ASUS IoT
IN SEARCH OF INCREDIBLE

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Intelligent Edge Computing Solutions and Services
Accelerating AI on the Edge

Product Guide

iot.asus.com

/ISUS

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ASUS IoT

ABOUT ASUS

ASUS is a global technology leader with over 5,000 R&D professionals and 1,000 service centers covering 98 countries. ASUS IoT offers a comprehensive portfolio of hardware, software and tailor-made internet of things (IoT) and artificial intelligence solutions to support customers in the development of fully integrated and efficient time-to-market applications and reduce their total cost of ownership.

ASUS has been selected to Clarivate Top 100 Global Innovator.

ASUS has been named as a Top 100 Global Technology Leader by Thomson Reuters.

We have been ranked as Taiwan's most valuable brand for 7 years.

Forbes has named ASUS among the Top Regarded Companies annual survey.

KEEPING ENVIRONMENT IN MIND

ASUS is fully committed to creating a sustainable future. We believe in adopting an eco-friendly approach towards every aspect of our business and being an active participant in environmental assessment programs for a greener tomorrow. Our GreenASUS philosophy guides both our internal practices and production processes, so we remain focused on safeguarding our planet.

Green Design
Good product design is not only about aesthetics, but also about how it is built and functions. Products should use modular components for simple repairs and prolonged lifespans, and be easily recyclable.

Green Manufacturing
Any product is only as green as its manufacturing processes. ASUS adheres to strict guidelines to ensure products are produced without hazardous substances like lead and halogens.

Green Services and Marketing
ASUS is part of environmental assessment programs and certifications such as EPEAT and TCO, ensuring the company meets or exceeds green technology standards.

Green Procurement
ASUS is not only committed to reducing its own environmental impact, but also to ensuring a greener supply chain from component sourcing to product shipping.

Internationally Certified
Enterprise-proven and with leading quality that exceeds industry standards, ASUS is certified by multiple international safety and environmental organizations, including UL and Blue Angel. ASUS provides safe, secure and sustainable solutions, making them the ideal choice for your business.

ABOUT ASUS IoT

ASUS IoT is a sub-brand of ASUS dedicated to the creation of incredible solutions in the fields of AI and IoT. Our mission is to become a trusted provider of embedded systems and partner to the wider AIoT solutions ecosystem. ASUS IoT strives to deliver best-in-class products and services across diverse vertical markets, and to partner with customers in the development of fully integrated and rapid time-to-market applications that drive efficiency – providing convenient, efficient and secure living and working environments for people everywhere.

Leading hardware design and software development capabilities

Exceptional quality control for reliability, compatibility and safety

Efficient thermal design and power protection

Product availability guarantee

x86 and ARM-platform solutions

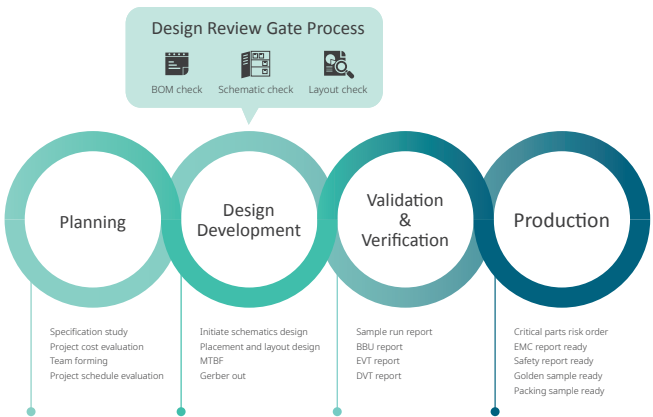Multiple compliances available

intel
partner
Titanium

ASUS is an associate member of the Intel® IoT Solutions Alliance, one of the world's most trusted associations for delivering first-in-market IoT solutions. The membership represents a close relationship between ASUS and Intel and enables ASUS to provide clients with better strategies, support and continuous innovation.

Design & Manufacturing Service

Better Process, Better Results

ASUS is known for creating products and services that exceed industry standards. Our engineers design to exacting standards to guarantee quality, and we use only the best components to ensure real-world performance and reliability. Along with offering customized production at low or high volumes, ASUS also provides flexible options for modified standards or fully customized design and manufacturing services for modules, motherboards or systems.

Design Review Gate Process

BOM check   Schematic check   Layout check

Planning
- Specification study
- Project cost evaluation
- Team forming
- Project schedule evaluation

Design Development
- Initiate schematics design
- Placement and layout design
- MTBF
- Gerber out

Validation & Verification
- Sample run report
- BBU report
- EVT report
- DVT report

Production
- Critical parts risk order
- EMC report ready
- Safety report ready
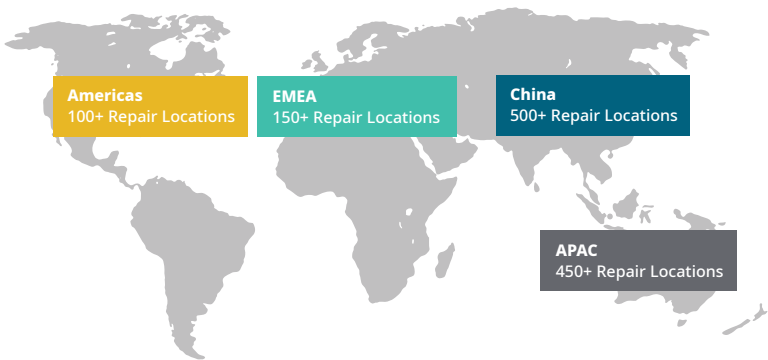- Golden sample ready
- Packing sample ready

All ASUS products undergo a series of strict validations, so customers can rest assured that they will receive consistent results of the highest quality.

- Dynamic tests - Altitude, vibration, shocks, and drops
- Environment tests - Temperature, humidity, thermal, acoustic noise and hardware monitor
- Power tests - Line voltage and frequency, power consumption, power line disturbance
- Function tests - BIOS for UEFI, system utilities, OS, and external hardware compatibility
- Emissions tests - EMC, EMI

ASUS factories are certified by ISO 9001, ISO 14001, OHSAS 18001, ISO 13485, QC 080000, and ISO/TS 16949 and ASUS offers customers the   opportunity to visit our production facilities. To schedule a visit, please contact with your local ASUS representative.

Global Reach, Local Touch

ASUS has hundreds of local service centers around the world that provide efficient, timely service by enabling customers to drop office items in need of repair instead of shipping them to a remote location. These service centers are either owned or operated by ASUS or by authorized service providers trained and certified by ASUS to provide the best service and quality.

Americas
100+ Repair Locations

EMEA
150+ Repair Locations

China
500+ Repair Locations

APAC
450+ Repair Locations

Automation

ASUS IoT Automation is optimized for robustness, intelligence, flexibility and manageability and offers faster time-to-market with standards-based, pre-validated systems, plus fanless-chassis designs and purpose-built I/O adaptability to support the ever-growing spectrum of industrial and machine-vision applications.

Hospitality

ASUS IoT hospitality is designed for hotels, event centers, and travel organizations. Leveraging leading technologies and our hardware and software expertise, ASUS IoT offers tailored solutions to enhance guest experiences and to improve workflow efficiency and flexibility, increasing overall productivity.

Retail

ASUS IoT Retail is designed for retailers that need a powerful system built to withstand harsh environments and support extensive AI capabilities. ASUS IoT intelligent Edge Computer can operate under a wide range of operating temperature and power inputs, making it ideal for use in retail with 24/7 operation in outdoor environments. ASUS IoT intelligent Edge Computer also offers diverse I/O options for different expansions. Vending machines, for example, are required to support multiple payment methods, and display continuous, real-time advertisements.

Gaming

ASUS IoT Gaming is designed for video lottery terminals (VLT), slot and lottery machines, infotainment for electronic games and kiosks with the latest processing performance, support for new graphics technologies, security enhancements and trusted reliability to ensure great entertainment experiences for users. As an associate member of the Intel® Internet of Things Solutions Alliance, ASUS IoT offers system integrators access to new processing technologies, roadmaps and resources for planning.

Healthcare

ASUS IoT fanless systems and industrial motherboards are designed for point-of-care devices, integrated operating rooms, general wards, and medication administration. ASUS IoT fanless systems feature fully sealed, gap-free housings in addition to their fanless design to prevent accumulation of bacteria and maintain hygienic conditions at hospitals to reduce the risk of infection.

Lifestyle & Home

ASUS IoT Smart Home products are innovative solutions that implement the latest technologies to create a wholly integrated, connected smart home ecosystem. We offer a range of products designed to enhance efficiency, along with products that make your home more comfortable and secure.

Success Stories

Epidemic Prevention

During the COVID-19 pandemic, many countries have adopted strict measures, such as imposing lockdowns and closing schools to encourage social distancing. A company in China utilizes ASUS Tinker Board to develop AI Face Recognition Intelligent Column, in which high-precision temperature measurement and dynamic face recognition are implemented to help stop the spread of disease on school campuses.

Interactive Kiosks

A leading European terminal company uses Tinker Board for their interactive kiosks to allow retailers to create a real connection with their customers. The touch terminals develop in all networks, whether to develop sales (e.g., interactive range extension catalog), inform or communicate.

Warehouse Management

Building solution for effective tracking, sorting and distribution of packages, an IT firm from China uses the ASUS Tinker Board in a machine vision camera system to manage warehouses. The system efficiently reads package codes and performs optical character recognition (OCR). These intelligent functions, enabled by Tinker Board, enable sorting and distribution with incredible accuracy and efficiency.

ASUS IoT Tinker Edge T powers self-driving car at Maker Faire Taipei 2019

A leading manufacturer of people-counting devices uses Tinker Edge T for their smart camera to help optimize customer traffic, staff and marketing strategies to increase conversion rates and profits with actionable data.

Smart Mirror

Solmate adopts ASUS IoT EV22A and EV13A as Smart Mirror applications in hair salon, opening up a new and innovative DOOH advertising channel. EV22A and EV13A Smart Mirror products are complementary pair with larger and smaller dimensions to fit different settings. EV22A and EV13A have now been deployed in 880+ hair salons across numerous major cities and township throughout Taiwan.

EV-charging Station

Fortune Electric creates an all-new EV-charging station with the powerful and versatile ASUS IoT ALPR Edge AI Dev Kit. ALPR technology is powered by artificial intelligence (AI) and coupled with a deep-learning algorithm to minimize image noise and maximize identification of key markers, just as the license-plate boundary. In tandem with the ASUS Open Cloud Infrastructure Software (OCIS), the new charging pile is able to deliver incredible-accurate ALPR recognition of up to 99.99% for reliable automated billing – including for both parking and charging.

Vending Machine

A vending machine manufacturer is developing a next-generation vending machine with ASUS IoT PE200U that helps it better connect with customers and to offer those customers browsing and buying experiences that are several levels above traditional vending-machine experiences. ASUS IoT PE200U is an intelligent, TCO-optimized edge computer for IoT applications. It can reshape the vending-machine experience for consumers and help our client realize greater profits through improved inventory control and targeted point-of-sale advertising.

EHS Safety Management System

Bridgestone Taiwan partners with ASUS IoT for EHS Safety Management System implementation. Through EHS Safety Management System, operational hazards can be quantifiable and potential unknown hazards can be identified, making performance analysis and education workflows much more streamlined and effective.

Smart Access Control

The building has AI-driven facial recognition technology and a network of IP cameras that provide reliable, high-precision, monitoring in real time. The system offers flexible controls and can be set to send alerts to relevant administrators or departments if a face is not recognized, which provides efficient and effective security.
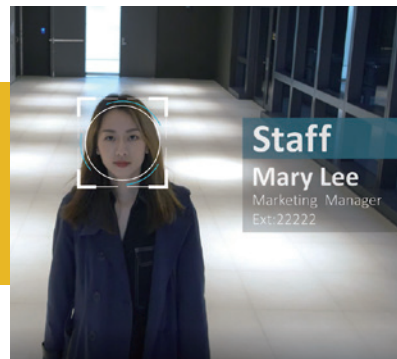
Glass-inspection Machine

A leading industrial-equipment system integrator (SI) uses ASUS IoT Q170A-IM-A industrial motherboard with an ASUS IoT EBE-4U barebones rackmount server to support a bespoke glass-inspection machine for smartphone manufacturing. The pairing of these two versatile products, with the extensive connectivity offered by Q170A-IM-A, allowed the SI to create an industrial inspection machine with scope for significant expansion.

Smart Meeting Room

ASUS IoT technology allows employees to use smart meeting rooms for a variety of needs. These smart meeting rooms are-equipped with AI-enabled check-in using facial recognition technology, automated lighting after successful check-in, wireless presentation capability and thermostat controls, a real-time device status monitoring via a single dashboard screen.

Metal Stamping Inspection

A metal stamping factory uses ASUS AI Computer Vision Solution for smart manufacturing application to save metal stamping factory cost and set QC standard new height. ASUS provides complete In-line inspection and ready API to align production process. ASUS sets the quality inspection high standard to minimize the deviation to increase throughput and customer satisfaction.
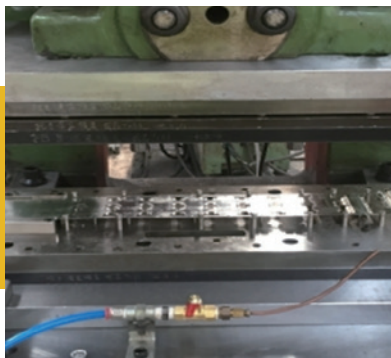
Smart Gym

The ASUS IoT Smart Gym people-counting System helps to keep track of fitness equipment usage by age and gender. The back-end of the system performs integrated data analysis, and the data is then used to plan courses and schedule resources. These technologies allow managers to immediately view the overall use of the leisure center, which greatly enhances management efficiency and performance.

EDGE COMPUTER

At the very frontier of AIoT and Cloud computing, edge computer is in charge of processing, filtering, analyzing and acting on data received in real-time, which not only reduces the traffic of data also provides lower latency and the cost of data transmission.

ASUS IoT Edge computer is built for 24/7 stability and reliability, combined with our world-class after-sales service and guaranteed long-term availability - your investment for the duration of the product lifecycle is maximized.

PE100A

NXP® i.MX 8M ARM Cortex-A53 core, 4GB LPDDR4, HDMI, Dual LAN, 16G eMMC, 1*M.2 E Key slot, 1*Mini-PCIe, 1*Micro SD Card, 3*USB 3.2 Gen 1

Features

· Certified with RF Regulation: CE-RED
· 16GB on board MMC, Mini PCIe slot for storage capacity
· Compact size gateway with low power consumption and scalable
   processor for diverse IoT applications
· Support Linux Yocto OS and Ubuntu server
· Wide Operating Temperature Range: -20~60°C

Specifications

System	CPU	NXP® i.MX 8M ARM Cortex-A53 Quad core , 1.3 GHz
	Memory	4 GB LPDDR4 onboard
	OS Storage	16 GB eMMC onboard
Wired Interfaces	Video	1 x HDMI 2.0, supports up to 3840 x 2160 @60Hz
	Ethernet	2 x 10/100/1000 Mbps, RJ45 1 x Realtek® RTL8211, supports WOL 1 x Intel I211-AT, supports WOL
	USB	2 x USB 3.2 Gen.1, Type-A 1 x USB 3.2 Gen.1, supports OTG, Type-C
	COM	1 x RS-232/422/485 1 x RS-232/ CANBus, 2 x 5 terminal block
	DIO	4 x DI, 4 x GND, 2.5 KV optical isolation 4 x DO, 4 x GND, 10KV relay isolation, 2 x 8 terminal block
Wireless Interfaces	Wi-Fi	1 x M.2 2230 E-key socket, supports 802.11 a/b/g/n/ac + BT 4.2 module
	SIM	1 x nano-SIM slot
Expansion Slot	mPCIe	1 x mPCIe socket, supports SATA or USB signal for mSATA/LTE/Google®TPU module
	M.2 E key	1 x M.2 2230 E key socket, supports PCIe or USB signal for Wi-Fi/BT
AI	Edge TPU	Google® Coral Edge TPU (mPCIe socket)
Power	Power	12 to 24 V DC, 2-pin terminal block
Mechanical	Mounting	Wall mount/ Din Rail
	Dimensions	55.5(H) x 145(W) x 78(D) mm
	Weight	0.775 KG
Environment	Operating Temp.	-20~60°C with wide temperature parts, fanless
	Storage Temp.	-40~85°C
	Relative Humidity	10 to 95% (non-condensing)
	EMC	CE(ITE), FCC, VCCI, RCM, BSMI, CCC
	RF Regulation	LTE: CE-RED Wi-Fi: CE-RED
	Safety	UL,CB, CCC, BSMI, CE
	Vibration	Operating: 0.21Grms, 5~500 Hz, 20min duration
	Shock	Operating: 50 G, half sine 11ms duration
	Green	GA (RoHS)
Security	TPM header	Cooperate with TPM 2.0 powered by Nuvoton NCPT 750 (Optional)
Others	Watch dog timer	Yes. Set up by software
	Operating System	Linux Yocto , Ubuntu server

