



## Embedded Computing



ARM-Based Computing



Computer-on-modules



Single Board Computers



Industrial Motherboards

# Trusted Embedded Computing Platform

ARBOR offers advanced embedded technology and a dedicated service team to help you get the best ROI



## Full-service OEM/ODM Solutions

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Our dedicated RD/BIOS service team provides customization support from initial prototype design all the way through development, manufacturing, assembly, logistics, and after sales services.



## Wide Temperature Design & Validation

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ARBOR COM Express modules can be operated in an extended temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  and have passed stringent vibration tests. The exclusive use of high quality components and highly effective thermal solutions ensure that the modules are rugged enough for use in harsh environments.



## In-house Technologies and Expertise

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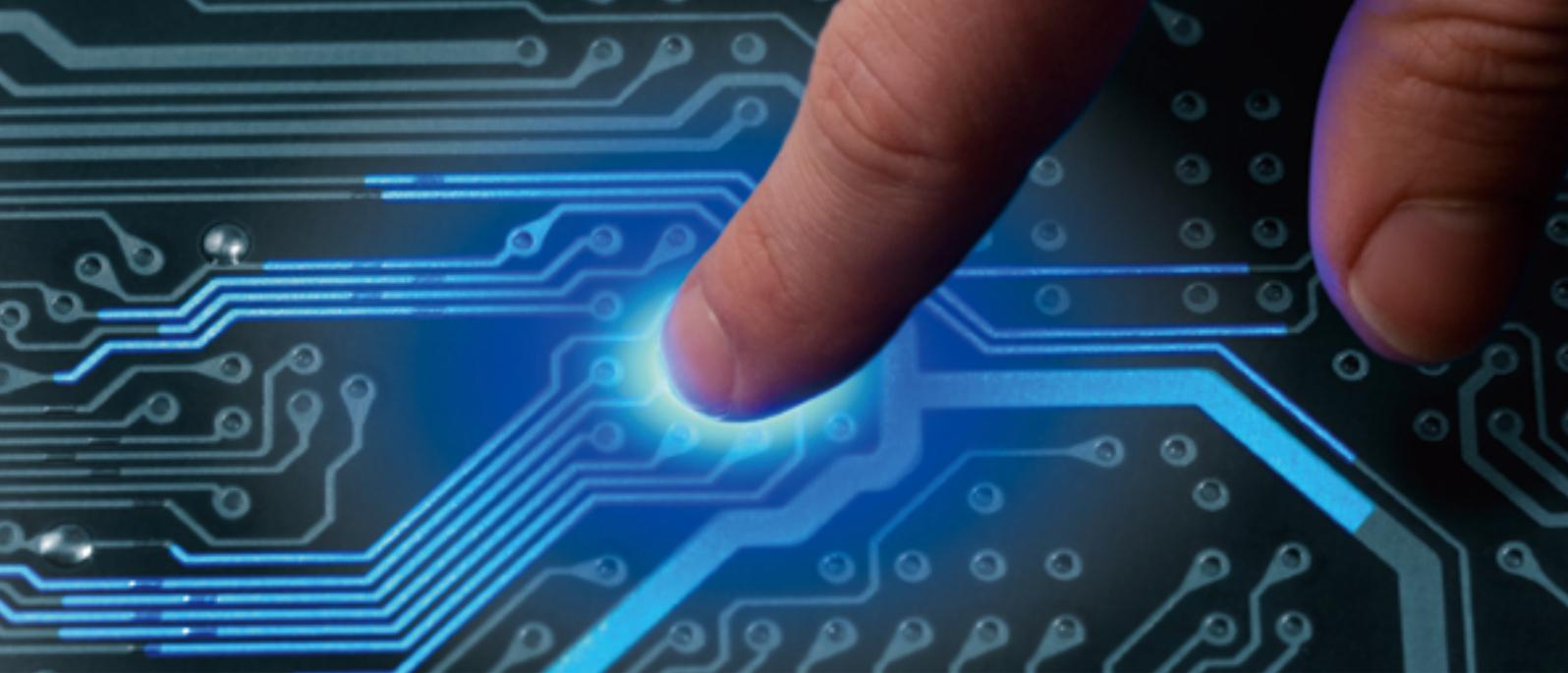
ARBOR has extensive expertise in power MCU design for automation control. Its BIOS Anti-Crash Technology (ACT) enables embedded system to recover BIOS code from a secondary on-board flash memory and restart in case of a system BIOS failure.



## Conformal Coating Service

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To provide maximum PCB operational lifespan and functionality, ARBOR offers automated conformal coating services to protect components and circuitry from dust, fungus, moisture and salt spray.



## 15 Years Longevity Commitment

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Most of ARBOR board products carry a life cycle commitment of 15 years from first production. ARBOR will notify customers in advance of component revisions or End-of-Life scheduling, and provide options in qualifying updated components and modules.



## Strategic Partner Ecosystem

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ARBOR extends our technology and business capability through a powerful alliance ecosystem of industry-leading companies including Intel®, AMD®, Microsoft, as well as the leading standards development organizations, such as PICMG & SGeT.



## Quality Assurance

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ARBOR's products are certified to comply with applicable regulatory bodies for their application to determine the quality of products, as well as ensure operational safety in embedded applications.



## Medical Regulation Compliance

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ARBOR is ISO 13485 and ISO 14971 certified, filling the requirements for implementing a comprehensive quality management system (QMS) for the design and manufacture of medical devices.

# Embedded Hardware & Software Design Competency

Accelerating your embedded development with lower risk



## Hardware Services

ARBOR offers a full lineup of embedded boards in different form factors to fulfill different industrial chassis. In addition to supporting the strong mechanical & thermal solution, our reliable components feature industrial-grade chipsets, and have passed stringent validation testing to an operating temperature range of up to  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ . ARBOR also has extensive expertise in power MCU design.



## Software Services

- Embedded BIOS/bootloaders
- Embedded OS/licenses
- Embedded tools
- Trusted Platform Module (TPM)
- SHA1
- BIOS Anti-Crash Technology (ACT)



## Validation & Testing

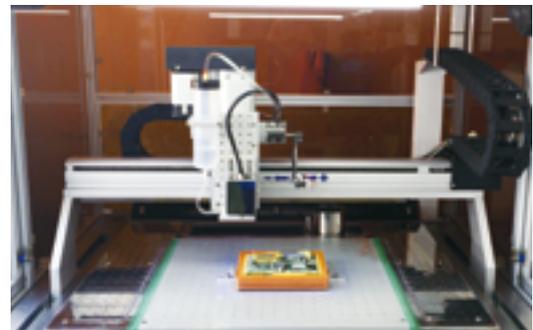
ARBOR provides rigorous product verification to ensure its ruggedness and performance to meet customers' requirements.

- EMI/EMC validation
- Vibration, shock and drop tests
- Humidity and temperature tests
- Thermal analysis
- Performance & compatibility tests

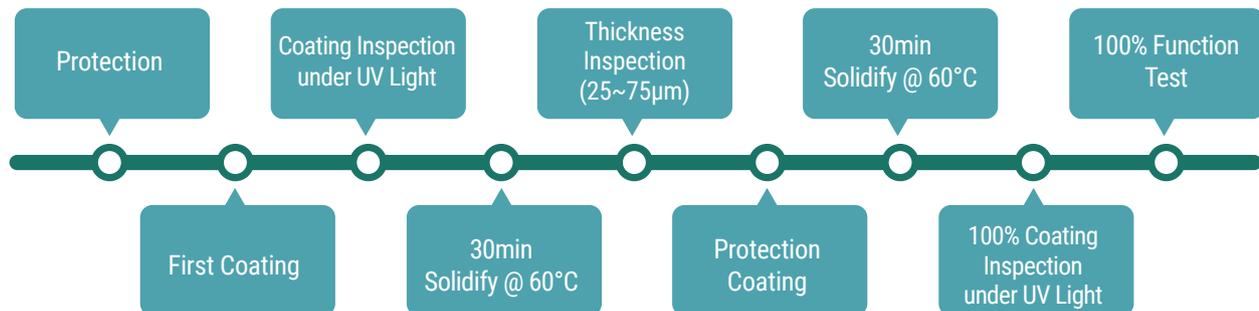


## Automated Conformal Coating Services

ARBOR provides the automated conformal coating service, with an acrylic coating being applied to the whole surface of the board except contact pins, to protect the components & circuitry against dust, fungus, moisture and salt spray. The conformal coating also prevents short circuits and corrosion of metal between conductors.



## Coating Flow Chart



## Supported Form Factors

CPU on Module	
Qseven	70 x 70 mm
COM Express Mini	84 x 55 mm
COM Express Compact	95 x 95 mm
COM Express Basic	125 x 95 mm
ETX	114 x 95 mm

Single Board Computer	
PC/104	96 x 90 mm
3.5"	146 x 102 mm
EPIC	165 x 115 mm
Slot Computing	338 x 122 / 185 x 122mm
Industrial Motherboard	
Mini-ITX	170 x 170 mm
Micro-ATX	244 x 244 mm

# Building a Trustworthy, Long-term Service

Increasing the value of applications at every level of evolution

## Extended Product Lifecycle

Unlike commercial motherboards with a typical lifespan of 12 to 18 months, motherboards in embedded computing applications, where design processes can last as long as two years, 3-5 year life cycles are a must. To deliver long-life products, ARBOR selects key components that offer long-life availability, and have adopted Product Lifecycle Management (PLM) systems to manage product design, collaboration, and manufacturing processes effectively.

