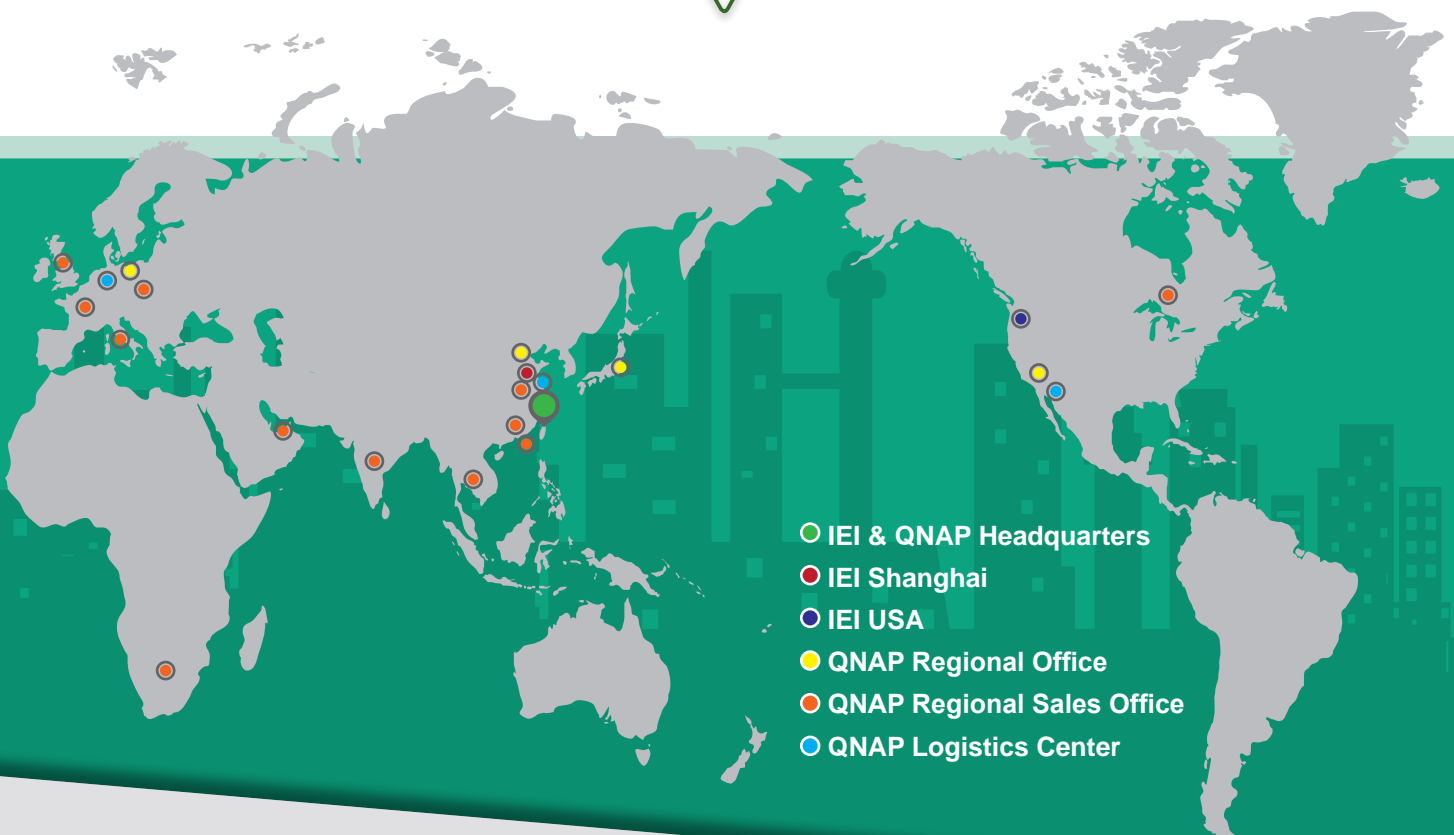# IEI Group

IEI Group has 20 offices in 14 countries. IEI is alliance with Intel, Microsoft, Wind River, SAP and Amazon to offer a complete intelligent system with various options, including kinds of hardware devices supporting different operating systems, multiple applications, private/hybrid/public cloud computing and data storage/security for developing integrated solutions, collaborating new applications and expanding the markets.

IEI Integration Corp.

Industrial Integrated IoT Solution Provider

ArmorLink SH Corp.

Leading Network Attached Storage Provider

MOTORCON INC.

Leading Automation System Products Provider

XINGWEI COMPUTER CO., LTD.

Professional Chassis Manufacturer

QNAP Systems, Inc.

Leading Network Attached Storage Provider

BriteMED Technology Inc.

Intelligent Medical System Provider

iEi GROUP 威強電集團

20 Offices in 14 Countries

- ○ IEI & QNAP Headquarters
- ● IEI Shanghai
- ● IEI USA
- ● QNAP Regional Office
- ● QNAP Regional Sales Office
- ● QNAP Logistics Center

iEi × QNAP

IEI Integration Corp. cooperates with its group company QNAP System Inc. to provide great service and technologies in both hardware and software. The upgraded services and the complete smart solutions enable our customers to easily achieve win-win business success.

iEi

Leading industrial computer provider

- Solid experience in a wide range of technologies and vertical know-how
- Support from concept to finished goods
- Specializes in IoT gateway, embedded system, panel PC, image capture and cloud based applications
- Meets market expectations by supplying a complete portfolio of computer-based applications

QNAP®

Leading network attached storage provider

- Innovative software development and IoT integration applications
- Complete portfolio from development and hardware design to manufacturing
- Global market allocation
- 1000+ employees worldwide

| Smart Transport | Smart Factory | Smart Healthcare | Smart Retail | Building Automation | Smart Fitness |

Best-in-Class Design and Service

➤ Custom engineering

IEI has extended its system assembly line to provide solutions that best fit customers' needs. Our assembly lines and logistics services have the flexibility to fulfill a wide variety of customer specifications and requirements.

Being the top brand in the IPC industry, all IEI staffs devote themselves to provide the highest quality service through global management and advanced technology.

➤ Global service

As a leading IPC provider, IEI offers prompt, localized services to customers worldwide. IEI has a global network of over 100 distributors in Europe, Asia and North America to provide quick service and achieve fast response time. From new sales inquiries to ongoing technical support, IEI's localization strategy is backed by our strong technical and logistical support team. Having forged strong relationships with our distributors, their support expertise and technical knowledge of IEI products are readily accessible to IEI customers worldwide. IEI has warehouses in Shanghai and the US which offer comprehensive system integration hardware, software, customer-driven services and global logistics support.

➤ Design

IEI's R&D team has years of experience in designing and developing professional software, hardware, mechanical and system integration. Our extensive experience covers nearly every product line in the IPC field and enables us to provide outstanding OEM/ODM services. We guarantee a successful and timely product development experience. The research and development team at IEI is focused on bringing successful products to our clients.

Successful projects include:
- Mobile PCs for police car video recording applications
- Medical certified devices for Medical vital sign monitoring & Medical gateway devices
- Companion Robot for Home care and interactive applications

reddot design award winner 2016

reddot award 2017 winner

BC AWARD

ICT Month Innovative Elite 2015 Top 100 Awards

DESIGN AWARD

TAIWAN EXCELLENCE 2017

1▶ IEI Quality Assurance

All IEI embedded industrial products have been rigorously tested in the quality assurance and compliance laboratory at IEI headquarters. To provide the customer with peace of mind, IEI has invested over two million dollars into developing state of the quality assurance and compliance testing facilities. IEI products are put through ten different quality assurance and compliance tests to ensure our embedded industrial products can withstand a variety of harsh operational environments.

Direct customer benefits of our comprehensive quality assurance and compliance testing procedures include:
- High quality products and customer peace of mind
- Maximum product durability
- Long term product reliability
- Less downtime due to failed components
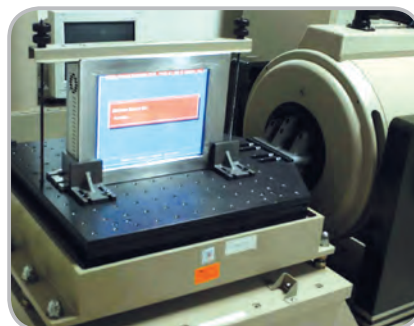
2▶ Thermal Testing

Infrared thermography detects infrared energy emitted from an object, converts it in to a temperature, and displays an image of the temperature distribution.
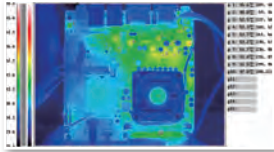
➡ Testing results

IEI SBCs operate with minimum difference in surface temperatures on separate sections of the board. Better temperature control guarantees more reliable long term system operation.

-40°C   85°C
Extreme Environment

Better temperature control guarantees more reliable system operation in the long run.
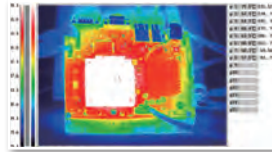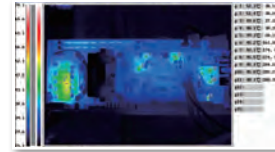
NIPPON
Neo Thermo TVS-700

Mini-ITX SBC   EPIC SBC   3.5" SBC   PICMG 1.3 SBC

3▶ All New Heat Sink Design

Heat sink design and selection are critical. Heat sink performance depends on many variables including air temperature and air flow rate in the immediate vicinity of the heat sink, the strength of other heat conduction paths through components and the board, the contact resistance between the heat sink and the component it is attached to and the radiation path from the heat sink to a cooler surface, among other things. Heat sinks can also have a significant effect on electromagnetic fields. A heat sink that works well in one application may be virtually useless in another.

➡ IEI heat sink features

1. Good aerodynamics

IEI heat sinks allow air to flow easily and rapidly through the cooler and reach all the cooling fins. This feature is important for heat sinks with many thin fins.

3. Good mounting method

For good thermal transfer, the pressure between the heat sink and the heat source must be high. IEI heat sink clips provide increased pressure at the heat sink's contact area and are easy to install.

20mm

IEI P/N:34000-000357-RS

2. Perfect flatness of the contact area with IEI new close flatness technology

A heat sink's contact area must be perfectly flat. A flat contact area allows the use of a thinner layer of thermal compound that reduces the thermal resistance between the heat sink and the heat source.
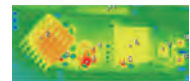
4. Good thermal transfer within the heatsink

IEI heat sinks are designed for efficient thermal transfer from the heat source to the fins.

4▶ Reliability Always Matters

Comprehensive quality assurance tests are performed on all IEI products throughout the product development cycle. Quality assurance tests are initiated in the research and development phase of a product and continued all the way to the manufacturing phase. Quality assurance testing throughout the product development cycle ensures that IEI products are able to provide stable performance in the industrial environments they are used.

Safety Testing   Vibration Testing   Thermal Testing   Power Consumption Testing
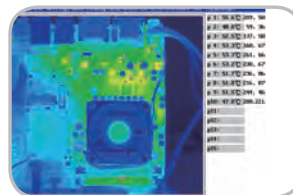
Drop Testing   IP 65 Testing   Temperature Testing   ESD Testing

5 ▶ Real-Time Power Consumption Test

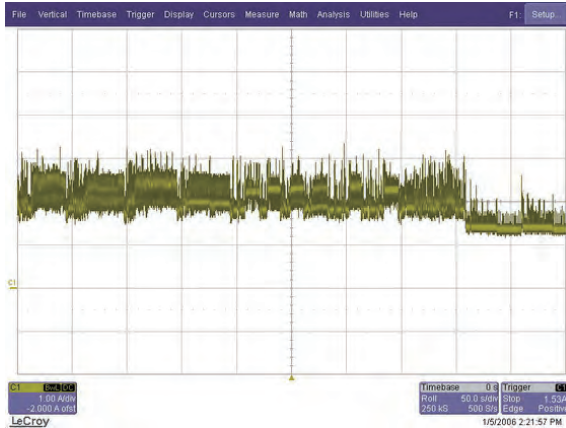Meeting stringent power budgets is essential for attaining system performance and cost goals. Low power enables higher clock frequency, higher reliability, better noise margins and reduced operational costs. All IEI products have passed strict power consumption tests. Complete power consumption details are listed on the product datasheets.

Power Consumption

Voltage	3.3V	5V	5VSB	12V
Current	0.93A	2.99A	0.02A	6.88A

System Configuration

CPU	i7-6700K 4.0GHz	HDD	1TB
Memory	DDR4-2133 16GB	O.S.	Windows 8.1 64bit

◆ Power Consumption
3.3V@ 0.93A, 5V@2.99A, 12V@6.88A, 5VSB@0.02A (Intel® Core™ i7-6700K 4.0GHz CPU with 16GB (two 8GB) 2133 MHz DDR4 memory)

6 ▶ Product Compliance Testing

IEI has more than 400 products used in a wide variety of applications and environments worldwide. In order to develop time-to-market products that comply with safety, EMC certification and environmental directives across the globe, IEI has three certification-compliant labs including an EMI/RF chamber, EMI chamber and semi-anechoic room. IEI's new IEC 651 class 0 level semi-anechoic room can perform ISO 3745 and ISO 7779 standard acoustics experiments. These labs are essential to help ensure the safety of our products as well as reducing costs and improving the quality of our products and services.
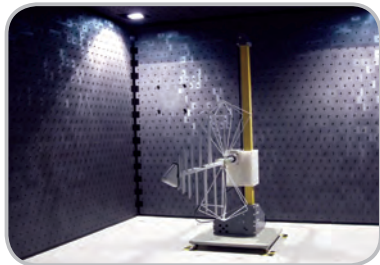
EMI Chamber

Semi-anechoic Room

EMI / RF Chamber

7 ▶ Flexibility Customization Service

- **Sheet metal shell manufacturing**
- **Sheet metal component processing**
- **Metal sheet punch, laser cutting, folding and welding**
- **Liquid painting**
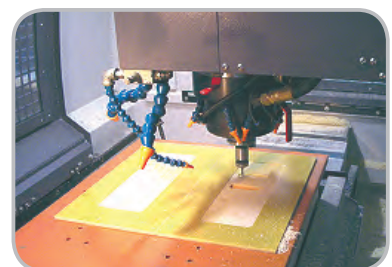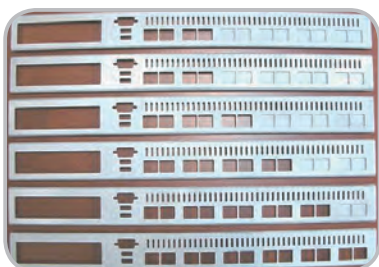
Total Platform Solutions

▶ IEI SBC Product Lines

Product Line	Specifications		Product Name
Full-Size SBC	PICMG 1.3	PCI + PCIe (Server Grade)	SPCIE-xxxx (Server Grade)
		PCI + PCIe (Graphic Grade)	PCIE-xxxx (Graphic Grade)
	PICMG 1.0	PCI+ISA	WSB-xxxx
			ROCKY-xxxx
Half-Size SBC	Half-Size SBC	PCIe	HPCIE-xxxx
		PCI + PCIe	PICOe-xxxx
		PCI + ISA	PCISA-xxxx
		Pure-ISA	IOWA-xxxx
Industrial Motherboard	ATX	305mm x 244mm	IMBA-xxxx
	Micro ATX	244mm x 244mm	IMB-xxxx
	Mini-ITX	170mm x 170mm	KINO-xxxx
Embedded Motherboard	5.25"	203mm x 146mm	NOVA-xxxx
	EPIC EPIC	165mm x 115mm	NANO-xxxx
	3.5"	146mm x 102mm	WAFER-xxxx
	Pico-ITX	100mm x 72mm	HYPER-xxxx
	PC104/PCI-104	95mm x 95mm	PM-xxxx
Computer On Module	COM Express	Type 6, 7, 10	ICE-xxxx
	Qseven	Rev. 2.0	IQ7-xxx

▶ AMD Solutions

AMD

| Chipset	Full Size	Half-Size	Main Board	Embedded Board					CPU Module		
		ISA		Mini ITX	5.25"	EPIC	3.5"	Pico-ITX	COM Express	PC104	Q7
R-Serier				gKINO-DMF KINO-DA750-i2 KINO-AA750-i2							
G-Series SoC				KINO-SE-i2 KINO-KBN-i2		NANO-SE-i1 NANO-KBN-i1	WAFER-KBN-i1	HYPER-KBN		PM-LX PM-LX2	
LX		IOWA-LX				NANO-LX	WAFER-LX/WAFER-LX2				

▶ Intel® Solutions

Innovation fulfills many different needs. Customers can easily select products by form factor, platform, or even main chipset provider. Meet market demands with our large selection of products.

intel IoT Solutions Alliance

Segment	Chipset	Full Size			Half-Size				Main Board		Embedded Board					CPU Module		
		PICMG 1.3	PICMG 1.0	PICMG 1.3	PCI/PCIExpress	PCI/ISA	PCI	ISA	ATX	Micro ATX	Mini ITX	5.25"	EPIC	3.5"	Pico-ITX	COM Express	PC 104	Q7
Server	D1500								IMBA-BDE							ICE-BDE-T7		
	C604								IMBA-C604EP									
	C236	SPCIE-C236		HPCIE-C236					IMBA-C2360-i2									
	C226	SPCIE-C2260-i2							IMBA-C2260-i2									
	C216	SPCIE-C2160																
	C206								IMBA-C2060									
Desktop	Q370								IMBA-Q370									
	Q170	PCIE-Q170		HPCIE-Q170					IMBA-Q170-TB3 IMBA-Q170-i2		KINO-AQ170							
	H110								IMBA-H110	IMB-H110	KINO-DH110							
	Q87	PCIE-Q870-i2							IMBA-Q870-i2	IMB-Q870-i2	KINO-AQ870							
	H81	PCIE-H810	WSB-H810						IMBA-H810	IMB-H810-i2	KINO-DH810							
	Q77								IMBA-Q770	IMB-Q770								
	Q67	PCIE-Q670							IMBA-Q670	IMB-Q670								
	B65				PICOe-B650													
	H61	PCIE-H610	WSB-H610						IMBA-H610	IMB-H610A/B	KINO-DH610 KINO-AH611 KINO-AH612							
	Q57	PCIE-Q57A																
Mobile	QM170/CM236										KINO-DCM236 KINO-DQM170							
	ULT4													WAFER-ULT4				
	ULT3										tKINO-ULT3		NANO-ULT3	WAFER-ULT3		ICE-ULT3		
	ULT2													WAFER-ULT2				
	ULT													WAFER-ULT				
	QM87										KINO-DQM871		NANO-QM871-i1			ICE-QM871		
	HM85																	
	QM77										KINO-QM770		NANO-QM770			ICE-QM770		
	NM70																	
	QM67										KINO-QM670							
	HM65				PICOe-HM650								NANO-HM650 NANO-HM651					
	QM57										KINO-QM57A							
	HM55										KINO-HM551							
Atom	N3350/N4200/E3900 Series (SoC)										KINO-DAL 1KINO-AL		NANO-ALW2	WAFER-AL				iQ7-AL
	N3000 series (SoC)										tKINO-BW			WAFER-BW	HYPER-BW			
	J1900/N2930/E3800 series (SoC)		WSB-BT			PCISA-BT					eKINO-BT KINO-ABT-i2 KINO-DBT		NANO-BT-W2 NANO-BT-i1	WAFER-BT-W2 WAFER-BT-i1	HYPER-BT	ICE-BT-T10 ICE-BT-T6	PM-BT	iQ7-BT-W2 iQ7-BT
	D2550/NM10 (ICH10R)										KINO-CV-D25501		NANO-CV-D25501 NANO-CV-D25502			ICE-CV-D25501 ICE-CV-D25502		
	D525/ICH8M		WSB-PV-D5251	PICOe-PV-D5251	PCISA-PV-D5251						KINO-PV-D5252	NOVA-PV-D5251	NANO-PV-D5251 NANO-PV-D5252	WAFER-PV-D5252			PM-PV-D5251	

▶ Base Board Solutions

COM Express	Q7
ICE-DB-T10/ICE-DB-T7-i2/ICE-DB-T6R/ICE-DB-T6	iQ7-DB-MATX/iQ7-DB-MITX

New Products in Red

Mustang-200 Accelerate to the Future

Multiple Applications & Tasking

iEi × QNAP

Mustang-200 (6)
Mustang-200 (5)
Mustang-200 (4)

Mustang-200 (1)
- Micro-Server 1-1 — Big data computing
- Micro-Server 1-2 — Face recognition

Mustang-200 (2)
- Micro-Server 2-1 — License plate identification
- Micro-Server 2-2 — Content encryption

Mustang-200 (3)
- Micro-Server 2-1 — Video transcoding
- Micro-Server 2-2 — Live Streaming

➽ **Intelligent, Versatile, Dense Computing Accelerator for standard servers and cloud networks.**

In the era of information explosion, various digital services such as over-the-top (OTT), multiple-system operator (MSO), content delivery network (CDN), SaaS providers are faced with shortage of computing resources. These service providers need more computing power that is large and strong enough to cope with enormous amount of information, data, audio and video, etc.

In the past, in the absence of space constraints, we will increase the number of servers to deal with huge amounts of data, but the space is still limited.

In the limited space, we can only use FPGA expansion cards or GPU expansion cards to increase the performance of the server. However, these cards often have only one single function and are lack of flexibility. The only one solution is to create an intelligent, versatile, dense computing accelerator.

Therefore, Mustang-200 is born!