PE200U

Intel® Core™ i7/i5/i3 Processor, DDR4 2400MHz, DP, HDMI, Dual-LAN,
Multiple COM, 12-24V DC

Features

· Supports 2 x RS-232/422/485, 4 x RS-232
· Supports dual independent video outputs
· Supports Windows® 10 IoT Enterprise or Linux Yocto OS
· Wide Operating Temperature Range: -20~60°C

Specifications

System	CPU	Intel® Core™ i7-8665UE	Intel® Core™ i5-8365UE	Intel® Core™ i3-8145UE
	TDP	15W	15W	15W
	# of Cores	4	4	2
	Base Freq.	1.7GHz	1.6GHz	2.2GHz
	Max Turbo Freq.	4.4GHz	4.1GHz	3.9GHz
	Memory	1 x SO-DIMM, DDR4 2400 MHz, supports up to 32GB		
External Interfaces	Display	1 x HDMI 1.4, supports up to 4096 x 2160 @ 24 Hz 1 x DP 1.2a, supports up to 4096 x 2160 @ 60 Hz		
	Ethernet	2 x 10/100/1000 Mbps, RJ45 (1 x Intel i219-V (1Gb)/1 x Intel i211AT (1Gb)) 2 x 802.11af PSE ports, RJ45 (optional) 2 x 10/100/1000 ethernet ports, RJ45 (optional) *either one		
	USB	4 x USB 3.2 Gen 2, type A 4 x USB 2.0, type A (optional)		
	Audio	1 x Mic-in, phone jack 1 x Line-out, phone jack		
	COM	2 x COM: RS-232/422/485, DB9 4 x COM: RS232, DB9 (optional)		
	GPIO	1 x 8bit GPIO, DB9		
Storage	SATA	1 x SATA 6 connector supports 2.5'' SSD		
	mSATA	1 x mSATA slot (shared with Mini PCIe socket)		
	Micro SD	1 x Micro SD Card slot (on-board)		
Expansion Slot	Mini PCIe	1 x Mini PCIe socket (SATA / PCIe / USB 2.0 mode)		
	M.2 M Key	1 x M.2 2242 M-key socket, (SATA / PCIe mode)		
	M.2 E Key	1 x M.2 2230 E-key socket (PCIe / USB2.0 / CNVi mode) (supports BT/Wi-Fi module/ Google TPU module)		
	SIM	1 x nano-SIM slot		
Power	Power input	12 to 24 V DC, 2-pin terminal block		
Mechanical	Mounting	Wall-mount/ VESA mount		
	Dimensions	254 (H) x 147 (W) x 57 (D) mm		
	Weight	2.45 kg		
Environment	Operating Temp.	-20~60°C with wide temperature parts, fanless		
	Storage Temp.	-40~85°C		
	Relative Humidity	5 to 95% (non-condensing)		
	EMC	CE (ITE), FCC , VCCI, BSMI, RCM,KCC		
	Safety	UL,CB, CCC, BSMI, CE		
	Vibration	Operating: 0.21Grms, 5~500 Hz, 20min duration		
	Shock	Operating: 50 G, half sine 11ms duration		
	Green	GA (RoHS)		
	TPM	TPM v2.0 powered by Nuvoton NCPT 750 (Optional)		
Others	Watch dog timer	Yes. HW WDT Enable (WDT_EN)		
	Operating System	Windows® 10 IoT Enterprise (64 bit) / Linux Yocto		

PE200S

Atom® X Series Processor, DDR3L SO-DIMM, DP, HDMI,
Dual-LAN, Multiple COM, 12-24V DC

Features

· Supports 2 x RS-232/422/485, 4 x RS-232
· Supports dual independent video outputs
· Supports Windows® 10 IoT Enterprise or Linux Yocto OS
· Wide Operating Temperature Range: -20~60°C

Specifications

System	CPU	Intel® Atom® X5-E3930	Intel® Atom® X5-E3940	Intel® Atom® X7-E3950
	TDP	6.5W	9.5W	12W
	# of Cores	2	4	4
	Base Freq.	1.3GHz	1.6GHz	1.6GHz
	Max Turbo Freq.	1.8GHz	1.8GHz	2.0GHz
	Memory	1 x SO-DIMM, DDR3L 1866 MHz, supports up to 8GB		
External Interfaces	Display	1 x HDMI 1.4, supports up to 3840 x 2160 @ 30 Hz 1 x DP 1.2a, supports up to 4096 x 2160 @ 60 Hz		
	Ethernet	2 x 10/100/1000 Mbps, RJ45 (2 x Intel i210IT (1Gb) 2 x 802.11af PSE ports, RJ45 (optional) 2 x 10/100/1000 ethernet ports, RJ45 (optional) *either one		
	USB	4 x USB 3.2 Gen 1, type A 2 x USB 2.0, type A (optional)		
	Audio	1 x Mic-in, phone jack 1 x Line-out, phone jack		
	COM	2 x COM: RS-232/422/485, DB9 4 x COM: RS232, DB9 (optional)		
	GPIO	1 x 8bit GPIO, DB9		
Storage	SATA	1 x SATA 6 connector supports 2.5'' SSD		
	Micro SD	1 x Micro SD Card slot (on-board)		
Expansion Slot	Mini PCIe	1 x Mini PCIe socket (USB / PCIex2 mode)		
	M.2 M Key	1 x M.2 2242 M-key socket, (SATA mode) (supports M.2 SSD up to 512GB)		
	M.2 E Key	1 x M.2 2230 E-key socket (PCIex2 / USB 2.0 mode) (supports BT/Wi-Fi module)		
	SIM	1 x nano-SIM slot		
Power	Power input	12 to 24 V DC, 2-pin terminal block		
Mechanical	Mounting	Wall-mount/ VESA mount		
	Dimensions	254 (H) x 147 (W) x 57 (D) mm		
	Weight	2.45 kg		
Environment	Operating Temp.	-20~60°C with wide temperature parts, fanless		
	Storage Temp.	-40~85°C		
	Relative Humidity	5 to 95% (non-condensing)		
	EMC	CE (ITE), FCC , VCCI, BSMI		
	Safety	UL,CB, CCC, BSMI, CE		
	Vibration	Operating: 0.21Grms, 5~500 Hz, 20min duration		
	Shock	Operating: 50 G, half sine 11ms duration		
	Green	GA (RoHS)		
Security	TPM	TPM v2.0 powered by Nuvoton NCPT 750 (Optional)		
Others	Watch dog timer	Yes. HW WDT Enable (WDT_EN)		
	Operating System	Windows® 10 IoT Enterprise (64 bit) / Linux Yocto		

PE400D

Intel® 10th Gen Xeon® W or Core™ i9/ i7/ i5/ i3 Embedded Computer with 3 expandable PCIe slots

Features

· Diverse SKUs with Intel® 10th Gen CPU
  support up to 64GB DDR4 memory
· 1 x mPCIe socket for cellular, 1x M.2 for Wi-Fi/BT, 1x M.2 for storage
· 3 x independent displays and 3x PCIe slots
· Wide-operating temperature: -20°C ~60°C

Specifications

System	CPU	Intel® Xeon® W-1290TE	Intel® Core™ i9-10900E	Intel® Core™ i7-10700E	Intel® Core™ i5-10500E	Intel® Core™ i3-10100E
	TDP	35W	65W	65W	65W	65W
	# of Cores	10	10	8	6	4
	Base Freq.	1.8GHz	2.8GHz	2.9GHz	3.1GHz	3.2GHz
	Max Turbo Freq.	4.5GHz	4.7GHz	4.5GHz	4.2GHz	3.8GHz
	Memory	2 x SO-DIMM, DDR4 2666/2400/2133 MHz, ECC (only for Xeon CPU), max. 64GB				
External Interfaces	Display	1 x HDMI 2.0, supports up to 4096 x 2160 @ 60 Hz 1 x HDMI 1.4, supports up to 4096 x 2160 @ 30 Hz 1 x DP 1.2, supports up to 4096 x 2304 @ 60 Hz *Default 4096 x 2304 @60Hz supports 3 independent displays at the same time				
	Ethernet	3 x Intel® i210-IT (1 GbE, TSN), RJ45				
	USB	2 x USB 3.2 gen.2, 4 x USB 3.2 gen. 1				
	Audio	1 x Mic-in, audio jack 1 x Line-out, audio jack				
	COM/CAN*	3 x COM: RS-232/422/485, DB9 1 x COM*: RS-232/422/485, CANBus (2.0A/B), DB9 *Default RS-232, configured to CANBus by onboard jumper				
	DIO	4 x DI, 4 x DO support relay output, 2 x 8 terminal block				
	SIM	2 x nano SIM slot				
Storage	CFast	1 x Type II CFast slot for OS storage				
	SATA	2 x 2.5" HDD slots (hot-swappable, supports SATA 3.0, 7~7.5mm)				
Expansion Slot	PCIe	3 x PCIe slot *2 configuration: 1 x PCIex16 + 1 x PCIex4 or 2 x PCIex8 + 1 x PCIex4, auto-detect *Max. length<192mm; Max. 100W power supply from mainboard for total 3 slots				
	Mini PCIe	1 x Mini PCIe socket (supports mSATA or cellular module)				
	M.2 M Key	1 x M.2 2242/60/80 M-key socket (PCIex4 & SATA mode)				
	M.2 E Key	1 x M.2 2230 E-key socket (supports CNVi, Wi-Fi/BT module)				
Power	Power	9 to 36 VDC, 2-pin terminal block *System can be powered up by pressable button/remote power button *Pressable power button can be disabled by onboard jumper/BIOS setting				
Mechanical	Mounting	Desktop mount				
	Dimensions	176.6 (H) x 210 (W) x 250 (D) mm				
	Weight	6.8 kg				
Environment	Operating Temp.	-20~60°C w/ all module operating (industrial parts) at 0.3m/s air flow 0~40° w/ all module operating (commercial parts) at 0.3m/s air flow				
	Storage Temp.	-40~85°C				
	Relative Humidity	5 to 95% (non-condensing)				
	EMC	CE (IEC 61000-6-2/4), FCC, VCCI, RCM, CCC, BSMI				
	Safety	UL, CB, CCC, BSMI				
	Vibration	Operating: 0.5 Grms, sine, 5-500 Hz (with SSD)				
	Shock	Operating: 50 Grms, half sine, 11ms(with SSD)				
	Green	GA (RoHS)				
Security	TPM	TPM v2.0 powered by Nuvoton NCPT 750 (Optional)				
Others	Watch dog timer	Yes. HW WDT Enable (WDT_EN)				
	Operating System	Windows 10 IoT Enterprise				

PV100A

NXP® i.MX 8M Arm Cortex-A53 Quad Core In-vehicle Fanless Embedded Computer

Features

· Integrated 4G LTE, Wi-Fi and GPS solution
· Intelligent Vehicle Power Management: ignition On/Off delay
· Vehicle diagnostic interface support: dual CAN (2.0 A/B, CANOpen, J1939, OBD-II)
· Wide-operating temperature with integrated 4G LTE + Wi-Fi + GPS solution: -20~60°C

Specifications

System	CPU	i.MX8M, 4 x Cortex-A53 Quad Core, 1.3 GHz
	Memory	2 GB DDR4 onboard
	OS Storage	16 GB eMMC onboard
External Interfaces	Video	1 x HDMI 2.0, supports up to 3840 x 2160 @60Hz
	Ethernet	2 x 10/100/1000 Mbps Ethernet ports, RJ45
	USB	2 x USB 3.2 Gen.1, Type-A 1 x USB 3.2 Gen.1, supports OTG, Type-C
	COM	1 x RS-232/422/485, DB9 1 x RS-232/422, DB9
	SIM	1 X Nano-SIM slot
	High Density Connector	4 x isolated DI, 4 x isolated DO 2 x RS-232/422/485 1 x Mic-in, 1 x Line-out 2 x CANbus (CAN2.0 A/B, CANOpen, J1939, OBDII) *all interfaces are integrated in one high density connector, please purchase high density cable from optional accessory list
Storage	Micro SD	1 x Micro SD Card slot (on-board)
	M.2 E Key	1 x mSATA slot (shared with Mini PCIe socket)
Expansion Slot	Mini PCIe	1 x Mini PCIe socket (supports SATA & PCIe & USB signal, supports mSATA up to 512 GB) * 2 signal configurations can be selected via SW: (1) PCIe & USB (2) SATA & USB
	M.2 B Key	1 x M.2 2242 B-key socket (supports UDR GPS module)
	M.2 E Key	1 x M.2 2230 E-key socket (supports BT/Wi-Fi module)
Power	Power	9 to 36 VDC, 3-pin terminal block *supports ignition ON/OFF control and remote power button
Mechanical	Mounting	Wallmount
	Dimensions	216(L) x 112(W) x 70.5(H) mm
	Weight	1.62 kg
Environment	Operating Temp.	-20~60°C w/ all module operating (industrial parts) 0~40° w/ all module operating (commercial module)
	Storage Temp.	-40~85°C
	Relative Humidity	5 to 95% (non-condensing)
	EMC	CE (ITE), FCC, VCCI, RCM, CCC
	RF Regulation	Wi-Fi: CE-RED, RCM 4G LTE: CE-RED, RCM
	Vehicle Regulation	E-Mark (12/24V), ISO-7637-2, SAE J1455, EN50155
	Military Standard	MIL-STD-810H
	Safety	UL, CE-LVD, CB, CCC, BSMI
	Shock	Operating: IEC 60068-2-27 (w/ SD card), MIL-STD-810H
	Vibration	Operating: IEC 60068-2-64 (w/ SD card), MIL-STD-810H
	Green	GA (RoHS)
Others	Watch dog timer	Yes. HW WDT Enable (WDT_EN)
	G-sensor	Triple-axis accelerometer (±2g/4g/8g)
	Operating System	Linux Yocto

PE1000N

Arm System, NVIDIA Jetson, LPDDR4, eMMC, USB3,
Dual LAN, HDMI, M.2 E, M.2 M, mini PCIe, AEM,
Dual SIM, 12-24V

Features

· Intelligent Edge AI System with NVIDIA Jetson™ Nano™, TX2 NX and Xavier™ NX
· Fanless design and diverse I/O in a compact size
· Built in Wi-Fi BT module, LTE ready to connect
· Wide range of power input and operating temperature
· Support ASUS Expansion Module (AEM)

Specifications

		NVIDIA Jetson Nano™	NVIDIA Jetson TX2 NX	NVIDIA Jetson Xavier™ NX
Processor System	SoM	NVIDIA Jetson Nano™	NVIDIA Jetson TX2 NX	NVIDIA Jetson Xavier™ NX
	CPU	4 x Arm® Cortex®-A57	2 x NVIDIA Denver 2 64-Bit 4 x Arm® Cortex®-A57	6 x NVIDIA Carmel Arm®v8.2 64-bit
	GPU	128-core NVIDIA Maxwell™	256-core NVIDIA Pascal™ GPU	384-core NVIDIA Volta™ with 48 Tensor Cores
	Memory	4 GB 64-bit LPDDR4	4 GB 128-bit LPDDR4	8 GB or 16 GB 128-bit LPDDR4x
	eMMC	16 GB	16 GB	16 GB
Wired Interface	Ethernet	2 x 10/100/1000 Mbps, RJ45		
	USB (or Header)	3 x USB 3.2 Gen1, Type-A 1 x USB 2.0, Micro-USB for OS Flash 2 x USB 2.0, Pin Header (Internal)		
	COM	1 x RS-232/422/485, DB9 1 x RS-232/422/485, DB9	1 x RS-232/422/485, DB9 1 x RS-232/422/485, DB9 1 x CAN bus, DB9	
	DIO	4 x DI, 4 x DO (2x5 Terminal Block, w/ isolation)		
	Display	1 x HDMI 2.0b, 3840 x 2160 @60Hz		
	Debug Port	1 x Debug console via Micro-USB		
Wireless Interface	Wi-Fi	Built-in (M.2 E Key) 802.11 a/b/g/n/ac, support 2.4G/5GHz, -20 ~ 60°C O.T.		
	Bluetooth	Integrated with Wi-Fi, BT 4.0+		
	Cellular	Optional LTE module, compatible with ASUS built LTE module, -20 ~ 60°C O.T.		
	GPS	Integrated with cellular		
Expansion	M.2 M key*	1 x 2242/2260/2280, for AEM, M.2 SSD (PCIe, I2C and SMBus)		
	M.2 E key*	1 x 2230, for Wi-Fi/BT (PCIe, USB 2.0, I²C and PCM)		
	Mini PCIe	1 x Full-Length socket, for 4G/LTE (USB 2.0)		
Slot	SIM	2 x nano-SIM slots		
	Micro SD	1 x Micro SD slot		
Power	Power Input	12 to 24 VDC, 3-pin terminal block (1-pin for remote button)		
Mechanical	Mounting	Wall-mount / DIN rail		
	Dimensions	Board: 3.5" System: 152 x 114 x 62 mm		
	Weight	1.4 KG		
Environment	Operating Temp.	-20 ~ 60°C w/ all modules operating		
	Storage Temp.	-40 ~ 85°C		
	Relative Humidity	10 ~ 95% (non-condensing)		
Security	TPM	on-board TPM v2.0		
Others	Watch Dog Timer	Yes. HW WDT		
	Operating System	Ubuntu		

* For Jetson Nano™, the M key slot shares same PCIe with E key slot. Default occupied with wireless module.