Parts do go End-of-Life, but ARBOR manages that process by making sure component revision and EOL notifications are made at least 180-days before occurring, helping customers facilitate smooth transitions. Most of ARBOR board products carry a life cycle commitment of 15 years from first production. ARBOR will notify customers in advance of component revisions or End-of-Life scheduling, and provide options in qualifying updated components and modules.



28 years of embedded experience



Up to 15 years longevity commitment from first production



EOL notifications are made within 180 days before occurring



## Ecosystem Partners

To deliver up-to-date technologies and solutions to our clients, ARBOR extends our technology and business capability through a powerful alliance ecosystem of industry-leading companies and organizations. Together, we provide our customers the top notch services to streamline their projects.



IoT Solutions  
Alliance



## Full Experience of Industry Standards

ARBOR holds the most required ISO certification and industry standards to ensure our products and manufacturing capabilities meet the worldwide regulations and standards compliance. Our customers have no need to worry about getting documents for their product development. With our internal and external test laboratories, this allows manufacturers to circulate industrial products freely within the internal market of the USA, Europe and China.

### Certified Quality Assurance

- ISO 9001:2008
- ISO 14001
- CE
- FCC

### Medical Regulation Compliance

- IEC60601-1, EN60601-1, EN60601-1-2
- UL60601-1
- ISO 13485
- ISO 14971



# Customization Competency

Satisfy all your needs to speed your embedded development

ARBOR's design team has the expertise to develop a solution to meet your environmental needs. Whether it is a completely new design or a minor modification to an existing product, ARBOR's skilled design teams' experience and expertise ensures a solution will be suited to your requirements.

## Live Video Equipment

Location: USA

Product & Design-In Service:

- Intel® Core i7 Processor COM Express Type 6 CPU Module w/ customized carrier board
- Full integration of system, chassis design and EMS service of capture, audio and LCD board
- UL-60950 certification service



## Train Control & Monitor System

Location: France

Product & Design-In Service:

- Wide-Temperature COM Express Type 10 CPU Module
- Conformal coating to enhance the resistance to environmental conditions
- Assembly integration and testing service



## ANPR Camera Engine

Location: South East Asia

Product & Design-In Service:

- 6<sup>th</sup> Gen. Intel® Core™ Processor 3.5" Compact Board
- Custom power and thermal design to fit space constraints of the camera enclosure
- Conformal coating to avoid short circuits in highly humid environments





## Innovative CWR Technology to Optimize CPU Power

CPU Watt Reduction (CWR) is one of ARBOR's latest technology illustrating our customization competency to satisfy customers' individual embedded applications. It limits CPU power consumption while at the same time optimizing its performance. By offering application-optimized CPU power configuration, it enables developers to achieve the best tradeoff between power and performance demands.



### Limiting CPU Power

With CWR technology, the thermal design power (TDP) of a CPU is specifically configured to limit CPU power consumption.



### Increasing Performance-per-Watt

Limiting CPU power inevitably impacts the performance, yet a higher performance-watt ratio can be delivered, indicating higher power efficiency can be attained.



### Better Performance

CWR optimizes performance at acceptable levels according to each project's actual applications to ensure workload can be met.

## CWR Technology Advantages



**Cost-Effective Migration to New Generation CPU**



**More Flexible CPU Selection**



**Project-Specific Configuration**



**Reducing Total Cost of Ownership (TCO)**

# ARM-Based Embedded Solutions

Smart design for sophisticated demands



ARBOR provides ARM-based computer-on-module and system solutions for general, communication and mobility purposes to fulfill the diverse market demands. We offer a series of flexible, highly customizable and cost effective small form factor solutions that can meet the requirements for power-efficient IoT devices and performance-oriented professional applications.

## ARBOR ARM-Based IIoT Solutions



Internet of Vehicle



Smart Retail



Industrial IoT



Intelligent Healthcare

**Vehicle Panel PC**

- 4G/LTE Communication
- OBDII
- CANBUS
- Low Power Consumption
- LCM

**Retail Price Checker**

- Touch Display
- NFC/RFID Support
- PoE Powered
- Barcode Scanner
- Wireless Communication

**Frame-less Panel PC**

- Frame-Less Design
- Efficient Thermal Solution
- Wireless Communication

**SOM Embedded Boards**

- Embedded CPU Board
- Customized Carrier Board

**Bedside Infotainment**

- Medical Certificate
- High Performance
- Rich I/O
- Various Size
- Android OS
- Wireless Communication

## ARM-Based Embedded Systems



SoM



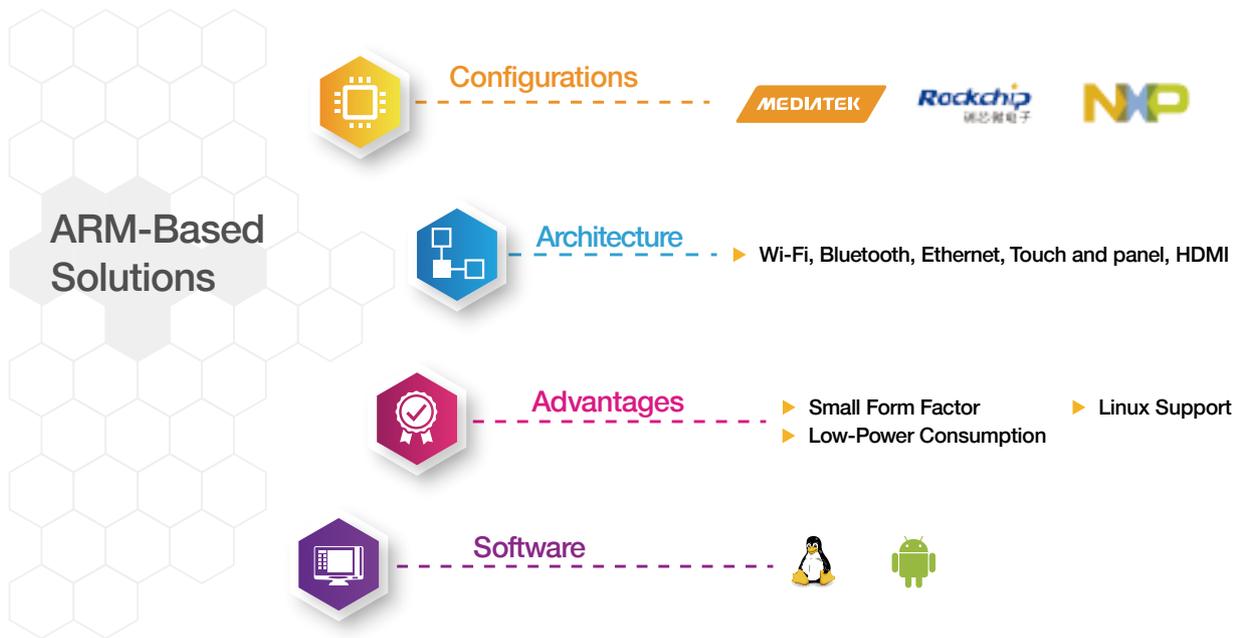
IOT-800N  
Slim Panel PC



PC1017  
Price Checking Terminal



## Custom Your ARM-Based Solutions with ARBOR



## ARM-Based Embedded Systems



**RP-101K**  
Open Frame Touch Panel Kit



**M1016**  
Medical Thin Client



**M1861**  
Medical Infotainment Terminal

# Computer on Modules

Building your embedded projects easier and faster!

Computer on Module perfectly meets your custom application requirements while helping you reach your goals for time-to-market, saving money, design flexibility and risk minimization. With a versatile portfolio of low-power CPU available from Intel®, AMD® and VIA supporting fanless operation, your embedded system will enjoy the benefits of high CPU performance per watt. ARBOR's Computer on Module supports different form factors, including COM Express, Qseven and ETX System on Module to meet every type of demand in your applications.



## PICMG Standard Compliant

As an active member of PICMG, ARBOR's COM Express comes with the latest module specifications and pinout definitions.



## High Efficient Thermal Solution

ARBOR uses specially CNC-machined aluminum heat-spreaders to contact hot spots in order to efficiently distribute the heat to the outside heat sink.



## Conformal Coating Services

Upon customer request, this optional service that protects the components & circuitry against dust, fungus, moisture and salt spray.

