCIe x 1 Golden Finger            |  |                   |
| Display       | Default                               | Options  | Resolution        |
|               | VGA                                   | VGA  | Depends on module |
|               | LVDS                                  | 24bit dual channel LVDS                                      |                   |
|               | DDI0                                  | DP   |                   |
|               | DDI1                                  | HDMI   |                   |
| Security      | Depends on module                     |  |                   |

## MECHANICAL & ENVIRONMENT

|                       |                            |
|-----------------------|----------------------------|
| Dimension             | 170 x 170 mm               |
| Power DC IN           | Support ATX power supply   |
| Storage Temperature   | -40°C to 80°C              |
| Operation Temperature | -40°C to 80°C              |
| Certification         | Contact us                 |
| MTBF                  | Over 100,000 hours at 40°C |
| Vibration             | N/A                        |
| OS                    | Depends on module          |

## ORDERING GUIDE

| Product   | Ordering P/N | Status    |
|-----------|--------------|-----------|
| PCOM-C605 | AB1-3998     | Available |

| Accessory  | Ordering P/N | Status         |
|------------|--------------|----------------|
| VGA Cable  | B7864720     | Available      |
| LVDS Cable | TBD          | In Development |

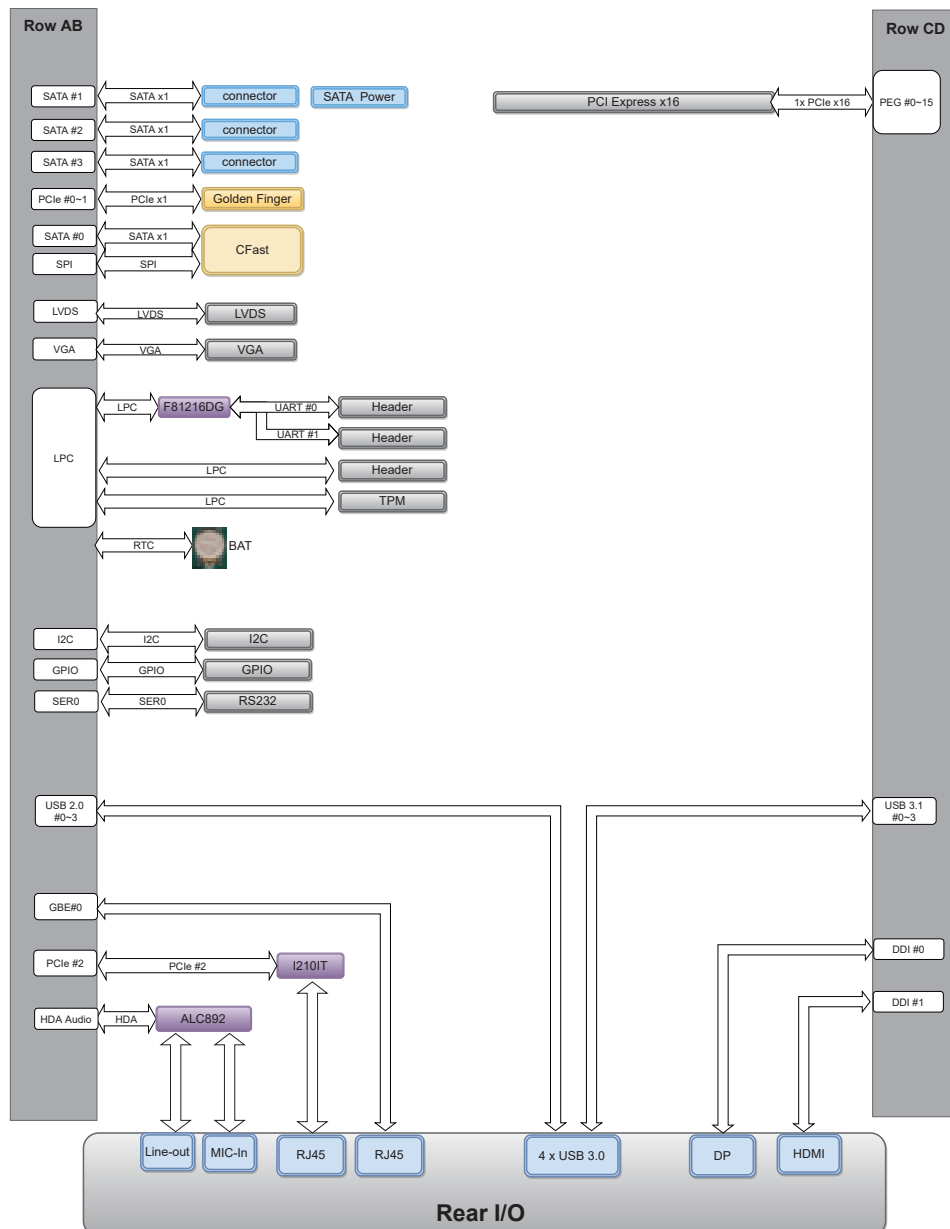
## BLOCK DIAGRAM

### PCOM-C605 R3

COM Express Type 6  
Carrier Board

Mini-ITX  
Form Factor

0 ~ +60°C





# PCOM-C615

PCOM-C615 is PICMG 1.3 Full Size Form Factor Evaluation Carrier Board for COM Express® Revision 2.0 Type VI Module. PCOM-C615 follows standard PICMG 1.3 golden finger pin definition and let customer save system total cost for easily upgrading modules



## FEATURES

- Supports four SATA III ports
- Supports multiple display by LVDS, HDMI, DP on board and DVI-I (DVI-D+VGA) on bracket (Choose either HDMI or VGA by BIOS)
- Rich I/O interfaces such as serial ports, USB, PCI



Portwell PCOM-C615 is designed with PICMG 1.3 form factor with COM Express Type VI row connectors, suitable for evaluation testing of Portwell's Type VI COM Express modules on PCIe, PEG, VGA/HDMI, DVI, USB and SATA interface.

