

# Computer On Modules

## Accelerate Application Development with Dedicated Design-in Services

- ✓ COM Express® Basic
- ✓ COM Express® Compact
- ✓ COM Express® Mini
- ✓ Qseven
- ✓ ETX
- ✓ COM Design-in Services



- Early sample
- Total solution
- Design-in services

**ADVANTECH**

Enabling an Intelligent Planet

**COM Express**

Q S E V E N

**intel**

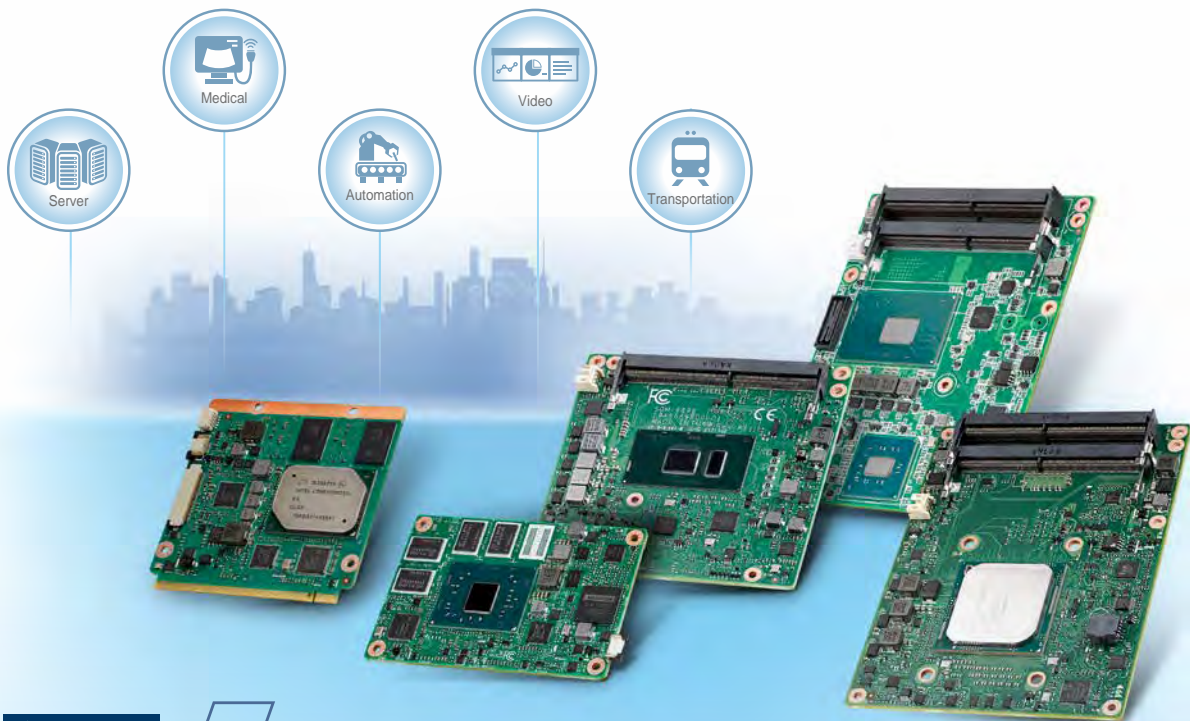
IoT Solutions Alliance Premier

COM.advantech.com

# Building up IoT applications with industrial grade Computer On Modules

The modularized computer concept has been employed for over 20 years. Advantech has always been an innovator in the development and manufacturing of high-quality, high-performance computing platforms. To help customers fast develop their core competencies, Computer On Modules (COM) reduce the time and work involved with designing new carrier boards. Advantech Computer On Module series include: COM-Express series, ETX, and Qseven, all Design-In Services support in various small form factors while supporting CPUs from the latest Intel platforms. Our solutions provide solid options for graphics-intensive, mobile, transportation, medical device, and even telecom application. Advantech seamlessly supports customers in handling the complexities of technical research at each development stage, which greatly minimizes development times.

Advantech COM Design-in Services covers all customers' questions from the design-in process and volume production, to product lifecycle management. We act as customers' in-house engineer as well as personal consultant. Customers benefit from easy selection of modules, accessories and software, all backed up by our expert-integrated team. Our complete embedded software services including BIOS, OS, remote monitoring, security solutions, and cloud services. With the Integrated IoT software and cloud platform, customers can decrease design effort and project complexity, and accelerate application development.



# Full spectrum of COM Platforms

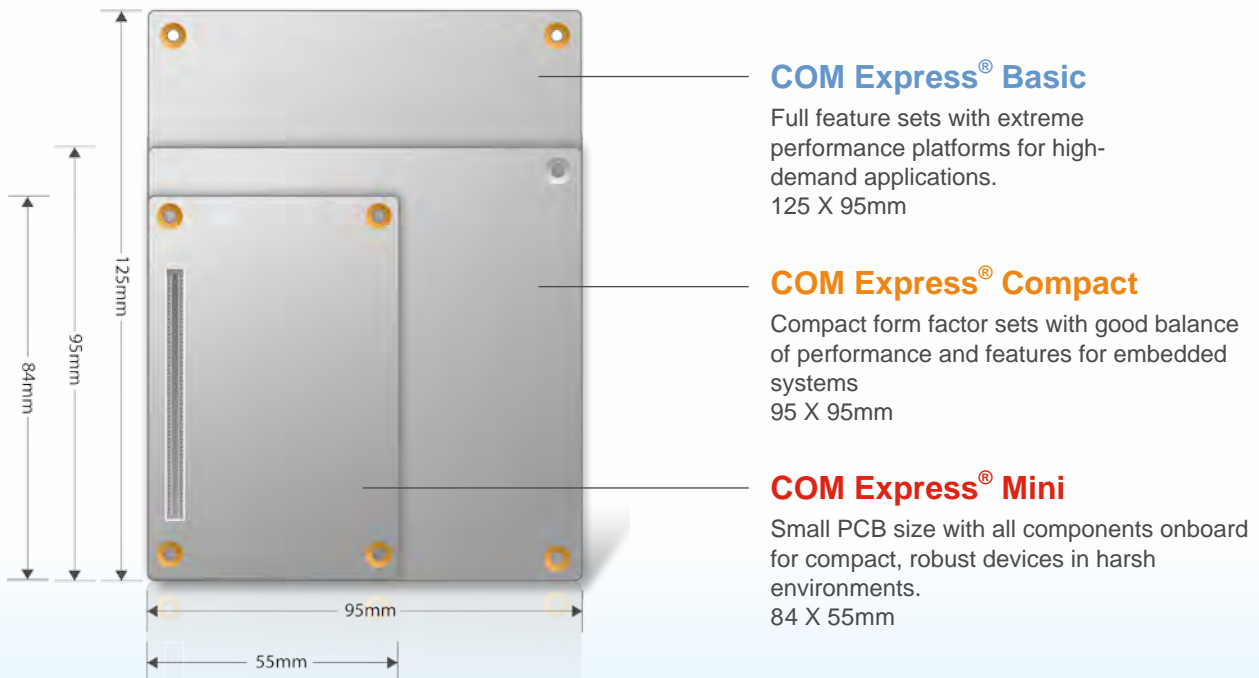
Computer-On-Module (COM), is a highly integrated board with CPU, chipset, memory, and peripherals designed into a component module. COM requires a carrier board to power up and provide expansion interfaces and I/O for use. Since the COM architecture provides various standard specifications in different form factors and pin-out types, it not only gives OEM customers flexibility to choose a suitable solution for their applications but also saves development time. The COM standard includes COM Express®, ETX and Qseven, providing a wide variety of interfaces like PCI Express, SATA, IDE, USB, DDI, etc. These standards cover electrical and mechanical compatibilities for easy replacement or upgrade, regardless of the mechanical and thermal design.