Video Transcoding/ Live Streaming
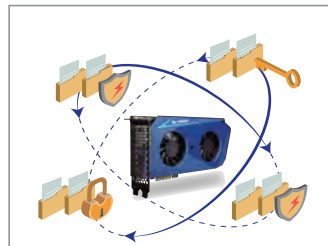
Numerous File Encryption/Decryption
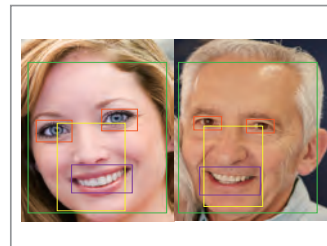
Numerous Face Analysis

Numerous Car Plate Analysis

Accelerator Card Comparison

	General Purpose GPU	Fixed Function HW (ASIC , FPGA)	Flexible Accelerator (CPU, x86 architecture)
Multiple Applications & Tasking	No	No	Yes 🏅
Flexibility	Low	Low	High 🏅
Power Consumption	High	Low	Low 🏅
Development Cost	High	High	Low 🏅

▶ Mustang-200 Overview

➠ 10Gbps Network Based x86 Computing Accelerator

● 10 Gigabit Ethernet based x86 computing nodes support decentralized computing architecture

● Perfectly integrated QNAP QTS-Lite provides a flexible and secure developing environment

● Support virtualization technology, virtual machine (VM) & container technology

● Fit standard server, compatible with PCI-Express x4, x8, x16

● Increase computing power without changing or adding servers

● Achieve higher densities computing and lower the total cost

➠ Mustang-200 Block Diagram

Every CPU on the Mustang-200 is accompanied with 16GB (2 x 8GB) RAM and an Intel® 600P series 512GB NVMe SSD. Once installed in a PCIe x4 slot, the host computer will be connected to both computing nodes on the Mustang-200 with 10GbE networks. The advantage of utilizing network-based structures is that no proprietary hardware is needed thus a lower cost is achieved. The computing nodes are powered by QTS-Lite, a lightweight version of QNAP's award-winning QTS operating system, and the eMMC component will serve as storage for QTS-Lite.
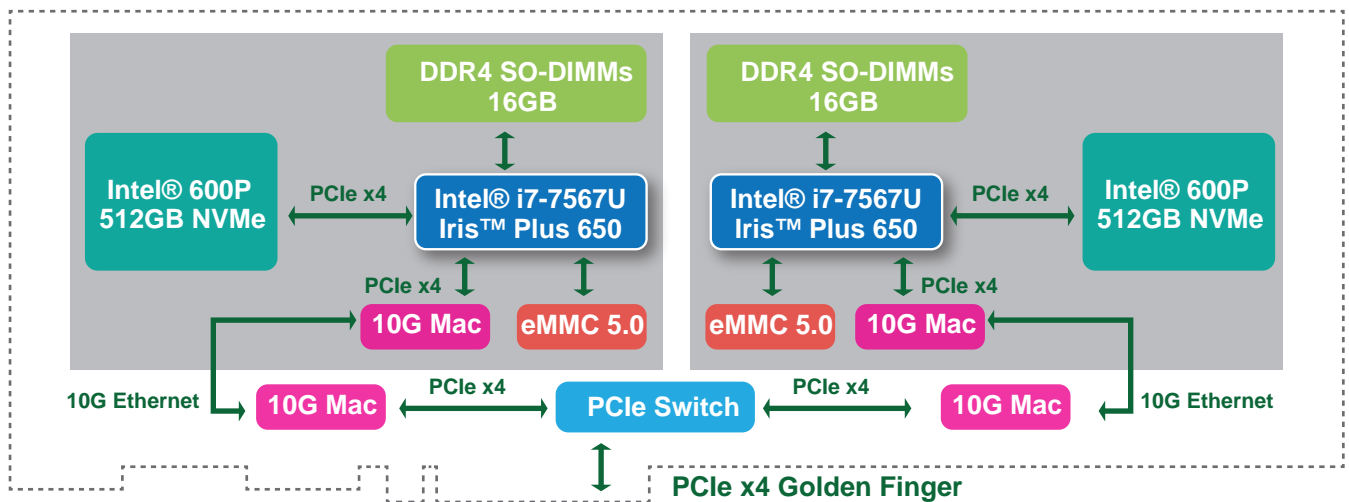
➠ Mustang-200: The best platform for application developers

● IEI which has focused on Industrial PC for 20 years provides stable and durable H/W platform.

● QNAP QTS-Lite which supports virtualization technology, information security and data protection is a flexible, secure and friendly S/W platform.

● Mustang-200 combines IEI H/W and QNAP S/W as a perfect platform for you to integrate your software application into a solution

➨ Distribute tasks among units of Mustang-200

With Mustang-200, every additional CPU works independently, so you can assign tasks to any nodes of your choice, and have real-time control of every node works.
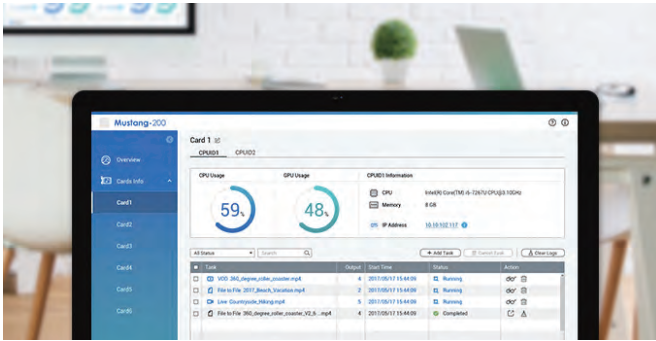
➨ Scalable infrastructure to suit your needs

The Mustang-200 needs no proprietary hardware and can be immediately installed into your existing system. If you need to perform additional calculations, you can always add additional Mustang-200 as they work independently from each other. The maximum amount of Mustang-200 is limited only by the number of available PCIe x4 slots in your system. This gives you enormous potential to expand your total computing capabilities.

➨ Perfect for fog computing

With robust computing capabilities and scalable characteristics, the Mustang-200 is perfectly suited for fog/edge computing. With fog/edge computing, you can pre-process data generated within your organization or across your devices on-premise, to filter out irrelevant information and only keep valuable insights, and then further utilize them by sending or uploading to cloud platforms. You can save a great deal of cloud platform and bandwidth fees as your data to be analyzed is filtered and only relevant data will be further dealt with.

Public Cloud

Fog to cloud communication

Fog computing   Fog computing   Fog computing

Public Cloud Platform
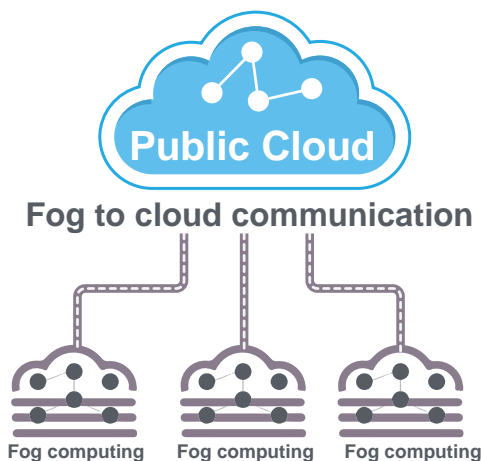
Mustang-200

Software of the Mustang-200

The integrated QTS-Lite operating system supports various virtualization technologies such as containers and virtual machines, so you can convert your physical system into a virtual one (P2V) and assign it to one of the nodes on the Mustang-200. Performance can be instantly boosted without interruption or additional physical space requirements.

No matter what kind of software you use, it can be hosted inside the Mustang-200, allowing you to do more and achieve more in performance-critical applications such as artificial intelligence, academic research, and simulations.

➡ QTS Lite Features

- Real-time computing
- Batch computing
- Parallel processing
- Automatic load balancing in each computing node
- Combine multiple cards as cluster via QTS Lite
  Assign each node to compute at the same time
- Control and manage QTS Lite via APIs

3 ways to drive Mustang-200 Accelerator

Container Station
Design your owned Container Applications

QNAP Container Station exclusively integrates LXC (Linux Container) and Docker® lightweight virtualization technologies, allowing you to operate multiple isolated Linux® systems on a QNAP NAS as well as download thousands of apps from all over the world.

Container Station extended the JeOS (Just enough OS) concept and uses lightweight virtualization technology to allow developers and IT administrators to easily and freely switch between Mustang-200 and cloud.

- Micro services, quick deployment
- Best partner for IoT maintenance and operation
- A growing number of popular Apps
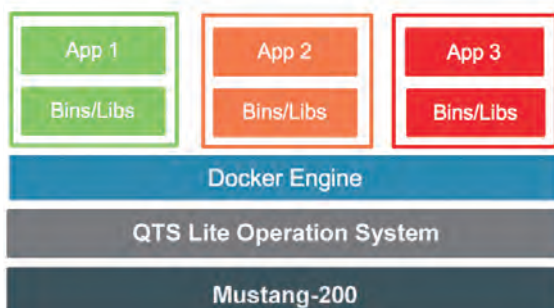
Virtualization Station
Running your existing S/W application

QNAP's Virtualization Station is a full virtualization solution for x86-based IEIxQNAP Mustang-200 with virtualization extensions that allows you to operate and manage multiple virtual machines (VM) on Mustang-200.Virtualization Station adds incredible versatility to your Mustang-200, so that you can build up a really high density computing environment by creating virtual machines (VM) and run the programs or the services that you already have on several PCs
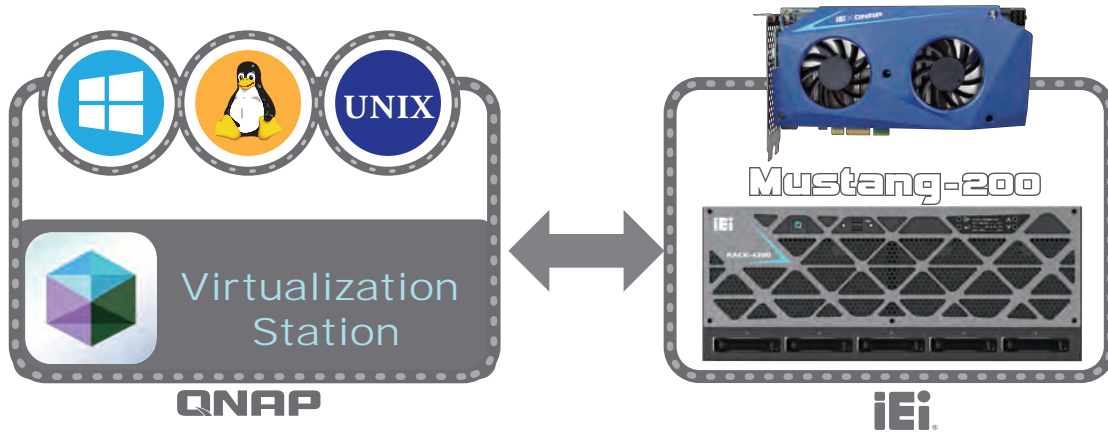
Mustang-200 App (QPKG)
Development

Use the following approaches to design applications:

1. QTS-Lite App (QPKG) development platform allows developers to design s/w applications running on Mustang-200.

2. Development Toolkit (API & SDK): Developers can design smart phone or PC applications that can remotely manage and access files and s/w applications on Mustang-200.

The development platform is designed for use by professional software developers, network and system integrators, and independent software developers to construct complete hardware and software integration platforms and develop applications. We welcome all passionate professionals to join our development team and help create a win-win future for IEI x QNAP and you.

▶ 7 bodyguards to ensure information security

QTS-Lite provides 7 bodyguards to ensure information security and data protection, so that your effort and time on application development can be save to focus on S/W development.

▶ QTS Lite provides you MORE !!

Storage management and network management

Firmware and package update

QTS Lite Provides You More!

More Apps in Qnap App Center

Easy to install and update applications from App Center

Web based management interface

Easy to maintain and monitor system status via web UI
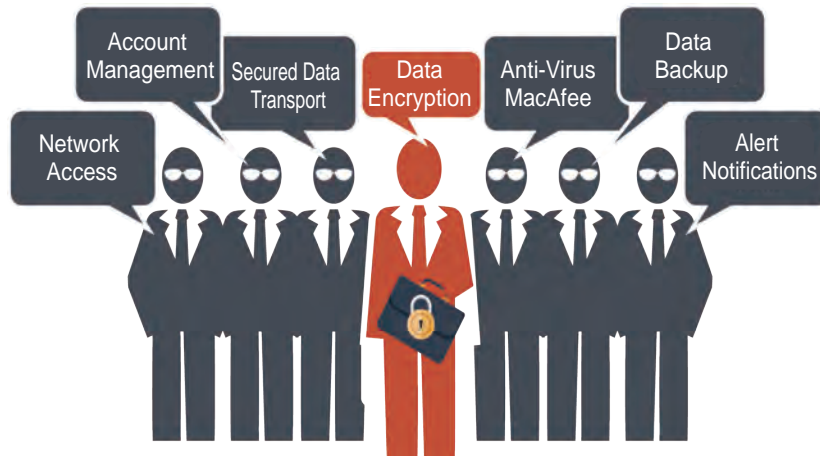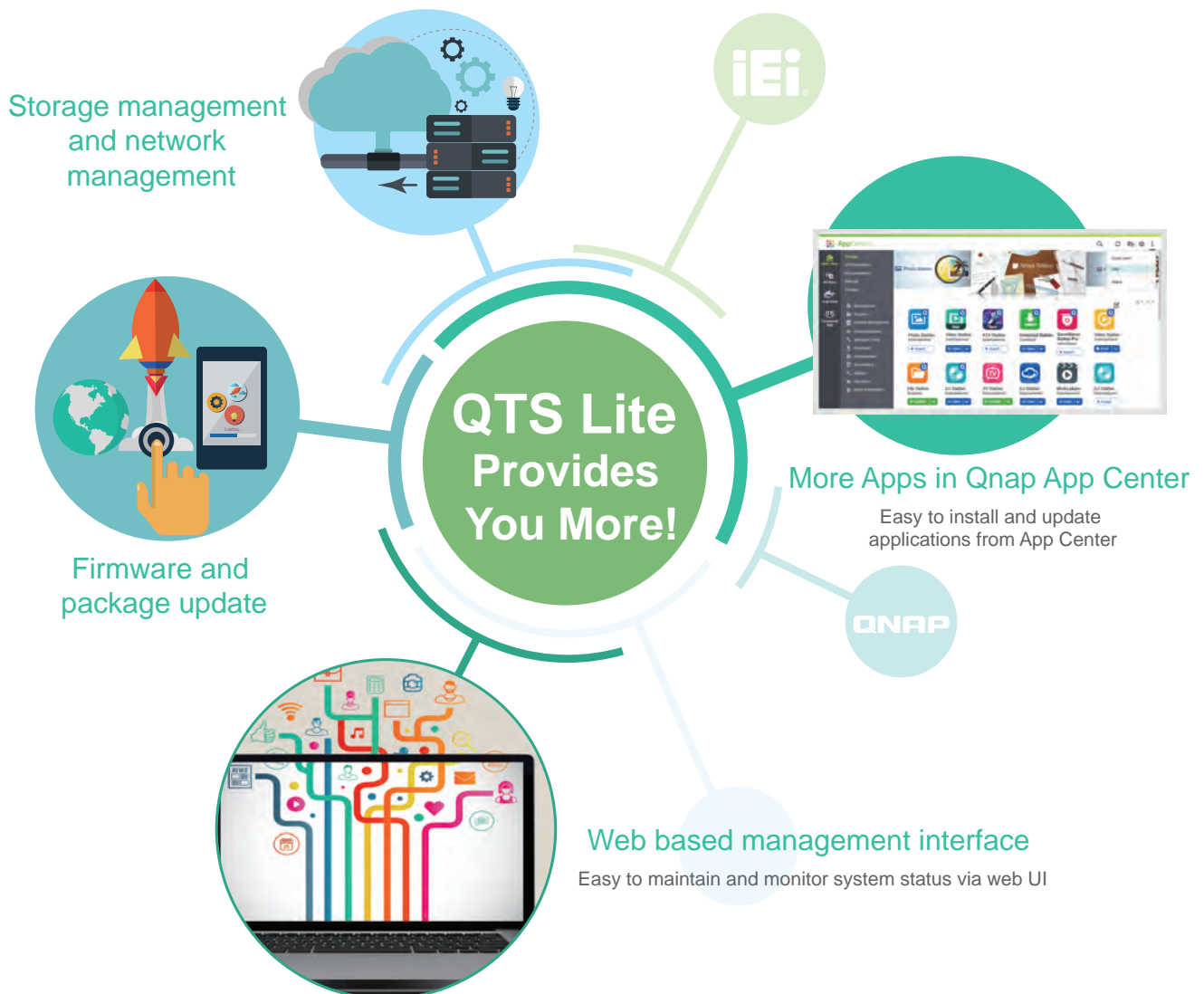
Mustang-200 Video Transcoding (MVT) Overview
Video Processing and Graphic Rendering Made Easy
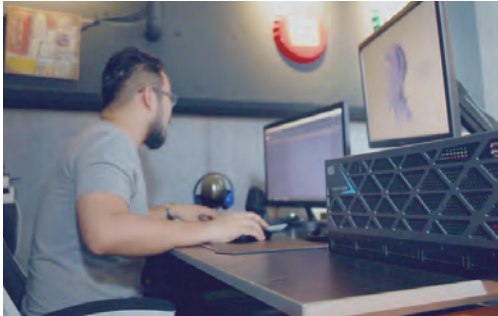
Video transcoding and streaming are also ideal applications of the Mustang-200. The powerful processors of the Mustang-200 can easily process high-definition 360° surround videos. The networked structure of the Mustang-200 is also perfectly applicable for render farms where a lot of parallel computing resources are needed. The Mustang-200 can help creative professionals streamline their workflows and accelerate their processes.

➠ Transcoding with GPU Accelerated Computing

- Mustang-200 uses a graphics processing unit (GPU) together with a CPU to accelerate media transcoding, AI (VR & deep learning), big data analytics, and other engineering applications.
- As an add-on card, Mustang-200 offers quick and scalable integration with existing and standard server architectures to meet demands of video streaming platform providers
- Mustang-200 offers full hardware transcoding (encoding & decoding)

➠ Transcoding Applications

| Online Course | Conference/ Seminar | VOD | Social Media Live Streaming |

Mustang-200 Video Transcoding (MVT) Key functions

➤ Live to Live Transcoding

Mustang-200 can transcode live streams into different resolutions for different clients.
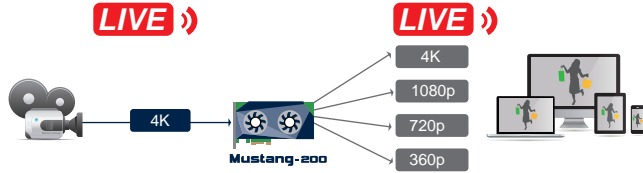
➤ Live to Live Transcoding

Mustang-200 supports several types of live streaming, For example, HLS, RTMP, MPEG-DASH and ICE CAST.
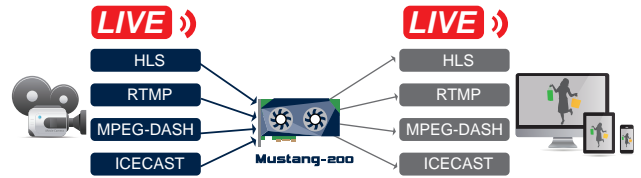
➤ File to Live Transcoding (VOD)

Mustang-200 can stream files by different resolutions for different clients.
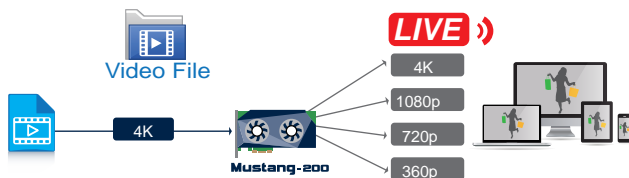
➤ File to File Transcoding (VOD)

Mustang-200 supports several types of video file formats, and it can transcode them into different kinds of live streaming formats, such as HLS, RTMP, MPEG-DASH and ICE CAST.
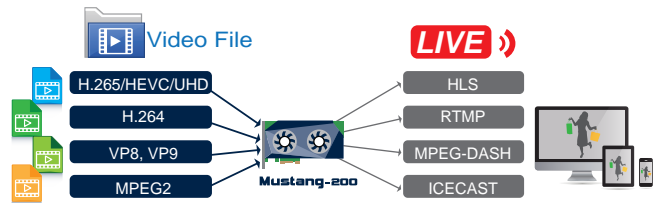
➤ File to File Transcoding

Mustang-200 supports several types of live streaming, including H.264, H.265/HEVC /UHD, VP8, VP9 and MPEC2.
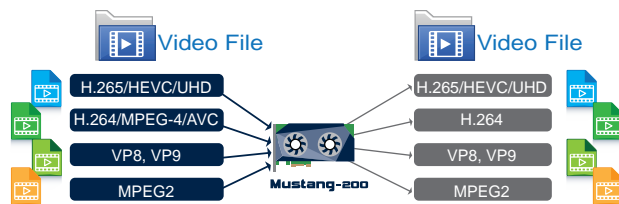
➤ Transcoding Host API Support

- **VOD API**
  VOD includes file to live streaming APIs.

- **LIVE API**
  Live includes live to live streaming APIs. Live input supports RTMP streaming only; VP9 does not support RTMP but supports RTSP.

- **File API**
  File includes file to file transcoding APIs.

