Industrial Board Solution Guide

4.0

5G

IoT

215

5G

Ver.221B

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.

Portwell is famous for her platform service that could offer the following benefits to customers.

■ Complete Product Portfolio

Select from our full range of both off-the-shelf and versatile custom solutions to scale your products. Portwell provides not only board-level products but also peripheral-level and complete system solutions.

■ Implement Latest Intel Technology

Portwell delivers cutting-edge solutions not only to meet and exceed the demand for the newest technologies, but also the need for greater product life cycles. Since partnering with Intel® in 1999, and with streamline access to the latest Intel® technologies and roadmaps, Portwell delivers superior products to meet your needs.

■ Faster Time-to-Market

Portwell's experienced engineers, complete product solutions,

global operation and flexible business service help you meet the time-to-market requirement and reduce your new product introduction cycles as well as the costs of conducting business.

■ Leading Edge Innovator

Portwell is committed to product and solution innovation. We have a complete variety of proof-of-concept designs with Intel and we are also a leader in offering the latest technologies to the market.

■ Committed to Customer Satisfaction

Portwell maintains high expectations in a determined pursuit of commitment to continuously improve our products and services in order to satisfy and exceed our customers' needs.
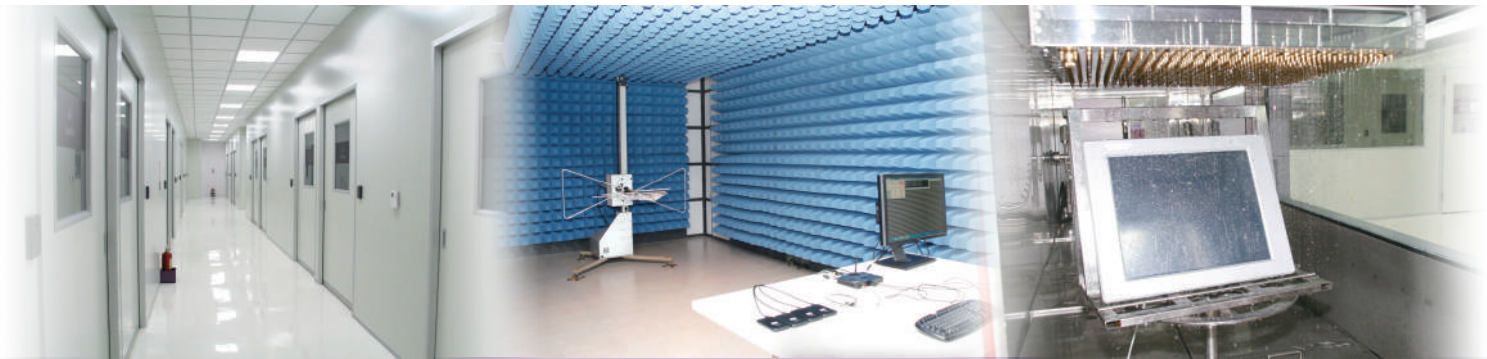
Consulting • Design • Product • Manufacturing • Logistics

Portwell is proud of the technology service it provides to our partners. These services include complete service-demand consulting, product development, advanced design, quality production and global logistics.

Share for Success

Portwell is eager to share its industrial know-how with customers via our online consulting. This feature enables customers to obtain suitable or customized solutions quickly and efficiently.

Design, Develop, and Deliver

■ We design, develop and deliver our customer requirements, such as production, reliability, stability, cost-effectiveness, and longevity of product.

■ Our experienced and sophisticated engineering capabilities include electronic, mechanical, firmware and system integration expertise.

Portwell Manufacturing Excellence

■ We supply component inventory management with automation.

■ In-house SMT lines and PCB assembly and functional testing.

■ In-house system integration and testing.

■ ISO 14001 and ISO 9001 certified manufacturing facilities (89,000 sq. ft. in Taipei).

■ Flexible production capability.

Portwell Global Presence

■ Single contact window, global support.

■ Sales and technical support teams are available through Portwell worldwide offices in the U.S.A., Taiwan, Japan, China, Netherland, United Kingdom, and India.

■ Customer-centric service and support.

Board Production Flow - SMT

Material Baking
The SMD components tend to be thin, hence, can't endure high temperature.

Raw Material Inspection
Materials in the production line are prepared based on the packing list provided by the warehouse staff and are stored in the WIP buffer area.

IPQC
Our IPQC personnel examine all products according to the IPC-610D magnifying glass standards to determine and confirmed ECO, BOM and assure the production contents are without defects.
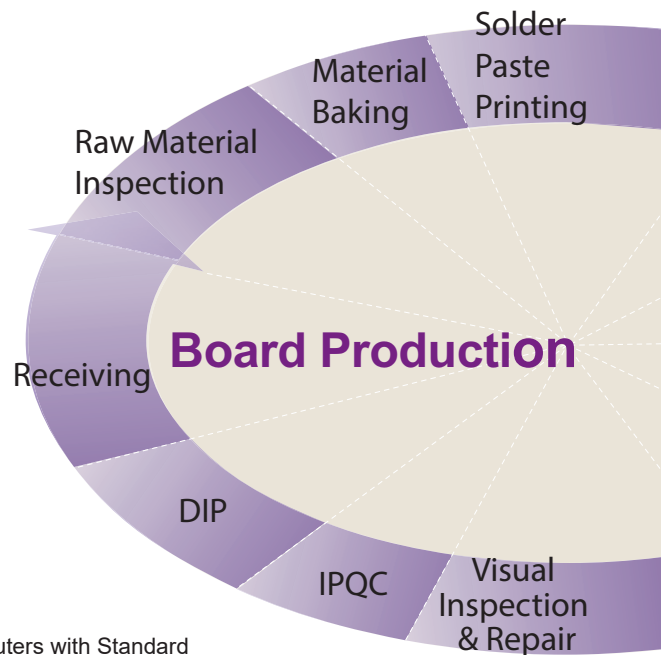
Visual Inspection
Visual inspection stations are equipped with computers with Standard Operating Procedures (SOP) for each product. The SOPs are composed of diagrams which allow our technicians to run their inspection effortlessly and efficiently.

In-Circuit Testing (ICT)
The ICT automated test system can check the assembly circuit wafer, short circuits, abruptions, resistors, capacitors, inductor components values, as well as diode, transistor, FET, SCR, TRIAC, IC for anomallies. Upon completion, reports regarding production and statistics aid in identifying errors in the production process and ensure product quality.

Board Production

Solder Paste Printing · Material Baking · Raw Material Inspection · Receiving · DIP · IPQC · Visual Inspection & Repair

Certifications
ISO 28000:2007 specifies the requirements for a security management system, including those aspects critical to security assurance of the supply chain.

Certifications
The ISO 14000 environmental management standards exist to help organizations minimize how their operations negatively affect the environment and comply with applicable laws, regulations, and other environmentally oriented requirements and continually improve in the above.
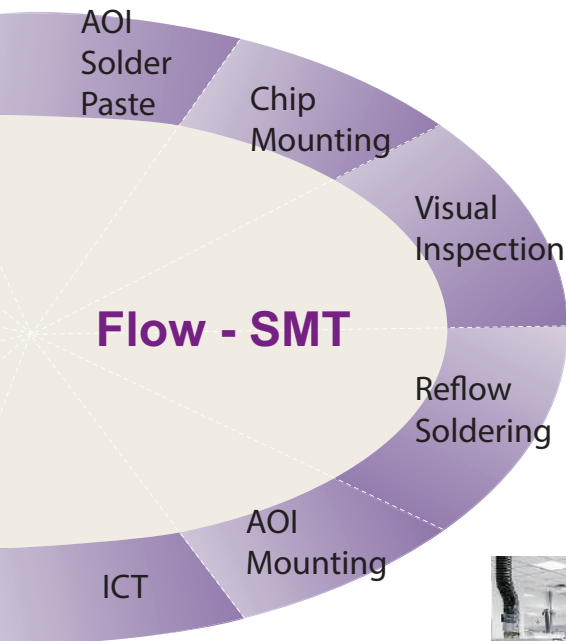
Solder Paste Printing
A stencil plate is used to print the soldering paste thru the plate holes onto the PCB.

AOI - Soldering Paste
One-hundred percent automatic inspection of the PCB after solder paste printing detects defects and improves quality the first time.

Chips Mounting
High Speed Mounting pertains to different tiny components such as resistors, capacitors and ICs. This is a widely used procedure to achieve high precision production.

Visual Inspection & Repair
Our visual technicians utilize magnifying glass examination to check for material flaws that causes undesirable tendency.

Flow - SMT

AOI Solder Paste

Chip Mounting

Visual Inspection

Reflow Soldering

AOI Mounting

ICT

Reflow Soldering
Reflow utilization uses an internal heat cycle system which allows the soldered components on the PCB to be soldered after cooling.

AOI - Mounting
The AOI machine uses an optical inspection method to verify that the printing, mounting, and reflow processes were completed without defects.

ISO 9001   ISO 14001   ISO 13485   ISO 28000 UKAS MANAGEMENT SYSTEM 001   REACH   RoHS

Certifications
ISO 9001 deals with the fundamentals of quality management systems, including the eight management principles on which the family of standards is based.

Certifications
ISO 13485 is an ISO standard that represents the requirements for a comprehensive management system for the design and manufacture of medical devices.

Certifications
ISO 45001 is a standard which represent her highly regards labors' safety, the commitment to employees' health management and continuously improvement to the company and society.

What We Focus on

■ ESD Protection

ESD is usually caused by HBM (Human-Body Model), MM (Machine Model), CDM (Charge d-Device Model) and FIM (Field-Induced Model). The advantages of preventing ESD in the factory include better product reliability, extended usage life, cost savings and increased yields.

In order to ensure that the products will not be affected by ESD during production, an ESD control procedure is in place to meet standards.

For operator :

Wear anti-static suits and wrist straps in the factory.

For equipment :

Each device and working area is grounded and tested periodically to confirm that the ESD measurement is normal.

For ESD Area :

(1) Cover the anti-static tape on cables and test tools which are used in board functional testing.

(2) Use acrylic shelves which may prevent electrostatic charge build-up.

(3) Cover keyboards with an anti-static membrane to protect units under test from electrostatic damage.

For component :

(1) Suppliers of ESD sensitive components are required to handle and ship them in a protective manner.

(2) Anti-static packaging is designed to prevent failures due to electrostatic charge build-up.

■ Quality Control

As an integral part of the overall quality system, Portwell emphasizes quality during the entire manufacturing process, from the acquisition of material to the delivery of finished goods.

In practice, documents are attached with materials from the Receiving department to IQC inspection or to IQC return if rejected. The internal audit checklist ensures that requirements are met for each process. In addition, Portwell periodically maintains and calibrates equipment. Per the standard process, if any equipment is found out of specification, the last three lots of products will be re-tested using confirmed calibrated equipment. Most importantly for quality control, all procedures include a checklist for inspection within incoming, in-process, and final out-going QC to ensure that correct documents and revisions are in place before assembly. MES software is used to ensure that each assembly station and process step is completed before moving to next step.
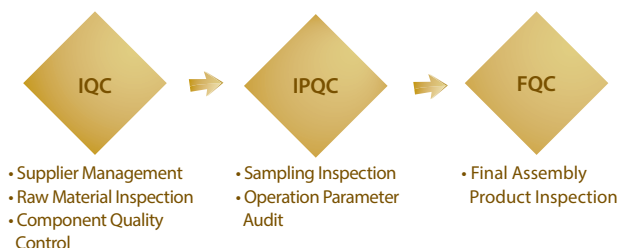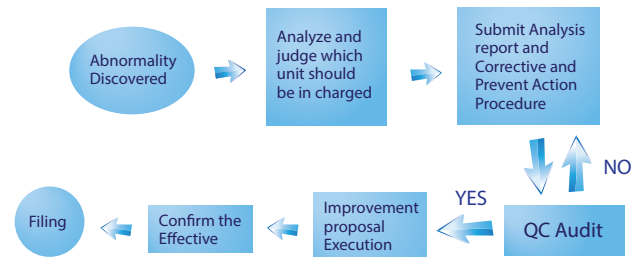
■ Corrective and Preventive Action (CAPA)

In order to ensure Portwell offers world-class manufacturing services, the corrective and preventive processes are implemented to manage abnormalities and potential problems.

The QA member in charge of a quality issue involves the supplier to provide corrective actions upon discovering issues. A Supplier Corrective Action form is sent to the supplier to document the root cause, corrective action and Portwell's approval. Once the supplier's corrective actions are returned and approved by the QA team, the document is signed which closes the request in Portwell's quality system.

Portwell reviews open issues monthly to track issues in order to resolve and provide closure. We provide a complete check on all of unresolved issues and establish a time line to close them.

Portwell ensures customer care by identifying and communicating abnormalities. It is for this reason that corrective and preventive action is taken – to find out the root cause and continuously monitor the effectiveness of the quality system after solutions are implemented to ensure issues do not recur.

Abnormality Discovered → Analyze and judge which unit should be in charged → Submit Analysis report and Corrective and Prevent Action Procedure → QC Audit → NO / YES → Improvement proposal Execution → Confirm the Effective → Filing

■ Employee Training

In Portwell MOC, each operator's professional skills are improved by training before jobs and re-training periodically as necessary. By paying particular attention to the human aspects of production, MOC ensures stable and reliable quality which directly decreases the costs of poor quality and increase customer satisfaction.

Individual training needs to be established based upon job requirements, and re-established whenever new equipment, processes or products are introduced. Training ensures that employees understand the consequences of performing their jobs incorrectly, and is conducted prior to assigning employees, contractors, or temporary personnel to a new task. Training records are maintained according to the quality system.

In the meantime, competency is measured relative to quality trends and retraining is provided where necessary.

Quality Assurance Flow Chart

IQC → IPQC → FQC

- IQC
  - Supplier Management
  - Raw Material Inspection
  - Component Quality Control
- IPQC
  - Sampling Inspection
  - Operation Parameter Audit
- FQC
  - Final Assembly Product Inspection

Pre-employment Training — On-the-Job Training — Regular Training — Regular Assessment

Table of Contents

■ SINGLE BOARD COMPUTER
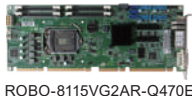
ROBO-8115VG2AR

12 ROBO-8115VG2AR
Intel® Xeon® W/ Core™ i3/i5/i7/i9 Pentium®/ Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

ROBO-8115VG2AR-Q470E

13 ROBO-8115VG2AR-Q470E
Intel® Core™ i3/i5/i7/i9 Pentium®/Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB.

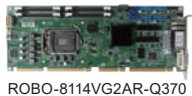ROBO-8114VG2AR

14 ROBO-8114VG2R
Intel® Xeon® E/ Core™ i3/i5/i7 Pentium® / Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

ROBO-8114VG2AR-Q370

15 ROBO-8114VG2AR-Q370
Intel® Core™ i3/i5/i7 Pentium /Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

ROBO-8113VG2AR

16 ROBO-8113VG2AR
Intel® Xeon® E3/ Core™ i3/i5/i7/ Pentium®/ Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

ROBO-8113VG2AR-Q170

17 ROBO-8113VG2AR-Q170
Intel® Core™ i3/ i5/ i7/ Pentium®/ Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

ROBO-6912VG2AR

18 ROBO-6912VG2AR
Intel® Core™ i3/i5/i7/Pentium® Celeron®/ Xeon® E Family processor based on PICMG 1.3 half size SHB with DDR4 SO-DIMM, mini DP, DVI-D, Dual Gigabit Ethernet, SATAIII, mSATA, Audio, USB.

ROBO-6912VG2AR-Q370

19 ROBO-6912VG2AR-Q370
Intel® Core™ i3/i5/i7/Pentium® Celeron® processor based on PICMG 1.3 half size SHB with DDR4 SO-DIMM, mini DP, DVI-D, Dual Gigabit Ethernet, SATAIII, mSATA, Audio, USB
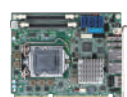

ROBO-6911VG2AR

20 ROBO-6911VG2AR
Intel® Xeon® E3/ Core™ i3/i5/i7/Pentium®/ Celeron® processor based on PICMG 1.3 half size SHB with DDR4 SO-DIMM, DP, DVI-I, Dual Gigabit Ethernet, mSATA, Audio, USB

ROBO-6911VG2AR-Q170

21 ROBO-6911VG2AR-Q170
Intel® Core™ i3/i5/i7/ Pentium®/Celeron® processor based on PICMG 1.3 half size SHB with DDR4 SO-DIMM, DP, DVI-I, Dual Gigabit Ethernet, mSATA, Audio, USB

■ INDUSTRIAL BACKPLANE

Table of Contents

Table of Contents

Portwell Embedded Board Solutions

Portwell Embedded Solutions meet your demand perfectly

Portwell Embedded product lines provide a wide range of selections from server grade to energy efficiency scale including Modules, 3.5", NANO-ITX, Mini-ITX, µATX, ATX, SBC, and Backplane. According to the form factors listed below, Portwell offers diverse products from high computing power to low power consumption devices. Products with high performance are equipped with not only the latest design but also various features which can precisely fulfill standard and customized demands. In another way, when energy-saving is the primary concern, energy efficiency is always the first target we are dedicated to. Therefore, in terms of power budget and green technology, Portwell's designs are still able to perform with a minimum of power consumption suitable for numerous fields.

Due to our experience with customized projects, our reliable solutions can be adopted and applied to multiple applications such as ATM, Kiosk, Digital Signage, POS (Point-Of-Sale), Lottery, Vending, Gaming, Factory Automation, Industrial Control, Transportation, Medical and Energy.

Form factor comparison of embedded computer boards

Form Factor	Board Size (inch/mm)				Expansion	Board Size (inch^2)
	L (inch)	W (inch)	L (mm)	W (mm)		
PC/104	3.55	3.78	90.17	95.89	Module	13.42
PC/104+	3.55	3.78	90.17	95.89	Module	13.42
STX	3.78	3.55	95.89	90.17	Carrier Board	13.42
ETX	4.49	3.74	114.00	95.00	Carrier Board	16.79
COM Express	4.92	3.74	125.00	95.00	Carrier Board	18.40
NANO-ITX	4.72	4.72	120.00	120.00	On Board	22.28
3.5" Embedded	5.75	4.02	146.00	102.00	Cables	23.12
3.5" ECX	5.75	4.13	146.00	105.00	Module	23.75
EPIC	6.50	4.53	165.00	115.00	Module	29.45
PICMG 1.3 Half-size	6.60	4.98	167.64	126.39	Backplane	32.87
PCI Half-size	7.28	4.80	185.00	122.00	Backplane	34.94
ISA Half-size	7.28	4.80	185.00	122.00	Backplane	34.94
PICMG 1.2 Half-size	7.52	4.80	191.03	121.92	Backplane	36.10
Mini-ITX	6.69	6.69	170.00	170.00	On Board	44.76
5.25"Embedded	5.75	8.00	146.05	203.20	Cables	46.00
EBX	5.75	8.00	146.05	203.20	Module	46.00
PICMG 1.0 Full-size	13.33	4.80	338.58	121.92	Backplane	63.98
PICMG 1.2 Full-size	13.33	4.80	338.58	121.92	Backplane	63.98
PICMG 1.3 Full-size	13.33	4.98	338.58	126.39	Backplane	66.38
Flex ATX	9.00	7.50	228.60	190.50	On Board	67.50
Micro-ATX	9.60	9.60	243.84	243.84	On Board	92.16
Embedded ATX	9.60	9.60	243.84	243.84	On Board	92.16
ATX	12.00	9.60	304.80	243.84	On Board	115.20

SBC Reference Table

■ FULL-SIZE SINGLE BOARD COMPUTER

MODEL	ROBO-8115VG2AR	ROBO-8115VG2AR-Q470E	ROBO-8114VG2AR	ROBO-8114VG2AR-Q370	ROBO-8113VG2AR
Form Factor	PICMG1.3	PICMG1.3	PICMG1.3	PICMG1.3	PICMG1.3
CPU	Intel® Xeon® W/ Core™ i3/i5/i7/i9/Pentium®/Celeron®	Intel® Core™ i3/i5/i7/i9/Pentium®/Celeron®	Intel® Xeon® E3/ Core™ i3/i5/i7/i9/Pentium®/Celeron®	Intel® Core™ i3/i5/i7/i9/Pentium®/Celeron®	Intel® Xeon® E3/ Core™ i3/i5/i7/Pentium®/Celeron®
Chipset	Intel® W480E	Intel® Q470E	Intel® C246	Intel® Q370	Intel® C236
BIOS	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI
Memory	4 x DDR4 ECC DIMM up to 128GB	4 x DDR4 non- ECC DIMM up to 128GB	4 x DDR4 ECC SO-DIMM up to 128GB	4 x DDR4 non- ECC SO-DIMM up to 128GB	2 x DDR4 ECC DIMM up to 32GB
Expansion	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slots or 1x PCIe x8 slot 2x PCIe x4 slots 1x PCIe x4 slot	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slots or 1x PCIe x8 slot 2x PCIe x4 slots 1x PCIe x4 slot	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slots or 1x PCIe x8 slot 2x PCIe x4 slots 1x PCIe x4 slot	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slots or 1x PCIe x8 slot 2x PCIe x4 slots 1x PCIe x4 slot	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slot or 1x PCIe x8 + 2x PCIe x4 slots 1x PCIe x4 slot
Display	DVI-I / HDMI	DVI-I / HDMI	DVI-I / HDMI	DVI-I / HDMI	VGA / DVI-D / HDMI
Audio	Realtek ALC888S HDA codec	Realtek ALC888S HDA codec	Realtek ALC886 HDA codec	Realtek ALC886 HDA codec	Realtek ALC886 HDA codec
LAN	2x GbE	2x GbE	2x GbE	2x GbE	2x GbE
Serial Port	2x RS-232 ports 2x RS-232/422/485	2x RS-232 ports 2x RS-232/422/485	2x RS-232 ports 2x RS-232/422/485	2x RS-232 ports 2x RS-232/422/485	2x RS-232 2x RS-232/422/485
USB	6x USB3.2 Gen2 8x USB2.0	6x USB3.2 Gen2 8x USB2.0	8x USB3.2 Gen1 2x USB3.2 Gen2 4x USB2.0	8x USB3.2 Gen1 2x USB3.2 Gen2 4x USB2.0	10x USB 3.0 2x USB 2.0
Storage Devices	5x SATA III 1x M.2 Type M 2280	5x SATA III 1x M.2 Type M 2280	5x SATA III 1x M.2 Type M 2280	5x SATA III 1x M.2 Type M 2280	6x SATA III
GPIO	8 bit	8 bit	8 bit	8 bit	8 bit
Others	PS2/KB & MS	PS2/KB & MS	PS2/KB & MS	PS2/KB & MS	PS/2 KB & MS
Dimension	338.5 x 126.39mm	338.5 x 126.39mm	338.5 x 126.39mm	338.5 x 126.39mm	338.5x126.39mm
Page	12	13	14	15	16

FULL-SIZE SINGLE BOARD COMPUTER

MODEL	ROBO-8113VG2AR-Q170	ROBO-6912VG2AR	ROBO-6912VG2AR-Q370	ROBO-6911VG2AR	ROBO-6911VG2AR-Q170
Form Factor	PICMG1.3	PICMG1.3	PICMG1.3	PICMG1.3	PICMG1.3
CPU	Intel® Core™ i3/i5/i7/Pentium®/Celeron®	Intel® Xeon® E3/ CoreTM i3/i5/i7/i9/Pentium®/Celeron®	Intel® CoreTM i3/i5/i7/i9/Pentium®/Celeron®	Intel® Xeon® E3/ Core™ i3/i5/i7/Pentium®/Celeron®	Intel® Core™ i3/i5/i7/Pentium®/Celeron®
Chipset	Intel® Q170	Intel® C246	Intel® Q370	Intel® C236	Intel® Q170
BIOS	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI
Memory	2 x DDR4 non-ECC DIMM up to 32GB	2 x DDR4 ECC SO-DIMM up to 32GB	2 x DDR4 non- ECC SO-DIMM up to 32GB	2 x DDR4 ECC DIMM up to 32GB	2 x DDR4 non-ECC DIMM up to 32GB
Expansion	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slot or 1x PCIe x8 + 2x PCIe x4 slots 1x PCIe x4 slot	1x PCIe x16 slot or 2x PCIe x8 slots or 1x PCIe x8 slot 2x PCIe x4 slots 1x PCIe x4 slot	1x PCIe x16 slot or 2x PCIe x8 slots or 1x PCIe x8 slot 2x PCIe x4 slots 1x PCIe x4 slot	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slot or 1x PCIe x8 + 2x PCIe x4 slots 1x PCIe x4 slot	4x PCI slots 1x PCIe x16 slot or 2x PCIe x8 slot or 1x PCIe x8 + 2x PCIe x4 slots 1x PCIe x4 slot
Display	VGA/DVI-D/HDMI	2x mini DP / DVI-D	2x mini DP / DVI-D	VGA/DVI-D/HDMI	VGA/DVI-D/HDMI
Audio	Realtek ALC886 HDA codec	Realtek ALC888S HDA codec	Realtek ALC888S HDA codec	Realtek ALC886 HDA codec	Realtek ALC886 HDA codec
LAN	2x GbE	2x GbE	2x GbE	2x GbE	2x GbE
Serial Port	2x RS-232 2x RS-232/422/485	1x RS-232/422/485	1x RS-232/422/485	2x RS-232 2x RS-232/422/485	2x RS-232 2x RS-232/422/485
USB	10x USB 3.0 2x USB 2.0	4x USB3.2 Gen1 2x USB3.2 Gen2	4x USB3.2 Gen1 2x USB3.2 Gen2	10x USB 3.0 2x USB 2.0	10x USB 3.0 2x USB 2.0
Storage Devices	6x SATA III	2x SATA III 1x mSATA	2x SATA III 1x mSATA	6x SATA III	6x SATA III
GPIO	8 bit	8 bit	8 bit	8 bit	8 bit
Others	PS/2 KB & MS	N/A	N/A	PS/2 KB & MS	PS/2 KB & MS
Dimension	338.5x126.39mm	167.64 x 126.39mm	167.64 x 126.39mm	338.5x126.39mm	338.5x126.39mm
Page	17	18	19	20	21