## COM Express®

COM Express® is becoming the most popular COM specification due to the latest expansion interfaces and I/O, generating various pin-out types and three different form-factors. COM Express® provides not only high-speed interfaces like HDMI/DisplayPort, PCI Express, SATA and USB 3.0 for volume data transportation, but also LVDS, VGA and LPC for legacy applications. COM Express® allows a wide-range of input power voltages in a specific form factor, which makes it more suitable for mobile, and battery-powered environments.

### Form Factor

COM Express® defines 3 different form factors:



## Functionality

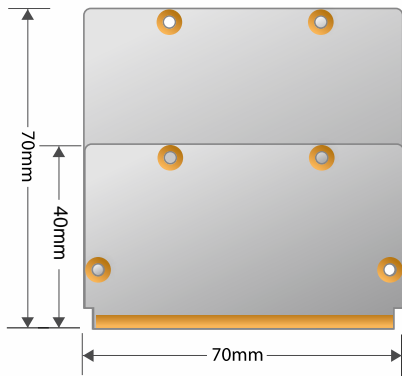
In the COM Express® R2.1 standard, there were 4 popular pin-out types that provide various features, and applied to different customer expansion or I/O requirements. Due to the emerging requirements and chipset vendors' new product portfolios aimed at entry networking, cloud storage, and micro-servers, computer-on-module standards PICMG put effort into generating a new pin-out type – type 7 to satisfy the requirements of both platform features and product applications.

Function / Interface		Type 2	Type 6	Type 7	Type 10
Display Interface	Port	1	1	-	-
	LVDS Channel A	1	1	-	1
	LVDS Channel B	1	1	-	1
	eDP (Muxed LVDS Channel A)	-	1	-	1
	DDI (HDMI/DVI/DP)	-	3	-	1
	SDVO (Muxed PEG Port)	2	-	-	-
Expansion Interface	PCI Express x16 (PEG Port)	1	1	1	-
	PCI Express x1	6	8	8	4
	PCI Bus - 32 Bit	1	-	-	-
	AC 97 / HD Audio I/F	1	1	-	1
	LPC Bus	1	1	1	1
I/O	Gigabit LAN	1	1	1	1
	10GB LAN	-	-	0 - 4	-
	NC-SI	-	-	1	-
	SATA / SAS Ports	4	4	2	2
	PATA Channel	1	-	-	-
	USB 3.0 Ports	-	4	4	2
	USB 2.0 Ports	8	8	4	8
	USB Client	1	1	-	1
	SDIO	-	1	1	1
	Serial Ports	-	2	2	2
	General Purpose I/O	8	8	8	8
System Management	SPI Bus	2	2	2	2
	SMBus	1	1	1	1
	I2C	1	1	1	1
	Watchdog Trigger Output	1	1	1	1
	Express Card Support	2	2	-	2
	Fan Control/Speed Detection	-	2	2	2
Power	Supply Voltage	12V	12V	12V	4.75 - 20V
Form Factor		All	All	All	All

## Qseven

Qseven is built with a 70 x 70mm or 70 x 40mm form factor, 1.2 mm thick PCB, 5-volt power input, power consumption limited to below 12W, and limited overall height to approximately 9.2mm from the bottom surface of module PCB to top surface of heat-spreader. These mechanical and power specifications make Qseven suitable for small form-factor, mobile or battery target applications. Qseven uses MXM as a board-to-board connector which is easily obtained and cost effective, along with proven high speed integration for PCI Express. This small module provides digital display interfaces including LVDS/eDP, HDMI/DisplayPort, expansion interface PCI Express x1, and I/O like Gigabit Ethernet, SATA, and USB3.0/2.0, etc. For size-crucial designs, Qseven provides the necessary functionality to minimize design effort for limited spaces.

### Form Factor



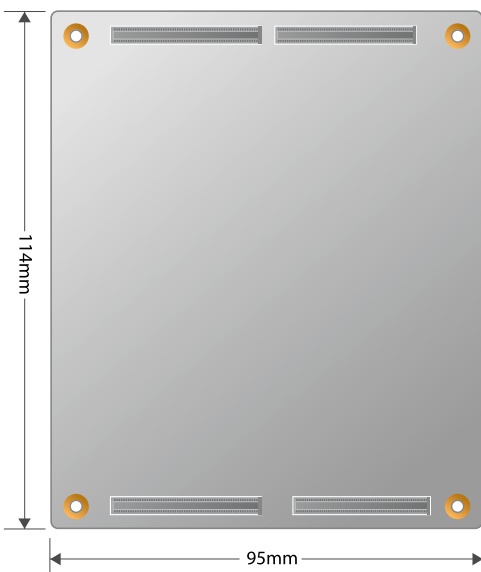
### Functionality

Function / Interface		Maximum Configuration
Display I/F	LVDS/eDP	Dual Channel 24-bit / 2 Ports
	HDMI/DP/DVI(TMDs)	1
Expansion I/F	PCI Express x1	4
	HD Audio/AC'97/I2S	1
	LPC	1
I/O	Gigabit Ethernet	1
	SATA	2
	USB3.0	2
	USB2.0	8
	SDIO	8-bit
	UART	1
	MIPI-CSI2	2 (x4, x2)
System Management	SPI Bus	1
	SMBus	1
	I2C Bus	1
	CAN Bus	1
	Watchdog Trigger	1
	Fan Control	1

## ETX

ETX is widely used in many industrial markets like automation, medical, networking, and transportation. It has a compact size of 114 x 95 mm, which makes it easy for customers to integrate, and provides legacy interfaces such as PCI, ISA, IDE, TTL/LVDS and LAN for vertical application continuity.

