Computer On Modules

Pioneering Technology and Design-in Service 3.0 Deliver Fast Time-to-Market

- COM Express® Basic
- COM Express® Compact
- COM Express® Mini
- Qseven
- ETX
- COM Design-in Services 3.0

ADVANTECH

Enabling an Intelligent Planet

COM Express ETX® 3.0 Long Term Support

Qseven

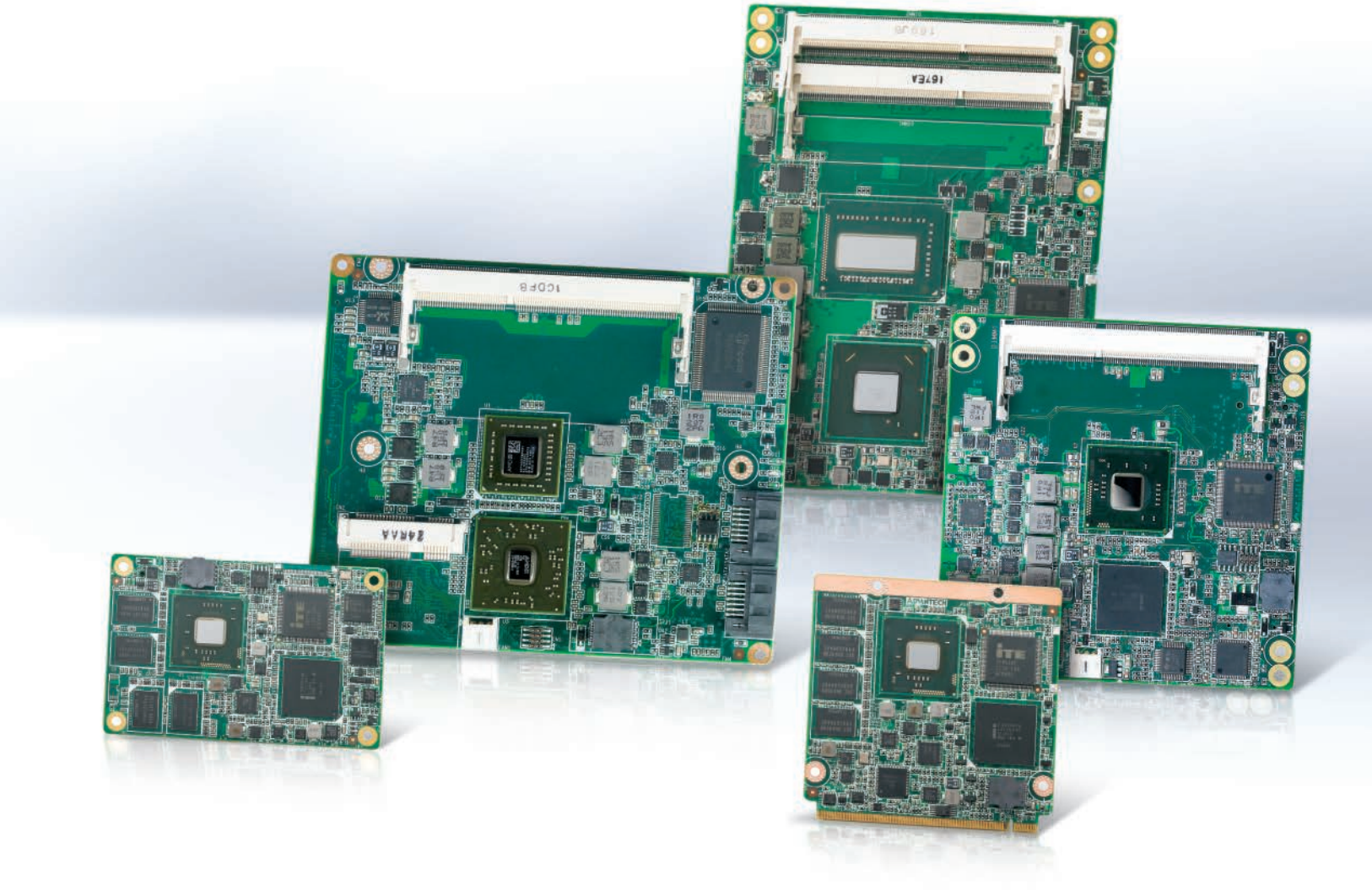
COM.advantech.com

About Advantech and COM

Founded in 1983, Advantech is a leader in providing trusted innovative embedded solutions. Advantech offers comprehensive system integration, hardware, software, customer-centric design services, and global logistics support; all backed by industry-leading front and back office e-business solutions. We cooperate closely with our partners to help provide complete solutions for a wide array of applications across a diverse range of industries. Advantech has always been an innovator in the development and manufacturing of high-quality, high-performance computing platforms, and our mission is to empower these innovations by offering trustworthy ePlatform products and services.

As a smart system integrator, knowing how to differentiate applications with faster solutions is the most important point. In a dynamic market, technical specifications keep changing. However, Computer On Modules can help you to reduce the time and work involved with designing new carrier boards. Advantech seamlessly supports you in handling the complexities of technical research at each development stage, which greatly minimizes development times. Advantech keeps developing innovative COM Design-in Service and provides scalable reliable Computer On Modules. When we stand by you, you can concentrate on your core competence.

With Advantech, there is no limit to the applications and innovations our products make possible.
For more information, visit: COM.advantech.com



Computer-On-Module Introduction

Computer-On-Module, or 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. As a result, COM is one of the most popular choices for customers to design their application-specific solutions.

Key Benefits of COM

Time-to-Market:

- Modularized design concept speeds up product development
- Immediate assistance for carrier board design

Easy Migration:

- Modularized thermal solution
- Unified electrical, mechanical properties, and software utilities

Focused Resource Allocation:

- Resources focused on carrier board design for key applications

Secured Core Knowledge:

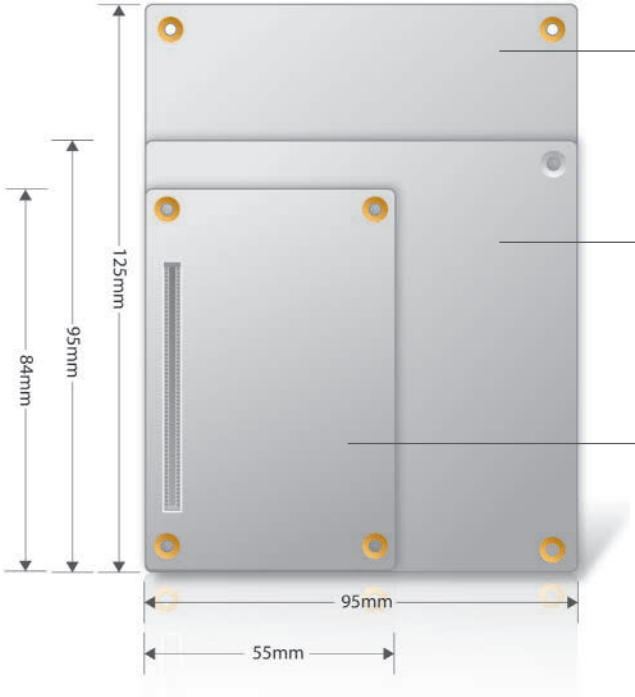
- Customer keeps domain know-how on their own carrier board

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 customers benefit from its flexibility and easy learning curve to serve a variety of applications. 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® defines 3 dimensions: - 125 x 95mm, 95 x 95mm, and 84 x 55mm - suitable from high performance, to low power designs. It also defines the PCB thickness to 2mm, onboard component height to less than 8 mm, and the total height from the bottom surface of the PCB module to the standard equipped heat-spreader top surface is 13mm. 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:



COM Express® Basic

Full feature sets with extreme performance platforms for high-demand applications.
125 X 95mm

COM Express® Compact

Compact form factor sets with good balance of performance and features for embedded systems
95 X 95mm

COM Express® Mini

Small PCB size with all components onboard for compact, robust devices in harsh environments.
84 X 55mm

Computer-On-Module Introduction

Functionality

In the COM Express® R2.1 standard, there are 4 popular pin-out types that provide various features, and apply to different customer expansion or I/O requirements.