ROBO-8115VG2AR

Intel® Xeon® W/ Core™ i3/i5/i7/i9 Pentium®/Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

4x 288-pin DDR4 SO-DIMM sockets   HDMI port   4x USB 3.0 ports

2x USB 3.2 ports

2x GbE ports

DVI-I port (DVI-D+VGA)

+12V power connector   LGA1200 socket

Intel® W480E

EC | USB 3.0 | SATA 3.0 | Watch DOG | USB 2.0 | TPM | HDMI | 2 GbE
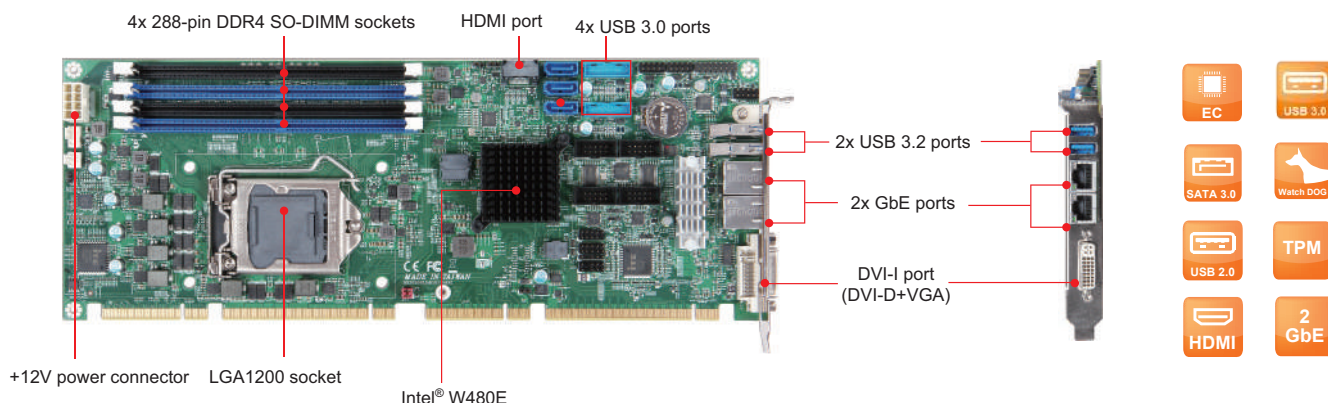
ROBO-8115VG2AR is based on Intel® W480E chipset and workstation processors. Built with flexible PCI express expansions, ROBO-8115VG2AR is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

■ Supports Intel® Xeon® W/Core™ i3/i5/i7/i9 /Pentium®/Celeron® processors in LGA 1200 package

■ Delivers up to 128GB maximum DDR4 2666 ECC Long-DIMM on four sockets

■ Supports mutiple display by DVI-I(DVI-D+VGA)and HDMI

■ High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

■ Rich I/O connections such as four serials ports,USB3.2(Gen2), SATA III ports

■ Support on board TPM2.0

ORDERING GUIDE

AB1-3K28Z	(R).ROBO-8115VG2AR. PICMG 1.3(PCI-E+PCI).LGA1200. W480E PCH. Intel Xeon/Core i3 processors.SHB.w/ VGA/Dual GbE/Audio/fourCOM ports

PACKING LIST

Standard	B6902932 SATA III cable
	B8981980 PICMG SBC Handling and Installation Notice
	B6903351 (GP).Cable.Video DVI-I to DVI-D+VGA Y cable L=150mm.0130-069-00-0263. E-CALL
	B6902352 *(GP).Cable.DB9x2 to HSG(5x2)x2 L=300mm W/Bracket for Ruby-9717/Ruby-9718. CY-8A08006R.CHUAN YANG
	TBD Installation CD
Optional	B6903090 USB 3.0 cable with bracket B6902980 PS/2 Keyboard / Mouse Cable with bracket B6902230 USB port cable with bracket

GENERAL

Processor	- Intel® Xeon® W Family/ Core™ i3/i5/i7/i9/ Pentium®/ Celeron® processors up to 3.5 GHz(35~95W) in LGA-1200 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost, Hyper-Threading, Virtualization, Thermal Monitoring, Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® W480E
BIOS	AMI uEFI BIOS
Memory	- Supports up to 128GB DDR4 2666 SDRAM on four 288-pin DIMM sockets - Supports ECC
Storage Devices	- 5x SATAIII drives (Dual ports via Backplane) - Supports RAID 0, 1, 5, 10 - 1x M.2 Type M 2280 (on bottom side)
Watchdog Timer	Programmable watchdog timer, time out period from 0.5 sec to 254.5 secs.
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- From CPU: 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting (Gen3 up to 8.0 GT/s) - From PCH: 1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s)4x PCI devices at 32bit 33MHz

I/O INTERFACE

Super I/O (Embedded Controller)	ITE IT5121E-I
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC888S HDA codec, 7.1 channels one on board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connectors with two LED indicators
Serial Port	- 2x RS-232 ports - 2x RS-232/422/485 ports selectable - LPC to COM port IC: Fintek F81216DG
USB	- 4x USB 2.0 ports (through backplane) - 480Mb/s bus capable of high-speed/full-speed/low-speed data ranges - 4x USB 3.2(Gen2) ports on board - 10Gbps bus capable of high-speed/ full-speed/low-speed data ranges - 2x USB 3.2(Gen2) ports on bracket - 10Gbps bus capable of high-speed/ full-speed/low-speed data ranges
Keyboard & Mouse	1x 10 pin box header for external PS/2 KB & MS
GPIO	On board programmable 8-bit Digital I/Os

DISPLAY

Graphic Controller	- Intel® Xeon® and Core™ i3 processors integrated graphics engine - Provides improved 3D multimedia capabilities including Microsoft DirectX 12, OpenGL 4.5
Display Interface	Support independent triple display by - VGA on bracket: Resolution up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (VGA + DVI-D on bracket by DVI-I port) - HDMI on board: up to 4096x2160 @ 30Hz

Mechanical & Environment

Dimension	- 338.5mm(L) x 126.39mm(W),13.33"(L) x 4.98"(W) - PCB: 10 layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5~95%, non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

FC CE intel IoT Solutions Alliance RoHS

ROBO-8115VG2AR-Q470E

Intel® Core™ i3/i5/i7/i9 Pentium®/Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

4x 288-pin DDR4 SO-DIMM sockets
HDMI port
4x USB 3.0 ports
2x USB 3.2 ports
2x GbE ports
DVI-I port (DVI-D+VGA)
+12V power connector
LGA1200 socket
Intel® Q470E

EC | USB 3.0 | SATA 3.0 | Watch DOG | USB 2.0 | TPM | HDMI | 2 GbE | DVI-I

ROBO-8115VG2AR-Q470E is based on Intel® Q470E chipset and workstation processors. Built with flexible PCI express expansions, ROBO-8115VG2AR-Q470E is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Supports Intel® Core™ i3/i5/i7/i9 /Pentium®/ Celeron® processors in LGA 1200 package
- Delivers up to 128GB maximum DDR4 2666 non-ECC Long-DIMM on four sockets
- Supports multiple display by DVI-I(DVI-D+VGA) and HDMI
- High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface
- Rich I/O connections such as four serials ports,USB3.2(Gen2), SATA III ports
- Support on board TPM2.0

ORDERING GUIDE

AB1-3K31Z	(R).ROBO-8115VG2AR-Q470E PICMG 1.3(PCI-E+PCI).LGA1200. Q470E PCH. Intel Xeon/Core i3 processors.SHB.w/ VGA/Dual GbE/Audio/fourCOM ports

PACKING LIST

Standard	B6902932 SATA III cable
	B8981980 PICMG SBC Handling and Installation Notice
	B6903351 (GP).Cable.Video DVI-I to DVI-D+VGA Y cable L=150mm.0130-069-00-0263. E-CALL
	B6902352 *(GP).Cable.DB9x2 to HSG(5x2)x2 L=300mm W/Bracket for Ruby-9717/Ruby-9718. CY-8A08006R.CHUAN YANG
	TBD Installation CD
Optional	B6903090 USB 3.0 cable with bracket
	B6902980 PS/2 Keyboard / Mouse Cable with bracket
	B6902230 USB port cable with bracket

GENERAL

Processor	- Intel® Core™ i3/i5/i7/i9/ Pentium®/ Celeron® processors up to 3.5 GHz(35~95W) in LGA-1200 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost, Hyper-Threading, Virtualization, Thermal Monitoring, Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® Q470E
BIOS	AMI uEFI BIOS
Memory	- Supports up to 128GB DDR4 2666 SDRAM on four 288-pin DIMM sockets - Supports non-ECC
Storage Devices	- 5x SATAIII drives (Dual ports via Backplane) - Supports RAID 0, 1, 5, 10 - 1x M.2 Type M 2280 (on bottom side)
Watchdog Timer	Programmable watchdog timer, time out period from 0.5 sec to 254.5 secs
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	From CPU: 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting (Gen3 up to 8.0 GT/s) From PCH: 1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s) 4x PCI devices at 32bit 33MHz

I/O INTERFACE

Super I/O (Embedded Controller)	ITE IT5121E-I
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC888S HDA codec, 7.1 channels one on board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connectors with two LED indicators
Serial Port	- 2x RS-232 ports - 2x RS-232/422/485 ports selectable - LPC to COM port IC: Fintek F81216DG
USB	- 4x USB 2.0 ports (through backplane) - 480Mb/s bus capable of high-speed/full-speed/low-speed data ranges - 4x USB 3.2(Gen2) ports on board - 10Gbps bus capable of high-speed/ full-speed/low-speed data ranges - 2x USB 3.2(Gen2) ports on bracket - 10Gbps bus capable of high-speed/ full-speed/low-speed data ranges
Keyboard & Mouse	- 1x 10 pin box header for external PS/2 KB & MS
GPIO	On board programmable 8-bit Digital I/Os

DISPLAY

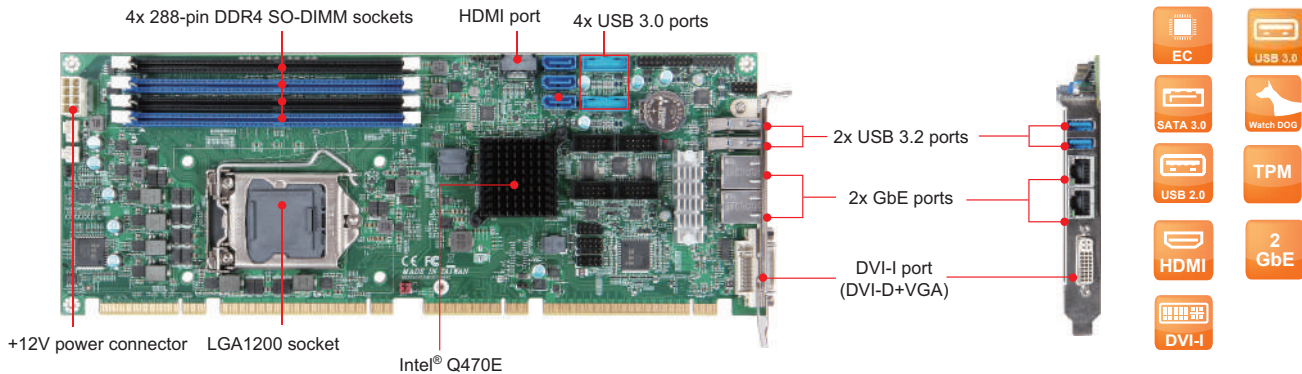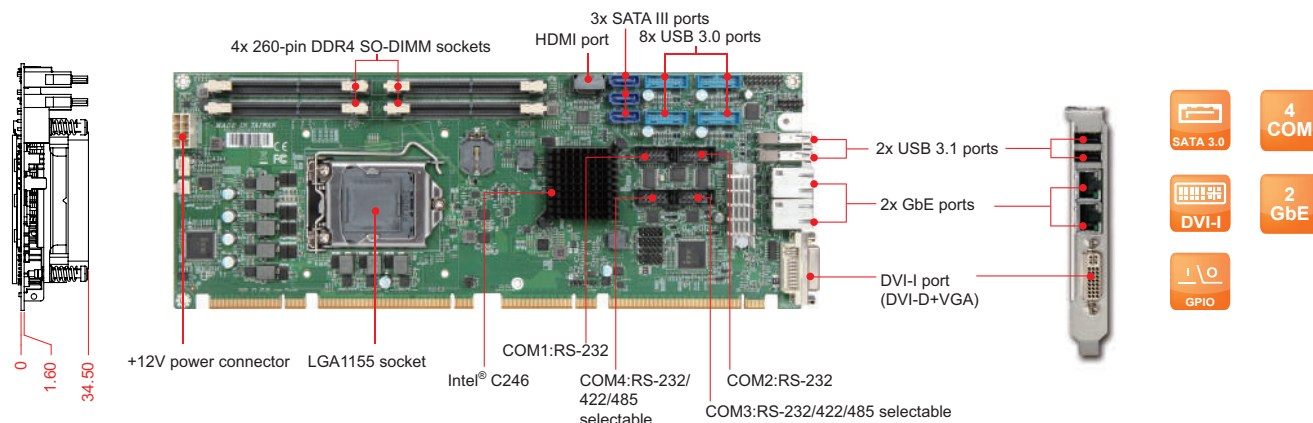| Graphic Controller	- Intel® Core™ i3/i5/i7/i9 processors integrated graphics engine - Provides improved 3D multimedia capabilities including Microsoft DirectX 12, OpenGL 4.5
Display Interface	Support independent triple display by - VGA on bracket: Resolution up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (VGA + DVI-D on bracket by DVI-I port) - HDMI on board: up to 4096x2160 @ 30Hz

Mechanical & Environment

Dimension	- 338.5mm(L) x 126.39mm(W),13.33"(L) x 4.98"(W) - PCB: 10 layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5~95%, non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

FC CE intel IoT Solutions Alliance RoHS

ROBO-8114VG2AR

Intel® Xeon® E/ Core™ i3/i5/i7 Pentium® / Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

4x 260-pin DDR4 SO-DIMM sockets
HDMI port
3x SATA III ports
8x USB 3.0 ports
2x USB 3.1 ports
2x GbE ports
DVI-I port (DVI-D+VGA)
+12V power connector
LGA1155 socket
COM1:RS-232
Intel® C246
COM4:RS-232/ 422/485 selectable
COM2:RS-232
COM3:RS-232/422/485 selectable

SATA 3.0
DVI-I
GPIO
4 COM
2 GbE

ROBO-8114VG2AR is based on Intel® C246 chipsetand workstation processors. Built with flexible PCI express expansions, ROBO-8114VG2AR is suitablefor Medical, Industrial Automation.

FEATURES

- Supports Intel® Xeon®/Core™ i3/i5/i7/ Pentium®/ Celeron® processors in LGA 1151 package

- Delivers up to 64GB maximum DDR4 2133 ECC SO-DIMM on four sockets

- Supports mutiple display by DVI-I(DVI-D+VGA)and HDMI

- High speed dual Gigabit Ethernet based on PCIe x press x 1, high bandwidth I/O interface

- Rich I/O connections such as four serials ports,USB 3.0/3.1, SATA III ports

- Support on board TPM2.0

ORDERING GUIDE

AB1-3J28	ROBO-8114VG2AR PICMG 1.3(PCI-E+PCI).LGA1151. C246 PCH. IntelXeon/Core i3 processors.SHB.w/ VGA/Dua lGbE/Audio/four COM ports

PACKING LIST

Standard	TBD Installation CD
	B6902352 dual head COM port cable with bracket
	B6903351 DVI-D + VGA cable
	B8981980 PICMG SBC Handling and Installation Notice
	B6902932 SATA III cable
Optional	B6903090 USB 3.0 cable with bracket
	B6902980 PS/2 Keyboard / Mouse Cable with bracket
	B6902230 USB port cable with bracket

GENERAL

Processor	- Intel® Xeon® E Family/ Core™ i3/i5/i7/ Pentium®/ Celeron® processors up to 3.6 GHz(35~95W) in LGA-1151 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost, Hyper-Threading, Virtualization, Thermal Monitoring, Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® C246 PCH
BIOS	AMI UEFI BIOS (SPI ROM)
Memory	- Supports up to 64GB DDR4 2133 SDRAM on four 260-pin SO-DIMM sockets - Supports ECC
Storage Devices	- 5x SATAIII drives (Dual ports via Backplane) - Supports RAID 0, 1, 5, 10 - 1x M.2 Type M 2280 (on bottom side)
Watchdog Timer	Programmable via S/W from 0.5 sec. to 255 sec
Hardware Monitoring	System monitor(Voltage, Fan Speed and Temperature)

I/O INTERFACE

Expansion Interface	- From CPU: 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper seng (Gen3 up to 8.0 GT/s) - From PCH: 1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s) - 4x PCI devices at 32bit 33MHz
Super I/O (Embedded Controller)	ITE IT5121E-I-128
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC886 HDA codec, 7.1 channels - one on board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connectors with two LED indicators
Serial Port	- 2x RS-232 ports - 2x RS-232/422/485 ports selectable - LPC to COM port IC: Fintek F81216DG
USB	- 4x USB 2.0 ports (through backplane) 480Mb/s bus capable of high-speed/full-speed/low-speed data ranges - 5Gbps bus capable of high-speed/ full-speed/low-speed data ranges - 10Gbps bus capable of high-speed/ full-speed/low-speed data ranges
Keyboard & Mouse	- 2x USB 3.1 ports on bracket dedicated to keyboard & mouse - 1x 10 pin box header for external PS/2 KB & MS
GPIO	On board programmable 8-bit Digital I/Os

DISPLAY

Graphic Controller	- Intel® Xeon® and Core™ i3 processors integrated graphics engine - Provides improved 3D multimedia capabilities including Microso DirectX 12, OCL 2.x and OpenGL 4.3/4.4
Display Interface	Support independent triple display by - VGA on bracket: Resolution up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (VGA + DVI-D on bracket by DVI-I port) - HDMI on board: up to 3200x2000 @ 60Hz

Mechanical & Environment

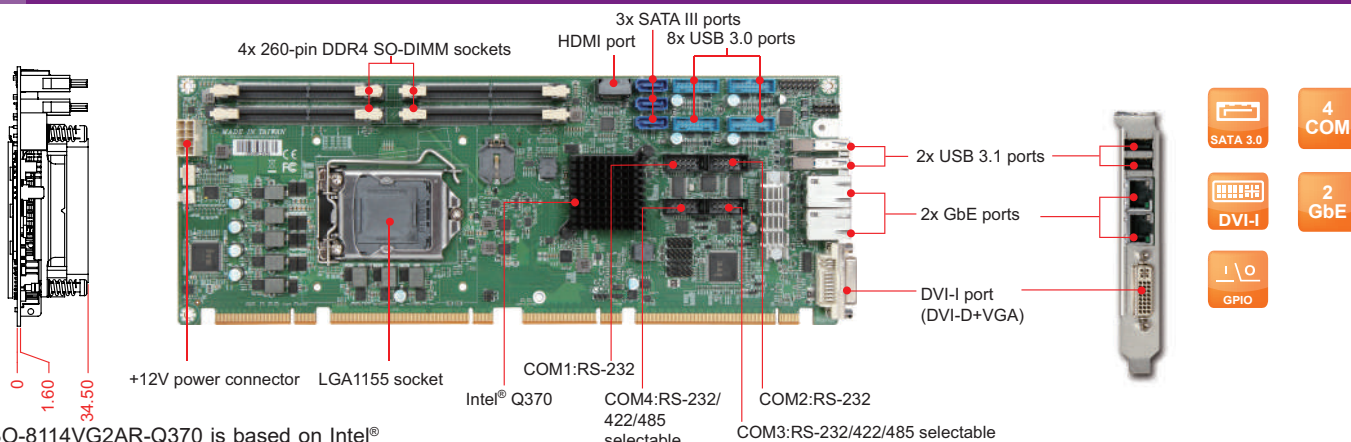| Dimension	- 338.5mm(L) x 126.39mm(W), 13.33"(L) x 4.98"(W) - PCB: 8 layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operation Temperature: 0~60°C - Storage Temperature: -20~80°C - Relative Humidity: 5~95%, non-condensing

IoT Solutions Alliance
RoHS

Intel® Core™ i3/i5/i7 Pentium /Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet,Audio and USB

4x 260-pin DDR4 SO-DIMM sockets
HDMI port
3x SATA III ports
8x USB 3.0 ports

2x USB 3.1 ports
2x GbE ports
DVI-I port (DVI-D+VGA)

SATA 3.0 | 4 COM
DVI-I | 2 GbE
GPIO

+12V power connector   LGA1155 socket
COM1:RS-232
Intel® Q370
COM4:RS-232/422/485 selectable
COM2:RS-232
COM3:RS-232/422/485 selectable

ROBO-8114VG2AR-Q370 is based on Intel® Q370 chipset and desktop processors. Built with flexible PCI express expansions, ROBO-8114VG2AR-Q370 is suitable for Medical, Industrial automation.