### Form Factor



### Functionality

Connector Location	Interfaces	Description
X1	PCI	32-bit 4 Masters
	USB2.0	4 Ports
	Audio	Line-in, Line-out, MIC
X2	ISA	16-bit data width, 16-bit I/O address
	VGA	R, G, B
X3	TTL/LVDS	TTL: 18-bit, LVDS: 2 channel 24-bit
	TV-out	CVBS or S-Video
	Serial Port	RS-232, RS-422, or RS-485 depends on carrier board design
	PS/2	Keyboard, Mouse
	IRDA	
X4	LPT/FDD	Multi-function pin selected in BIOS or boot up strapping
	IDE	2 Channel, up to 4 devices
	LAN	10/100 Mbps
	SMBus	
	I2C Bus	
	GPE/GPIO	2-bit
Onboard	WDTOUT	Watchdog trigger output
	SATA	2 Ports

# Comprehensive Design-in Services

Advantech COM Design-in Services covers all customers' questions from the design-in process to volume production, with product lifecycle management. We act as customers' in-house engineer as well as personal consultant. Customers benefit from easy selection of modules, accessories and software, all backed up by our expert-integrated team. We transform complex COM development into easy tasks so our customers can better meet new market challenges. No matter customers choose standard COM modules or full customized products, we can always satisfy our customers through the comprehensive design-in services.



## Deliver project proposal

- Technical feasibility study
- Fast/Early Sample for Customer's Investigation
- Off-the-shelf or customized product selection
- Hardware & software proposal
- Performance & power consumption comparison
- Product selection guide
- Evaluation board

## Schematic review and design document

- Schematic & layout checklist
- User's manual
- Application note
- 2D/3D mechanical model
- IP library
- Placement and layout check

## Troubleshooting and risk management

- Verification and Feasibility Testing
- Phenomenon duplication
- Analysis and suggestions
- Sequential debugging SOP
- Local FAE for on-site debug support
- BIOS & EC Customization Service

## Design-in Service for Standard Products

COM Design-in Services offer proactive services with pre-validated technology to ensure project success. There are 6 phases of design-in process from planning, design, validation, software and hardware integration, production, and longevity support. It shortens the complex procedure of developing applications which helps customers focus on their core business. With COM Design-in Service for standard products, customers can save time, cost and resources, and reduce development risks.



### Custom software and thermal solution

- Wide Temperature Design for Extreme Environments (-40 °C to +85 °C)
- Advanced thermal solution (DHCS) for high TDP products
- Customized thermal solution
- Selected software services
- Embedded peripherals integration

### Assured product quality & delivery

- Design Quality Assurance
- Product mass production
- Localized production and supports
- Customer Quality Control after delivery

### EOL & Migration

- Product change notice
- Last-time buy & last shipment
- Product migration proposal



## Full Customization Services

Under some cases, customers may find they have difficulties in carrier board design and semi system integration. Or they simply want a customized COM module for their specific applications. Advantech clearly understand the needs and expectations of our customers. With the COM customization services, customers can save their development schedule time, production cost, and their workforce, all of which ensure that customers meet time-to-market expectations.

COM customization services provide flexible integration including COM module customization, carrier board design and production, semi-system integration services, and manufacturing service. The four key solutions benefit our customers with faster time-to-market. Without wasting time on collecting resources and stock management, customers can focus on their own products and businesses.



## Four Solutions for Customization Services

### COM Module Customization Service

As an industry leader, Advantech has provided a wide range of COM modules and design-In services to customers for years. To service more vertically-focused markets and respond various requirements, we also provide customized COM service for our customers to develop multiple applications easily.

Services include:

- Advantech proven design IPs
- Design and project management
- Prototype validation
- Strict revision controls

### Semi-system Integration Service

Most customers face the problem of LCD, storage device, and Wi-Fi module integration. We provide component integration services including resource matching and integration testing that can help customers to adapt and certify devices with longevity support.

Services include:

- Validating LCD, storage with longevity support
- Certifying Wi-Fi, 3G, and Bluetooth modules
- Assembling devices on carrier board and performance testing

### Carrier Board Design and Production Services

COM customized service provides customers with comprehensive carrier board solutions, either designing a customized carrier board (ODM) based on the customer's needs, or providing a cost-effective carrier board (OEM) production service. With our help on designing and producing carrier boards, customers can focus on developing their core businesses.

Services include:

- Longevity component support
- SI, PWR, QE+QA testing of module + carrier board
- Accessory integration and assembly
- Module + carrier board functionality testing

### Manufacturing Service

Advantech has great production capacity and is able to leverage resource deployment as well as maintenance. With our advantages and experience in manufacture, we deliver cost-effective manufacturing services on time and within budget.

Services include:

- Highly effective production system
- Flexible, high temperature, burn-in testing service
- Advanced testing and inspection
- Shop-Flow control system
- Certified quality assurance systems



# Embedded Software Integration

## Intelligent Self-Management

### iManager

To fulfill the ever-changing specialized demands of various industrial applications, Advantech designed an intelligent self-management firmware agent. iManager is a built-in solution chip with a standardized API, integrating several unique platform consolidating functions needed by embedded system integrators to help improve consistency, lighten the development effort and speed-up your product's time-to-market.



## Selected Embedded OS

### Windows Embedded

Windows Embedded is a group of Microsoft operating systems that are designed to be run on embedded computer systems. We offer a ready-to-use embedded OS image that provides a complete set of components for rapid prototyping and application development.



### Linux

Linux OS is popular in the embedded market, and the fast growth of IoT is accelerating the move toward open source Linux. Advantech works with a wide range of Linux partners for integration services.



### Android

Android gives you everything you need to build best-in-class app experiences. It gives you a single application model that lets you deploy your apps broadly to hundreds of millions of users across a wide range of devices.



## WISE-PaaS IoT Software Platform

Advantech's WISE-PaaS ecosystem features a flexible and expandable architecture that facilitates the seamless integration of diverse cloud solutions and solution-ready packages (SRP). Customers can choose from a variety of solution-ready solutions, purchase a standard suite for creating unique solutions, or combine standard and purpose-built packages to customize an IoT solution according to their specific requirements and usage conditions.

### WISE-PaaS/RMM

Remote Monitoring and Management

- Centralized management
- High availability
- Sensor/device connectivity

### WISE-PaaS/OTA

Over-the-Air Software Upgrades

- Centralized update management
- Upgrade scheduling
- Rollback support

## Security, Backup and Recovery Solutions

### Intel Security

Centralizes IoT Device Security Management

- Rapid remote deployment/configuration
- Whitelisting and Application Control
- Change Control of Whitelisting