Function / Interface		Type 1	Type 2	Type 6	Type 10
Display Interface	VGA Port	1	1	1	-
	LVDS Channel A	1	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	-
	PCI Express x1	6	6	8	4
	PCI Bus - 32 Bit	-	1	-	-
	AC'97 / HD Audio I/F	1	1	1	1
	LPC Bus	1	1	1	1
I/O	Gigabit LAN	1	1	1	1
	SATA / SAS Ports	4	4	4	2
	PATA Channel	-	1	-	-
	USB 3.0 Ports	-	-	4	2
	USB 2.0 Ports	8	8	8	8
	USB Client	1	1	1	1
	SDIO	-	-	1	1
	Serial Ports	-	-	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	2
	Fan Control/Speed Detection	-	-	2	2
Power	Supply Voltage	12V	12V	12V	4.75 - 20V
Form Factor		All	All	All	All

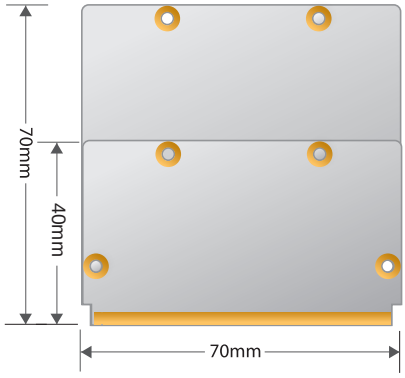
Qseven

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.

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

Form Factor



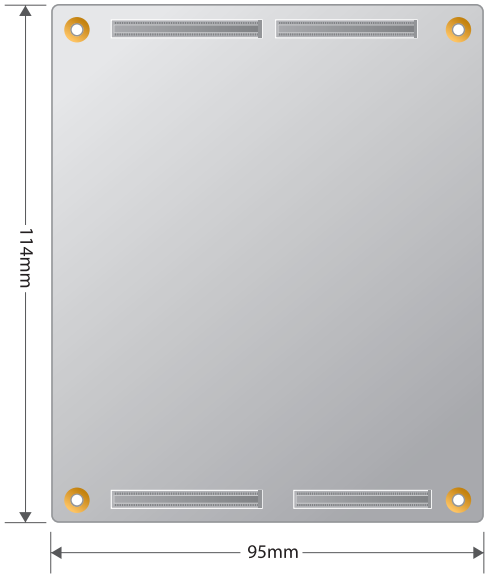
ETX

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. ETX board-to-board connectivity is robust enough for rugged conditions and only requires 5V input voltage, for easy system design. These features make ETX a widely adopted platform in many crucial, legacy-interface type applications.

Functionality

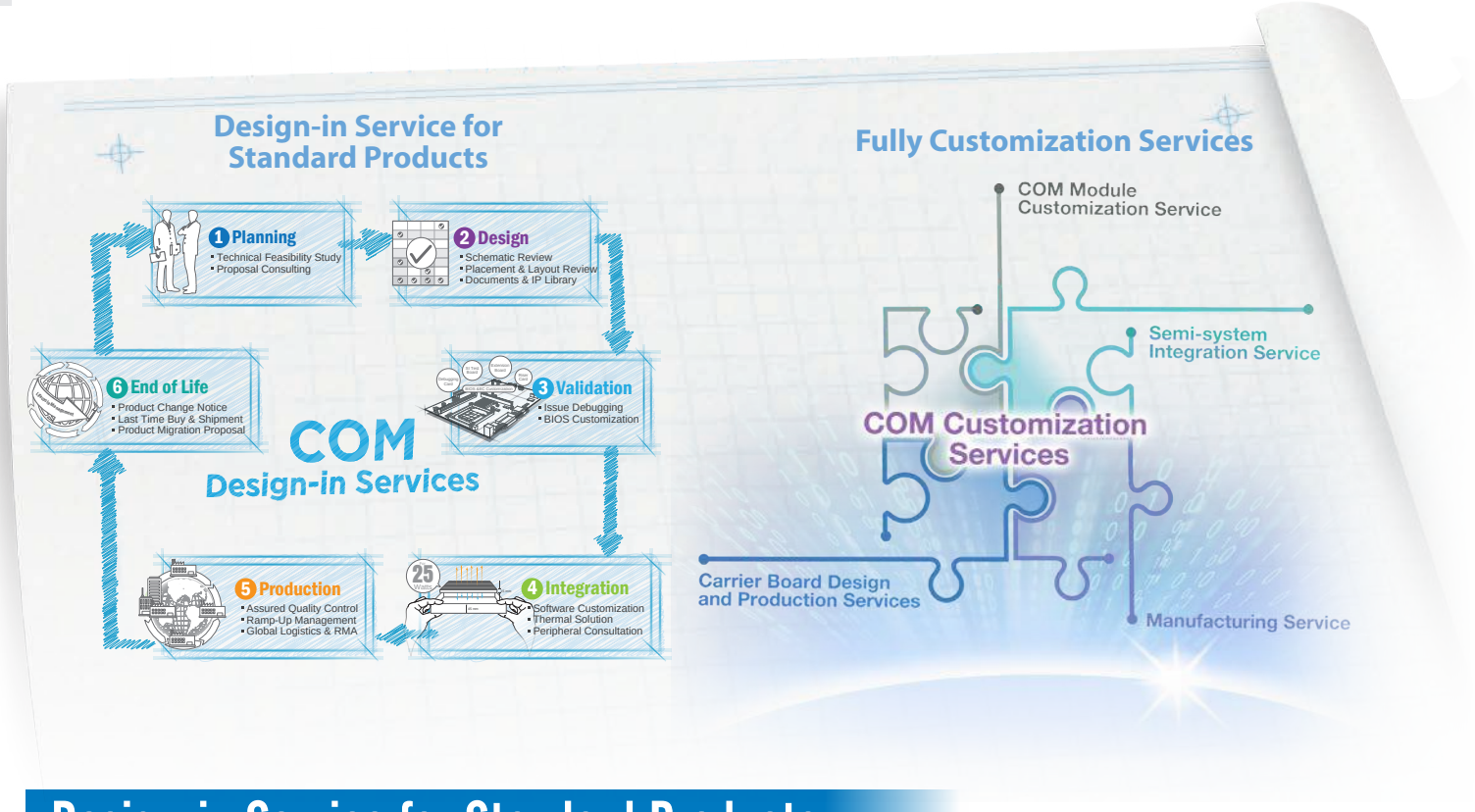
Connector Location	Interfaces	Description
X1	PCI	32-bit 4 Masters
	USB2.0	4 Ports
	Audio	Line-in, Line-out, MIC
X2	ISA	16-bit data width, 16-bit I/O address
X3	VGA	R, G, B
	TTL/LVDS	TTL: 18-bit, LVDS: 2 channel 24-bit
	TV-out	CVBS or S-Video
	Serial Port	RS-232, RS-422, or RS-485 depends on carrier board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

Form Factor



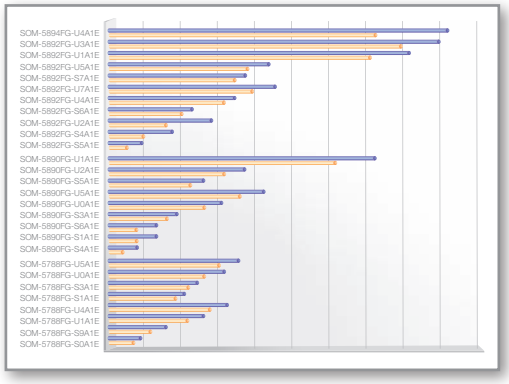
COM Design-in Services 3.0

Advantech COM Design-in Services covers all your questions from the design-in process to volume production, with product lifecycle management. We act as your in-house engineer as well as your 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. COM Design-in Service 1.0 was focused on timely response to customers' issues. Services 2.0 offered proactive services with pre-validated technology to ensure project success and life cycle management. Now, Services 3.0 not only include 6 phases of design-in process but also add 4 customization services for our customers to develop various applications.