## Supported Form Factors



COM Express



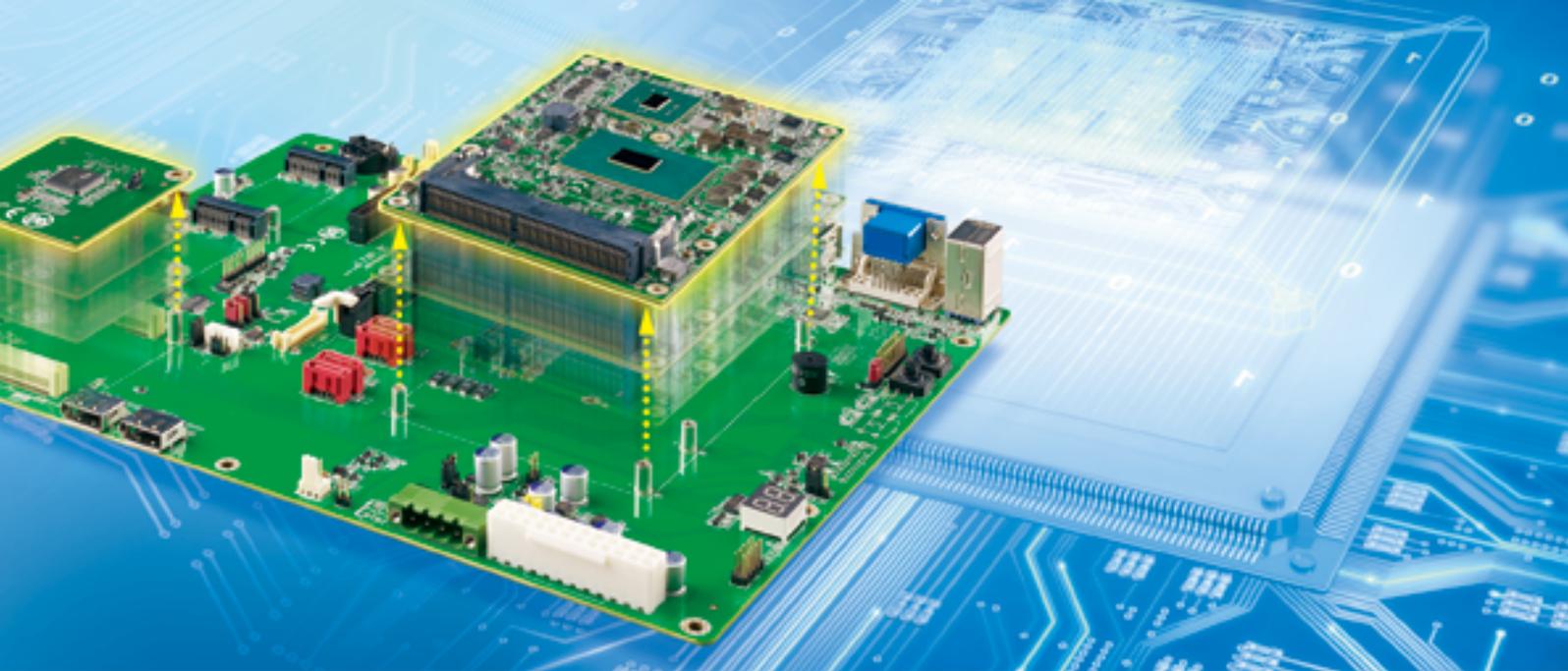
ETX



Qseven



Carrier Board



## COM Express CPU Modules

COM Express Builds Highly-Reliable Embedded Systems, Rugged and wide-temperature designed for the harshest environments.

### Ready for Harsh Environment Applications

ARBOR COM Express modules provide a wide operating temperature range and conformal coating that protects components and circuitry from harmful environmental conditions. Size and cost-efficient COM Express modules also address space and budget constraints while delivering utmost reliability and long life cycle support. Changing customer project scale and/or parameters can easily be addressed with minimum system downtime via ARBOR's broad range of ready-made COM Express modules.



### Accelerating Development of Medical Ultrasound Equipment

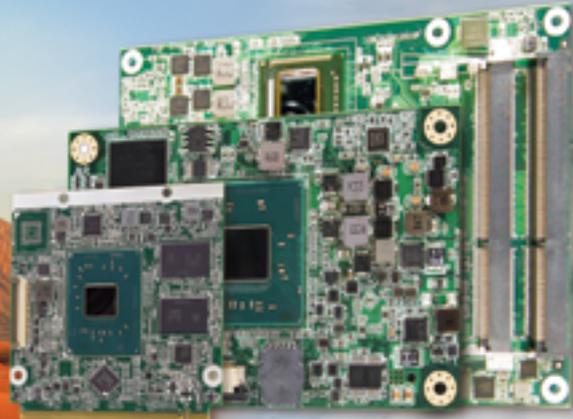
Scalability, performance, and complete safety are key concerns for developers and manufacturers of ultrasound medical equipment. ARBOR addresses these requirements with ready made COM Express modules in different form factors for distinct type of devices, and supporting the most compute intensive requirements and most advanced graphics applications.

## COM Express CPU Modules

			
Intel® 11 <sup>th</sup> Gen.	Intel® 8 <sup>th</sup> Gen.	Intel® 7 <sup>th</sup> Gen.	Intel® 6 <sup>th</sup> Gen.
EmETXe-i92U0-WT	EmETXe-i91M0-WT	EmETXe-i90M3-WT	EmETXe-i89U0-WT

# Single Board Computers

Meet industrial grade design and quality



ARBOR Single Board Computer (SBC) series ranging from 3.5", PC/104, PC/104-Plus and EPIC, to a wide range of full-size and half-size Slot Computing boards. ARBOR's SBCs are designed around the powerful core logic embodied within the chipsets from Intel® and AMD®. Highly integrated designs allow them to fit the minimal /critical space requirements of most embedded applications.

Moreover, ARBOR's slot based SBCs are all based on open PICMG standards. All of these slot-based SBCs are ideally suited for applications in compact and rugged enclosures suited for mission-critical applications.



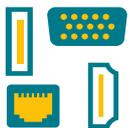
## Reliable and Rugged Designs

- Wide temperature design option
- Industrial-grade components
- Conformal coating services



## Ready-to-use Platforms

- X86 architecture, Intel® & AMD®
- PICMG, SGeT standards compliance



## Extensive I/O Interfaces

- Expandable by PCI Express, Mini PCI Express and M.2 slots
- I/O extension options



## Conformal Coating Services

To protect the components & circuitry against dust, fungus, moisture and salt spray.

## SBC Product Highlights



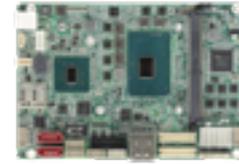
AMD Embedded Ryzen R1000

EmCORE-a10R2



Intel® 7<sup>th</sup> Gen.

EmCORE-i90U2-WT

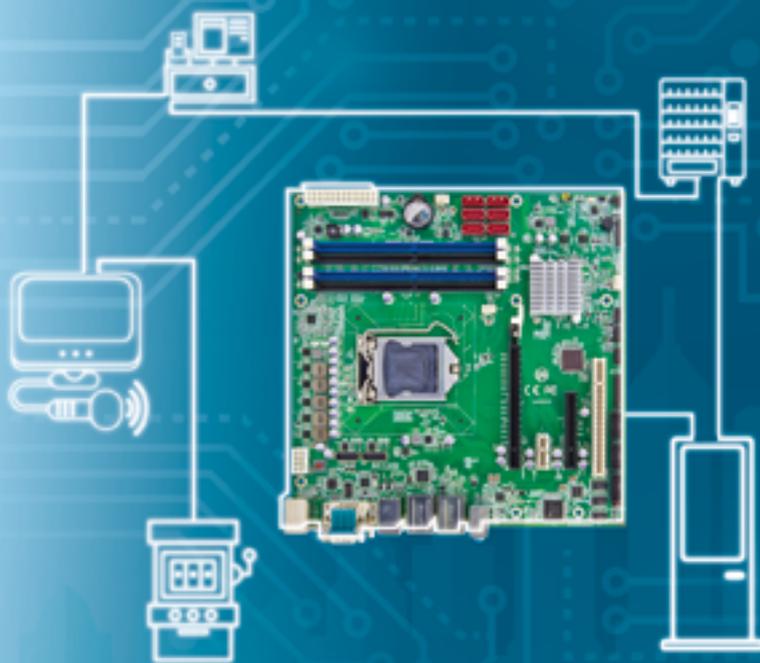


Intel® 7<sup>th</sup> Gen.

EmCORE-i90M2-WT

# Industrial Motherboards

Minimal configuration and maintenance required



ARBOR offers plenty of industrial motherboard series in different form factors including Micro ATX and Mini-ITX. All industrial motherboards are designed with Intel® chipsets based on demand from system integrators, and ideal alternatives to platforms needing industrial features such as longevity, reliability and manageability, including many controller, server and gaming machine applications.



## Customization & Configuration

- One-stop SW/HW integration
- Extensive I/O expansion



## Reliability & Longevity

- Fanless Thermal Solution System
- Long term availability 10+ years
- Extended temp. of -20~70°C option
- Wide-Range DC Input



## Ready for Vertical Markets

- Standards form factors for easy integration
- Industrial design for the complete product life cycle

## Supported Form Factors



Mini-ITX



Micro-ATX



ATX

# Semi-Industrial Motherboards

## Minimal configuration and maintenance



ARBOR's Semi-Industrial Motherboards are a new series of off-the-shelf motherboards ready for clients to commission their projects faster, smarter and more efficiently. This series is designed to meet the growing demand of light industrial embedded computing applications, such as commercial, retail, gaming and residential systems. Coming in versatile form factors including mini-ITX, micro-ATX and ATX, these motherboards can satisfy various vertical market needs. Plus, the series features the latest platforms such as 8th Gen. Intel® Core™ processors, so that customers can take advantage of the cutting-edge features, making it a perfect fit for price sensitive but performance-demanding applications.