EBE-4U

19" Rackmount 4U Barebone

Features

· Standard 19" Rackmount 4U Chassis with 1.2mm durable SGCC sheet metal
· Compatible with ATX, Micro ATX, Mini ITX Form Factor MB
· Excellent expansibility with up to 7 Full Height PCI/PCIE
  Expansion Slots at rear I/O

Specifications

Drive Bay	Storage	2*3.5''HDD +1*3.5'' Slim HDD (19mm)
Front I/O	USB2.0	2
Switch		1 x Power on/off, 1 x System Reset
Rear I/O	Standrad motherboard I/O shield	Depend on compatible motherboard design
Expansion Slot		7 slots, Full Height
Indicators	LED Indicators	Power LED, Reset LED
Cooling		1 x 12025 Fan
Power Supply	Wattage	300W Bronze or 500W GOLD ATX Power Supply
Environment	Operating Temperature	0~50°C
	Non-Operating Temperature	-15~60°C
	Relative Humidity	10~95%@40°C,non-condensing
Physical Characteristics	Steel plate thickness of chassis	1.2mm SGCC
	Dimension	430(W)x177(H)x450(H)mm
Certification	EMI & Safety	CE

Front View

Power LED

HDD LED

USB 2.0*2

Inside View

HDD Bracket Support   PSU
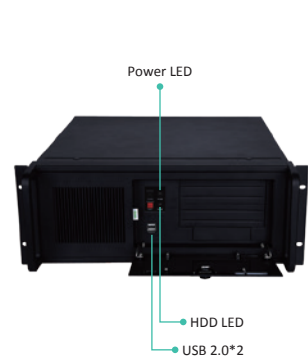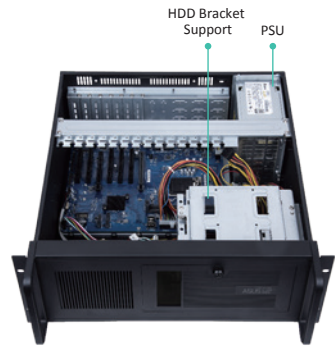
(The pictures are for reference only, actual product may vary)

EB-ITX-A
Compact 2U High Chassis for Mini-ITX Motherboard

Specifications

Case Items	Key Features	Description
Drive Bay	Storage	1 x 3.5" or 2 x 2.5" HDD (Optional)
Front I/O	USB	2 x USB 2.0
	Audio	2
Rear I/O	Serial Ports	2 x RS232/422/485
		4 x RS232
	HDMI	1
	DP	2
	USB3.2 Gen1	4
	Ethernet	2 x RJ45 (10/100/1000Mbps)
	Audio Jack	2
Internal Connector	PCIe	1 x PCIe x16
	Mini PCIe	1 x Full/Half Mini-PCIe with SATA
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242/2260/2280
Expandability	Expansion Slot	1 x Low-profile add-on card
Security	TPM	1 x TPM Header
Power	Power Supply Unit	Flex ATX 250W Gold
Environment	Operating Temperature	0~35°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	10~95%
Dimension	Form Factor	255 x 230 x 88 mm (10.04" x 8.46" x 3.5")

EB-ITX-B
Compact Chassis for Mini-ITX Motherboard
with 2 PCIe x8 Expansion Slot

Specifications

Case Items	Key Features	Description
Drive Bay	Storage	1 x 3.5" or 1 x 2.5" HDD
Front I/O	USB	2 x USB 2.0
	LED	2
Rear I/O	Serial Ports	2 x RS232/422/485
		1 x RS232
	DVI-D	1
	DP	2
	USB3.2 Gen2	3 (2*Type A, 1*Type C)
	USB3.2 Gen1	1 (Type A)
	USB2.0	4
	Ethernet	2 x RJ45 (10/100/1000Mbps)
	Audio Jack	2
	PS/2	1 x KB, 1 x MS
Internal Connector	PCIe	2 x PCIe x8
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242/2260/2280
Expandability	Expansion Slot	2 x PCIe x8 add-on card
Security	TPM	1 x TPM Header
Power	Power Supply Unit	Flex ATX 250W Gold
Environment	Operating Temperature	0~40°C
	Non-Operating Temperature	-20~85°C
	Relative Humidity	10~95%
Dimension	Form Factor	310 x 252 x 109 mm (mm)

INDUSTRIAL MOTHERBOARD & SINGLE BOARD COMPUTER

ASUS IoT offers a wide range of long-lifecycle industrial motherboards and & single board computers in various form factors to serve different applications from customers.

ASUS IoT industrial motherboards and single board computers are manufactured with extremely durable, industrial-grade components to ensure 24/7 reliable operation in industrial settings and harsh environments like extreme temperatures, power fluctuations and high humidity.

Also, ASUS IoT provides the longevity supply guarantee, optimized service and complete reference documents for our customers. We not only provide international industry standard form factor models, but also offer customized hardware and software solutions for specific applications.

R680EI-IM-A

ITX, LGA 1700 Socket for 12th Gen. CPU, R680E Chipset, DDR5 2*SO-DIMM
1*PCIe Gen 5.0 x16 slot, DP*3, HDMI, 2*M.2 slot, USB 3.2 Gen2 port *4, USB Type C

Specifications

Category	Item	Specification
Processor System	CPU	LGA1700 for Intel® 12th Gen. Core™ i9/ i7/ i5/ i3/ Pentium®/ Celeron® Processors
	TDP	Max. 65W
	Chipset	Intel® R680E Chipset
Memory	Technology	Up to DDR5 4800 MHz, ECC support
	Max.	2 x 32GB (Total 64GB)
	Socket	2 x SO-DIMM
Display	Display Port	3, Supports DP 1.4, up to 4K resolution
	HDMI	1
	eDP/LVDS	1 x Header (Support either eDP or LVDS ; switched by BIOS)
Expansion Slot	PCIe	1 x PCIe 5.0 x16 Slot (Bifurcation Support: 16x to 8x+8x)
	M.2	1 x Intel® i210AT (co-lay i211AT), 1 x Intel® i225LM (Intel vPro supported)
Ethernet	Speed	10/100/1000Mbps/2500Mbps
	Controller	1 x Intel® i219LM (1 GbE), support WOL/PXE 1 x Intel® i225V (2.5 GbE), support WOL/PXE
	Teaming	Yes
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	4 x SATA Gen 3.0, Up to 6Gb/s, Support RAID 0,1,5,10
Rear I/O	Display Port	3
	HDMI	1
	USB3.2 Gen2	3 (2*Type A, 1*Type C)
	USB3.2 Gen1	1 (Type A)
	USB2.0	4 (Type A)
	Ethernet	2 x RJ45
	Serial Port	1 (RS232/422/485)
	Audio jack	2
	PS/2	1 x Keyboard, 1x Mouse
Internal Connector	COM header	4 x COM Header (1 x RS232/422/485, 3 x RS232)
	USB3.2 Gen1	1 x USB3.2 Gen1 Stick Connector 1 x Header Support Additional 2 x USB3.2 Gen1 Ports
	USB2.0	1 x Header Support Additional 2 x USB2.0 Ports
	CPU Fan Connector	1 x Header (PWM Mode)
	Chassis Fan Header	1 x Header (PWM Mode)
	Disable ME	1 x Header
	Front Panel Audio Connector (AAFP)	1 x Header
	System Panel Header	1 x Header
	Clear CMOS Jumper	1 x Header
	Speaker Connector	1 x Header
	LVDS/ eDP selection	1 x Header
	Panel SW	1 x Header
	SP/DIF	1 x Header
	Chassis Intrusion	1 x Header
	GPIO Header	1 x Header (8-Bit)
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	IAMT/vPRO	Yes
	Power Type	ATX / 12V DC-IN (supported by additional cable)
Operating System	Microsoft Windows	Windows 10 (64bit)
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	5%~95%
Dimension	Form Factor	Mini-IX, 170 x 170 mm
Certification	EMI & Safety	CE (Class B), FCC (Class B)

Q670EI-IM-A

ITX, LGA 1700 Socket for 12th Gen. CPU, Q670E Chipset, DDR5 2*SO-DIMM
1*PCIe Gen 5.0 x16 slot, DP*3, HDMI, 2*M.2 slot, USB 3.2 Gen2 port *4, USB Type C

Specifications

Processor System	CPU	LGA1700 for Intel® 12th Gen. Core™ i9/ i7/ i5/ i3/ Pentium®/ Celeron® Processors
	TDP	Max. 65W
	Chipset	Intel® Q670E Chipset
Memory	Technology	Up to DDR5 4800 MHz
	Max.	2 x 32GB (Total 64GB)
	Socket	2 x SO-DIMM
Display	Display Port	3, Supports DP 1.4, up to 4K resolution
	HDMI	1
	eDP/LVDS	1 x Header (Support either eDP or LVDS ; switched by BIOS)
Expansion Slot	PCIe	1 x PCIe 5.0 x16 Slot (Bifurcation Support: 16x to 8x+8x)
	M.2	1 x M.2 E key, Type 2230 for WIFI/BT device (PCIe & CNVi) 1 x M.2 M key, Type 2242/2260/2280 (PCIe x4 & SATA mode)
Ethernet	Speed	10/100/1000Mbps/2500Mbps
	Controller	1 x Intel® i219LM (1 GbE), support WOL/PXE 1 x Intel® i225V (2.5 GbE), support WOL/PXE
	Teaming	Yes
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	4 x SATA Gen 3.0, Up to 6Gb/s, Support RAID 0,1,5,10
Rear I/O	Display Port	3
	HDMI	1
	USB3.2 Gen2	3 (2*Type A, 1*Type C)
	USB3.2 Gen1	1 (Type A)
	USB2.0	4 (Type A)
	Ethernet	2 x RJ45
	Serial Port	1 (RS232/422/485)
	Audio jack	2
	PS/2	1 x Keyboard, 1x Mouse
Internal Connector	COM header	4 x COM Header (1 x RS232/422/485, 3 x RS232)
	USB3.2 Gen1	1 x USB3.2 Gen1 Stick Connector 1 x Header Support Additional 2 x USB3.2 Gen1 Ports
	USB2.0	1 x Header Support Additional 2 x USB2.0 Ports
	CPU Fan Connector	1 x Header (PWM Mode)
	Chassis Fan Header	1 x Header (PWM Mode)
	Disable ME	1 x Header
	Front Panel Audio Connector (AAFP)	1 x Header
	System Panel Header	1 x Header
	Clear CMOS Jumper	1 x Header
	Speaker Connector	1 x Header
	LVDS/ eDP selection	1 x Header
	Panel SW	1 x Header
	SP/DIF	1 x Header
	Chassis Intrusion	1 x Header
	GPIO Header	1 x Header (8-Bit)
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	IAMT/vPRO	Yes
	Power Type	ATX / 12V DC-IN (supported by additional cable)
Operating System	Microsoft Windows	Windows 10 (64bit)
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	5%~95%
Dimension	Form Factor	Mini-IX, 170 x 170 mm
Certification	EMI & Safety	CE (Class B), FCC (Class B)

Q470EA-IM-A

ATX, LGA 1200 Socket for 10th Gen. CPU, Q470E Chipset, 4*U-DIMM
2*PCIe x16 slots, VGA, HDMI, DP, 3*M.2 slot, USB 3.2 Gen2, USB Type C

Specifications

Processor System	CPU	Intel® Socket 1200 for 10th Generation Core™ i9/ i7/ i5/ i3/Pentium®/Celeron® Processors
	TDP	Up to 125W
	Chipset	Intel® Q470E Chipset
Memory	Technology	DDR4 2400/2666/2933 MHz
	Max.	128GB (32GB per U-DIMM)
	Socket	4 x U-DIMM
Display	VGA	1, up to 1920 x 1200 @ 60Hz
	HDMI	1, up to 4096 x 2160 @ 30Hz
	DP	2, up to 4096 x 2160 @ 60Hz
	Triple Display	VGA + HDMI + DP/ DP + HDMI + DP/ VGA + DP + DP
Expansion Slot	PCIe	2 x PCIe 3.0/2.0 x16 slot (1 x16 mode/ 2 x8 mode) *If any expansion card is installed on the second x16 slot, BIOS automatically switches the signal from 1 x16 mode to 2 x8 mode. 3 x PCIe 3.0/2.0 x4 slot (x4, x4, x2 mode)
	PCI	2
	M.2	1 x M.2 M key, type 2242/2260/2280 (PCIe x4/ SATA mode) 1 x M.2 B key, type 3042/3052/2260/2280 (PCIe x1/USB 3.2 Gen1/USB 2.0) *type 3042/3052 support 4G/5G module 1 x M.2 E key, type 2230 (PCIe x1/USB 2.0)
	SIM Socket	1
Ethernet	Speed	10/100/1000Mbps/2500Mbps
	Controller	1 x Intel® i219LM (1 GbE), support WOL/PXE 1 x Intel® i225V (2.5 GbE), support WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Line-In, Mic in
Storage	SATA port	Up to 6 x SATA Gen 3.0, up to 6Gb/s* , RAID 0/1/5/10 *If install M.2 PCIe x4/ SATA SSD on M.2 M key slot, 2/ 1 SATA port will be disabled.
Rear I/O	VGA	1
	HDMI	1
	DP	2
	USB 3.2 Gen2	4 (3 x type A, 1 x Type C)
	USB 2.0	2
	Ethernet	2
	COM Port	1 x RS232/422/485
	PS/2	1
	Audio jack	3 (Line-Out, Line-In, Mic in)
Internal Connector	COM header	1 x (RS232/422/485); 4x RS232
	USB2.0	1 x Header support additional / 2 x USB2.0 connectors 2 x Vertical connector
	USB3.2 Gen 1	1 x Header support additional / 2 x USB3.2 Gen1 connectors
	CPU Fan Connector	1 (PWM mode)
	Chassis Fan Header	3 (PWM mode)
	Chassis Intrusion Header	1
	Front Panel Audio Connector (AAFP)	1
	System Panel Header	1
	Clear CMOS Jumper	1
	Speaker Connector	1
	LPC Debug Header	1
	I²C Header	1
	Parallel (LPT Header)	1
	Buzzer	1
	GPIO Header	1 (8 Bit)
	SPDIF	1
	AT/ATX Select Header	1
	Power Connector	1 x 8-pin ATX 12V Power Connector & 1 x 24-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	v Pro	yes
	Power Type	AT mode/ ATX mode
Operating System	Microsoft Windows	Windows 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60° C
	Non-Operating Temperature	-40~85° C
	Relative Humidity	15%~95%
Dimension	Form Factor	ATX, 305 x 244 mm
Certification	EMI & Safety	CE (Class B), FCC (Class B)

Q370M-IM-A

Micro ATX , LGA1151 socket for 9th/8th Gen CPU, Q370 chipset, 4*U-DIMM, 1*PCIe x16,2*DP, HDMI, VGA, Intel® vPro support

Q370I-IM-A R3.0

Mini-ITX, LGA1151 socket for the 9th/8th Gen CPU, Q370 chipset, 2*SO-DIMM. 1*PCIe x16, 2*DP, DVI-D, LVDS, eDP, 2*M.2 slot

Specifications

Processor System	CPU	LGA1151 socket for 9th/8th Generation Intel® Core™ i9/ i7/ i5/ i3/Pentium®/Celeron® Processors
	Chipset	Intel® Q370 Chipset
	TDP	65W
Memory	Technology	DDR4 2666/2400/2133MHz
	Max. Speed	64GB
	Socket	4 x U-DIMM
Display	Controller	Intel UHD Graphics 630/610
	HDMI	1,Supports HDMI 1.4 up to 4096 x 2160@24Hz/2560 x 1600@60Hzz
	Display Port	2,Supports DP 1.2a up to 4096 x 2304@60 Hz
	VGA	1,Supports up to 1920 x 1200@60Hz
	Multi Display	Dual DP+HDMI+VGA, DP+HDMI+VGA, Dual DP+HDMI, Dual DP+VGA,
Expansion Slot	PCIe	1 x PCI Express 3.0/2.0 x16 2 x PCI Express 3.0/2.0 x1 1 x PCI
	M.2	2 x M.2 Socket with M Key, type 2242/2260/2280 storage devices with IRST support(1@ SATA* & PCIE mode), SATA mode share with SATA6G_2. Ready for Intel® Optane Memory 1 x M.2 Socket with E Key, type 2230 Wi-Fi devices support
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® I219LM
	Connector	1 x RJ-45
Audio	Codec	Realtek® ALC887/ALC897 8-channel High Definition Audio CODEC
	Connector	Line-in, Line-out, Mic-in
Storage	SATA port	6 x SATA 6.0 Gb/s ports (gray), support Raid 0,1,5,10
Rear I/O	PS/2	1 x Keyboard (Purple), 1 x Mouse port (Green)
	DisplayPort	2
	HDMI	1
	VGA	1
	Ethernet	1
	USB	USB 3.2 Gen 2 (TypeA)x 1, USB 2.0 (TypeA) x 2
	Audio	3 Audio jacks support 8 channel
Internal Connector	Serial Port	2 (2 x RS-232 header)
	USB	2, support additional 4 x USB 3.2 Gen 1 connectors
	USB2.0	1, support additional 2 x USB2.0 connectors
	Fan header	CPU fan x 1, Chassis fan x 2
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	System panel header	1
	Clear CMOS jumper	1
	LPC Debug header	1
	LPT port header	1
	Power connector	1 x 24-pin ATX Power connector, 1 x 8-pin ATX 12V Power connector
	Speaker connector	1
	MONO-out header	1 (with AMP IC)
	DIS ME jumper	1
Security	TPM	TPM 2.0 IC Onboard (NPCT750)
Power	Power Type	ATX Power
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	40~85°C
	Relative Humidity	5%~95%
Dimension	Form Factor	Micro ATX, 244 x 244 mm
Certification	EMI & Safety	CE, FCC