### Acronis

Backup and Recovery

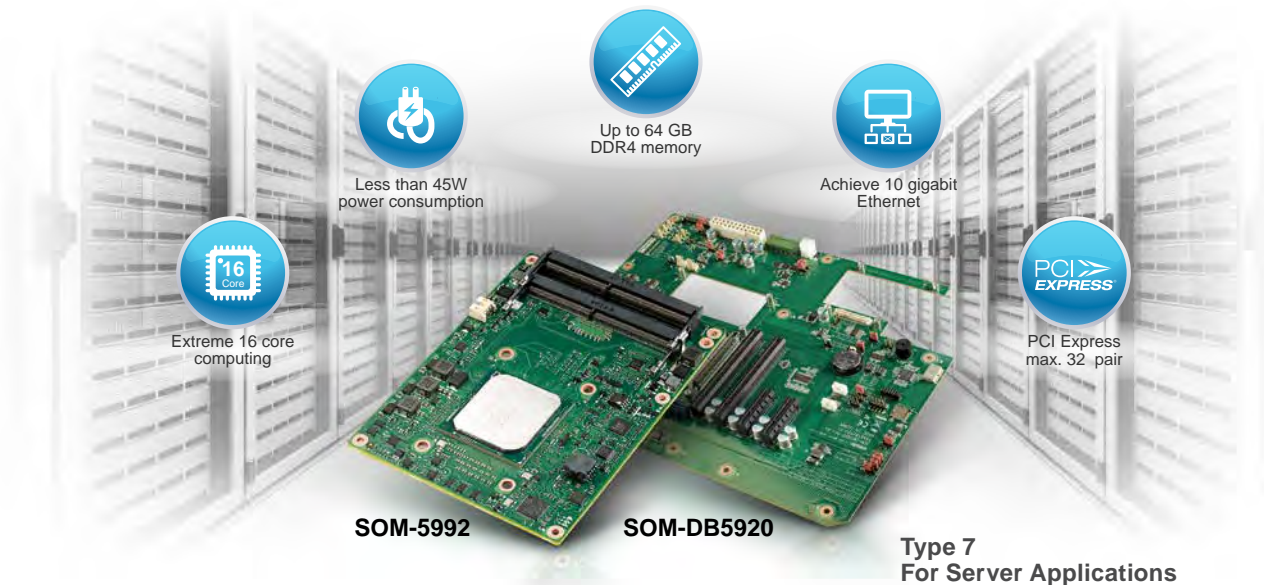
- Centralized update management
- Upgrade scheduling
- Rollback support



# Server-grade COM Express for Big Data Analysis

## Empowering Telecom and Networking Applications

Advantech SOM-5992, is the world's first COM Express powered by server-grade processor that boasts up to 16-core scalability and support maximum 64GB DDR4 memory, comes out amazing computing performance. Integrated two 10GBase-KR, it provides high bandwidth interfaces for data transmission-reception. The outstanding computing capability and low thermal design power deliver better power efficiency and make it very suitable for microservers, networking, and cloud storage.



## 64GB DDR4 Brings Out Excellent Computing Power

In the past, high-end COM Express modules usually support 32GB memory because of board size limitation. With innovative design and technology, SOM-5992 supports maximum 64GB memory capacity, it is more closed to the scenario of server application. It completely realizes the extreme performance of Intel Xeon 16 Core processor in a COM Express Basic module. This is the first COM Express designed for server and fully satisfying users who pursue maximum performance in order to process efficiently multiple and complicated tasks in the system, also thousands data exchange demand from worldwide clients. The enhanced reliability, availability and scalability, allow users easily platform upgrade, quickly integrate and benefit to hardware virtualization.

## The New PICMG COM Express Type 7

With the emerging developments in micro-server, cloud storage and entry networking equipment for big data applications, current COM Express pin-out types can no longer satisfy the expanding requirements. Advantech, as part of its role as a world leader in embedded and COM solutions, is helping generate a new pin-out type—type 7 with PICMG, which contains original comprehensive interfaces and also networking/ server oriented features. The Type 7 pinout removes display interfaces DDI replaced by 10GbE transmit-recv for high bandwidth data transmission and in addition adds 8 PCI Express lanes for data encryptions to offloading CPU.

# Compact Qseven Modules for Easy Implementation

## Low Power Consumption & Rugged Design

Advantech Qseven module is equipped with native extended temperature support, deliver superb graphics and processing performance in a compact (70 x 70 mm) ultra-low profile. With its onboard memory and onboard eMMC storage capability, Qseven is suitable for small form-factor, battery powered, and ruggedized applications infields such as industrial automation, in-vehicle, medical, military, and portable instruments. The wide temperature design can also benefit customer applications work under crucial environment more reliable.

Upgraded Graphics

Lower Cost

Low Power

Wide Temperature\*

Compact Size

**SOM-3567**    **SOM-3568**    **SOM-3569**    **SOM-DB3520**

\* Only SOM-3567 & SOM-3569 support wide temp.

## High Expansion Flexibility

Qseven integrates a rich array of I/O interfaces including PCIe, USB3.0 and USB2.0 for maximum connectivity, and LPC for legacy expansion interfaces. It also provides high bandwidth, onboard, dual-channel DDR3 for system memory, and optional onboard storage with eMMC 4.51 specifications providing integrated, rugged, space saving storage at an attractive low cost. These sufficient I/O interfaces on a highly integrated system make the Qseven ideal for portable and ruggedized applications.

## Driving Rich Media Content

Qseven supports the latest DX11.1, OpenGL 4.2, OpenGL ES 3.0, OpenCL 1.2, plus hardware acceleration for VP8, VP9 and HEVC/ H.265 codecs. In addition, it provides next-generation 4K display resolutions via various display interfaces e.g., LVDS, eDP, HDMI, and DisplayPort, and allows multiple independent content displays. Therefore, Qseven enables high-resolution playback and graphics-intensive applications without substantial CPU load.

## Minimizing Development Risk

SOM-DB3520 is a new, Qseven Rev.2.1 development board, designed in a Mini-ITX (170 x 170 mm) form factor. It features compatibility with Qseven 2.1 modules, and assists customers in emulating functions while developing their own carrier boards.

## Application Story

# Enabling Multimedia Content with Qseven Modules

Our customer is a leading presentation switcher maker who provides one of the most outstanding video processing and presentation control systems on the market, which supports swift source selection, advanced screen division, seamless switching, rich video effects and high integrated control for video presentations.

## Customer's challenges

To enhance the capability of their system they have integrated an IO expansion box to each of their presentation switcher, so that their system can support more inputs or outputs—for example, running 8 HD video feeds at the same time. Our customer required for the latest N3710 processor with 4GB DRAM and 32GB flash memory. Custom BIOS configurations and software integration are also required for the board-level solution. No board vendors can meet their quality requirements and tight timeline but Advantech, who delivered evaluation units quickly for the customer to start their development process sooner than expectation.