Design-in Service for Standard Products

Phase 1: Planning | Deliver project proposal



Performance-Sandra 2009 CPU Benchmark

Consulting Services

During our client's planning phase, Advantech's integrated COM expert team provides various hardware and software suggestions for potential issues that our clients might face, such as technical specifications and schedules.

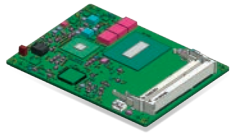
- Technical feasibility study
- Off-the-shelf or customized product selection
- Hardware & software proposal
- Performance & power consumption comparison
- Product selection guide
- Evaluation board

Phase 2: Design | Schematic review and design document

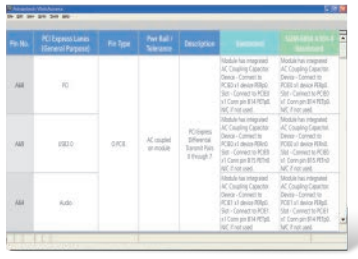
Design Documents

Advantech provides plenty of product-related information and services for designing carrier boards, such as design check lists and mechanical drawings. For details, please visit the "Download" page of the COM design support website at **Http://com.advantech.com**

- Schematic & layout checklist
- User's manual
- Application note
- 2D/3D mechanical model



3D Board Model



Schematic Checklist

IP Library

Advantech provides itsclients with a hardware design library for choosing features such as dual LVDS, TV-out solutions, second Super I/O, and smart battery. Our client reference library makes it simple to implement features on carrier boards, saving overall design and verification efforts.

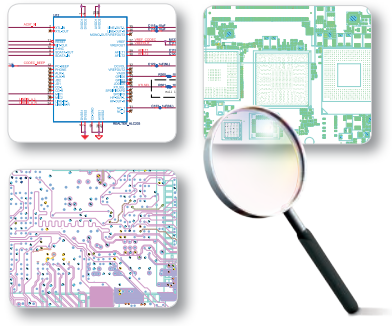
Review Service

Schematic Check

Advantech design assistance is a review service based on our clients' carrier board schematic for COM module functions. This service helps to catch design errors before they happen.

Placement/Layout Check

After the schematic review, Advantech provides a placement & layout review on our clients' carrier boards, with respect to COM module related functions. These reviews provide suggestions for improving signal quality and anticipate possible mechanical conflicts.



Phase 3: Validation | Troubleshooting and risk management

Debugging, Verification and Feasibility Testing

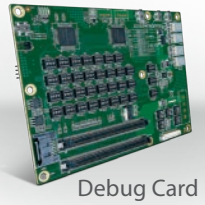
Advantech strives to deal with customers' carrier board design issues even when it cannot be there. We not only have a dedicated FAE and engineering team to help customers debug, but also provide a sequential debugging SOP and various debug cards for customers to implement self analysis.

Dedicated FAE & engineering team

- Phenomenon duplication
- Analysis and verification
- Solutions and suggestions

Customer self-analysis/debugging tools

- Sequential debugging SOP
- Debug cards



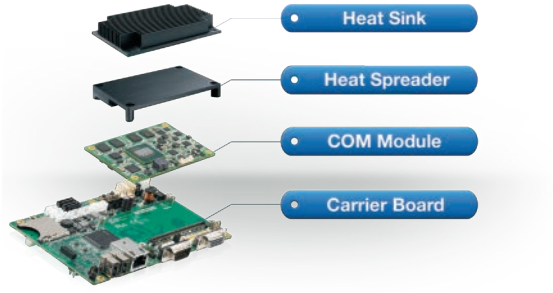
Debug Card

COM Design-in Services 3.0

Phase 4: Integration | Custom software and thermal solution

Wide Temperature Design for Extreme Environments

Customer applications that operate in harsh environments require high-reliability system designs to sustain normal functions. Particularly in industrial automation, transportation, and medical environments, systems are often exposed to extreme conditions; extreme temperatures, humidity, dust, etc., that may hamper bottom-line business success. With that in mind, Advantech provides wide temperature solutions with a range of -20 °C to +80 °C and -40 °C to +85 °C for highly demanding industrial applications. These wide temperature solutions can be used by all the Advantech COM products.



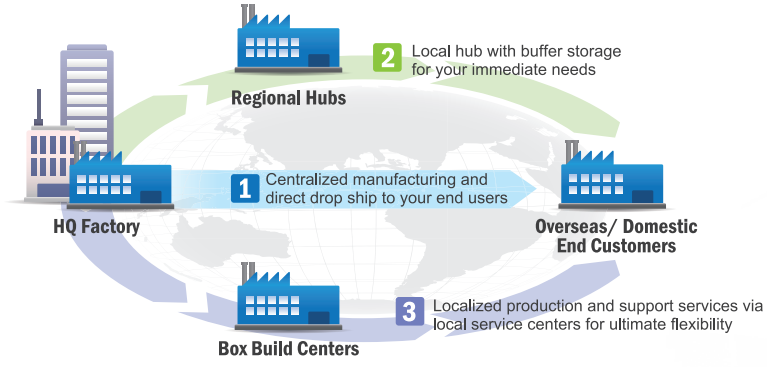
Thermal Solutions:

- Two-part thermal solution for standard products
- One-part thermal solution (DHCS) for high TDP products
- Customized thermal solution

Phase 5: Production | Assured product quality & delivery

From initial design concept to final production, Advantech helps its customers take full control of quality management. In the first stage, our "Design Quality Assurance" process ensures that New Product Introduction (NPI) is fully understood and executed by our project team before moving to the next stage. The second stage involves Advantech's core competence of product mass production.

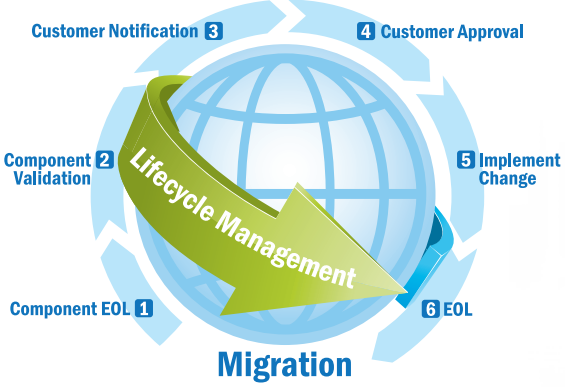
The final stage "Customer Quality Control" guarantees product satisfaction after delivery. "Time to value" weighs in our customers' requirements. As an international company with global presence, Advantech offers direct shipment from our manufacturing factories to our customers' designated locations. As a trusted consultant and partner, Advantech's global customer care services help save our customers' time and resources.