## General

|                                |                              |
|--------------------------------|------------------------------|
| Product                        | PCOM-C615                    |
| Form Factor                    | PICMG 1.3 (338.5 x 126.39mm) |
| Processor                      | Depends on Module            |
| Core                           |                              |
| Freq.                          |                              |
| Turbo                          |                              |
| Cache                          |                              |
| Processor Graphics             |                              |
| Graphics Base Frequency        |                              |
| Graphics Max Dynamic Frequency |                              |
| HW Encoding                    |                              |
| HW Decoding                    |                              |
| HW Acceleration                |                              |
| Processor TDP                  |                              |
| BIOS                           |                              |
| ECC Memory Supported           |                              |
| Memory                         |                              |

## I/O Interface

|             |  |                              |
|-------------|--|------------------------------|
| SATA        | 4 x SATA III (2 ports through backplane)   |                              |
| USB         | 2 x USB3.1 Gen2 ports on bracket<br>2 x USB3.1 Gen1 ports on board<br>4 x USB2.0 ports through backplane |                              |
| Ethernet    | 2 x GbE  |                              |
| Serial I/O  | GPIO   | 8 bit GPIO                   |
|             | I²C  | base on module design        |
|             | SMBus  | base on module design        |
|             | UART   | 1x RS232<br>1x RS232/422/485 |
| PEG         | 1x PCIe x16 (PCIe Gen3)  |                              |
| PCI Express | 4x PCIe x1 or 1x PCIe x4 by different bios support (PCIe Gen3)   |                              |
| Display     | HDMI   | base on module design        |
|             | DP   |                              |
|             | DVI-I (DVI-D/VGA)  |                              |
|             | 24bit dual channel LVDS  |                              |
| Security    | N/A  |                              |

## MECHANICAL & ENVIRONMENT

|                       |                            |
|-----------------------|----------------------------|
| Dimension             | 338.5 x 126.39mm           |
| Power DC IN           | Support ATX power supply   |
| Storage Temperature   | -20°C to 80°C              |
| Operation Temperature | 0°C to 60°C                |
| Certification         | CE, FCC                    |
| MTBF                  | Over 100,000 hours at 40°C |
| Vibration             | N/A                        |
| OS                    | Depends on Module          |

## ORDERING GUIDE

| Product   | Ordering P/N | Status    |
|-----------|--------------|-----------|
| PCOM-C615 | ABI-3J53     | Available |

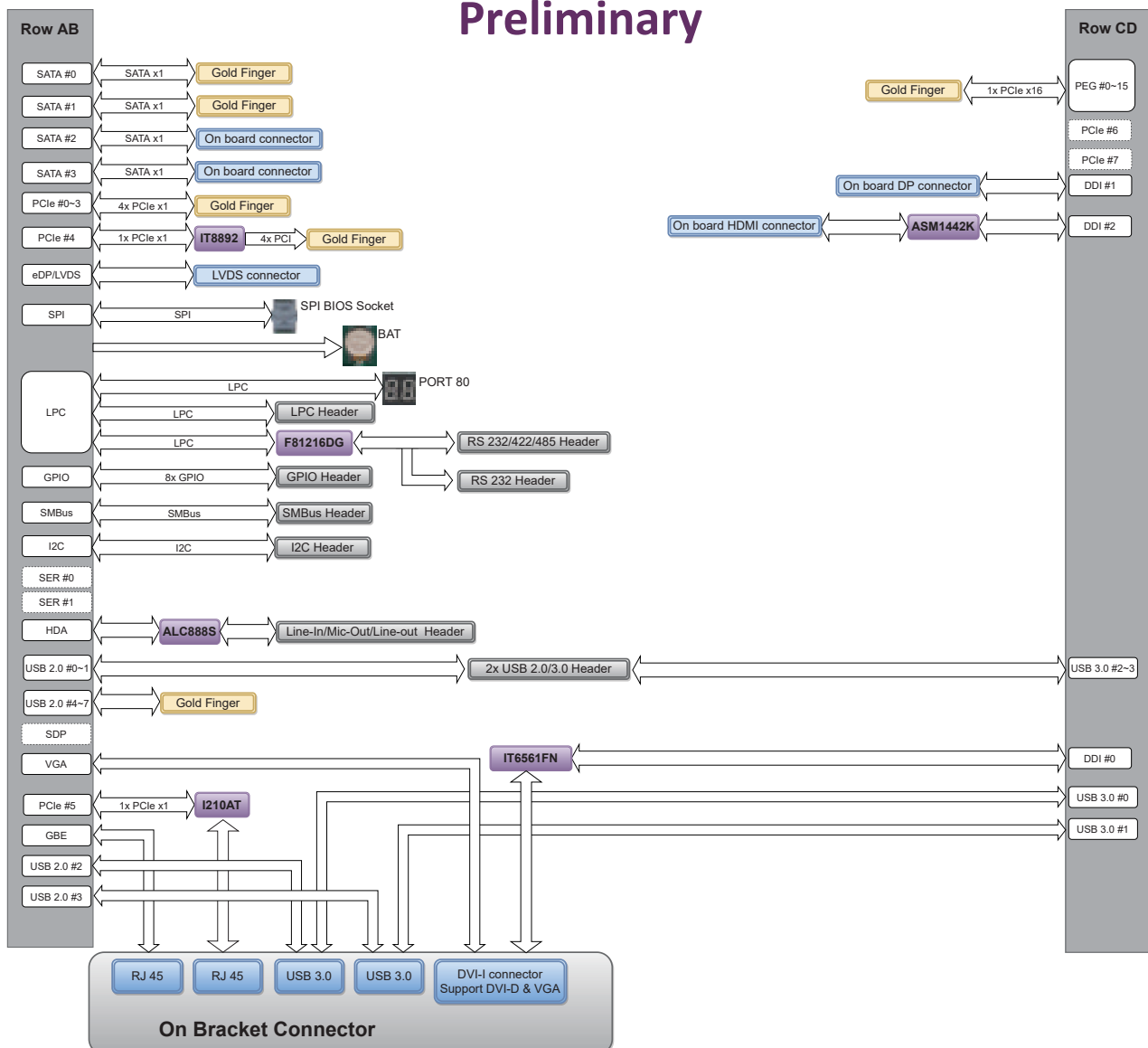
## BLOCK DIAGRAM

**PCOM-C615** ZR0

COM Express Type 6  
Carrier Board

-20 ~ +80° C

Preliminary



# PCOM-C701

ATX Form Factor Evaluation Carrier Board for COM Express  
Revision 3.0 Type VII Module with 4x 10GbE Support with  
Inphi CS4227 PHY