- **Card Info API**
  Basic card information APIs
  (Card Info Attributes CPU Info Attributes)

- **CPU/GPU Monitor API**
  CPU and GPU Monitoring APIs
  (CPU/GPU Attributes & Usage Attributes)

➤ Transcoding Specifications

Video File	H.264/MPEG-4/AVC H.265/HEVC /UHD/4K VP8 VP9 MPEC2	**Resolution**	3840 x 2160 2560 x 1440 1920 x 1080 1280 x 720 858 x 480 640 x 360 426 x 249
Audio File	AAC MP3 Vorbis Copy Disable	**Video Bit Rate**	1 Mbps ~25 Mbps
		Frame Rate	24 fps ~ 60 fps
		QP Value	1 ~ 50
Streaming Format	RTMP HLS MPEG-DASH ICECAST		

⇛ Transcoding Performance

Video Source	Video Output	Resolution	Channel Number per Node	Channel Number per Mustang-200
HEVC 4K	H.264 4K	3840x2160	3	6
HEVC 4K	H.264 2K	2560x1440	5	10
HEVC 4K	H.264 1080P	1920x1080	8	16
HEVC 1080p	H.264 1080p	1920x1080	10	20

Video Source	Video Output	Resolution	Channel Number per Node	Channel Number per Mustang-200
H.264 4K	H.264 4K	3840x2160	3	6
H.264 4K	H.264 2K	2560x1440	5	10
H.264 4K	H.264 1080P	1920x1080	6	12
H.264 1080p	H.264 1080p	1920x1080	12	24

Mustang-200

Hardware Features

- Dual 10Gbps network based x86 computing accelerator
- Decentralized computing architecture for independent tasks
- PCI Express x4 delivers scalable and flexible solution
- Two Intel® Core™ i7-7567U/i5-7267/Celeron® 3865U processors, up to 4.00 GHz
- Support high-end graphics engine - Intel® Iris™ Plus Graphics 650
- Pre-installed 32 GB DDR4 (max. 64 GB) and 1 TB NVMe (max. 2 TB)

Specifications

Main Chipset	Two (2) Intel Kabylake ULT CPU
	Intel® Core™ i7-7567U (28 W) (4M Cache, up to 4.00 GHz)
	Intel® Core™ i5-7267U (28 W) (4M Cache, up to 3.50 GHz)
	Intel® Celeron® 3865U (15W) (2M Cache, 1.80 GHz)
Processor Graphics	Intel® Core™ i7-7567U & i5-7267U support Iris™ Plus Graphics 650 (GT3e) •Graphics base frequency 300 MHz •Graphics max dynamic frequency: 1.05 GHz •Embedded graphics DRAM per GPU: 64 MB
	Intel® Celeron® 3865U supports Intel® HD Graphics 610 •Graphics base frequency 300 MHz •Graphics max dynamic frequency: 900 MHz
Hardware Video Decode	H.264, H.265/HEVC
	MPEG2, M/JPEG
	VC-1
	VP8(8 bit)/VP9(10 bit)
Hardware Video Encode	H.264, H.265/HEVC
	MPEG2, M/JPEG
	VC-1
	VP8 (8-bit)

Display Output	2 x Micro HDMI for debugging
USB 2.0	4 x USB 2.0 (pin header) for debugging
Memory	(2 SO-DIMMs per CPU) 4 x DDR4 8GB SO-DIMM (Core™ i7/i5 SKU) 4 x DDR4 2GB SO-DIMM (Celeron® 3865U SKU)
Storage	2 x Intel® SSD 600P series (Core™ i7/i5 SKU only) (512GB M.2 80mm PCIe 3.0 x4, 3D1, TLC)
Dataplane Interface	PCI Express x4
	Compliant with PCI Express Specification V2.0
	Compatible with PCI Express x4, x8, and x16 slots
External Interfaces	Reset button
	Power button
Indicator	Seven segment (indicate card number and debug code)
Power Input	12V PCIe 6-pin power input
Power Consumption	12V@7.41A (Intel® Core™ i7-7567U SKU)
Operating Temperature	0°C~40°C
Fan	Dual fan
Dimensions (DxWxH)	40mm x 210mm x 111mm
Operating Humidity	10% ~ 90%

Packing List

1 x Mustang-200
1 x QIG
1 x 4-pin to PCIe power cable

Ordering Information

Part No.	Description
Mustang-200-i7-1T/32G-R10	Computing Accelerator Card supports Two Intel® Core™ i7-7567U with Intel® 600P 1TB (512GB x2) SSD, 32GB (8GB x4) DDR4, PCIe x4 interface, QTS-Lite, and RoHS
Mustang-200-i5-1T/32G-R10	Computing Accelerator Card supports Two Intel® Core™ i7-7267U with Intel® 600P 1TB (512GB x2) SSD, 32GB (8GB x4) DDR4, PCIe x4 interface, QTS-Lite, and RoHS
Mustang-200-C-8G-R10	Computing Accelerator Card supports Two Intel® Celeron® 3865U with 8GB (2GB x4) DDR4, PCIe x4 interface, QTS-Lite, and RoHS (without NVMe storage)
19B00-000396-00-RS	Mustang-200 dual-port USB cable

RACK-4200G-M-R10

Features

- Support PICMG 1.3 SBC and Mustang-200
- Support six PCIe x4 (physical PCIe x16)
- One 2.5" cabled drive bay; five 2.5" hot-plugging drive bay
- 1000W PSU

Specifications

Color	Black
SBC Form Factor	SPCIE-C236-R10
Backplane	SPCIE-11S1-R10
PSU	ACE-A210A-R10 (1000W)
Drive Bays	1 x 2.5" internal drive bay 5 x 2.5" external Hot-Plug drive bay
I/O	2 x USB 2.0 (front IO)
Expansion Slots	6 x PCIe x4 (physical PCIe x16)
Front Panel	2 x USB 2.0
Indicators	1. Power 2. OLED indicators
Buttons	Power switch
System Fan	4 x System fan
Construction	Heavy duty metal
Dimensions (DxWxH)	551mm x 431mm x 176 mm
Operating Temperature	0°C~40°C (SPCIE-C236-R10 & 6 x MUSTANG-200)
Operating Humidity	10% ~ 90%

Ordering Information

Part No.	Description
RACK-4200G-M-R10	4U 14-slot rackmount system for six Mustang-200, RoHS
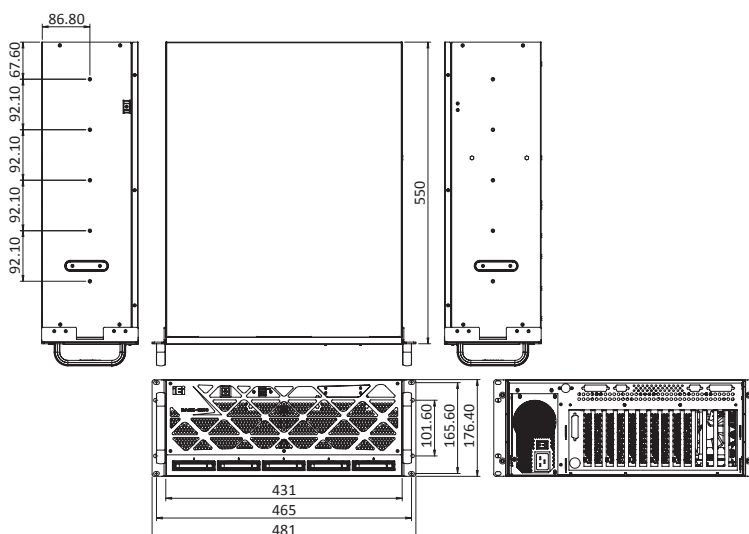
Dimensions (mm)

QTS Gateway for IoT Cloud Solution

Cloud-based IPC Built-in with QTS Gateway OS for IIoT

IoT Empowered by your Private Cloud

QNAP iEi QIOT
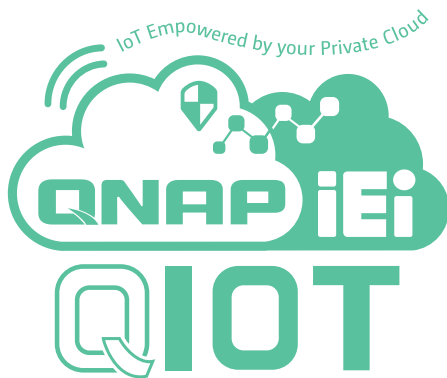
By connecting machines, work pieces and systems, we can create intelligent networks along with the entire value chain of IoT, that is, at your demand, our expandable products are connected to each other autonomously.

The IIoT (Industrial Internet of Things) concept is changing the past production modes; more and more automated equipment is used to replace manual labor. However, the meaning of automation would have been lost if these equipment still have to rely on a lot of manpower. Machine to machine (M2M) communication, data storage and analysis capability are the keys to creating a smart production line. IEI incorporates with QNAP to launch cloud-based IPC with QTS Gateway operating system, offering possibilities of connecting devices, communications and the cloud servers for IPC applications.

Health Care/ Hospital Care	Factory Automation & MES	Fleet Management	Retail	Home Automation
POC-W22A	TANK-870	IVS-300	IDS-300	uIBX-250

▶ QTS Gateway for Cloud-based IPC Solution

IEI's new generation smart fan-less embedded computer has an ultra-rugged design that allows stable operation even under the worst environments; it is not only quiet but also safe. QTS Gateway platform allowing you to easily monitor the system status. Diverse application programs can also be downloaded to satisfy different application needs.

QTS Gateway is an operating system designed specifically for IEI IPCs and fully integrated the QNAP NAS operating system (QTS), breaking through the stereotype of IPCs of not having operating systems and saving unnecessary costs for installing servers and computers. QTS Gateway not only allows easy monitoring of computer status through its visualized interface, it also allows the use of many free application programs, making it multifunctional while challenging the values of traditional IPCs.

	Traditional IPC	Cloud-based IPC
Remote System Visualization	No	Yes
OS	No (additional devices must be purchased and installed)	Built-in VM virtual application
Remote Device Management	No (additional management software must be installed)	Free Apps: Qcenter, QRM+
Data Backup	No (additional management software must be installed)	Hybrid Backup Sync
myQNAPcloud Management	No	Yes, supports system update through a cloud
Video Surveillance	No (additional surveillance software must be installed)	Free software: Surveillance Station
RAID Data Storage	No (must use with specific platforms)	RAID 0, RAID 1
Support for Mobile Devices	No	Free App Qfile, Qmanager

➠ Virtualization Station painless migration, complete OS virtualization

- Quick transfer, zero threshold
- PCIe card connection
- VM Backup & Restore
- Remote Import & Export
- USB Passthrough
- Advances in VM network structure, again – the Software Dened Network
- Virtual switch
- Device Management
- Visibility and direct access to files
- User-based permissions settings
- Operate VMs through web browsers
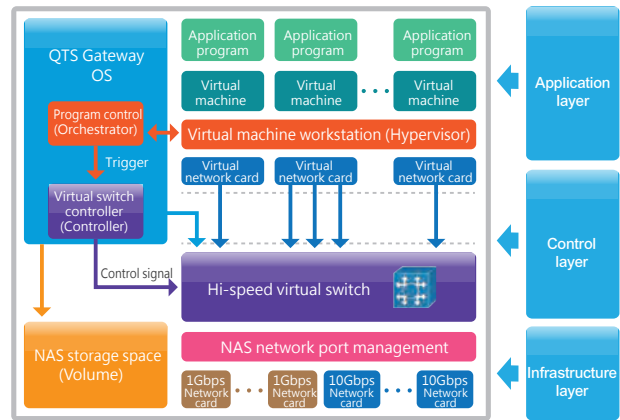
Quick Transfer, Zero Threshold

Provides physical-to-virtual (P2V) technology can be used to create a familiar operating system (e.g. Win 2000/XP/7/8.1/10/Server 2003/2012, Linux, x86-Android…etc) adding more flexible system management.
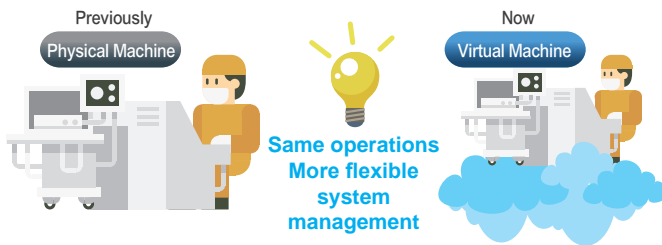
VM Backup & Restore with VM Snapshot

Supporting local and remote backup and restore your VM avoid disaster. Able to set schedule or real time snapshot to reduce the downtime while restoring.
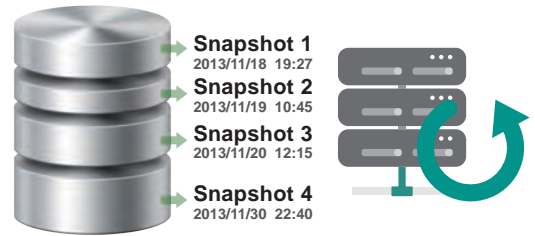
PCIe card connection and USB Passthrough

With Intel® Virtual technology allowing VMs to allocated H/W resources such as PCIe, PCI, Lan, USB, COM, DIO…etc.
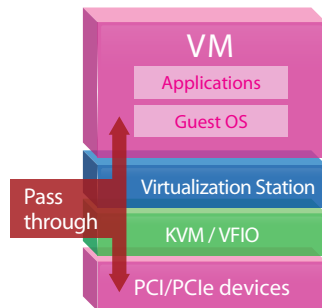
Remote Import & Export

Virtual machines of various formats can be easily imported to and exported from the Virtualization Station.
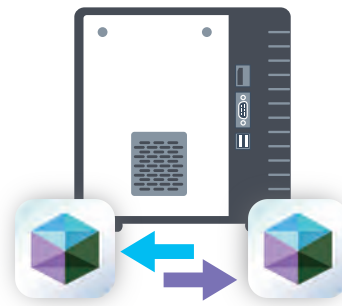
➠ Container Station – Rapidly deploy containers

Container Station is developed following the Just enough OS, or JeOS, philosophy. This lightweight virtualization technology can instantly and truly create a ready-to-use environment on PCs, TANK-860-QGW and the Cloud for RD developers and IT administrators.

Micro services, quick deployment

Container Station only requires 64MB of memory to run an application program; such lightweight virtualization technology allows you to quickly deploy large numbers of environments.

Best partner for IoT maintenance and operation

Container Station supports the required device protocols (MQTT and AMQT etc.), interface services and data computation needed in the IoT environment, allowing it to be easily connected to the IoT era.

A growing number of popular apps

Container station offers the most up-to-date and top-of-technology applications for rapid deployment with just a click. The following apps are now available: LibreOffice, MongoDB, Nginx, Node.js, Redis, MySQL, WordPress, Deluge, Minecraft, Wine, Jenkins, GitLab, Redmine, Joomla! and OpenERP

➥ HD Station

Using VGA, DVI, HDMI, DP display to output the entire HD Station provides you east to access your application (VM), output the Virtual Machine (VM) console via monitor.

Linux

Windows

Android

QVM Desk

➥ Linux Station

Comprehensive service from the Ubuntu Linux. Just download Linux Station from the App Center and use displays to output the entire Ubuntu desktop.

➥ Surveillance Station – Remote video surveillance

QNAP video sur veillance center provides four free camera channels, and suppor ts ONVIF and PSIA universal camera protocols, compatible with over 3,000 IP camera models of over 100 brands. It allows you to easily create an automated video surveillance system for your factory to protect property and personnel safety, and to create a working environment with no blind spots.

free **4** video channels

Manual recording

Microphone

Audio

Snapshot

Digital zooming

Camera setting

Camera information

Key areas

TANK-860-QGW

➥ Q'Center Centralized multi-GTS Gateway management

Q'Center offers you a powerful management solution can view the status and system information of multiple QTS Gateway systems at the same time. Q'center can greatly assist IT administrators in system resource allocation and future capacity planning.

Q'center centralized management

IT department

RD department

Factory terminal
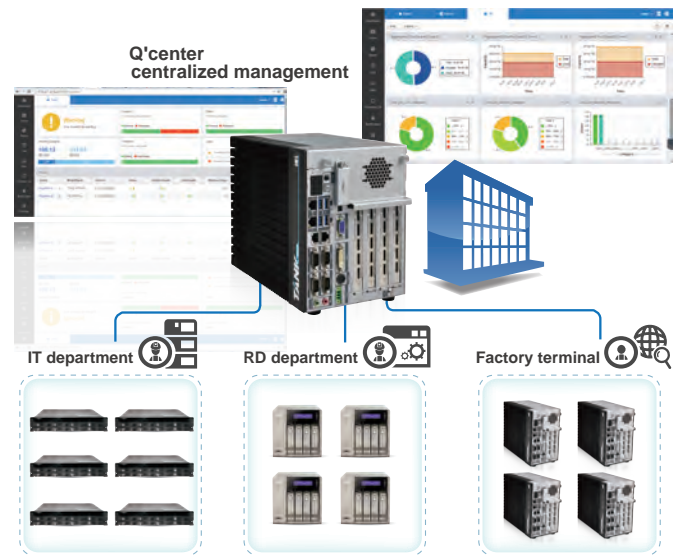
➥ Data Center and Backup – Perfect integration of public and private clouds

Local backup and synchronization:
• External device
• Local folder

Remote backup and synchronization:
• RTRR
• FTP
• Rsync
• CIFS/SMB

Cloud backup:
• Support for a variety of enterprise-class cloud storage

In the era of information explosion, there are thousands of data being written every day. QTS Gateway continues the essence of the cloud purpose operating system and provides several management and backup tools to allow you to easily nd data and back them up or share them to other devices or cloud services, providing more diverse and mind-easing backup management solutions.

➠ QRM+
IT infrastructure management

QRM+ is a centralized remote server and PC management solution from QNAP designed for IT teams. QRM+ monitors and controls the pulse/health of all the mission critical servers in your network. QRM+ provides a single point solution to discover, map, monitor and control all the critical devices (Servers/PCs/Thin Clients etc.) in your network. Manage your servers remotely from different client with-in or from outside of the same network.
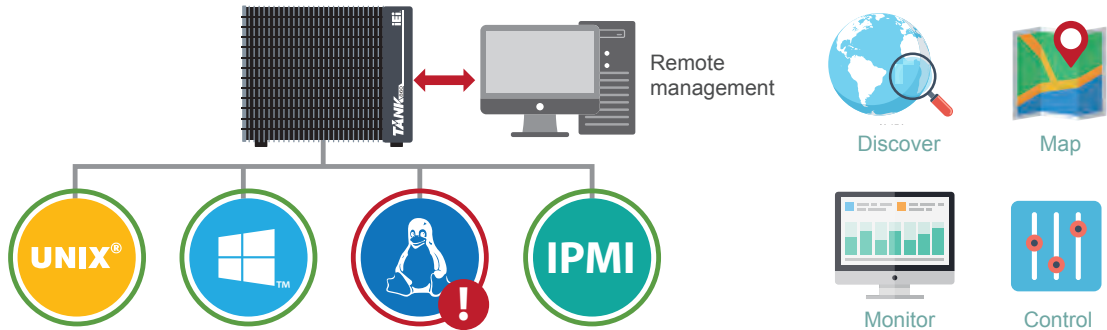
- Improve server health status control for the administrators.
- Discover, map, monitor and control resources in your network on a single platform.
- Supports Agent based (QRMAgent) and Agentless (IPMI) surveillance, supports IPMI 2.0.
- Keeps track of all mission-critical device settings and provides state of art alert/event management.
- Generate reports to help analyze the performance of network resources.
- Exclusive QRMAgent (lightweight remote management agent service) that supports multiple platforms such as Windows and Linux.
- Save time on troubleshooting and quickly restore the system to operable status.

➠ QRMAgent

Developed by QNAP, QRMAgent is an agent program installed on workstations. QRM+ can monitor and manage the workstations through this program. After you add a device to the QRM+ server, the system will automatically install this agent program to that device. Or, you can choose to manually install QRMAgent on the workstation if you prefer. QRMAgent currently supports the following operating systems (more to be added later):

Platform	Operating System
x86 - Windows	Windows XP/7/Vista/8/8.1/10, Windows Server 2008/2012
AMD64 - Windows	Windows XP/7/Vista/8/8.1/10, Windows Server 2008/2012
X86 - Linux	Ubuntu 12.x/14.x/15.x

➠ QIoT Suite -
Your private IoT cloud platform

A look at IoT technology

IoT (Internet of Things) architecture consists of 3 main layers: sensors, networks, and applications. The sensor layer includes devices that collect data about the environment and send that data to the network layer. The network layer transports the accumulated data to the application layer; the application layer combines and processes the data to transform it to actionable information, and eventually help enterprises make informed decisions.
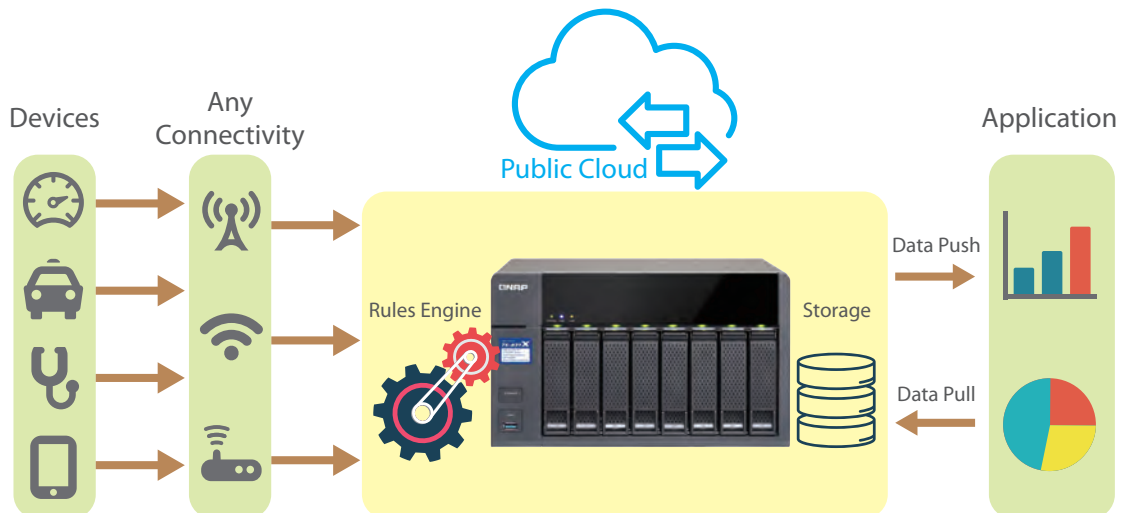
QIoT Suite with efficient development cases

QIoT Suite provides several IoT tools to help developers build an IoT environment, integrate sensors, and make use of development kits (Arduino, Raspberry Pi, etc) with the NAS's Ponte (data receiver), Node-RED (data analysis), MongoDB (data storage), Freeboard (data presentation) to construct a comprehensive IoT architecture.
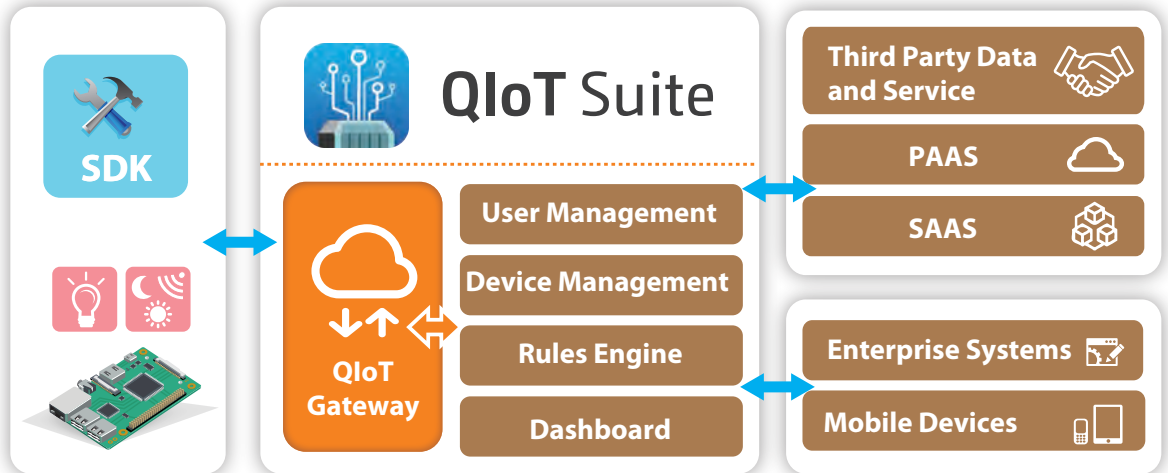
▶ Product List

PPC-FxxB-BT

- 12"/15"/17"/19" Fanless Intel® Bay Trail Solution
- Robust IP65 aluminum front bezel

TANK-870-Q170-QGW
Preliminary

- Triple independent display
- Flexibility for hardware expansion

TANK-860-HM86

- Ruggedized fanless embedded system with Intel® HM86 mobile solution
- Up to six different expansion slot options

TANK-760-HM86

- Ruggedized fanless embedded system with Intel® HM86 mobile solution
- Three independent video outputs

ECW-281B-BT

- Fanless embedded system with Intel® Celeron J1900 Processor
- 12V DC and 9~36V DC models available

DRPC-120-BT

- Fanless DIN-Rail embedded system with Intel® E3845 processor
- Programmable OLED display

IVS-300-ULT3-QGW
Preliminary

- 4 x PoE IEEE802.3af
- E-Mark certification

IDS-300-BW
Preliminary

- Digital signage system with Intel® Celeron N3160 solution
- Three independent HDMI outputs

ECN-380-QM87i

- Fanless embedded system with Intel® Core™ i5/Celeron® CPU
- Triple display with two HDMI and one VGA output

uIBX-250-BW-QGW

- Fanless system with Intel® Celeron® N3160 processor
- Dual display

SBOX-100-QM87-QGW

- Fanless marine computer with Intel® Core™ i5 CPU
- Isolated 18 V~36 V DC input

IVS-200-ULT2-QGW

- Intel® i5-5350U or Celeron® 3755U CPU
- 9~36V DC input
- E-Mark certification

IPMI Remote Management in IEI Solution - IPMI 2.0 Compliant

▶ What is iRIS?