Phase 6: EOL & Migration

The market is ever changing, making today's innovative product obsolete over time. Advantech's experienced consulting team is able to give market insights to help our customers make the right decisions. When a product comes into the End-Of-Life (EOL) stage, we offer the following services:

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



Migrate to Advantech state-of-the-art COM products

Full Customization Services

Why do you need COM Customization Services

In addition to its strong design-in ability for standard COM products, Advantech has released its advanced customized service, called COM Design-in Service 3.0, in order to take care of more vertically-focused markets. With this advanced customized service, customers save time and costs on design and production of COM modules or carrier boards; they are able to focus on developing their core businesses to meet new market challenges.

Benefits of COM Customization Services

Advantech is experienced in product design and project management; we clearly understand the needs and expectations of our customers. With the new, comprehensive COM customization services, customers can save 50% of their development schedule time, 20% on production cost, and 30% on 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.

Ensuring Design Quality

Our COM Design-in Services team has long experience working with customers in integrating their proprietary-designed carrier boards with particular features, and ensuring design quality right at the development phase. Since ensuring design quality is critical, COM customization services provide a complete signal and power integrity service for customer-designed carrier boards.

Faster Time-to-Market Integration Capability

Simulation Design

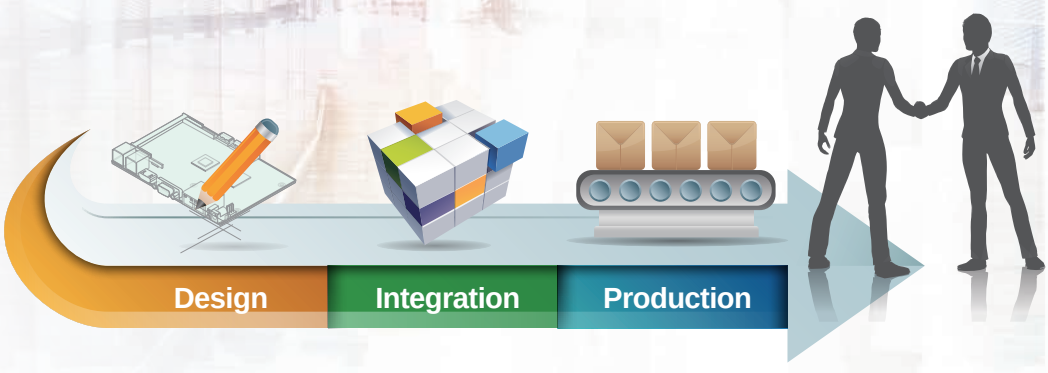
Our thermal design team can optimize system size, power consumption, and noise and vibration to extend product longevity. The design team utilizes the Computer Aided Design tool Flotherm to simulate and analyze hot-spots and air flow conditions. This provides a scientifically based scheme optimum thermal solution before the system is physically built or tooled.

Thermal Testing

IR analysis monitors a variety of processors and chipsets for significantly different heat loads across time. Takes the biggest value as the result and follows strain limits from Intel® BFI report 450 & 500 micro strain. Process included in heatsink module and assembly PCBA.

Highly Effective Production System

To ensure products meet customers' requirements and budget, we specialize in project management to deliver cost-effective manufacturing services on time and within budget.



COM Design-in Services 3.0

Four Key Solutions for Customization Service

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

Advanced Technologies

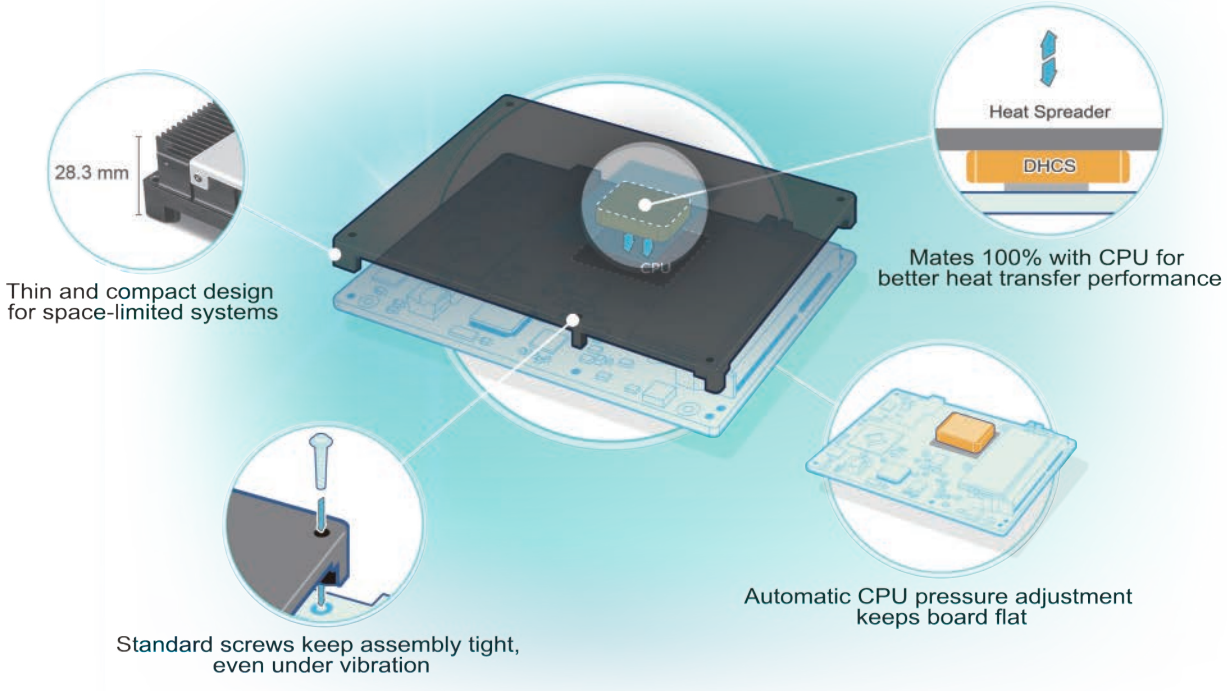
High Efficiency Thermal Solution-Dynamic Heat Conduction System (DHCS)

Advantech Innovative Thermal Solution - 20 °C Decrease

The Dynamic Heat Conduction System is an innovative technology that benefits high-computing power SOM series products. It resolves mechanical tolerance issues and makes a tight CPU to heatsink contact, while preventing board bending and CPU damage. It offers significant heat dissipation efficiency for high-power CPUs. More effective than traditional thermal modules, DHCS provides more than 20 °C temperature drop.

Key features:

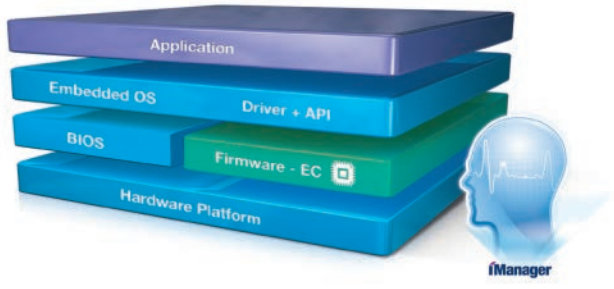
- Mates 100% with CPU for better heat transfer performance
- Automatic CPU pressure adjustment keeps board flat
- Standard screws keep assembly tight, even under vibration
- Thin and compact design for space-limited systems



Advanced Technologies

Intelligent Self-Management - iManager

To fulfill the ever-changing yet specialized demands of industrial applications, Advantech has designed an intelligent self-management tool with software control functions implemented in hardware. iManager is a built-in chip solution that provides a standardized API that integrates several unique platform consolidating functions that are needed by embedded system integrators to help improve consistency, lighten the development effort, and speed-up a product's time-to-market.