## FEATURES

- Support both AT and ATX mode
- 10G PHY: Inphi CS4227
- 1x GbE, 4x 10GbE SFP+
- 32 PCIe Lanes, 2 SATA III, 4 USB 3.0, 4 USB 2.0



Portwell PCOM-C701 is designed with ATX form factor with COM Express Type VII row connectors; it's suitable for evaluation testing of Portwell's Type VII COM Express modules with 4x USB 3.0, 32x PCIe lanes, 4x 10 Gigabit Ethernet, and BMC AST2500 support. Portwell is able to provide carrier board design guide for customer to design their carrier board as a reference. This can shorten customer's carrier board developing time and make the development quick and easy. The PCOM-C701 provides COM Express Type VII support in addition to fulfill wide range of device connectivity for prototype and flexibility .

## General

|                                |                               |
|--------------------------------|-------------------------------|
| Product                        | PCOM-C701                     |
| Form Factor                    | ATX Form Factor (305 X 244mm) |
| Processor                      | Depends on module             |
| Core                           |                               |
| Freq.                          |                               |
| Turbo                          |                               |
| Cache                          |                               |
| Processor Graphics             |                               |
| Graphics Base Frequency        |                               |
| Graphics Max Dynamic Frequency |                               |
| HW Encoding                    |                               |
| HW Decoding                    |                               |
| HW Acceleration                |                               |
| Processor TDP                  |                               |
| BIOS                           |                               |
| ECC Memory Supported           |                               |
| Memory                         |                               |

## I/O Interface

|             |  |                          |
|-------------|--|--------------------------|
| SATA        | 2x SATA III (Port 0/1)                                 |                          |
| USB         | 4x USB 3.0 (Port 0~3)<br>4x USB 2.0 (Port 0~3)         |                          |
| Ethernet    | 1x GbE, 4x 10GbE SFP+                                  |                          |
| Serial I/O  | GPIO   | 8 bit GPIO (4 in, 4 out) |
|             | I <sup>2</sup> C                                       | 1                        |
|             | SMBus  | 1                        |
|             | UART   | 2                        |
| PCI Express | 1x PCIe Gen3 x16<br>3x PCIe Gen3 x4<br>4x PCIe Gen3 x1 |                          |
| Display     | Unavailable in Type7                                   |                          |
| Security    | N/A  |                          |

## MECHANICAL & ENVIRONMENT

|                       |   |
|-----------------------|---|
| Dimension             | 305 X 244mm   |
| Power DC IN           | Single Power: +12V DC<br>PSU connector available<br>AT/ATX mode |
| Storage Temperature   | -40°C to 85°C   |
| Operation Temperature | -40°C to 85°C<br>0°C to 70°C for BMC and 10G                    |
| Certification         | Contact us  |
| MTBF                  | Contact us  |
| Vibration             | Contact us  |
| OS                    | Depends on Module   |

## ORDERING GUIDE

| Product   | Ordering P/N | Status    |
|-----------|--------------|-----------|
| PCOM-C701 | AB1-3J61Z    | Available |