Specifications

Processor System	CPU	LGA1151 socket for the 9th/8th Generation Intel® Core™ i7/ i5/ i3/ Pentium® / Celeron® processors supports 14nm CPU, Max. 65W TDP
	CHIPSET	Intel® Q370 chipset
Memory	Technology	DDR4 2666/2400/2133 MHz
	Max.	64GB
	Socket	2 x SO-DIMM
Display	DVI-D	1, Supports up to 1920 X 1200 @ 60 Hz
	Display Port	2, Supports DP 1.2a up to 4096 x 2160 @ 60 Hz
	LVDS	1, Supports up to 1920 x1200 @ 60Hz
	Embedded Display Port	1, 2 lanes supported (co-lay with LVDS), Supports up to 1920 x1200 @ 60Hz
	Multi Display	DVI-D+DP+LVDS, DP+DP+LVDS, DP+DP+DVI-D, DVI-D+DP+eDP, DP+DP+eDP
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device (support Intel® CNVi,PCIe) 1 x M.2 Socket 3 with M key, type 2242/2260/2280(PCIe & SATA mode)
Ethernet	Speed	10/100/1000 Mbps
	Controller	1 x Intel® i219LM, supports WOL/PXE 1 x Intel® i210AT colay with i211AT), supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897-VD2 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	4 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	DVI-D	1
	Display Port	2
	USB3.2 Gen1	4
	USB 2.0	4
	Ethernet	2
	Serial Port	1(RS232/422/485)
	Audio jack	2
	PS/2	1 x Keyboard Port, 1 x Mouse Port
Internal Connector	Serial Port	3 (RS232)
	USB3.2 Gen1	1 x Header Support Additional 2 X USB3.2 Gen1 Connectors , 1 X Stick Socket
	USB2.0	1 x Header Support Additional 2 X USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1(10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Connector	1(4-pin)
	LPC Debug Header	1
	S/PDIF Header	1
	I²C Header	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 X 4-pin ATX Power Connector, 1 X 24-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	Both ATX mode and DC in (need an extra card)
	Voltage	DC in 12V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE, FCC

Q370I-IM-A

Mini-ITX, LGA1151 socket for the 9th/8th Gen CPU, Q370 chipset,
2*SO-DIMM. 1*PCIe x16, 2*DP, DVI-D, LVDS, eDP, 2*M.2 slot, 1*Mini-PCIe

Q170A-IM-A

ATX, LGA1151 socket for the 6th/7th Gen CPU, Q170 chipset, 2*U-DIMM.
4*PCIe, 3*PCI, HDMI, VGA, Dual LAN, M.2 slot

Specifications

Processor System	CPU	LGA1151 socket for the 9th/8th Generation Intel® Core™ i7/ i5/ i3/ Pentium® /Celeron® processors supports 14nm CPU
	CHIPSET	Intel® Q370 chipset
	TDP	65W
Memory	Technology	DDR4 2666/2400/2133 MHz
	Max.	64GB
	Socket	2 x SO-DIMM
Display	DVI-D	1, Supports up to 1920 X 1200 @ 60 Hz
	Display Port	2, Supports DP 1.2a up to 4096 x 2160 @ 60 Hz
	LVDS	1, Supports up to 1920 x1200 @ 60Hz
	Embedded Display Port	1, 2 lanes supported (co-lay with LVDS), Supports up to 1920 x1200 @ 60Hz
	Multi Display	DVI-D+DP+LVDS, DP+DP+LVDS, DP+DP+DVI-D, DVI-D+DP+eDP, DP+DP+eDP
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot
	Mini PCIe	1 x full/half PCIe & SATA mode
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device (support Intel®CNVi,PCIe) 1 x M.2 Socket 3 with M key, type 2260/2280(PCIe & SATA mode)@back
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219LM, 1 x Intel® i211AT
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC887-VD2 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	4 x SATA Gen 3.0, up to 6Gb/s
	mSATA	1 x Full/Half size (shared with Mini PCIe Slot)
Rear I/O	DVI-D	1
	Display Port	2
	USB3.2 Gen1	4
	USB 2.0	4
	Ethernet	2
	Serial Port	1 (RS-232/422/485)
	Audio jack	2
	PS/2	1 x Keyboard Port, 1 x Mouse Port
Internal Connector	Serial Port	3 (RS-232)
	USB3.2 Gen1	1 X Header Support Additional 2 X USB3.2 Gen1 Connectors , 1 X Stick Socket
	USB2.0	1 X Header Support Additional 2 X USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1(10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Connector	1(4-pin)
	LPC Debug Header	1
	S/PDIF Header	1
	I²C Header	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 X 4-pin ATX Power Connector, 1 X 24-pin ATX Power Connector
Security	TPM	1 x SPI TPM header
Power	Power Type	both ATX mode and DC in (need an extra card)
	Voltage	DC in 12V
Dimension	Form Factor	Mini-ITX, 170 x 170 mm

Specifications

Processor System	CPU	Intel® Socket 1151 for 7th/6th Generation Core™ i7/i5/i3/Pentium®/ supports Intel® 14 nm CPU, support max. 65W CPU
	CHIPSET	Intel® Q170 chipset
Memory	Technology	DDR4 2400/2133 MHz
	Max.	32GB
	Socket	2 x U-DIMM
Display	VGA	1, Supports up to 1920 x 1200 @60Hz
	HDMI	1, Supports up to 4096 x 2160 @24Hz
	Dual Display	VGA+HDMI(Default)
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot (x16 mode) 2 x PCIe 3.0/2.0 x16 slot (x4 mode) 1 x PCIe 3.0/2.0 x4 slot
	PCI	3 x PCI
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280(SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® I219LM, 1 x Intel® I211AT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897
	Connector	Line-Out, Line-In, Mic in
Storage	SATA port	3 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	VGA	1
	HDMI	1
	USB 3.2 Gen1	4
	Ethernet	2
	Serial Port	2(RS232/422/485)
	Audio jack	3
	PS/2	1 x Keyboard Port, 1 x Mouse Port
Internal Connector	Serial Port	6 (RS232)
	USB2.0	2 x Header Support Additional 4 x USB2.0 Connectors 2 x Stick Socket
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Connector (AAFP)	1
	System Panel Header	1
	Clear CMOS Jumper	1
	Speaker Connector	1
	LPC Debug Header	1
	I²C Header	1
	Parallel	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 x 4-pin ATX Power Connector, 1 x 24-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	AT/ATX mode
Operating System	Microsoft Windows	Windows 7 (32/64bit) / Windows 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, Red Hat Enterprise, Fedora Workstation, Open SUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	10~95%
Dimension	Form Factor	ATX, 305 x 244 mm
Certification	EMI & Safety	CE, FCC

H610A-IM-A

ATX, LGA1700 socket for the 12th Gen CPU, H610 chipset, 2*U-DIMM, 2*PCIe x16 slots, VGA, HDMI, DP, Dual LAN, M.2 slot, USB 3.2 Gen2

Coming soon

Specifications

Processor System	CPU	LGA1700 Socket for Intel® Core™ i9/ i7/ i5/ i3/ Pentium® /Celeron® Processors Max. 125W TDP
	CHIPSET	Intel® H610 chipset
Memory	Technology	Up to DDR4 2400/1666/2933/3200 MHz
	Max.	64GB
	Socket	2 x U-DIMM
Display	HDMI	1, Supports HDMI 2.1 up to 4096 x 2160 @ 60 Hz
	VGA	1, up to 1092 x 1200 @ 60 Hz
	DP	1, up to 4096 x 2160 @ 60 Hz
	Triple Display	DP+HDMI+VGA(default)
Expansion Slot	PCIe x16	1 x PCIe 5.0 x16 slot
	PCIe x4	1 x PCIe 3.0/2.0 x16 slot (run at x4)
		1 x PCIe 3.0/2.0 x1 slot
	PCI	4 x PCI slot
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280(SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219V, 1 x Intel® I210AT
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Mic-In
Storage	SATA port	3 x SATA Gen 3.0, up to 6Gb/s
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280(SATA/PCIe x 1 mode)
Rear I/O	HDMI	1
	VGA	1
	DP	1
	USB 3.2	4(2 x USB 3.2 Gen2, 2 x USB 3.2 Gen1)
	USB 2.0	4
	Ethernet	2
	Serial Port	2(RS232/422/485)
	Audio jack	2
Internal Connector	Serial Port	4 (RS232)
	USB2.0	1 x Header Support Additional 2 x USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	2 (PWM Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Connector(AAFP)	1
	System Panel Header	1 (10-1 Pin)
	Buzzer	1
	Clear CMOS Jumper	1
	Speaker Connector	1 (4-pin)
	COM Debug Header	1
	I²C Header	1
	Parallel	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	2 x 4-pin ATX Power Connector, 1 x 24-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	both ATX/AT mode
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	10%~95%
Dimension	Form Factor	ATX
Certification	EMI & Safety	CE, FCC

H610M-IM-A

Micro-ATX, LGA1700 socket for the 12th Gen CPU, H610 chipset,2*U-DIMM,1*PCIe x16, 1*PCIe x4, 2*PCI, 1*M.2Slot, 1* Mini PCIe,4*SATA connectors, 9*USB, 6*COM,Triple Dispaly

Specifications

Processor System	CPU	Max. 65W TDP
	CHIPSET	Intel® H610 chipset
Memory	Technology	DDR4
	Max.	64GB
	Socket	2 x U-DIMM
Display	HDMI	2, Supports HDMI 1.4b up to 4096 x 2160 @ 60 Hz
	Display Port	1, Supports DP 1.2a up to 4096 x 2160 @ 60 Hz
	VGA	1,Supports 1920 x 1200 @60 Hz
	Triple Display	VGA/ DP/ HDMI1/ HDMI2
Expansion Slot	PCIe x16	1 x PCIe 5.0 x16 slot
	PCIe x4	1 x PCIe 3.0/2.0 x4 slot (x1 speed)
	PCI	2 x PCI slot
	Mini PCIe	1 x full/half mini-PCIe
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280 (SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Realtek® 8111H, 1 x Intel® i219V
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Mic-In
Storage	SATA port	4 x SATA Gen 3.0, up to 6Gb/s *No. 4 SATA port shared with M.2
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280(SATA/PCIe x 1 mode)
Rear I/O	HDMI	2
	Display Port	1
	VGA	1
	USB 3.2 GEN2	2
	USB 3.2 GEN1	2
	Ethernet	2
	Serial Port	2 (RS232/422/485)
	Audio jack	2
Internal Connector	Serial Port	4 (RS232)
	USB2.0	2 x Header Support Additional 4 x USB2.0 Connectors, 1 x stick socket
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header	1 (AAFP)
	System Panel Header	1 (10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Connector	1 (4-pin)
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	PS/2(KBMS)	1
	I²C header	1
	Power Connector	1 x 8-pin ATX Power Connector, 1 x 24-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	both ATX/AT mode
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	10%~95%, non-coagulation
Dimension	Form Factor	Micro-ATX, 244 x 244mm
Certification	Safety	CE, FCC

H310I-IM-A R3.0

Mini-ITX, LGA1151 socket for the 9th/8th Gen CPU, H310 chipset, 2*SO-DIMM.
1*PCIe x16, 2*DP, HDMI, LVDS, 2*M.2 slot, 1*Mini-PCIe

Coming soon

Specifications

Processor System	CPU	LGA1151 socket for the 9th/8th Generation Intel® Core™ i7/ i5/ i3/ Pentium® / Celeron® processors supports 14nm CPU, Max. 65W TDP
	CHIPSET	Intel® H310 chipset
Memory	Technology	DDR4 2666/2400/2133 MHz
	Max.	32GB
	Socket	2 x SO-DIMM
Display	HDMI	1, Supports HDMI 1.4b up to 4096 X 2160 @ 24 Hz
	Display Port	2, Supports DP 1.2a up to 4096 x 2160 @ 60 Hz
	LVDS	1, Supports 48 bits up to 1.4b 1920 x1200 @ 60Hz
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot
	Mini PCIe	1 x full/half mini-PCIe with SATA
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242/2260/2280(PCIe & SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® I219V, Support WOL/PXE 1 x Intel® I210AT, Support WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897
	Connector	Line-Out, Line-In
Storage	SATA port	4 x SATA Gen 3.0, up to 6Gb/s
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280(PCIe & SATA mode)
	mSATA	1 x full/half mini-PCIe with SATA
Rear I/O	HDMI	1
	Display Port	2
	USB3.2 Gen1	4
	Ethernet	2
	Serial Port	2 (RS232/422/485)
	Audio jack	2
Internal Connector	Serial Port	4 (RS232)
	USB3.2 Gen1	1 x Header Support Additional 2 x USB3.2 Gen1 Connectors
	USB2.0	2 x Header Support Additional 4 x USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1 (10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Connector	1 (4-pin)
	LPC Debug Header	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 X 4-pin ATX Power Connector, 1 X 24-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	both ATX/AT mode
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60° C
	Non-Operating Temperature	-40~85° C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE, FCC

H310M-IM-A

Micro-ATX, LGA1151 socket for the 9th/8th Gen CPU, H310 chipset, 2*DIMM
1*PCIe x16, 1*DVI-D, 1*VGA, 1*M.2 slot, 4*SATA connectors

Specifications

Processor System	CPU	LGA1151 socket for the 9th/8th Generation Intel® Core™ i7/ i5/ i3/ Pentium® / Celeron® processors supports 14nm CPU.
	Max. Speed	4.9GHz eight core
	L2 Cache	12MB
	Chipset	Integrated
	TDP	65W
Memory	Technology	DDR4 2666/2400/2133 MHz, non-ECC, un-buffered memory *DDR4 2666MHz and higher memory modules will run at max. 2666MHz on Intel® 8th Gen. 6-core or higher processors.
	Max.	32GB
	Socket	2 x U-DIMM
Display	Controller	Intel UHD Graphics 630/610
	DVI-D	1, Supports 1920 x 1200 @60 Hz
	VGA	1, Supports 1920 x 1200 @60 Hz
	Multi Display	DVI-D+VGA Multi-VGA output support :DVI-D/VGA ports Supports up to 2 displays simultaneous under OS
Expansion Slot	PCIE	1x PCIE x16 2x PCIE 2.0 x1
	PCI	1x PCI
	M.2	1 x M.2 socket 3 with M key, type 2260/2280 storage devices support both SATA* & PCIe x2 mode
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Realtek RTL8111H Gb Lan
	Connector	1 x RJ-45
Audio	Codec	Realtek® ALC887/ALC 897*-VD2 High Definition Audio CODEC
	Connector	Line-out, Lin-in, Mic-in
Storage	SATA port	4x SATA Gen 3.0, up to 6Gb/s
Rear I/O	DVI-D	1
	VGA	1
	USB	2x USB3.2 Gen1 Type-A ports, 4xUSB 2.0 Type-A ports
	Ethernet	1
	COM port	1 (RS-232 port)
	P/S2	1 x keyboard port, 1 x mouse port
Internal Connector	Serial Port	1 (RS-232 header)
	USB3.2 Gen1 Type A header	1, support additional 2 x USB3.2 Gen1 connectors
	USB2.0 header	1, support additional 2 x USB2.0 connectors
	Chassis fan header	1
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	System panel header	1
	Clear CMOS header	1
	Speaker connector	1
	Parallel connector	1
	LPC Debug header	1
	LPC TPM header	1
	power connector	1 x 24-pin EATX Power connector, 1 x 4-pin EATX 12V Power connector
Security	TPM	LPC TPM header
Power	Power Type	ATX Power
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Micro-ATX, 244 x 193 mm
Certification	EMI & Safety	CE, FCC

H310I-IM-B

Mini-ITX, LGA1151 socket for the 9th/8th Gen CPU, H310 chipset, 2*SO-DIMM.
1*PCIe x16, DP, DVI-D, LVDS, eDP, 2*M.2 slot