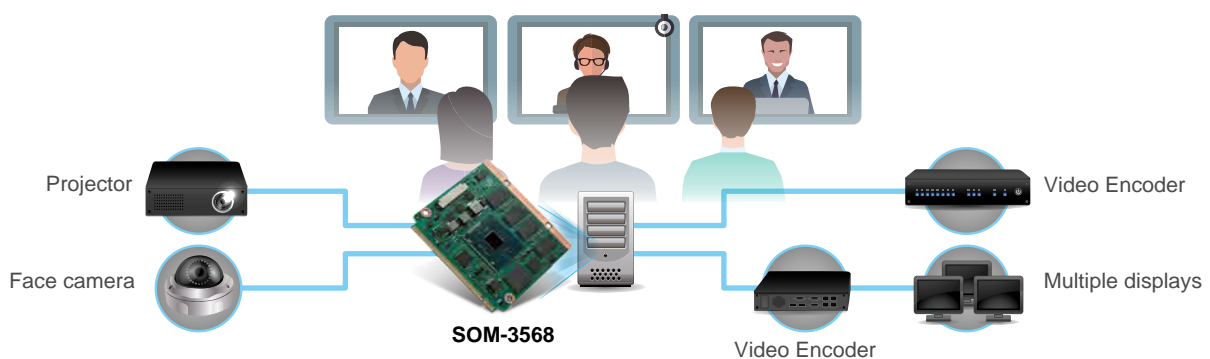
## Solution

Advantech delivered a system-on-module codenamed SOM-3568 as solution, which features a compact and simple Qseven form factor, rich I/O support, and astounding graphic capabilities with low power consumption. In terms of graphics, SOM-3568 has integrated an Intel® gen 8 graphic engine in SoC with up to 16 execution units, which provides two times the graphic performance of previous generation platforms with support for the latest DX11.1, OpenGL 4.2, OpenGL ES 3.0 and OpenCL 1.2 standards and additional hardware acceleration for VP8, VP9 and HEVC/ H.265 codecs. Therefore, though with an economic small size, SOM-3568 is able to provide next-generation 4K display resolution via multiple display interfaces, allowing for 3 simultaneous independent displays of extra high image quality.

## Conclusion

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## Application Diagram



## Application Story

# Paving the way for Virtual Reality in Business

Virtual Reality (VR) is a technology that generates a virtual interactive 3D environment with computer graphics system and a variety of interface devices. Over the past few years, the advancements in VR technology have brought forth fast increase in commercial applications and fostered a burgeoning industry chain; more and more companies are developing their VR devices to meet the soaring market demands.

## Customer's challenges

Our customer expected to develop a complete solution which includes a head display, a knapsack-type wireless processor, total body motion capture sensors, hand recognition sensors and space positioning equipment. As the VR system has to run graphics-intensive game software in move, the knapsack-type wireless processor has to deliver high computing performance and the system has to withstand constant shock and vibrations. In the past the customer had used commercial-level boards and found their inadequacy in dealing with shock and vibrations, therefore they turned to an industrial level board this time. Customized board designs are also needed to support multiple peripherals in the VR systems and our customer's purposed functions.

## Solution

To meet the customer's requirements, Advantech provided SOM-5897 as solution featuring:

**High-Performance Processor:** SOM-5897 supports Intel® 6th Gen i7 CPU, a significant upgrade in computing performance;

**Flexible Modular Design:** The modular design concept of COM modules and carrier boards makes product migration and component replacement easier and brings faster-to-market benefits to system developers;

**Flexible technology support:** The customer requires for a custom module/board that can meet their particular requirements and purposes, and Advantech provided them with a quick ODM solution while maintaining flexibility for upgrading.

## Conclusion

The burgeoning VR industry has brought new potential opportunities for COM products, with their market demand expected to be likely to burst within the next few years. Some commercial PC companies and graphics firms have also entered the competition in this field. However, to raise competitiveness the VR vendors have to design their products with distinct features and selling points, and we believe an industrial level customized board will meet their purposes better and bring more advantages in product differentiation, performance and ruggedness.

## Application Diagram



# Product Selection

NEW



NEW



Model Name		SOM-5992	SOM-5991	SOM-5897	SOM-5898
Form Factor		COM Express Basic Module	COM Express Basic	COM Express Basic	COM Express Basic Module
Pin-out Type		COM R3.0 Type 7	COM R2.1 Type 6	COM R2.1 Type 6	COM R2.1 Type 6 pin out
Processor System	CPU	Intel Xeon Processor D-1500 Product Family	Intel Xeon Processor D-1500 Product Family	6th Gen. Intel Core i7/i5/i3/Celeron/ Xeon	7th Gen. Intel Core i7/i5/i3/ Xeon
	Base Frequency	1.3 - 2.2 GHz	2.0 - 1.4GHz	2.8 - 1.9GHz	2.1 - 3.0 GHz
	Processor Core	16/12/8/6/4/2	16/8/4/2	4/2	4/2
	LLC	24/12/6/3MB	12/9/6/3MB	8/6/3MB	-
	CPU TDP	45/35/25W	45/35/25W	45/35/25W	45/35/25W
	Chipset	-	-	Intel QM170/CM236	-
Memory	Technology	DDR4 2400/2133/1866MHz	DDR4-2400	DDR4-2133	DDR4-2400
	ECC Support	ECC and non-ECC	ECC and non-ECC	ECC (Xeon only)	ECC (Xeon only)
	Max. Capacity	64GB	32GB	32GB	32GB
	Socket	4 x 260P SODIMM	2 x 260P SODIMM	2 x 260P SODIMM	2 x 260P SODIMM
Graphics	Controller	-	-	Intel® HD Graphics	Intel Gen 9 low power graphics
	Max. Frequency	-	-	1000 - 950MHz	-
	VGA	-	-	1	-
	LCD (TTL/LVDS/eDP)	-	-	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit BOM optional eDP
	DDI (HDMI/DVI/DisplayPort)	-	-	2; up to 3	2; up to 3
	SDVO	-	-	-	-
	TV-out	-	-	-	-
Expansion	Multiple Displays	-	-	3	-
	PCIe x16	1	1	1	1
	PCIe x8	-	1	-	-
	PCIe x1	7	8	8	8
	PCI Masters	-	-	-	-
Serial Bus	ISA Bus	-	-	-	-
	LPC	1	1	1	1
	SMBus	1	1	1	1
Ethernet	I <sup>2</sup> C Bus	1	1	1	1
	CAN Bus	-	-	-	-
	Gigabit Ethernet	Intel i210AT	i201AT	i219LM	Intel i219
I/O	10GB Ethernet	2	-	-	-
	Speed	10/100/1000Mbps	10/100/1000Mbps	10/100/1000Mbps	10/100/1000 Mbps
	SATA	2	4	4	4
	PATA Channel	-	-	-	-
	USB3.0	4	4	4	4
	USB2.0	4	4	8	8
	Audio	-	-	HD Audio	-
	SPI Bus	1	1	1	1
	GPIO	8	8	8	8
	SDIO (GPIO pin shared)	-	-	-	-
	Watchdog	1	1	1	1
	COM Port	2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)
	LPT/FDD	-	-	-	-
	PS/2	-	-	-	-
	IR	-	-	-	-
	Onboard Storage	-	-	-	-
	Power	TPM	Optional TPM2.0	Optional TPM2.0	Optional
Power Type		ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
Supply Voltage		Vin: 8.5-20V VSB: 4.75-5.25V	Vin: 8.5-20V VSB: 4.75-5.25V	Vin: 8.5-20V VSB: 4.75-5.25V	Vin: 8.5-20V VSB: 4.75-5.25V
Power Consumption Max.		TBD	55.6W	TBD	TBD
Environment	Power Consumption Idle	TBD	11W	TBD	TBD
	Operating Temp.	0 ~ 60° C (32 ~ 140° F)	0 ~ 60° C (32 ~ 140° F)	0 ~ 60° C (32 ~ 140° F)	0 ~ 60° C (32 ~ 140° F)
Mechanical	Dimensions	125 x 95mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")