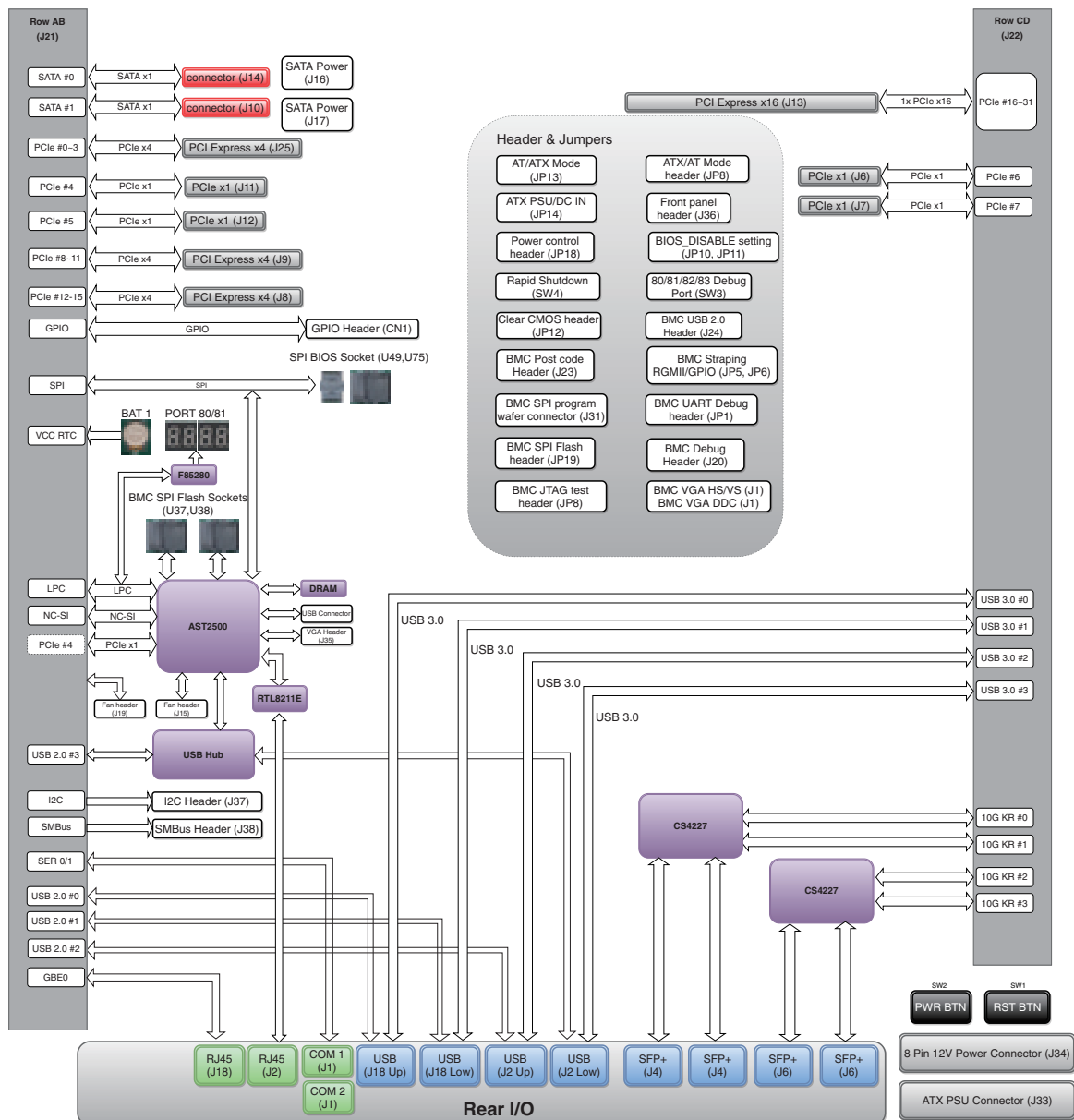
## BLOCK DIAGRAM

### PCOM-C701

ZR1

COM Express Type 7  
Carrier Board

AT/ATX Form  
Factor

-40 ~ +80° C  
0 ~ +70° C (BMC, 10G)


# 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.

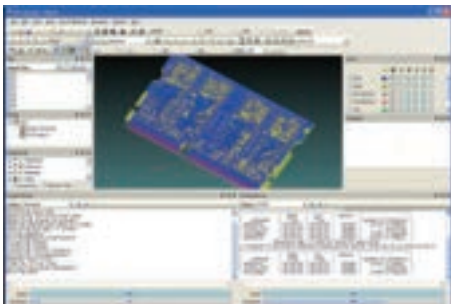
- Ensure high-speed signal quality.
- Reduce PCB turn-around time to fix SI, PI and EMC issue in advance.
- Minimize cost on board design (size, layer no., stackup, etc ).
- Provide board stack-up design and PCB material selection.
- Export layout guidelines of high-speed signals.
- Signal validation 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

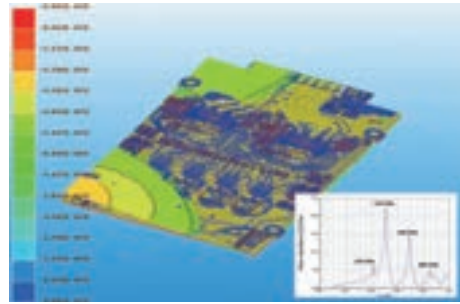
## Ansys (Ansoft) Siwave 5.0

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



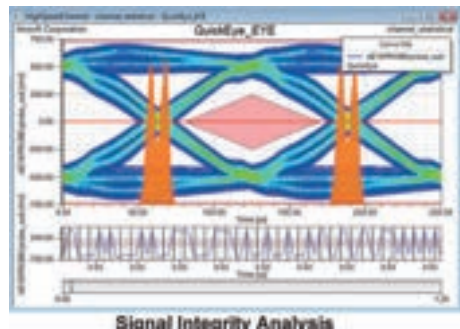
## Ansys (Ansoft) PI Advisor

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



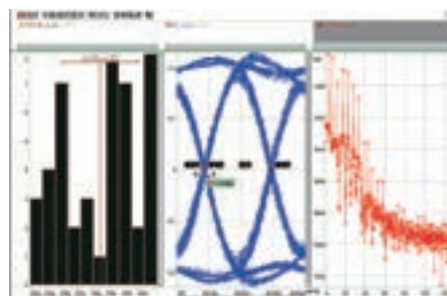
## Ansys (Ansoft) Designer SI 6.0

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

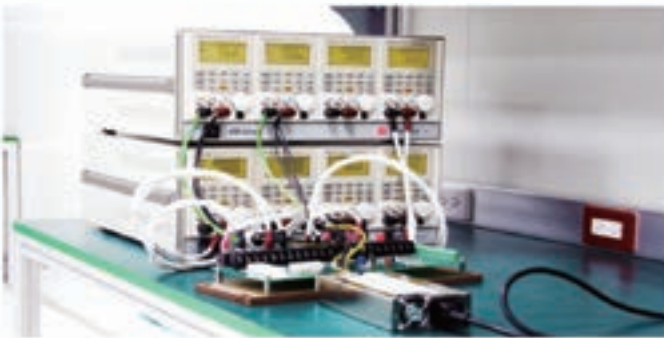
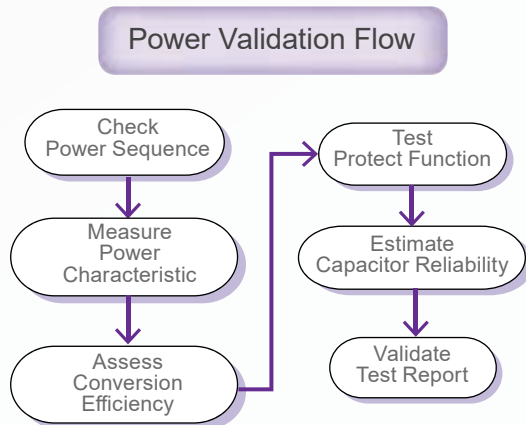
1. Uses the Gold Standard for accurate circuit simulation.
2. Provides Yield-Process variability and device reliability simulation.
3. Applies high speed simulation with harmonic balance and shooting algorithms.



# Power & energy, stable & 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.

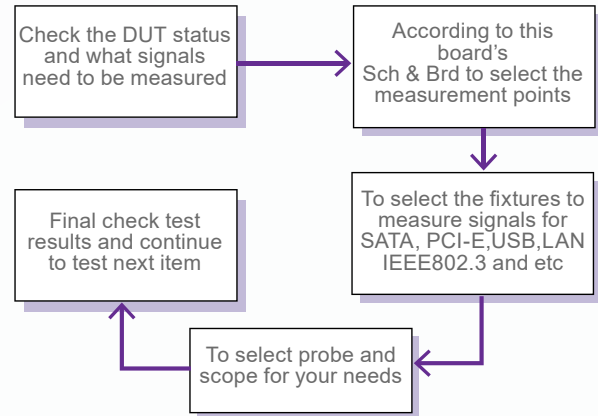


## Electronic R&D Lab

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.