Let's start from IPMI first before we talk about iRIS. IPMI is a standardized computer system interface used by system administrators for out-of band management of computer systems and monitor and control of their operation. It is a way to manage a computer that may be powered off or otherwise unresponsive by using a network connection to the hardware rather than to an operating system or login shell. iRIS is a modularized IPMI product, which is designed and manufactured by IEI company. iRIS is compliant with IPMI 2.0, and supports out-of –band remote management to allow administrators to manage a system remotely in the absence of an operating system or of the system management software. Thus, IPMI functions can work in any kind of scenarios such as:

1. Before an OS has booted
2. When the system is powered off
3. After OS or system failure or BSOD
4. Cross platform and OS independent

Using a worldwide standardized IPMI 2.0 interface and protocol allows IEI's iRIS technology to assist administrators to remotely monitor and manage all IEI iRIS supported devices by group or individual via Internet communication.

▶ Application for iRIS

■ Retail Industry

Retail industry relies on software more than pure hardware architecture. Maintenance cost is the highest cost since service location could be everywhere, and any shutdown will cause business lost. Graphics performance with hardware management is the requirement for retail application such as digital signage, vending machine, kiosk, and ATM machine. IEI offers AMD graphics solution with IPMI module to fulfill application needs.

ECN-380

PPC-F22A-H81
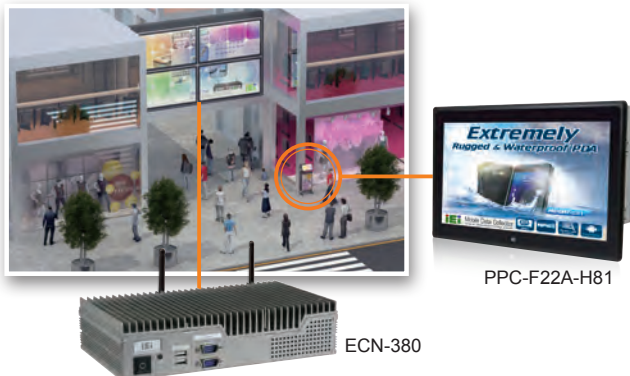
■ Factory Automation

Each production line has its own computer systems to do automated control of production processes. Active system alert could help to monitor all systems in production lines with less human resources, and instant notice and detailed event log with screen record could save time for troubleshooting. IEI provides a variety of solutions with iRIS support to save both time and human resources, and achieve less loss in production capacity.

PPC-F17A-H81

TANK-870

TANK-6000-C226
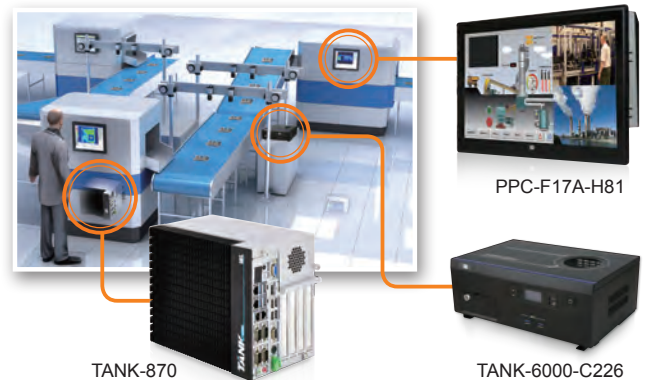
iRIS Key Features

- Remote video streaming record
- Event trigger setting & video record

- Instant system alert email
- Instant system alert SMS

- Remote software update
- Remote OS installation & recovery
- Remote KVM
- POST code display

- Fan control
- Remote KVM
- Remote BIOS setting
- Remote, Cycling, Scheduling power turn On/Off control

- Software update
- OS installation & recovery
- KVM over IP
- POST code display

Diagnose **Update** **Recover**

» **Diagnose:**
Check system health, event log & POST code
» **Update:**
Remote firmware update
» **Recover:**
Remote OS installation & recovery
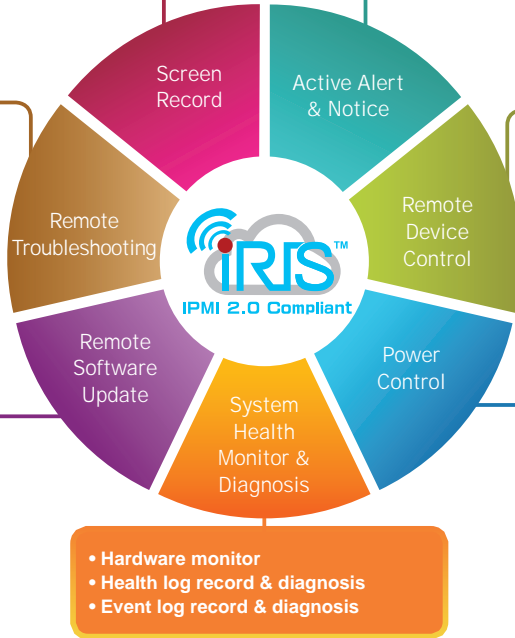
- Reset system
- Power off system – Immediately / Orderly
- Power on system
- Power cycle system
- Group power control

Screen Record · **Active Alert & Notice** · **Remote Device Control** · **Power Control** · **System Health Monitor & Diagnosis** · **Remote Software Update** · **Remote Troubleshooting**

iRIS IPMI 2.0 Compliant

- Hardware monitor
- Health log record & diagnosis
- Event log record & diagnosis

Conclusion

As mentioned in the introduction, more and more devices need to be organized by a smart way. iRIS module is able to support a variety of working environments, and to run in different operating systems. Moreover, iRIS solution can not only help you to manage devices, but also bring more convenience into your business for increasing working efficiency and reducing system failure probability.

IEI iRIS Solution

Intel® Skylake Porject		
Project	**Form Factor**	**IPMI Solution**
SPCIE-C2360-i2	PICMG 1.3	iRIS-2400
PCIE-Q170-i2	PICMG 1.3	iRIS-2400
IMBA-C236-i2	ATX	iRIS-2400
IMBA-Q170-i2	ATX	iRIS-2400
Intel® Broadwell-DE Project		
IMBA-BDE	ATX	iRIS-2500 (on board)
Intel® Haswell Projects		
SPCIE-C2260-i2	PICMG 1.3	iRIS-2400
PCIE-Q870-i2	PICMG 1.3	iRIS-2400
IMBA-C2260-i2	ATX	iRIS-2400
IMBA-Q870-i2	ATX	iRIS-2400
IMB-Q870-i2	microATX	iRIS-2400
IMB-H810-i2	microATX	iRIS-2400
KINO-DQM871-i1	Mini-ITX	iRIS-1010
NANO-QM871-i1	EPIC	iRIS-1010
WAFER-ULT/ULT2-i1	3.5"	iRIS-1010
Intel® Bay Trail		
KINO-ABT-i2	Mini-ITX	iRIS-2400
NANO-BT-i1	EPIC	iRIS-1010
WAFER-BT-i1	3.5"	iRIS-1010

AMD G-series		
Project	**Form Factor**	**IPMI Solution**
KINO-KBN/SE-i2	Mini-ITX	iRIS-2400
NANO-KBN/SE-i1	EPIC	iRIS-1010
WAFER-KBN-i1	3.5"	iRIS-1010
Embedded Box		
TANK-6000	Intel® Haswell (C226)	iRIS-2400 (on board)
TANK-760	Intel® Haswell (HM86)	iRIS-2400
TANK-870	Intel® Skylake (Q170)	iRIS-2400
TANK-860	Intel® Haswell (HM86)	iRIS-2400
TANK-801	Intel® Bay Trail (J1900)	iRIS-2400
DRPC-120	Intel® Bay Trail (E3845)	iRIS-2400
SBOX-QM87	Intel® Haswell (QM87)	iRIS-2400
ECN-380	Intel® Haswell (QM87)	iRIS-1010
ECW-281B-BTi	Intel® Bay Trail (J1900)	iRIS-1010
Panel PC		
PPC-FxxA-H81	Intel® Haswell (H81)	iRIS-2400
PPC-FxxA-BT	Intel® Bay Trail (J1900)	iRIS-2400
PPC-FXXB-BT	Intel® Bay Trail (J1900)	iRIS-2400
POC-W22A-H81	Intel® Haswell (H81)	iRIS-2400
SxxA-QM87	Intel® Haswell (QM87)	iRIS-2400

IEI Provides 15-year Long-Term Supply

In order to provide more stable and better services to our customers, IEI greatly extends product availability for the following best-selling models from a minimum of 3 years to a maximum of 15 years life span in alignment with Intel's IOTG roadmap.

▶ Products with 15-year long-term supply

Bay Trail			Braswell

PCISA-BT
- Half-size PCISA CPU card supports 22nm Intel® Atom™ or Celeron® on-board SoC
- Supports dual independent display, dual GbE LAN, PCIe mini, mSATA, RoHs

NANO-BT-i1
- EPIC SBC supports 22nm Intel® Atom™ or Celeron® on-board SoC
- Supports dual independent display, Supports dual independent display

WAFER-BT-i1
- 3.5" SBC supports 22nm Intel® Atom™ or Celeron® on-board SoC
- Supports dual independent display, COM, USB 3.0, PCIe Mini, mSATA

uIBX-250-BW
- Fanless system with Intel® Celeron® N3160 processor
- Supports dual display, dual GbE LAN, 4 USB3.0, 2 COM

Skylake			

PCIE-Q170
- PICMG 1.3 full-size CPU Card with LGA 1151 Intel® 6th/7th generation Core™ i7/i5/i3, Pentium® or Celeron® processor supported
- Supports dual GbE LAN, PCIe mini, TPM security by TPM module

IMBA-Q170-i2
- ATX motherboard supports LGA 1151 Intel® 6th/7th generation Core™ i7/i5/i3, Pentium® or Celeron® processor
- Supports triple display, TPM security by TPM module, IPMI 2.0 via iRIS-2400 module

IMB-H110
- microATX motherboard supports LGA 1151 Intel® 6th/7th generation Core™ i7/i5/i3, Pentium® or Celeron® processor
- Supports 12 COM and 12 USB, TPM security by TPM module

NANO-ULT3
- EPIC SBC with 6th generation Intel® ULT proccessor supports
- Supports triple independent display, dual GbE LAN, 2 PCIe mini slot for expansion

Notes:

- Product revision may be performed in response to the EOL of peripheral components in order to ensure the extension of the product life cycle.
- If the main CPU supplier stops the 15-year long-term manufacturing support, IEI will follow Intel to reduce the period of product availability.
- If the demand slows down, with agreement of the majority of customers, IEI has the right to early declare EOL for the above mentioned products or to continually supply the products to the customer with MOQ restriction.
- 15-year long-term support includes 6-month last time buy period plus 3-month last time ship period.
- IEI reserves the right to revise these Terms of Service at any time without prior notice.

IEI 8th Generation Intel® Solution

Intel® Coffee Lake Platform Overview

- Additional performance with 1.37x better productivity and up to 6 processor cores vs 4th generation processors

- Speed and versatility with USB-C and USB 3.1

- Gen 11 graphics engine
  » 3 independent displays with audio
  » Display resolutions supporting up to 4K@60Hz/5K@30Hz

- Security
  » Intel® Device Protection Technology with Boot Guard
  » Intel® Memory Protection Extensions (Intel® MPX)
  » Intel® Software Guard Extensions (Intel® SGX)

Block Diagram
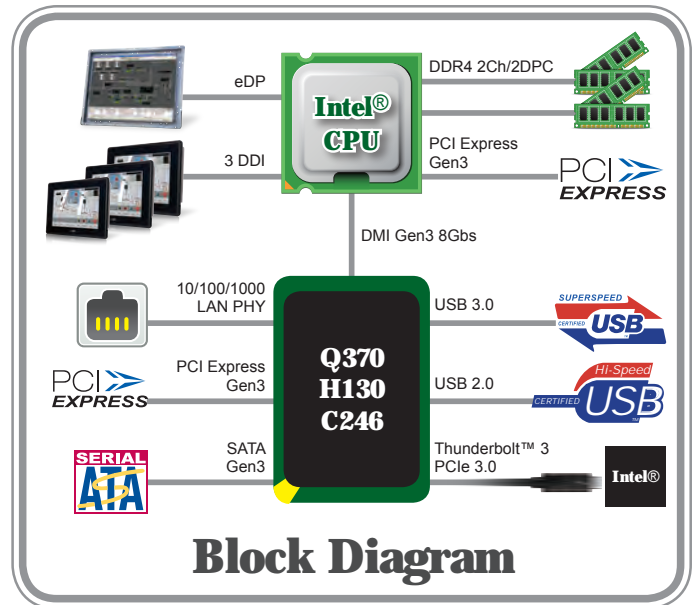
More Features on Coffee Lake

➼ **Additional Performance**

137% better productivity vs 4th Gen processors or 10% performance gain from 7th Gen processors.

➼ **Media/Video Experience**

High Dynamic Range (HDR) Rec.2020, HEVC 10-bit encode/decode, VP9 10-bit decode, Chrome browser VP9 HW acceleration support.

➼ **New UX Capabilities**

Speed and versatility with USB-C / USB 3.1 (10 Gbps)

Intel® 8 Series, 9 Series & 100 Series Comparison

Item	2-Chip Platform-S (WS/DT)				2-Chip Platform-H (Mobile)				
	8 Series	100 Series	100 Series	300 Series	8 Series	9 Series	100 Series	100 Series	300 Series
Platform Name	Haswell	Skylake	Kaby Lake	Coffee Lake/ Canon Lake	Haswell	Broadwell	Skylake	Kaby Lake	Coffee Lake/ Canon Lake
Process	22nm	14nm	14nm	14nm	22nm	14nm	14nm	14nm	14nm
CPU Package	LGA1150	LGA1151	LGA1151	LGA1151	BGA1364	BGA1364	BGA1440	BGA1440	BGA1440
Memory	DDR3/DDR3L	DDR3L/DDR4	DDR3L/DDR4	DDR4	DDR3L	DDR3/DDR3L	DDR3L/DDR4	DDR3L/DDR4	DDR4
PCI Express Lanes	Up to 8 Lanes (Gen2)	Up to 20 PCIe (Gen3)	Up to 24 PCIe (Gen3)	Up to 30 PCIe (Gen3)	Up to 8 Lanes (Gen2)	Up to 12 PCIe (Gen2)	Up to 16 lanes PCIe (Gen3)	Up to 16 lanes PCIe (Gen3)	Up to 24 PCIe (Gen3)
PCH	Q87/C226	C236/Q170/ H110	C236/Q170/ H110	C246/Q370/ H310	HM86/QM87	HM86/QM87	CM236/HM170/ QM170	CM238/ HM175/QM175 (Compatible with Skylake)	CM246/QM370/ HM310

Intel® Coffee Lake Graphics Support

Display Comparison

Time	2015	2016	2018
Platform Name	Skylake	Kaby Lake	Coffee Lake
Graphics	Gen9 graphics Intel® HD 510~530	Gen9 graphics Intel® HD 615~620	Gen9 graphics Intel® UHD
DirectX Support	Direct 12/11.3	Direct 12/11.3	Direct 12/11.3
OpenGL Support	4.4	4.4	4.5

DisplayPort & 4K UHD Premium Content Support

Intel® Coffee Lake OS Support

Type	Operating System	Support
Microsoft	Windows* 10 Enterprise & IOT Enterprise (64bit)	Intel / Microsoft
Linux	Ubuntu	Open Source community / Canonical Ltd
	Yocto	Yocto project community
RTOS	Wind River VxWorks	Wind River systems

** Distributions supported depend on each CPU sku.

Features of IEI Product with 8th Gen Intel® Core™ Processors

M.2

IEI provides new products supporting Next Generation Form Factor (NGFF) expansion cards in different types, such as SSD, WWAN and WLAN cards suitable for small devices. Products with 8th Gen Intel® Core™ processors supports PCIe Gen3 x2 NVMe interface.

M.2 M key

M.2 (A key)
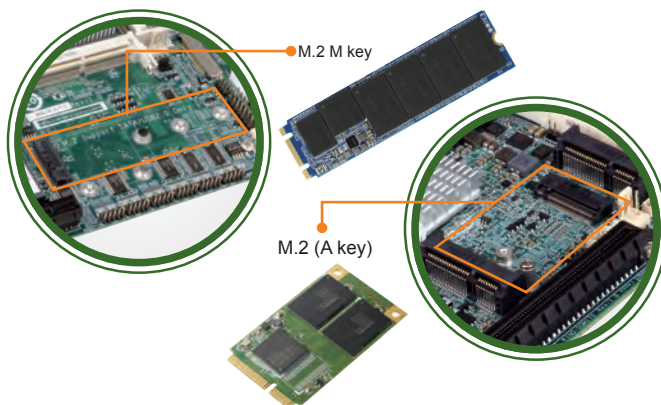
Thunderbolt 3

Support dual Thunderbolt 3 by PCIe x4 card with Intel® Alpine Ridge DSL6540. Support more high speed applications through the latest USB Type C and thunderbolt 3 technology.

40 Gpbs

10 Gpbs

5 Gpbs

| USB 3.1 Gen 1 | USB 3.1 Gen 2 | Thunderbolt™ 3 |

• 40Gbps Thunderbolt: PCI Express Gen 3
• Four times the data bandwidth of USB 3.1

Flexible CPU PCIe x16

Motherboards with high-end CPU has three controllers that can separate PCIe x16 into different sets.

PCIe x16 slot

A — 2 x PCIe x4 + 1 x PCIe x8 — x4 x4 x8

B — 2 x PCIe x8 — x8 x8

C — 1 x PCIe x16 — x16
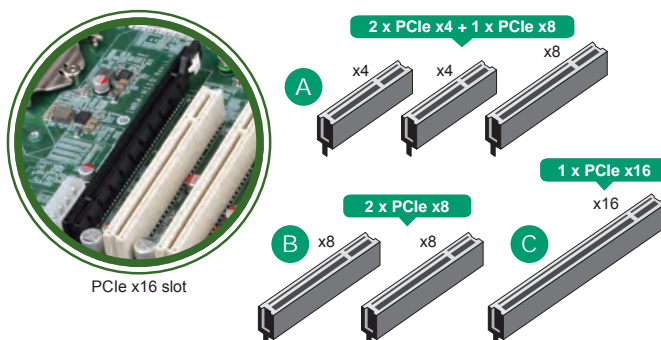
USB 3.1 Gen2

USB 3.1 Gen2 on USB Type A connector doubling the speeds of USB 3.1 Gen1 to as much as 10Gbps.