FEATURES

■ Supports Intel® Core™ i3/i5/i7/Pentium®/Celeron® processors in LGA 1151 package

■ Delivers up to 128GB maximum DDR4 2133 Non-ECC SO-DIMM on four sockets

■ Supports mutiple display by DVI-I(DVI-D+VGA)and HDMI

■ High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

■ Rich I/O connections such as four serials ports,USB 3.0/3.1, SATA III ports

■ Support on board TPM2.0

ORDERING GUIDE

AB1-3J29	**ROBO-8114VG2AR-Q370** PICMG 1.3(PCI-E+PCI).LGA1151. Q370 PCH. Intel Core i5/i7 processors.SHB.w/ VGA/Dual GbE/Audio/four COM ports

PACKING LIST

Standard	TBD Installation CD
	B6902352 dual head COM port cable with bracket
	B6903351 DVI-D + VGA cable
	B8981980 PICMG SBC Handling and Installation Notice
	B6902932 SATA III cable
Optional	B6903090 USB 3.0 cable with bracket
	B6902980 PS/2 Keyboard / Mouse Cable with bracket
	B6902230 USB port cable with bracket

GENERAL

Processor	- Intel® Core™ i3/i5/i7/ Pentium/ Celeron® processors up to 3.6 GHz(35~95W) in LGA-1151 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost, Hyper-Threading, Virtualization, Thermal Monitoring, Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® Q370 PCH
BIOS	AMI UEFI BIOS (SPI ROM)
Memory	- Supports up to 128GB DDR4 2133 SDRAM on four 260-pin SO-DIMM sockets - Supports non-ECC
Storage Devices	- 5x SATAIII drives (Dual ports via Backplane) - Supports RAID 0, 1, 5, 10 - 1x M.2 Type M 2280 (on bottom side)
Watchdog Timer	Programmable via S/W from 0.5 sec. to 255 sec
Hardware Monitoring	System monitor(Voltage, Fan Speed and Temperature)

I/O INTERFACE

Expansion Interface	- From CPU: 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper settinng
	  (Gen3 up to 8.0 GT/s)
	- From PCH: 1x PCIe x4 or 4x PCIe x1 by different bios support
	  (Gen 3 up to 8.0 GT/s)
	- 4x PCI devices at 32bit 33MHz

Super I/O (Embedded Controller)	ITE IT5121E-I-128
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC886 HDA codec, 7.1 channels - one on board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connectors with two LED indicators
Serial Port	- 2x RS-232 ports - 2x RS-232/422/485 ports selectable - LPC to COM port IC: Fintek F81216DG

USB	- 4x USB 2.0 ports (through backplane)
	  480Mb/s bus capable of high-speed/full-speed/low-speed data ranges
	- 8x USB 3.0 ports on board
	  5Gbps bus capable of high-speed/ full-speed/low-speed data ranges
	- 2x USB 3.1 ports on bracket
	  10Gbps bus capable of high-speed/ full-speed/low-speed data ranges

Keyboard & Mouse	- 2x USB 3.1 ports on bracket dedicated to keyboard & mouse - 1x 10 pin box header for external PS/2 KB & MS
GPIO	On board programmable 8-bit Digital I/Os

DISPLAY

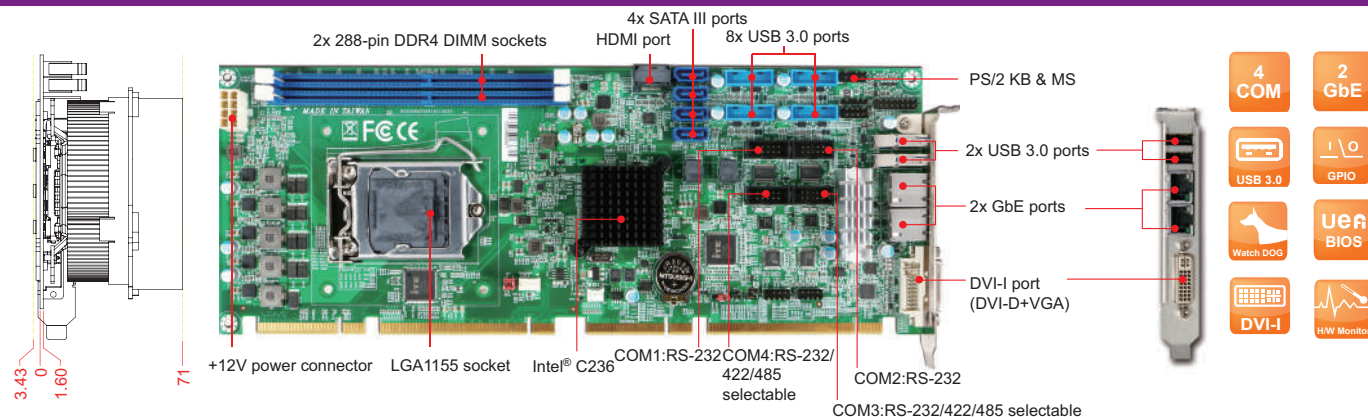| Graphic Controller	- Intel® Core i3™ processors integrated graphics engine - Provides improved 3D multimedia capabilities including Microso DirectX 12, OCL 2.x and OpenGL 4.3/4.4
Display Interface	Support independent triple display by - VGA on bracket: Resolution up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (VGA + DVI-D on bracket by DVI-I port) - HDMI on board: up to 3200x2000 @ 60Hz

Mechanical & Environment

Dimension	- 338.5mm(L) x 126.39mm(W), 13.33"(L) x 4.98"(W) - PCB: 8 layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operation Temperature: 0~60°C - Storage Temperature: -20~80°C - Relative Humidity: 5~95%, non-condensing

ROBO-8113VG2AR

Intel® Xeon® E3/ Core™ i3/i5/i7 Pentium®/ Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

- 2x 288-pin DDR4 DIMM sockets
- 4x SATA III ports
- HDMI port
- 8x USB 3.0 ports
- PS/2 KB & MS
- 2x USB 3.0 ports
- 2x GbE ports
- DVI-I port (DVI-D+VGA)
- +12V power connector
- LGA1155 socket
- Intel® C236
- COM1:RS-232
- COM4:RS-232/ 422/485 selectable
- COM2:RS-232
- COM3:RS-232/422/485 selectable

- 4 COM
- 2 GbE
- USB 3.0
- I\O GPIO
- Watch DOG
- UEFI BIOS
- DVI-I
- H/W Monitor

3.43 0 1.60 71

ROBO-8113VG2AR is based on Intel® C236 chipset and workstation processors. Built with flexible PCI express expansions, ROBO-8113VG2AR is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Supports Intel® 7th and 6th Gen Skylake-S Kaby Lake-S Xeon®/Core™ i3/i5/i7/ Pentium®/Celeron® processors in LGA 1151 package

- Delivers up to 32GB maximum DDR4 2133 ECC DIMM on two sockets

- Supports mutiple display by DVI-I(DVI-D+VGA) and HDMI

- High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

- Rich I/O connections such as four serials ports, USB 3.0/2.0, SATA III ports

- Support on board TPM2.0

ORDERING GUIDE

AB1-3D40	**(R).ROBO-8113VG2AR** PICMG 1.3(PCI-E+PCI).LGA1151. Intel® Xeon®/Core™ i3 processors.SHB.w/VGA/ Dual GbE/Audio/four COM ports
AB1-3G68	**(R).ROBO-8113VG2AR-KBL** PICMG 1.3(PCI-E+PCI).LGA1151. Intel® Xeon®/Core™ i3 processors.SHB.w/VGA/ Dual GbE/Audio/four COM ports

PACKING LIST

Standard	B6902932 SATA III cable
	B8981980 PICMG SBC Handling and Installation Notice
	B6903351 DVI-D + VGA cable
	B6902352 dual head COM port cable with bracket
	B8983660 Installation CD
Optional	B6902980 PS/2 Keyboard / Mouse Cable with bracket
	B6902230 USB port cable with bracket
	B6903090 USB 3.0 cable with bracket

GENERAL

Processor	- Intel® Xeon® E3-1200v5/v6 series / Core™ i3/i5/i7/Pentium®/Celeron® processors up to 3.6 GHz (35~80W) with (8MB) Cache in LGA-1151 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost , Hyper-Threading, Virtualization, Thermal Monitoring,Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® C236 PCH
BIOS	AMI UEFI BIOS (SPI ROM)
Memory	- Supports up to 32GB DDR4 2133/1866 SDRAM on two 288-pin DIMM sockets - Supports ECC
Storage Devices	- 6x SATAIII drives (Dual ports via Backplane) - RAID 0, 1, 5, 10
Watchdog Timer	Programmable via S/W from 0.5 sec. to 254.5 sec
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- From CPU (Xeon®/Core™ i3): 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting (Gen3 up to 8.0 GT/s) - From PCH:1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s) - 4x PCI devices at 32bit 33MHz

I/O INTERFACE

Embedded Controller	ITE IT8528E
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC886-GR HDA codec, 5.1 channels - one on- board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connector with two LED indicators
Serial Port	- 2x RS-232 ports - 2x RS-232/422/485 selectable - LPC to COM port IC: Fintek F81216DG
USB	- 4x USB 2.0 ports (through backplane) - 480Mb/s bus capable of high-speed/full-speed/low-speed data ranges - 10x USB 3.0 ports on board (eight ports on board, dual ports on bracket) - 5Gbps bus capable of high-speed/ full-speed/low-speed data ranges
Keyboard & Mouse	- 2x USB 3.0 ports on bracket dedicated to keyboard & mouse (on bracket) - 1x 10 pin box header for external PS/2 KB & MS
GPIO	On board programmable 8-bit Digital I/Os

DISPLAY

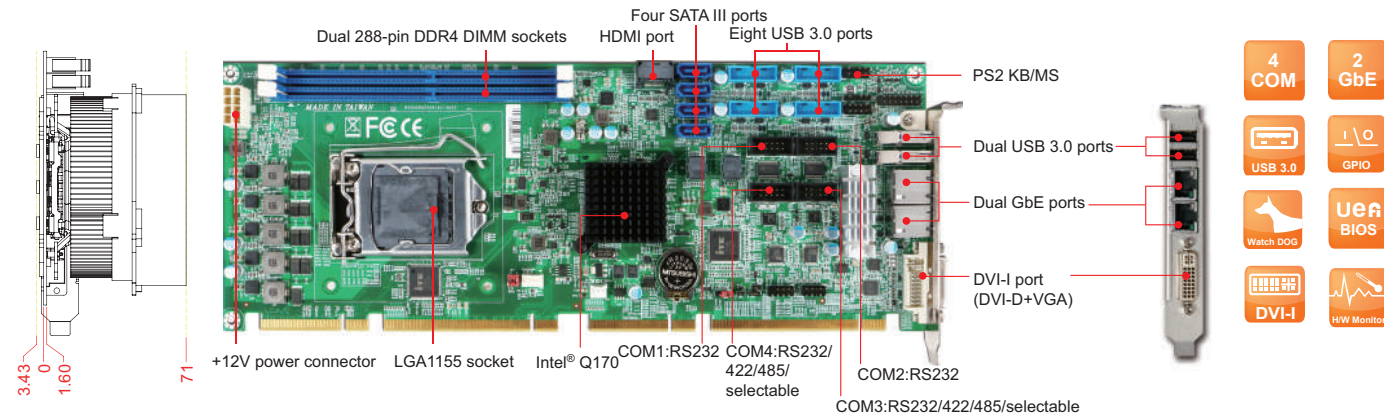| Graphic Controller	- Intel® Xeon® and Core™ i3 processors integrated graphics engine - Provides improved 3D multimedia capabilities including Microsoft DirectX 12, OCL 2.x and OpenGL 4.3/4.4
Display Interface	- Support independent triple display by - CRT on bracket: Resolution up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (CRT + DVI-D on bracket by DVI-I port) - HDMI: up to 4096x2160 @ 24Hz

Mechanical & Environment

Dimension	- 338.5mm(L) x 126.39mm(W), 13.33"(L) x 4.98"" (W) - PCB: 8 layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operatin Temperature:0~60°C - Storage Temperature:-20~80°C - Relative Humidity:5~90%,non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

ROBO-8113VG2AR-Q170

Intel® Core™ i3/i5/i7 Pentium®/Celeron® processor based on PICMG 1.3 SHB with DDR4 SDRAM, HDMI, DVI-I, Dual Gigabit Ethernet, Audio and USB

Dual 288-pin DDR4 DIMM sockets
HDMI port
Four SATA III ports
Eight USB 3.0 ports
PS2 KB/MS
Dual USB 3.0 ports
Dual GbE ports
DVI-I port (DVI-D+VGA)
+12V power connector
LGA1155 socket
Intel® Q170
COM1:RS232
COM4:RS232/ 422/485/ selectable
COM2:RS232
COM3:RS232/422/485/selectable

4 COM
2 GbE
USB 3.0
GPIO
Watch DOG
UEFI BIOS
DVI-I
H/W Monitor

ROBO-8113VG2AR-Q170 is based on Intel® Q170 chipset and desktop processors. Built with flexible PCI express expansions, ROBO-8113VG2AR is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Supports Intel® 7th and 6th Gen Skylake-S Kaby Lake-S Core™ i3/i5/i7/Pentium®/ Celeron® processors in LGA 1151 package

- Delivers up tp 32GB maximum DDR4 2133 MT/s non-ECC DIMM on two sockets

- Supports mutiple display by DVI-I(DVI-D+VGA)and HDMI

- High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

- On-board 6x SATA III ports

- Rich I/O connections such as four serials ports, USB 3.0/2.0, SATA III ports

- Support on board TPM 2.0

ORDERING GUIDE

AB1-3D41	**(R).ROBO-8113VG2AR-Q170** PICMG 1.3(PCI-E+PCI).LGA1151. Intel® Xeon®/Core™ i3 processors.SHB.w/VGA/ Dual GbE/Audio/four COM ports
AB1-3G67	**(R).ROBO-8113VG2AR-Q170-KBL** PICMG 1.3(PCI-E+PCI).LGA1151. Intel® Xeon®/Core™ i3 processors.SHB.w/VGA/ Dual GbE/Audio/four COM ports

PACKING LIST

Standard	B6902932 SATA III cable
	B8981980 PICMG SBC Handling and Installation Notice
	B6903351 DVI-D + VGA cable
	B6902352 dual head COM port cable with bracket
	B8983660 Installation CD
Optional	B6902980 PS/2 Keyboard / Mouse Cable with bracket
	B6902230 USB port cable with bracket
	B6903090 USB 3.0 cable with bracket

GENERAL

Processor	- Intel® Core™ i3/i5/i7 Pentium®/Celeron® processors up to 3.4 GHz (35~65W) with (8MB) Cache in LGA-1151 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost , Hyper-Threading, Virtualization, Thermal Monitoring,Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® Q170 PCH
BIOS	AMI UFEI BIOS (SPI ROM)
Memory	- Supports up to 32GB DDR4 2133/1866 SDRAM on two 288-pin DIMM sockets - Supports non-ECC
Storage Devices	- 6x SATAIII drives (Dual ports via Backplane) - RAID 0, 1, 5, 10
Watchdog Timer	Programmable via S/W from 0.5 sec. to 254.5 sec
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- From CPU (Core™ i5/i7): 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting (Gen3 up to 8.0 GT/s) - From PCH:1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s) - 4x PCI devices at 32bit 33MHz

I/O INTERFACE

Embedded Controller	ITE IT8528E
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC886-GR HDA codec, 5.1 channels - one on- board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connector with two LED indicators
Serial Port	- 2x RS-232 ports - 2x RS-232/422/485 selectable - LPC to COM port IC: Fintek F81216DG
USB	- 4x USB 2.0 ports (through backplane) - 480Mb/s bus capable of high-speed/full-speed/low-speed data ranges - 10x USB 3.0 ports on board (eight ports on board, dual ports on bracket) - 5Gbps bus capable of high-speed/ full-speed/low-speed data ranges
Keyboard & Mouse	- 2x USB 3.0 ports on bracket dedicated to keyboard & mouse (on bracket) - 1x 10 pin box header for external PS/2 KB & MS
GPIO	On board programmable 8-bit Digital I/Os

DISPLAY

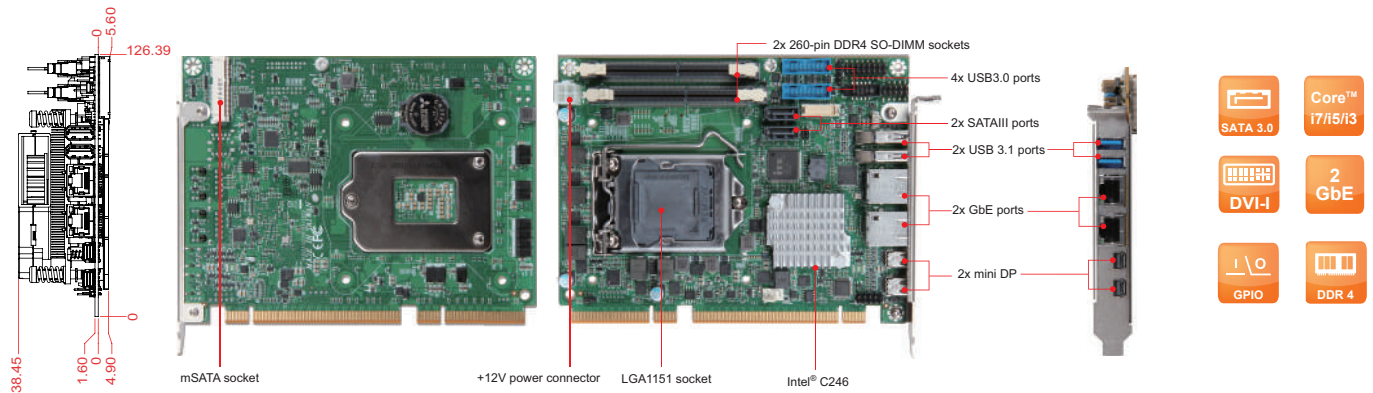| Graphic Controller	- Intel® Core™ i5/i7 processors integrated graphics engine - Provides improved 3D multimedia capabilities including Microsoft DirectX 12, OCL 2.x and OpenGL 4.3/4.4
Display Interface	- Support independent triple display by - CRT on bracket: up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (CRT + DVI-D on bracket by DVI-I port) - HDMI: up to 4096x2160 @ 24Hz

Mechanical & Environment

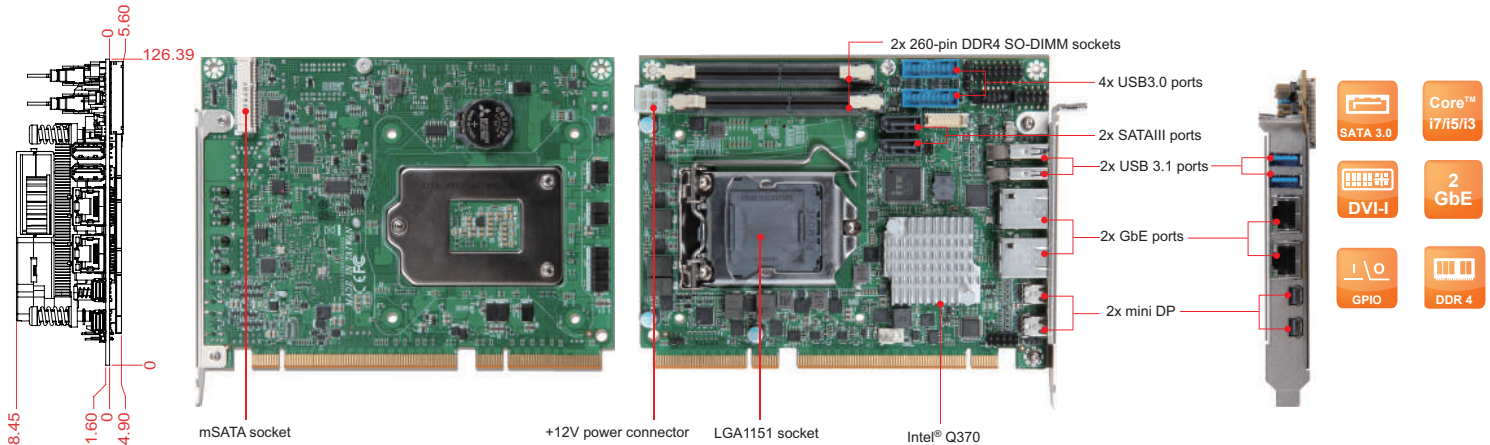| Dimension	- 338.5mm(L) x 126.39mm(W), 13.33"(L) x 4.98"" (W) - PCB: 8 layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operatin Temperature:0°C~60°C - Storage Temperature:-20°C~80°C - Relative Humidity:5~90%,non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

ROBO-6912VG2AR

5.60
126.39
38.45
1.60
0
4.90
0

2x 260-pin DDR4 SO-DIMM sockets
4x USB3.0 ports
2x SATAIII ports
2x USB 3.1 ports
2x GbE ports
2x mini DP

mSATA socket
+12V power connector　LGA1151 socket　Intel® C246

SATA 3.0 | Core™ i7/i5/i3
DVI-I | 2 GbE
GPIO | DDR 4

ROBO-6912VG2AR is based on Intel® C246 chipset to support both Intel® Xeon® and Core™ i3/i5/i7 processors. Built with flexible PCI express expansions, ROBO-6912VG2AR is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

■ Support Intel® 8th Gen Coffee Lake-S processor in LGA1151

■ Delivers up tp 32GB maximum DDR4 2400 MT/s ECC SO-DIMM on two sockets

■ High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

■ On-board two SATAIII ports, support RAID 0, 1

ORDERING GUIDE

AB1-3J42Z	(R).ROBO-6912VG2AR PICMG 1.3(PCI-E+PCI).LGA1151. C246 PCH. IntelXeon/Core i3 processors.SHB.w/ DVI-D/miniDP*2/Dual GbE/Audio/USB 3.1/ COM

PACKING LIST

Standard	B8983650 Installation CD
	B8981980 PICMG SBC Handling and Installation Notice
	B6902932 SATA III cable
Optional	B6903090 USB 3.0 cable with bracket
	B6902230 USB port cable with bracket

GENERAL

Processor	- Intel® Core™ i3/i5/i7 Pentium®/Celeron®/ Xeon® processors up to 3.4 GHz (35~65W) with Cache in LGA-1151 package
Chipset	Intel® C246
BIOS	AMI UFEI BIOS (SPI ROM)
Memory	- Supports up to 32GB DDR4-2400MT/s SDRAM on two 260-pin ECC SO-DIMM sockets - Supports ECC
Storage Devices	- 2x SATAIII ports - 1x mSATA socket
Watchdog Timer	Programmable via S/W from 0.5 sec. to 255 sec
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)

I/O INTERFACE

Expansion Interface	- 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting or BIOS (Gen3 up to 8.0 GT/s) - 1x PCIe x4 or 4x PCIe x1 by different BIOS support (Gen3 up to 8.0 GT/s)
Super I/O (Embedded Controller)	IT5121E-I
Audio	- Realtek ALC888S-VD2-GR HDA codec, 7.1 channels - one on-board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connector with two LED indicators
Serial Port	- 1x RS-232/422/485 selectable by bios
USB	- 4x USB3.0 ports - 2x USB3.1 Gen 2 ports on bracket
Keyboard & Mouse	2x USB3.1 ports on bracket dedicated to keyboard & mouse
GPIO	N/A

DISPLAY

Graphic Controller	Intel® Coffee-Lake-S processors integrated graphics engine
Display Interface	-- DVI-D on board: up to 1920x1600 @ 60Hz - mini DP: two ports on bracket up to 4096x2304 @ 60Hz

Mechanical & Environment

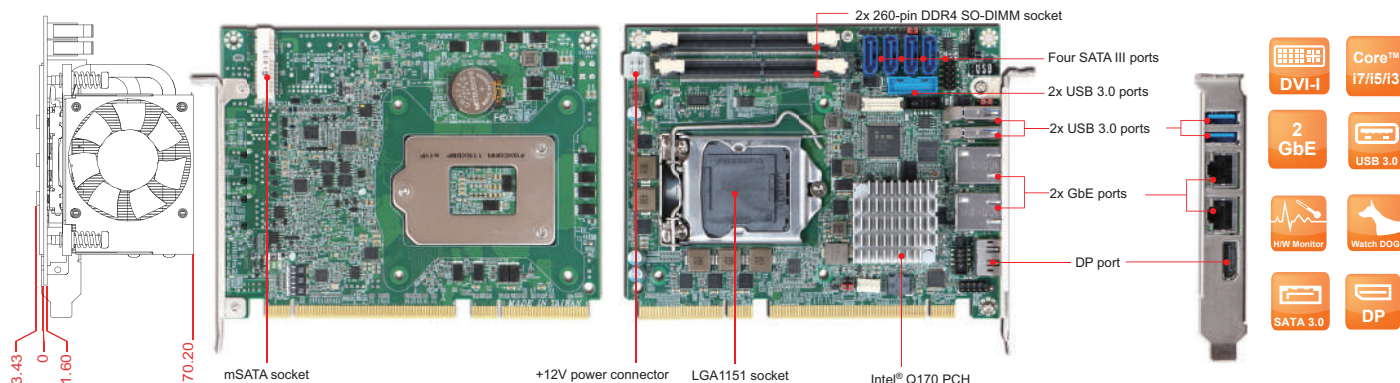| Dimension	- 167.64mm(L) x 126.39mm(W), 6.6" (L) x 4.98"(W) - PCB: 12 Layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operation Temperature:0°C~60°C - Storage Temperature:-20°C~80°C - Relative Humidity:5~95%,non-condensing

FC CE (intel) IoT Solutions Alliance RoHS

ROBO-6912VG2AR-Q370

Intel® Core™ i3/i5/i7/Pentium® Celeron® processor based on PICMG 1.3 halfsize SHB with DDR4 SO-DIMM, mini DP, DVI-D,Dual Gigabit Ethernet, SATAIII, mSATA, Audio, USB

2x 260-pin DDR4 SO-DIMM sockets
4x USB3.0 ports
2x SATAIII ports
2x USB 3.1 ports
2x GbE ports
2x mini DP

mSATA socket

+12V power connector   LGA1151 socket   Intel® Q370

SATA 3.0
Core™ i7/i5/i3
DVI-I
2 GbE
GPIO
DDR 4

ROBO-6912VG2AR-Q370 is based on Intel® Q370 chipset to support Intel® Core™ i3/i5/i7 processors. Built with flexible PCI express expansions, ROBO-6912VG2AR-Q370 is suitable for Medical, Industrial automation, and Digital Signage application

FEATURES

- Support Intel® 8th Gen Coffee Lake-S processor in LGA1151

- Delivers up tp 32GB maximum DDR4 2400 MT/s non-ECC SO-DIMM on two sockets

- High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

- On-board two SATAIII ports, support RAID 0, 1

ORDERING GUIDE

AB1-3J42Z	**(R).ROBO-6912VG2AR-Q370** PICMG 1.3(PCI-E+PCI).LGA1151. Q370 PCH. Intel Core i5/i7 processors.SHB. w/ DVI-D/miniDP*2/Dual GbE/Audio/USB 3.1/ COM

PACKING LIST

Standard	B8981980 PICMG SBC Handling and Installation Notice
	B6902932 SATA III cable
	B8983650 Installation CD
Optional	B6902230 USB port cable with bracket
	B6903090 USB 3.0 cable with bracket