Key Benefits

OS-Independent

Cross-Platform Programming

Operates independent of any OS. iManager 2.0 runs automatically without depending on any operating system; it increases stability for managing platform resources.

Real-Time Response

Instant reaction for real-time status monitoring. iManager 2.0 source code is a built-in, onboard embedded controller, providing faster response time for processing hardware control and interrupts.

Plug & Play

Power on and run without any driver installation. iManager 2.0 works well without any software installed, easing the deployment process for developers.

Self-Management

Intelligent Resource Management

Fan speed auto adjusts based on temperature, with multi-control interfaces for peripheral devices. System health inspection includes real-time monitoring of fan speed, temperature sensors, voltages, etc.

Auto-protection & System Restore

Multi-level failover protection quickly puts systems back in service. CPU Throttling feature automatically reduces clock frequency to lower temperature, protecting the CPU from physical damage and preventing data processing errors.

Security Enhancement

Boot information and data both securely protected.

iManager Function Set

Advanced Watchdog
- Multi-level
- Programmable

Unified S/W API/ Utility
- Smart Fan
- Smart battery

Brightness Control
- Control LCD levels

Hardware Monitoring
- Voltage
- Temperature
- Fan speed

Data Security Area
- 64 Bytes for customer data
- 8 Byte key

Board Information
- Boot record
- Running hours
- Board data

Power Saving
- Deep sleep

Multi-control Interface
- I^2C
- GPIO
- SMBus

Remote Monitoring and Management - WISE-PaaS/RMM

WISE-PaaS/RMM for Remote Device Management

WISE-PaaS/RMM is a value-added intelligent management agent which transforms traditional embedded systems into intelligent systems, helping shape new business models and opportunities in COM development. Key benefits of WISE-PaaS/RMM consists of efficient remote monitoring, quick recovery & backup, and real-time remote configuration.

Key Benefits

Active Control

- Intel® Active Management Technology (AMT)
- Scheduled On/Off
- Remote KVM

Complete Protection

- System Protection
- System Recovery
- Standalone Management

Powered by Acronis intel Security

Remote Monitoring

- System Monitoring
- Alerts via SMS Gateway
- Event Logging

Multi-Platform Support

- Windows System
- Linux System

Embedded OS

Windows Embedded

We offer a ready-to-use embedded OS image that provides a complete set of components for rapid proto-typing and application development.

- Windows 7 Pro/ Ult for Embedded System, Windows embedded 8/8.1 Pro, Windows 10 IoT Enterprise LTSB
- XP Embedded, Windows Embedded Standard 2009, 7, and Windows Embedded 8 Standard
- Windows Embedded POSReady 2009,7, Windows Embedded 8/8.1 Industry Pro for Retail, and Win10 IoT Enterprise LTSB for Retail
- Windows CE4.2,5.0, 6.0, and Windows Embedded Compact 7 and 2013

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—from phones to tablets and beyond.

Wind River VxWorks

VxWorks provides you with the functionality and support you require to stay competitive. And as your platform plans evolve to take advantage of next-generation processor capabilities, we continue to stay ahead of the technology curve, continually expanding VxWorks' proficiency to extract maximum performance from the new multi-core landscape.

QNX

The QNXR NeutrinoR RTOS is a full-featured and robust OS that scales down to meet the constrained resource requirements of realtime embedded systems. Its true microkernel design and its modular architecture enable customers to create highly optimized and reliable systems with low total cost of ownership.

Application Stories

New Thermal Solution Enhances Performance in Harsh Environments

Introduction

Test equipment requires precision and high reliability, and is used widely in demanding industries such as medical, aerospace and transportation. Usually these delicate systems are designed with high-end processors that support extreme performance and collect exact test data. Since they require high computing ability in often harsh environments, thermal solution efficiency is an important factor for extreme performance.

Application Requirements and Challenges

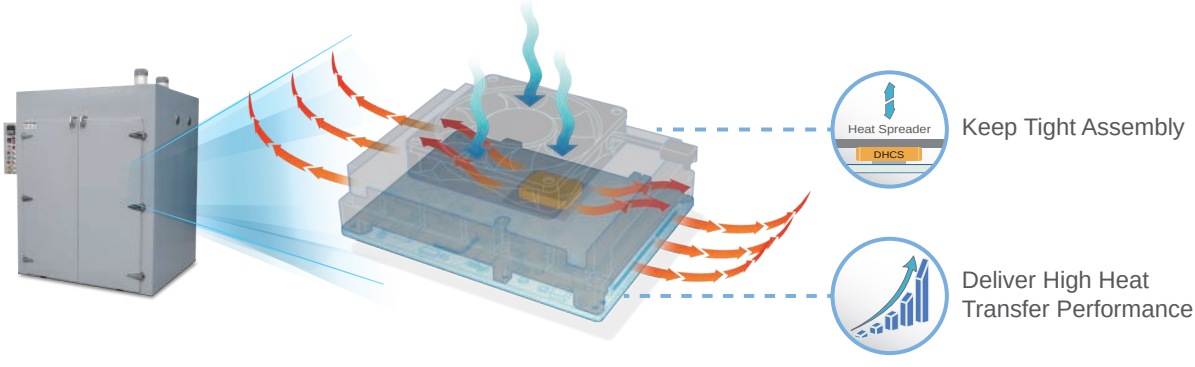
Test equipment can consist of a simple computer like a tablet or portable device, or of a complicated system with a bundle of built in test instruments. A flexible configuration was required to meet wide testing device applications for different industries. These devices needed to provide real-time signal measurements, with quick, reliable data transmission to the backend system for rapid analysis. SOM-5894 with i7-4700EQ is a 47W CPU module which provided perfect computing performance; it was deemed very suitable for this high-end test device. In this case, however, system space was very limited, and heat could only be transfered through a short, air-flow heat sink. So the customer focused on heat conduction efficiency, the crucial factor in high CPU performance. The customer's intent was to adopt their ultimate thermal solution into different systems that could easily be migrated to new generations. Because of this multi-purpose approach, there were some special challenges:

1. Top computing performance required effective heat dissipation
2. Traditional thermal modules are simple and stable, but the heat conduction path is too long
3. Ideal thermal solution should be reliable, with easy assembly and applicable to different system spaces, even portable test devices

Advantech Solution and Benefits

The new Dynamic Heat Conduction System (DHCS) thermal module was deemed suitable for this high end test equipment, especially considering that it is powered by a high TDP CPU. The DHCS resolved the customer's problems without design change, and did not require any extra assembly processes. Benefits included:

1. High CPU performance: Because we shortened the heat flow path, the DHCS could conduct heat quickly from the CPU, to the heat sink, and then into the air. CPU could run at max without throttling.
2. No vibration issue for portable devices. Since DHCS uses normal screws for assembly, there is no loosening issue if the device is moved about in most application scenarios.
3. Easy execution: DCHS is compatible with traditional thermal solutions, so assembly is easy, and does not require any extra fixtures to attach it to products. Besides, DCHS was thin enough to comply with the customer's chassis, and also suitable for a wide range of test equipment. The customer plans to use the DHCS in most of their products in the future.
4. Value-added service: If the customer requires it, Advantech can also provide the COM and thermal module pre-assembly service without design change. This can reduce the customer's working time in adopting SOM-5894 plus heat spreader.



COM Express Mini Module Enables Locomotive Remote Monitoring and Diagnostic System

Introduction

Creating this wireless transmission platform to operate between railway locomotives and their control center required a complex system design. It needed to integrate all locomotive travel logs and alerts, as well as collect, process, and transmit data between the rolling stock and the command center. Thus, a reliable partner and integrated services were important in this case.