Specifications

Processor System	CPU	LGA1151 socket for the 9th/8th Generation Intel® Core™ i7/ i5/ i3/ Pentium® /Celeron® processors supports 14nm CPU
	CHIPSET	Intel® H310 chipset
	TDP	65W
Memory	Technology	DDR4 2666/2400/2133 MHz
	Max.	64GB
	Socket	2 x SO-DIMM
Display	DVI-D	1, Supports up to 1920 X 1200 @ 60 Hz
	Display Port	1, Supports DP 1.2a up to 4096 x 2160 @ 60 Hz
	LVDS	1, Supports up to 1920 x1200 @ 60Hz
	Embedded Display Port	1, 2 lanes supported (co-lay with LVDS), Supports up to 1920 x1200 @ 60Hz
	Multi Display	DVI-D+DP, DVI-D+LVDS, DVI-D+eDP, DP+LVDS, DP+eDP
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device (support Intel®CNVi,PCIe) 1 x M.2 Socket 3 with M key, type 2242/2260/2280(PCIe mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219V, 1 x Intel® i211AT
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC887-VD2 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	4 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	DVI-D	1
	Display Port	1
	USB3.2 Gen1	2
	USB 2.0	3
	Ethernet	2
	Serial Port	1(RS-232/422/485)
	Audio jack	2
	PS/2	1 x Keyboard Port, 1 x Mouse Port
Internal Connector	Serial Port	3 (RS-232)
	USB3.2 Gen1	1 X Header Support Additional 2 X USB3.2 Gen1 Connectors
	USB2.0	1 X Header Support Additional 2 X USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1(10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Connector	1(4-pin)
	LPC Debug Header	1
	S/PDIF Header	1
	I²C Header	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 X 4-pin ATX Power Connector, 1 X 24-pin ATX Power Connector
Security	TPM	1 x SPI TPM header
Power	Power Type	both ATX mode and DC in (need an extra card)
	Voltage	DC in 12V
Dimension	Form Factor	Mini-ITX, 170 x 170 mm

H110A-IM-A

ATX, LGA1151 socket for the 6th/7th Gen CPU, H110 chipset, 2*U-DIMM.
2*PCIe x16, 5*PCI, HDMI, VGA, Dual LAN, M.2 slot

Specifications

Processor System	CPU	Intel® Socket 1151 for 7th/6th Generation Core™ i7/i5/i3/Pentium®/ Celeron® Processors supports Intel® 14 nm CPU, support max. 65W CPU
	CHIPSET	Intel® H110 chipset
Memory	Technology	DDR4 2400/2133 MHz
	Max.	32GB
	Socket	2 x U-DIMM
Display	VGA	1, Supports up to Up to 1920 x 1200 @60Hz
	HDMI	1, Supports up to 4096 X 2160 @ 24Hz (colay with DP, optional)
	Dual Display	VGA+HDMI(Default) VGA+DP(optional)
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot (x16 mode) 1 x PCIe 2.0 x16 slot (@x4mode, x4pin)
	PCI	5 x PCI
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280(SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219V, 1 x Intel® I211AT
	Connector	2 x RJ - 45
Audio	Codec	Realtek ALC887/ALC 897*-VD2 High Definition Audio
	Connector	Line-Out, Line-In, Mic in
Storage	SATA port	3 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	VGA	1
	HDMI	1 (colay with DP, optional)
	USB 3.2 Gen1	4
	Ethernet	2
	Serial Port	2(RS232/422/485)
	Audio jack	3
	PS/2	1 x Keyboard Port, 1 x Mouse Port
Internal Connector	Serial Port	6 (RS232)
	USB2.0	2 x Header Support Additional 4 x USB2.0 Connectors 2 x stick socket
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Connector(AAFP)	1
	System Panel Header	1
	Clear CMOS Jumper	1
	Speaker Connector	1
	LPC Debug Header	1
	I²C Header	1
	Parallel	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 x 4 - pin ATX Power Connector, 1 x 24 - pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	AT/ATX mode
Operating System	Microsoft Windows	Windows 7 (32/64bit) / Windows 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85
	Relative Humidity	0%~85%
Dimension	Form Factor	ATX, 305 x 244 mm
Certification	EMI & Safety	CE, FCC

H110M-IM-A

Micro-ATX, LGA1151 socket for the 6th/7th Gen CPU, H110 chipset, 2*U-DIMM,1*mSATA slot, 2*PCIe x1, 1*PCIe x16, 1*Mini-PCIe, VGA+DVI-D, 20*USB,10*RS232, 1*M.2(WIFI) slot

Coming soon

Specifications

Processor System	CPU	Intel® Socket 1151 for 7th/6th Generation Core™ i7/i5/i3/Pentium®/Celeron® Processors supports Intel® 14 nm CPU, support max. 65W CPU
	CHIPSET	Intel® H110 chipset
Memory	Technology	DDR4 2400/2133 MHz
	Max.	32GB
	Socket	2 x U-DIMM
Display	VGA	1, Supports up to Up to 1920 x 1200 @60Hz
	DVI-D	1, Supports up to Up to 1920 x 1200 @60Hz
	Dual Display	VGA+DVI-D
Expansion Slot	PCIe	2 x PCIe 2.0 x 1 slot, 1 x PCIe 3.0/2.0 x16 slot (x16 mode)
	Mini PCIe	1 x full mini-PCIe
		1 x SIM Card Slot (N)
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897-VD2 High Definition Audio
	Connector	Line-Out, Line-In, Mic-In
Storage	SATA port	Realtek ALC897-VD2 High Definition Audio
	mSATA	1 x mSATA 6Gb/s (1 x full/half mSATA)
Rear I/O	VGA	1
	DVI-D	1
	USB 3.2 Gen1	6
	USB 2.0	10
	Ethernet	2
	Audio jack	3
Internal Connector	Serial Port	10* RS232 (Oher 2 coms are reserved and not loaded)
	USB2.0	2 x Header Support Additional 4 x USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header	1 (AAFP)
	System Panel Header	1 (10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Header	1 (4-pin)
	LPC Debug Header	1
	Speaker out Header	1 (With speaker AMP IC, 3W)
	AT/ATX select header	1
	GPIO	1
	SIM Header	1 (8-1pin SIM header, don't use with SIM Card Slot Simultaneously)
	Watchdog	1
	Power Connector	1 X 4-pin ATX 12V Power Connector, 1 X 24-pin EATX Power Connector
Security	TPM	TPM Header
Power	Power Type	AT/ATX mode
Operating System	Microsoft Windows	Windows 7 (32/64bit) / Windows 10 (64bit)) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	10%~95%, non-coagulation
Dimension	Form Factor	Micro-ATX, 244x244mm
Certification	EMI & Safety	CE, FCC

H110T-CM-A R2.0

Thin Mini-ITX, H110T Chipset, 2*SO-DIMM, DP, HDMI, LVDS, 2*M.2 slot (E Key, M Key)

Specifications

Processor System	CPU	Intel® for 7th/6th Generation Core™ i7/i5/i3/Pentium®/Celeron® Processors supports Intel® 14 nm CPU, support max. 65W CPU
	Chipset	Intel® H110 chipset
Memory	Technology	DDR4 2133/1866MHz, non-ECC, un-buffered Memory
	Max.	32GB
	Socket	2 x SO-DIMM
Display	DisplayPort	1, Supports up to 4096 x 2160 @ 60 Hz
	HDMI	1, Supports up to 4096 x 2160 @ 24 Hz / 2560 x 1600 @ 60 Hz
	LVDS	1, Supports up to 1920 x1200 @ 60Hz
	Multi Display	HDMI/LVDS/DisplayPort ports, supports up to two displays simultaneously
Expansion Slot	M.2	1 x M.2 Socket 3 with M key, type 2242/2260 storage devices (SATA & PCIE mode)
		1 x M.2 Socket 1 with E key, type 2230 for Wi-Fi/BT devices (PCIE/USB mode)
Ethernet	Speed	10/100/1000 Mbps
	Controller/PHY	1 x Realtek RTL8111H
		1 x Intel I219V, support WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897-VA2 High Definition Audio
	Connector	Line-Out, Mic-In
Storage	SATA port	2 x SATA 6Gb/s port(s)
		1 x SATA PWR CONN
Rear I/O	DC power input	1
	USB3.0 Port	4
	HDMI	1
	Display Port	1
	Ethernet	2 x RJ45
	Audio jack	2 (1 x LINE OUT, 1 x MIC in)
Internal Connector	Serial Port	1 (RS232)
	USB2.0 Header	3 x Headers Support Additional 5 USB 2.0 Connectors
	CPU Fan Header	1 (PWM Mode)
	Chassis Fan Header	1 (PWM Mode & DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1(10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Header	1 (4 pin)
	Internal Stereo Speaker Header	1 (4 pin)
	DMIC Header	1 (4 pin)
	RTC Battery Header	1 (2 pin)
	LVDS Signal Header	1 (support Dual Channel, 40 pin)
	LCD panel monitor switch Header	1 (2 pin)
	LVDS panel VCC power selection jumper	1 (6 pin)
	LVDS Backlight Panel selection header	1 (8 pin)
	Display Panel Backlight Power selection jumper	1 (3 pin)
	LPC debug header	1 (10 pin)
	DC Power Connector	1 x 2pin ATX 19V/12V
Watchdog Timer	BIOS	YES (SW porting)
Security	TPM	1 x SPI TPM header
Power	Power Type	DC in mode
	Voltage	Choose from either type below, and cannot be used at the same time -DC in 12V/19V -2 pin internal DC mode 12V / 19
Operating System	Microsoft Windows	Windows 7 / Windows 8.1 / Windows 10 (64bit)
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~50°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	5%~95%
Dimension	Form Factor	Thin Mini-ITX, 170 x 170 mm
Certification	EMC	CE, FCC

J6412T-IM-A

Thin mini ITX, Intel® J6412 SoC onboard Processors, 2*SO-DIMM.
1*PCIe x1, HDMI, LVDS, Dual LAN, M.2 slot

Coming soon

Specifications

Processor System	CPU	Intel® Celeron® Quad-Core J6412 SoC onboard Processors
Memory	Technology	DDR4 3200/3000/2800/2666/2400/2133 MHz, (non-ECC)
	Max.	32 GB
	Socket	2 x SO-DIMM
Display	HDMI	1, Supports HDMI 1.4b, up to 3840x2160 @ 30Hz (Default)
	DP1	1, Supports up to 4096x2160 @ 60Hz (Default)
	DP2 (optional by request)	1, Supports up to 4096x2160 @ 60Hz (colay with HDMI)
	LVDS	1, Supports up to 1920x1200 @ 60Hz (Default)
	Edp (optional by request)	1, Supports up to 4096x2160 @ 60Hz (colay with LVDS)
	Triple Displays	HDMI+ DP+ LVDS, HDMI(Default)+ DP+ eDP, DP+ DP+ LVDS, DP+ DP+ eDP
Expansion Slot	PCIe 3.0/2.0 x1	1
	Mini PCIe	1 x Full/Half-size PCIe mini card slot(w/ SIM holder) (PCIE x1 mode)
	M.2	1 x E key, type 2230 for WIFI/BT device (PCIE x1 /USB2.0)
		1 x M key, type 2242/2260/2280 (PCIE x2 / SATA mode) supports NVMe
	SD card	1 x Full-size SD card slot
Ethernet	Speed	10/100/1000 Mbps
	Controller	2 x Realtek RTL8111H (Support WOL/PXE)
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	1 x SATA Gen 3.0, Up to 6Gb/s
Rear I/O	HDMI	1
	DP	1
	USB	3*USB 3.2 Gen2 + 1*USB 2.0
	Ethernet	2
	Audio jack	1
	DC-12V Power Input	1
Internal I/O Connectors	Serial Port	6
		COM1 supports RS232/422/485: Ring/5V/12V Select, switch by jumper
		COM2 supports RS232:Ring/5V/12V Select, switch by jumper
		COM3~6 supports RS232
	USB2.0	2 (Support Additional 4 x USB2.0 Ports)
	Chassis Fan	1 (PWM)
	Front Panel Audio Header (AAFP)	1
	Front panel as Power/Reset/HDD (F_Panel)	1 (10-1 Pin)
	Chassis Intrusion	1
	Speaker	1 (4 pin)
	Stereo Out	2 (2-pin, 3 watt/channel amplifier)
	Clear CMOS	1
	COM Debug Header	1 (6 pin)
	GPIO	1 (8 Bit)
	LVDS Signal header	1 (support Dual Channel stand type, 40 pin)
	LCD panel monitor switch header	1 (2 pin)
	LVDS panel VCC power selection jumper	1 (6 pin)
	LVDS panel backlight enable signal selection jumper	1 (3 pin)
	LVDS backlight panel header	1 (5 pin)
	PS/2 Keyboard/Mouse	1 (2 x 4 Pin)
	Power in Connector	1 (4-pin ATX Power Connector, DC in mode)
Watchdog Timer	H/W	Yes
Security	TPM	1 x SPI TPM Header
Power	Power Type	12V DC-in (1x External DC jack; 1 x Internal 4-pin power connector)
OS & Software Support	Microsoft Windows	Windows® 10 (64-bit) / Windows® IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
	IoT Suite	☑ HW Monitor ☑ Power Scheduling ☑ Fan Control ☑ Watch Dog Timer ☑ GPIO
	User Interface	☑ API ☑ GUI
Environment	Operating Temperature	0 ~ 60°C
	Non-Operating Temperature	-40 ~ 85° C
	Relative Humidity	Operational humidity: 40°C@10%~95%
Mechanical	Dimensions	Thin Mini-ITX, 170 x 170 mm
Certification	EMC	CE, FCC, VCCI, BSMI, RCM
	Safety	CE-LVD

J3455T-IM-A R2.0

Thin mini ITX, Intel® J3455 SoC onboard Processors, 2*SO-DIMM.
1*PCIe x1, HDMI, VGA, LVDS, Dual LAN, M.2 slot

Specifications

Processor System	CPU	Build in Intel®J3455 SoC onboard Processors
Memory	Technology	DDR3L 1866 MHz Non-ECC, Un-buffered Memory
	Max.	8GB
	Socket	2 x SO-DIMM
Display	VGA	1, Supports up to 1900 X 1200 @ 60 Hz(colay with DP++)
	HDMI	1, Supports up to 3840 X 2160 @ 30Hz
	Display Port++	1, Supports up to 4096 x2160 @ 60Hz(colay with VGA)
	LVDS	1, Supports up to 1920 x1200 @ 60Hz(colay with eDP)
	Embedded Display Port	1, Supports up to 4096 x2160 @ 60Hz(colay with LVDS, optional)
	Triple Display	VGA+HDMI+LVDS, VGA+HDMI+eDP, DP+HDMI+LVDS, DP+HDMI+eDP
Expansion Slot	PCIe	1 x PCIe 2.0 x1 (colay with M.2 E key)
	Mini -PCIe	1 x Full/Half-size PCIe mini card slot(w/ SIM holder)
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device(colay with PCIe)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC897
	Connector	Line-Out, line-In
Storage	SATA port	2 x SATA Gen 3.0, up to 6Gb/s
	mSATA	1 x Full/Half-size mSATA slot(shared with Mini PCIe)
Rear I/O	VGA	1
	HDMI	1
	Display Port++	1
	USB3.2 Gen1	4
	Ethernet	2
	Audio jack	1 (Default Line-out, switch to line-in by BIOS)
	DC IN	1
Internal Connector	Serial Header	6 (5 x RS232, 1 x RS232/422/485)
	USB 2.0	2 x Header support additional 4 x USB2.0 connectors
	8-bit GPIO Header	1
	KB/MS Header	1
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM Mode)
	SATA Power Connector	1
	SATA Gen 3.0 Connector	2
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1
	Speaker Header	1
	AT/ATX select header	1
	ATX Power supply(5VSB) Connector	1
	Chassis intrusion header	1
	Clear CMOS Jumper	1
	I2C Header	1
	LVDS Connector	1
	eDP Connector	1 (optional)
	LPC Debug header	1
	Display Panel Backlight Power Selector	1
	Flat Panel Display Brightness Connector	1
	Display Panel VCC Power Selector	1
	LCD panel monitor switch header	1
	Power Connector	1 x 4-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	AT/ATX mode and DC in
	Voltage	DC in 12V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Thin Mini-ITX, 170 x 170 mm
Certification	EMC	CE, FCC, VCCI, BSMI, RCM
	Safety	CE-LVD

J3455I-CM-A R2.0

Mini-ITX, Intel® Celeron® Quad-Core J3455 SoC, 2*U-DIMM, 1*PCIe x4, HDMI, VGA, LVDS, 1*M.2 E Key, 6*USB3.2 Gen1, 4*USB2.0, 2*SATA, 2*COM, TPM