GENERAL

Processor	- Intel® Core™ i3/i5/i7 Pentium®/Celeron® processors up to 3.4 GHz (35~65W) with Cache in LGA-1151 package
Chipset	Intel® Q370
BIOS	AMI UFEI BIOS (SPI ROM)
Memory	- Supports up to 32GB DDR4-2400MT/s SDRAM on two 260-pin non-ECC SO-DIMM sockets
Storage Devices	- 2x SATAIII ports - 1x mSATA socket
Watchdog Timer	Programmable via S/W from 0.5 sec. to 255 sec
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)

I/O INTERFACE

Expansion Interface	- 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting or BIOS (Gen3 up to 8.0 GT/s) - 1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s)
Super I/O (Embedded Controller)	IT5121E-I
Audio	- Realtek ALC888S-VD2-GR HDA codec, 7.1 channels - one on-board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connector with two LED indicators
Serial Port	- 1x RS-232/422/485 selectable by BIOS
USB	- 4x USB3.0 ports - 2x USB3.1 Gen 2 ports on bracket
Keyboard & Mouse	2x USB3.1 ports on bracket dedicated to keyboard & mouse
GPIO	N/A

DISPLAY

Graphic Controller	Intel® Coffee-Lake-S processors integrated graphics engine
Display Interface	- DVI-D on board: up to 1920x1600 @ 60Hz - mini DP: two ports on bracket up to 4096x2304 @ 60Hz

Mechanical & Environment

Dimension	- 167.64mm(L) x 126.39mm(W), 6.6" (L) x 4.98"(W) - PCB: 12 Layers
Power Supply	- Typical: +12V, +5V - Support ATX mode
Environment	- Operation Temperature:0°C~60°C - Storage Temperature:-20°C~80°C - Relative Humidity:5~95%,non-condensing

ROBO-6911VG2AR

Intel® Xeon® E3/Core™ i3/i5/i7/ Pentium®/Celeron® processor based on PICMG 1.3 half size SHB with DDR4 SO-DIMM, DP, DVI-I, Dual Gigabit Ethernet, mSATA, Audio, USB

2x 260-pin DDR4 SO-DIMM socket
Four SATA III ports
2x USB 3.0 ports
2x USB 3.0 ports
2x GbE ports
DP port

mSATA socket
+12V power connector LGA1151 socket Intel® Q170 PCH

DVI-I | Core™ i7/i5/i3 | 2 GbE | USB 3.0 | H/W Monitor | Watch DOG | SATA 3.0 | DP

ROBO-6911VG2AR is based on Intel® C236/ Q170 chipset to support both Intel® Xeon® and Core™ i3 processors. Built with flexible PCI express expansions, ROBO-6911VG2AR is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Support Intel® 7th and 6th Gen Skylake-S Kaby Lake-S processor in LGA1151

- Delivers up tp 32GB maximum DDR4 2133 MT/s ECC SO-DIMM on two sockets

- Supports mutiple display by DP on bracket and on-board DVI-I(DVI-D+VGA)

- High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

- On-board four SATAIII ports, support RAID 0, 1, 5, 10

ORDERING GUIDE

AB1-3D38	**(R).ROBO-6911VG2AR** PICMG 1.3 half size (PCI-E) .LGA1151. Intel® Xeon®/Core™ i3 processors.SHB.w/ DP/DVI-I/Dual GbE/Audio/mSATA
AB1-3G66	**(R).ROBO-6911VG2AR-KBL** PICMG 1.3 half size (PCI-E) .LGA1151. Intel® Xeon®/Core™ i3 processors.SHB.w/ DP/DVI-I/Dual GbE/Audio/mSATA

PACKING LIST

Standard	B6902932 SATA III cable
	B8981980 PICMG SBC Handling and Installation Notice
	B8983650 Installation CD
Optional	B6902230 USB port cable with bracket
	B6903090 USB 3.0 cable with bracket

GENERAL

Processor	- Intel® Xeon® E3-1200v5/v6 series / Core™ i3/i5/i7/Pentium®/Celeron® processors up to 3.6 GHz (35~80W) with (8MB) Cache in LGA-1151 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost , Hyper-Threading, Virtualization, Thermal Monitoring,Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® C236
BIOS	AMI UFEI BIOS (SPI ROM)
Memory	- Supports up to 32GB DDR4 2133/1066 MT/s SDRAM on two 260-pin ECC or non ECC SO-DIMM sockets - Supports ECC
Storage Devices	4x SATAIII ports 1x mSATA socket
Watchdog Timer	Programmable via S/W from 0.5 sec. to 254.5 sec
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting (Gen3 up to 8.0 GT/s) - 1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s)

I/O INTERFACE

Super I/O	ITE IT8772E
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC886-GR HDA codec, 5.1 channels - one on-board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connector with two LED indicators
Serial Port	- 1x RS-232/422/485 selectable by bios
USB	- 4x USB3.0 ports (2 ports on bracket)
Keyboard & Mouse	2x USB3.0 ports on bracket dedicated to KB & MS
GPIO	N/A

DISPLAY

Graphic Controller	Intel® 6th Skylake-S processors integrated graphics engine
Display Interface	Support independent triple display by - CRT on bracket:up to 1920x1200 @ 60Hz - DVI-D on bracket: up to 1920x1200 @ 60Hz (CRT+ DVI-D by on-board connector) - DP: up to 4096X2304@60Hz (on bracket)

Mechanical & Environment

Dimension	167.64mm(L) x 126.39mm(W), 6.6" (L) x 4.98"(W) -PCB: 12 Layers
Power Supply	Typical: +12V, +5VSB -Support ATX mode
Environment	Operatin Temperature:0°C~60°C -Storage Temperature:-20°C~80°C -Relative Humidity:5~90%,non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

ROBO-6911VG2AR-Q170

2x 260-pin DDR4 SO-DIMM socket
Four SATA III ports
2x USB 3.0 ports
2x USB 3.0 ports
2x GbE ports
DP port

mSATA socket
+12V power connector
LGA1151 socket
Intel® Q170 PCH

DVI-I · Core™ i7/i5/i3 · 2 GbE · USB 3.0 · H/W Monitor · Watch DOG · SATA 3.0 · DP
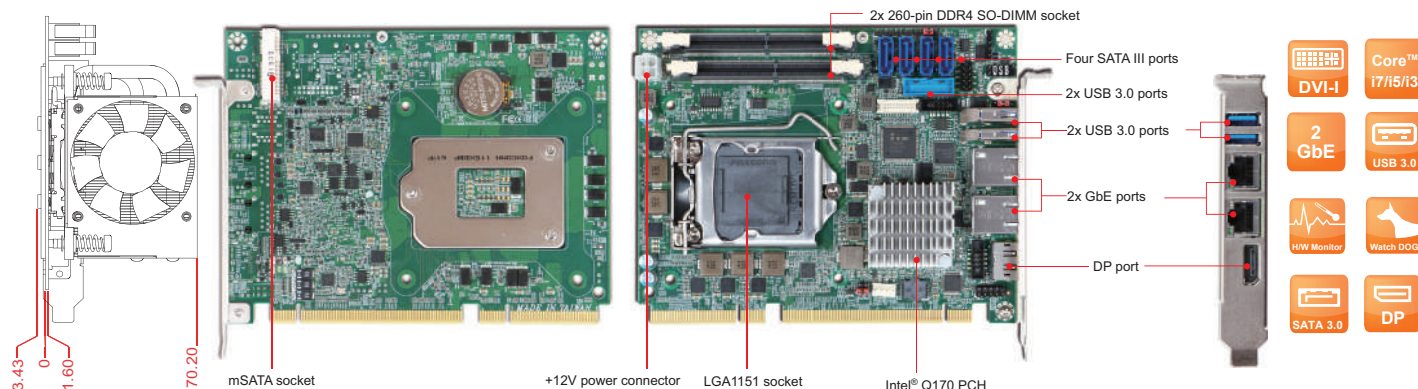
ROBO-6911VG2AR-Q170 is based on Intel® Q170 chipset to support Core™ i5 and i7 processors. Built with flexible PCI express expansions, ROBO-6911VG2AR-Q170 is suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Support Intel® 7th and 6th Gen Skylake-S Kaby Lake-S processor in LGA1151

- Delivers up tp 32GB maximum DDR4 2133 MT/s non-ECC SO-DIMM on two sockets

- Supports mutiple display by DP on bracket and on-board DVI-I(DVI-D+VGA)

- High speed dual Gigabit Ethernet based on PCI express x 1, high bandwidth I/O interface

- On-board four SATAIII ports, support RAID 0, 1, 5, 10

ORDERING GUIDE

AB1-3D39	(R).ROBO-6911VG2AR-Q170 PICMG 1.3 half size (PCI-E) .LGA1151. Intel® i5/i7 processors.SHB.w/DP/DVI-I/Dual GbE/Audio/mSATA
AB1-3G65	(R).ROBO-6911VG2AR-Q170-KBL PICMG 1.3 half size (PCI-E) .LGA1151. Intel® i5/i7 processors.SHB.w/DP/DVI-I/Dual GbE/Audio/mSATA

PACKING LIST

Standard	B6902932 SATA III cable
	B8981980 PICMG SBC Handling and Installation Notice
	B8983650 Installation CD
Optional	B6902230 USB port cable with bracket
	B6903090 USB 3.0 cable with bracket

GENERAL

Processor	- Intel® Core™ i3/i5/i7 Pentium®/Celeron® processors up to 3.4 GHz (35~65W) with (8MB) Cache in LGA-1151 package - DMI x4 Link: 5.0GT/s - Support Intel® Turbo Boost , Hyper-Threading, Virtualization, Thermal Monitoring,Trusted Execution and SpeedStep Technology (depends on CPU sku)
Chipset	Intel® Q170
BIOS	AMI UFEI BIOS (SPI ROM)
Memory	- Supports up to 32GB DDR4 2133/1866 MT/s SDRAM on two 260-pin ECC or non ECC SO-DIMM sockets - Supports non-ECC
Storage Devices	4x SATAIII ports 1x mSATA socket
Watchdog Timer	Programmable via S/W from 0.5 sec. to 254.5 sec
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- 1x PCIe x16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 by jumper setting (Gen3 up to 8.0 GT/s) - 1x PCIe x4 or 4x PCIe x1 by different bios support (Gen 3 up to 8.0 GT/s)

I/O INTERFACE

Super I/O	ITE IT8772E
Audio	- Intel® PCH built-in High Definition Audio up to 192-kHz 32-bit - Realtek ALC886-GR HDA codec, 5.1 channels - one on-board audio pin header
Ethernet	- Intel® WGI219LM + WGI210AT Gigabit Ethernet controller - Dual 10BASE-T / 100BASE-TX / 1000BASE-T Ethernet - PCI Express x1 interface based on Gigabit Ethernet - Dual RJ-45 connector with two LED indicators
Serial Port	- 1x RS-232/422/485 selectable by bios
USB	- 4x USB3.0 ports (2 ports on bracket)
Keyboard & Mouse	2x USB3.0 ports on bracket dedicated to KB & MS
GPIO	N/A

DISPLAY

Graphic Controller	Intel ® 6th Skylake-S processors integrated graphics engine
Display Interface	Support independent triple display by - CRT on bracket:up to 1920x1200 @ 60Hz - DVI-D on bracket:up to 1920x1200 @ 60Hz (CRT+ DVI-D by on-board connector) - DP: up to 4096X2304@60Hz (on bracket)

Mechanical & Environment

Dimension	167.64mm(L) x 126.39mm(W), 6.6"(L) x 4.98"(W) -PCB: 12 layers
Power Supply	Typical: +12V, +5VSB -Support ATX mode
Environment	Operatin Temperature:0°C~60°C -Storage Temperature:-20°C~80°C -Relative Humidity:5~90%,non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

PICMG 1.0 Backplane

PICMG GENERAL DESCRIPTION

PICMG Backplanes in this section are Single Board Computers (SBCs) and Single Host Board (SHB) companions that feature expansion slots such as ISA, PCI, PCI-X or PCI Express interface. In addition, the backplane also features several power connectors that draw power from power supply to devices on it. Some LEDs are designed on board to indicate status of each power rail.

PICMG 1.0 supports both ISA & PCI, PICMG 1.2 supports dual PCI or PCI-X, and PICMG 1.3 supports PCI Express and PCI expansion. Some bridges or switches can be applied to the backplane to support more devices or different kinds of expansion interfaces. However, PICMG 1.0, 1.2, and 1.3 are not compatible with each other.

PICMG 1.0 BACKPLANE

Passive Backplane: Backplane that only support up to four PCI master

■ 32-bit PCI/16-bit ISA
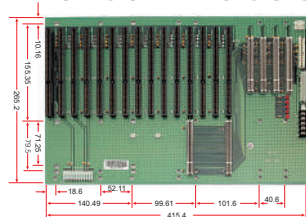
PBP-19P4

19-slot (4x PCI) PICMG Backplane

- Fit for 20-slot chassis
- ATX power connector support
- Sufficient ISA slots for CTI application
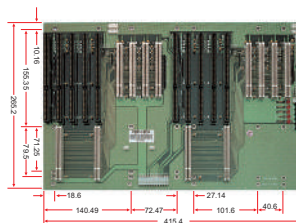
PBP-18D4

18-slot Dual-system PICMG Backplane

- Fit for 20-slot chassis
- Designed for fault-tolerant computing
- ATX power connector support
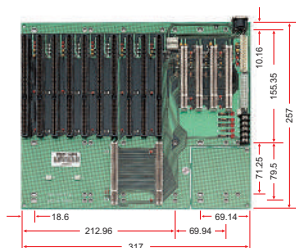
PBP-14P4

14-slot (4x PCI) PICMG Backplane

- Fit for 14-slot chassis
- ATX power connector support
- The most popular and reliable PICMG backplane
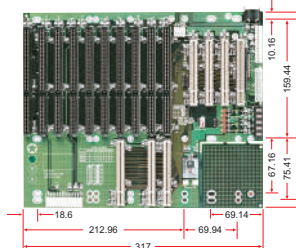
**ACTI-14P4**

14-slot (4x PCI) Active PICMG Backplane

- Fit for 14-slot chassis
- 2.4 mm PCB thickness
- ATX power connector support
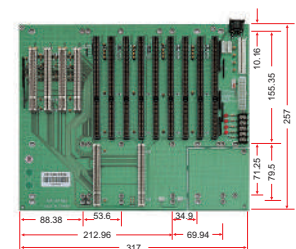
PBP-13R4

13-slot (4x PCI) PICMG Backplane

- Fit for 14-slot chassis
- Special design for full-length PCI cards
- ATX power connector support
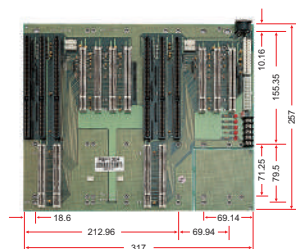
PBP-13D4

13-slot Dual-system PICMG Backplane

- Fit for 14-slot chassis
- Design for fault-tolerant computing
- ATX power connector support
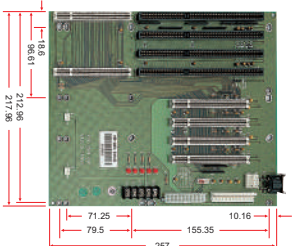
PBP-08P4

8-slot (4x PCI) PICMG Backplane

- Fit for node chassis and desktop case
- ATX power connector support
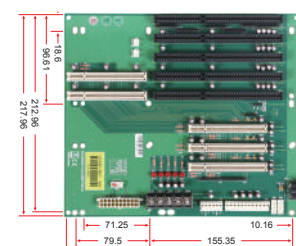
PBP-08P3

8-slot (3x PCI) PICMG Backplane

- Fit for node chassis and desktop case
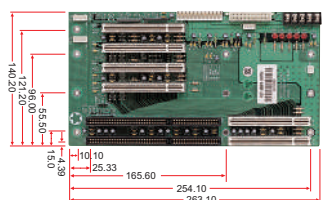
PBP-06P4

6-slot (4x PCI) PICMG Backplane

- Fit for node chassis
- ATX power connector support
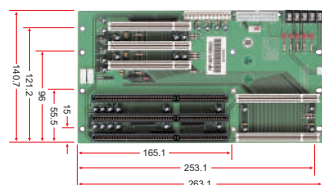
PBP-06P3

6-slot (3x PCI) PICMG Backplane

- Fit for node chassis
- ATX power connector support
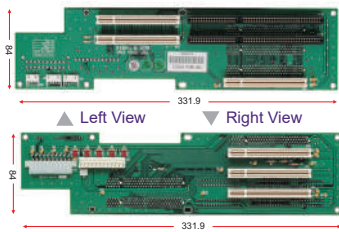
PBP-06V4
Vertical 6-slot (4x PCI) PICMG Backplane

- Fit for 2U chassis
- ATX and AT power connector support

▲ Left View ▼ Right View
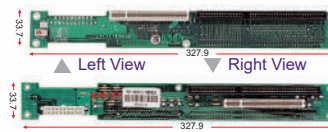
PBP-02V1X
Vertical 2-slot (1x PCI) PICMG Backplane

▲ Left View ▼ Right View

- Fit for 1U chassis
- ATX power connector support
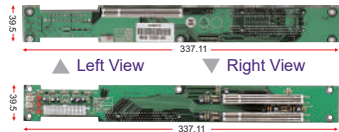
PBP-03P2X
Vertical 3-slot (2x PCI) PICMG Backplane

▲ Left View ▼ Right View

- Fit for Portwell's 1U chassis
- ATX power connector support

Active Backplane: Backplane that utilizes a bridge to support PCI master beyond four
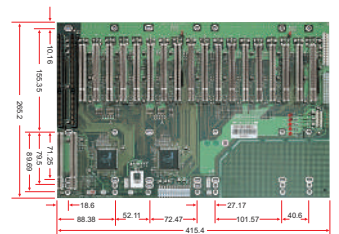
PBP-19AI
19-slot (18x PCI) Active PICMG Backplane
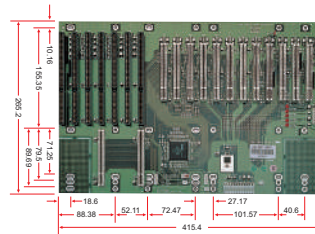
PBP-19AC
19-slot (12x PCI) Active PICMG Backplane
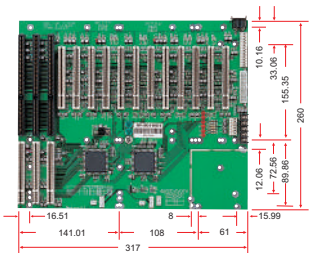
PBP-14AC-B
14-slot (12x PCI) Active PICMG Backplane
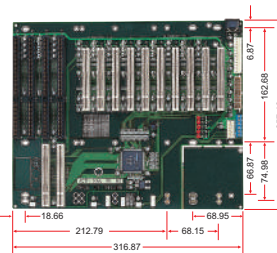
ACTI-14AA
14-slot (10x PCI) Active PICMG Backplane

- Fit for 14-slot chassis
- 2.4 mm PCB thickness
- ATX power connector support
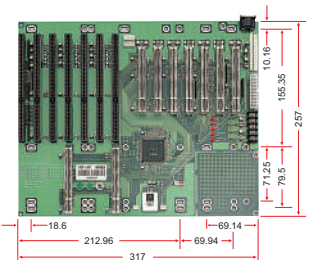
PBP-14A7
14-slot (7x PCI) Active PICMG Backplane
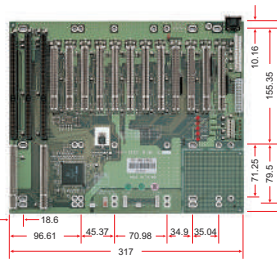
PBP-14AC
14-slot (12x PCI) Active PICMG Backplane
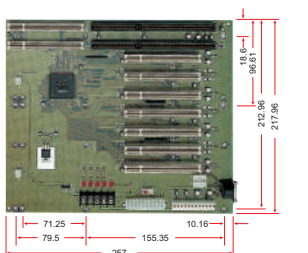
PBP-08A7
8-slot (7x PCI) Active PICMG Backplane

PICMG 1.3 Backplane Matrix Table

		PCI Express				PCI-X	PCI
		x16 slot	x8 slot	x4 slot	x1 slot		
Server Grade	PBPE-19AG64	1 [x8]	1 [x4]			16	
	PBPE-14AD64		1	1		8	3
	PBPE-06V464			1		4	
	PBPE-08P41	2 [x8]	1 [x4]				4
	PBPE-06A364	2 [x8]				2	1
	PBPE-06P2	2 [x8]	1 [x4]				2
Non-Server Grade	PBPE-13A4	1 + 2 [x1]		5 [x1]			4
	PBPE-12P4	1 [x8]	2 [x4]	4 [x1]			4
	PBPE-11A3	1 + 2 [x8]	4 [x1]				3
	PBPE-13A8	1			3		8
	PBPE-12A9	1	1 [x4]				9
	PBPE-12AA64	1				8	2
	PBPE-06V3	1	1 [x4]				3
	PBPE-06V	1			4		
	PBPE-07P4	1	1 [x4]	1			4
	PBPE-05A364	1				2	1
	PBPE-06P4		1 [x4]				4
	PBPE-06P3	1		1			3

*Remark: [ ] → means real signal, ex. [x4] is for x4 signal but slot may not be x4 slot; [x8] is for x8 signal but slot may not be x8 slot

		ROBO-8120	ROBO-8113	ROBO-8113	ROBO-8112	ROBO-8112	ROBO-8111	ROBO-8111	ROBO-8110	ROBO-8110	ROBO-8210
		3420	C236	Q170	C226	Q87	C216	Q77	C206	Q67	QM57
Server Grade	PBPE-19AG64	✿	✿	✿	✿		✿		✿		
	PBPE-14AD64	✿	✿	✿	✿		✿		✿		
	PBPE-06V464	✿	✿	✿	✿		✿		✿		
	PBPE-08P41	✿	✿	✿	✿		✿		✿		
	PBPE-06A364	✿	✿	✿	✿		✿		✿		
	PBPE-06P2	✿	✿	✿	✿		✿		✿		
Non-Server Grade	PBPE-13A4	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-12P4		✿	✿	✿		✿		✿		
	PBPE-11A3	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-13A8	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-12A9	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-12AA64	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-06V3	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-06V	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-07P4	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-05A364	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-06P4	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿
	PBPE-06P3	✿	✿	✿	✿	✿	✿	✿	✿	✿	✿

PICMG 1.3 Backplane

Server Grade Backplane
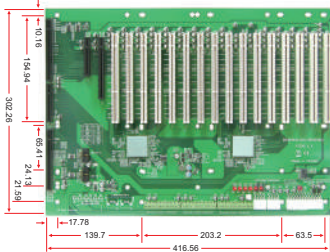
PBPE-19AG64

19-slot [PCIe x16 (1, x8 signal), PCIe x8 (1, x4 signal), PCI-X (16)]

- Fit for 4U up chassis
- Four PCI-X buses support 16 PCI-X expansion slots
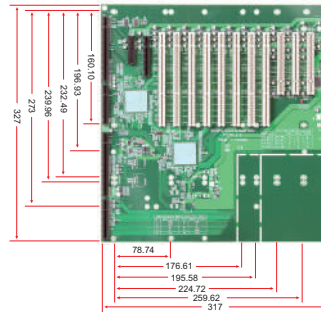
PBPE-14AD64

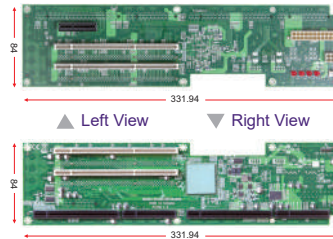**14-slot [PCIe x8 (1,x4 signal), PCIe x8 (1), PCI-X (8), PCI (3)]**

- Fit for 4U chassis
- Four PCI-X buses support eight PCI-X expansion slots
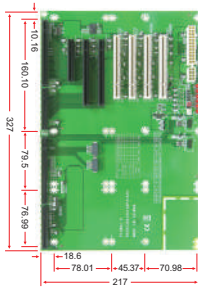
PBPE-08P41

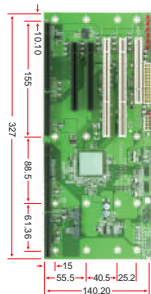**8-slot [PCIe x8 (1, x4 signal), PCIe x16 (2, x8 signal), PCI (4)]**

- Fit for Node chassis
- Four USB ports

PBPE-06V464

Vertical 6-slot [PCIe x4 (1), PCI-X (4)]

▲ Left View   ▼ Right View

- Fit for 2U chassis
- Dual PCI-X buses support four PCI-X slots

PBPE-06A364

6-slot [PCIe x16 (2, x8 signal), PCI-X (2), PCI (1)]