Application Requirements and Challenges

This railway system needed to provide locomotive locations, real-time status data monitoring and fault alarms, remote diagnostics, video surveillance, statistical analysis, onboard electronic records management, information sharing, and a functional interface, as well as conducting detailed analysis by calling various specialist software packages. The operating environment was demanding. Space was at a premium as well, and the system had to remain reliable in spite of constant shaking and vibration; it also had to be fanless, yet able to function under a wide range of ambient temperatures.

Advantech Solution and Benefits

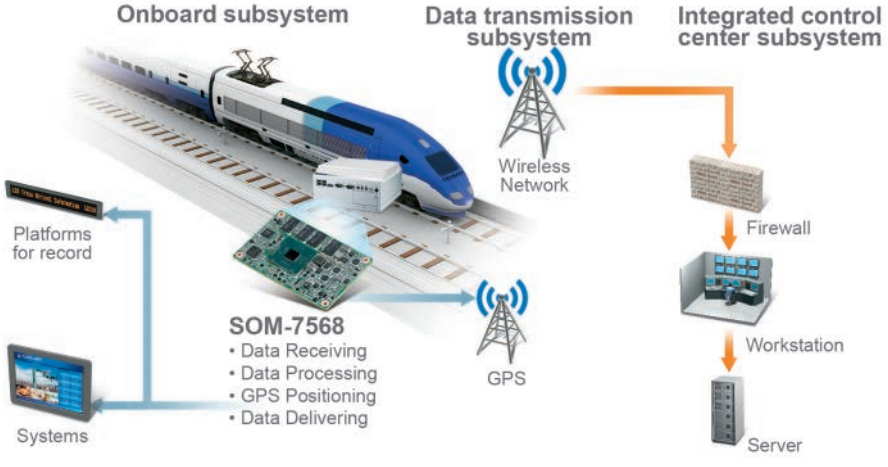
We recommended Advantech's COM Express mini to the customer. The dimensions of the SOM-7568 are 84mm x 55mm.
Other key features of SOM-7568 are:

- Intel® Pentium® and Celeron® N3000 Series SoC
- Dual Channel DDR3L 1600 non-ECC onboard memory up to 4 GB
- Supports HEVC/H.265, H.264 MPEG2 HW Decode
- Supports: LVDS/eDP, HDMI/DisplayPort/DVI
- iManager, WISE-PaaS/RMM and Embedded Software APIs

Advantages: Daylight Readability and an Easy-to-use Interface

The customer was more than satisfied by the SOM-7568, equipped with the latest Intel® Atom™ processor. Its significantly improved CPU performance fulfilled the target performance requirements. Environmental conditions in the transportation business, especially the vibration and shock encountered, demand rock-solid, dependable performance. The on-board memory and storage served by the COMe SOM-7568 high-precision connector provide outstanding shock resistance. In addition, the on-board storage capacity can be adjusted from 4GB to 32GB to suit different system requirements. As part of the COM express mini series, the SOM-7568 is about the size of a business card, with low power consumption, and it fully supports fanless cooling with no problem at all. It thrives across a wide range of temperatures, ensuring stable operation at different latitudes.

Application Diagram



Product Selection

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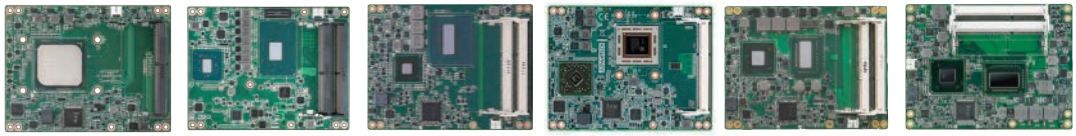

Model Name		SOM-5991	SOM-5897	SOM-5894	SOM-5893	SOM-5892	SOM-5890
Form Factor		COM Express Basic	COM Express Basic	COM Express Basic	COM Express Basic	COM Express Basic	COM Express Basic
Pin-out Type		COM R2.1 Type 6	COM R2.1 Type 6	COM R2.1 Type 6	COM R2.1 Type6	COM R2.0 Type 6	COM R2.0 Type 6
Processor System	CPU	Intel® Xeon® Processor D-1500 Product Family	6th Gen. Intel Core i7/i5/i3/ Celeron/ Xeon	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
	Base Frequency	2.0 - 1.4GHz	2.8 - 1.9GHz	2.7-1.5GHz	2.7 - 2.2GHz	2.7-1.4GHz	2.5 - 1.4GHz
	Processor Core	16/8/4/2	4/2	4/2	4/2	4/2/1	4/2/1
	LLC	12/9/6/3MB	8/6/3MB	6/3/2MB	4/2MB	6/4/3/2/1MB	6/4/3/2/1.5MB
	CPU TDP	45/35/25W	45/35/25W	47/37/25W	35W/17W	45/35/25/17W	45/35/25/17W
	Chipset	-	Intel QM170/CM236	Intel QM87	A77E	Intel QM77	Intel QM67
Memory	Technology	DDR4-2400	DDR4-2133	DDR3L 1600/1333	DDR3 2133 ; DDR3L 1866/1600	DDR3/DDR3L 1600/1333	DDR3 1333/1066
	ECC Support	Support	-	B1 version only	-	B1 version only	B1 version only
	Max. Capacity	32GB	32GB	16GB	16GB	16GB	16GB
	Socket	2 x 260P SODIMM	2 x 260P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM
Graphics	Controller	-	Intel® HD Graphics	Intel HD Graphics	AMD Radeon HD9000	Intel HD Graphic	Intel HD Graphic
	Max. Frequency	-	1000 - 950MHz	1GHz - 900MHz	686MHz	1GHz - 900MHz	1.1GHz - 800MHz
	VGA	-	1	1	1	1	1
	LCD (TTL/LVDS/eDP)	-	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit
	DDI (HDMI/DVI/DisplayPort)	-	2 Up to 3	3	4	3	3
	SDVO	-	-	-	-	1	1
	TV-out	-	-	-	-	-	-
	Multiple Displays	-	3	Dual/Triple	Dual/Triple/Quad	Dual/Triple	Dual
Expansion	PCIe x16	1	1	1	1(option)	1	1
	PCIe x1	8	8	7	7	7	7
	PCI Masters	-	-	-	-	-	-
	PCI Masters	2	-	-	-	-	-
	ISA Bus	-	-	-	-	-	-
	LPC	1	1	1	1	1	1
Serial Bus	SMBus	1	1	1	1	1	1
	I2C Bus	1	1	1	1	1	1
	CAN Bus	-	-	-	-	-	-
Ethernet	Controller	i201AT	i219LM	Intel i217LM	Intel i211AT	Intel 82579LM	Intel 82579LM
	Speed	10/100/1000Mbps	10/100/1000Mbps	10/100/1000Mbps	10/100/1000 Mbps	10/100/1000Mbps	10/100/1000Mbps
I/O	SATA	4	4	4	4	4	4
	PATA Channel	-	-	-	-	-	-
	USB3.0	4	4	4	4	4	-
	USB2.0	4	8	8	4	8	8
	Audio	-	HD Audio	HD Audio	HD Audio	HD Audio	HD Audio
	SPI Bus	1	1	1		1	1
	GPIO	8	8	8	8	8	8
	SDIO (GPIO pin shared)	-	-	-	-	-	-
	Watchdog	1	1	1	1	1	1
	COM Port	2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)
	LPT/FDD	-	-	-	-	-	-
	PS/2	-	-	-	-	-	-
	IR	-	-	-	-	-	-
	Onboard Storage	-	-	-	-	-	-
	TPM	Optional	Optional	Optional	Optional	Optional	-
Power	Power Type	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	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	Vin: 11.4-12.6V, VSB: 4.75-5.25V	Vin:8.5-20V, VSB: 4.75-5.25V
	Power Consumption Max.	TBD	TBD	41.8 Watt	39.6 Watt	41.8 Watt	42.8 Watt
	Power Consumption Idle	TBD	TBD	8.5 Watt	16.8 Watt	5.4 Watt	9.6 Watt
Environment	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)	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 95 mm (4.92'' x 3.74")	125 x 95mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")