USB 3.1
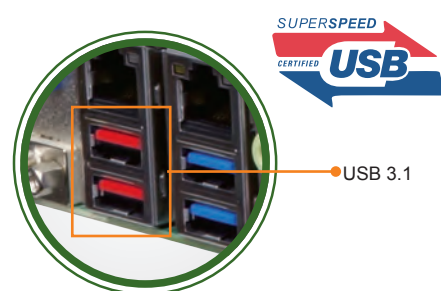
Intel® Apollo Lake Platform

▶ Intel® Apollo Lake Platform Overview

GLBenchmark 2.5.1 Egypt Off-screen Normalized to BYT-J1900
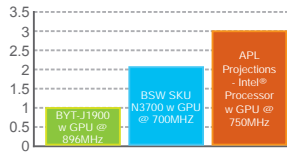
➡ Improved 3D & Full-HD Media Performance

- Fast HD video acceleration over previous generation
- Up to 15 simultaneous 1080p30 decode streams
- Fast graphics and media performance @ ISO power over previous generation

➡ Reliable and Efficient Computing

- Highly reliability with ECC
- Wide termperatue SKU with Tj: -40°C ~ 110°C and extreme 15-years lifetime for Industrial applications

➡ Enhanced Security Executions

- Integral Intel® Security Engine
- Fast cryptographic execution with Intel ® AES New Instructions (Intel® AES-NI)
- Secure/measured booting features

▶ Intel® Atom™ Comparison
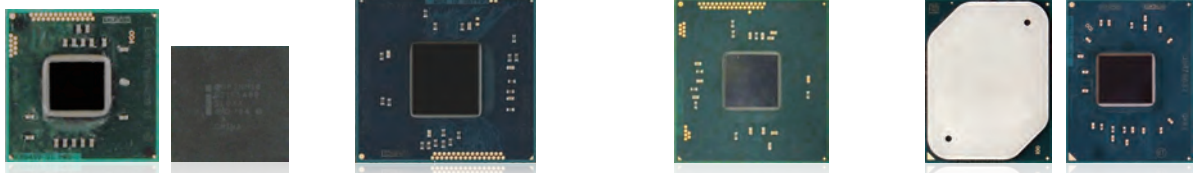
	Cedar Trail	Bay Trail	Braswell	Apollo Lake
Launch	Q1'12	Q4'13	Q1'15	Q4'16
Process	32nm	22nm	14nm	14nm
Processor Frequency & TDP	D2550: 2C, 1.86GHz /10W N2800: 2C, 1.86GHz /6.5W N2600: 2C, 1.6GHz /3.5W	J1900: 4C, 2 GHz /10W N2930: 4C, 1.83 GHz /7.5W N2807: 2C, 1.58 GHz /4.3W E3845: 4C, 1.91 GHz /10W E3827: 2C, 1.75 GHz /8W E3826: 2C, 1.46 GHz /7W E3825: 2C, 1.33 GHz /6W E3815: 1C, 1.46 GHz /5W	N3710: 4C, up to 2.56GHz /6W N3160: 4C, up to 2.24GHz /6W N3060: 2C, up to 2.48GHz /6W N3010: 2C, up to 2.24GHz /4W	N4200: 4C, up to 2.5GHz/6W N3350: 2C, up to 2.3GHz/6W x7-E3950: 4C, up to 2.0GHz/6.5W x5-E3940: 4C, up to 1.8GHz/9.5W x5-E3930: 2C, up to 1.8GHz/12W
Chipset TDP	Intel® NM10: 1.5W	N/A	N/A	N/A
Memory	DDR3 1066 MHz for D2550/N2800 (Max. 4GB) DDR3 800MHz for N2600 (Max. 2GB)	DDR3L 1333MHz for J1900/N2930/E3845/E3827 (Max. 8GB) DDR3L 1333MHz for N2807 (Max. 4GB) DDR3L 1066MHz for E3826/E3825/E3815 (Max. 8GB)	DDR3L 1600MHz (Max. 8GB)	DDR3L 1866 MHz (Max. 8GB)
Graphics	2 Independent Displays DirectX9 , OpenGL 3.0 Gfx @ up to 640MHz (D2550/N2800)	Gen 7 graphics 2 Independent Displays Gen 7 4 EUs DirectX11.1 , OpenGL 4.0 Gfx @ up to 854MHz (J1900/N2930)	Gen 8 graphics 3 Independent Displays Gen 8 LP 16 EUs DirectX12 2 , OpenGL 4.2 Gfx @ up to 700MHz (N3700)	Gen9 Low Power graphics 3 Independent Diplats Gen9 LP 18 EUs OpenGL* ES 3.0/3.0+, OpenCL* 1.2 Gfx@ up to 750 MHz (N4200)
Video Decode	MPEG2, h.264, VC-1/WMV9 Up to 1080p	MPEG4, h.264, VC-1/WMV9 VP8 up to 1080p	H.265/HEVC @ level 5, H.264 @ Level 5.2, MPEG2, MVC, VC-1, WMV9, JPEG, VP8	4K Codec Decode & Encode for HEVC , H.264, VP8
Storage & IO	SATA 3Gb/s, 8 USB 2.0	SATA 3Gb/s, 1 USB 3.0, 3 USB 2.0, eMMC 4.51	SATA 6Gb/s, 4 USB 3.0, 1 USB 2.0, eMMC 4.51	SATA 6Gb/s, 5 USB 3.0, 2 USB 2.0, eMMC 5.0

Block Diagram

DDR3L SO-DIMM
Dual Channel ECC
Max. 8GB

Wi-Fi / Wimax / Bluetooth

PCIe Mini
= M.2 Card

SIM Card Slot

4 x PCI Express

PCI EXPRESS

Hi-Speed
CERTIFIED USB

Apollo Lake
Processer

LVDS/ eDP

DP/HDMI

VGA

Converter IC

Codec

HD Audio

2 SATA

SPI

SIO

LAN
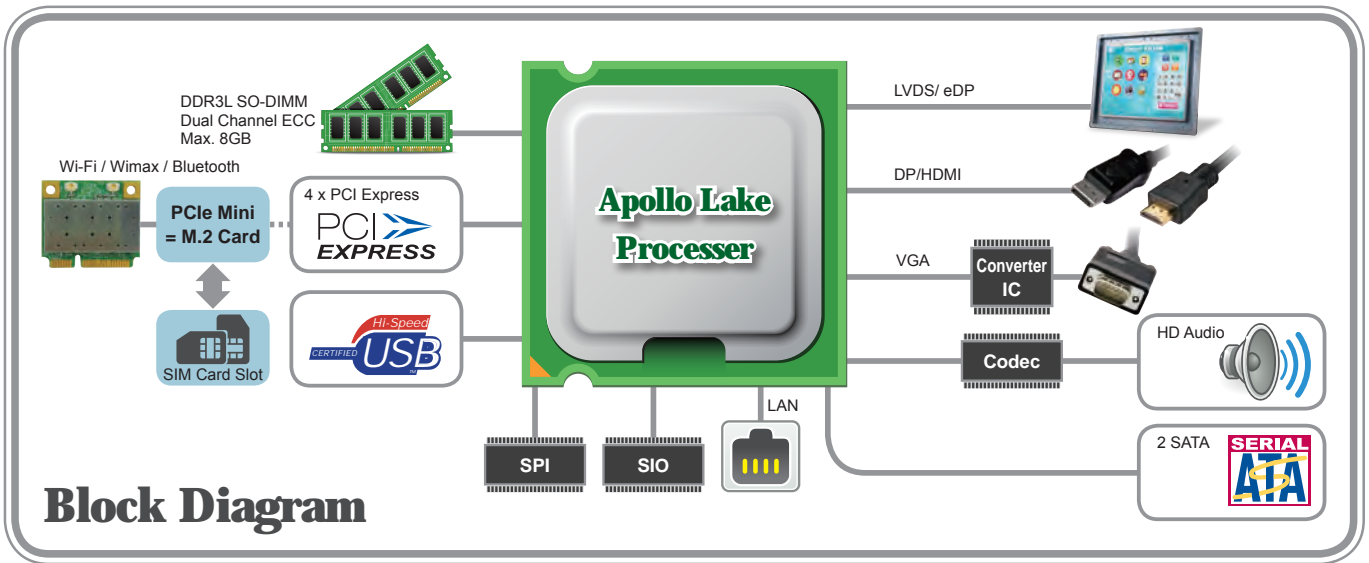
▶ Intel® Apollo Lake CPU Matrix

Product Family	Brand	Processor No.	CPU Core Count	CPU HFM Freq (GHz)	CPU Burst Freq (GHz)	Memory Speed/ Channel	Gfx Freq (MHz) Nominal/ Turbo	Max. TDP	Junction Temperature Range
Apollo Lake/ Apollo Lake-I	Pentium®	N4200	4	1.1	2.5	1866/2	200/750	6W	0°C ~ 105°C
	Celeron®	N3350	2	1.1	2.3	1866/2	200/650	6W	0°C ~ 105°C
	Atom™	x7-E3950	4	1.6	2	1866/2	500/650	12W	-40°C ~ 110°C
	Atom™	x5-E3940	4	1.6	1.8	1866/2	400/600	9.5W	-40°C ~ 110°C
	Atom™	x5-E3930	2	1.3	1.8	1866/2	400/550	6.5W	-40°C ~ 110°C

▶ Intel® Apollo Lake Platform OS Support

Type	Operating System	Support
Microsoft	Windows 10 Enterprise (64-bit), IoT Core (32/64-bit)	Intel ®/Microsoft
Linux	Wind River 8.0 Linux distribution (64-bit)	Wind River
	Yocto Project BSP tool-based embedded Linux distribution (64-bit)	Yocto Project and ISV Partners
Android	Android 6.0 (64-bit) Marshmallow	ISV Partners
RTOS	Wind River VxWorks 7.0	Wind River

▶ Features of IEI Apollo Lake Product

▶ DP++

IEI provides products support Dual-mode DisplayPort output which can auto detect the plugged-in cable type and provide multiple option of display output in single port.
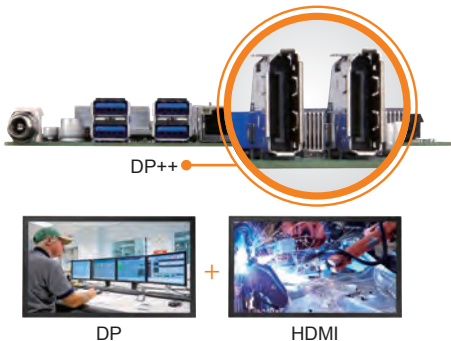
DP++

DP   +   HDMI

▶ M.2

IEI provides new products supporting Next Generation Form Factor (NGFF) expansion cards in different types, such as SSD,

WWAN and WLAN cards suitable for small devices.

M.2 (B key)
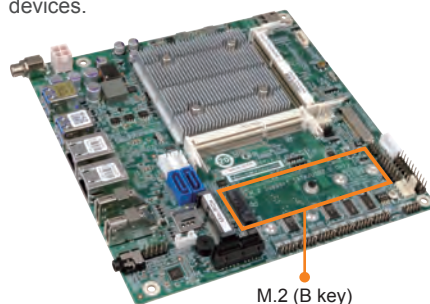
▶ Low profile

Thin type products with single layer rear I/O and low profile thermal solution design are suitable for open frame panel PC solutions and also the best choice for thin compact size embedded box solutions.

Thin Type
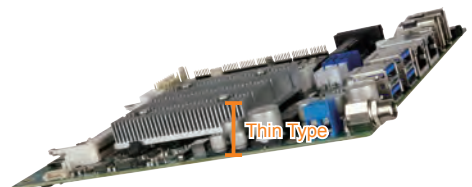
IEI Extreme Environment Series
New Wide Temperature Products

Aerospace

With the popularization of commercial aircraft, in-flight system has improved with computing and the market has also been growing. IEI Extreme Environment series products with outstanding graphic performance, smarter power saving design and good expansion possibility are competitive and suitable for in-flight entertainment (IFE) system under dramatic temper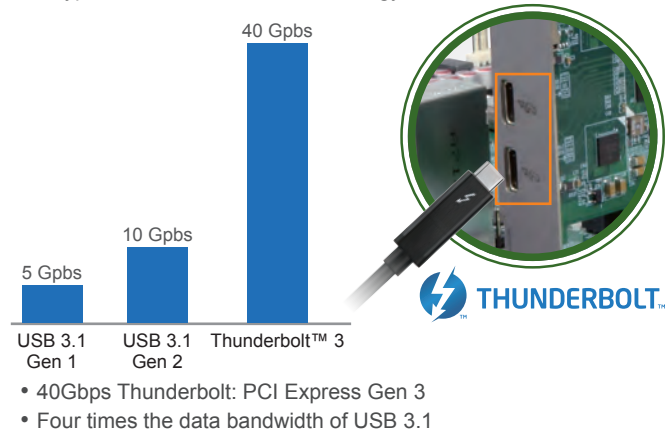ature change. For Extreme Environment series, the supply guarantee we provide is up to 5 years with reliable qualities and affordable price.

▲NANO-ALW2

Aerospace

Military

Military applications are usually under operating in various environments and with special design portion which should be properly protected. CPU on module products from IEI Extreme Environment series offer fast and fully supportive baseboard/ BIOS customization services and rich features with high flexibility for every different application. IEI also provides industrial level monitors from 12.1 och to 24 och with IP65 designs and comprehensive video input which fulfill different need.

Military

▲ICE-BT-T10

Measurement System

-40°C   85°C
Extreme Environment

Transportation
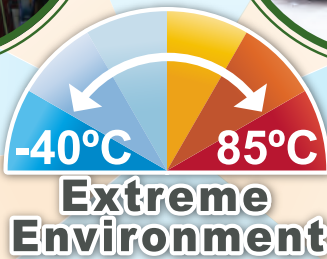
IEI Extreme Environment series – design for operating in high or low temperatures, under thermal shock, high humidity or startups in low temperature. IEI wide temperature products account for most of these demands. The system must be very reliable under every possible operating condition, and it must provide the highest level of failure tolerance since system failures often result in high costs. Wide Temperature Design solution and Testing ensures the system's reliability under extreme operating environments.

Target Market of Wide Temperature Products

Heavy Industry

KIOSK

▲WAFER-BTW2   ▲DM-F24A

Mining Industry

◀MPCIE-UART

Energy

▲EBC-1100
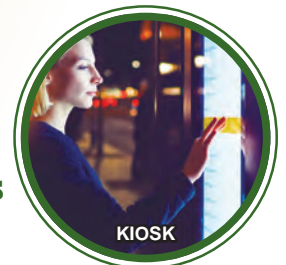
Mining Industry

Under the rugged environment of mining industry, products with wide humidity and temperature support are widely needed. Sensitive touch screen with high brightness and wide viewing angle is also suitable for this application. IEI offers industrial monitors in various sizes and optional touch screen types for mining industrial applications. IEI motherboards with dual independent display output and interface support are also suitable for modern design. Customers can also collocation IEI peripherals with wide temperature support with our system for various applications.

Energy

Energy industrial workstations usually locate in ruggedized environment far from support force. IEI Extreme Environment series are all with fan-less cooling design to lower the system failure opportunity from losing fan and increase the reliability. Dual LAN support and further expansion ability also provide stable internet connection for remote system monitoring and control. IEI provide system health supervision API for customers to prevent disasters such as system instability or damage by quickly capturing and reporting system health data.

IEI Designs Process for Wide Temperature Products

Designing a system using extended temperature components is the most effective method to ensure reliable functionality in an extreme temperature range is met

➠ Component specification review

To meet -40°C~ 85°C, the critical components must have the best reliability. IEI reviews critical components, such as CPU, chipset, SD-RAM, Ethernet IC, clock generator, super IO, EC, PWM IC, transceiver, switch, bridge, hubs, etc.

➠ Thermal solution design

1. Placement & layout

A PCB with good placement & layout helps SBC or system reduce heat.
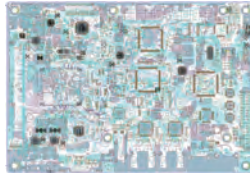
2. Thermal Simulation

To develop a thermal design with thermal simulation and air flow design is a more effective way to ensure a reliable thermal solution.

3. Infrared Thermography

Detects infrared energy emitted from an object, converts it in to a temperature, and displays an image of the temperature distribution.

NEC TVS-G100EXD ▶
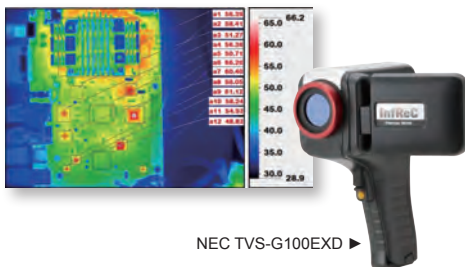
➠ Wide temperature testing before shipment

It ensures the system's reliability under extreme operating environments.

Testing criteria:

1. Wide temperature cycle chamber
2. Operating temperature: -40ºC ~ 85ºC
3. Passmark® burn-in test at 100% loading and power on-off test

Test Process

Pass

-20ºC ~ 60ºC
Standard Prodct

-40ºC ~ 85ºC
Wide Temperature Product
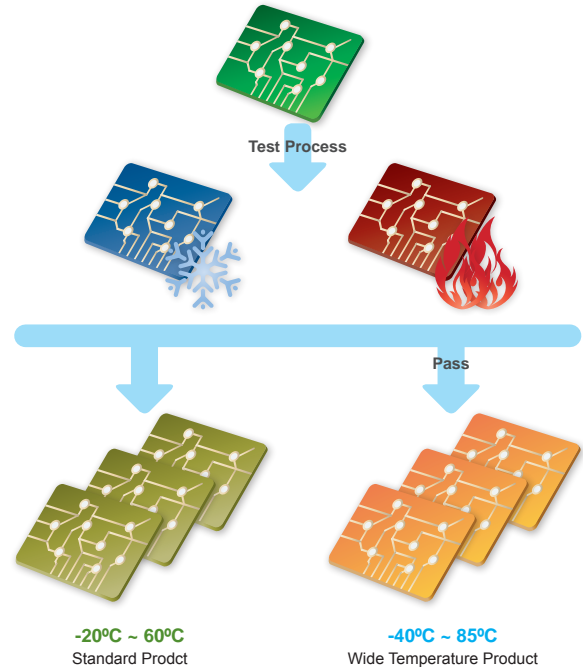
IEI Extreme Environment Series Selection Guide

Model	KINO-DALW2	NANO-ALW2	NANO-BTW2	WAFER-BTW2	iQ7-ALW2	iQ7-BTW2	ICE-BTW2-T10
Size	170mm x 170mm	115mm x 165mm	115mm x 165mm	146mm x 102mm	70mm x 70mm	70mm x 70mm	84mm x 55mm
Memory	2 x DDR3L SO-DIMM slot Max. 8GB	1 x DDR3L SO-DIMM slot Max. 8GB	1 x DDR3L SO-DIMM slot Max. 8GB	2GB onboard (4GB optional)	4GB onboard (8GB optional)	2GB onboard (4GB optional)	2GB onboard (4GB optional)
Display	1 x HDMI 1 x LVDS 1 x VGA	2 x HDMI 1 x LVDS 1 x iDP	1 x HDMI 1 x LVDS 1 x VGA	1 x iDP 1 x LVDS 1 x VGA	1 x DDI (DP/HDMI) 1 x eDP/LVDS	1 x DDI (DP/HDMI) 1 x LVDS	1 x DDI (DP/HDMI) 1 x eDP 1 x VGA
I/O	4 x USB 3.0 4 x RS-232 2 x USB 2.0 2 x RS-232/422/485 1 x PS/2 KB/MS	4 x USB 3.0 4 x RS-232 2 x USB 2.0 2 x RS-232/422/485 1 x PS/2 KB/MS	3 x USB 2.0 3 x RS-232 2 x USB 3.0 1 x RS-422/485 1 x PS/2 KB/MS	6 x USB 2.0 3 x RS-232 1 x USB 3.0 1 x RS-422/485 1 x PS/2 KB/MS	6 x USB 2.0 1 x USB 3.0	6 x USB 2.0 1 x USB 3.0	4 x USB 2.0 1 x USB 3.0
Storage	1 x microSD 2 x SATA 6Gb/s	2 x SATA 6Gb/s	1 x microSD 2 x SATA 3Gb/s	1 x microSD 1 x mSATA 2 x SATA 3Gb/s	1 x 8GB eMMC 5.0 (optional) 2 x SATA 6Gb/s	1 x 4GB SSD (optional) 2 x SATA 3Gb/s	1 x 4GB SSD (optional) 2 x SATA 3Gb/s
Expansion	1 x M.2 (B Key) 1 x PCIe Mini 1 x PCIe x1	1 x M.2 (B Key) 1 x PCIe Mini	1 x PCI/104 1 x PCIe Mini	2 x PCIe Mini	4 x PCIe x1	3 x PCIe x1	3 x PCIe x1

IEI Intelligent System Management Module

▶ What is IEI Intelligent System Management Module?

The IEI Intelligent System Management Module (iSMM) is a system health supervision application which utilizes sensor chips on IEI motherboards to track CPU and system temperatures, fan speed, watchdog timer, digital I/O status and system event. By quickly capturing and reporting system health data, users can prevent disasters such as system instability or damage.

▶ Features

- Both local and remote management
- External and on-chip voltages data feedback
- CPU and system temperature data feedback
- Cooling fan speed data feedback
- Cooling fan speed controlled by PWM/On-Off/Automatic Mode
- Warning sound provided by the buzzer
- WDT test
- Programmable digital I/O
- Save and load system health configurations
- Remote power on/off control

▶ Available Operation System

- Windows® XP
- Windows® Vista
- Windows® 7
- Windows® 8
- Windows® 10

Note: Please disable the UAC function or enable Administrator account while using iSMM+ remote management under Windows® Vista, Windows® 7, Windows® 8 and Windows® 10

▶ Architecture

User Model → User App

Kernel Model →

API
IEI API provides a quick and easy tool for developing applications for your customers.

iSMM Library/DLL

iSMM Device Driver

Hardware Portion Update

Hardware →

iSMM+ supported EC:	iSMM supported Super I/O:
1. iWDD IW0001E 2. ITE IT8528E	1. Winbond W83627 2. Winbond W83697 3. ITE IT8712 4. ITE IT8718 5. ITE IT8783F 6. Fintek F81216D 7. Fintek F81865 8. SMSC SCH311x

PWN/DC

Fan Tachs

CPU Thermal Diode/ Thermistor — Voltage Planes — Fan#1~~ #N — Warning Signal

▶ Remote Control and Management

- Event log list
- Temp. & fan speed value
- Temp. & fan event alert
- System health monitoring

Group of Devices

- Remote power control
- System alert limit setting
- WDT/DIO setting
- Temp & fan alert setting
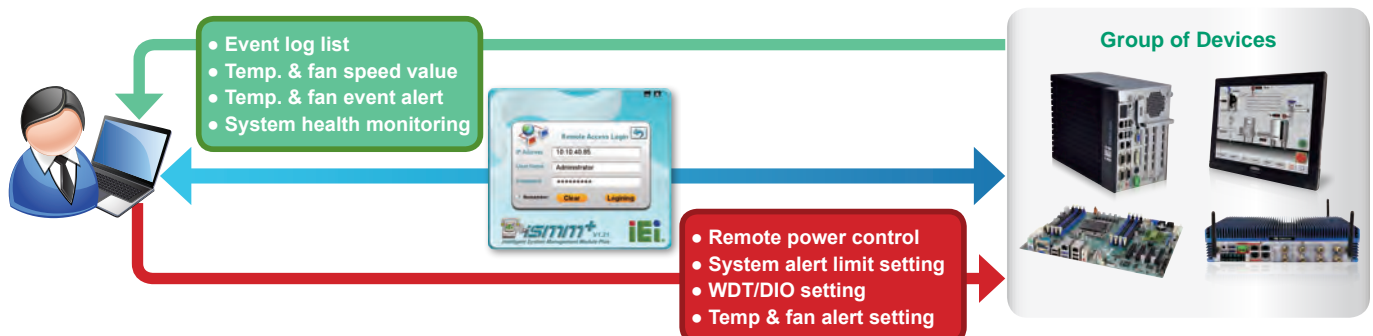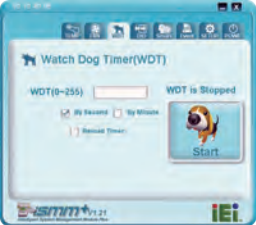
Local/Remote Management

Temp. Sensors
CPU + System temperature monitoring and alert limit setting

Fan
Dynamic fan speed monitoring, control and alert limit setting
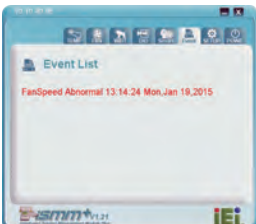
Watchdog Timer
Trouble free watchdog timer testing
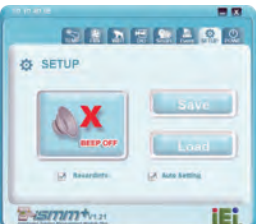
DIO
Easy digital I/O configuration

Full graphical user interface
Real-time access system
Efficient API functions

Smart Fan Control
Advanced fan setting for both CPU and system smart fan

Event List
Clear list for abnormal events with event name, event status and 1st generation time

Beep/Save/Load
Flexible user profile retrieval and beep function setting

Remote Power On/Off
Remotely turn off iSMM+ supported system and turn on system which supports remote wake-up

iSMM & iSMM+ Support List

Software	iSMM+			
Single Board Computer	HPCIE-Q170/C236	PCIE-Q870/H810/Q170	SPCIE-C2260-i2/C236	WSB-H810
	PCISA-BT	IMBA-H110	IMBA-Q170/C2360-i2	IMBA-H810
	IMBA-Q870/C2260-i2	IMB-H110	IMB-Q870-i2	tKINO-ULT3
	KINO-DQM170/DCM-236	KINO-AQ170	tKINO-BW	KINO-DBT
	KINO-DH810	eKINO-BT	KINO-DAL	tKINO-AL
	KINO-AQ870	KINO-DQM871	KINO-SE/KBN-i1	NANO-ULT3
	NANO-BT-i1/BTW2	NANO-QM81-i1	NANO-KBN/SE-i1	WAFER-BW
	WAFER-BTW2	WAFER-ULT/ULT2-i1	WAFER-BT-i1	WAFER-KBN-i1
	HYPER-BW/BT/KBN	ICE-ULT3	ICE-BT-T6/T10	iQ7-BT/AL
Industrial System	IKARPC-07A-BT	IKARPC-W10A-BT	IVS-300-ULT3	IVS-200-ULT2
	IVS-100-BT	IRS-100-ULT3	SBOX-100-QM87	TANK-6000-C226
	TANK-870-QM170	TANK-860-HM86	TANK-820-BW	TANK-801-BT
	TANK-760-HM86	TANK-610-BW	IDS-300-BW	uIBX-250-BW
	uIBX-230-BT	ECN-380A-QM870	ECW-281B-BT	DRPC-120-BT
Panel PC	POC-W22A-H81	PPC-F06B-BT	PPC-F08B-BT	PPC-F10B-BT
	PPC-F12B-BT	PPC-F15A-H81	PPC-F15B-BT	PPC-F17B-BT
	S19A-QM87	S24A-QM87	INOX-F15A	UPC-F12A

* iSMM+ is supported by products with platform above Haswell (4th Gen.) / Bay Trail / eKabini.