- Fit for Node chassis
- Four USB ports
- Dual SATA ports
- Two PCI-X buses support two PCI-X expansion slot
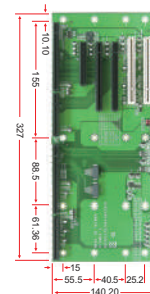
PBPE-06P2

6-slot [PCIe x8 (1, x4 signal), PCIe x16 (2, x8 signal), PCI (2)]

- Fit for Node chassis
- Four USB ports

Non-Server Grade Backplane
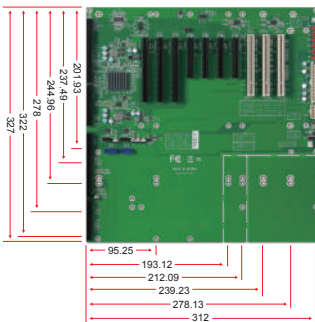
PBPE-11A3

11-Slot [PCIe x16(1), PCIe x16 (2, x8 signal), PCIe x8 (4, x1 signal), PCIe (3)]

- Fit for 4U Chassis
- Four USB ports
- Two SATA ports
- Support PCIe Gen3 with ROBO-8112/8113 series
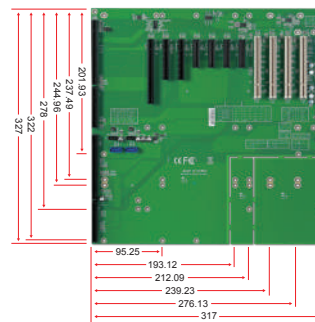
PBPE-12P4

12-Slot [PCIe x16 (1, x8 signal), PCIe x8 (2, x4 signal), PCIe x4 (4, x1 signal), PCI (4)]

- Fit for 4U Chassis
- Four USB ports
- Two SATA ports
- Support PCIe Gen3 with ROBO-8112/8113 series
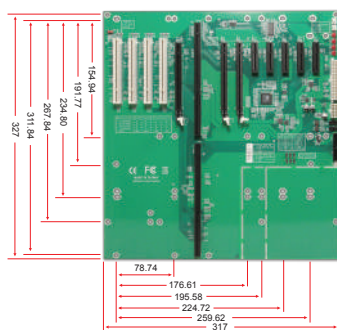
PBPE-13A4

13-slot [PCIe x16(1), PCIe x16(2, x1 signal), PCIe x4(5, x1 signal), PCI(4)]
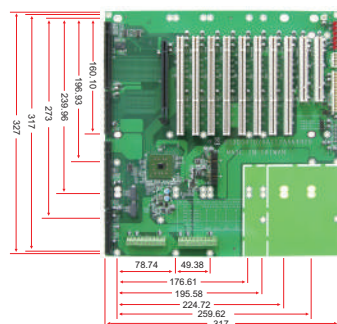
- Fit for 4U chassis
- Four USB 2.0 ports
- Dual SATA II ports
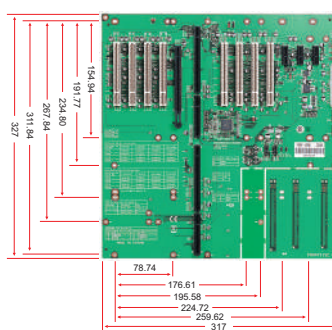
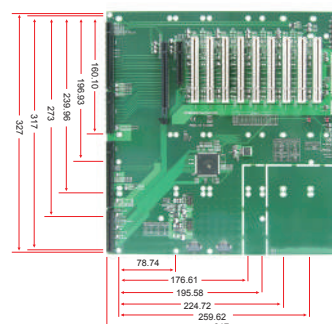## PBPE-13A8

13-slot [PCIe x1 (3), PCIe x16 (1), PCI (8)]

- Fit for 4U chassis
- Four USB ports
- Dual SATA ports
- 24-pin ESP12V power connector

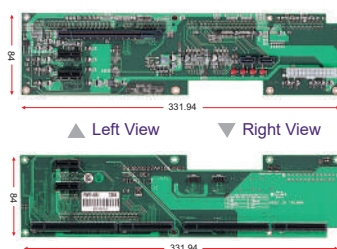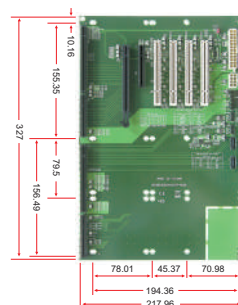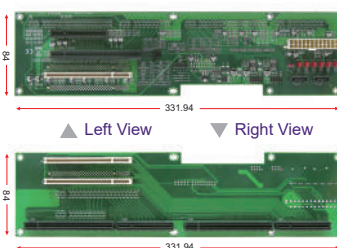## PBPE-12AA64

12-slot [PCI-X (8), PCIe x16 (1), PCI (2)]

- Fit for 4U chassis
- Four USB ports
- Dual SATA ports
- Two PCI-X buses support eight PCI-X expansion slot

PBPE-12A9

12-slot [PCIe x16 (1), PCIe x8 (1, x4 signal), PCI (9)]

- Fit for 4U chassis
- Four USB ports
- Dual SATA ports

PBPE-06V

Vertical 6-slot [PCIe x1 (4), PCIe x16 (1)]

▲ Left View   ▼ Right View

- Fit for 2U chassis
- Four USB ports
- Dual SATA ports
- 24-pin ESP 12V power connector

PBPE-07P4

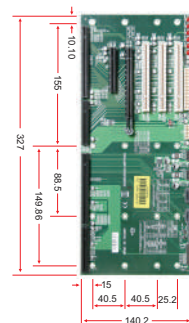**7-slot [PCIe x8 (1, x4 signal), PCIe x16 (1), PCI (4)]**

- Fit for Node chassis
- Four USB ports
- Dual SATA ports

PBPE-06V3

Vertical 6-slot [PCIe x8 (1, x4 signal), PCIe x16 (1), PCI (3)]
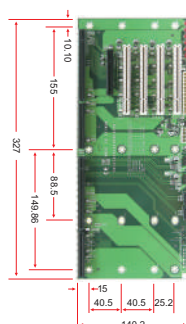
▲ Left View   ▼ Right View

- Fit for 2U chassis
- Four USB ports
- Dual SATA ports

PBPE-06P3

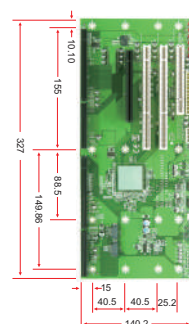**6-slot [PCIe x16 (1), PCIe x4 (1), PCI (3)]**

- Fit for Node chassis
- Four USB ports
- Dual SATA ports

PBPE-06P4

6-slot [PCIe x8 (1, x4 signal), PCI (4)]

- Fit for Node chassis
- Four USB ports
- Dual SATA ports

PBPE-05A364

5-slot [PCIe x16 (1), PCI-X (2), PCI (1)]

- Fit for Node chassis
- Four USB ports
- Dual SATA ports
- Two PCI-X buses support two PCI-X expansion slot

PIC & ISA Backplane

PCI GENERAL DESCRIPTION

- Compact size backplane for half size PCI SBC
- PICMG 1.0 Rev 2.1 Compliant (PCI golden finger only)
- Support AT or ATX type power connector
- 4-layer PCB with power and ground planes to reduce power noise and maintain a lower impedance
- Frame rated PCB at 94-V0
- User friendly design supports external K/B connector, power for chassis fan and power indicator
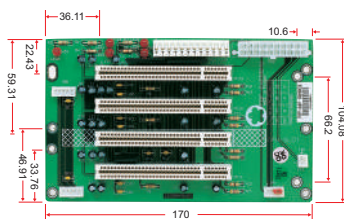
PBP-05P
5-slot Passive PCI Backplane
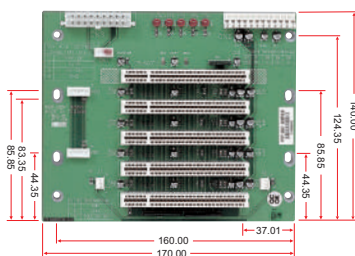
PBP-04P
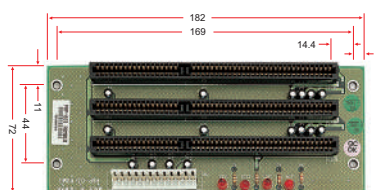**4-slot Passive PCI Backplane**

ISA GENERAL DESCRIPTION

- 4-layer PCB with ground and power planes for reducing noise and keeping lower impedance
- Frame Rated PCB at 94-V0
- LED power indicator for +5V, +12V, -5V and 12V
- Heavy duty terminal block connector for industrial power supply wiring(*)
- Equipped with gold-plated socket for good contact
- Easy cut for dual or multi systems(*)
- Plug-in sockets of termination resistors for high-speed signal.(*)
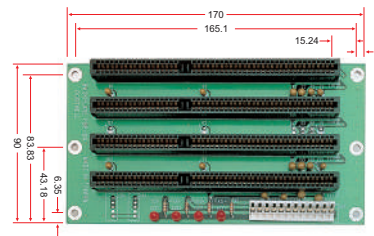
  "*"means for most part of products
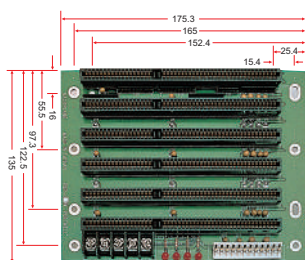
PBP-03I
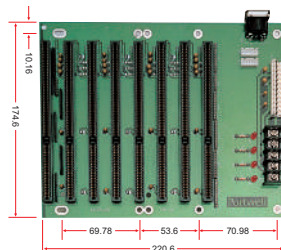**3-slot Passive ISA Backplane**

PBP-04I
4-slot Passive ISA Backplane

PBP-06I
6-slot Passive ISA Backplane

PBP-08I
8-slot Passive ISA Backplane

PBP-14I
14-slot Passive ISA Backplane
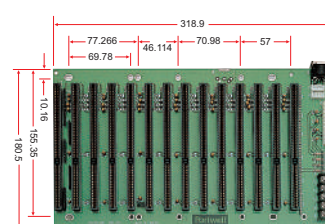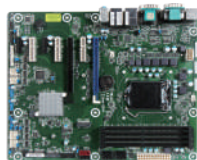
MODEL	RUBY-D811-Q370	RUBY-D810-H110	RUBY-D718VG2AR
Form Factor	ATX	ATX	ATX
CPU	Intel® Core™ i3/i5/i7/i9/Pentium®/Celeron®	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package
Chipset	Intel® Q370	Intel® H110	Intel® Q170/H110/C236
BIOS	AMI UEFI	AMI UEFI	AMI UEFI
Memory	4 x DDR4 DIMM up to 128GB	2x DDR4 DIMM up to 32GB	4x DDR4 DIMM up to 64GB
Expansion	2x PCIe x16 (1 x PCIe x8 signal) 3x PCIe x4 slots 2x PCIe x1 slots	1x PCIe x16 slot 1x PCIe x16 slot 1x PCIe x1 slot 4x PCI slots	4x PCI slots 1x PCIe x16 slot 2x PCIe x4 slots
Display	VGA/Dual DP/HDMI	VGA/DVI-D/HDMI	VGA/DVI-D/HDMI
Audio	Realtek ALC887 HDA codec	Realtek ALC662 HDA Audio codec	Realtek ALC886 HDA codec
LAN	2x GbE	2x GbE	2x GbE
Serial Port	8x RS-232 ports 2x RS-232/422/485	1x RS232/422/485 5x RS232	1x RS-232/422/485 5x RS-232
USB	6x USB3.2 Gen1 6x USB2.0	4x USB3.0 6x USB2.0	6x USB3.0 8x USB2.0
Storage Devices	6x SATA III (SATAI shared with M.2 Key M)	4x SATA III	6x SATA III (C236 supports 8x SATA III)
GPIO	8 bit	8 bit	8 bit
Others	N/A	-	PS/2 KB & MS
Dimension	304.8 x 243.8mm	304.8 x 243.8 mm	304.8 x 243.8mm
Page	29	30	31

RUBY-D811-Q370

Leading Desktop Intel® 8th/9th Gen Core™ Processors ATX with DDR4 Long-DIMM up to 128G, VGA ,Dual DP ports,HDMI ,Two GbE LAN ports, Ten COM Ports

PCIe x1 slot
PCIe x4 slot
PCIe x16 slot (x8 PCIe signal)
SATA III ports
PCIe x16 slot
DDR4 long-DIMM slot
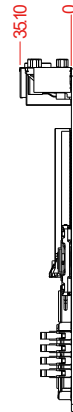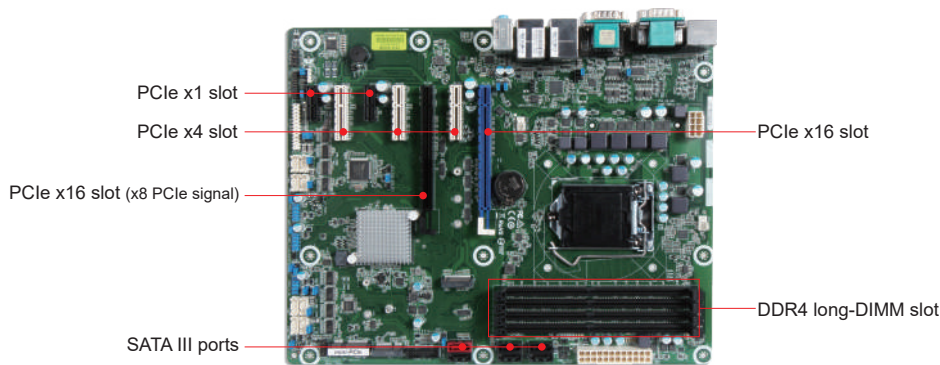
RUBY-D811-Q370 is based on Intel® Q370 chipset and Desktop processors including Intel ® 8th/9th Gen Core™ i3/i5/i7 SKU. This board supports DDR4, PCIe 3.0, and SATA III.Those features help you to build high performance and stabile system.

FEATURES

- Intel® 8th/9th Gen Core™ Processors support
- Supports four Long- DIMMs suppor t DDR4 Non-ECC SDRAM up to 128GB
- Supports dual Ethernet, ten COM Ports, six USB3.0 Ports, six SATA III Ports and Audio
- Supports Two PCIe x16 (1x PCIe x8 signal), three PCIe x4 slot, two PCIex1 slot ,one M.2 Type E socket for Wireless,one M.2 Type M socket for SSD, and one mini-PCIe slot

REAR I/O

Dual DP
RS-232/422/485
Dual GbE LAN
Audio
HDMI
PS/2
VGA
4xUSB3.2 (Geul) ports
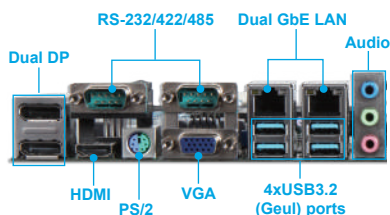
ORDERING GUIDE

AB1-3D29	**(R).RUBY-D811-Q370**
	ATX ESB.Q370 w/o ECC LGA1151.w/DDR4 / VGA/Dual DP/Dual GbE/COM/Audio/USB

PACKING LIST

One RUBY-D811-Q370 Main board
One I/O shield
One Installation CD
One SATA cable
One CPU coolor bracket

GENERAL

Processor	Intel® 8th/9th Gen Core™ Processors CPU in LGA1151 package
Chipset	Intel® Q370
BIOS	AMI uEFI BIOS
Memory	Supports up to 128GB DDR4 2400/2666MHz Non-ECC SDRAM on four Long-DIMM socket
Storage Devices	Supports six SATA III ports(one is shared with M.2 Key M)
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- 2x PCIe x16 (1 x PCIe x8 signal) - 3x PCIe x4 slots - 2x PCIe x1 slots - 1x M.2 Type E socket for Wireless - 1x M.2 Type M socket for SSD - 1x mini-PCIe socket

I/O INTERFACE

Super I/O	NCT5104D
Audio	- Realtek AL887 High Definition Audio integrated in Intel SoC - Audio Jack on rear I/O with Line-in/ Line-out/ Mic-in
Ethernet	- Intel® I219LM & I210AT Ethernet controller - 2x RJ45 connectors on rear I/O
Serial Port	- 2x RS-232/422/485 ports on REAR I/O - 8x RS-232 ports on board pin header
USB	- 4x USB3.0 on rear I/O,2x USB3.0 in pin header - 6x USB2.0 on board pin header
Keyboard & Mouse	PS/2 Keyboard & Mouse Pin Header
GPIO	8-bit configurable controlled by embedded controller

DISPLAY

Graphic Controller	- Intel® UHD Graphics 630 supports DirectX 12, OpenGL 4.5 - Video decode HW acceleration support for H.264, H.265, MPEG2, VC-1/WMV9, JPEG, VP8, and VP9
Display Interface	- HDMI:HDMI ports on rear I/O, resolution up to 4096x2340 - DPI:Dual DP ports on rear I/O, resolution up to 4K (4096x2340) - VGA:One VGA port on rear I/O, resolutoin up to 1920x1200

Mechanical & Environment

Dimension	304.8mm(L) x 243.8mm(W)
Power Supply	ATX power input
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5% to 95%, non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

Core™ i7/i5/i3
USB 3.0
SATA 6Gb
2 GbE
HDMI
VGA
DVI-D
AMI BIOS
GPIO
Watch DOG
H/W Monitor

RoHS FC CE intel inside Microsoft Windows Embedded Partner intel IoT Solutions Alliance CFEX

RUBY-D810-H110

Four PCI slot
One PCIe x1 slot
One PCIe x16 slot
One PCIe x16 slot (x4 signal)
SATA III ports

Dual GbE ports
LGA1511 socket
Two DDR4 DIMM socket

33.30   1.60

RUBY-D810-H110 is based on Intel® H110 chipset and desktop processor SKU like Intel® 7th and 6th Gen Core™ i3, i5 and i7 Processors. Built with PCI and PCIe expansions, it's suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Intel® 7th & 6th Gen Core™ Processors support
- Supports two Long-DIMMs support DDR4 Non- ECC SDRAM up to 32GB
- Supports display output by VGA, DVI, and HDMI
- Supports total six Com ports(one support RS-232/422/485)
- Supports two PCIe x16(x16 & x4 signal), one PCIe x1 and four PCI slots

REAR I/O

PS/2 RS232/422/485 VGA Dual GbE
USB2.0 HDMI DVI-D USB 3.0 Audio

ORDERING GUIDE

AB1-3G36	(R).RUBY-D810-H110
	ATX.IMB.LGA1151.CPU.H110.DDR4/VGA/ HDMI/DVI/Dual GbE/COM/Audio/USB

PACKING LIST

One CPU cooler bracket
One SATA cable
One Installation CD
One RUBY-D810-H110 Main board
One I/O shield

GENERAL

Processor	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package
Chipset	Intel® H110
BIOS	AMI UEFI BIOS (SPI ROM)
Memory	Supports up to 32GB DDR4 2133/1866 Non-ECC on two 288 pin DIMM socket
Storage Devices	Supports four SATA III ports
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	System monitor(Voltage, Fan Speed and Temperature)
Expansion Interface	- 1x PCIe x16 slot - 1x PCIe x16 slot(PCIe x4 signal) - 1x PCIe x1 slot - 4x PCI slots

I/O INTERFACE

Super I/O	Fintek F81866AD-l
Audio	Realtek ALC662HAD Audio codec Audio Jack on rear I/O with Line-out / Mic-in
Ethernet	- Intel® I219V and Intel® I210AT Ethernet controller - 2x RJ45 connectors on rear I/O
Serial Port	- 1x RS232/422/485 port on rear I/O - 5x RS232 ports on pin header
USB	- 4x USB3.0 ports on rear I/O - 2x USB2.0 ports on rear I/O - 4x USB2.0 ports on pin header(2 x 5pins, 1 x 5pins, Vertical USB type A)
GPIO	8-bit configurable controlled by embedded controller

DISPLAY

Graphic Controller	- Intel® Core™ i5/i7 processors integrated graphic engine - Provided improved 3D multimedia capabilities including Microsoft DirectX 11.1, Shader Model 4.0, MPEG-2 and OpenGL® 3.2
Display Interface	- VGA:up to 2560x1600 @ 60Hz - DVI-D: up to 1920x1200 @ 60Hz - HDMI: up to 1920x1200 @ 60Hz - Support Triple Display

Mechanical & Environment
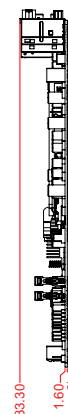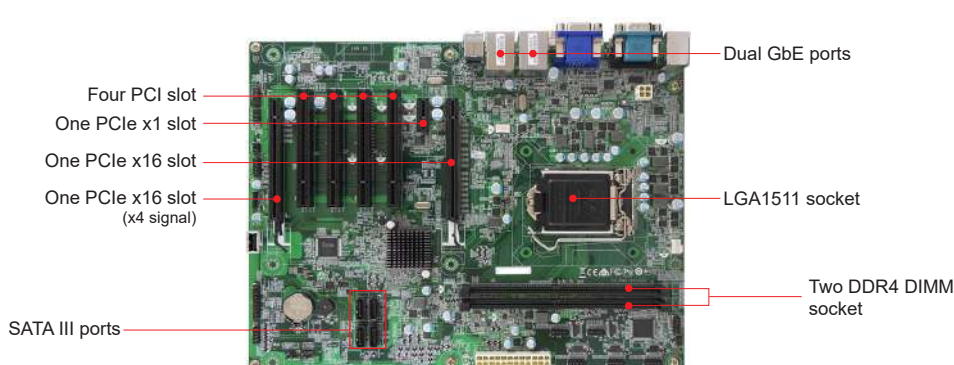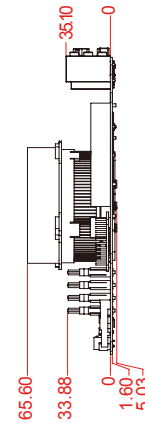
Dimension	304.8(L) x 243.8(W);12"(L) x 9.6"(W)
Power Supply	ATX power input
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5% to 95%, non-condensing
MTBF	Over 100,000 hours at 40°C

AMI BIOS   DVI-D   2 GbE   GPIO   HDMI

RUBY-D718VG2AR

Leading Desktop Intel® 7th and 6th Gen Core™ processors (former Kaby Lake/ Skylake) ATX with DDR4 SDRAM, Triple Displays, 2x GbE LAN ports, 6x COM Ports

- 2x PCIe x4 slot
- PCIe x16 slot
- 4x PCI slots
- 8x USB 2.0 ports
- 4x RS-232 ports
- CFEX
- SATA III

- LGA1151 socket
- Q170/C236 PCH
- DDR4 Long-DIMM socket
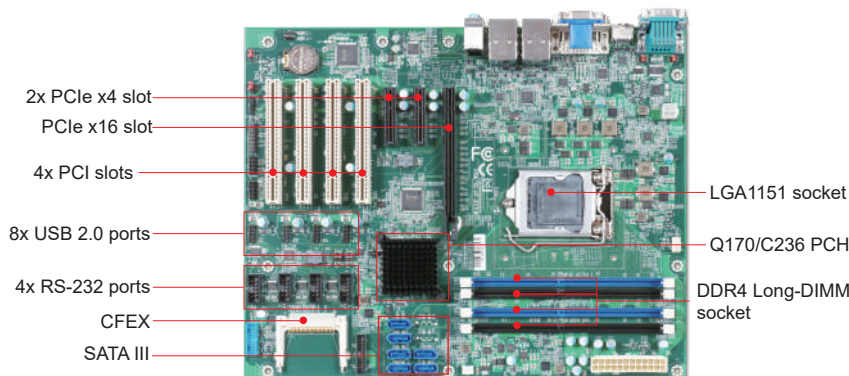
RUBY-D718VG2AR is based on Intel® Q170/ C236 chipset and desktop processor SKU like Intel® 7th and 6th Gen Core™ i3, i5 and i7 Processors. Built with PCI and PCIe expansions, it's suitable for Medical, Industrial automation, and Digital Signage application.