## Engineering Validation Flow



## On / Off Lab

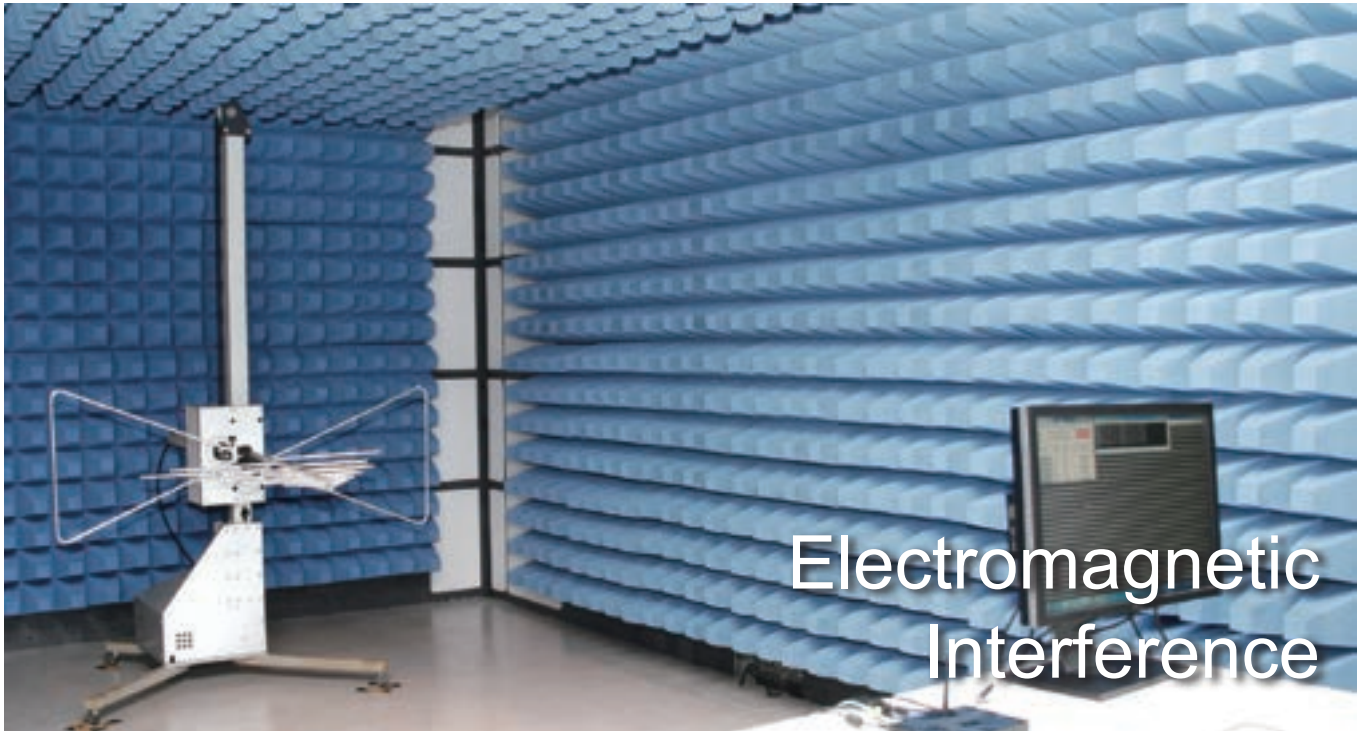
ON/OFF Lab is built to ensure our products are designed with the highest quality. By testing On and Off we can validate the system power sequence which is one of the most important test methods to ensure the reliability and compatibility.

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 (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 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 compliants with EMS standards

## EMS

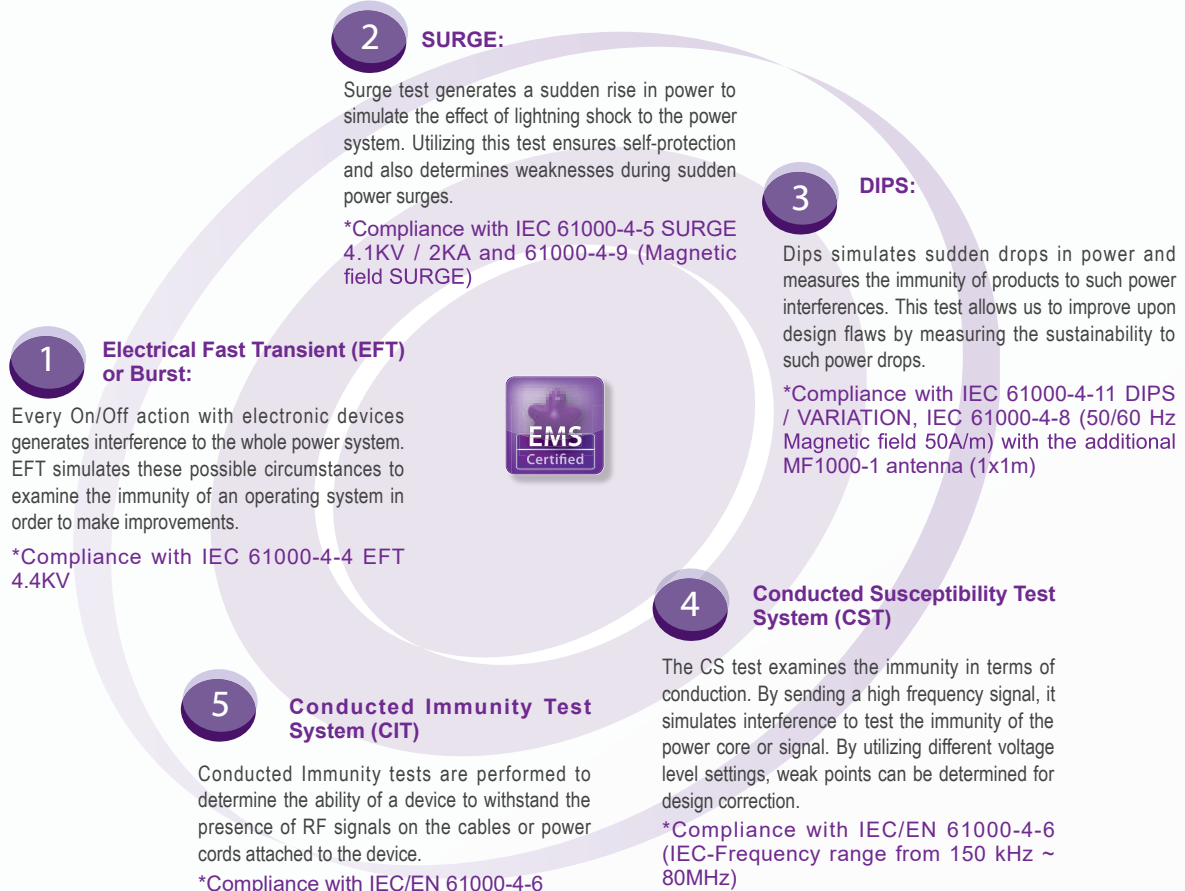
EMS tests including CS & RS are the reliability tests against electric fields, magnetic fields, power cords, control cables, signal cables, ground interference and static electricity discharges, electricity discharge and electromagnetic wave.