SOM-5894	SOM-5893	SOM-5892	SOM-5890
COM Express Basic	COM Express Basic	COM Express Basic	COM Express Basic
COM R2.1 Type 6	COM R2.1 Type6	COM R2.0 Type 6	COM R2.0 Type 6
4th Gen. Intel Core i7/i5/i3/Celeron	AMD R-Series Bald Eagle	3rd Gen. Intel Core i7/i5/i3/Celeron	2nd Gen. Intel Core i7/i5/i3/Celeron
2.7-1.5GHz	2.7 - 2.2GHz	2.7-1.4GHz	2.5 - 1.4GHz
4/2	4/2	4/2/1	4/2/1
6/3/2MB	4/2MB	6/4/3/2/1MB	6/4/3/2/1.5MB
47/37/25W	35W/17W	45/35/25/17W	45/35/25/17W
Intel QM87	A77E	Intel QM77	Intel QM67
DDR3L 1600/1333	DDR3 2133 ; DDR3L 1866/1600	DDR3/DDR3L 1600/1333	DDR3 1333/1066
B1 version only	-	B1 version only	B1 version only
16GB	16GB	16GB	16GB
2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM
Intel HD Graphics	AMD Radeon HD9000	Intel HD Graphic	Intel HD Graphic
1GHz - 900MHz	686MHz	1GHz - 900MHz	1.1GHz - 800MHz
1	1	1	1
LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit
3	4	3	3
-	-	1	1
-	-	-	-
Dual/Triple	Dual/Triple/Quad	Dual/Triple	Dual
1	1(option)	1	1
-	-	-	-
7	7	7	7
-	-	-	-
-	-	-	-
1	1	1	1
1	1	1	1
1	1	1	1
-	-	-	-
Intel i217LM	Intel i211AT	Intel 82579LM	Intel 82579LM
-	-	-	-
10/100/1000Mbps	10/100/1000 Mbps	10/100/1000Mbps	10/100/1000Mbps
4	4	4	4
-	-	-	-
4	4	4	-
8	4	8	8
HD Audio	HD Audio	HD Audio	HD Audio
1	1	1	1
8	8	8	8
-	-	-	-
1	1	1	1
2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)
-	-	-	-
-	-	-	-
-	-	-	-
Optional	Optional	Optional	-
ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
Vin: 8.5-20V, VSB: 4.75-5.25V	Vin: 8.5-20V VSB: 4.75-5.25V	Vin: 11.4-12.6V, VSB: 4.75-5.25V	Vin:8.5-20V, VSB: 4.75-5.25V
41.8 Watt	39.6 Watt	41.8 Watt	42.8 Watt
8.5 Watt	16.8 Watt	5.4 Watt	9.6 Watt
0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)
125 x 95mm (4.92" x 3.74")	125 x 95 mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")

**NEW**

Model Name		SOM-6898	SOM-6897	SOM-6896	
Form Factor		COM Express Compact Module	COM Express Compact	COM Express Compact	
Pin-out Type		COM Express R2.1 Type 6 pin out	COM R2.1 Type 6	COM R2.1 Type 6	
Processor System	CPU	i7-7600U/i5-7300U/i3-7100U/ Celeron3965U	i7-6600U/i5-6300U/i3-6100U/ Celeron 3955U	i7-5650U/i5-5350U/i3-5010U/ Celeron 3765U	
	Base Frequency	2.2 - 2.8GHz	2-2.6GHz	1.8-2.2GHz	
	Processor Core	-	2	-	
	LLC	4/2 MB	4/3/2MB	4/3/2 MB	
	CPU TDP	15W	15W	15W	
Chipset	-	-	N/A		
Memory	Technology	DDR4 2133	DDR3L 1600	DDR3L 1600	
	ECC Support	Not supported	-	-	
	Max. Capacity	Up to 32GB	16GB	16GB	
	Socket	Dual channels / 2 sockets	2 x 204P SODIMM	2 x 204P SODIMM	
Graphics	Controller	Intel Gen 9 LP GT2/Intel Gen 9 LP GT2/Intel Gen 9 LP GT2/Intel Gen 9 LP GT1	Intel® HD Graphics	Intel® HD Graphics	
	Max. Frequency	100-1000MHz	1050 - 900MHz	1GHz-850MHz	
	VGA	Support up to 1920 x 1200 @ 60 Hz	Support up to 1920 x 1200 @ 60Hz	Support up to 1920 x 1200 @ 60Hz	
	LCD (TTL/LVDS/eDP)	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18-bit/24-bit	
	DDI (HDMI/DVI/DisplayPort)	1 (BOM optional 2)	1 (BOM optional 2)	2 (DDI2 for option)	
	SDVO	-	-	-	
	TV-out	-	-	-	
	Multiple Displays	Triple	Triple	Dual/Triple	
	PCIe x16	-	-	-	
Expansion	PCIe x1	PCI Express Gen3 (8.0 GT/s) 5 PCIe x1 or 4 PCIe x1 + 1 PCIe x4 (support up to 5 devices and 8 lanes)	5 Controllers, 8 Lanes	4	
	PCI Masters	-	-	-	
	PCI Masters	-	-	-	
	ISA Bus	-	-	-	
	LPC	1 (24MHz)	1 (24MHz)	1 (24MHz)	
Serial Bus	SMBus	1	1	1	
	I <sup>2</sup> C Bus	1	1	1	
	CAN Bus	-	-	-	
Ethernet	Controller	Intel i219LM	i219LM	Intel i218LM	
	Speed	10/100/1000 Mbps	10/100/1000Mbps	10/100/1000Mbps	
I/O	SATA	3 (Sku dependency)	3 (Sku dependency)	4	
	PATA Channel	-	-	-	
	USB3.0	4	4	2	
	USB2.0	8	8	8	
	Audio	-	HD Audio	HD Audio	
	SPI Bus	1	1	1	
	GPIO	8-bit GPIO	8-bit GPIO	8-bit GPIO	
	SDIO (GPIO pin shared)	-	-	-	
	Watchdog	65536 level, 0 ~ 65535 sec	65536 level, 0 ~ 65535 sec	65536 level, 0 ~ 65535 sec	
	COM Port	2 Ports (2-wire)	2 (2-wire)	2 (2-wire)	
	LPT/FDD	-	-	-	
	PS/2	-	-	-	
	IR	-	-	-	
	Onboard Storage	-	-	-	
	TPM	Optional	Optional	Optional	
	Power	Power Type	ATX: Vin, VSB; AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
		Supply Voltage	Vin: 8.5V (9V-5%) ~ 20V (19+5%); VSB: 5V ±5%	Vin: 8.5V (9V-5%) ~ 20V (19+5%); VSB: 5V ±5%	Vin: 4.75(5-5%) ~ 20V(19+5%), VSB: 5V±5%, RTC Battery: 2.0-3.3V
Power Consumption Max.		17.9W (i5-7300U)	12.81W (i3-6100U)	21.58W (i7-5650U)	
Power Consumption Idle		4.48W (i5-7300U)	2.76W (i3-6100U)	4.86W (i7-5650U)	
Environment	Operating Temp.	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	
Mechanical	Dimensions	95 x 95 mm (3.74" x 3.74")	95 x 95 mm (3.74" x 3.74")	95 x 95 mm (3.74" x 3.74")	