FEATURES

- Intel® 7th and 6th Gen Core™ Processors support
- 4x Long-DIMMs support DDR4 ECC(C236) / Non-ECC(Q170) SDRAM up to 64GB
- 1x PCIe x16, 2x PCIe x4, 4x PCI slots

REAR I/O

- RS-232/422/485
- VGA
- Dual GbE LAN
- RS-232
- HDMI
- DVI-D
- USB 3.0
- Audio Jack
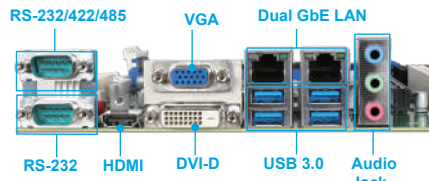
ORDERING GUIDE

AB1-3D29	(R).RUBY-D718VG2AR ATX.IMB.LGA1151.CPU.Q170.DDR4/VGA/ HDMI/DVI/Dual GbE/COM/Audio/USB
AB1-3D77	(R).RUBY-D718VG2AR-C236 ATX.IMB.LGA1151.CPU.C236.DDR4/VGA/ HDMI/DVI/Dual GbE/COM/Audio/USB
AB1-3G14	(R).RUBY-D718VG2AR-kBL ATX.IMB.LGA1151.CPU.Q170.DDR4/VGA/ HDMI/DVI/Dual GbE/COM/Audio/USB
AB1-3G15	(R).RUBY-D718VG2AR-C236-kBL ATX.IMB.LGA1151.CPU.Q170.DDR4/VGA/ HDMI/DVI/Dual GbE/COM/Audio/USB

PACKING LIST

One RUBY-D718VG2AR ATX Industrial Main Board
One Installation DVD
One SATA III cable
One I/O shield

GENERAL

Processor	Intel® 7th and 6th Gen Core™ Processors in LGA1151 package
Chipset	Intel® Q170 / C236
BIOS	AMI UEFI BIOS (SPI ROM)
Memory	4x DDR4 1866/2133 MT/s Long-DIMM up to 64GB non-ECC memory
Storage Devices	6x SATA III ports (C236 Supports 8x SATAIII ports)
Watchdog Timer	Programmable by embedded controller
Hardware Monitoring	System monitor voltage, fan speed, and temperature
Expansion Interface	- 1x PCIe 3.0 x16 slot - 2x PCIe 3.0 x4 slot - 4x PCI devices at 32 bit 33 MHz

I/O INTERFACE

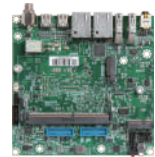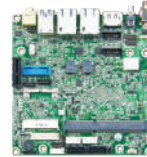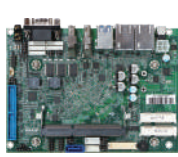| Super I/O	N/A
Audio	- Realtek ALC886 HDAcodec - Audio jack on rear I/O with Line-out/ Line-in/ Mic-in
Ethernet	- Intel® I219LM and Intel® I210AT Ethernet controller - 2x RJ45 connectors on rear I/O
Serial Port	- 1x RS-232/422/485 on rear I/O - 1x RS-232 on rear I/O - 4x RS-232 on pin header
USB	- 4x USB 3.0 ports on rear I/O - 2x USB 3.0 ports on pin header - 8x USB 2.0 ports on pin header
Keyboard & Mouse	PS/2 Keyboard & Mouse Pin Header
GPIO	8-bit configurable controlled by embedded controller
Other	Option TPM module with LPC pin header

DISPLAY

Graphic Controller	Intel® Gen 9 graphic engine supports DirectX 12, OpenGL 4.4
Display Interface	- DVI-D: 1x DVI-D port on rear I/O, up to 1920x1200@60Hz - HDMI: 1x HDMI port on rear I/O, up to 4096x2160 @ 24Hz - VGA: 1x VGA port on rear I/O, up to 1920x1200 @ 60Hz

Mechanical & Environment

Dimension	304.8mm(L) x 243.8mm(W)
Power Supply	24-pin Pin ATX power input
Environment	- Operation temperature: 0°C~60°C - Storage temperature: -20°C~80°C - Relative humidity: 5%~95%, non-condensing
Certification	CE,FCC Class A
MTBF	Over 120,000 hours at 40°C

Core™ i7/i5/i3 · USB 3.0 · SATA 6Gb · 2 GbE · HDMI · VGA · DVI-D · AMI BIOS · GPIO · Watch DOG · H/W Monitor

RoHS · FC · CE · intel inside · Microsoft Windows Embedded Partner · Linux · intel · IoT Solutions Alliance · CFEX

35.10 0 65.60 33.88 0 1.60 5.03

MODEL	PEB-2773	NANO-6062	NANO-6060	NANO-6051
Form Factor	3.5" Embedded	NANO-ITX	NANO-ITX	NANO-ITX
CPU	Intel® Atom® E3900 Family	Intel® Atom® E3900 Family	Intel® Atom® E3800 Family	Intel® 8th Gen Core™ i5/i3 processor
Chipset	N/A	N/A	N/A	N/A
BIOS	AMI UEFI	AMI UEFI	Phoenix UEFI	AMI UEFI
Memory	1x DDR3L SO-DIMM up to 8GB	1x DDR3L SO-DIMM up to 8GB	1x DDR3L SO-DIMM up to 4GB	1x DDR4 2400 non-ECC SO-DIMM up to 32GB
Expansion	2x mini-PCIe sockets	1x M.2 socket (E key) 1x mini-PCIe socket	1x PCIe x1 slot 1x Half Size mini-PCIe socket	1x M.2 Type M 2280 socket 1x M.2 Type E 2230 socket
Display	DP/HDMI/LVDS	VGA/LVDS/DP	VGA/LVDS/DP	Dau Mini DP
Audio	Realtek ALC892 HDA codec	Realtek ALC892 HDA codec	Realtek ALC892-GR HDA codec	Realtek ALC888S HDA codec
LAN	2x GbE	2x GbE/ 1x GbE	2x GbE/ 1x GbE	2x GbE/1 x GbE
Serial Port	1x RS-232/422/485 5x RS-232	1x RS-232/422/485 1x RS-232/422/485	1x RS-232/422/485	1x RS-232/422/485
USB	6x USB 3.0	4x USB 3.0	2x USB 2.0 4x USB 3.0	2x USB 3.2(Gen2) 4x USB 3.2(Gen1)
Storage Devices	1x SATA	1x SATA III 1x mSATA 1x Micro-SD socket	2x SATA II 1x Micro-SD socket	N/A
GPIO	8 bit	8 bit	8 bit	8 bit
Others	N/A	N/A	N/A	N/A
Dimension	146 x 102mm	120x 120mm	120x 120mm	120 x 120 mm
Page	33	34	35	36

PEB-2773

Apollo Lake Atom® Processor based 3.5' embedded Board with DDR3L SDRAM, Gigabit Ethernet, 2x mini-PCIe sockets, 6x COM ports and 12~24V DC input


- 5x RS-232 COM ports
- 2x mini-PCIe sockets
- 4x USB3.0 ports
- DDR3L socket
- SATA III
- LVDS
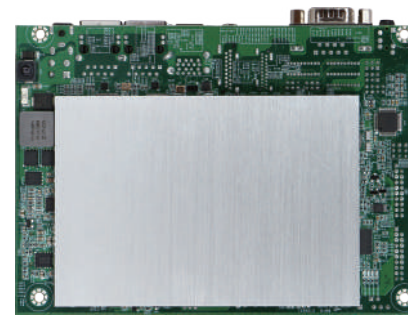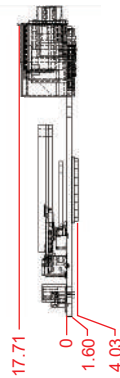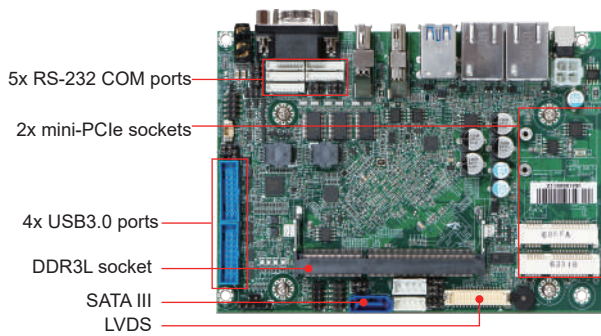
PEB-2773 build with Intel® Atom® processor E3900 series. Not only does it operates with TDP under 12W for fan-less applications, but it also supports industrial temperature range from -40°C to 85°C and wide voltage of power input from 12V to 24V.

FEATURES

- Supports Intel® Apollo Lake series processor
- Supports DD3L-1866/1600 MT/s non-ECC SDRAM on one SO-DIMM slot, up to 8GB
- Supports Triple displays including DP, HDMI, and Dual channel 24bit LVDS
- Supports mini-PCIe / mSATA (2x mini-PCIe slots)
- Supports 6x COM ports(REAR IO support RS-232/422/485)

REAR/IO

- Power Jack
- HDMI
- DP
- Dual GbE
- USB 3.0
- RS-232/422/485
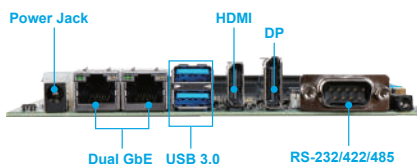
ORDERING GUIDE

AB1-3E83	(R).PEB-2773. Intel® Apollo Lake SoC on Board.EBC. w/DDR3L/DP/HDMI/GbE/COM/Audio/USB

PACKING LIST

One PEB-2773 Main board
One Installation CD
One SATA cable

GENERAL

Processor	Intel® Atom® Dual/Quad Core E3900 series Processor (up to 12W)
Chipset	N/A
BIOS	AMI UEFI BIOS
Memory	Support up to 8GB DDR3L 1333/1600/1866 MT/s SDRAM on one 204 pin SO-DIMM socket
Storage Devices	- 1x SATA III port - 1x mSATA socket(mini-PCIe)
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	Temperature (CPU & System)
Expansion Interface	2x mini-PCIe sockets (Full size support mSATA / Half size support WiFi/BT)

I/O INTERFACE

Super I/O	N/A
Audio	- High Definition Audio integrated in Intel® SoC - Realtek ALC892 HDA codec - Audio jack on rear I/O with Line-in, Line-out, and Mic-in on board pin header
Ethernet	- Dual Intel® I210IT GbE controller - 2x RJ45 connectors on rear I/O
Serial Port	1x RS-232/422/485 with DP9 connector on REAR I/O(selected by bios)
USB	- 2x USB 3.0 ports on rear I/O - 4x USB 3.0 ports on board with pitch 3.0 header
GPIO	8-bit configurable controlled by embedded controller

DISPLAY

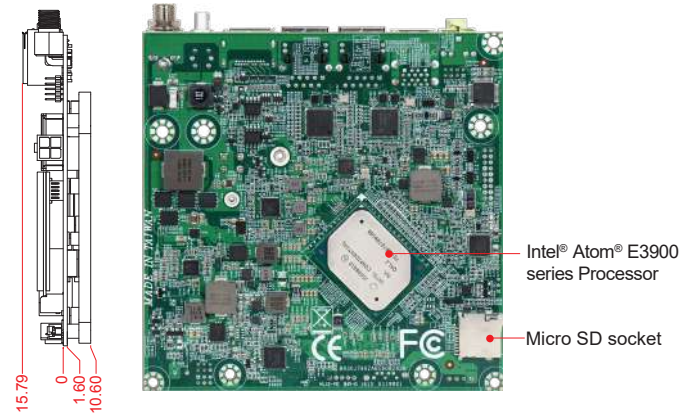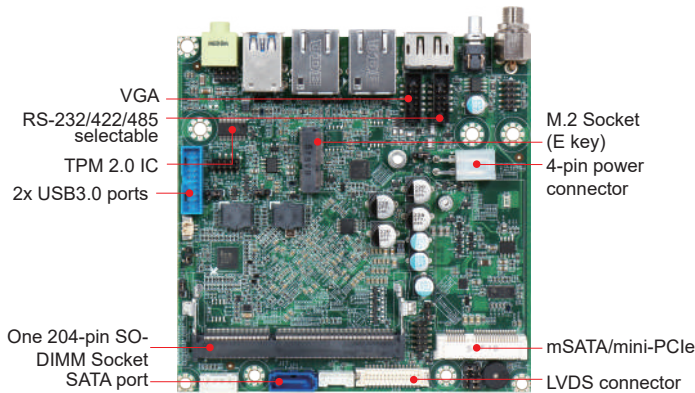| Graphic Controller	- Intel® Gen 9 Graphics supports DirectX 12, OpenGL® 4.2 / OpenCL® 2.0 - Video decode HW acceleration support for H.264, H.265, MPEG2, VC-1/WMV9, JPEG, VP8, and VP9
Display Interface	- LVDS: dual channel 24bit LVDS on board connector, up to 1920x1200 - HDMI: on board connector, up to 3840 x2160 - DP: on board connector, up to 4096x2160

Mechanical & Environment

Dimension	146mm(L) x 102(W) mm; 5.75"(L) x 4.02"(W)
Power Supply	DC 12-24V input
Environment	- Operation Temperature: -40°C~80°C - Storage Temperature: -40°C~80°C - Relative Humidity: 5%~95%, non-condensing
MTBF	Over 120,000 hours at 40°C

NANO-6062

VGA
RS-232/422/485 selectable
TPM 2.0 IC
2x USB3.0 ports

M.2 Socket (E key)
4-pin power connector

One 204-pin SO-DIMM Socket
SATA port

mSATA/mini-PCIe
LVDS connector

Intel® Atom® E3900 series Processor

Micro SD socket

15.79 0 1.60 10.60

NANO-6062 build with Intel® Atom® processor E3900 series. Not only does it operates with TDP under 12W for fan-less applications, but it also supports industrial temperature range from -40°C to 85°C and wide voltage of power input from 12V to 24V.

Support four USB 3.0 ports ensures fast data transmission with low-power consumption. Two SATA III interfaces with up to 6 Gb/s (one of them available as mSATA and the other for SATA) allow quick and flexible system expansions. Two Intel® I210IT Gigabit Ethernet controllers provide dual Gigabit Ethernet LAN access via the two RJ45 ports. NANO-6062 can design their own unique systems for Medical, Networking, Panel PC, Kiosk and Digital Signage applications.

FEATURES

- Intel® Atom® Dual/Quad Core E3900 series SoC
- Supports DDR3L 1866/1600 MT/s SO-DIMM up to 8GB
- Supports triple displays by VGA, DP, and LVDS
- Supports M.2 socket, SATA III port, mini-PCIe, and mSATA socket
- Supports DC 12-24V input

REAR/IO

DC 12-24V   DP   GbE LAN   USB 3.0   Audio
Power Button
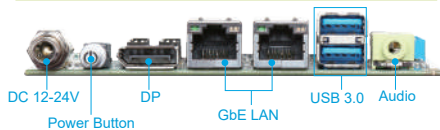
ORDERING GUIDE

AB1-3E89Z	(R).NANO-6062-E3950 Nano-ITX ESB. Intel® Atom® Quad Core 1.6GHz (12W). w/DDR3L SO-DIMM/ VGA/ LVDS/ DP/ Dual GbE LAN/ M.2/ SATA III
AB1-3G40Z	(R).NANO-6062-E3940 Nano-ITX ESB. Intel® Atom® Quad Core 1.6GHz (9W). w/DDR3L SO-DIMM/ VGA/ LVDS/ DP/ Dual GbE LAN/ M.2/ SATA III
AB1-3G41Z	(R).NANO-6062-E3930 Nano-ITX ESB. Intel® Atom® Dual Core 1.6GHz (6W). w/DDR3L SO-DIMM/ VGA/ LVDS/ DP/ Singal GbE LAN/ M.2/ SATA III

PACKING LIST

One NANO-6062 NANO-ITX Main Board
One Passive Heat Spreader
One Installatuon CD

GENERAL

Processor	- Intel® Atom® Dual/Quad Core E3900 series Processor (up to 12W) - 2MB Cache
BIOS	AMI UEFI BIOS
Memory	1x DDR3L 1866/1600 MT/s SO-DIMM up to 8GB
Storage Devices	- 1x SATA III port - 1x mSATA socket (Choose either mSATA or mini-PCIe by BIOS) - 1x Micro-SD socket
Watchdog Timer	Programmable by embedded controller
Hardware Monitoring	- Temperature (CPU & System) - Voltage (CPU Vcore,12V, 5V, 3.3V, 1.35V)
Expansion Interface	- 1x M.2 socket (E key) - 1x full size mini-PCIe socket (Choose either mSATA or mini-PCIe by BIOS)

I/O INTERFACE

Audio	- High Definition Audio integrated in Intel® SoC - Realtek ALC892 HDA codec - Audio jack on rear I/O with Line-out and on board pin header with Line-in, Line-out, and Mic-in
Ethernet	- Dual Intel® I210IT GbE controller (E3950/ E3940 only) - Dual RJ45 connectors on rear I/O (E3950/ E3940 only) - Singal Intel® I210IT GbE controller and singal RJ45 (E3930 only)
Serial Port	1x RS-232/422/485 on board connector (selected by bios)
USB	- 2x USB 3.0 ports on rear I/O - 2x USB 3.0 ports on board with header
GPIO	8bit configurable controlled by embedded controller
Other	TPM 2.0 on board

DISPLAY

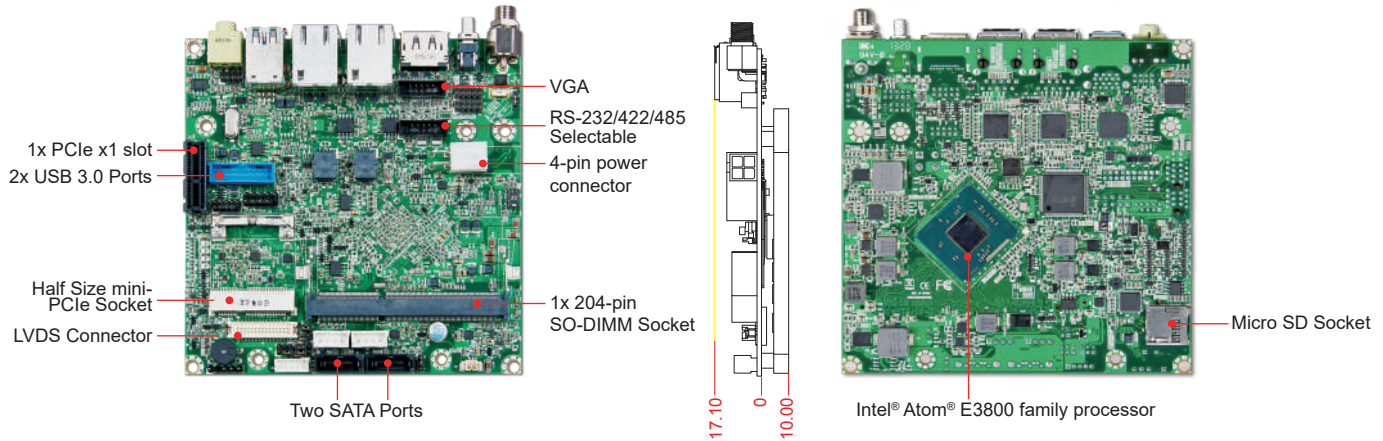|	
Graphic Controller	- Intel® Gen 9 Graphics supports DirectX 12, OpenGL® 4.2 / OpenCL® 2.0 - Video decode HW acceleration support for H.264, H.265, MPEG2, VC-1/WMV9, JPEG, VP8, and VP9
Display Interface	- LVDS: Dual channel 24bit LVDS on board connector, up to 1920x1200 - VGA: 1x DB-15 on board connector, up to 2560x1600 - DP: 1x DP port on rear I/O, up to 4096x2160

Mechanical & Environment

Dimension	120mm(L) x 120mm(W) ; 4.72"(L) x 4.72"(W)
Power Supply	DC 12-24V input
Environment	- Operation Temperature: -40°C~85°C - Storage Temperature: -40°C~85°C - Relative Humidity: 5%~95%, non-condensing
Certification	CE, FCC Class B
MTBF	Over 100,000 hours at 40°C

EC   SATA 3.0   AMI BIOS   LVDS   Fanless   TPM   2 GbE   Wide Temperature   Mini-PCIe   DP

NANO-6060

Intel® Atom® E3800 family SoC based NANO-ITX. Board with Dual displays, Gigabit Ethernet, Audio, USB 3.0, micro SD and SATA

- VGA
- RS-232/422/485 Selectable
- 1x PCIe x1 slot
- 2x USB 3.0 Ports
- 4-pin power connector
- Half Size mini-PCIe Socket
- LVDS Connector
- 1x 204-pin SO-DIMM Socket
- Two SATA Ports
- Micro SD Socket
- Intel® Atom® E3800 family processor

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

FEATURES

- Intel® Bay Trial-I SoC based platform
- 1x 204-pin SO-DIMM supports DDR3L up to 4GB
- Multiple displays by VGA, DP, dual channel 24 bit LVDS
- Supports 2x SATA II ports, 1x micro SD socket, and 4x USB 3.0 ports
- 1x half size mini-PCIe socket and PCIe x1 slot for expansion
- Supports DC 12V input

REAR I/O

- Power Button
- USB 3.0
- DC 12V
- DP
- GbE LAN
- Audio
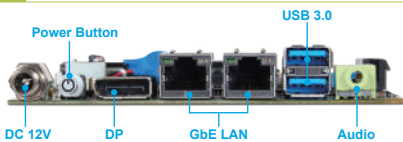
ORDERING GUIDE

AB1-3A45	**(R).NANO-6060- E3815** Nano-ITX ESB. Intel® Atom® E3815 1.46GHz Single Core.w/DDR3L SO-DIMM/VGA/24bit LVDS/DP/single GbE LAN/micro SD
AB1-3A46	**(R).NANO-6060- E3827** Nano-ITX ESB. Intel® Atom® E3827 1.75GHz Dual Core.w/DDR3L SO-DIMM/VGA/24bit LVDS/DP/dual GbE LAN/micro SD
AB1-3A47	**(R).NANO-6060- E3845** Nano-ITX ESB. Intel® Atom® E3845 1.91GHz Quad Core.w/DDR3L SO-DIMM/VGA/24bit LVDS/DP/dual GbE LAN/micro SD

PACKING LIST

One NANO-6060 NANO-ITX Main Board
One Passive Heat Spreader
One Installation CD

GENERAL

Processor	- Intel® Atom® E3800 family processor - Cache up to 2MB (for Quad Core) - DPM (Defect Per Million devices) <50 - Support Intel® VT-x techology
BIOS	Phoenix EFI BIOS
Memory	1x DDR3L 1066/1333 MT/s SO-DIMM up to 4GB
Storage Devices	- 2x SATA II - 1x Micro-SD socket
Watchdog Timer	Programmable by embedded controller
Hardware Monitoring	- Temperature (CPU & System) - Voltage (CPU Vcore,12V, 5V, 3.3V, 1.35V)
Expansion Interface	- 1x PCIe x1 slot - 1x half size mini-PCIe slot

I/O INTERFACE

Audio	- HDA controller integrated in Intel® SoC - Realtek ALC892 HDA codec, Audio Jack on rear I/O with Line-out and on board pin header with Line-in, Line-out, and Mic-in
Ethernet	- Dual Intel® I210IT Gigabit Ethernet controller (for E3827/ E3845 only) - 2x RJ45 connectors on rear I/O (for E3827/ E3845 only) - Single Intel® I210IT Gigabit Ethernet controller and 1xRJ45 connector on rear I/O for E3815
Serial Port	1x RS-232/422/485 on board connector (selected by bios)
USB	- 2x USB 3.0 ports on rear I/O - 2x USB 2.0 and 2x USB 3.0 ports on board with pitch 2.0 header
GPIO	8bit configurable controlled by embedded controller

DISPLAY

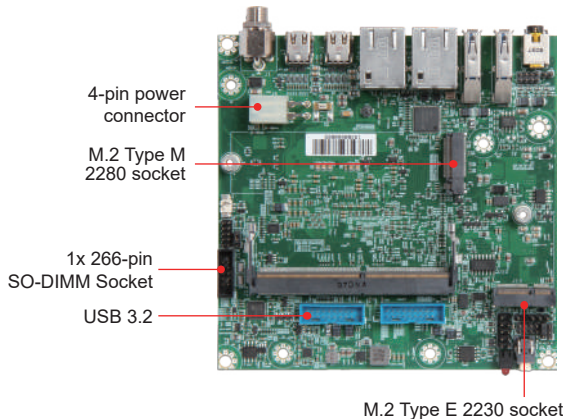|	
Graphic Controller	- Intel® Gen7 graphic engine supports DirectX 11, OpenGL® 4.0 - Video decode hardware acceleration supports for H.264, MPEG2, MVC, VC-1, WMV9 and VP8 formats
Display Interface	- LVDS: Dual channel 24bit LVDS on board connector, resolution up to 1920x1200 @60Hz - VGA: One on-board DB-15 connector, resolution up to 1920x1200 (WUXGA) - DP: One DP port on rear I/O, resolution up to 2560x1600

Mechanical & Environment

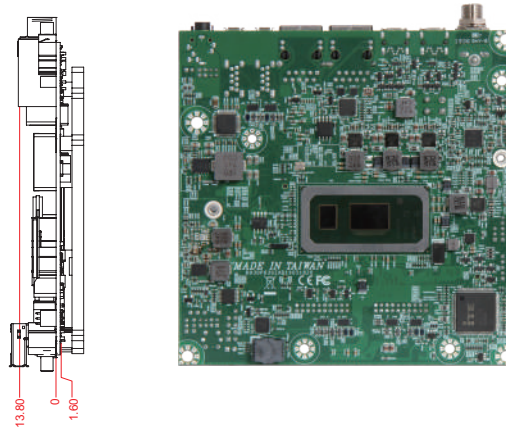|	
Dimension	120mm(L) x 120mm(W) ; 4.72"(L) x 4.72"(W)
Power Supply	DC 12V input
Environment	- Operation temperature: -40°C~80°C - Storage temperature: -40°C~80°C - Relative humidity : 5%~95%, non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000hrs at 55°C

NANO-6051

4-pin power connector

M.2 Type M 2280 socket

1x 266-pin SO-DIMM Socket

USB 3.2

M.2 Type E 2230 socket

13.80 0 1.60

NANO-6051 build with Intel® 8th Generation Core™ i7/i5/i3 Processors and takes advantages of Intel® Core™ mobile processor technologies such as Hyper-Threading, high performance, and low power consumption. Portwell NANO-6051-based systems are ideal for passively cooled and hermetically sealed systems that can be used in various environments. NANO-6051 is an ideal platform with HD graphic output for POS, kiosk, digital signage and transportation applications.