### Faster Time to Market

Standard form factors from mini-ITX to full size ATX for easy integration



### Greater Affordability

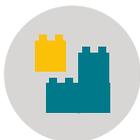
Our cost effective solutions save turnaround costs and time for your projects.



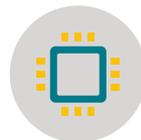
### Vertical Markets Ready

Our expertise in a variety of vertical markets can help provide quick execution and rapid project delivery.

## Features



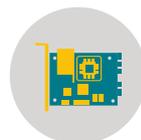
Off-the-shelf motherboards with expansion ability and industrial reliability



Intel® latest platforms from 6<sup>th</sup> to 8<sup>th</sup> Gen. Intel® Core Processors



Standard form factors from mini-ITX to full size ATX for easy integration



High bandwidth I/Os like USB 3.1 Gen. 2 (10 Gbit/s), PCIe Gen. 3.0 lanes and M.2

# Selection Guide

## ARM-Based System on Module



Model	SOM-RK391
<b>Form Factor</b>	SOM-1
<b>Dimension</b>	69.6 x 70 mm
<b>Processor</b>	Rockchip RK3399 Dual-core Cortex-A72 + Quad-core Cortex-A53
<b>Memory</b>	LPDDR4 2GB, optional to 4GB
<b>Storage</b>	16GB eMMC with SDIO 5.1
<b>Graphics</b>	Mali-T860MP4 GPU
<b>Display</b>	1 x HDMI, 1 x MIPI DSI, 1 x eDP
<b>Camera</b>	2 x MIPI CSI RX (up to 13MP)
<b>Audio</b>	2 x 1W Speaker; 2 x Analog MIC; 1 x Digital MIC; 1 x Headphone
<b>LAN</b>	1 x GbE
<b>Wifi+BT</b>	1 x 802.11 a/b/g/n/ac + BT 5.0
<b>USB 2.0</b>	4
<b>USB 3.0</b>	2 (Type C)
<b>Serial Ports</b>	2 x UART ports, 2-wire; 2 x UART ports, 4-wire
<b>RTC</b>	Supported
<b>SDIO</b>	Supported
<b>GPIO</b>	Supported
<b>SPI</b>	1
<b>I<sup>2</sup>C</b>	2
<b>Power Input</b>	5V/3A
<b>Operating Temperature</b>	-10 ~ 60°C
<b>OS Support</b>	Android



Model	PBA-9000-A
<b>Form Factor</b>	Carrier Board for SOM series
<b>Dimension</b>	165 x 115 mm
<b>Display</b>	1 x HDMI; 1x MIPI DSI; 1 x eDP
<b>Camera</b>	2 x MIPI CSI RX (up to 13MP)
<b>Audio</b>	2 x 1W Speaker; 2 x Analog MIC; 1 x Digital MIC; 1 x Headphone
<b>Ethernet</b>	1 x GbE RJ-45
<b>USB 2.0</b>	4
<b>USB 3.0</b>	2 (Type C)
<b>Serial Port</b>	2 x RS-232 ports, 2-wire; 2 x RS-232 ports, 4-wire
<b>RTC</b>	Supported
<b>SD Card</b>	Supported
<b>SPI</b>	2
<b>I<sup>2</sup>C</b>	2
<b>Power Input</b>	12V/3A
<b>Operating Temperature</b>	-10 ~ 60°C

## Computer On Module COM Express - Type 6



Model	EmETXe-i88U0-WT	EmETXe-i88U4	EmETXe-i89U0-WT	EmETXe-i90U0-WT	EmETXe-i91U0-WT
<b>Form Factor</b>	COM Express® Compact Type 6	COM Express® Compact Type 6	COM Express® Compact Type 6	COM Express® Compact Type 6	COM Express® Compact Type 6
<b>Dimension</b>	95 x 95 mm	95 x 95 mm	95 x 95 mm	95 x 95 mm	95 x 95 mm
<b>Processor</b>	5 <sup>th</sup> Gen. Intel® Core™ i7-5650U 3.1GHz	5 <sup>th</sup> Gen. Intel® Xeon® D-1539 2.2GHz / D-1527 2.7GHz / Pentium® D1508 2.6GHz	6 <sup>th</sup> Gen. Intel® Core™ i7-6600U 3.4GHz / i5-6300U 3.0GHz / i3-6100U 2.3GHz / Celeron® 3955U 2.0GHz	7 <sup>th</sup> Gen. Intel® Core™ i7-7600U 3.9GHz / i5-7300U 3.5GHz	8 <sup>th</sup> Gen. Intel® Core™ i7-8665UE 4.4GHz / i5-8365UE 4.1GHz / i3-8145UE 3.9GHz / Celeron® 4305UE 2.0GHz
<b>Chipset</b>	N/A	N/A	N/A	N/A	N/A
<b>Memory</b>	1 x DDR3L SO-DIMM Sockets	2 x DDR4 ECC SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets
<b>Video Output</b>	2 x DDI ports	N/A	2 x DDI ports	2 x DDI ports	2 x DDI ports or 1 x DDI port, 1 x Analog RGB(Optional)
<b>LVDS</b>	Dual Channels 24-bit	N/A	Dual Channels 24-bit	Dual Channels 24-bit	Dual Channels 24-bit
<b>Audio</b>	HD audio link	HD audio link	HD audio link	HD audio link	HD audio link
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	1 x GbE	1 x GbE
<b>Mass Storage</b>	3 x SATA3.0	4 x SATA3.0	2 x SATA3.0, eMMC 5.0 (OEM Request)	2 x SATA3.0, eMMC 5.0 (OEM Request)	2 x SATA3.0, eMMC 5.0 (OEM Request)
<b>RS-232</b>	N/A	2 x RX/TX	2 x RX/TX	2 x RX/TX	2 x RX/TX
<b>RS-232/422/485</b>	N/A	N/A	N/A	N/A	N/A
<b>USB 2.0</b>	8	8	8	8	8
<b>USB 3.0</b>	2	4	4	4	4
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	8 x PCIe x1, I <sup>2</sup> C, SMBus, SPI, LPC	1 x PCIe x16, 8 x PCIe x1, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, I <sup>2</sup> C, SMBus, SPI, LPC
<b>Power Input</b>	DC 12V, 5VSB	DC 12V, 5VSB	DC 5~20V, 5VSB	DC 5V~20V, 5VSB	DC 8.5V~20V, 5VSB
<b>Operating Temperature</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	0 ~ 60°C (32 ~ 140°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>

**W** Wide Temperature Range

## Computer On Module COM Express - Type 6



**NEW**

Model	EmETXe-i87U2-WT	EmETXe-i2309-WT	EmETXe-a10M0	EmETXe-a10R0
<b>Form Factor</b>	COM Express® Compact Type 6	COM Express® Compact Type 6	COM Express® Compact Type 6	COM Express® Compact Type 6
<b>Dimension</b>	95 x 95 mm	95 x 95 mm	95 x 95 mm	95 x 95 mm
<b>Processor</b>	4 <sup>th</sup> Gen. Intel® Core™ i7-4650U 3.3GHz	Intel® Atom® E3845 1.91GHz	AMD® Ryzen™ V1000 V1605B 3.6GHz / V1756B 3.6GHz / V1807B 3.8GHz	AMD® Ryzen™ R1000 R1606G 3.5GHz / R1505G 3.3GHz
<b>Chipset</b>	N/A	N/A	N/A	N/A
<b>Memory</b>	1 x DDR3L SO-DIMM Socket	1 x DDR3L SO-DIMM Socket	2 x DDR4 ECC SO-DIMM Sockets	2 x DDR4 ECC SO-DIMM Sockets
<b>Video Output</b>	2 x DDI ports	Analog RGB, 1 x DDI port	3 x DDI ports	2 x DDI ports
<b>LVDS</b>	Dual Channels 24-bit	Dual Channels 24-bit	Dual Channels 24-bit	Dual Channels 24-bit
<b>Audio</b>	HD audio link	HD audio link	HD audio link	HD audio link
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	1 x GbE
<b>Mass Storage</b>	3 x SATA3.0	2 x SATA2.0 eMMC 4.5 (OEM request)	2 x SATA3.0	2x SATA3.0
<b>RS-232</b>	N/A	1 x RX/TX	2 x RX/TX	2 x RX/TX
<b>RS-232/422/485</b>	N/A	N/A	N/A	N/A
<b>USB 2.0</b>	8	8	8	8
<b>USB 3.0</b>	2	1	4	2
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable (Optional)	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	8 x PCIe x1, I <sup>2</sup> C, SMBus, SPI, LPC	7 x PCIe x1, SDIO (GPIO pin shared), I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, 1 x PCIe x8, I <sup>2</sup> C, SMBus, SPI, LPC	6 x PCIe x1, 1 x PCIe x4 I <sup>2</sup> C, SMBus, SPI, LPC
<b>Power Input</b>	DC 12V, 5VSB	DC 12V, 5VSB	DC 8.5V~20V, 5VSB	DC 8.5V~20V, 5VSB
<b>Operating Temperature</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-20 ~ 70°C (-4 ~ 158°F)	-20~70°C (-4 ~ 158°F)