Software	iSMM			
Single Board Computer	SPCIE-C2160	PCIE-Q670-R20	WSB-H610	PICOe-B650
	PICOe-HM650	PICOe-PV-D5251-R11	PCISA-PV-D5251	IMBA-C604EP
	IMBA-C2160	IMBA-Q770	IMB-C2160	IMB-Q770
	IMB-G41A	KINO-QM770	KINO-CV-D25501	KINO-CVR-D25502
	NOVA-HM551	NOVA-PV-D5251-R11	NANO-QM770	NANO-CV-D25501 NANO-CV-D25502
	WAFER-NM701-1007U	WAFER-CV-D25501 WAFER-CV-D25502	PM-PV-D5251-R11	ICE-QM770
	ICE-CV-D25501 / ICE-CV-D25502			
Industrial System	TANK-820-H61	TANK-800-D525	TANK-720-Q67	TANK-700-QM67
	TANK-600-D2550	uBIX-210-CV-N2600	ECN-380-QM77	ECW-281B-D2550
	DRPC-100-CV			
Panel PC	AFOLUX GEN III Panel PC	AFL3-12A-BT	AFL3-W07A-BT	AFL3-W10A-BT
	AFL3-W15A-BT	AFL3-W15B-H81	AFOLUX GEN II Panel PC	AFOLUX Panel PC
	IBS-19A Series	POC-17i-HM55	POC-19i-HM55	PPC-37xxA Series
	PPC-51xxA-H61 Series	UPC-V312-D525	UPC-V315-NM70	UPC-V316-QM77
	WIDS-5xxA-H61 Series			

* iSMM is supported by products with platform below Ivy Bridge (3th Gen.) / Cedarview.

IEI One Key Recovery Solution

One Key Recovery
F3

iEi symantec™

IEI's unique One Key Recovery solution allows you to recover and backup your operating system without complicated settings. One Key Recovery is bundled with every IEI SBC, embedded system, and all-in-one panel PC product.

▶ Recovery Tool for IEI Products Only

A. Local operation:
Fix problems at your finger tips via hot key

By pressing F3, users can access the backup/recovery process easily. One Key Recovery simplifies the imaging and migration process, increasing efficiency in system maintenance.

Press F3 to boot into recovery mode...

One Key Backup / Restore

Support OS List	
Windows® XP	Windows® Vista
Windows® 7	Windows® CE 5.0
Windows® CE 6.0	Windows® XP Embedded

Linux OS
1. RedHat 9
2. RedHat RHEL- 5.4
3. Fedora Core 7, 8, 10, 11, 12
4. Ubuntu 6.10, 7.10 , 8.10
5. Debien 4.0, 5.0
6. SuSe 10.3, 11.2

● **One-Key Recovery**
- Factory restore: restore your system to default setting (iei.gho)
- Restore your last backup: recover the last system configuration (iei_user.gho)

```
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:_
```

● **One-Key Backup**
Backup your operating system to the secure hidden partition. You can create your own ghost image as "iei_user.gho" including your application programs set-ups.

B. Auto scheduling: Instant problem solving from auto recovery
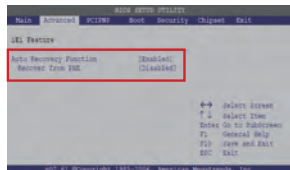
Make sure to enable auto recovery function from BIOS after standard set up

When the system encounters a Blue Screen of Death (BSoD) or hangs for 10 minutes [Default setting is 10 minutes , If want to change the time setting please contact us], the auto recovery function enables the factory default image automatically. This function shortens repair downtime, ensuring continuous work.

Supported OS List	
Windows® 2000	Windows® XP Embedded
Windows® XP	Windows® Embedded Standard 7
Windows® Vista	

Optional function, support by request.

OS Partition C: → **Create Partition** → **Recover image to partition** + **Start SRFixMBR**

Standard OS

Into recovery mode ← **Auto reboot** ← **TCO timer time-out** ← **BSOD or system crash** ← **TCO timer counts down**

Recover factory image | **Auto reboot** | **BSOD or system crash** | **TCO timer counts down**
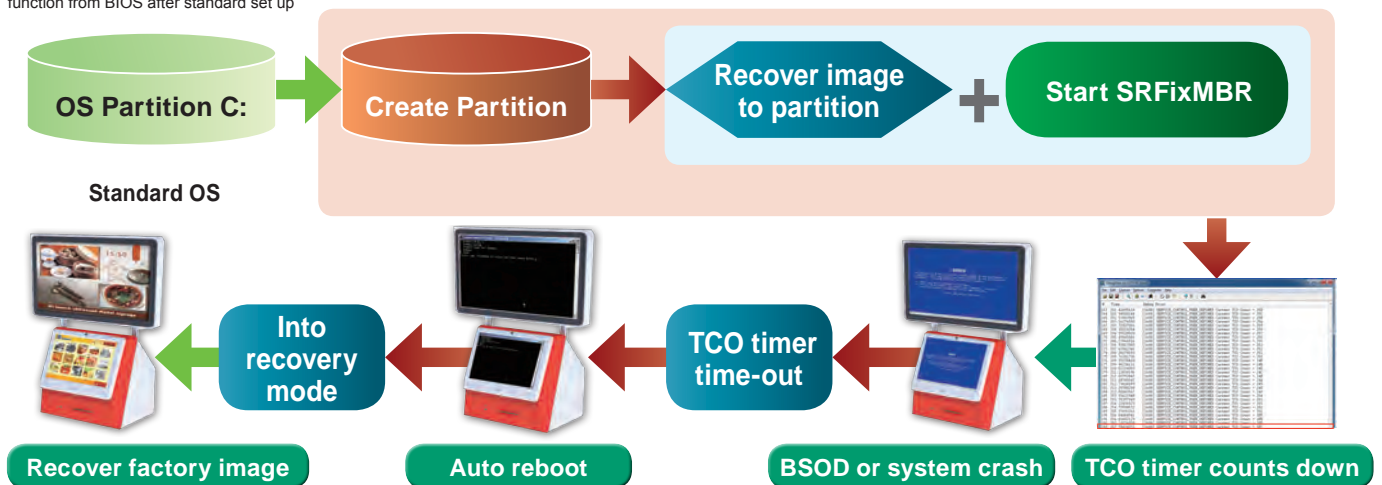
C. Network: Remote recovery through LAN

One key Recovery also provides a remote recovery function. IT professionals can easily maintain client device through the network. When the system has a Blue Screen of Death (BSoD) or hangs for 10 minutes [Default setting is 10 minutes , If want to change the time setting please contact us], the default factory system image can be restored from server to ensure seamless workflow.

Install utility from One Key Recover CD for server

Server requirement
Linux server with DHCP, TFTP and HTTP function

Install setup from One Key Recover CD for client device

Restart client through LAN
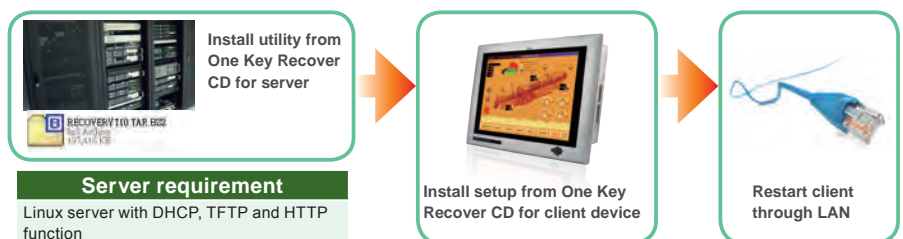
System Chipset	CE 6.0	Embedded Compact 7 CE 7.0	Embedded Compact 2013	2000	XP Pro	7	8.1	10	Server-2003	Server-2008	Server-2012	Server-2016	Linux Kernel
Intel® Coffee Lake S								V					TBD
Intel® Broadwell-DE						V	V	V		V	V		Linux Kernel 3.19
Intel® C604						V			V	V	V		Linux Kernel 2.6.3x
Kaby Lake — Intel® C236								V		V	V	V	Linux Kernel 4.4
Intel® Q170								V					Linux Kernel 4.4
Intel® H110								V					Linux Kernel 4.4
Intel® CM238								V					Linux Kernel 4.4
Intel® QM175								V					Linux Kernel 4.4
Intel® HM175								V					Linux Kernel 4.4
Intel® Kaby Lake ULT								V					Linux Kernel 4.4
Skylake — Intel® C236						V	V	V		V	V	V	Linux Kernel 4.0 (3.2)
Intel® Q170						V	V	V					Linux Kernel 4.0 (3.2)
Intel® H110						V	V	V					Linux Kernel 4.0 (3.2)
Intel® CM236						V	V	V					Linux Kernel 4.0(3.2)
Intel® QM170						V	V	V					Linux Kernel 4.0 (3.2)
Intel® HM170						V	V	V					Linux Kernel 4.0 (3.2)
Intel® Skylake ULT						V	V	V					Linux Kernel 4.0 (3.2)
Intel® Broadwell ULT						V	V	V					Linux Kernel 3.19
Haswell — Intel® C226					V	V	V	V	V	V	V		Linux Kernel 3.x
Intel® Q87					V	V	V						Linux Kernel 3.x
Intel® H81					V	V	V	V					Linux Kernel 3.x
Intel® QM87					V	V	V	V					Linux Kernel 3.x
Intel® Haswell ULT						V	V	V					Linux Kernel 2.6.3x
Ivy Bridge — Intel® C216					V	V	V	V	V	V	V		Linux Kernel 2.6.3x
Intel® Q77					V	V	V	V					Linux Kernel 2.6.3x
Intel® QM77					V	V	V	V					Linux Kernel 2.6.3x
Sandy Bridge — Intel® C206					V	V	V		V	V	V		Linux Kernel 2.6.3x
Intel® Q67	V				V	V	V						Linux Kernel 2.6.3x
Intel® B65	V				V	V	V						Linux Kernel 2.6.3x
Intel® H61	V				V	V	V						Linux Kernel 2.6.3x
Intel® QM67	V				V	V	V						Linux Kernel 2.6.3x
Intel® HM65	V				V	V	V						Linux Kernel 2.6.3x
Intel® Legacy — Intel® Q57					V	V							Linux Kernel 2.6.2x
Intel® QM57					V	V							Linux Kernel 2.6.2x
Intel® HM55					V	V							Linux Kernel 2.6.2x
Intel® Atom™ — Intel® Apollo Lake N4000/ E3900								V					Linux Yocto Project 4.1
Intel® Braswell N3000						V	V	V					Linux Kernel 3.14 Android 5.0
Intel® Bay Trail J1900/ N2930/N2807/E3800		V	V			V	V	V					Linux Kernel 3.12 Andriod 4.2 (32 bit) Android 4.4 (64 bit)
Intel® D2550/N2600/ N2800+ NM10					V	V							Linux Kernel 2.6.35
Intel® D2550/N2600/ N2800 + ICH10R					V	V							Linux Kernel 2.6.35
Intel® D525/D425/ N455/N425 + ICH8M	V				V	V							Linux Kernel 2.6.2x
AMD® — AMD® R-series + A75M						V	V	V					Linux Kernel 3.x
AMD® R-series (MERLIN FALCON) SoC						V	V	V					Linux Kernel 3.13
AMD® G-series (eKABINI) SoC	V	V	V		V	V	V	V					Linux Kernel 3.x
AMD® Geode LX800 +CS5536					V								Linux Kernel 2.6.18

Intel® CPU and Chipset Matrix Table

▶ Microserver D1500 family CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCBGA1667	Xeon® E3	22 nm Broadwell	16/32	D-1577	1.30 GHz	24 MB	45 W	None	None	DDR4-2133, DDR3L-1600	-
			16/32	D-1571	1.30 GHz	24 MB	45 W				
			12/24	D-1567	2.10 GHz	18 MB	65 W				
			12/24	D-1559	1.50 GHz	18 MB	45 W				
			12/24	D-1557	1.50 GHz	18 MB	45 W				
			8/16	D-1548	2.00 GHz	12 MB	45 W				
			8/16	D-1541	2.10 GHz	12 MB	45 W				
			8/16	D-1540	2.00 GHz	12 MB	45 W			DDR4-2133	
			8/16	D-1539	1.60 GHz	12 MB	35 W			DDR4-2133, DDR3L-1600	
			8/16	D-1537	1.70 GHz	12 MB	35 W				
			6/12	D-1531	2.20 GHz	9 MB	45 W				
			4/8	D-1529	1.30 GHz	6 MB	20 W				
			6/12	D-1528	1.90 GHz	9 MB	35 W				
			4/8	D-1527	2.20 GHz	6 MB	35 W				
			4/8	D-1521	2.40 GHz	6 MB	45 W				
			4/8	D-1520	2.20 GHz	6 MB	45 W			DDR4-2133	
			4/8	D-1518	2.20 GHz	6 MB	35 W			DDR4-2133, DDR3L-1600	
	Pentium®		4/8	D1519	1.50 GHz	6 MB	25 W				
			4/8	D1517	1.60 GHz	6 MB	25 W			DDR4-2133, DDR3L-1600	
			2/2	D1509	1.50 GHz	3 MB	19 W				
			2/4	D1508	2.20 GHz	3 MB	25 W				
			2/2	D1507	1.20 GHz	3 MB	20 W				

▶ Workstation E3 CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCLGA1151	Xeon® E3	14 nm Kaby Lake	4/8	E3-1280 V6	3.9GHz	8 MB	72W	None	None	DDR4-2400, DDR3L-1866	C236
			4/8	E3-1275 V6	3.8GHz	8 MB	73W	Intel® HD Graphics P630	350 MHz		
			4/8	E3-1270 V6	3.8GHz	8 MB	72W	None	None		
			4/8	E3-1245 V6	3.7GHz	8 MB	73W	Intel® HD Graphics P630	350 MHz		
			4/8	E3-1240 V6	3.7GHz	8 MB	72W	None	None		
			4/8	E3-1230 V6	3.5GHz	8 MB	72W	None	None		
			4/4	E3-1225 V6	3.3GHZ	8 MB	73W	Intel® HD Graphics P630	350 MHz		
			4/4	E3-1220 V6	3.0GHz	8 MB	72W	None	None		
		14 nm Skylake	4/8	E3-1515MV5	2.80 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics P580	350 MHz	DDR4-2133, LPDDR3-1866, DDR3L-1600	
			4/8	E3-1505MV5	2.80 GHz	8 MB	45 W	Intel® HD Graphics P530			
			4/8	E3-1578LV5	2.00 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics P580	700 MHz	DDR3L, DDR4 2133MHz at 1.2V	
			4/8	E3-1558LV5	1.90 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics P555	650 MHz		
			4/8	E3-1505LV5	2.00 GHz	8 MB	25 W	Intel® HD Graphics P530	350 MHz	DDR4-2133, LPDDR3-1866, DDR3L-1600	
			4/8	E3-1268LV5	2.40 GHz	8 MB	35 W			DDR4-1866/2133, DDR3L-1333/1600@1.35V	
			4/8	E3-1585V5	3.50 GHz	8 MB	65 W	Intel® Iris™ Pro Graphics P580		DDR3L, LPDDR3 1600MHz, DDR4 2133MHz at 1.2V	
			4/8	E3-1585LV5	3.00 GHz	8 MB	45 W				
			4/8	E3-1565LV5	2.50 GHz	8 MB	35 W				
			4/8	E3-1280V5	3.70 GHz	8 MB	80 W	None	None	DDR4-1866/2133, DDR3L-1333/1600@1.35V	
			4/8	E3-1275V5	3.60 GHz	8 MB	80 W	Intel® HD Graphics P530	400 MHz		
			4/8	E3-1270V5	3.60 GHz	8 MB	80 W	None	None		
			4/8	E3-1260LV5	2.90 GHz	8 MB	45 W	None	None		
			4/8	E3-1245V5	3.50 GHz	8 MB	80 W	Intel® HD Graphics P530	400 MHz		
			4/8	E3-1240LV5	2.10 GHz	8 MB	25 W	None	None		
			4/8	E3-1240V5	3.50 GHz	8 MB	80 W	None	None		
			4/4	E3-1235LV5	2.00 GHz	8 MB	25 W	Intel® HD Graphics P530	400 MHz		
			4/8	E3-1230V5	3.40 GHz	8 MB	80 W	None	None		
			4/4	E3-1225V5	3.30 GHz	8 MB	80 W	Intel® HD Graphics P530	400 MHz		
			4/4	E3-1220V5	3.00 GHz	8 MB	80 W	None	None		

Yellow means long-term support

Workstation E3 CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCLGA1150	Xeon® E3	22 nm Haswell	4/4	E3-1220 v3	3.1 GHz	8 MB	80 W	None	-	DDR3 and DDR3L 1333/1600 at 1.5V	C226
			2/4	E3-1220LV3	1.1 GHz	4 MB	13 W		-	DDR3 1333/1600	
			4/4	E3-1225V3	3.2 GHz	8 MB	84 W	Intel® HD Graphics P4600	350 MHz	DDR3 and DDR3L 1333/1600 at 1.5V	
			4/4	E3-1226V3	3.3 GHz	8 MB	84 W		350 MHz		
			4/8	E3-1230 v3	3.3 GHz	8 MB	80 W	None	-		
			4/8	E3-1230Lv3	1.8 GHz	8 MB	25 W		-		
			4/8	E3-1231V3	3.4 GHz	8 MB	80 W		-		
			4/8	E3-1240 v3	3.4 GHz	8 MB	80 W		-		
			4/8	E3-1240LV3	2 GHz	8 MB	25 W		-		
			4/8	E3-1241V3	3.5 GHz	8 MB	80 W		-		
			4/8	E3-1245 v3	3.4 GHz	8 MB	84 W	Intel® HD Graphics P4600	350 MHz		
			4/8	E3-1246V3	3.5 GHz	8 MB	84 W				
			4/8	E3-1265Lv3	2.5 GHz	8 MB	45 W	Intel® HD Graphics	350 MHz		
			4/8	E3-1268LV3	2.3 GHz	8 MB	45 W	Intel® HD Graphics 4600		DDR3 1333/1600	
			4/8	E3-1270 v3	3.5 GHz	8 MB	80 W	None	-	DDR3 and DDR3L 1333/1600 at 1.5V	
			4/8	E3-1271V3	3.6 GHz	8 MB	80 W	None	-		
			4/8	E3-1275 v3	3.5 GHz	8 MB	84 W	Intel® HD Graphics P4600	350 MHz		
			4/8	E3-1275LV3	2.7 GHz	8 MB	45 W	Intel® HD Graphics	350 MHz		
			4/8	E3-1276V3	3.6 GHz	8 MB	84 W	Intel® HD Graphics P4600			
			4/8	E3-1280 v3	3.6 GHz	8 MB	82 W	None	-		
			4/8	E3-1281V3	3.7 GHz	8 MB	82 W	None	-		
			4/8	E3-1285 v3	3.6 GHz	8 MB	84 W	Intel® HD Graphics P4700	350 MHz		
			4/8	E3-1285Lv3	3.1 GHz	8 MB	65 W				
			4/8	E3-1286V3	3.7 GHz	8 MB	84 W				
			4/8	E3-1286LV3	3.2 GHz	8 MB	65 W				
LGA1155	Xeon® E3	22nm Ivy Bridge	4/8	E3-1290V2	3.7 GHz	8 MB	87 W	-	-	DDR3-1333/1600	C206/ C216
			4/8	E3-1280V2	3.6 GHz	8 MB	69 W	-	-		
			4/8	E3-1275V2	3.5 GHz	8 MB	77 W	-	1.25 GHz		
			4/8	E3-1270V2	3.5 GHz	8 MB	69 W	-	-		
			4/8	E3-1265LV2	2.5 GHz	8 MB	45 W	-	1.15 GHz		
			4/8	E3-1245V2	3.4 GHz	8 MB	77 W	-	1.25 GHz		
			4/8	E3-1240V2	3.4 GHz	8 MB	69 W	-	-		
			4/8	E3-1230V2	3.3 GHz	8 MB	69 W	-	-		
			4/4	E3-1225V2	3.2 GHz	8 MB	77 W	-	1.25 GHz		
			4/4	E3-1220V2	3.1 GHz	8 MB	69 W	-	-		
			4/2	E3-1220LV2	2.3 GHz	3 MB	17 W	-	-		
	Xeon® E3	32nm Sandy Bridge	4/8	E3-1290	3.6 GHz	8 MB	95 W	-	-	DDR3-1066/1333	
			4/8	E3-1280	3.5 GHz	8 MB	95 W	-	-		
			4/8	E3-1275	3.4 GHz	8 MB	95 W	-	1.35 GHz		
			4/8	E3-1270	3.4 GHz	8 MB	80 W	-	-		
			4/8	E3-1260L	2.4 GHz	8 MB	45 W	-	1.25 GHz		
			4/8	E3-1245	3.3 GHz	8 MB	95 W	-	1.35 GHz		
			4/8	E3-1240	3.3 GHz	8 MB	80 W	-	-		
			4/8	E3-1235	3.2 GHz	8 MB	95 W	-	1.35 GHz		
			4/8	E3-1230	3.2 GHz	8 MB	80 W	-	-		
			4/4	E3-1225	3.1 GHz	6 MB	95 W	-	1.35 GHz		
			4/2	E3-1220L	2.2 GHz	3 MB	20 W	-	-		
			4/4	E3-1220	3.1 GHz	8 MB	80 W	-	-		