NEW

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SOM-6897	SOM-6896	SOM-6894	SOM-6868	SOM-6867	SOM-6765
COM Express Compact	COM Express Compact	COM Express Compact	COM Express Compact	COM Express Compact	COM Express Compact
COM R2.1 Type 6	COM R2.1 Type 6	COM R2.1 Type 6	COM R2.1 Type 6	COM R2.0 Type 6	COM R2.0 Type 2
6th Gen. Intel Core i7/i5/i3/Celeron U-Series	Intel 5th Generation Core i Processor	4th Gen. Intel Core i7/i5/i3/Celeron (U-Processor Line)	Intel® Pentium®/Celeron® N3000 Series and Atom™ SoC	Intel Atom E3800 & Celeron J1900	Intel Atom D2550/N2600/ N2800
2.6 - 2.0GHz	1.9-2.2GHz	1.9 - 1.6GHz	1.6 - 1.04GHz	1.91/ 2.0GHz	1.86 - 1.6GHz
2	2	2	4/2	4	2
4/3/2MB	4/3/2 MB	4/3/2MB	2MB	2MB	1MB
15W	15W	15W	6/5/4W	10W	10/6.5/3.5W
-	N/A	-	-	-	Intel NM10
DDR3L-1600	DDR3L 1600 MHz	DDR3L 1600/1333	DDR3L-1600	DDR3L 1333	DDR3 1066/800
-	-	-	-	-	-
16GB	16GB	16GB	8GB	8GB	4GB/2GB
2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM	2 x 204P SODIMM	1 x 204P SODIMM
Intel® HD Graphics	Intel® HD Graphics	Intel HD Graphic	Intel® HD Graphics	Intel HD Graphic	Intel GMA3650/3600
1050 - 900MHz	1GHz-850MHz	1.1 - 1GHz	700 MHz	688MHz	640 - 400MHz
1	1	1	1	1	1
LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18-bit/24-bit	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18-bit/24-bit	D Series: LVDS 1-CH 18/24-bit N Series: LVDS 1-CH 18-bit
1 Up to 2	2 (DDI2 for option)	-	1 BOM optional 2	2	2
-	-	2 (DDI 2: Optional)	-	-	-
-	-		-	-	
3	Dual/Triple	Dual/Triple	3	Dual	Dual
-	-	-	-	-	-
5 Controllers, 8 Lanes	4	4	5	3	2 (Optional 4)
-	-	-	-	-	4
-	-	-	-	-	-
-	-	-	-	-	-
1	1 (24MHz)	1	1	1	1
1	1	1	1	1	1
1	1	1	1	1	1
-	-	-	-	1	-
i219LM	Intel i218LM	Intel i218LM	i211AT	Intel i210	Intel 82583V
10/100/1000Mbps	10/100/1000Mbps	10/100/1000Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
3 (Sku dependency)	4	4	2	2	2
-	-	-	-	-	1
4	2	2	4	1	-
8	8	8	8	8	8
HD Audio	HD Audio	HD Audio	HD Audio	HD Audio	HD Audio
1		1	1		1
8	8	8	8	8	8
-	-	-	SD3.0	-	-
1	1	1	1	1	1
2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)	2 (2-wire)	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	1 (option)	-
Optional	Yes	-	Optional	-	-
ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	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: 4.75-20V VSB: 4.75-5.25V	Vin: 4.75-20V, VSB: 4.75-5.25V	Vin: 4.75-20V VSB: 4.75-5.25V	Vin: 4.75-20V VSB: 4.75-5.25V	Vin: 11.4-12.6V, VSB: 4.75-5.25V
TBD	21.9W	21.7W	TBD	TBD	10.3 W
TBD	3.3W	4.4W	TBD	TBD	7.06 W
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)	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")	95 x 95 mm (3.74'' x 3.74")	95 x 95 mm (3.74" x 3.74")

Product Selection

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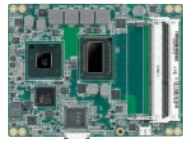


Model Name		SOM- 7568	SOM-7567	SOM-7565	SOM-5790	SOM-9890
Form Factor		COM Express Mini	COM Express Mini	COM Express Mini	COM Express Basic	COM Express Basic
Pin-out Type		COM R2.1 Type 10	COM R2.1 Type 10	COM R2.1 Type 10	COM R2.0 Type 2	COM R2.0 Type 6
Processor System	CPU	Intel Pentium N3700/N3710 Intel Celeron 3160/N3060/N3010 Intel Atom™ X5-E8000	Intel Atom E3845/E3825/E3815 Intel Celeron J1900/N2930	Intel Atom N2800/N2600	2nd Gen. Intel Core i7/i5/i3/Celeron	3rd Gen. Intel Core i7/i5/i3/Celeron
	Base Frequency	1.6/1.04GHz	1.33~2GHz	1.86 - 1.6 GHz	2.5 - 1.4GHz	2.7-2.2GHz
	Processor Core	4/2	4/2/1	2	4/2/1	4/2
	LLC	2MB	2/1/512KB	1MB	6/4/3/2/1.5MB	6/3/2MB
	CPU TDP	6/5/4W	10/7.5/6/5W	6.5/3.5W	45/35/25/17W	45/35W
	Chipset	-	-	Intel NM10	Intel QM67	Intel QM77
Memory	Technology	Dual Channel DDR3L-1600	DDR3L 1333/1066	DDR3 1066/800	DDR3 1333/1066	DDR3/DDR3L 1600/1333
	ECC Support	-	-	-	-	-
	Max. Capacity	8GB	4GB	4GB/2GB	16GB	16GB
	Socket	Onboard	Onboard	Onboard	2 x 204P SODIMM	2 x 204P SODIMM
Graphics	Controller	Intel HD Graphics	Intel HD Graphics	Intel GMA3650/3600	Intel HD Graphic	Intel HD Graphic
	Max. Frequency	320-700MHz	792-854MHz	640 - 400MHz	1.1GHz - 800MHz	1GHz - 900MHz
	VGA	-	-	-	1	1
	LCD (TTL/LVDS/eDP)	LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 1-CH 18/24-bit	LVDS 1-CH 18-bit	LVDS 2-CH 18/24-bit	LVDS 2-CH 18/24-bit
	DDI (HDMI/DVI/DisplayPort)	1	1	1	-	3
	SDVO	-	-	-	1	1
	TV-out	-	-	-	-	-
	Multiple Displays	Dual	Dual	Dual	Dual	Dual/Triple
Expansion	PCIe x16	-	-	-	-	1
	PCIe x1	3	3 (Optional 4)	3 (Optional 4)	5	7
	PCI Masters	-	-	-	4	-
	ISA Bus	-	-	-	-	-
	LPC	1	1	1	1	1
Serial Bus	SMBus	1	1	1	1	1
	I2C Bus	1	1	1	1	1
	CAN Bus	-	Optional	-	-	-
Ethernet	Controller	Intel® i210AT	Intel i210E	Intel 82574L	Intel 82579LM	Intel 82579LM
	Speed	Speed 10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000Mbps	10/100/1000Mbps
I/O	SATA	2	1 (Optional 2)	1 (Optional 2)	4	4
	PATA Channel		-	-	1	-
	USB3.0	2	1	-	-	4
	USB2.0	8	4	8	8	8
	Audio	HD Audio	HD Audio	HD Audio	HD Audio	HD Audio
	SPI Bus	1	1	1	1	1
	GPIO	-	8	8	8	8
	SDIO (GPIO pin shared)	-	-	-	-	-
	Watchdog	1	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	-	SLC/MLC SSD	SLC/MLC SSD	-	-
	TPM	-	-	-	-	Optional
Power	Power Type	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
	Supply Voltage	Vin: 4.75 (5-5%) ~ 20V (19+5%), VSB: 5V±5%, RTC Battery: 2.0-3.3V	Vin: 4.75-20V, VSB: 4.75-5.25V	Vin: 4.75-20V, VSB: 4.75-5.25V	Vin: 11.4-12.6V, VSB: 4.75-5.25V	Vin: 11.4-12.6V, VSB: 4.75-5.25V
	Power Consumption Max.	7.29 Watt	16.56 Watt	8.64 Watt.	40.1 Watt	41.8 Watt
	Power Consumption Idle	3.05 Watt	8.04 Watt (E3845)	6.96 Watt.	11.4 Watt	4.7 Watt
Environment	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)	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 55mm (3.3" x 2.17")	125 x 95mm (4.92" x 3.74")	125 x 95mm (4.92" x 3.74")