**W** Wide Temperature Range

## Computer On Module COM Express - Type 6

**NEW**



Model	EmETXe-i87M0-WT	EmETXe-i87M2-WT	EmETXe-i89M0-WT	EmETXe-i89M3-WT	EmETXe-i90M0-WT
<b>Form Factor</b>	COM Express® Basic Type 6	COM Express® Basic Type 6	COM Express® Basic Type 6	COM Express® Basic Type 6	COM Express® Basic Type 6
<b>Dimension</b>	125 x 95 mm	125 x 95 mm	125 x 95 mm	125 x 95 mm	125 x 95 mm
<b>Processor</b>	4 <sup>th</sup> Gen. Intel® Core™ i7-4700EQ 3.4GHz / i5-4402E 2.7GHz / i3-4102E 1.6GHz / i3-4112E 1.8GHz	5 <sup>th</sup> Gen. Intel® Core™ i7-5700EQ 3.4GHz	6 <sup>th</sup> Gen. Intel® Core™ i7-6822EQ 2.8GHz	6 <sup>th</sup> Gen. Intel® Core™ i7-6822EQ 2.8GHz / i5-6442EQ 2.7GHz Xeon E3-1505Lv5 2.8GHz Xeon E3-1505Mv5 3.7GHz	7 <sup>th</sup> Gen. Intel® Core™ i7-7820EQ 3.7GHz / i5-7442EQ 2.9GHz
<b>Chipset</b>	QM87	QM87	QM170	QM170 / CM236	QM175
<b>Memory</b>	2 x DDR3L SO-DIMM Sockets	2 x DDR3L ECC SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets
<b>Video Output</b>	Analog RGB, 3 x DDI ports	Analog RGB, 3 x DDI ports	3 x DDI ports	Analog RGB, 2 x DDI ports	3 x DDI ports
<b>LVDS</b>	Dual Channels 24-bit (OEM request)	Dual Channels 24-bit (OEM request)	Dual Channels 24-bit	Dual Channels 24-bit	Dual Channels 24-bit
<b>Audio</b>	HD audio link	HD audio link	HD audio link	HD audio link	HD audio link
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	1 x GbE	1 x GbE
<b>Mass Storage</b>	2 x SATA2.0, 2 x SATA3.0	2 x SATA2.0, 2 x SATA3.0	4 x SATA3.0	4 x SATA3.0	4 x SATA3.0
<b>RS-232</b>	N/A	N/A	2 x RX/TX	2 x RX/TX	2 x RX/TX
<b>RS-232/422/485</b>	N/A	N/A	N/A	N/A	N/A
<b>USB 2.0</b>	8	8	8	8	8
<b>USB 3.0</b>	4	4	4	4	4
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	8 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC	6 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC	6 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC
<b>Power Input</b>	DC 12V, 5VSB	DC 12V, 5VSB	DC 5~20V, 5VSB	DC 5~20V, 5VSB	DC 8.55~20V, 5VSB
<b>Operating Temperature</b>	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)

**W** Wide Temperature Range

## Computer On Module COM Express - Type 6

**NEW**

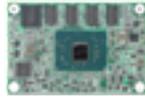


Model	EmETXe-i90M3-WT	EmETXe-i91M0-WT	EmETXe-i92U0-WT	EmETXe-a10M3
<b>Form Factor</b>	COM Express® Basic Type 6	COM Express® Basic Type 6	COM Express® Compact Type 6	COM Express® Basic Type 6
<b>Dimension</b>	125 x 95 mm	125 x 95 mm	95 x 95 mm	125 x 95 mm
<b>Processor</b>	7 <sup>th</sup> Gen. Intel® Core™ i7-7820EQ 3.7GHz i5-7442EQ 2.9GHz Xeon E3-1505L v6 3.0GHz	8 <sup>th</sup> Gen. Intel® Core™ i7-8850H 4.3GHz i5-8400H 4.2GHz i3-8100H 3.0GHz	11 <sup>th</sup> Gen Intel® i7-1185GRE 4.4GHz i5-1145GRE 4.1GHz i3-1115GRE 3.9GHz Celeron 6305E 1.8GHz	AMD® Ryzen™ V1000 Processor V1605B 3.6 GHz V1756B 3.6 GHz V1807B 3.8 GHz
<b>Chipset</b>	QM175 / CM238	QM370	N/A	N/A
<b>Memory</b>	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 ECC SO-DIMM Sockets
<b>Video Output</b>	Analog RGB, 2 x DDI ports	3 x DDI ports or 2 x DDI ports, Analog RGB (Optional)	Analog RGB (Optional) 3 x DDI ports	3 x DDI ports
<b>LVDS</b>	Dual Channels 24-bit	Dual Channels 24-bit	Dual Channels 24-bit	Dual Channels 24-bit
<b>Audio</b>	HD audio link	HD audio link	HD audio link	HD audio link
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	1 x GbE
<b>Mass Storage</b>	4 x SATA3.0	4 x SATA3.0	2 x SATA3.0	4 x SATA3.0
<b>RS-232</b>	2 x RX/TX	2 x RX/TX	2 x RX/TX	2 x RX/TX
<b>RS-232/422/485</b>	N/A	N/A	N/A	N/A
<b>USB 2.0</b>	8	8	8	8
<b>USB 3.0</b>	4	4	4	4
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit programmable
<b>Expansion &amp; Serial Bus</b>	8 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, 1 x PCIe x16, I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, 1 x PCIe x4 I <sup>2</sup> C, SMBus, SPI, LPC	8 x PCIe x1, 1 x PCIe x8, I <sup>2</sup> C, SMBus, SPI, LPC
<b>Power Input</b>	DC 8.5V~20V, 5VSB	DC 8.5V~20V, 5VSB	DC 5V ~ 20V, 5VSB	DC 5V~20V, 5VSB
<b>Operating Temperature</b>	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40~185°F)	-20 ~ 70°C <b>W</b> (-4 ~ 158°F)

**W** Wide Temperature Range

## Computer On Module COM Express - Type 10

## Computer On Module Qseven



Model	EmQ-i2401	EmNANO-i2402	EmNANO-i2402-WT	EmNANO-i230V-WT	EmQ-i240A
<b>Form Factor</b>	Qseven® R2.0	COM Express® Mini Type 10	COM Express® Mini Type 10	COM Express® Mini Type 10	Qseven® R2.1
<b>Dimension</b>	70 x 70 mm	84 x 55 mm	84 x 55 mm	84 x 55 mm	70 x 70 mm
<b>Processor</b>	Intel® Celeron® N3350 2.4GHz Intel® Pentium® N4200 2.5GHz	Intel® Celeron® N3350 2.4GHz Intel® Pentium® N4200 2.5GHz	Intel® Atom® X7-E3950 2.0GHz / X5-E3940 1.8GHz / X5-E3930 1.8GHz	Intel® Atom® Processor E3825 1.33GHz / E3845 1.91GHz	Intel® Celeron® N3350 2.4GHz Intel® Pentium® N4200 2.5GHz
<b>Chipset</b>	N/A	N/A	N/A	N/A	N/A
<b>Memory</b>	Soldered onboard 4GB DDR3L SDRAM	Soldered onboard 4GB DDR3L SDRAM	Soldered onboard 4GB DDR3L SDRAM	Soldered Onboard 2GB/4GB DDR3L SDRAM	Soldered onboard 8GB LPDDR4 SDRAM
<b>Video Output</b>	1 x DDI port	1 x DDI port	1 x DDI port	1 x DDI port	1 x DDI port
<b>LVDS</b>	Dual Channels 24-bit	Single Channel 24-bit	Single Channel 24-bit	Single Channel 24-bit	Dual Channels 24-bit
<b>Audio</b>	HD audio link	HD audio link	HD audio link	HD audio link	HD audio link
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	1 x GbE	1 x GbE
<b>Mass Storage</b>	2 x SATA3.0 eMMC (OEM Request)	2 x SATA3.0 eMMC 5.0 (OEM Request)	2 x SATA3.0 eMMC 5.0 (OEM Request)	2 x SATA2.0	2 x SATA3.0 eMMC 5.0 (OEM Request)
<b>RS-232</b>	1	2 x RX/TX	2 x RX/TX	2 x RX/TX	1
<b>RS-232/422/485</b>	N/A	N/A	N/A	N/A	N/A
<b>USB 2.0</b>	4	8	8	8	6
<b>USB 3.0</b>	2	2	2	1	2
<b>Digital I/O</b>	N/A	N/A	N/A	N/A	N/A
<b>Expansion &amp; Serial Bus</b>	4 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	4 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	4 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	3x PCIe x1, SDIO, I <sup>2</sup> C, SMBbus, PI, LPC	4 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC
<b>Power Input</b>	DC 5V, 5VSB	DC 12V / 5V Auto Detect	DC 12V / 5V Auto Detect	DC 12V / 5V Auto Detect	DC 5V, 5VSB
<b>Operating Temperature</b>	-20~85°C (-4 ~ 185°F)	-20~ 85°C (-4~185°F)	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-20~ 85°C (-4~185°F)