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



# Bringing thermal validation expertise to module development

## Programmable Temperature & 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.



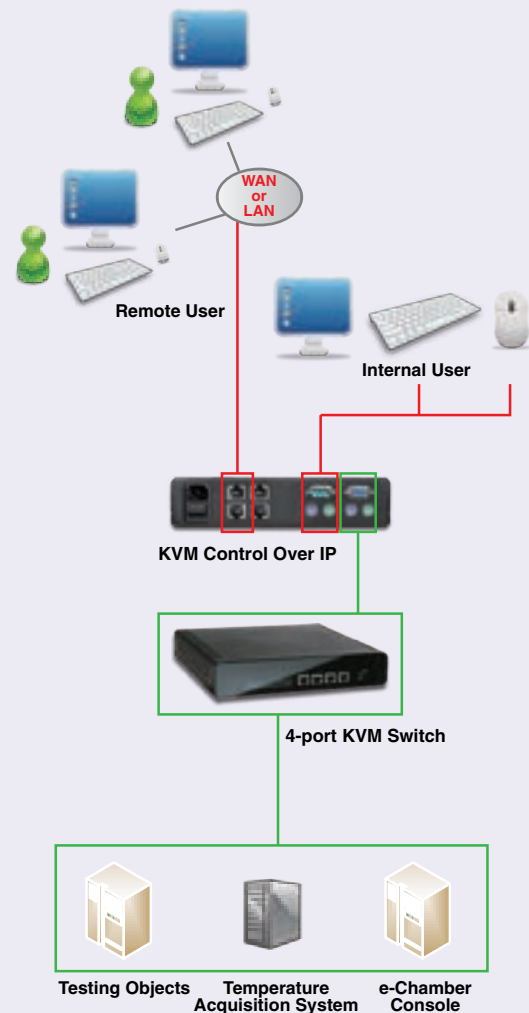
### Features:

- **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

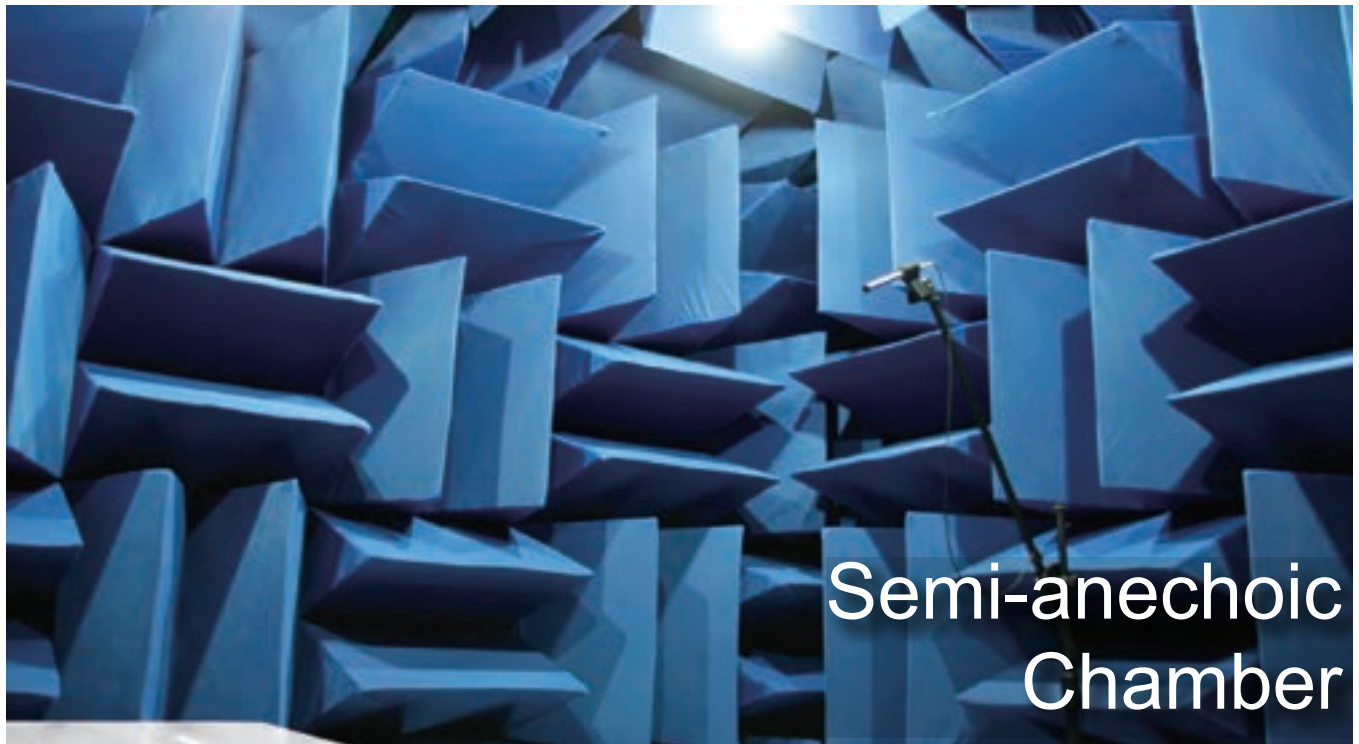
In order to serve those customers unable to stay at our facility for the environmental test, Portwell developed web-based tests to meet the customer demands via the internet by remote control access.