Specifications

Processor System	CPU	Build in Intel® Celeron® Quad-Core J3455 SoC onboard Processors
Memory	Technology	DDR3L 1866/1600/1333 MHz Non-ECC, Un-buffered Memory
	Max.	8GB
	Socket	2 x U-DIMM
Display	VGA	1, Supports up to 1920 X 1200 @ 60 Hz
	HDMI	1, Supports up to 3840 X 2160 @ 30 Hz
	LVDS	1, Supports up to 1920 X 1200 @ 60Hz
	Multi Display	HDMI+VGA+LVDS
Expansion Slot	PCIe	1 x PCIe 2.0 x4 (x1 mode)
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Realtek® RTL8111H
	Connector	1 x RJ-45
Audio	Codec	Realtek® ALC897-VD2 8-Channel High Definition Audio
	Connector	Line-Out, Line-In, MIC
Storage	SATA port	2 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	VGA	1
	HDMI	1
	USB3.2 Gen1	4
	Ethernet	1
	Serial Port	1 (RS232)
	Audio jack	3
	PS/2	1 x Keyboard Port, 1 x Mouse Port
Internal Connector	Serial Port	1 (RS232)
	USB3.2 Gen1	1 x Header Support Additional 2 X USB3.2 Gen1 Connectors
	USB2.0	2 x Header Support Additional 4 X USB2.0 Connectors
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Parallel Port Connector	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1(10-1 Pin)
	Clear CMOS Jumper	1
	Buzzer	1
	LVDS Connector	1
	Display Panel Backlight Power Selector	1
	Flat Panel Display Brightness Connector	1
	Display Panel VCC Power Selector	1
	LCD panel monitor switch header	1
	Power Connector	1 X 4-pin ATX Power Connector, 1 X 24-pin EATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x LPC TPM header
Power	Power Type	EATX, ATX mode
Operating System	Microsoft Windows	Windows® 10 (64bit)
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~50°C
	Non-Operating Temperature	-40~70°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE, FCC

N5105I-IM-A R2.0

Mini-ITX, N5105 SoC, 2*SO-DIMM, VGA, HDMI, LVDS, 6*COM, 8*USB, POS market dedicated

Specifications

Processor System	CPU	Intel® Celeron® Quad-Core N5105 SoC onboard Processors (Jasper Lake)
	Chipset	Integrated
Memory	Technology	DDR4 2933/2666/2400/2133 MHz
	Max.	32 GB
	Socket	2 x SO-DIMM
Display	HDMI	1,Supports HDMI 1.4b up to 4096 X 2160 @24 Hz
	VGA	1, Supports up to 1920 X 1200 @ 60 Hz
	LVDS(Colay with eDP)	1, Supports 40 bits up to 1.4b 1920 x1200 @ 60Hz (Optional BOM colay with eDP)
Expansion Slot	PCIe3.0/2.0 x1	1
	Mini PCIe	1 x mini PCIe (support PCIex1/USB2.0 mode) (w/ SIM holder)
Ethernet	Speed	10/100/1000 Mbps
	Controller	1 x Realtek RTL8111H (Support WOL/PXE)
	Connector	1 x RJ-45
Audio	Codec	Realtek ALC897 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	2 x SATA Gen 3.0, Up to 6Gb/s
	SATA Power connectors	2
Rear I/O	VGA	1
	HDMI	1
	USB3.2 Gen1	4
	Ethernet	1 x RJ45
	RJ11	1 x RJ11 (For cash drawer 12V/24V, optional)
	Serial Port	3 (1*RS232/422/485, 2*RS232 5/12/Ring, switched by BIOS)
	Audiojack(s)	2
	DC-12VPowerInput	1 (4-pin, Lockable DC Jack 4P connector)
Internal Connector	Serial Port	3 (RS232: Ring/5V/12V Select, switched by jumper) Please keep your device around +/-12V
	USB2.0	2 x Header Support Additional 4 x USB2.0 Ports (stand by power, MOS, switch from BIOS)
	Chassis Fan	1 x Header (PWM)
	Front Panel Audio header (AAFP)	1 x Header (10-1 Pin)
	System panel header	1 x Header (10-1 Pin)
	Chassis Intrusion	1 x Header
	Buzzer	1
	Speaker	1 x Header
	Clear CMOS	1 x Header
	LPT	1 x Header (2 x 13 Pin)
	COM Debug	1 x Header
	DIO	1 x Header (8 Bit)
	Audio Amplifier connector	2 (3 Watt/Channel Amplifier IC)
	LVDS Signal header	1 (support Dual Channel stand type, 40 pin)
	LCD panel monitor switch header (Panel_SW)	1 (2 pin)
	LVDS panel VCC power selection jumper (VCC_PWR_SEZL)	1 (6 pin, support 3V/5V/12V selection)
	LVDS Panel enable signal selection jumper (BKLTEN_SEL)	1 (3 pin, default with high active)
	LVDS backlight panel header (LCD_BLK_PANEL)	1 (5 pin, support 5V/12V)
	MSR Pin Header	1 (6-pin, support both USB and PS/2 mode)
	MSR Definition Change Jumper (MSR_DAT_SEL) (MSR_CLK_SEL)	2 (3-pin)
Internal Connector	RJ11 VCC selection jumper	1 (3-pin, 12V/24)
	PS/2 Keyboard/Mouse header	1 (2 x 4 Pin)
	Power out Connector	1 x 4-pin ATX DC Power Output Connector
	Power in Connector	1 x 4-pin ATX DC Power In Connector (DC in mode)
Watchdog Timer	H/W	Yes
Security	TPM	1 x SPI TPM Header
Power	Power Type	12V DC-IN
Operating System	Microsoft Windows	Windows® 10 (64bit) – version after 20'H1, 20'H2
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	15%~95%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm

N4200T-IM-A

Thin mini ITX, Intel® N4200E SoC onboard Processors, 2*SO-DIMM.
1*PCIe x1, HDMI, VGA, LVDS, Dual LAN, M.2 slot

Specifications

Processor System	CPU	Build in Intel®N4200E SoC onboard Processors
Memory	Technology	DDR3L 1866 MHz Non-ECC, Un-buffered Memory
	Max.	8GB
	Socket	2 x SO-DIMM
Display	VGA	1, Supports up to 1900 X 1200 @ 60 Hz(colay with DP++)
	HDMI	1, Supports up to 3840 X 2160 @ 30Hz
	Display Port++	1, Supports up to 4096 x2160 @ 60Hz(colay with VGA)
	LVDS	1, Supports up to 1920 x1200 @ 60Hz(colay with eDP)
	Embedded Display Port	1, Supports up to 4096 x2160 @ 60Hz(colay with LVDS,optional)
	Triple Display	VGA+HDMI+LVDS, VGA+HDMI+eDP, DP+HDMI+LVDS, DP+HDMI+eDP
Expansion Slot	PCIe	1 x PCIe 2.0 x1 (colay with M.2 E key)
	Mini-PCIe	1 x Full/Half-size PCIe mini card slot(w/ SIM holder)
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device(colay with PCIe)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887
	Connector	Line-Out, line-In
Storage	SATA port	2 x SATA Gen 3.0, up to 6Gb/s
	mSATA	1 x Full/Half-size mSATA slot(shared with Mini PCIe)
Rear I/O	VGA	1
	HDMI	1
	Display Port++	1
	USB3.2 Gen1	4
	Ethernet	2
	Audio jack	1(Default Line-out, switch to line-in by BIOS)
	DC IN	1
Internal Connector	Serial Header	6 (5 x RS232, 1 x RS232/422/485)
	USB 2.0	2 x Header support additional 4 x USB2.0 connectors
	8-bit GPIO Header	1
	KB/MS Header	1
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM Mode)
	SATA Power Connector	1
	SATA Gen 3.0 Connector	2
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1
	Speaker Header	1
	AT/ATX select header	1
	ATX Power supply(5VSB) Connector	1
	Chassis intrusion header	1
	Clear CMOS Jumper	1
	I²C Header	1
	LVDS Connector	1
	eDP Connector	1(optional)
	LPC Debug header	1
	Display Panel Backlight Power Selector	1
	Flat Panel Display Brightness Connector	1
	Display Panel VCC Power Selector	1
	LCD panel monitor switch header	1
	Power Connector	1 X 4-pin ATX Power Connector
Security	TPM	1 x SPI TPM header
Power	Power Type	AT/ATX mode and DC in
	Voltage	DC in 12V
Dimension	Form Factor	Thin Mini-ITX, 170 x 170 mm

N3350T-IM-A

Thin mini ITX, Intel® N3350E SoC onboard Processors, 2*SO-DIMM.
1*PCIe x1, HDMI, VGA, LVDS, Dual LAN, M.2 slot

Specifications

Processor System	CPU	Build in Intel®N3350E SoC onboard Processors
Memory	Technology	DDR3L 1866 MHz Non-ECC, Un-buffered Memory
	Max.	8GB
	Socket	2 x SO-DIMM
Display	VGA	1, Supports up to 1900 X 1200 @ 60 Hz(colay with DP++)
	HDMI	1, Supports up to 3840 X 2160 @ 30Hz
	Display Port++	1, Supports up to 4096 x2160 @ 60Hz(colay with VGA)
	LVDS	1, Supports up to 1920 x1200 @ 60Hz(colay with eDP)
	Embedded Display Port	1, Supports up to 4096 x2160 @ 60Hz(colay with LVDS, optional)
	Triple Display	VGA+HDMI+LVDS, VGA+HDMI+eDP, DP+HDMI+LVDS, DP+HDMI+eDP
Expansion Slot	PCIe	1 x PCIe 2.0 x1 (colay with M.2 E key)
	Mini-PCIe	1 x Full/Half-size PCIe mini card slot(w/ SIM holder)
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device(colay with PCIe)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887
	Connector	Line-Out, line-In
Storage	SATA port	2 x SATA Gen 3.0, up to 6Gb/s
	mSATA	1 x Full/Half-size mSATA slot(shared with Mini PCIe)
Rear I/O	VGA	1
	HDMI	1
	Display Port++	1
	USB3.2 Gen1	4
	Ethernet	2
	Audio jack	1(Default Line-out, switch to line-in by BIOS)
	DC IN	1
Internal Connector	Serial Header	6 (5 x RS232, 1 x RS232/422/485)
	USB 2.0	2 x Header support additional 4 x USB2.0 connectors
	8-bit GPIO Header	1
	KB/MS Header	1
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM Mode)
	SATA Power Connector	1
	SATA Gen 3.0 Connector	2
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1
	Speaker Header	1
	AT/ATX select header	1
	ATX Power supply(5VSB) Connector	1
	Chassis intrusion header	1
	Clear CMOS Jumper	1
	I²C Header	1
	LVDS Connector	1
	eDP Connector	1(optional)
	LPC Debug header	1
	Display Panel Backlight Power Selector	1
	Flat Panel Display Brightness Connector	1
	Display Panel VCC Power Selector	1
	LCD panel monitor switch header	1
	Power Connector	1 X 4-pin ATX Power Connector
Security	TPM	1 x SPI TPM header
Power	Power Type	AT/ATX mode and DC in
	Voltage	DC in 12V
Dimension	Form Factor	Thin Mini-ITX, 170 x 170 mm

C786ES-IM-AA

3.5" form factor, Intel® Core™ i7-8665UE Processor, DDR4 SO-DIMM, DP, HDMI, LVDS, Dual-LAN, Multiple COM, 12-24V DC

Specifications

Processor System	CPU	Intel® Core™ i7-8665UE Processor (SoC) ,non-ECC, un-buffered memory
	Base Frequency	1.7GHz Quad-core
	L2 Cache	8MB
	Chipset	Integrated
Memory	Technology	DDR4 2400/2133 MHz
	Max.	32GB
	Socket	1 x SO-DIMM
Display	Controller	Intel UHD Graphics 620
	HDMI	1, Supports HDMI 1.4 up to 4096 x 2160 @ 24 Hz
	Display Port	1, Supports DP 1.2a up to 4096 x 2304 @ 60 Hz
	LVDS	1, Supports 24 bits up to 1920 x 1200 @ 30Hz (colay with eDP)
	Embedded Display Port	1, Supports up to 4096 x 2304 @ 60 Hz (co-lay with LVDS)
	Multi Display	DP+HDMI+LVDS, DP+HDMI+eDP
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on -board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M.2 Socket 3 with M key, type 2242(PCIe x4 & SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219AT, supports vPro/WOL/PXE 1 x Intel® i211AT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897-VA2 High Definition Audio
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s
	M.2	1 x M.2 Socket 3 with M key, type 2242(PCIe x4 & SATA mode)
	mSATA	1 x Full-size (shared with Mini PCIe slot)
Rear I/O	Display Port	1
	HDMI	1
	USB3.2 gen2	4
	Ethernet	2
Internal Connector	Serial Port	6 x header (2 x RS232/422/485, 4 x RS232)
	USB2.0	2 x header support additional 4 x USB2.0 connectors
	Chassis fan header	1
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	Internal speaker header	1 (4-pin, w/ 3 Watt/Channel Amplifier IC)
	System panel header	1
	Clear CMOS jumper	1
	SATA power header	1 (4-pin)
	LPC Debug header	1
	GPIO header	1 (8 bit)
	SMBus header	1
	I²C header	1
	power connector	1 x 4-pin ATX power connector
Watchdog Timer	H/W	yes
Security	TPM	1 x SPI TPM header
Power	Power Type	DC input
	Voltage	12-24V DC input
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 Iot Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	-20~60 ˚C
	Non-Operating Temperature	-40~85 ˚C
	Relative Humidity	Operational humidity: 40 ˚C@5%~ 95%
Dimension	Form Factor	3.5 ", 146 x 105 mm
Certification	EMC	CE, FCC, CCC

C583ES-IM-AA

3.5" form factor, Intel® Core™ i5-8365UE Processor, DDR4 SO-DIMM, DP, HDMI, LVDS, Dual-LAN, Multiple COM, 12-24V DC

Specifications

Processor System	CPU	Intel® Core™ i5-8365UE Processor (SoC) ,non-ECC, un-buffered memory
	Base Frequency	1.6GHz Quad-core
	L2 Cache	6MB
	Chipset	Integrated
Memory	Technology	DDR4 2400/2133 MHz
	Max.	32GB
	Socket	1 x SO-DIMM
Display	Controller	Intel UHD Graphics 620
	HDMI	1, Supports HDMI 1.4 up to 4096 x 2160 @ 24 Hz
	Display Port	1, Supports DP 1.2a up to 4096 x 2304 @ 60 Hz
	LVDS	1, Supports 24 bits up to 1920 x 1200 @ 30Hz (colay with eDP)
	Embedded Display Port	1, Supports up to 4096 x 2304 @ 60 Hz (co-lay with LVDS)
	Multi Display	DP+HDMI+LVDS, DP+HDMI+eDP
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on -board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M.2 Socket 3 with M key, type 2242(PCIe x4 & SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219LM, supports vPro/WOL/PXE 1 x Intel® i211AT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897-VA2 High Definition Audio
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s
	M.2	1 x M.2 Socket 3 with M key, type 2242(PCIe x4 & SATA mode)
	mSATA	1 x Full-size (shared with Mini PCIe slot)
Rear I/O	Display Port	1
	HDMI	1
	USB3.2 gen2	4
	Ethernet	2
Internal Connector	Serial Port	6 x header (2 x RS232/422/485, 4 x RS232)
	USB2.0	2 x header support additional 4 x USB2.0 connectors
	Chassis fan header	1
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	Internal speaker header	1 (4-pin, w/ 3 Watt/Channel Amplifier IC)
	System panel header	1
	Clear CMOS jumper	1
	SATA power header	1(4-pin)
	LPC Debug header	1
	GPIO header	1 (8 bit)
	SMBus header	1
	I²C header	1
	power connector	1 x 4-pin ATX power connector
Watchdog Timer	H/W	yes
Security	TPM	1 x SPI TPM header
Power	Power Type	DC input
	Voltage	12-24V DC input
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 Iot Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	-20~60 ˚C
	Non-Operating Temperature	-40~85 ˚C
	Relative Humidity	Operational humidity: 40 ˚C@5%~ 95%
Dimension	Form Factor	3.5 ", 146 x 105 mm
Certification	EMC	CE, FCC, CCC

C381ES-IM-AA

3.5" form factor, Intel® Core™ i3-8145UE Processor, DDR4 SO-DIMM, DP, HDMI, LVDS, Dual-LAN, Multiple COM, 12-24V DC

Specifications

Processor System	CPU	Intel® Core™ i3-8145UE Processor (SoC) ,non-ECC, un-buffered memory
	Base Frequency	2.2GHz Dual-core
	L2 Cache	4MB
	Chipset	Integrated
Memory	Technology	DDR4 2400/2133 MHz
	Max.	32GB
	Socket	1 x SO-DIMM
Display	Controller	Intel UHD Graphics 620
	HDMI	1, Supports HDMI 1.4 up to 4096 x 2160 @ 24 Hz
	Display Port	1, Supports DP 1.2a up to 4096 x 2304 @ 60 Hz
	LVDS	1, Supports 24 bits up to 1920 x 1200 @ 30Hz (colay with eDP)
	Embedded Display Port	1, Supports up to 4096 x 2304 @ 60 Hz (co-lay with LVDS)
	Multi Display	DP+HDMI+LVDS, DP+HDMI+eDP
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on -board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M.2 Socket 3 with M key, type 2242(PCIe x4 & SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® i219LM, supports WOL/PXE 1 x Intel® i211AT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC897-VA2 High Definition Audio
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s
	M.2	1 x M.2 Socket 3 with M key, type 2242(PCIe x4 & SATA mode)
	mSATA	1 x Full-size (shared with Mini PCIe slot)
Rear I/O	Display Port	1
	HDMI	1
	USB3.2 gen2	4
	Ethernet	2
Internal Connector	Serial Port	6 x header (2 x RS232/422/485, 4 x RS232)
	USB2.0	2 x header support additional 4 x USB2.0 connectors
	Chassis fan header	1
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	Internal speaker header	1 (4-pin, 3 Watt/Channel Amplifier IC)
	System panel header	1
	Clear CMOS jumper	1
	SATA power header	1 (4-pin)
	LPC Debug header	1
	GPIO header	1 (8 bit)
	SMBus header	1
	I²C header	1
	power connector	1 x 4-pin ATX power connector
Watchdog Timer	H/W	yes
Security	TPM	1 x SPI TPM header
Power	Power Type	DC input
	Voltage	12-24V DC input
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 Iot Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	-20˚60˚C
	Non-Operating Temperature	-40˚85˚C
	Relative Humidity	Operational humidity: 40˚C@5%~ 95%
Dimension	Form Factor	3.5 ", 146 x 105 mm
Certification	EMC	CE, FCC, CCC