**W** Wide Temperature Range



Model	Computer On Module Qseven			Computer On Module	
	EmQ-i2200	EmQ-i2205	EmQ-i230J-WT	SMARC	ETX
<b>Form Factor</b>	Qseven® R2.0	Qseven® R2.0	Qseven® R1.2	SMARC 2.0	ETX 3.02
<b>Dimension</b>	70 x 70 mm	70 x 70 mm	70 x 70 mm	82 x 50 mm	114 x 95 mm
<b>Processor</b>	Intel® Celeron® Processor N3160 2.24GHz	Intel® Celeron® processor N3060 2.48GHz / N3160 2.24GHz	Intel® Atom® Processor E3825 1.33GHz / E3845 1.91GHz	Intel® Atom® Processor X7-E3950 2.0GHz	Intel® Atom® Processor E3825 1.33GHz, E3845 1.91GHz
<b>Memory</b>	Soldered onboard 4GB DDR3L SDRAM	Soldered onboard 2GB/4G DDR3L SDRAM	Soldered onboard 2GB/4GB DDR3L SDRAM	Soldered Onboard 8GB LPDDR4 SDRAM	1 x DDR3L SO-DIMM Socket
<b>Video Output</b>	1 x D230J DI ports	2 x DDI ports, 1 x eDP port	Analog RGB, 1 x DDI port	1 x eDP port, 1 x DP++ port, 1 x HDMI port	Analog RGB, 1 x DDI port*
<b>LVDS</b>	Dual Channels 24-bit	N/A	Dual Channels 24-bit	N/A	Dual Channels 24-bit
<b>Audio</b>	HD audio link	HD audio link	HD audio link	HD audio link	Realtek® ALC662
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	1 x GbE	1 x 10/100Mbps
<b>Mass Storage</b>	2 x SATA3.0	2 x SATA3.0	2 x SATA2.0, eMMC 4.5 (OEM request)	1 x SATA3.0, eMMC (OEM Request)	1 x Ultra ATA, 2 x SATA2.0
<b>RS-232</b>	1 x RX/TX	1 x RX/TX	N/A	4 RX/TX	1 RX/TX
<b>RS-232/422/485</b>	N/A	N/A	N/A	N/A	1 (by Carrier Board)
<b>USB 2.0</b>	4	4	8	6	4
<b>USB 3.0</b>	2	2	N/A	2	N/A
<b>Digital I/O</b>	N/A	N/A	N/A	8-bit Programmable	N/A
<b>Expansion &amp; Serial Bus</b>	3 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	3 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	3 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	4 x PCIe x1, SDIO, I <sup>2</sup> C, SMBus, SPI, LPC	4 x PCI & ISA, LPC
<b>Power Input</b>	DC 5V, 5VSB	DC 5V, 5VSB	DC 5V, 5VSB	DC 3~5.25V	DC 5V, 5VSB
<b>Operating Temperature</b>	-20~70°C (-4 ~ 158°F)	-20 ~ 70°C (-4 ~ 158°F)	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>	-40 ~ 85°C (-40 ~ 185°F) <b>W</b>

**W** Wide Temperature Range \*Note: Via FPC connector

## Carrier Board



Model	PBC-900J	PBN-9007	PBQ-3000	PBQ-900L
<b>Form Factor</b>	COM Express® Basic Type 6 Carrier Board	COM Express® Mini Type 10 Carrier Board	EPIC™ form factor Qseven® Carrier Board	EPIC™ form factor Qseven® Carrier Board
<b>Dimension</b>	125 x 95 mm	125 x 95 mm	165 x 115 mm	165 x 115 mm
<b>Graphics interface</b>	1 x VGA BHs, 1 x LVDS connector	1 x LVDS connector, 1 x DisplayPort connector	1 x VGA connector, 1 x LVDS connector, 1 x DVI-D connector	1 x LVDS connector, 1 x DVI-I connector
<b>Audio</b>	Realtek® ALC662	Realtek® ALC662	Realtek® ALC662	Realtek® ALC662
<b>Ethernet</b>	2 x lockable BHs	2 x RJ-45 connectors	2 x RJ-45 connectors	2 x RJ-45 connectors
<b>Storage</b>	1 x SATA connector, 1 x mSATA Socket	1 x SATA connector, 1 x CFast Socket	2 x SATA connectors	1 x SATA connector, 1 x M.2 Socket
<b>Serial Port</b>	3 x RS-232, 1 x RS-232/422/485	1 x RS-232, 1 x RS-232/422/485	3 x RS-232, 1 x RS-232/422/485	3 x RS-232, 1 x RS-232/422/485 1 x UART
<b>LPT Port</b>	1	N/A	N/A	N/A
<b>USB 2.0</b>	2	4	6	1
<b>USB 3.0/2.0</b>	2	2	N/A	2
<b>Digital I/O</b>	16-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	1 x Mini-Card Socket, PCI/104	1 x Mini-Card Socket, SIM Socket	1 x Mini-Card Socket, LPC	SMBus, I <sup>2</sup> C, SDIO, 1 x M.2 Socket E-key
<b>Power Input</b>	DC 12V	DC 12V	10V ~ 30V	10V ~ 30V
<b>Operating Temperature</b>	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)

**W** Wide Temperature Range

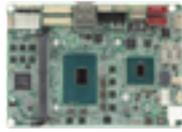
# Carrier Board



Model	PBQ-900R	PBE-1000	PBE-1101	PBE-1705	PBS-9015
<b>Form Factor</b>	ATX form factor Qseven Carrier Board	ATX form factor ETX Evaluation Board	ETX carrier Board	ATX form factor COM Exp. Type 6 Evaluation Board	SMARC 2.0 Evaluation Carrier Board
<b>Dimension</b>	305 x 244 mm	305 x 210 mm	114 x 95mm	305 x 244 mm	294 x 172mm
<b>Graphics interface</b>	Depends on CPU module	1 x VGA connector, 1 x LVDS connector	1 x VGA connector 1 x 24-bit LVDS connector	1 x VGA connector, 1 x DVI-I connector, 1 x LVDS connector, 2 x DisplayPort connectors	1 x HDMI connector 1 x DP++ connector 1 x LVDS/2 x eDP connector
<b>Audio</b>	Realtek® ALC886	Mic-in/ Line-in/ Line-out	Mic-in/Line-in/Line-out	Realtek® ALC886	Realtek® ALC662
<b>Ethernet</b>	1 x RJ-45 connector	1 x RJ-45 connector	2 x LAN PHs	1 x RJ-45 connector	2 x RJ-45 connectors
<b>Storage</b>	2 x SATA connectors	2 x Ultra ATA connectors 1 x FDD connector, 1 x CF II socket	1 x Ultra ATA connector 1 x CFII Socket	4 x SATA connectors	1 x SATA connector
<b>Serial Port</b>	12 x RS-232/422/485 (depends on Super IO module)	3 x RS-232, 1 x RS-232/422/485	3 x RS-232 1 x RS-232/422/485	6 x RS-232	2 x RS-232
<b>LPT Port</b>	1 (depends on Super IO module)	1	1	1	N/A
<b>USB 2.0</b>	5 (depends on Super IO module)	4	4	2	2
<b>USB 3.0/2.0</b>	3 (depends on Super IO module)	N/A	N/A	4	2
<b>Digital I/O</b>	12-bit Programmable	16-bit DIO 8-in/ 8-out	16-bit DIO, 8-in/ 8-out	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	1 x PCIe x 16 slot, 4 x PCIe x1 slots, 1 x M.2 Socket E-key SDIO, I <sup>2</sup> C, LPT	4 x PCI slots, 3 x ISA slots	PC/104-Plus, 1 x I <sup>2</sup> C	2 x PCIe x1 slots, 1 x PCIe x 4 slot, 1 x PCIe x16 slot, 2 x Mini-Card Sockets	1 x PCIe x 1, 1 x PCIe x 4, 1 x mini PCIe, 1 x M.2 Socket E-key
<b>Power Input</b>	9~36V	AT/ ATX	12V DC	DC 5~20V / ATX	ATX
<b>Operating Temperature</b>	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)