FEATURES

- Intel® 8th Gen Core™ i7, i5 and i3 processor
- Supports one DDR4 2400 non-ECC SO-DIMM up to 32GB
- Supports Dual mini DP ports
- Supports one M.2 Type M, one M.2 Type E, two USB 3.1 and four USB 3.0 ports
- Supports DC 12V input
- Supports TPM 2.0 (On board)

REAR I/O

USB3.2   **GbE LAN**   **Dual mini Dp ports**

Audio   **DC 12V**
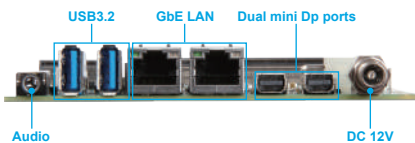
ORDERING GUIDE

AB1-3J58	(R).NANO-6051-8145UE
	Nano-ITX ESB. Intel Core i3-8145UE 2.2GHz Dual Core.w/DDR4 SO-DIMM/two mini DP/dual GbE LAN/USB/M.2
AB1-3J57	(R).NANO-6051-8365UE
	Nano-ITX ESB. Intel Core i5-8365UE 1.6GHz Quad Core.w/DDR4 SO-DIMM/two mini DP/dual GbE LAN/USB/M.2
AB1-3J56	(R).NANO-6060- E3845
	Nano-ITX ESB. Intel Core i7-8665UE 1.7GHz Quad Core.w/DDR4 SO-DIMM/two mini DP/dual GbE LAN/USB/M.2

PACKING LIST

| One NANO-6051 NANO-ITX Main board |
| One Passive Hear Spreader |
| One Installation CD |

GENERAL

Processor	- Intel® 8th Gen Core™ i5/i3 processor - With 4MB Cache - Support Intel® Hyper-Threading Technology, Virtualization Technology (VT-x), Small Business Advantage
BIOS	AMI uEFI BIOS
Memory	1x DDR4 2400 non-ECC SO-DIMM up to 32GB
Storage Devices	N/A
Watchdog Timer	Programmable by embedded controller
Hardware Monitoring	- Temperature (CPU & System) - Voltage (CPU Vcore, 12V, 5V, 3.3V, RAM)
Expansion Interface	- 1x M.2 Type M 2280 socket - 1x M.2 Type E 2230 socket

I/O INTERFACE

Audio	- HDA controller integrated in Intel® SoC - Realtek ALC888S HDA codec - Audio Combo Jack on rear I/O with Line-out/Mic in and on board pin header with Line-in, Line-out, Mic-in
Ethernet	- Intel® I210AT and Intel® I219LM ethernet controller - 2x RJ45 connector on rear I/O
Serial Port	1x RS-232/422/485 on board connector (selected by bios)
USB	- 2x USB 3.2(Gen2) ports on rear I/O - 4x USB 3.2(Gen1) ports on board
GPIO	8-bit configurable controlled by embedded controller
Other	N/A

DISPLAY

| Graphic Controller | - Intel® HD Graphics 5500/6000 supports DirectX11.2, OpenGL 4.3 / OpenCL 2.0
- Video decode HW acceleration support for H.264/AVC, VC-1, MPEG2, VP8 |
| Display Interface | 2x Mini DP on Rear I/O, up to 3840x2160 |

Mechanical & Environment

Dimension	120(L) x 120(W) mm; 4.72"(L) x 4.72"(W)
Power Supply	DC 12V input
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 85°C - Relative Humidity: 5% to 95%, non-condensing
Certification	CE,FCC Class A
MTBF	Over 100,000 hours at 40°C

Mini-ITX Platform

The Mini-ITX form factor, defined by the chipset manufacturers in Taiwan, is a highly integrated all-in-one x86-based embedded computer board that measures a mere 170mm x 170mm. Its compact size and all-in-one design simplifies and accelerates the implementation of an embedded PC system. Portwell's Mini-ITX computer boards and barebones systems offer a wide selection of microprocessors, power efficient technologies, peripheral I/Os, expansions and mechanical form factors.

Whether you're working on medical instruments, thin network devices or digital media systems, Portwell's Mini-ITX boards and barebone systems are the perfect solutions to help you to deliver your products on time and stay one step ahead of the competition.

With 20 years of experience in the design and manufacture of single board computers, Portwell provides not only one-stop shopping for off-the shelf products, but also custom-built solutions tailor-made to suit your needs.

Portwell's WADE series

Portwell already provides a variety of products based on the Mini-ITX form factor such as Desktop, Mobile and Low Power solutions.

Desktop

Equipped with Intel's latest generation Intel® Core™ i3/i5/i7 processor, it not only meets your high performance requirements but it also provides quality and reliability as supported by our standard and customized service. With its rich display interface, it is capable of supporting several multimedia devices to meet your different needs.
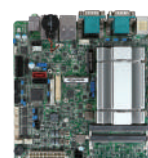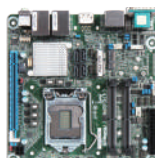
Mobile

Striking a balance between energy efficiency and performance, Portwell's mobile Intel® Core™ 2 Duo product is based on mobile processors built with excellent power. It is a mobile platform that can be easily adapted to quite the system and available for numerous usage in the small size.

Low Power

With a low power consumption target, the Intel® Atom® processor offers customers more than adequate computing power. Furthermore, its fanless design also offers noise reduction and efficient heat dissipation in keeping with Portwell's devotion to green environments.

Mini-ITX Reference Table

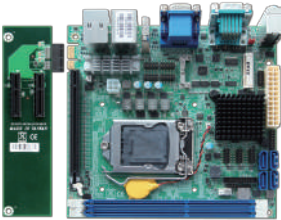| MODEL	WADE-8212-Q470E	WADE-8211-Q370	WADE-8017	WADE-8210-H110	WADE-8172	WADE-8171
Form Factor	Mini-ITX	Mini-ITX	Mini-ITX	Mini-ITX	Mini-ITX	Mini-ITX
CPU	Intel® Core™ i3/i5/i7/i9/Pentium®/Celeron®	Intel® Core™ i3/i5/i7/Pentium®/Celeron®	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package	Intel® Celeron® processor N3350 in FCBGA1296 package	Intel® Atom® N3000 Family
Chipset	Intel® Q470E	Intel® Q370	Intel® Q170/H110/C236 PCH	Intel® H110	N/A	N/A
BIOS	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI	AMI UEFI
Memory	2x DDR4 SO-DIMM up to 64G	2x DDR4 SO-DIMM up to 64G	2x DDR4 DIMM up to 32GB	up to 32GB DDR4 2133 Non-ECC SDRAM on two 260 pin SO-DIMM socket	up to 8 GB DDR3L 1600/1333 MHz memory (non-ECC) on 2x 204-pin SO-DIMM socket	2x DDR3L SO-DIMM up to 8GB
Expansion	1x PCIe x16 1x M.2 Type E(2230) socket 1x M.2 Type B(3042) socket	1x PCIe x16 1x M.2(Key E, 2230) socket	1x PCIe x16 slot 1x PCIe x1 Golden finger 1x M.2 type E socket 1x mini-PCIe socket	1x PCIe x16 1x mini-PCIe socket	1x PCIe x1 slot 1x M.2 socket 1x full/half size Mini PCIe socket with PCIe x1 and USB(shared)	1x PCIe x1 slot 2x mini-PCIe socket
Display	VGA/Dual DP/LVDS	VGA/Dual DP/LVDS	DP/HDMI/VGA	LVDS/HDMI/VGA	LVDS/HDMI/VGA	VGA/HDMI/LVDS
Audio	Realtek ALC887 HDA codec	Realtek ALC887 HDA codec	Realtek ALC892 HDA codec	Realtek ALC269HDA codec	Realtek ALC887 HDA codec	Realtek ALC887 HDA codec
LAN	2x GbE	2x GbE	2x GbE	2x GbE	2x GbE	2x GbE
Serial Port	3x RS-232 2x RS-232/422/485	3x RS-232 2x RS-232/422/485	2x RS-232/422/485 4x RS-232	2x RS-232 4x RS-232	2x RS-232/422/485 4x RS-232	2x RS-232/422/485 4x RS-232
USB	6x USB3.2 Gen1 4x USB2.0	4x USB3.2 Gen1 4x USB2.0	4x USB 3.0 2x USB 2.0	4x USB3.0 4x USB2.0	4x USB3.0 4x USB2.0	4x USB 3.0 4x USB 2.0
Storage Device	4x SATA III 1.M.2 (Key M, 2242/2260/2280) socket	4x SATA III 1.M.2 (Key M, 2242/2260/2280) socket	6x SATA (H110 just 4x SATA)	2x SATA III	1x SATA III 1x M.2 socke"	2x SATA
GPIO	8 bit	8 bit	8 bit	8 bit	8 bit	8 bit
Others	N/A	N/A	N/A	N/A	N/A	N/A
Dimension	170 x 170mm	170 x 170mm	170 x 170mm	170 x 170 mm	170 x 170mm	170 x 170mm
Page	40	41	42	43	44	45

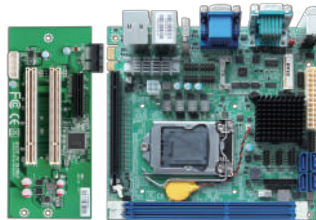# Side Expansion Board Series

What is side expansion board?

WADE-8017 has one PCIex1 gold finger. This special gold finger is redefined PCIex1 pin definition, and we put two PCIex1 signal inside. Portwell created a new daughter board from the side to combination, we call it SEB(side expansion board)

Bridging PCIe signals through the Gold Finger to the extension board, WADE-8017 can easily support the functions on a two-slot-added Flex-ATX or three-slot-added Micro ATX motherboard. This expansion mechanism also supports other interfaces transmitted via specific circuit design and component selection. Therefore, Portwell can quickly make ready a customized solution with additional, project-required features, such as LAN, Mini-PCIe, etc.
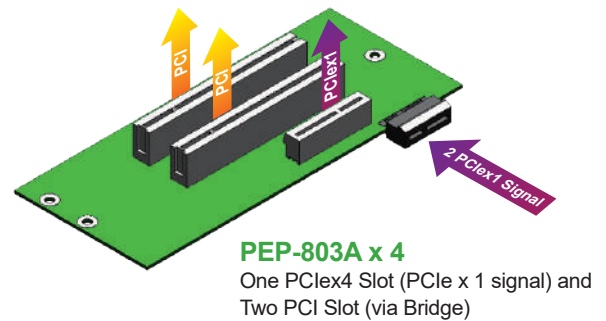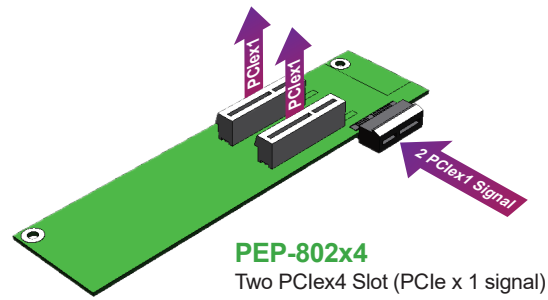

PEP-802x4
Two PCIex4 Slot (PCIe x 1 signal)

PEP-803A x 4
One PCIex4 Slot (PCIe x 1 signal) and
Two PCI Slot (via Bridge)

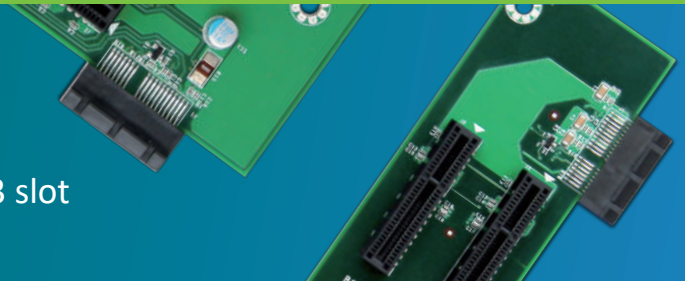### Flex-ATX

Micro-ATX

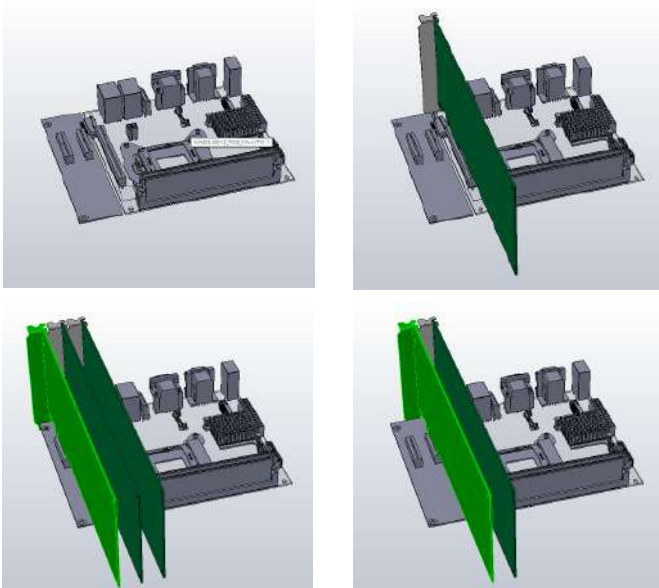* Meet Flex-ATX or Micro-ATX Form Factor Scope

Side Expansion Board (SEB)

### Flexibility of Side Expansion Board

- PCIe x1 Gold-Finger (Two PCIe x1 signal)
- Meet Flex-ATX/Micro-ATX scope, provide 2 or 3 slot

SEB Concept

Portwell's WADE-8017, featuring flexible expansion interface, provides a brand-new solution under available resources and limited mainboard space. Different from existing Mini-ITX boards in the marketplace, which utilize a riser card to increase functional interfaces or additional PCIe/PCI slots, the Portwell WADE-8017 leverages an extension board to furnish a flexible platform that facilitates multiple functional expansion choices.
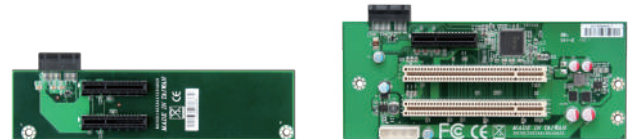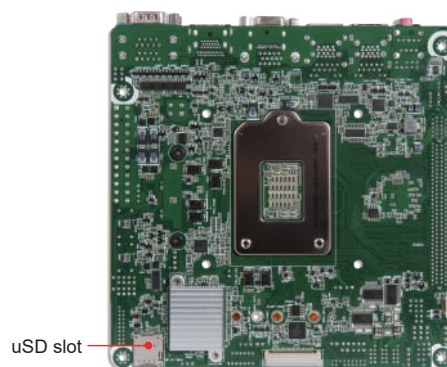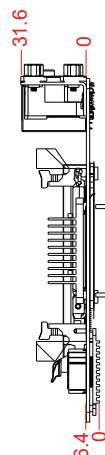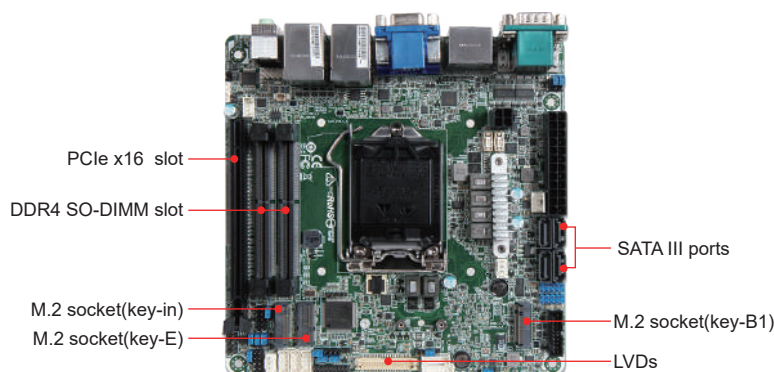

ORDERING GUIDE

AA1-3134Z	(R) PEP-802X4. 2 Slot Riser Card for two PCIex4 for WADE-8015 series
AA1-3141Z	(R) PEP-803AX4. 3 Slot Riser Card for one. PCIex4 and two PCI for WADE-8015 series

WADE-8212-Q470E

PCIe x16 slot
DDR4 SO-DIMM slot
M.2 socket(key-in)
M.2 socket(key-E)
SATA III ports
M.2 socket(key-B1)
LVDs
uSD slot

WADE-8212-Q470E is based on Intel® Q470E chipset and Desktop processors including Intel® 10th Gen Core™ i3/i5/i7 SKU. This board supports DDR4, PCIe 3.0, and SATAIII. Those features help you to build high performance and stabile system.

FEATURES

- Intel® 10th Gen Core™ Processors support
- Supports two SO-DIMMs support DDR4 Non-ECC SDRAM up to 64GB
- Supports dual Ethernet(one port support 1G/one port support 2.5G), five COM Ports, ten USB Ports, four SATA III Ports and Audio
- Supports one PCIe x16 (Gen3), one M.2 Type E socket(2230) for Wireless,one M.2 Type M socket(2242/2260/2280) for SSD, and one mini-PCIe slot

REAR I/O

DP port
VGA
Dual GbE LAN
RS-232/422/485
HDMI
USB 3.2 (GenI)
Audio
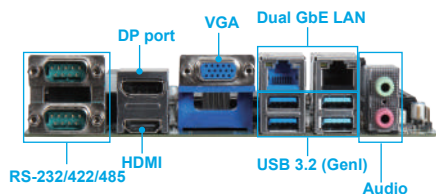
ORDERING GUIDE

AB1-3D63	**(R).WADE-8212-Q470E** Mini-ITX ESB.Q470E w/o ECC LGA1200.w/ DDR4 SO-DIMM /VGA/DP/HDMI/Dual GbE/ COM/Audio/USB

PACKING LIST

One WADE-8212-Q470E Main board
One I/O shield
One Installation CD
One SATA cable
One CPU coolor bracket

GENERAL

Processor	Intel® 10th Gen Core™ Processors CPU in LGA1200 package
Chipset	Intel® Q470E
BIOS	AMI uEFI BIOS
Memory	Supports up to 64GB DDR4 2400/2666/2933MHz Non-ECC SDRAM on two SO-DIMM socket
Storage Devices	- Supports four SATA III port - 1x M.2 Type M socket (2242/2260/2280) for SSD
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	System monitor(Voltage,Fan Speed and Temperature)
Expansion Interface	- 1x PCIe x16 - 1x M.2 Type E socket (2230) for Wireless - 1x M.2 Type B socket (3042) for 4G/5G

I/O INTERFACE

Super I/O	F81966D-I
Audio	- Realtek AL887 High Definition Audio integrated in Intel SoC - Audio Jack on rear I/O with Line-out/ Mic-in
Ethernet	- Intel® I219LM & I225LM Ethernet controller - 2x RJ45 connectors on rear I/O
Serial port	- 2x RS-232/422/485 ports on REAR I/O - 3x RS-232 ports on board pin header
USB	- 4x USB3.2 on rear I/O - 2x USB3.2 on board pin header - 4x USB2.0 on board pin header
GPIO	8-bit configurable controlled by embedded controller

DISPLAY

Graphic Controller	- Intel® UHD Graphics 630 supports DirectX 12, OpenGL 4.5 - Video decode HW acceleration support for H.264, H.265, MPEG2, VC-1/WMV9, JPEG, VP8, and VP9
Display Interface	- LVDS:Dual channel 2bit LVDS on board, resolution up to 1920 x1200 - DP:DP port on rear I/O, resolution up to 4096x2160 - HDMI:HDMI port on rear I/O, resolution up to 4096x2160 - VGA:One VGA port on rear I/O resolutoin up to 1920x1200

Mechanical & Environment

Dimension	170mm(L) x 170mm(W) x 1.6mm(H)
Power Supply	ATX power input
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5% to 95%, non-condensing
MTBF	Over 100,000 hours at 40°C

WADE-8211-Q370

Leading Desktop Intel® 8th Gen Core™ Processors Mini-ITX with DDR4 SO-DIMM up to 64G, VGA ,Dual DP ports ,Two GbE LAN ports, Five COM Ports

Dual GbE Ports
Q370 PCH
SATA III ports
PCIe x16 slot
DDR4 SO-DIMM slot
Mini PCIe socket
M.2 socket (key-E)
LVDs

M.2 socket (key-M)

WADE-8211-Q370 is based on Intel® Q370 chipset and Desktop processors including Intel ® 8th/9th Gen Core™ i3/i5/i7 SKU. This board supports DDR4, PCIe 3.0, and SATA III. Those features help you to build high performance and stabile system.

FEATURES

- Intel® 8th/9th Gen Core™ Processors support
- Supports two SO-DIMMs suppor t DDR4 Non-ECC SDRAM up to 64GB
- Supports dual Ethernet, five COM Ports, eight USB Ports, four SATA III Ports and Audio
- Supports one PCIe x16 (Gen3), one M.2 Type E stocke(2230) for Wireless,one M.2 Type M socket(2242/2260/2280) for SSD, and one mini-PCIe slot

REAR I/O

Dual pp
VGA
GbE LAN
Audio

RS-232/422/485
4x USB 3.2(Geul) ports
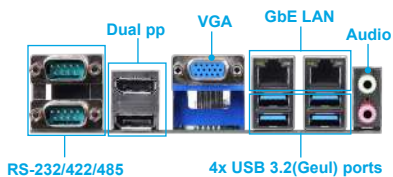
ORDERING GUIDE

AB1-3D63	**(R).WADE-8211-Q370**
	Mini-ITX ESB.Q370 w/o ECC LGA1151.w/DDR4 SO-DIMM /VGA/Dual DP/Dual GbE/COM/ Audio/USB

PACKING LIST

One WADE-8211-Q370 Main board
One I/O shield
One Installation CD
One SATA cable
One CPU coolor bracket

GENERAL

Processor	Intel® 8th/9th Gen Core™ Processors CPU in LGA1151 package
Chipset	Intel® Q370
BIOS	AMI uEFI BIOS
Memory	Supports up to 64GB DDR4 2400/2666MHz Non-ECC SDRAM on two SO-DIMM socket
Storage Devices	Supports four SATA III port
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	System monitor(Voltage, Fan Speed and Temperature)
Expansion Interface	- 1x PCIe x16 - 1x M.2 Type E socket(2230) for Wireless - 1x M.2 Type M socket(2242/2260/2280) for SSD

I/O INTERFACE

Super I/O	NCT6116D
Audio	- Realtek AL887 High Definition Audio integrated in Intel SoC - Audio Jack on rear I/O with Line-out/ Mic-in
Ethernet	- Intel® I219LM & I210AT Ethernet controller - 2x RJ45 connectors on rear I/O
Serial port	- 2x RS-232/422/485 ports on REAR I/O - 3x RS-232 ports on board pin header
USB	- 4x USB3.0 on rear I/O - 4x USB2.0 on board pin header
GPIO	8-bit configurable controlled by embedded controller

DISPLAY

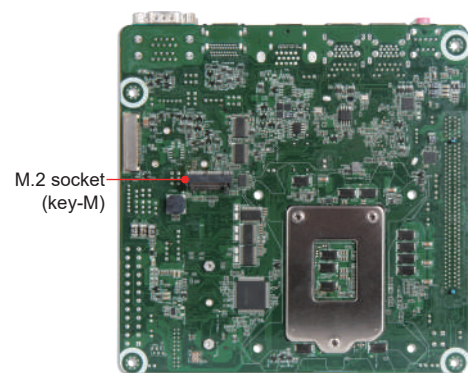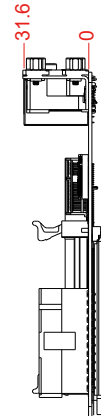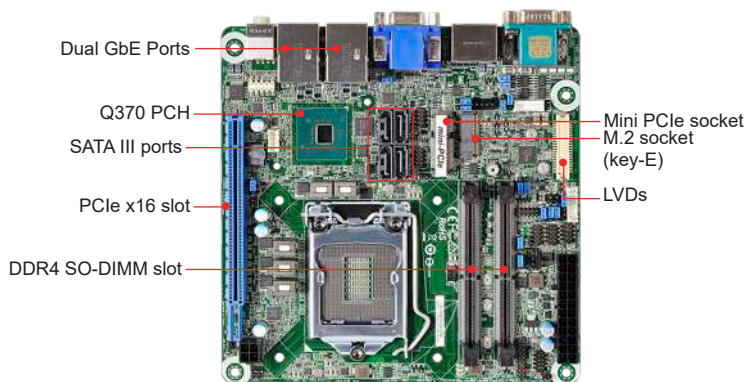|	
Graphic Controller	- Intel® UHD Graphics 630 supports DirectX 12, OpenGL 4.5 - Video decode HW acceleration support for H.264, H.265, MPEG2, VC-1/WMV9, JPEG, VP8, and VP9
Display Interface	- LVDS:Dual channel 2bit LVDS on board, resolution up to 1920 x1200 - DPI:Dual DP ports on rear I/O, resolution up to 4096x2340 - VGA:One VGA port on rear I/O resolutoin up to 1920x1200

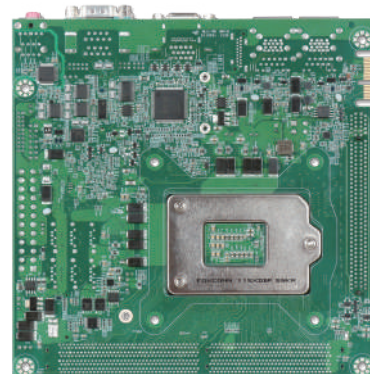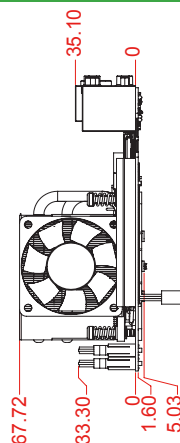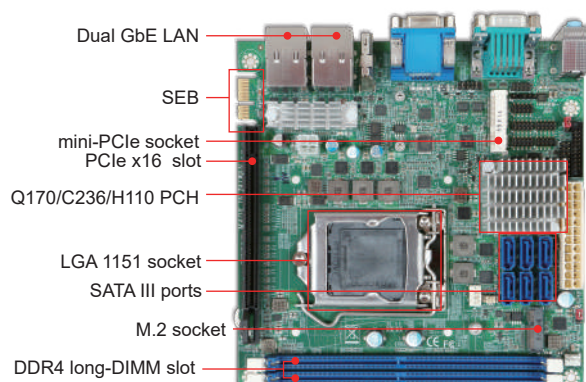## Mechanical & Environment

Dimension	170mm(L) x 170mm(W) x 1.6mm(H)
Power Supply	ATX power input
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5% to 95%, non-condensing
MTBF	Over 100,000 hours at 40°C

WADE-8017

Dual GbE LAN
SEB
mini-PCIe socket
PCIe x16 slot
Q170/C236/H110 PCH
LGA 1151 socket
SATA III ports
M.2 socket
DDR4 long-DIMM slot

WADE-8017 is based on Intel® Q170/C236/H110 chipset and desktop processors including Intel® 7th and 6th Gen Core™ i3/i5/i7 SKU. This board supports DDR4, PCIe 3.0, and SATA III. Those features help you to build high performance and stability system.