Desktop Core™ i7/i5/i3/Pentium®/Celeron® CPU List

Suppoted Sockets	Brand	process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCLGA1151	Core™ i7	14nm Kaby Lake	4/8	i7-7700	3.6GHz	8 MB	65W	Intel® HD Graphics 630	350 MHz	DDR4-2133/2400, DDR3L-1333/1600 @ 1.35V	C236/ Q170/ H110
			4/8	i7-7700K	4.2GHz	8 MB	91W				
			4/8	i7-7700T	2.9GHz	8 MB	35W				
		14 nm Skylake	4/8	i7-6785R	3.30 GHz	8 MB	65 W	Intel® Iris™ Pro Graphics 580		DDR4-1866/2133, DDR3L-1333/1600 @ 1.35V	
			4/8	i7-6700K	4.00 GHz	8 MB	91 W	Intel® HD Graphics 530			
			4/8	i7-6700T	2.80 GHz	8 MB	35 W				
			4/8	i7-6700	3.40 GHz	8 MB	65 W				
			4/8	i7-6700TE	2.40 GHz	8 MB	35 W				
	Core™ i5	14nm Kaby Lake	4/4	i5-7600K	3.8GHz	6 MB	91W	Intel® HD Graphics 630	350 MHz	DDR4-2133/2400, DDR3L-1333/1600 @ 1.35V	
			4/4	i5-7600T	2.8GHz	6 MB	35W				
			4/4	i5-7600	3.5GHz	6 MB	65W				
			4/4	i5-7500	3.4GHz	6 MB	65W				
			4/4	i5-7400T	2.4GHz	6 MB	35W				
			4/4	i5-7500T	2.7GHz	6 MB	35W				
			4/4	i5-7400	3.5GHz	6 MB	65W				
		14 nm Skylake	4/4	i5-6600	3.30 GHz	6 MB	65 W	Intel® Iris™ Pro Graphics 580		DDR4-1866/2133, DDR3L-1333/1600 @ 1.35V	
			4/4	i5-6600K	3.50 GHz	6 MB	91 W				
			4/4	i5-6585R	2.80 GHz	6 MB	65 W				
			4/4	i5-6500	3.20 GHz	6 MB	65 W	Intel® HD Graphics 530			
			4/4	i5-6500T	2.50 GHz	6 MB	35 W				
			4/4	i5-6402P	2.80 GHz	6 MB	65 W	Intel® HD Graphics 510			
			4/4	i5-6400	2.70 GHz	6 MB	65 W	Intel® HD Graphics 530			
			4/4	i5-6400T	2.20 GHz	6 MB	35 W				
			4/4	i5-6500TE	2.30 GHz	6 MB	35 W				

Yellow means long-term support

▶ Desktop Core™ i7/i5/i3/Pentium®/Celeron® CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCLGA1151	Core™ i3	14nm Kaby Lake	2/4	i3-7350K	4.2GHz	4 MB	60W	Intel® HD Graphics 630	350 MHz	DDR4-2133/2400, DDR3L-1333/1600 @ 1.35V	C236/ Q170/ H110
			2/4	i3-7320	4.1GHz	4 MB	51W				
			2/4	i3-7300	4.0GHz	4 MB	51W				
			2/4	i3-7300T	3.5GHz	4 MB	35W				
			2/4	i3-7101E	3.9GHz	3 MB	54W				
			2/4	i3-7101TE	3.4GHz	3 MB	35W				
			2/4	i3-7100T	3.4GHz	3 MB	35W				
			2/4	i3-7100T	3.9GHz	3 MB	51W				
		14 nm Skylake	2/4	i3-6300	3.80 GHz	4 MB	51 W	Intel® HD Graphics 530		DDR4-1866/2133, DDR3L-1333/1600 @ 1.35V	
			2/4	i3-6300T	3.30 GHz	4 MB	35 W				
			2/4	i3-6320	3.90 GHz	4 MB	51 W				
			2/4	i3-6100	3.70 GHz	3 MB	51 W				
			2/4	i3-6100T	3.20 GHz	3 MB	35 W				
			2/4	i3-6100TE	2.70 GHz	4 MB	35 W				
	Pentium®	14nm Kaby Lake	2/4	G4620	3.7GHz	3 MB	51W	Intel® HD Graphics 630		DDR4-2133/2400, DDR3L-1333/1600 @ 1.35V	
			2/4	G4600	3.0GHz	3 MB	35W				
			2/4	G4600T	3.6GHz	3 MB	51W				
			2/4	G4560T	2.9GHz	3 MB	35W	Intel® HD Graphics 610			
			2/4	G4560	3.5GHz	3 MB	54W				
		14 nm Skylake	2/2	G4500	3.50 GHz	3 MB	51W	Intel® HD Graphics 530		DDR4-1866/2133, DDR3L-1333/1600 @ 1.35V	
			2/2	G4500T	3.00 GHz	3 MB	35W				
			2/2	G4520	3.60 GHz	3 MB	51W				
			2/2	G4400	3.30 GHz	3 MB	54W	Intel® HD Graphics 510			
			2/2	G4400T	2.90 GHz	3 MB	35W				
			2/2	G4400TE	2.40 GHz	3 MB	35W				
	Celeron®	14nm Kaby Lake	2/2	G3950	3.0GHz	2 MB	51W	Intel® HD Graphics 610		DDR4 2133, DDR3L 1333/1600 @ 1.35V	
			2/2	G3930TE	2.7GHz	2 MB	35W			DDR4-2133, DDR3L-1600	
			2/2	G3930T	2.7GHz	2 MB	35W			DDR4 2133, DDR3L 1333/1600 @ 1.35V	
			2/2	G3930E	2.9GHz	2 MB	54W			DDR4-2133, DDR3L-1600	
			2/2	G3930	2.9GHz	2 MB	51W			DDR4 2133, DDR3L 1333/1600 @ 1.35V	
		14 nm Skylake	2/2	G3920	2.90 GHz	2 MB	51 W	Intel® HD Graphics 510		DDR4-1866/2133, DDR3L-1333/1600 @ 1.35V	
			2/2	G3900T	2.60 GHz	2 MB	35 W				
			2/2	G3900	2.80 GHz	2 MB	51 W				
			2/2	G3900TE	2.30 GHz	2 MB	35 W				
FCLGA1150	Core™ i7	22 nm Haswell	4/4	i7-4765T	2 GHz	8 MB	35 W	Intel® HD Graphics 4600	350 MHz	DDR3-1333/1600, DDR3L-1333/1600 @ 1.5V	C226/ Q87/H81 C226/ Q87/H81
			2/4	i7-4770	3.4 GHz	8 MB	84 W		350 MHz		
			4/4	i7-4770K	3.5 GHz	8 MB	84 W		350 MHz		
			4/8	i7-4770S	3.1 GHz	8 MB	65 W		350 MHz		
			4/8	i7-4770T	2.5 GHz	8 MB	45 W		350 MHz		
			4/8	i7-4771	3.5 GHz	8 MB	84 W		350 MHz		
			4/8	i7-4785T	2.2 GHz	8 MB	35 W		350 MHz		
			4/8	i7-4790	3.6 GHz	8 MB	84 W		350 MHz		
			4/8	i7-4790S	3.2 GHz	8 MB	65 W		350 MHz		
			4/8	i7-4790T	2.7 GHz	8 MB	45 W		350 MHz		
	Core™ i5		4/4	i5-4670	3.4 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4670K	3.4 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4670S	3.1 GHz	6 MB	65 W		350 MHz		
			4/4	i5-4670T	2.3 GHz	6 MB	45 W		350 MHz		
			4/4	i5-4690	3.5 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4690S	3.2 GHz	6 MB	65 W		350 MHz		
			4/4	i5-4690T	2.5 GHz	6 MB	45 W		350 MHz		
			4/4	i5-4570	3.2 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4570S	2.9 GHz	6 MB	65 W		350 MHz		
			2/4	i5-4570T	2.9 GHz	4 MB	35 W		200 MHz		
			4/4	i5-4590	3.3 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4590S	3 GHz	6 MB	65 W		350 MHz		
			4/4	i5-4590T	2 GHz	6 MB	35 W		350 MHz		
			4/4	i5-4460T	1.9 GHz	6 MB	35 W		350 MHz		
			4/4	i5-4460S	2.9 GHz	6 MB	65 W		350 MHz		
			4/4	i5-4460	3.2 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4440S	2.8 GHz	6 MB	65 W		350 MHz		
			4/4	i5-4440	3.1 GHz	6 MB	84 W		350 MHz		
			4/4	i5-4430S	2.7 GHz	6 MB	65 W		350 MHz		
			4/4	i5-4430	3 GHz	6 MB	84 W		350 MHz		
	Core™ i3		2/4	i3-4330	3.5 GHz	4 MB	54 W	Intel® HD Graphics 4600	350 MHz		
			2/4	i3-4330T	3 GHz	4 MB	35 W		200 MHz		
			2/4	i3-4340	3.6 GHz	4 MB	54 W		350 MHz		
			2/4	i3-4350	3.6 GHz	4 MB	54 W		350 MHz		
			2/4	i3-4350T	3.1 GHz	4 MB	35 W		200 MHz		
			2/4	i3-4360	3.7 GHz	4 MB	54 W		350 MHz		
			2/4	i3-4360T	3.2 GHz	4 MB	35 W		200 MHz		
			2/4	i3-4370	3.8 GHz	4 MB	54 W		350 MHz		
			2/4	i3-4370T	3.3 GHz	4 MB	35 W		200 MHz		
			2/4	i3-4170T	3.2 GHz	3 MB	35 W	Intel® HD Graphics 4400	200 MHz		
			2/4	i3-4170	3.7 GHz	3 MB	54 W		350 MHz		
			2/4	i3-4160T	3.1 GHz	3 MB	35 W		200 MHz		
			2/4	i3-4160	3.6 GHz	3 MB	54 W		350 MHz		
			2/4	i3-4150T	3 GHz	3 MB	35 W		200 MHz		
			2/4	i3-4150	3.5 GHz	3 MB	54 W		350 MHz		
			2/4	i3-4130T	2.9 GHz	3 MB	35 W		200 MHz		
			2/4	i3-4130	3.4 GHz	3 MB	54 W		350 MHz		

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▶ Desktop Core™ i7/i5/i3/Pentium®/Celeron® CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCLGA1150	Pentium®	22 nm Haswell	2/2	G3470	3.6 GHz	3 MB	53 W	Intel® HD Graphics	350 MHz	DDR3-1333/1600, DDR3L-1333/1600 @ 1.5V	C226/Q87/H81
			2/2	G3460T	3 GHz	3 MB	35 W		200 MHz		
			2/2	G3460	3.5 GHz	3 MB	53 W		350 MHz		
			2/2	G3450T	2.9 GHz	3 MB	35 W		200 MHz		
			2/2	G3450	3.4 GHz	3 MB	53 W		350 MHz		
			2/2	G3440T	2.8 GHz	3 MB	35 W		200 MHz		
			2/2	G3440	3.3 GHz	3 MB	53 W		350 MHz		
			2/2	G3430	3.3 GHz	3 MB	53 W		350 MHz		
			2/2	G3420T	2.7 GHz	3 MB	35 W		200 MHz		
			2/2	G3420	3.2 GHz	3 MB	53 W		350 MHz		
			2/2	G3260T	2.9 GHz	3 MB	35 W		200 MHz	DDR3-1333, DDR3L-1333 @ 1.5V	
			2/2	G3260	3.3 GHz	3 MB	53 W		350 MHz		
			2/2	G3258	3.2 GHz	3 MB	53 W		350 MHz		
			2/2	G3250T	2.8 GHz	3 MB	35 W		200 MHz		
			2/2	G3250	3.2 GHz	3 MB	53 W		350 MHz		
			2/2	G3240T	2.7 GHz	3 MB	35 W		200 MHz		
			2/2	G3240	3.1 GHz	3 MB	53 W		350 MHz		
			2/2	G3220T	2.6 GHz	3 MB	35 W		200 MHz		
			2/2	G3220	3 GHz	3 MB	53 W		350 MHz		
	Celeron®		2/2	G1820	2.7 GHz	2 MB	53 W		350 MHz		
			2/2	G1820T	2.4 GHz	2 MB	35 W		200 MHz		
			2/2	G1830	2.8 GHz	2 MB	53 W		350 MHz		
			2/2	G1840	2.8 GHz	2 MB	53 W		350 MHz		
			2/2	G1840T	2.5 GHz	2 MB	35 W		200 MHz		
			2/2	G1850	2.9 GHz	2 MB	53 W		350 MHz		
LGA1155	Core™ i7	22nm Ivy Bridge	4/8	i7-3770T	2.5 GHz	8 MB	45 W	-	1.15 GHz	DDR3-1333/1600	Q77/Q67/B65/H61
			4/8	i7-3770S	3.1 GHz	8 MB	65 W	-	1.15 GHz		
			4/8	i7-3770K	3.5 GHz	8 MB	77 W	-	1.15 GHz		
			4/8	i7-3770	3.4 GHz	8 MB	77 W	-	1.15 GHz		
	Core™ i7	32nm Sandy Bridge	4/8	i7-2700K	3.5 GHz	8 MB	95 W	-	1.35 GHz	DDR3-1066/1333	
			4/8	i7-2600S	2.8 GHz	8 MB	65 W	-	1.35 GHz		
			4/8	i7-2600K	3.4 GHz	8 MB	95 W	-	1.35 GHz		
			4/8	i7-2600	3.4 GHz	8 MB	95 W	-	1.35 GHz		
	Core™ i5	22nm Ivy Bridge	4/4	i5-3570T	2.3 GHz	6 MB	45 W	-	1.15 GHz	DDR3-1333/1600	
			4/4	i5-3570S	3.1 GHz	6 MB	65 W	-	1.15 GHz		
			4/4	i5-3570K	3.4 GHz	6 MB	77 W	-	1.15 GHz		
			4/4	i5-3570	3.4 GHz	6 MB	77 W	-	1.15 GHz		
			4/4	i5-3550S	3 GHz	6 MB	65 W	-	1.15 GHz		
			4/4	i5-3550	3.3 GHz	6 MB	77 W	-	1.15 GHz		
			4/4	i5-3475S	2.9 GHz	6 MB	65 W	-	1.1 GHz		
			2/4	i5-3470T	2.9 GHz	3 MB	35 W	-	1.1 GHz		
			4/4	i5-3470S	2.9 GHz	6 MB	65 W	-	1.1 GHz		
			4/4	i5-3470	3.2 GHz	6 MB	77 W	-	1.1 GHz		
			4/4	i5-3450S	2.8 GHz	6 MB	65 W	-	1.1 GHz		
			4/4	i5-3450	3.1 GHz	6 MB	77 W	-	1.1 GHz		
			4/4	i5-3350P	3.1 GHz	6 MB	69 W	-	1.05 GHz		
			4/4	i5-3330S	2.7 GHz	6 MB	65 W	-	1.05 GHz		
			4/4	i5-3330	3 GHz	6 MB	77 W	-	1.05 GHz		
	Core™ i5	32nm Sandy Bridge	4/4	i5-2550K	3.4 GHz	6 MB	95 W	-	1.25 GHz	DDR3-1066/1333	
			4/4	i5-2500T	2.3 GHz	6 MB	45 W	-	1.25 GHz		
			4/4	i5-2500S	2.7 GHz	6 MB	65 W	-	1.1 GHz		
			4/4	i5-2500K	3.3 GHz	6 MB	95 W	-	1.1 GHz		
			4/4	i5-2500	3.3 GHz	6 MB	95 W	-	1.1 GHz		
			4/4	i5-2450P	3.2 GHz	6 MB	95 W	-	1.1 GHz		
			4/4	i5-2405S	2.5 GHz	6 MB	65 W	-	1.1 GHz		
			4/4	i5-2400S	2.5 GHz	6 MB	65 W	-	1.1 GHz		
			4/4	i5-2400	3.1 GHz	6 MB	95 W	-	1.1 GHz		
			2/4	i5-2390T	2.7 GHz	3 MB	35 W	-	1.1 GHz		
			4/4	i5-2380P	3.1 GHz	6 MB	95 W	-	1.1 GHz		
			4/4	i5-2320	3 GHz	6 MB	95 W	-	1.1 GHz		
			4/4	i5-2310	2.9 GHz	6 MB	95 W	-	1.1 GHz		
			4/4	i5-2300	2.8 GHz	6 MB	95 W	-	1.1 GHz		
	Core™ i3	22nm Ivy Bridge	2/4	i3-3240T	2.9 GHz	3 MB	35 W	-	1.05 GHz	DDR3-1333/1600	
			2/4	i3-3240	3.4 GHz	3 MB	55 W	-	1.05 GHz		
			2/4	i3-3225	3.3 GHz	3 MB	55 W	-	1.05 GHz		
			2/4	i3-3220T	2.8 GHz	3 MB	35 W	-	1.05 GHz		
			2/4	i3-3220	3.3 GHz	3 MB	55 W	-	1.05 GHz		
	Core™ i3	32nm Sandy Bridge	2/4	i3-2130	3.4 GHz	3 MB	65 W	-	1.1 GHz	DDR3-1066/1333	
			2/4	i3-2125	3.3 GHz	3 MB	65 W	-	1.1 GHz		
			2/4	i3-2120T	2.6 GHz	3 MB	35 W	-	1.1 GHz		
			2/4	i3-2120	3.3 GHz	3 MB	65 W	-	1.1 GHz		
			2/4	i3-2105	3.1 GHz	3 MB	65 W	-	1.1 GHz		
			2/4	i3-2102	3.1 GHz	3 MB	65 W	-	1.1 GHz		
			2/4	i3-2100T	2.5 GHz	3 MB	35 W	-	1.1 GHz		
			2/4	i3-2100	3.1 GHz	3 MB	65 W	-	1.1 GHz		
	Pentium®	22nm Ivy Bridge	2/2	G2120	3.1 GHz	3 MB	55 W	-	1.05 GHz	DDR3-1333/1600	
			2/2	G2100T	2.6 GHz	3 MB	35 W	-	1.05 GHz		

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Desktop Core™ i7/i5/i3/Pentium®/Celeron® CPU List

CPU Socket	Brand	Process	Core/Threads	CPU No.	Clock Speed	Smart Cache	TDP	Int. GFX Speed	Max Memory Speed (DDR3)	Chipset
LGA1155	Pentium®	32nm Sandy Bridge	2/2	G870	3.1 GHz	3 MB	65 W	1.1 GHz	DDR3-1066/1333	Q77/Q67/B65/H61
			2/2	G860T	2.6 GHz	3 MB	35 W	1.1 GHz		
			2/2	G860	3 GHz	3 MB	65 W	1.1 GHz		
			2/2	G850	2.9 GHz	3 MB	65 W	1.1 GHz		
			2/2	G840	2.8 GHz	3 MB	65 W	1.1 GHz		
			2/2	G645T	2.5 GHz	3 MB	35 W	1.1 GHz	DDR3-1066	
			2/2	G645	2.9 GHz	3 MB	65 W	1.1 GHz		
			2/2	G640T	2.4 GHz	3 MB	35 W	1.1 GHz		
			2/2	G640	2.8 GHz	3 MB	65 W	1.1 GHz		
			2/2	G632	2.7 GHz	3 MB	65 W	1.1 GHz		
			2/2	G630T	2.3 GHz	3 MB	35 W	1.1 GHz		
			2/2	G630	2.7 GHz	3 MB	65 W	1.1 GHz		
			2/2	G622	2.6 GHz	3 MB	65 W	1.1 GHz		
			2/2	G620T	2.2 GHz	3 MB	35 W	1.1 GHz		
			2/2	G620	2.6 GHz	3 MB	65 W	1.1 GHz		
	Celeron®	22nm Ivy Bridge	2/2	G1610	2.6 GHz	2 MB	55 W	1.05 GHz		
			2/2	G1620	2.7 GHz	2 MB	55 W	1.05 GHz		
			2/2	G1610T	2.3 GHz	2 MB	35 W	1.05 GHz		
	Celeron®	32nm Sandy Bridge	2/2	G555	2.7 GHz	2 MB	65 W	1 GHz		
			2/2	G550T	2.2 GHz	2 MB	35 W	1 GHz		
			2/2	G550	2.6 GHz	2 MB	65 W	1 GHz		
			2/2	G540T	2.1 GHz	2 MB	35 W	1 GHz		
			2/2	G540	2.5 GHz	2 MB	65 W	1 GHz		
			2/2	G530T	2 GHz	2 MB	35 W	1 GHz		
			2/2	G530	2.4 GHz	2 MB	65 W	1 GHz		
			1/2	G465	1.9 GHz	1.5 MB	35 W	1 GHz		
			1/2	G460	1.8 GHz	1.5 MB	35 W	1 GHz		
			1/1	G440	1.6 GHz	1 MB	35 W	1 GHz		
LGA1156	Core™ i7	45nm	Quad Core	i7-880	2.93G	8M	95W	-	DDR3-1333/1600	Q57
				i7-875K	2.93G	8M	95W	-		
				i7-870S	2.66G	8M	82W	-		
				i7-870	2.93G	8M	95W	-		
				i7-860S	2.53G	8M	82W	-		
				i7-860	2.8G	8M	95W	-		
	Core™ i5			i5-760	2.8G	8M	95W	-		
				i5-750S	2.4G	8M	82W	-		
				i5-750	2.66G	8M	95W	-		
	Core™ i5	32nm	Dual Core	i5-680	3.6G	4M	73W	733MHz		
				i5-670	3.46G	4M	73W	733MHz		
				i5-661	3.33G	4M	87W	900MHz		
				i5-660	3.33G	4M	73W	733MHz		
				i5-665K	3.2G	4M	73W	733MHz		
				i5-650	3.2G	4M	73W	733MHz		
	Core™ i3			i3-560	3.33G	4M	73W	733MHz		
				i3-550	3.2G	4M	73W	733MHz		
				i3-540	3.06G	4M	73W	733MHz		
				i3-530	2.93G	4M	73W	733MHz		
	Pentium®			G6960	2.933G	3M	73W	533MHz	DDR3-1333	
				G6950	2.8G	3M	73W	533MHz		