**W** Wide Temperature Range

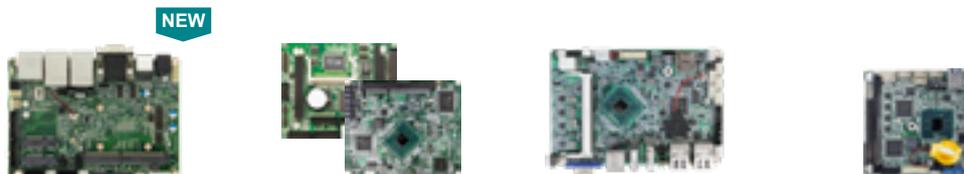
## Single Board Computer 3.5" Miniboard



Model	EmCORE-i89M2-WT	EmCORE-i90U2-WT	EmCORE-i90M2-WT	EmCORE-i2305-WT
<b>Form Factor</b>	3.5"	3.5"	3.5"	3.5"
<b>Dimension</b>	146 x 102 mm	146 x 102 mm	146 x 102 mm	146 x 102 mm
<b>Processor</b>	6 <sup>th</sup> Gen. Intel® Core™ i5-6442EQ 2.7GHz / i7-6822EQ 2.8GHz	7 <sup>th</sup> Gen. Intel® Core™ i7-7600U 3.9GHz / i5-7300U 3.5GHz / i3-7100U 2.4GHz, Intel® Celeron® 3965U 2.2GHz	7 <sup>th</sup> Gen. Intel® Core™ i5-7442EQ 2.9Ghz	Intel® Atom® E3825 1.33GHz / E3845 1.91GHz Celeron® N2807 2.16GHz / N2930 2.16GHz
<b>Chipsets</b>	QM170	N/A	QM175	N/A
<b>Memory</b>	1 x DDR4 SO-DIMM Socket	2 x DDR4 SO-DIMM Sockets	1 x DDR4 SO-DIMM Socket	1 x DDR3L SO-DIMM Socket
<b>Graphic interface</b>	1 x HDMI 1 x DisplayPort	1 x HDMI 1 x DisplayPort	1 x HDMI 1 x DisplayPort	Analog RGB, 1 x HDMI
<b>LVDS</b>	2 x Dual Channels 24-bit	Dual Channels 24-bit	2 x Dual Channels 24-bit (1 x LVDS is optional)	Dual Channels 24-bit
<b>Audio</b>	Realtek® ALC662	Realtek® ALC269	Realtek® ALC662	Realtek® ALC662
<b>Ethernet port</b>	2 x GbE	5 x GbE	2 x GbE	2 x GbE
<b>Storage</b>	2 x SATA3.0 1 x M.2 M-key	1 x SATA3.0 1 x M.2 B-key	2 x SATA3.0 1 x M.2 M-key	1 x SATA2.0, 1 x mSATA, eMMC 4.5 (OEM request, E3800 family only)
<b>Serial port</b>	4 x RS-232 2 x RS-232/422/485 selectable	4 x RS-232/422/485 selectable	4 x RS-232 2 x RS-232/422/485 selectable	1 x RS-232 1 x RS-232/485 selectable
<b>USB 2.0</b>	4	4	4	4
<b>USB 3.0/2.0</b>	2	4	2	1
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	1 x Mini-Card Socket 1 x Micro SIM Socket (OEM request)	4 x PCIe x 1 / 1 x PCIe x 4 FCC connector, 1 x M.2 E-key, 1 x Nano SIM Socket (OEM request)	1 x Mini-Card Socket 1 x Micro SIM socket	1 x Mini-Card Socket, 1 x micro-SDXC socket, 2 x I <sup>2</sup> C ports (OEM request, E3800 family only)
<b>Power Input</b>	DC 12V	DC 9V ~ 15V / 15V ~ 36V	DC 12V	DC 12V
<b>Operating Temperature</b>	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)

**W** Wide Temperature Range

## Single Board Computer 3.5" Miniboard



Model	EmCORE-a10R2	Em104P-i2313	EmCORE-i230G-WT	Em104-i230F
<b>Form Factor</b>	3.5"	ETXP	3.5"	PC/104
<b>Dimension</b>	146 x 102 mm	114 x 95 mm	146 x 102 mm	96 x 90 mm
<b>Processor</b>	Soldered onboard AMD® Ryzen™ R1102G 2.6GHz	Intel® Atom® E3825 1.33GHz / E3845 1.91GHz	Intel® Atom® E3825 1.33GHz / E3845 1.91GHz	Intel® Atom® E3825 1.33GHz / E3845 1.91GHz
<b>Chipsets</b>	N/A	N/A	N/A	N/A
<b>Memory</b>	1 x DDR4 SO-DIMM Socket	1 x DDR3L SO-DIMM Socket	1 x DDR3L SO-DIMM Socket	1 x DDR3L SO-DIMM Socket
<b>Graphic interface</b>	1 x DisplayPort*	Analog RGB	Analog RGB, HDMI	Analog RGB
<b>LVDS</b>	2 x Dual Channels 24-bit LVDS*	Dual Channel 24-bit	Dual Channel 24-bit	Dual Channel 24-bit
<b>Audio</b>	Realtek® ALC269	Realtek® ALC662	Realtek® ALC662	Realtek® ALC662
<b>Ethernet port</b>	2 x GbE	1 x 10/100Mbps 1 x GbE	2 x GbE	2 x GbE
<b>Storage</b>	2 x SATA3.0	1 x Ultra ATAx SATA2.0, 1 x CF II Socket	1 x SATA2.0, 1 x CFast Socket, eMMC 4.5 (OEM request)	1 x SATA2.0, 1 x mSATA Socket
<b>Serial port</b>	6 x RS-232	3 x RS-232 1 x RS-232/422/485 selectable	2 x RS-232/485 selectable	2 x RS-232 2 x RS-232/422/485 selectable
<b>USB 2.0</b>	6	4	6	2
<b>USB 3.0/2.0</b>	2	N/A	1	1
<b>Digital I/O</b>	8-bit Programmable	16-bit DIO (8-in/8-out)	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	2 x Mini-Card Sockets (1 x Full size, 1 x Half size) 1 x Micro SIM Socket	PC/104-Plus	1 x Mini-Card Socket, 1 x micro SDXC Socket, 1 x micro SIM Socket	PC/104
<b>Power Input</b>	DC 8V - 13.2V	DC 12V, 5V	DC 12V	DC 12V, 5V
<b>Operating Temperature</b>	-20 ~ 70°C (-4 ~ 158°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)	-40 ~ 85°C <b>W</b> (-40 ~ 185°F)

**W** Wide Temperature Range      \*Choose two from three

## Slot Computing

## Industrial Motherboard



Model	HiCORE-i89Q1	HiCORE-i89Q2	ITX-i89H0	MB-i89Q0
<b>Form Factor</b>	PICMG 1.3 full size SBC	PICMG 1.3 full size SBC	Mini-ITX	Micro-ATX Motherboard
<b>Dimension</b>	338 x 126 mm	338 x 126 mm	170 x 170 mm	244 x 244 mm
<b>Processor</b>	6 <sup>th</sup> /7 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 (Socket LGA1151)	6 <sup>th</sup> /7 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 (Socket LGA1151)	6 <sup>th</sup> Gen. Intel® Core™ i3-6100E 2.7GHz Intel® Xeon® E3-1505L V5 2.8GHz / E3-1515M V5 3.7GHz	6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 (Socket LGA1151)
<b>Chipsets</b>	Q170	Q170	CM236	Q170
<b>Memory</b>	4 x DDR4 Long-DIMM Sockets	4 x DDR4 Long-DIMM Sockets	2 x DDR4 ECC SO-DIMM Sockets	4 x DDR4 Long-DIMM Sockets
<b>Graphic interface</b>	1 x DVI-I 1 x DisplayPort	1 x Analog RGB 1 x DisplayPort	1 x HDMI 2 x DisplayPort	1 x DVI-I 2 x DisplayPort
<b>LVDS</b>	N/A	N/A	N/A	N/A
<b>Audio</b>	HD Audio Link	HD Audio Link	Realtek® ALC662	Realtek® ALC269
<b>Ethernet port</b>	2 x GbE	2 x GbE	1 x GbE	2 x GbE
<b>Storage</b>	6 x SATA3.0	6 x SATA3.0	2 x SATA3.0 1 x M.2 M-key Socket	6 x SATA3.0
<b>Serial port</b>	1 x RS-232 1 x RS-232/422/485	1 x RS-232 1 x RS-232/422/485	1 x RS-232	2 x RS-232 up to 4 x RS-232 (OEM request)
<b>USB 2.0</b>	8	8	4	10
<b>USB 3.0/2.0</b>	2	2	6	4
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	N/A	N/A
<b>Expansion &amp; Serial Bus</b>	PCI / PCIe golden finger	PCI / PCIe golden finger	1 x PCIe x16 Slot 1 x M.2 E-key 1 x LPC	1 x PCI Slot 1 x PCIe x16 Slot 1 x PCIe x4 in x8 Slot 1 x PCIe x1 Slot
<b>Power Input</b>	DC 12V, 5VSB	DC 12V, 5VSB	DC12V	24-pin + 4-pin ATX power connector
<b>Operating Temperature</b>	0 ~ 60°C (32 ~ 122°F)	0 ~ 60°C (32 ~ 122°F)	-20 ~ 70°C (-4 ~ 158°F)	0 ~ 60°C (32 ~ 140°F)