E395S-IM-AA

3.5" form factor, Intel® Atom® x7-E3950, DDR3L 1866, 1*M.2 E-key 2230, 1*M.2 M-key 2242, 2*GbE, 4*USB3.1, 2*USB2.0, 6*COM, 1*SATA3.0, 1*TPM, 12-24V DC

Specifications

Processor System	CPU	Intel®Atom® x5-E3950 Processor (Quad-Core)
Memory	Technology	DDR3L 1866/1600/1333 MHz Non-ECC, un-buffered memory
	Max.	8GB
	Socket	1 x SO-DIMM
Display	Controller	Intel HD Graphics 505
	HDMI	1, Supports HDMI 1.4b up to 3840 x 2160 @ 30 Hz
	Display Port	1, Supports DP 1.2 up to 4096 x 2160 @ 60 Hz
	Embedded DisplayPort	1, Supports eDP1.3 x4 lanes, up to 3840x2160 @ 60 Hz (co-lay with LVDS)
	LVDS	1, Supports 1920 x 1080 @ 60 Hz (co-lay with eDP)
	Multi Display	HDMI+DP+LVDS
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242 (SATA mode)
	others	1 x Micro SD Card slot (on-board)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Intel® I210IT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887-VD2 8-Channel High Definition Audio
	Connector	Line-out, Mic-in
Storage	SATA port	1x SATA Gen 3.0, up to 6Gb/s
Rear I/O	Display Port	1
	HDMI	1
	USB3.1 Gen1	4
	Ethernet	2
Internal Connector	Serial Port	6 (2 x RS-232/422/485, 4 x RS-232)
	USB2.0	1, support additional 2 x USB2.0 connectors
	Chassis fan header	1 (PWM+DC Mode)
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	System panel header	1 (10-1 pin)
	Clear CMOS jumper	1
	SATA power header	1
	LPC Debug header	1
	SMBus header	1
	I²C header	1
	GPIO Header	1 (8-bit)
	Power connector	1 x 4-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	DC power input
	Voltage	12V-24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Windows 10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation
Environment	Operating Temperature	-40~85°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	3.5", 146 x 105 mm
Certification	Safety	CE, FCC
	EMC	UL, CCC

E394S-IM-AA

3.5" form factor, Intel® Atom® x5-E3940, DDR3L 1866, 1*M.2 E-key 2230, 1*M.2 M-key 2242, 2*GbE, 4*USB3.1, 2*USB2.0, 6*COM, 1*SATA3.0, 1*TPM, 12-24V DC

Specifications

Processor System	CPU	Intel®Atom® x5-E3940 Processor (Quad-Core)
Memory	Technology	DDR3L 1866/1600/1333 MHz Non-ECC, un-buffered memory
	Max.	8GB
	Socket	1 x SO-DIMM
Display	Controller	Intel HD Graphics 505
	HDMI	1, Supports HDMI 1.4b up to 3840 x 2160 @ 30 Hz
	Display Port	1, Supports DP 1.2 up to 4096 x 2160 @ 60 Hz
	Embedded DisplayPort	1, Supports eDP1.3 x4 lanes, up to 3840x2160 @ 60 Hz (co-lay with LVDS)
	LVDS	1, Supports 1920 x 1080 @ 60 Hz (co-lay with eDP)
	Multi Display	HDMI+DP+LVDS, HDMI+DP+eDP
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242 (SATA mode)
	others	1 x Micro SD Card slot (on-board)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Intel® I210IT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887-VD2 8-Channel High Definition Audio
	Connector	Line-out, Mic-in
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	Display Port	1
	HDMI	1
	USB3.1 Gen1	4
	Ethernet	2
Internal Connector	Serial Port	6 (2 x RS-232/422/485, 4 x RS-232)
	USB2.0	1, support additional 2 x USB2.0 connectors
	Chassis fan header	1 (PWM+DC Mode)
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	System panel header	1 (10-1 pin)
	Clear CMOS jumper	1
	SATA power header	1
	LPC Debug header	1
	SMBus header	1
	I²C header	1
	GPIO Header	1 (8-bit)
	Power connector	1 x 4-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	DC power input
	Voltage	12V-24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Windows 10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation
Environment	Operating Temperature	-40~85°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	3.5", 146 x 105 mm
Certification	Safety	CE, FCC
	EMC	UL, CCC

E393S-IM-AA

3.5" form factor, Intel® Atom® x5-E3930, DDR3L 1866, 1*M.2 E-key 2230, 1*M.2 M-key 2242, 2*GbE, 4*USB3.1, 2*USB2.0, 6*COM, 1*SATA3.0, 1*TPM, 12-24V DC

Specifications

Processor System	CPU	Intel®Atom® x5-E3930 Processor (Quad-Core)
Memory	Technology	DDR3L 1866/1600/1333 MHz Non-ECC, un-buffered memory
	Max.	8GB
	Socket	1 x SO-DIMM
Display	Controller	Intel HD Graphics 505
	HDMI	1, Supports HDMI 1.4b up to 3840 x 2160 @ 30 Hz
	Display Port	1, Supports DP 1.2 up to 4096 x 2160 @ 60 Hz
	Embedded DisplayPort	1, Supports eDP1.3 x4 lanes, up to 3840x2160 @ 60 Hz (co-lay with LVDS)
	LVDS	1, Supports 1920 x 1080 @ 60 Hz (co-lay with eDP)
	Multi Display	HDMI+DP+LVDS, HDMI+DP+eDP
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242 (SATA mode)
	others	1 x Micro SD Card slot (on-board)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Intel® I210IT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887-VD2 8-Channel High Definition Audio
	Connector	Line-out, Mic-in
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	Display Port	1
	HDMI	1
	USB3.1 Gen1	4
	Ethernet	2
Internal Connector	Serial Port	6 (2 x RS-232/422/485, 4 x RS-232)
	USB2.0	1, support additional 2 x USB2.0 connectors
	Chassis fan header	1 (PWM+DC Mode)
	Chassis intrusion header	1
	Front panel audio header (AAFP)	1
	System panel header	1 (10-1 pin)
	Clear CMOS jumper	1
	SATA power header	1
	LPC Debug header	1
	SMBus header	1
	I²C header	1
	GPIO Header	1 (8-bit)
	Power connector	1 x 4-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	DC power input
	Voltage	12V-24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Windows 10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation
Environment	Operating Temperature	-40~85°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	3.5", 146 x 105 mm
Certification	Safety	CE, FCC
	EMC	UL, CCC

N420S-IM-AA

3.5" form factor, Intel® Pentium® N4200, DDR3L 1866, 1*M.2 E-key 2230, 1*M.2 M-key 2242, 2*GbE, 4*USB3.1, 2*USB2.0, 6*COM, 1*SATA3.0, 1*TPM, 12-24V DC

Specifications

Processor System	CPU	Intel® Pentium® N4200 Processor (Quad-Core)
Memory	Technology	DDR3L 1866/1600/1333 MHz Non-ECC, Un-buffered Memory
	Max.	8GB
	Socket	1 x SO-DIMM
Display	Controller	Intel HD Graphics 505
	HDMI	1, Supports HDMI1.4b up to 3840 x 2160 @ 30 Hz
	Display Port	1, Supports DP1.2 up to 4096 x 2160 @ 60 Hz
	Embedded DisplayPort	1, Supports eDP1.3 x4 lanes, up to 3840x2160 @ 60 Hz (co-lay with LVDS)
	LVDS	1, Supports 1920 x 1080 @ 60 Hz (co-lay with eDP)
	Multi Display	HDMI+DP+LVDS
Expansion Slot	Mini PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device 1 x M.2 Socket 3 with M key, type 2242 (SATA mode)
	Others	1 x Micro SD Card slot (on-board)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Intel® i210IT, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887-VD2 8-Channel High Definition Audio
	Connector	Line-Out, Mic-in
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s
Rear I/O	HDMI	1
	Display Port	1
	USB3.1 Gen1	4
	Ethernet	2
Internal Connector	Serial Port	6 (2 x RS-232/422/485, 4 x RS-232)
	USB2.0	1, support additional 2 x USB2.0 connectors
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion Header	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1 (10-1 Pin)
	Clear CMOS Jumper	1
	SATA Power Header	1
	LPC Debug Header	1
	SMBus Header	1
	I²C Header	1
	GPIO Header	1 (8-bit)
	Power Connector	1 x 4-pin ATX Power Connector
Watchdog Timer	H/W	YES
Security	TPM	1 x SPI TPM header
Power	Power Type	DC power input
	Voltage	12V-24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Windows 10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation
Environment	Operating Temperature	-20~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	3.5", 146 x 105 mm
Certification	EMC	UL, CCC
	Safety	CE, FCC

V1605I-IM-A / R1505I-IM-A

Mini-ITX, AMD Ryzen™ Embedded R-Series V1605/R1505 APU, 2 x SO-DIMM

Specifications

Processor System	APU	AMD Ryzen™ Embedded V1605B/R1505G APUs
Memory	Technology	DDR4 2400MHz, ECC support
	Max.	32GB
	Socket	2 x SO-DIMM
Display	Display Port	3/2, DP++ supports DisplayPort 1.4 with max. resolution 3840x2160 @60Hz (V1605I-IM-A/R1505I-IM-A) 1, DP++ DisplayPort 1.4 with max. resolution 3840x2160 @60Hz (Optional, shared with LVDS and eDP)
	LVDS (default option)	1, LVDS supports LVDS with max. resolution 1920 x1200 @60Hz (Optional, shared with DisplayPort1 and eDP)
	eDP (optional)	1, eDP supports eDP 1.4 with max. resolution 3840 x 2160 @ 60Hz (Optional, shared with DisplayPort1 and LVDS)
	Multi Display	4DP/ 3DP+eDP/ 3DP+LVDS (V1605I-IM-A) , 3DP/ 2DP+eDP/ 2DP+LVDS (R1505I-IM-A) Multi-VGA output support: DP/ eDP/ LVDS ports Supports up to 4/3 displays simultaneous under OS (V1605I-IM-A/R1505I-IM-A)
Expansion Slot	PCIe	1 x PCIe 3.0 x8 slot (PCIe x8 mode for V1605I-IM-A/ PCIe x4 mode for R1505I-IM-A)
	M.2	1 x M.2 (key B 2242/2260/2280) PCIe x2(NVME)/ SATA/ USB mode for storage / 3G / LTE cat6 (USB3.2 Gen1) (V1605I-IM-A) or 3G / LTE cat4 (USB2.0) (R1505I-IM-A) mechanical support for module sizes: - 3042 (width up to 30 mm) - 2260 (width up to 22 mm) - 2280 (width up to 22 mm) 1 x M.2 E key for PCIe/USB2.0 support (V1605I-IM-A only) - 2230 (width up to 22 mm)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC887 / ALC897 codec
	Connector	2 x Audio jacks 2 x 2W Stereo Speaker output 1 x 5.1 channel (internal pin header)
Storage	Default	1 x SATA port Gen 3.0, up to 6Gb/s 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2 and SATA mode* 1 x CFAST* *If CFAST is enabled, M.2 SATA mode will be disabled, and vice versa. You may configure this setting in the BIOS.
	Per request	2 x SATA port Gen 3.0, up to 6Gb/s 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2
Rear I/O	Display Port	Default: 3 x DP + 1 x LVDS (V1605I-IM-A), 2 x DP + 1 x LVDS (R1505I-IM-A) Per request: 4 x DP / 3 x DP + eDP (V1605I-IM-A) ,3 x DP / 2 x DP + eDP (R1505I-IM-A)
	USB 3.2 Gen2 Type-A ports	2 x ports
	USB 2.0 Type-A ports	2 x ports
	Ethernet	2 x RJ45 ports
	Serial Port	2 x COM connectors (support RS232/422/485)
	Audio jack	1 x Mic in , 1 x Line out
	Power	1 x DC jack (lockable)
Internal Connector	Serial Port	4 x header (RS-232); COM3 colay CCtalk & COM4 colay TTL (BOM option)
	USB 3.2 Gen1	1 x Type A vertical connector (V1605I-IM-A)
	USB 2.0	1 x header support additional 2 x USB2.0 Connectors 1 x type A vertical connector (R1505I-IM-A)
	CPU Fan	1 x header (PWM mode)
	Chassis Fan	1 x header (PWM mode)
	Chassis Intrusion	1 x header
	Front Panel Audio (AAFP)	2 x headers
	System Panel Header	1 x header
	Clear CMOS Jumper	1 x header
	SATA power	2 x headers
	LPC Debug	1 x header
	S/PDIF	1 x header
	I²C	1 x header
	GPIO	1 x header
	AT/ATX Select	1 x header
	Power Connector	1 (4 pin)
Watchdog Timer	H/W	Yes
Security	TPM	1 x SPI TPM header
Power	Power Type	DC-in (ATX and AT mode supported)
	Voltage	DC-in 12V ~ 24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE, FCC

V1605I-IM-B / R1505I-IM-B

Mini-ITX, AMD Ryzen™ Embedded V/R1000-Series V1605/R1505G APU,
2 x SO-DIMM

Specifications

Processor System	APU	AMD Ryzen™ Embedded V1605B/R1505G APUs
Memory	Technology	DDR4 2400MHz, ECC support
	Max.	32GB
	Socket	2 x SO-DIMM
Display	Display Port	3/2, DP++ supports DisplayPort 1.4 with max. resolution 3840x2160 @60Hz (V1605I-IM-B/R1505I-IM-B) 1, DP++ DisplayPort 1.4 with max. resolution 3840x2160 @60Hz (Optional, shared with LVDS and eDP)
	LVDS(default option)	1, LVDS supports LVDS with max. resolution 1920 x1200 @60Hz (Optional, shared with DisplayPort1 and eDP)
	eDP(optional)	1, eDP supports eDP 1.4 with max. resolution 3840 x 2160 @ 60Hz (Optional, shared with DisplayPort1 and LVDS)
	Multi Display	• Default: 3DP+LVDS (V1605I-IM-B) / 2DP+LVDS (R1505I-IM-B) • Optional: 4DP or 3DP+eDP (V1605I-IM-B) / 3DP or 2DP+eDP (R1505I-IM-B) Supports up to 4/3 displays simultaneous under OS (V1605I-IM-B/R1505I-IM-B)
Expansion Slot	PCIe	1 x PCIe 3.0 x8 slot (PCIe x8 mode for V1605I-IM-B/ PCIe x4 mode for R1505I-IM-B)
	M.2	1 x M.2 Socket 1 with E key, type 2230 (PCIe x1, USB 2.0) (V1605I-IM-B only) 1 x M.2 Socket 3 with M key, type 2242/2260/2280 (PCIe x2, SATA)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC897 codec
	Connector	2 x Audio jacks (1 x Mic-in, 1 x Line-out) 2 x 2W Stereo Speaker output 1 x 5.1 channel (internal pin header)
Storage	Default	1 x SATA port Gen 3.0, up to 6Gb/s 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2 and SATA mode* 1 x CFAST* *If CFAST is enabled, M.2 SATA mode will be disabled, and vice versa. You may configure this setting in the BIOS.
	Per request	2 x SATA port Gen 3.0, up to 6Gb/s 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2
Rear I/O	Display Port	• Default: 3DP+LVDS (V1605I-IM-B) / 2DP+LVDS (R1505I-IM-B) • Optional: 4DP or 3DP+eDP (V1605I-IM-B) / 3DP or 2DP+eDP (R1505I-IM-B)
	USB 3.2 Gen2 Type-A ports	2 x ports
	USB 2.0 Type-A ports	2 x ports
	Ethernet	2 x RJ45 ports
	Serial Port	2 x COM connectors (support RS232/422/485)
	Audio jack	1 x Mic in , 1 x Line out
	Power	1 x DC jack (lockable)
Internal Connector	Serial Port	4 x header (RS-232); COM3 colay CCtalk & COM4 colay TTL (BOM option)
	USB 3.2 Gen1	1 x Type A vertical connector (V1605I-IM-B)
	USB 2.0	1 x header support additional 2 x USB2.0 Connectors 1 x type A vertical connector (R1505I-IM-B)
	CPU Fan	1 x header (PWM mode)
	Chassis Fan	1 x header (PWM mode)
	Chassis Intrusion	1 x header
	Front Panel Audio (AAFP)	2 x headers
	System Panel Header	1 x header
	Clear CMOS Jumper	1 x header
	SATA power	2 x headers
	LPC Debug	1 x header
	S/PDIF	1 x header
	I²C	1 x header
	GPIO	1 x header
	AT/ATX Select	1 x header
	Power Connector	1 (4 pin)
Watchdog Timer	H/W	Yes
Security	TPM	1 x SPI TPM header
Power	Power Type	DC-in (ATX and AT mode supported)
	Voltage	DC-in 12V ~ 24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE, FCC