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

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.



|              |   |
|--------------|---|
| 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 Microphone, 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          |

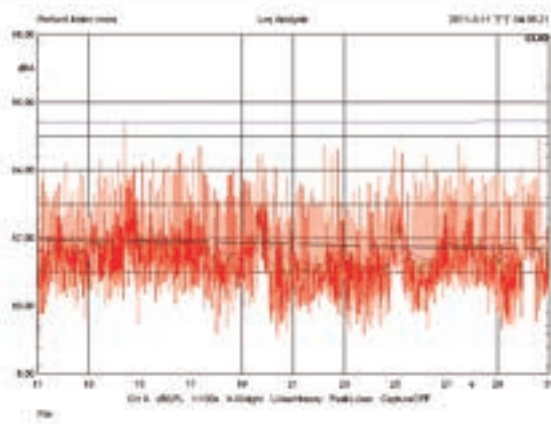
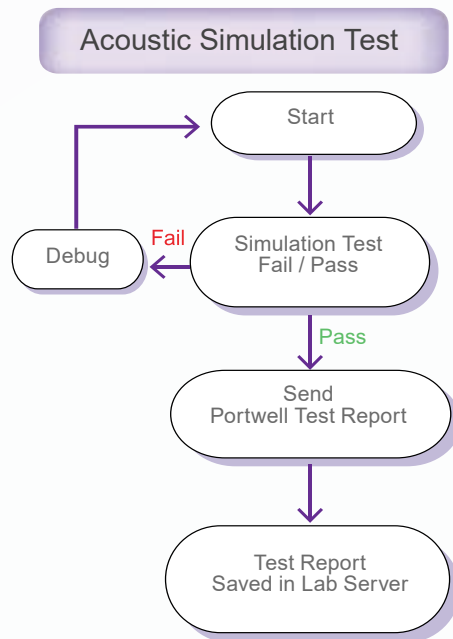
# The noise emission meet ISO Standards

## 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:

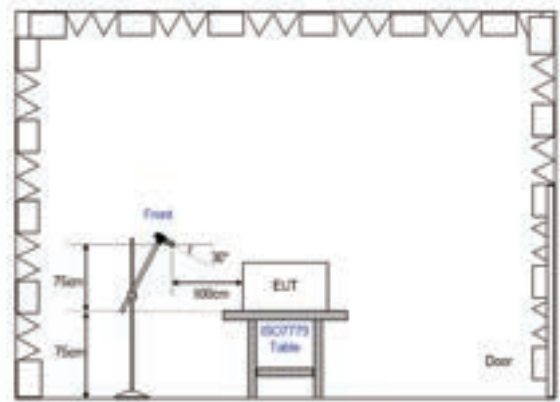
- Ensure medical related products can comply with noise requirements.
- Service customer to verify their products can meet local noise standards.



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.



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 make it even stronger



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

| Typhoon 4.0        |   |
|--------------------|---|
| WORK SPACE         | UPPER TABLE POSITION :<br>53.8" w x 54" d x 34.6" h (1366 x 1372 x 879mm)<br>LOWER TABLE POSITION :<br>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<br>(1759 x 2003 x 2640mm)  |
| TEMPERATURE RANGE  | +200 °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)<br>TABLE CAPACITY 600 lbs (272kg)<br>Recommended   |
| TABLE CAPACITY     | 600 lbs (272kg)<br>Recommended  |
| POWER REQUIREMENTS | 380V, 400V, 440V, 480V, 3Φ, 50/60Hz, 100A   |
| ACTUATORS          | 12 Lubricant free   |



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



Stresses are delivered in an ordered sequence:

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

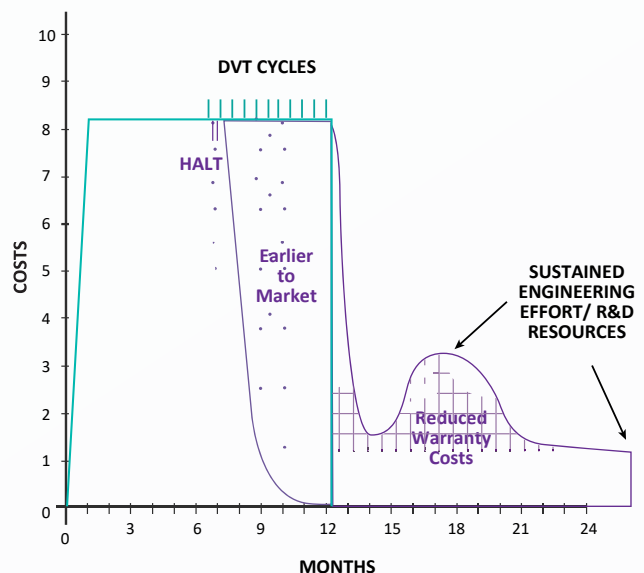
Portwell chooses a Typhoon 4.0 system which is designed specifically for the task of performing Highly Accelerated Stress Screening (HASS) and HALT on large products. With the Lowest Total Cost of Ownership within the AST industry, the 48" x 48" vibration table is capable of supporting hundreds of pounds 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 200°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.