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SOM-3568	SOM-3567	SOM-3565	SOM-4466	SOM-4455
Qseven	Qseven	Qseven	ETX	ETX
Qseven 2.0	Qseven 2.0	Qseven R1.2	ETX 3.0	ETX 3.0
Intel Pentium N3710 Intel Celeron N3160/N3060/N3010 Intel Atom™ X5-E8000	Intel Atom/Celeron E3800/J1900/N2900 Series SoC	Intel Atom N2600	AMD G-Series T56N/T40E/T16R	AMD LX800
1.6 - 1.04GHz	1.91 - 1.33GHz	1.6GHz	615MHz-1G	500MHz
4/2	4/2	2	1	1
2MB	2/1MB	1MB	512KB	128KB
6/5/4W	10/8/6/4.3W	3.5W	4.5/6.4/18W	3.6W
-	-	Intel NM10	AMD A55E	AMD CS5536
DDR3L-1600	DDR3L-1333/1066	DDR3 800	DDR3 1066	DDR 400/333
-	-	-	-	-
8GB	4GB	2GB	4GB	1GB
Onboard	Onboard	Onboard	1 x 204P SODIMM	1 x 200P SODIMM
Intel® HD Graphics	Intel® HD Graphics	Intel GMA3600	AMD Radeon HD6320/HD6250	AMD LX800
320-700MHz	792 - 400MHz	400MHz	276MHz	-
-	-	-	1	1
LVDS 2-CH 18/24-bit BOM optional eDP	LVDS 2-CH 18/24-bit	LVDS 1-CH 18-bit	LVDS 1-CH 18/24-bit TTL 1-CH 18-bit	LVDS 1-CH 18/24-bit TTL 1-CH 18-bit
2	1	1	-	-
-	-	-	-	-
-	-	-	-	-
Dual/Triple	Dual	Dual	Dual	Dual
-	-	-	-	-
3 (Optional 4)	3 (Optional 4)	3 (Optional 4)	-	-
-	-	-	4	4
-	-	-	1	1
1	1	1	-	-
1	1	1	1	1
1	1	1	1	1
-	-	-	-	-
i211AT	I211IT	Intel 82574L	Realtek RTL8105E	Realtek RTL8100CL
10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100 Mbps	10/100Mbps
2	2	Up to 2	2	2
-	-	-	2	2
Up to 3	1	-	-	-
4 (optional 5)	6	8	4	4
HD Audio	HD Audio	HD Audio	HD Audio	Line-in/Line-out/MIC
1	1	1	-	-
-	-	8	1	1
SD3.0	SD3.0	-	-	-
1	1	1	1	1
1 (4-wire)	1 (4-wire)	1 (2-wire)	2	2
-	-	-	1	1
-	-	-	KB/MS	KB/MS
-	-	-	1	1
eMMC4.51 up to 32GB	eMMC4.51 up to 32GB	SLC/MLC SSD	mSATA socket	CF socket
-		-	-	-
ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin	ATX: Vin, VSB, AT: Vin
Vin: 4.75-5.25V VSB: 4.75-5.25V	Vin: 4.75-5.25V VSB: 4.75-5.25V	Vin: 4.75-5.25V, VSB: 4.75-5.25V	Vin: 4.75-5.25V, VSB: 4.75-5.25V	Vin: 4.75-5.25V, VSB: 4.75-5.25V
6.85 Watt	TBD	7.8 Watt.	7.75 Watt.	10.05 Watt.
3.04 Watt	TBD	4.9 Watt.	6.1 Watt.	9.0 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)	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)	-20~80 °C (-4~176 °F)
70 x 70 mm (2.75" x 2.75")	70 x 70 mm (2.75" x 2.75")	70 x 70mm (2.75" x 2.75")	114 x 95 mm (3.74" x 4.5")	114 x 95 mm (3.74" x 4.5")

COM Solutions and Services

- Faster Time-to-Market
- Flexible to Customer Demands

- Simplify System Design Complexity
- Enhance System Reliability

- Time and Resources Saving
- Quality Assurance

Regional Service & Customization Centers

China
Kunshan
86-512-5777-5666

Taiwan
Taipei
886-2-2792-7818

Netherlands
Eindhoven
31-40-267-7000

Poland
Warsaw
48-22-33-23-730

USA
Milpitas, CA
1-408-519-3898

Worldwide Offices

Greater China

China	800-810-0345
Beijing	86-10-6298-4346
Shanghai	86-21-3632-1616
Shenzhen	86-755-8212-4222
Chengdu	86-28-8545-0198
Hong Kong	852-2720-5118
Taiwan	0800-777-111
Neihu	886-2-2792-7818
Xindian	886-2-2218-4567
Taichung	886-4-2329-0371
Kaohsiung	886-7-229-3600

Asia Pacific

Japan	0800-500-1055
Tokyo	81-3-6802-1021
Osaka	81-6-6267-1887
Korea	080-363-9494
Seoul	82-2-3663-9494
Singapore	
Singapore	65-6442-1000
Malaysia	1800-88-1809
Kuala Lumpur	60-3-7725-4188
Penang	60-4-537-9188
Indonesia	
Jakarta	62-21-751-1939
Thailand	
Bangkok	66-2-248-3140
India	1800-425-5071
Pune	91-20-3948-2075
Bangalore	91-80-2545-0206
Australia	1300-308-531
Melbourne	61-3-9797-0100
Sydney	61-2-9476-9300

Europe

Europe	00800-2426-8080
Germany	
Münich	49-89-12599-0
Hilden/ D'dorf	49-2103-97-885-0
France	
Paris	33-1-4119-4666
Italy	
Milano	39-02-9544-961
Benelux & Nordics	
Breda	31-76-5233-100
UK	
Reading	44-0118-929-4540
Poland	
Warsaw	48-22-33-23-740/741
Russia	8-800-555-01-50
Moscow	7-495-644-0364
St. Petersburg	7-812-332-5727

Americas

North America	1-888-576-9668
Cincinnati	1-513-742-8895
Milpitas	1-408-519-3898
Irvine	1-949-420-2500
Mexico	1-800-467-2415
Mexico	52-55-6275-2777
Brazil	0800-770-5355
São Paulo	55-11-5592-5355

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