## Semi-Industrial Motherboard



Model	ITX-i89QA	ITX-i89QB	ITX-i89QC	ITX-i89Q3	ITX-i91Q2
<b>Form Factor</b>	Mini-ITX	Mini-ITX	Mini-ITX	Mini-ITX	Mini-ITX
<b>Dimension</b>	170 x 170 mm	170 x 170 mm			
<b>Processor</b>	7 <sup>th</sup> /6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 / Pentium®	7 <sup>th</sup> /6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 / Pentium®	7 <sup>th</sup> /6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 / Pentium®	7 <sup>th</sup> /6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 / Pentium®	8 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 / Pentium®
<b>Socket</b>	LGA1151	LGA1151	LGA1151	LGA1151	LGA1151
<b>Chipset</b>	Intel® PCH Q170	Intel® PCH Q170	Intel® PCH Q170	Intel® PCH H110	Intel® PCH Q370
<b>Super I/O</b>	Fintek® F81768	Fintek® F81866	Fintek® F81866	Fintek® F81803U	NUVOTON® NCT6116D
<b>RAM Socket</b>	2 x DDR4 2133MHz SO-DIMM	2 x DDR4 2400MHz SO-DIMM			
<b>Max. Capacity</b>	32GB	32GB	32GB	32GB	32GB
<b>Serial Port</b>	1 x RS-232 (RJ-45 type)	2 x RS-232 2 x RS-232/422/485	4 x RS-232 2 x RS-232/422/485	4 x RS-232 2 x RS-232/422/485	4 x RS-232 2 x RS-232/422/485
<b>USB Port</b>	6 x USB 3.0/2.0 2 x USB 2.0	6 x USB 3.0/2.0 2 x USB 2.0	2 x USB 3.0/2.0 4 x USB 2.0	4 x USB 3.0/2.0 4 x USB 2.0	4 x USB 3.1 (Gen. 2) 6 x USB 3.0/2.0 2 x USB 2.0
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	1 x PCIe x16, 1 x Mini-card (half), 1 x M.2 E-key, 1 x SIM	1 x PCIe x16, 1 x Mini-card (half)	1 x PCIe x4, 1 x Mini-card (half), 1 x SIM	1 x PCIe x16, 1 x Mini-card (full), 1 x SIM	1 x PCIe x16, 1 x Mini-card(half), 1 x SIM
<b>Storage</b>	4 x SATA 600MB/s 1 x mSATA (full)	4 x SATA 600MB/s 1 x mSATA (full)	4 x SATA 600MB/s 1 x mSATA (full)	2 x SATA 600MB/s, 1 x M.2 M-key	5 x SATA 600MB/s 1 x mSATA (full)
<b>Ethernet</b>	4 x GbE	2 x GbE	2 x GbE	2 x GbE	2 x GbE
<b>Audio</b>	N/A	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out
<b>LVDS</b>	Dual Channels 24-bit	Dual Channels 24-bit	N/A	N/A	Dual Channels 24-bit
<b>Video Output</b>	1 x HDMI	1 x DVI-D 1 x HDMI, 1 x DP	3 x HDMI	1 x eDP 1 x HDMI, 1 x DP	1 x VGA 1 x HDMI, 1 x DP
<b>Power Input</b>	24-pin + 4-pin ATX power connector	24-pin + 4-pin ATX power connector	9V~ 24V DC-in jack or 2-pin internal ATX connector	24-pin + 4-pin ATX power connector	24-pin + 4-pin ATX power connector
<b>Operating Temperature</b>	0 ~ 60°C (32 ~ 140°F)	0 ~ 60°C (32 ~ 140°F)			

## Semi-Industrial Motherboard



Model	ITX-i240B	MB-i89Q8	MB-i89Q9	MB-i91Q0	MB-i91Q1
<b>Form Factor</b>	Mini-ITX	ATX	micro-ATX	ATX	micro-ATX
<b>Dimension</b>	170 x 170 mm	305 x 244 mm	244 x 244 mm	305 x 244 mm	244 x 244 mm
<b>Processor</b>	Intel® Pentium® N4200/ Celeron® N3350 Atom® x7-E3950 / x5-E3930	7 <sup>th</sup> /6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 Pentium® / Celeron®	7 <sup>th</sup> /6 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 Pentium® / Celeron®	8 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 Pentium®	8 <sup>th</sup> Gen. Intel® Core™ i7/i5/i3 Pentium®
<b>Socket</b>	BGA	LGA1151	LGA1151	LGA1151	LGA1151
<b>Chipset</b>	N/A	Intel® PCH H110	Intel® PCH H110	Intel® PCH Q370	Intel® PCH H310
<b>Super I/O</b>	NUVOTON® NCT6116D	Fintek® F71808E	Fintek® F81866A	Fintek® F81966	Fintek® F81966
<b>RAM Socket</b>	2 x DDR3L 1866MHz SO-DIMM	2 x DDR4 2133 / 1866MHz Long-DIMM	2 x DDR4 2133MHz Long-DIMM	4 x DDR4 2666MHz Long-DIMM	2 x DDR4 2666MHz Long-DIMM
<b>Max. Capacity</b>	8GB	32GB	32GB	64GB	32GB
<b>Serial Port</b>	5 x RS-232 1 x RS-232/422/485	4 x RS-232 2 x RS-232/422/485	9 x RS-232 1 x RS-232/422/485	8 x RS-232 2 x RS-232/422/485	8 x RS-232 2 x RS-232/422/485
<b>USB Port</b>	4 x USB 3.0/2.0 3 x USB 2.0	8 x USB 3.0/2.0 5 x USB 2.0	4 x USB 3.0/2.0 ports 5 x USB 2.0 ports	4 x USB 3.1 (Gen. 2) 4 x USB 3.0/2.0 4 x USB 2.0	4 x USB 3.0/2.0 ports 4 x USB 2.0 ports
<b>Digital I/O</b>	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable	8-bit Programmable
<b>Expansion &amp; Serial Bus</b>	1 x PCIe x1, 1 x Mini-card (full) 1 x SIM	1 x PCIe x16, 1 x PCIe x4, 5 x PCI, 1 x Mini-card (full), 1 x SIM	1 x PCIe x16, 1 x PCIe x1, 2 x PCI, 1 x Mini-card (full), 1 x SIM	2 x PCIe x16, 1 x PCIe x4, 1 x PCIe x1, 2 x PCI, 1 x M.2 E-key	1 x PCIe x16, 1 x PCIe x1, 2 x PCI, 1 x Mini-card (full) 1 x SIM
<b>Storage</b>	1 x SATA 600MB/s 1 x M.2 M-key	3 x SATA 600MB/s 1 x M.2 M-key	3 x SATA 600MB/s 1 x M.2 M-key	5 x SATA 600MB/s 1 x M.2 M-key	3 x SATA 600MB/s 1 x M.2 M-key
<b>Ethernet</b>	2 x GbE	2 x GbE	2 x GbE	2 x GbE	2 x GbE
<b>Audio</b>	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out
<b>LVDS</b>	Dual Channels 24-bit	N/A	N/A	N/A	N/A
<b>Video Output</b>	1 x HDMI 1 x DP	1 x VGA 1 x HDMI	1 x VGA, 1 x DVI-D, 1 x HDMI	1 x VGA, 1 x DVI-D, 1 x HDMI, 1 x DP	1 x VGA, 1 x DVI-D, 1 x HDMI, 1 x DP
<b>Power Input</b>	24-pin ATX power connector	24-pin + 8-pin ATX power connector	24-pin + 8-pin ATX power connector	24-pin + 8-pin ATX power connector	24-pin + 8-pin ATX power connector
<b>Operating Temperature</b>	0 ~ 60°C (32 ~ 140°F)	0 ~ 60°C (32 ~ 140°F)	0 ~ 60°C (32 ~ 140°F)	0 ~ 60°C (32 ~ 140°F)	0 ~ 60°C (32 ~ 140°F)

## Multi-Display Controllers



Model	IEC-3900	IEC-3901/3901-F	IEC-3902	IEC-3300	IEC-3350
<b>Dimension (W x H x D)</b>	130 x 124 x 35 mm	130 x 124 x 35 mm	130 x 124 x 35 mm	163 x 109 x 39 mm	163 x 109 x 50 mm
<b>CPU</b>	7 <sup>th</sup> Gen. Intel® Core™ i7-7600U 3.9GHz / i5-7300U 3.5GHz	AMD® Ryzen™ V1605B 3.6GHz	8 <sup>th</sup> Gen. Intel® Core™ i5-8365UE 4.1GHz / Celeron® 4305UE 2.0GHz	Intel® Celeron® N2807 2.16GHz / J1900 2.42GHz	Intel® Celeron® N3350 2.4GHz
<b>Chipsets</b>	N/A	N/A	N/A	N/A	N/A
<b>Memory</b>	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	2 x DDR4 SO-DIMM Sockets	1 x DDR3L SO-DIMM Socket	1 x DDR3L SO-DIMM Socket
<b>Video</b>	2 x HDMI	2 x HDMI	2 x HDMI	1 x VGA, 1 x HDMI	2 x DisplayPort
<b>Audio</b>	N/A	N/A	N/A	1 x Line-out	1 x Line-out & Mic
<b>Ethernet</b>	1 x GbE	1 x GbE	1 x GbE	2 x GbE	2 x GbE
<b>Mass Storage</b>	1 x M.2 M-Key	1 x M.2 M-key	1 x M.2 M-key	1 x mSATA eMMC (OEM request)	1 x M.2 M-key
<b>USB 2.0</b>	N/A	N/A	N/A	3	N/A
<b>USB 3.0/2.0</b>	4	4	4	1	4
<b>RS-232</b>	1(RJ-45)	1(RJ-45)	1(RJ-45)	1 (DB-9)	3 (1 x RJ-45, 2 x DB-9)
<b>Expansion &amp; Serial Bus</b>	N/A	N/A	N/A	1 x mPCIe (for Wi-Fi option)	1 x mPCIe (for Wi-Fi option)
<b>Power Input</b>	DC 24V	DC 24V	DC 24V	DC 12V	DC 12V
<b>Operating Temperature</b>	-40 ~ 70°C (-40 ~ 158°F)	IEC-3901: -40 ~ 40°C (-40 ~ 104°F) IEC-3901-F: -40 ~ 60°C (-40 ~ 140°F)	-40 ~ 70°C (-40 ~ 158°F)	-20 ~ 55°C (-4 ~ 131°F)	0 ~ 50°C (32 ~ 122°F)

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