**NEW**


SOM-6894	SOM-6869	SOM-6868	SOM-6867
COM Express Compact COM R2.1 Type 6	COM Express Compact COM Express R2.1 Type 6	COM Express Compact COM R2.1 Type 6	COM Express Compact COM R2.1 Type 6
i7-4650U/i5-4300U/i3-4010U/ Celeron 2980U	Pentium® N4200/Celeron® N3350/Atom® x7-E3950/Atom® x5-E3940/Atom® x5-E3930	Intel Pentium N3710 Celeron N3160/ N3060/ N3010 Atom X5-E8000	Intel Atom E3800 & Celeron J1900
1.6-1.9GHz	1.1GHz/1.1GHz/1.6GHz/1.6GHz/1.3GHz	1.6 - 1.04GHz	1.33/ 2.0GHz
2	4/2	4/2	4/2
4/3/2MB	2 MB	2MB	2MB
15W	6 W/6 W/12 W/9.5 W/6/5 W	6/5/4W	6/10W
-	-	-	-
DDR3L 1600	Dual channel DDR3L 1866	DDR3L-1600	DDR3L 1333
-	-	-	-
16GB	Up to 8 GB	8GB	8GB
2 x 204P SODIMM	Dual Channels / 2 sockets	2 x 204P SODIMM	2 x 204P SODIMM
Intel HD Graphic	Intel® HD Graphics	Intel® HD Graphics	Intel HD Graphic
1.1 - 1GHz	750-550MHz	700MHz	854MHz
Support up to 1920 x 1200 @ 60Hz	1 port up to 1920 x 1200	Optional	1
LVDS 2-CH 18/24-bit	Dual Channel 18/24-bit LVDS, up to 1920 x 1200	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18-bit/24-bit up to 1920 x 1200 BOM optional eDP
2 (DDI2 for option)	Multi-independent display: Up to 3 simultaneous display (1 Internal + 2 Externals) Resolution: HDMI1.4b: 3840 x 2160 @ 30Hz DP1.2a: 4096 x 2160 @ 60Hz eDP1.4: 4096 x 2160 @ 60Hz	1 (BOM optional 2)	1 (BOM optional 2)
-	-	-	-
-	-	-	-
Dual/Triple	Dual/ Triple	Dual/ Triple	Dual
-	-	-	-
4	5 PCIe x1, configurable to x4 or x2	4 (Optional 5)	3 (Optional 4)
-	-	-	-
-	-	-	-
-	-	-	-
1	1	1	1
1	1	1	1
1	1	1	1
-	-	-	-
Intel i218LM	Intel® i210IT	i211AT	Intel i210
10/100/1000Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
4	2 ports to support SATA Gen 3 (6 GB/s)	2	2
-	-	-	-
2	2	4	1
8	8	8	8
HD Audio	HD Audio	HD Audio	HD Audio
1	1	1	1
8-bit GPIO	8-bit GPIO	8	8
-	-	-	-
65536 level, 0 ~ 65535 sec	65536 level, 0~65535 sec	65536 level, 0~65535sec	65536 level, 0~65535sec
2 (2-wire)	2	2 (2-wire)	2 (2-wire)
-	-	-	-
-	-	-	-
-	-	-	-
-	Optional TPM2.0	Optional	Optional
ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB; AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
Vin: 4.75-20V, VSB: 4.75-5.25V	Vin: 4.75V (5-5%) ~ 20V (19+10%); VSB: 5 +/-5%	Vin: 4.75-20V, VSB: 4.75-5.25V	Vin: 4.75-20V, VSB: 4.75-5.25V
22.08W(i7-4650U)	-	12.3 (N3060)	15.36 (E3845)
4.44W(i7-4650U)	-	4.7 (N3060)	9.48 (E3845)
0 ~ 60 °C (32 ~ 140 °F)	Operating Standard: 0 ~ 60° C (32 ~ 140° F), Extend: -40 ~ 85° C (-40 ~ 185° F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)
95 x 95 mm (3.74" x 3.74")	95 x 95 mm (3.74" x 3.74")	95 x 95 mm (3.74" x 3.74")	95 x 95 mm (3.74" x 3.74")