FEATURES

- Intel® 7th and 6th Gen Core™ Processors support
- 2x long-DIMM support DDR4 ECC/Non-ECC SDRAM up to 32GB
- Display : VGA/DP/HDMI
- 1x PCIe x1 Golden finger support SEB 6x SATA III ports support RAID 0/1/5/10 H110 just support 4x SATA port and not support RAID Function
- 1x PCIe x16 (Gen3), one M.2 type E socket (H110 not support)

REAR I/O

RS-232/422/485   VGA   GbE LAN

Audio   RS-232   DP   HDMI   4x USB 3.0 ports
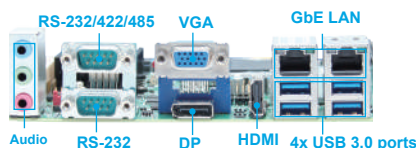
ORDERING GUIDE

AB1-3D16	**(R).WADE-8017** Mini-ITX ESB.Q170 w/o ECC LGA1151.w/DDR4 SDRAM /VGA/DP/HDMI/Dual GbE/COM/Audio/USB
AB1-3D75	**(R).WADE-8017-H110** Mini-ITX ESB.H110 w/o ECC LGA1151.w/DDR4 SDRAM /VGA/DP/HDMI/Dual GbE/COM/Audio/USB
AB1-3D76	**(R).WADE-8017-C236.** Mini-ITX ESB.C236 w/ECC LGA1151.w/DDR4 SDRAM /VGA/DP/HDMI/Dual GbE/COM/Audio/USB
AB1-3G16	**(R).WADE-8017-kBL** Mini-ITX ESB.Q170 w/ECC LGA1151.w/DDR4 SDRAM /VGA/DP/HDMI/Dual GbE/COM/Audio/USB
AB1-3G13	**(R).WADE-8017-C236-kBL** Mini-ITX ESB.C236 w/ECC LGA1151.w/DDR4 SDRAM /VGA/DP/HDMI/Dual GbE/COM/Audio/USB
AB1-3G12	**(R).WADE-8017-H110-kBL** Mini-ITX ESB.H110 w/o ECC LGA1151.w/DDR4 SDRAM /VGA/DP/HDMI/Dual GbE/COM/Audio/USB

PACKING LIST

One WADE-8017 motherboard
One Driver CD
One SATA Cable

35.10   0
67.72   33.30   0   1.60   5.03

GENERAL

Processor	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package
Chipset	Intel® Q170/C236/H110
BIOS	AMI UEFI BIOS (SPI ROM)
Memory	Support up to 32GB DDR4 2133/1866 MT/s ECC/Non-ECC SDRAM on 2x 288 pin DIMM socket
Storage Devices	6x SATA III (H110 just support 4x SATA)
Watchdog Timer	Programmable by embedded controller
Hardware Monitoring	System monitor (Voltage, Fan Speed and Temperature)
Expansion Interface	- 1x PCIe 3.0 x16 slot - 1x M.2 Type E socket(H110 not support) - 1x mini-PCIe socket(H110 just support mSATA) - 1x PCIe 2.0 x1 Golden finger

I/O INTERFACE

Super I/O	N/A
Audio	- Audio Jack on rear I/O with Line-in/ Line-out/ Mic-in - Realtek ALC892 HD Audio codec
Ethernet	- Intel® I219LM and Intel® I211AT Ethernet controller - 2x RJ45 connectors on rear I/O
Serial Port	- 1x RS-232/422/485 port on rear I/O - 1x RS-232 port on rear I/O - 4x RS-232 ports on pin header
USB	- 4x USB 3.0 on rear I/O - 2x USB 2.0 on pin header
GPIO	8-bit configurable controlled by embedded controller
Other	Option TPM module with LPC pin header

DISPLAY

Graphic Controller	Intel® Gen9 graphic engine supports DirectX 12, OpenGL 4.4
Display Interface	- DP:1x DP port on rear I/O, up to 4K (4096x2304@60Hz) - HDMI:1x HDMI port on rear I/O, up to 4K (4096x2160@24Hz) - VGA:1x VGA port on rear I/O, up to 1920x1200 @ 60Hz

Mechanical & Environment

Dimension	170mm(L) x 170mm(W); 6.69"(L) x 6.69"(W)
Power Supply	24 pin ATX power input (different style)
Environment	- Operation temperature:0˚C~60˚C - Storage temperature:-20˚C~80˚C - Relative humidity:5%~95%,non-condensing
Certification	CE,FCC Class A
MTBF	Over 120,000 hours at 40°C

AMI BIOS   USB 3.0   Watch DOG   H/W Monitor   2 GbE   M2   HDMI   SATA 6Gb   VGA   GPIO   DP   Core™ i7/i5/i3

WADE-8210-H110

Leading Desktop Intel® 7th and 6th Gen Core™ Processors (former Kaby Lake/Skylake) Mini-ITX with DDR4 SDRAM, Triple Displays, Two GbE LAN ports, Six COM Ports

- PCIe x1 slot
- Mini PCIe socket
- PCIe x16 slot
- Two DDR4 DIMM socket
- SATA III Ports

33.20 1.60 0
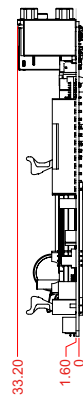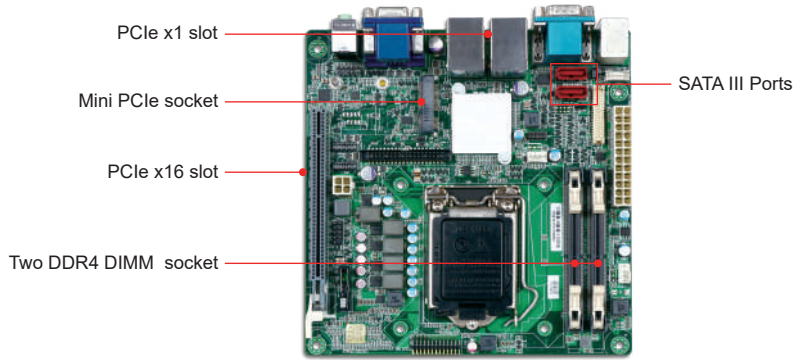
WADE-8210-H110 is based on Intel® H110 chipset and Desktop processors including Intel® 7th and 6th Gen Core™ i3/i5/i7 SKU. This board supports DDR4, PCIe 3.0, and SATA III. Those features help you to build high performance and stable system.

FEATURES

- Intel® 7th and 6th Gen Core™ Processors support
- Supports two SO-DIMMs support DDR4 Non-ECC SDRAM up to 32GB
- Supports dual Ethernet, six COM Ports, eight USB Ports, two SATA III Ports and Audio
- Supports one PCIe x16 slot, and one mini-PIe socket(mSATA)

REAR I/O

- Dual GbE
- VGA
- P/S2
- RS-232
- Four USB3.0 ports
- HDMI
- Audio

ORDERING GUIDE

PACKING LIST

One CPU Cooler bracket
One SATA cable
One Installation CD
One I/O shield
One WADE-8210-H110 Main board

GENERAL

Processor	Intel® 7th and 6th Gen Core™ Processors CPU in LGA1151 package
Chipset	Intel® H110
BIOS	AMI UEFI BIOS
Memory	Supports up to 32GB DDR4 2133 Non-ECC SDRAM on two 260 pin SO-DIMM socket
Storage Devices	Supports two SATA III port
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	System monitor(Voltage, Fan Speed and Temperature)
Expansion Interface	- 1x PCIe x16 - 1x mini-PCIe socket (Only support mSATA / USB2.0)

I/O INTERFACE

Super I/O	ITE IT8786E-I
Audio	- High Definition Audio integrated in Intel® SoC - Audio Jack on rear I/O with Line-out/ Mic-in
Ethernet	- Realtek 8111H chip - 2x RJ45 connectors on rear I/O
Serial port	- 2x RS-232 on rear I/O - 4x RS-232 on board 2x20 pin header
USB	- 4x USB3.0 on rear I/O - 4x USB2.0 on baodr pin header
GPIO	8bit configurable controlled by embedded controller

DISPLAY

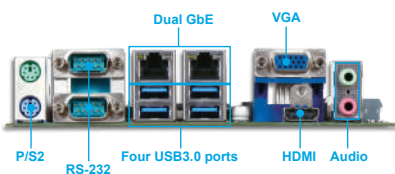| Graphic Controller	- Intel® Gen 9 Graphics supports DirectX 12, OpenGL 4.2 / OpenCL 2.0 - Video decode HW acceleration support for H.264, H.265, MPEG2, VC-1/WMV9, JPEG, VP8, and VP9
Display Interface	- LVDS: Dual channel 24bit LVDS on board, resolution up to 1920 x1200 - HDMI: One HDMI port on rear I/O, resolution up to 4K (4096x2160@24Hz) - VGA: One VGA port on rear I/O resolution up to 1920x1200 @ 60Hz

## Mechanical & Environment

Dimension	170mm(L) x 170mm(W) x 1.6mm(H)
Power Supply	ATX power input
Environment	- Operation Temperature: 0°C to 60°C - Storage Temperature: -20°C to 80°C - Relative Humidity: 5% to 95%, non-condensing
Certification	Over 100,000 hours at 40°C
MTBF	Over 120,000hrs at 40°C

WADE-8172

Intel® Celeron® Processor N3350 Based Mini-ITX Board with VGA, HDMI, LVDS, Dual GbE, USB 3.0, SATA III, Mini PCIe, M.2

- mini-PCIe
- PCIe x1 slot
- SATA III
- LVDs
- M2 socket
- 2x DDR3L socket

1.60 ~ 0
35.01
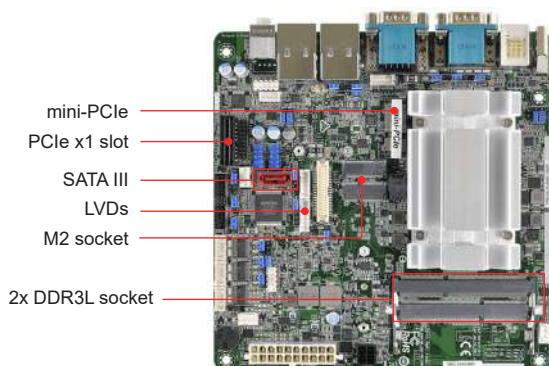
WADE-8172 is based on Intel® Celeron® processor N3350. With dual-channel DDR3L memory and rich I/O sets, WADE-8172 empowers energy-efficient solutions for point-of-sale (POS) and industrial automation applications.

FEATURES

- Intel® Apollo Lake SoC Processor
- Supports Dual Channel DDR3L 1333/1600MHz, 2 x SO-DIMM, up to 8GB system memory
- 1 x HDMI, 1 x D-Sub, 1 x Dual Channel 24-bit LVDS
- 4 xUSB 3.0, 4 x USB 2.0, 1 x SATA3 port
- Supports 1x mini-PCIe, 2x M.2 socket(KEY M & KEY E)

REAR I/O

- RS-232
- Dual GbE
- HDMI
- PS/2
- RS-232/422/485
- VGA
- USB 3.0
- Audio Jack Line-out Mic-in
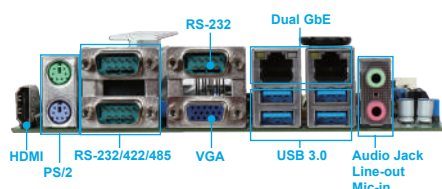
ORDERING GUIDE

AB1-3F78	(R).WADE-8172-N3350
	Mini-ITX ESB.Intel® Apollo lake SoC Processor N3350 w/DDR3L/ VGA/LVDS/HDMI/dual GbE LAN/SATA

PACKING LIST

One Driver CD
One SATA cable
One I/O shield
One WADE-8172 motherboard

GENERAL

Processor	Intel® Celeron® processor N3350 in FCBGA1296 package, 1.1 GHz (2.4 GHz turbo), 2 MB L2, 6W TDP
Chipset	N/A
BIOS	AMI UEFI BIOS
Memory	Support up to 8 GB DDR3L 1600/1333 MHz memory (non-ECC) on 2x 204-pin SO-DIMM socket
Storage Devices	- 1x SATA III ports - 1x M.2 socket (KEY M 2260/2280) with SATA signal for SSD
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	- Temperature (CPU & System) - Voltages (CPU Vcore, 12V, 5V, 3.3V, RAM)
Expansion Interface	- 1x PCIe x1 slot (Gen2, 5GT/s) - 1x M.2 socket (KEY E 2230) with PCIe x1 and USB(shared) for Wireless - 1x full/half size Mini PCIe socket with PCIe x1 and USB(shared)

I/O INTERFACE

Super I/O	N/A
Audio	- Intel® High Definition Audio interface Realtek® ALC887 High Definition Audio - 1x jumbo jack support Line-out/Mic-in
Ethernet	2x RJ45 connectors on rear I/O (Realtek® RTL8111G)
Serial port	- 2x RS-232/422/485 on rear I/O (selectable by BIOS) - 1x RS-232 on rear I/O - 3x RS-232 on pin header (2.00 mm pitch)
USB	- 4x USB 3.0 on rear I/O - 4x USB 2.0 on pin header (2.54mm pitch)
GPIO	8 bit GPI/GPO

DISPLAY

Graphic Controller	Integrated Intel® Generation 9 Graphics Supports DirectX 12, OpenGL 4.2, OpenCL 2.0
Display Interface	- LVDS: dual channel 24bit LVDS on board connector, up to 1920x1200 - HDMI: resolution up to 3840x2160 - VGA: resolution up to 1920 x 1200 , on rear I/O

Mechanical & Environment

Dimension	170mm(L) x 170mm(W); 6.7"(L)x 6.7"(W)
Power Supply	12V & 19~24V DC input or ATX power input
Environment	- Operating temperature: 0°C to 60°C - Storage temperature: -20°C to 80°C - Relative humidity: 5~95%, non-condensing
MTBF	Over 100,000 hours at 40°C

WADE-8171

Intel® Celeron® Processor N3150/N3160 Based Mini-ITX Board with VGA, HDMI, LVDS, Dual GbE, USB 3.0, SATA III, mini-PCIe, and mSATA

- mSATA
- PCIe x1 slot
- SATA III
- LVDS
- mini-PCIe
- 2x DDR3L socket

1.60
0
35.60
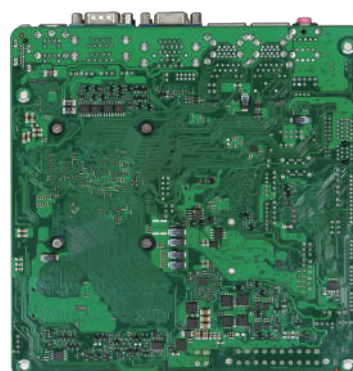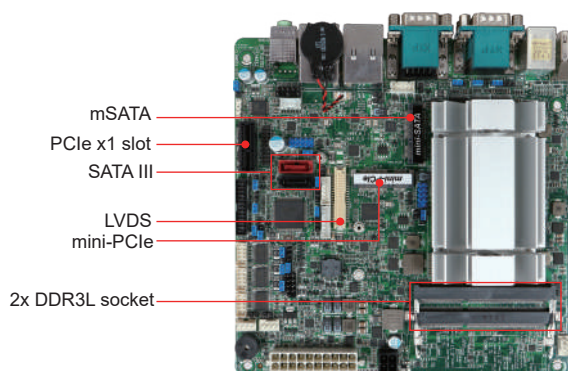
WADE-8171 is based on Intel® Celeron® processor N3160. With dual-channel DDR3L memory and rich I/O sets, WADE-8171 empowers energy-efficient solutions for point-of-sale (POS) and industrial automation applications.

FEATURES

- Intel® Pentium®/Celeron® Braswell SoC Processor
- Supports Dual Channel DDR3L 1333/1600 MT/s, 2 x SO-DIMM, up to 8GB system memory
- 1x HDMI, 1x D-Sub, 1x Dual Channel 24-bit LVDS
- 4x USB 3.0, 4x USB 2.0, 2x SATA III ports
- Supports 1 x mini-PCIe, 1 x mSATA(shared)

REAR I/O

- RS-232
- GbE LAN
- HDMI
- PS/2
- RS-232/422/485
- VGA
- USB 3.0
- Audio Jack Line-out Mic-in
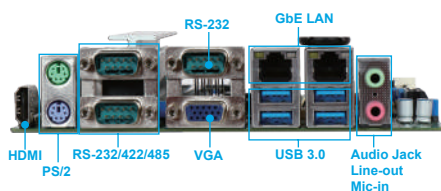
ORDERING GUIDE

AB1-3D63	(R).WADE-8171-N3150
	Mini-ITX ESB.Intel® Braswell Quad Core Celeron® 2.08GHz (6W). w/DDR3L/VGA/LVDS/HDMI/dual GbE LAN/SATA

PACKING LIST

1x WADE-8171 motherboard
1x I/O shield
1x SATA cable
1x Driver CD

GENERAL

Processor	Intel® Celeron® processor N3160 in FCBGA1170 package, 1.6 GHz (2.08 GHz turbo), 2 MB, 6W TDP (4C/4T)
Chipset	Integrated
BIOS	AMI UEFI BIOS
Memory	Support up to 8 GB DDR3L 1600/1333 MT/s memory (non-ECC) on 2x 204-pin SO-DIMM socket
Storage Devices	- 2x SATA III ports - 1x mSATA (shared with SATA III)
Watchdog Timer	Programmable watchdog timer, time out period from 1 sec to 255 secs.
Hardware Monitoring	- Temperature (CPU & System) - Voltages (CPU Vcore, 12V, 5V, 3.3V, RAM
Expansion Interface	- 1x PCIe 2.0 x1 slot - 1x full/half-size mini-PCIe socket (USB + PCIe x1 signal) - 1x full size mini-PCIe socket (support mSATA)

I/O INTERFACE

Super I/O	NCT61060
Audio	Intel® High Definition Audio interface Realtek® ALC887 High Definition Audio 1x jumbo jack support Line-out/Mic-in
Ethernet	2x RJ45 connectors on rear I/O (Realtek® RTL8111G)
Serial port	- 2x RS-232/422/485 on rear I/O (selectable by BIOS) - 1x RS-232 on rear I/O - 3x RS-232 on pin header (2.00 mm pitch)
USB	- 4x USB 3.0 ports on rear I/O - 4x USB 2.0 ports on pin header (2.54mm pitch)
GPIO	8-bit GPI/GPO

DISPLAY

Graphic Controller	- Integrated Intel® Generation 8 Graphics - Supports DirectX 11.1, OpenGL® 4.2, OpenCL® 1.2
Display Interface	- LVDS: dual channel 24bit LVDS on board connector, up to 1920x1200 - HDMI: up to 3840x2160 - VGA: up to 1920 x 1200 , on rear I/O

Mechanical & Environment

|	
Dimension	170mm(L) x 170mm(W); 6.69"(L) x 6.69"(W)
Power Supply	12V DC input
Environment	- Operation temperature: 0°C~60°C - Storage temperature: -20°C~80°C - Relative humidity: 5%~95%, non-condensing
MTBF	Over 120,000hrs at 40°C

Further Contact

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.

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.

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.

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.

www.portwell.com.tw/contact/portwell-worldwide/

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

TSD@portwell.com.tw

01010111010101100101011

INDUSTRIAL 4.0

IoT

www.portwell.com.tw

Portwell, Inc. (Headquarters)

No. 242, Bo'Ai St., Shu-Lin Dist,
New Taipei City 238, Taiwan
Tel: +886-2-7731-8888
Fax: +886-2-7731-9888
E-mail: info@portwell.com.tw
www.portwell.com.tw

Americas

American Portwell (Fremont, CA)

44200 Christy St.,Fremont, CA 94538, USA
Tel: +1-510-403-3399
Fax: +1-510-403-3184
E-mail: info@portwell.com
www.portwell.com

Japan

Portwell Japan, Inc. (Tokyo)

〒112-0011 4-27-10, Sengoku, Bunkyo-ku,
Tokyo, Japan
Tel: +81-3-6902-9225
Fax: +81-3-6902-9226
E-mail: info@portwell.co.jp
www.portwell.co.jp

Portwell Japan, Inc. (Osaka)

〒532-0004 Ste.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
www.portwell.co.jp

Europe

European Portwell

Schillingweg 3, 2153 PL
Nieuw Vennep,The Netherlands
Tel: +31-252-620790
E-mail: info@portwell.eu
www.portwell.eu

Portwell Deutschland GmbH

Otto-Hahn-Str. 48, D-63303 Dreieich
Tel: +49-6103-3008-0
Fax: +49-6103-3008-199
E-mail: info@portwell.eu
www.portwell.de

Portwell UK Ltd.

Office TH2
Trident House, Trident Park Basil
Hill Road, Didcot, OX11 7HJ, UK
Tel: +44-1235-750-760
Fax: +44-1235-750-761
E-mail: info@portwell.eu
www.portwell.eu

China

Shanghai Portwell

(201612), Room 1303-1, Building 33, No.258,
Xinhuan Highway, Songjiang District,
Shanghai
Tel: +86-21-5771-2505
Fax: +86-21-5772-2965
E-mail: info@portwell.com.cn
www.portwell.com.cn

Korea

Portwell Korea, Inc.

O-BIZ Tower 1901,No.126,
Beolmal-ro,Dongan-gu,Anyang-si,
Gyeonggi-do, Korea, 431-060
Tel :+82-31-450-3043
Fax:+82-31-450-3044
E-mail: info@portwell.co.kr
www.portwell.co.kr

India

Portwell India Technology

2nd Floor, 5M-665, 5TH Main Road, OMBR
Layout, Banaswadi, Bangalore -560043, India
Tel: +91-80-4168-4255
E-mail: enquiry@portwell.in
www.portwell.in

M201214