ULT CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCBGA1356	Core™ i7	14 nm Kabylake	2/4	i7-7660U	2.5GHz	4MB	15W	Intel® Iris™ Plus Graphics 640	300 MHz	DDR4-2133, LPDDR3-1866, DDR3L-1600	-
			2/4	i7-7600U	2.8GHz	4MB	15W	Intel® HD Graphics 620			-
			2/4	i7-7567U	3.5GHz	4MB	28W	Intel® Iris™ Plus Graphics 650			-
			2/4	i7-7560U	2.4GHz	4MB	15W	Intel® Iris™ Plus Graphics 640			-
			2/4	i7-7500U	2.70 GHz	4MB	15 W	Intel® HD Graphics 620			-
	Core™ i5		2/4	i5-7360U	2.3GHz	4MB	15W	Intel® Iris™ Plus Graphics 640			-
			2/4	i5-7300U	2.6GHz	3MB	15W	Intel® HD Graphics 620			-
			2/4	i5-7287U	3.3GHz	4MB	28W	Intel® Iris™ Plus Graphics 650			-
			2/4	i5-7267U	3.1GHz	4MB	28W	Intel® Iris™ Plus Graphics 650			-
			2/4	i5-7260U	2.2GHz	4MB	15W	Intel® Iris™ Plus Graphics 640			-
			2/4	i5-7200U	2.50 GHz	3MB	15W	Intel® HD Graphics 620			-
	Core™ i3		2/4	i3-7130U	2.7GHz	3MB	15W	Intel® HD Graphics 620			-
			2/4	i3-7167U	2.8GHz	3MB	28W	Intel® Iris™ Plus Graphics 650			-
			2/4	i3-7100U	2.40 GHz	3MB	15W	Intel® HD Graphics 620			-
	Pentium®		2/4	4415U	2.3GHz	2MB	15W	Intel® HD Graphics 610			-
	Celeron®		2/2	3965U	2.2GHz	2MB	15W	Intel® HD Graphics 610			-
			2/2	3865U	1.8GHz	2MB	15W	Intel® HD Graphics 610			-

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ULT CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCBGA1356	Core™ i7	14 nm Skylake	2/4	i7-6500U	2.50 GHz	4 MB	15 W	Intel® HD Graphics 520	300 MHz	DDR4-2133, LPDDR3-1866, DDR3L-1600	-
			2/4	i7-6560U	2.20 GHz	4 MB	15 W	Intel® Iris™ Graphics 540			-
			2/4	i7-6567U	3.30 GHz	4 MB	28 W	Intel® Iris™ Graphics 550			-
			2/4	i7-6600U	2.60 GHz	4 MB	15 W	Intel® HD Graphics 520			-
			2/4	i7-6660U	2.40 GHz	4 MB	15 W	Intel® Iris™ Graphics 540			-
			2/4	i7-6650U	2.20 GHz	4 MB	15 W				-
	Core™ i5		2/4	i5-6287U	3.10 GHz	4 MB	28 W	Intel® Iris™ Graphics 550			-
			2/4	i5-6267U	2.90 GHz	4 MB	28 W				-
			2/4	i5-6260U	1.80 GHz	4 MB	15 W	Intel® Iris™ Graphics 540			-
			2/4	i5-6200U	2.30 GHz	3 MB	15 W	Intel® HD Graphics 520			-
			2/4	i5-6300U	2.40 GHz	3 MB	15 W				-
			2/4	i5-6360U	2.00 GHz	4 MB	15 W	Intel® Iris™ Graphics 540			-
	Core™ i3		2/4	i3-6006U	2.00 GHz	3 MB	15 W	Intel® HD Graphics 520			-
			2/4	i3-6167U	2.70 GHz	3 MB	28 W	Intel® Iris™ Graphics 550			-
			2/4	i3-6157U	2.40 GHz	3 MB	28 W				-
			2/4	i3-6100U	2.30 GHz	3 MB	15 W	Intel® HD Graphics 520			-
	Pentium®		2/4	4405U	2.10 GHz	2 MB	15 W	Intel® HD Graphics 510		DDR4-1866/2133, LPDDR3-1600/1866	-
	Celeron®		2/2	3855U	1.60 GHz	2 MB	15 W			DDR4-1866/2133, LPDDR3-1600/1866, DDR3L-1333/1600	-
			2/2	3955U	2.00 GHz	2 MB	15 W				-
FCBGA1168	Core™ i7	14 nm Broadwell	2/4	i7-5650U	2.2 GHz	4 MB	15 W	Intel® HD Graphics 6000	300 MHz	DDR3L 1333/1600, LPDDR3 1600/1866	-
	Core™ i5		2/4	i5-5350U	1.8 GHz	3 MB	15 W		300 MHz		-
	Core™ i3		2/4	i3-5010U	2.1 GHz	3 MB	15 W	Intel® HD Graphics 5500	300 MHz	DDR3L 1333/1600, LPDDR 1333/1600	-
	Celeron®		2/2	3765U	1.9 GHz	2 MB	15 W	Intel® HD Graphics	300 MHz		-
	Core™ i7	22 nm Haswell	2/4	i7-4650U	1.7 GHz	4 MB	15 W	Intel® HD Graphics 5000	200 MHz	DDR3L 1333/1600, LPDDR3 1333/1600	-
	Core™ i5		2/4	i5-4300U	1.9 GHz	3 MB	15 W	Intel® HD Graphics 4400	200 MHz		-
	Core™ i3		2/4	i3-4010U	1.7 GHz	3 MB	15 W		200 MHz		-
	Celeron®		2/2	2980U	1.6 GHz	2 MB	15 W	Intel® HD Graphics	200 MHz		-

Mobile Core™ i7/i5/i3/Celeron® CPU List

Supported Sockets	Brand	Process	Cores/Threads	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCBGA1440	Xeon® E3	14 nm Skylake	4/8	E3-1575MV5	3.00 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics P580	350 MHz	DDR4-2133, LPDDR3-1866, DDR3L-1600	CM236
			4/8	E3-1545MV5	2.90 GHz	8 MB	45 W				
			4/8	E3-1535MV5	2.90 GHz	8 MB	45 W	Intel® HD Graphics P530			
			4/8	E3-1515MV5	2.80 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics P580			
			4/8	E3-1505MV5	2.80 GHz	8 MB	45 W	Intel® HD Graphics P530			
FCBGA1440	Core™ i7	14 nm Skylake	4/8	i7-6820EQ	2.80 GHz	8 MB	45 W	Intel® HD Graphics 530	350 MHz	DDR4-2133, LPDDR3-1866, DDR3L-1600	QM170/HM170
			4/8	i7-6822EQ	2.00 GHz	8 MB	25 W				
			4/8	i7-6700HQ	2.60 GHz	6 MB	45 W				
			4/8	i7-6770HQ	2.60 GHz	6 MB	45 W	Intel® Iris™ Pro Graphics 580			
			4/8	i7-6820HK	2.70 GHz	8 MB	45 W	Intel® HD Graphics 530			
			4/8	i7-6820HQ	2.70 GHz	8 MB	45 W				
			4/8	i7-6870HQ	2.70 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics 580			
			4/8	i7-6920HQ	2.90 GHz	8 MB	45 W	Intel® HD Graphics 530			
			4/8	i7-6970HQ	2.80 GHz	8 MB	45 W	Intel® Iris™ Pro Graphics 580			
	Core™ i5		4/4	i5-6442EQ	1.90 GHz	6 MB	25 W	Intel® HD Graphics 530			
			4/4	i5-6440EQ	2.70 GHz	6 MB	45 W				
			4/4	i5-6300HQ	2.30 GHz	6 MB	45 W				
			4/4	i5-6350HQ	2.30 GHz	6 MB	45 W	Intel® Iris™ Pro Graphics 580			
			4/4	i5-6440HQ	2.60 GHz	6 MB	45 W				
	Core™ i3		2/4	i3-6102E	1.90 GHz	3 MB	25 W	Intel® HD Graphics 530			
			2/4	i3-6100E	2.70 GHz	3 MB	35 W				
			2/4	i3-6100H	2.70 GHz	3 MB	35 W				
	Celeron®		2/2	G3900E	2.40 GHz	2 MB	35 W	Intel® HD Graphics 510		DDR4-1866/2133, DDR3L-1333/1600 @ 1.35V	
			2/2	G3902E	1.60 GHz	2 MB	25 W				

Yellow means long-term support   *HM65/HM55 chipset doesn't support Intel® AMT feature*
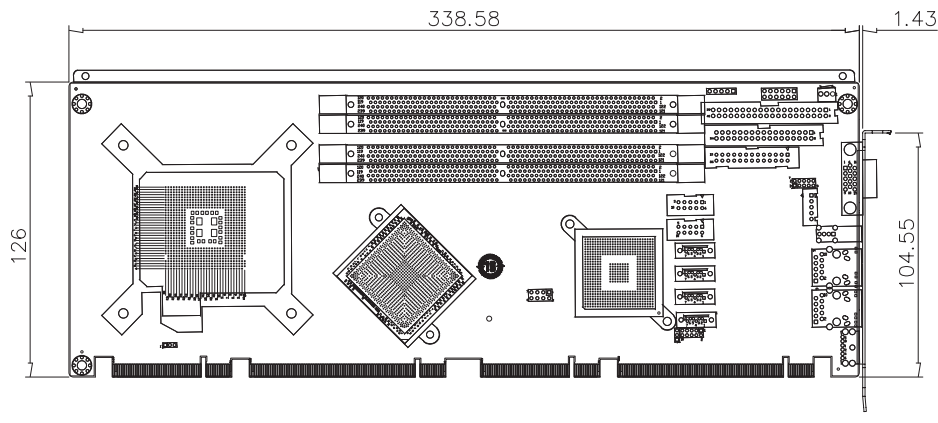
Mobile Core™ i7/i5/i3/Celeron® CPU List

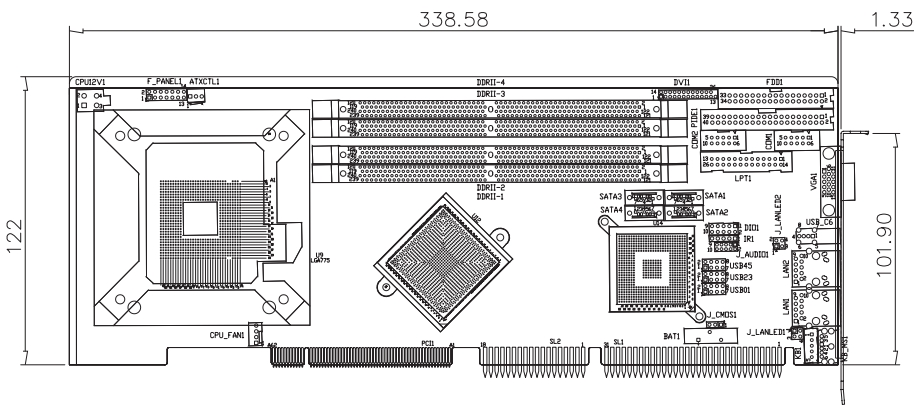| Supported Sockets	Brand	Process	Cores/Threads	Package Type	Processor Number	Processor Base Frequency	Cache	TDP	Processor Graphics	Graphics Base Frequency	Memory Types	Chipset
FCBGA1364	Core™ i7	22 nm Haswell	4/8	BGA	i7-4700EC	2.7 GHz	8 MB	43 W	Intel® HD Graphics 4600	400 MHz	DDR3L 1333/1600	QM87/HM86
			4/8		i7-4700EQ	2.4 GHz	6 MB	47 W		400 MHz		
			4/8		i7-4702EC	2 GHz	8 MB	27 W	None	400 MHz		
	Core™ i5		2/4		i5-4422E	1.8 GHz	3 MB	25 W	Intel® HD Graphics 4600	400 MHz		
			2/4		i5-4410E	2.9 GHz	3 MB	37 W		400 MHz		
			2/4		i5-4402EC	2.5 GHz	4 MB	27 W	None	-		
			2/4		i5-4402E	1.6 GHz	3 MB	25 W	Intel® HD Graphics 4600	400 MHz		
			2/4		i5-4400E	2.7 GHz	3 MB	37 W		400 MHz		
	Core™ i3		2/4		i3-4100E	2.4 GHz	3 MB	37 W		400 MHz		
			2/4		i3-4102E	1.6 GHz	3 MB	25 W		400 MHz		
			2/4		i3-4110E	2.6 GHz	3 MB	37 W		400 MHz		
			2/4		i3-4112E	1.8 GHz	3 MB	25 W		400 MHz		
	Celeron®		2/2		2002E	1.5 GHz	2 MB	25 W	Intel® HD Graphics	400 MHz		
			2/2		2000E	2.2 GHz	2 MB	37 W		400 MHz		
rPGA988B	Core™ i7 Extreme Edition	22nm Ivy Bridge	4/8	PGA	i7-3940XM	3 GHz	8 MB	55 W	-	1.35 GHz	DDR3/L/-RS 1333/1600	QM77/QM67
			4/8		i7-3920XM	2.9 GHz	8 MB	55 W	-	1.3 GHz		
	Core™ i7 Extreme Edition	32nm Sandy Bridge	4/8		i7-2960XM	2.7 GHz	8 MB	55 W	-	1.3 GHz	DDR3-1066/1333/1600	
			4/8		i7-2920XM	2.5 GHz	8 MB	55 W	-	1.3 GHz		
	Core™ i7	22nm Ivy Bridge	4/8		i7-3840QM	2.8 GHz	8 MB	45 W	-	1.3 GHz	DDR3/L/-RS 1333/1600	QM77/QM67/HM65
			4/8		i7-3820QM	2.7 GHz	8 MB	45 W	-	1.25 GHz		
			4/8		i7-3740QM	2.7 GHz	6 MB	45 W		1.3 GHz		
			4/8		i7-3720QM	2.6 GHz	6 MB	45 W	-	1.25 GHz		
			4/8		i7-3632QM	2.2 GHz	6 MB	35 W	-	1.15 GHz		
			4/8		i7-3630QM	2.4 GHz	6 MB	45 W	-	1.15 GHz		
			4/8		i7-3612QM	2.1 GHz	6 MB	35 W	-	1.1 GHz		
			4/8		i7-3610QM	2.3 GHz	6 MB	45 W	-	1.1 GHz		
			4/8		i7-3610QE	2.3 GHz	6 MB	45 W	-	1.0 GHz	DDR3/L 1333/1600	
			2/4		i7-3520M	2.9 GHz	4 MB	35 W	-	1.25 GHz	DDR3/L/-RS 1333/1600	
		32nm Sandy Bridge	4/8		i7-2860QM	2.5 GHz	8 MB	45 W	-	1.3 GHz	DDR3-1066/1333/1600	
			4/8		i7-2820QM	2.3 GHz	8 MB	45 W	-	1.3 GHz		
			4/8		i7-2760QM	2.4 GHz	6 MB	45 W	-	1.3 GHz		
			4/8		i7-2720QM	2.2 GHz	6 MB	45 W	-	1.3 GHz		
			4/8		i7-2710QE	2.1 GHz	6 MB	45 W	-	1.2 GHz		
			4/8		i7-2670QM	2.2 GHz	6 MB	45 W	-	1.1 GHz		
			2/4		i7-2640M	2.8 GHz	4 MB	35 W	-	1.3 GHz	DDR3-1066/1333	
			4/8		i7-2630QM	2 GHz	6 MB	45 W	-	1.1 GHz		
			2/4		i7-2620M	2.7 GHz	4 MB	35 W	-	1.3 GHz		
	Core™ i5	22nm Ivy Bridge	2/4		i5-3610ME	2.7 GHz	3 MB	35 W	-	950 MHz	DDR3/L 1333/1600	QM77/QM67/HM65
			2/4		i5-3360M	2.8 GHz	3 MB	35 W	-	1.2 GHz	DDR3/L/-RS 1333/1600	
			2/4		i5-3320M	2.6 GHz	3 MB	35 W	-	1.2 GHz		
			2/4		i5-3210M	2.5 GHz	3 MB	35 W	-	1.1 GHz		
	Core™ i5	32nm Sandy Bridge	2/4		i5-2540M	2.6 GHz	3 MB	35 W	-	1.3 GHz	DDR3-1066/1333	
			2/4		i5-2520M	2.5 GHz	3 MB	35 W	-	1.3 GHz		
			2/4		i5-2510E	2.5 GHz	3 MB	35 W		1.1 GHz		
			2/4		i5-2450M	2.5 GHz	3 MB	35 W		1.3 GHz		
			2/4		i5-2435M	2.4 GHz	3 MB	35 W	-	1.3 GHz		
			2/4		i5-2430M	2.4 GHz	3 MB	35 W	-	1.2 GHz		
			2/4		i5-2410M	2.3 GHz	3 MB	35 W	-	1.2 GHz		
	Core™ i3	22nm Ivy Bridge	2/4		i3-3120M	2.5 GHz	3 MB	35 W	-	1.1 GHz	DDR3/L/-RS 1333/1600	
			2/4		i3-3110M	2.4 GHz	3 MB	35 W	-	1 GHz		
	Core™ i3	32nm Sandy Bridge	2/4		i3-2370M	2.4 GHz	3 MB	35 W	-	1.15 GHz	DDR3-1066/1333	
			2/4		i3-2350M	2.3 GHz	3 MB	35 W	-	1.15 GHz		
			2/4		i3-2330M	2.2 GHz	3 MB	35 W	-	1.1 GHz		
			2/4		i3-2330E	2.2 GHz	3 MB	35 W	-	1.05 GHz		
			2/4		i3-2328M	2.2 GHz	3 MB	35 W	-	1.1 GHz		
			2/4		i3-2312M	2.1 GHz	3 MB	35 W	-	1.1 GHz		
			2/4		i3-2310M	2.1 GHz	3 MB	35 W	-	1.1 GHz		
	Celeron®	32nm Sandy Bridge	2/2		B840	1.9 GHz	2 MB	35 W	-	1 GHz		
			2/2		B830	1.8 GHz	2 MB	35 W	-	1.05 GHz		
			2/2		B820	1.7 GHz	2 MB	35 W	-	1.05 GHz		
			2/2		B815	1.6 GHz	2 MB	35 W	-	1.05 GHz		
			2/2		B810	1.6 GHz	2 MB	35 W	-	950 MHz		
			2/2		B800	1.5 GHz	2 MB	35 W	-	1 GHz		
			1/1		B720	1.7 GHz	2 MB	35 W	-	1 GHz		
			1/1		B710	1.6 GHz	1.5 MB	35 W	-	1 GHz		
Socket988A	Core i7 Extreme Edition	45nm	Quad	PGA	i7-940XM	2.13G	8M	55W	-	-	1333 MHz 1066 MHz	QM57/HM55
					i7-920XM	2.0G	8M	55W	-	-		
	Core i7				i7-840QM	1.86G	8M	45W	-	-		
					i7-820QM	1.73G	8M	45W	-	-		
					i7-740QM	1.73G	6M	45W	-	-		
					i7-720QM	1.6G	6M	45W	-	-		
			Dual		i7-640M	2.8G	4M	35W	-		500MHz	
					i7-620M	2.66G	4M	35W	-			
	Core i5				i5-580M	2.66G	3M	35W	-			
					i5-560M	2.66G	3M	35W	-			
					i5-540M	2.53G	3M	35W	-		1066 MHz 800 MHz	
					i5-520M	2.4G	3M	35W	-			
					i5-480M	2.66G	3M	35W	-			
					i5-460M	2.53G	3M	35W	-			
					i5-450M	2.4G	3M	35W	-			
					i5-430M	2.26G	3M	35W	-			
	Core i3				i3-390M	2.66G	3M	35W	-			
					i3-380M	2.53G	3M	35W	-			
					i3-370M	2.4G	3M	35W	-			
					i3-350M	2.26G	3M	35W	-			
					i3-330M	2.13G	3M	35W	-			
	Celeron				P4600	2.0G	2M	35W	-			
					P4500	1.86G	2M	35W	-			

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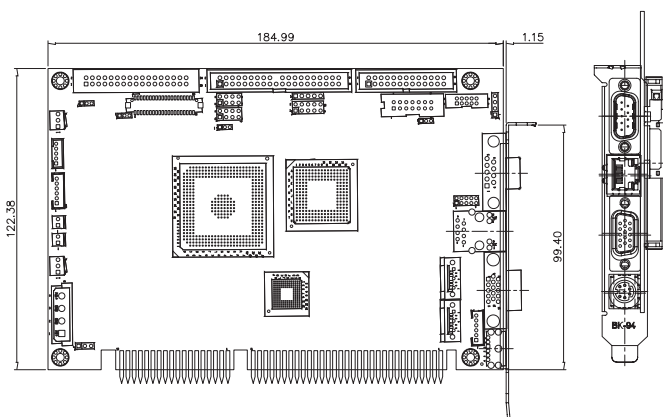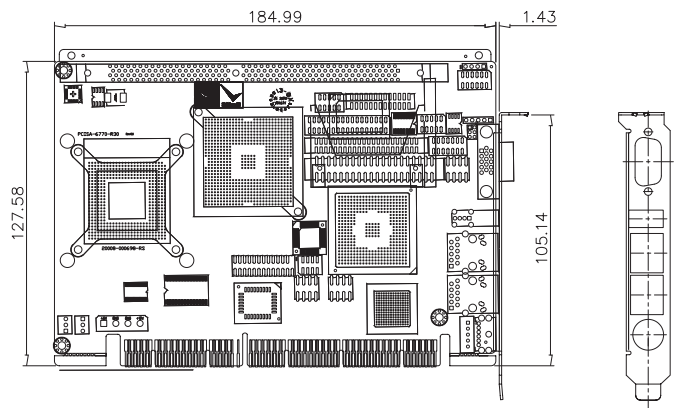
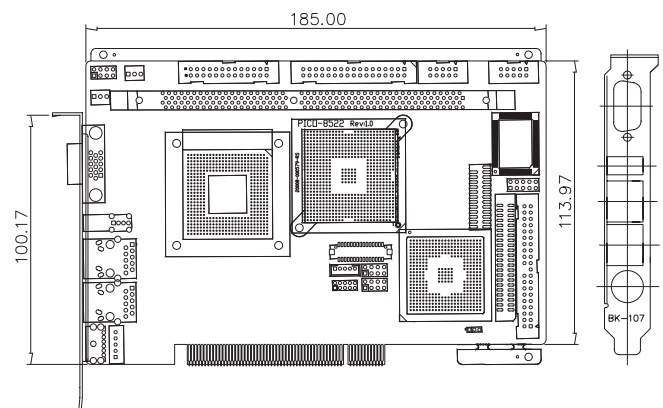# IEI SBC Dimensions (mm)

➡ PICMG 1.3 full-size SBC

338.58   1.43   126   104.55

➡ PICMG 1.0 full-size SBC

338.58   1.33   122   101.90

➡ ISA half-size SBC

184.99   1.15   122.38   99.40

➡ PCI & ISA half-size SBC

184.99   1.43   127.58   105.14

➡ PCI half-size SBC

185.00   100.17   113.97

➡ PCIe half-size SBC

1.42   185.00   100.17   122.00