**NEW**

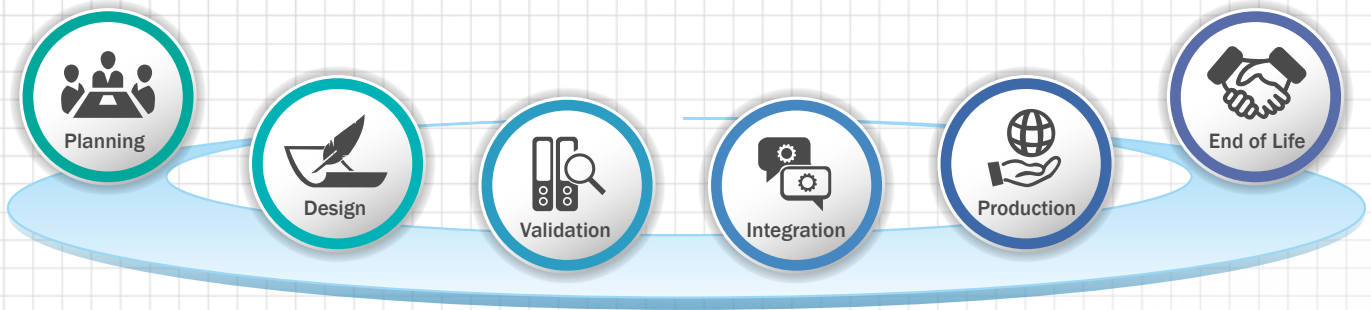
Model Name		SOM-7569	SOM-7568	SOM-7567
Form Factor		COM-Express Mini	COM Express Mini	COM Express Mini
Pin-out Type		COM R2.1 Type 10	COM R2.1 Type 10	COM R2.1 Type 10
Processor System	CPU	Atom x7-E3950/Atom x5-E3940/Atom x5-E3930/Pentium N4200/Celeron N3350	Intel Pentium N3710 Intel Celeron N3160/N3060/N3010 Intel Atom™ X5-E8000	Intel Atom E3845/E3825/E3815 Intel Celeron J1900/N2930
	Base Frequency	1.6-1.1GHz	1.6/1.04GHz	1.33~2GHz
	Processor Core	4/2	4/2	4/2/1
	LLC	2MB	2MB	2/1/512KB
	CPU TDP	12/9.5/6.5/6W	6/5/4W	10/7.5/6/5W
Memory	Chipset	-	-	-
	Technology	One channel DDR3L 1866	Dual Channel DDR3L-1600	DDR3L 1333/1066
	ECC Support	Yes	-	-
	Max. Capacity	8GB	8GB	4GB
	Socket	Onboard	Onboard	Onboard
Graphics	Controller	Intel® HD Graphics	Intel HD Graphics	Intel HD Graphics
	Max. Frequency	750-550MHz	700MHz	854MHz
	VGA	-	-	-
	LCD (TTL/LVDS/eDP)	LVDS: 1-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 1-CH 18/24-bit
	DDI (HDMI/DVI/DisplayPort)	1	1	1
	SDVO	-	-	-
	TV-out	-	-	-
	Multiple Displays	Dual	Dual	Dual
	PCIe x16	-	-	-
	PCIe x1	4 PCIe1, 1PClex4 (optional)	3 (Optional 4)	3 (Optional 4)
Expansion	PCI Masters	-	-	-
	ISA Bus	-	-	-
	LPC	1	1	1
	SMBus	1	1	1
Serial Bus	I <sup>2</sup> C Bus	1	1	1
	CAN Bus	Optional	-	-
	Ethernet	Controller Speed	Intel® i210IT 10/100/1000 Mbps	Intel® i210AT Speed 10/100/1000 Mbps
I/O	SATA	2	2 (Optional 3)	1 (Optional 2)
	PATA Channel	-	-	-
	USB3.0	2	2	1
	USB2.0	8	8	4
	Audio	HD Audio	HD Audio	HD Audio
	SPI Bus	1	1	1
	GPIO	8-bit GPIO	8	8
	SDIO (GPIO pin shared)	-	-	-
	Watchdog	65536 level, 0 ~ 65535 sec	65536 level, 0 ~ 65535 sec	65536 level, 0 ~ 65535 sec
	COM Port	2 (2-Wire)	2 (2-Wire)	2 (2-wire)
	LPT/FDD	-	-	-
	PS/2	-	-	-
	IR	-	-	-
	Onboard Storage	MLC eMMC	MLC eMMC	SLC/MLC SSD
	TPM	-	-	-
	Power	Power Type	ATX:Vin, VSB, AT:Vin	ATX: Vin, VSB, AT: Vin
Supply Voltage		ATX (Vin 4.75-20V, Vsb 4.75-5.25V) AT (Vin 4.75-20V)	Vin: 4.75-20V VSB: 4.75-5.25V	Vin: 4.75-20V, VSB: 4.75-5.25V
Power Consumption Max.		14.73W (x7-E3950)	6.99 Watt (N3700)	16.56 Watt
Power Consumption Idle		4.69W (x7-E3950)	2.64 Watt (N3700)	8.04 Watt (E3845)
Environment	Operating Temp.	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)
	Extended Temp. (Optional)	-40 ~ 85 °C (-40 ~ 185 °F)	-	-40 ~ 85 °C (-40 ~ 185 °F)
Mechanical	Dimensions	84 x 55 mm (3.3" x 2.17")	84 x 55 mm (3.3" x 2.17")	84 x 55 mm (3.3" x 2.17")

**NEW****NEW**

SOM-3569	SOM-3568	SOM-3567	SOM-4466
QSeven	Qseven	Qseven	ETX
QSeven 2.1	Qseven 2.1	Qseven 2.1	ETX 3.0
Celeron N3350/Pentium® N4200/ Atom X5-E3930/Atom X5-E3940/ Atom X7-E3950	Intel Pentium N3710 Intel Celeron N3160/N3060/N3010 Intel Atom™ X5-E8000	Intel Atom/Celeron E3800/J1900/ N2900 Series SoC	AMD G-Series T56N/T40E/T16R
1.1GHz/1.1GHz/1.3GHz/1.6GHz/ 1.6GHz	1.6 - 1.04GHz	1.91 - 1.33GHz	1G - 615MHz
4/2	4/2	4/1	1
2MB	2MB	2/1/512KB	512KB
6W/6W/6.5W/9.5W/12W	6/5/4W	10/8/6/4.3W	4.5/6.4/18W
-	-	-	AMD A55E
LPDDR4-2400	DDR3L-1600	DDR3L-1333/1066	DDR3 1066
-	-	-	-
Up to 8GB	8GB	4GB	4GB
Dual Channel / Onboard Memory	Onboard	Onboard	1 x 204P SODIMM
Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics	AMD Radeon HD6320/HD6250
750-550MHz	320-700MHz	792 - 400MHz	276MHz
-	-	-	1
LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit	LVDS 1-CH 18/24-bit TTL 1-CH 18-bit
1 DDI port supports HDMI/DP/DVI HDMI 1.4b: up to 3840 x 2160 @ 30Hz or 2560 x 1600 @ 60Hz, 24bpp DP 1.1a: up to 3840 x 2160 @ 30Hz or 2560 x 1600 @ 60Hz, 24bpp DVI: up to 1920 x 1200 @ 60Hz	2	1	-
-	-	-	-
-	-	-	-
Dual Display	Dual/Triple	Dual	Dual
-	-	-	-
3 PCIe1 (option 1 PCIe4 without LAN)	3 (Optional 4)	3 (Optional 4)	-
-	-	-	4
-	-	-	1
1	1	1	-
1	1	1	1
1	1	1	1
-	-	-	-
i211AT	i211AT	Intel® i210IT	Realtek RTL8105E
10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100 Mbps
2 Ports, Support Gen3.1 (6Gb/s) and Gen2 (3 Gb/s) or Gen 1(1.5 Gb/s)	2	2	2
-	-	-	2
2	Up to 3	1	-
5	4 (optional 5)	6	4
HD Audio	HD Audio	HD Audio	HD Audio
1	1	1	-
-	-	-	1
SD3.0	SD3.0	SD3.0	-
65536 level, 0 ~ 65535 sec	65536 level, 0 ~ 65535 sec	65536 level, 0 ~ 65535 sec	1
4-wire COM 2 Ports; optional mux with GPIO 8-bit	1 (4-wire)	1 (4-wire)	2
-	-	-	1
-	-	-	KB/MS
-	-	-	1
eMMC4.51 up to 64GB	eMMC4.51 up to 32GB	eMMC4.51 up to 32GB	mSATA socket
-	-	-	-
ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
Vin: 5V±5%, VSB: 5V±5%, RTC Battery: 2.0-3.3V	Vin: 5V±5%, VSB: 5V±5%, RTC Battery: 2.0-3.3V	Vin: 5V±5%, VSB: 5V±5%, RTC Battery: 2.0-3.3V	Vin: 4.75-5.25V, VSB: 4.75-5.25V
-	6.85 Watt	TBD	7.75 Watt.
-	3.04 Watt	TBD	6.1 Watt.
0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)	0 ~ 60 °C (32 ~ 140 °F)
-40 ~ 85 °C (-40 ~ 185 °F)	-40 ~ 85 °C (-40 ~ 185 °F)	-40 ~ 85 °C (-40 ~ 185 °F)	-40 ~ 85 °C (-40 ~ 185 °F)
70 x 70 mm (2.75" x 2.75")	70 x 70 mm (2.75" x 2.75")	70 x 70 mm (2.75" x 2.75")	114 x 95 mm (3.74" x 4.5")

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