## 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



# Undergo shipping simulation to ensure intact transportation

## 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.

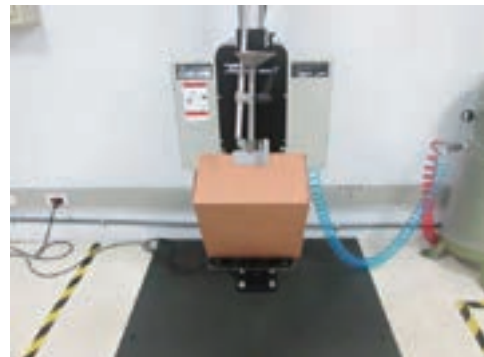


\* Compliance with IEC-68 Comply the IEC-68 environmental regulation. The max magnetic force is 1000kgF.



## 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.

# Portwell superior service

**Completed Technical Service**-In order to ensure that customers can get the right and speedy service from Portwell, we do offer the following services to meet your needs.



## Logistics Service

It is not only for the scalable or world-grade customers, we offer the service to our partners who need the world-wide delivery to save time and expense.



## Consulting Service

Our engineering experts provide a free service to discuss with you the projects or technologies that you need in a short period of time. Please visit Portwell web and click the button, then the on-line service will appear for you.



## Product Service

We have the experienced product managers who can help you to get the right products in our list and also the related information to complete your solution.



## Design Service

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



## Manufacturing Service

Portwell has the most advanced manufacturing facilities to produce the quality product for your application or business. Please pay a visit to our Portwell engine, you will know how best that we can do for you.



Both Portwell RDC & SIC are set for the completed service to our customers & Partners. Your any requirements or technical issues are welcome to contact us for further solution. Our service can be arranged in the following ways.

## Web Service

Portwell already set up the contact for our technology service on the air. Please just visit our web on the internet and left the message for further contact by our people. Besides, you also can get the on-line consulting service via Skype or the phone if the immediate service is needed.

## Extended Visits to PE

Some idea or issue is not easy to have the solution within short period of time. Portwell has the necessary facility and dormitory for customers or partners who need to stay with us for a period of time. Please contact us and our service people will give you the message for it.

## Direct Contact

Portwell welcomes our customers to visit our Laboratory for the regulation test or design service. We believe that it is the fastest way to solve your questions and achieve the right solution. Just call or mail us; you will have the right service immediately.



## Global Service (Telephone)

In addition, you can get immediate support via telephone. Check the web site for phone numbers.  
<https://www.portwell.com.tw/portwell-worldwide/>



## Technical Request

For technical support, you could reach our technical request website as follows  
<https://www.portwell.com.tw/support-center/technical-request/>





# Intelligent City

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



## Portwell, Inc. Headquarters

No. 242, Bo'At St., Shu-Lin Dist,  
New Taipei City 238, Taiwan  
Tel: +886-2-7731-8888  
Fax: +886-2-7731-8888  
E-mail: [info@portwell.com.tw](mailto:info@portwell.com.tw)  
[www.portwell.com.tw](http://www.portwell.com.tw)

### Americas

#### American Portwell (Fremont, CA)

44200 Chivaly St., Fremont, CA 94538, USA  
Tel: +1-510-403-3388  
Fax: +1-510-403-3188  
E-mail: [info@portwell.com](mailto:info@portwell.com)  
[www.portwell.com](http://www.portwell.com)

### Europe

#### European Portwell

Schillingweg 3, 2153 PL  
Klaar, Veenop, The Netherlands  
Tel: +31-202-630790  
E-mail: [info@portwell.eu](mailto:info@portwell.eu)  
[www.portwell.eu](http://www.portwell.eu)

### China

#### Shanghai Portwell

Q21632, Room 1303-1, Building 33, No.258,  
Xinhuai Highway, Songjiang District,  
Shanghai  
Tel: +86-21-3771-2305  
Fax: +86-21-3772-2365  
E-mail: [info@portwell.com.cn](mailto:info@portwell.com.cn)  
[www.portwell.com.cn](http://www.portwell.com.cn)

### Japan

#### Portwell Japan, Inc. (Tokyo)

〒112-0011 4-27-18, Bengoku, Bunkyo-ku,  
Tokyo, Japan  
Tel: +81-3-6902-9229  
Fax: +81-3-6902-9226  
E-mail: [info@portwell.co.jp](mailto:info@portwell.co.jp)  
[www.portwell.co.jp](http://www.portwell.co.jp)

#### Portwell Japan, Inc. (Osaka)

〒532-0064 8th 501 Nippo Shin-osaka Dai-2  
Bldg, 1-8-33 Nishi-Miyahara, Yodogawa-ku  
Osaka Japan  
Tel: +81-6-4807-7721  
Fax: +81-6-4807-7720  
E-mail: [info@portwell.co.jp](mailto:info@portwell.co.jp)  
[www.portwell.co.jp](http://www.portwell.co.jp)

#### KIOSK Embedded Systems GmbH

Am Technologiepark 8-10,  
D-52229 Eschfeld  
Tel: +49-5153-3862-500  
E-mail: [info@portwell.de](mailto:info@portwell.de)  
[www.portwell.de](http://www.portwell.de)

#### Portwell UK Ltd.

Office 7142  
Trident House, Trident Park Basil  
160 Road, Oxford, OX11 7HA, UK  
Tel: +44(0)1235-750-780  
Fax: +44(0)1235-750-781  
E-mail: [info@portwell.eu](mailto:info@portwell.eu)  
[www.portwell.eu](http://www.portwell.eu)

### Korea

#### Portwell Korea, Inc.

D-BIZ Tower 1901 No.126,  
Beomil-ro, Dongan-gu, Anyang-si,  
Gyeonggi-do, Korea, 431-062  
Tel: +82-31-480-3043  
Fax: +82-31-480-3044  
E-mail: [info@portwell.co.kr](mailto:info@portwell.co.kr)  
[www.portwell.co.kr](http://www.portwell.co.kr)

### India

#### Portwell India Technology Private Limited.

3rd Floor, Jeeb Dynasty, Old Madras Rd,  
next to Gujarati Signature Mall, Nagavara/ya,  
Bengaluru Halli, Bengaluru, Karnataka 560093,  
India  
Tel: +91-80-4188-4255  
E-mail: [enquiry@portwell.in](mailto:enquiry@portwell.in)  
[www.portwell.in](http://www.portwell.in)

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