W480EI-IM-A / Q470EI-IM-A

Mini-ITX, LGA1200 socket for the 10th Gen CPU, Q470E chipset, 2*SO-DIMM.
1*PCIe x16, 2*DP, DVI-D, LVDS/ eDP, 2*M.2 slot, USB 3.2 Gen2, USB Type C

Specifications

Processor System	CPU	LGA1200 Socket for The 10th Generation Intel® Core™ i9/ i7/ i5/ i3/ Pentium®/ Celeron® Processors Supports 14nm CPU
	CHIPSET	Intel® W480E/Q470E Chipset
	TDP	Max. 65W
Memory	Technology	DDR4 2933/2666/2400/2133 MHz (W480EI-IM-A: ECC support)
	Max.	Overall: 64GB, Per Module:32GB
	Socket	2 x SO-DIMM
Display	Display Port	2, Supports DP 1.4
	DVI-D	1
	eDP/LVDS	1 x Header (Support either eDP or LVDS ; switched by BIOS)
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 Slot (Bifurcation Support: 16x to 8x+8x or 8x+4x+4x)
	M.2	1 x M.2 Socket 1 with E key, Type 2230 for WIFI/BT device (PCIe & CNVi) 1 x M.2 Socket 3 with M key, Type 2242/2260/2280 (PCIe x4 & SATA mode)
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Intel® I210AT, 1 x Intel® I219LM
	Teaming	Yes
	Connector	2 x RJ-45
Audio	Codec	Realtek ALC887-VD2 High Definition Audio
	Connector	Line-Out, Line-In
Storage	SATA port	3 x SATA Gen 3.0, up to 6Gb/s
	M.2	1 x M.2 Socket 3 with M key, Type 2242/2260/2280 (PCIe x4 & SATA mode)
Rear I/O	Display Port	2
	DVI-D	1
	USB 3.2 Gen2	3 (2*Type A, 1*Type C)
	USB 3.2 Gen1	1 (Type A)
	USB 2.0	4 (Type A)
	Ethernet	2 x RJ45
	Serial Port	1 (RS232/422/485)
	Audio jack	2
	PS/2	1 x Keyboard, 1 x Mouse
Internal Connector	Serial Port	4 x COM Header (1 x RS232/422/485, 3 x RS232)
	USB3.2 Gen1	1 x USB3.2 Gen1 Stick Connector 1 x Header Support Additional 2 x USB3.2 Gen1 Ports
	USB2.0	1 x Header Support Additional 2 x USB2.0 Ports
	CPU Fan Connector	1 (PWM Mode)
	Chassis Fan Header	1 (PWM+DC Mode)
	Chassis Intrusion	1
	Disable ME	1
	Front Panel Audio Header (AAFP)	1
	System Panel Header	1(10-1 Pin)
	Clear CMOS Jumper	1
	Speaker Connector	1(4-pin)
	LVDS/ eDP selection	1
	Panel SW	1
	LPC Debug Header	1
	S/PDIF Header	1
	I²C Header	1
	GPIO Header	1 (8 Bit)
	AT/ATX Select Header	1
	Power Connector	1 x 8-pin ATX Power Connector, 1 x 24-pin ATX Power Connector
Watchdog Timer	H/W	Yes
Security	TPM	1 x SPI TPM header
Power	IAMT/vPRO	Yes
	Power Type	ATX / 12V DC-IN (Supported by additional cable)
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE, FCC

R1606I-IM-B

Mini-ITX, AMD Ryzen™ Embedded R1606G APU, 2 x SO-DIMM

Specifications

Processor System	APU	AMD Ryzen™ Embedded R1606G APU
Memory	Technology	DDR4 2400MHz, ECC support
	Max.	32GB
	Socket	2 x SO-DIMM
Display	Display Port	2, DP++ supports DisplayPort 1.4 with max. resolution 3840x2160 @60Hz 1, DP++ DisplayPort 1.4 (Optional, shared with LVDS and eDP) with max. resolution 3840x2160 @60Hz
	LVDS (default option)	1, LVDS supports LVDS with max. resolution 1920 x1200 @60Hz (Optional, shared with DisplayPort1 and eDP)
	eDP (optional)	1, eDP supports eDP 1.3 with max. resolution 3840 x 2160 @ 60Hz (Optional, shared with DisplayPort1 and LVDS)
	Multi Display	・Default: 2DP+LVDS ・Optional: 3DP or 2DP+eDP Supports up to 3 displays simultaneous under OS
Expansion Slot	PCIe	1x PCIe 3.0 x8 slot (x4 mode)
	M.2	1 x M.2 Socket 3 with M key, type 2242/2260/2280 (PCIe x2, SATA)
Ethernet	Speed	10/100/1000Mbps
	Controller	2 x Realtek® 8111H, supports WOL/PXE
	Connector	2 x RJ-45
Audio	Codec	Realtek® ALC897 codec
	Connector	2 x Audio jacks (1 x Mic-in, 1 x Line-out) 2 x 2W Stereo Speaker output 1 x 5.1 channel (internal pin header)
Storage	Default	1 x SATA port Gen 3.0, up to 6Gb/s 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2 and SATA mode* 1 x CFAST* *If CFAST is enabled, M.2 SATA mode will be disabled, and vice versa. You may configure this setting in the BIOS.
	Per request	2 x SATA port Gen 3.0, up to 6Gb/s 1 x M.2 (Key B, 2242 / 2260 / 2280) PCIe x2
Rear I/O	Display Port	・Default: 2DP+LVDS ・Optional: 3DP or 2DP+eDP
	USB 3.2 Gen2 Type-A ports	2 x ports
	USB 2.0 Type-A ports	2 x ports
	Ethernet	2 x RJ45 ports
	Serial Port	2 x COM connectors (support RS232/422/485)
	Audio jack	1 x Mic in , 1 x Line out
	Power	1 x DC jack (lockable)
Internal Connector	Serial Port	4 x header (RS-232); COM3 colay CCtalk & COM4 colay TTL (BOM option)
	USB 2.0	1 x header support additional 2 x USB2.0 Connectors 1 x type A vertical connector
	CPU Fan	1 x header (PWM mode)
	Chassis Fan	1 x header (PWM mode)
	Chassis Intrusion	1 x header
	Front Panel Audio (AAFP)	2 x headers
	System Panel Header	1 x header
	Clear CMOS Jumper	1 x header
	SATA power	2 x headers
	LPC Debug	1 x header
	S/PDIF	1 x header
	I²C	1 x header
	GPIO	1 x header
	AT/ATX Select	1 x header
	Power Connector	1 (4 pin)
Watchdog Timer	H/W	Yes
Security	TPM	1 x SPI TPM header
Power	Power Type	DC-in (ATX and AT mode supported)
	Voltage	DC-in 12V ~ 24V
Operating System	Microsoft Windows	Windows® 10 (64bit) / Win10 IoT Enterprise
	Linux	Ubuntu, RedHat Enterprise, Fedora Workstation, OpenSUSE
Environment	Operating Temperature	0~60°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Form Factor	Mini-ITX, 170 x 170 mm
Certification	Safety	CE (Class B), FCC (Class B)

IMX8P-IM-A

NXP® i.MX 8M ARM Cortex-A53 core, 4GB LPDDR4, HDMI, Dual LAN, 16G eMMC, 1*M.2 E Key slot, 1*Micro SD Card, 3*USB 3.2 Gen 1
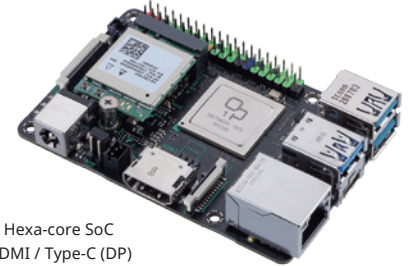

Specifications

Processor System	CPU	NXP® i.MX 8 M ARM Cortex-A53 core
	Max.Speed	1.3 GHz
	L2 Cache	1MB
	Integrated	Integrated
Memory	Technology	LPDDR4
	Max.	4GB on board memory
Display	HDMI	1, Supports HDMI 2.0 up to 3840 x 2160@60Hz
	MIPI DSI	1, Supports MIPI DSI (2 lane) up to 1920 x 1080@60Hz
Expansion Slot	M.2	1 x M.2 2230 E Key for BT/WiFi module (cooperate with Google EdgeTPU Module)
	Others	1 x Micro-SD Card connector
Ethernet	Speed	10/100/1000Mbps
	Controller	1 x Realtek® RTL8211, 1 x Intel I211-AT
	Connector	2 x RJ-45
Storage	eMMC	1 x 16GB onboard eMMC
Front I/O	HDMI	1
	USB3.2 Gen1	2@Type A, 5V/2A 1@Type C OTG, 5V/1.5A
	Ethernet	2
	Power Button	1
	Reset Button	1
Rear I/O	Power Connector	DC Power input
Internal Connector	GPIO Header	1 x 40-pin headers includes: - up to 6 x GPIO pins - up to 2 x I²C bus - up to 1 x UART - up to 2 x PWM - up to 1 x PCM/I2S - 2 x 5V power pins - 2 x 3.3V power pins - 8 x ground pins
	Micro-SD Card	1 Slot
	TPM Header	1 (14-1 pin)
	MIPI DSI	1, Supports MIPI DSI (2 lane) up to 1920 x 1080@60Hz
	MIPI CSI	2, support two MIPI-CSI camera inputs (4-lane each)
	I²C Header	1 (5-1 pin)
Security Module	TPM Module	TPM 2.0 power by Nuvoton NCPT 750 (Optional)
	Crypto Module	Cloud security power by Microchip ATECC608A/ NXP SE050 (Optional)
Power	Power Type	DC power input
	Voltage	12-24V DC input
Environment	Operating Temperature	-20~70°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	10~95%
Dimension	Form Factor	100mm x 72mm x 21mm

TINKER BOARD SERIES

Tinker Board Series is a Single Board Computer (SBC) in a small form factor that offers class-leading performance, greater durability, better stability and overall improved user experience for developers.

For those in search of tailor-made solutions, ASUS IoT offers custom design services such as changing your existing hardware, or creating a completely new solution according to your specific requirements. With the right skills to design, manufacture, test and support, ASUS IoT provides a one-stop service to help you manage your business in an effective, cost-saving manner.

Tinker Board 2 / Tinker Board 2S

ARM SBC, Rockchip RK3399 Hexa-core, LPDDR4 RAM, eMMC, HDMI, MIPI-DSI, MIPI-CSI, 12-19V DC in

Features
- Arm® big.LITTLE™ A72+A53 Hexa-core SoC
- Multiple MIPI-CSI & DSI / HDMI / Type-C (DP)
- USB 3.0 / Wi-Fi 802.11ac / BT 5.0 / GPIO
- 12V~19V DC-in offers stable power delivery
- Linux & Android supported

Microsoft Azure Certified

Specifications

SoC	Rockchip RK3399
CPU	Dual-core Arm® Cortex®-A72 @ 2.0 GHz + Quad-core Arm® Cortex®-A53 @ 1.5 GHz
GPU	Arm® Mali™-T860 MP4 GPU @ 800 MHz
Memory	Dual-CH LPDDR4 2/4GB
Storage	16GB eMMC™ (** Only available on S model) 1 x MicroSD (TF) card slot (push & push)
Display	1 x HDMI with CEC hardware ready 1 x Type-C (DP) 1 x 22-pin MIPI DSI (4 lane)
USB	2 x USB3.2 Gen1 Type-A ports 1 x USB3.2 Gen1 Type-C OTG port
Camera Interface	1 x 15-pin MIPI CSI-2 (2 lane)
Connectivity	1 x RTL8211E/F GbE LAN 1 x 802.11 a/b/g/n/ac & Bluetooth 5.0 (2T2R)
Audio	1 x HDMI audio, 1 x I2S (40-pin), 1 x S/PDIF (40-pin)
Internal I/O	1 x 40-pin header includes: - up to 28 x GPIO pins - up to 2 x SPI bus - up to 2 x I²C bus - up to 2 x UART - up to 3 x PWM - up to 1 x PCM/I2S - up to 1 x S/PDIF TX - 2 x 5V power pins - 2 x 3.3V power pins - 8 x ground pins 1 x 2-pin Recovery header 1 x 2-pin Power-on header 1 x 2-pin Reset header 1 x 2-pin Debug UART header 1 x 2-pin DC Fan header 1 x 2-pin RTC Battery header
Power requirement	1 x 12~19V DC input (5.5/2.5 mm)
Operation Temperature	0~60℃
Non-Operation Temperature	-40~85℃
Relative Humidity	0%~85%
Operating System Support	Debian 10 / Android 11
Form Factor	3.37" x 2.125" (85 × 56 mm)

Tinker Board R2.0/ Tinker Board S R2.0

Card size SBC, Quad-core Arm processor, 2/4GB onboard memory & 16/32GB eMMC, HDMI, GbE LAN, Multiple USB

Features

· Ultra-small form factor
· Onboard 16/32G eMMC for durability
· 40-pin GPIOs for multiple purposes
· Linux & Android supported

Specifications

SoC	Rockchip RK3288-CG.W
CPU	Dual-core Arm® Cortex®-A72 @ 2.0 GHz + Quad-core Arm® Cortex®-A53 @ 1.5 GHz
GPU	Arm® Mali™-T860 MP4 GPU @ 800 MHz
Memory	Dual-CH LPDDR4 2/4GB
Storage	16/32GB eMMC 1 x Micro SD (TF) card slot (push & pull)
Display	1 x HDMI with CEC hardware ready 1 x Type-C (DP) 1 x 22-pin MIPI DSI (4 lane)
USB	3 x USB3.2 Gen1 Type-A ports 1 x USB3.2 Gen1 Type-C OTG port
Camera Interface	1 x 15-pin MIPI CSI-2 (2 lane)
Connectivity	1 x RTL8211E-VB-CG 1 x 802.11 b/g/n & BT 4.2 + EDR (extendable antenna header)
Audio	1 x RTL ALC4030U codec with 3.5mm audio jack (with Mic & plug-in detecton)
Internal I/O	1 x 40-pin header includes: - up to 28 x GPIO pins - up to 2 x SPI bus - up to 2 x I²C bus - up to 2 x UART - up to 3 x PWM - up to 1 x PCM/I2S - up to 1 x S/PDIF TX - 2 x 5V power pins - 2 x 3.3V power pins - 8 x ground pins 1 x 2-pin Recovery header 1 x 2-pin Power-on header 1 x 2-pin Reset header 1 x 2-pin Debug UART header 1 x 2-pin DC Fan header 1 x 2-pin RTC Battery header
Power requirement	1 x 12~19V DC input (5.5/2.5 mm)
Operation Temperature	0~60ºC
Non-Operation Temperature	-40~85ºC
Relative Humidity	0%~85%
Operating System Support	Debian 10/ Android 11
Form Factor	3.37" x 2.125" (85 × 56 mm)

Tinker Edge T

Card size SBC, NXP i.MX 8M Quad-core SoC, Google Edge TPU, 1GB RAM, 8GB eMMC, HDMI, MIPI-DSI, MIPI-CSI, 12-19V DC in

Features

· ML capability with Google Edge TPU
· 2 x MIPI-CSI / MIPI-DSI / HDMI
· 40-pin GPIOs for multiple purposes
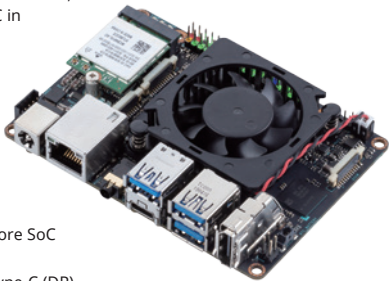· 12V~19V DC-in offers stable power delivery

Coral   Microsoft Azure Certified

Specifications

SoC	NXP i.MX 8M
CPU	Quad-core Arm® Cortex®-A53 @ 1.5GHz, Coretex-M4
GPU	GC7000 Lite
NN Processor	Google Edge TPU ML accelerator coprocessor
Memory	LPDDR4 1GB
Storage	8GB eMMC 1 x Micro SD (TF) card slot (push & pull)
Display	1 x HDMI with CEC hardware ready 1 x 22-pin MIPI DSI
USB	2 x USB3.2 Gen1 Type-A ports 1 x USB3.2 Gen1 Type-C OTG port
Camera Interface	2 x 24-pin MIPI CSI-2
Internet	1 x RTL8211F-CG GbE LAN 1 x 802.11 a/b/g/n/ac & Bluetooth 4.2
Internal I/O	1 x 40-pin headers includes: - up to 28 x GPIO pins - up to 1 x SPI bus - up to 2 x I²C bus - up to 2 x UART - up to 3 x PWM - up to 1 x PCM/I2S - 2 x 5V power pins - 2 x 3.3V power pins - 8 x ground pins 1 x Boot mode switch 1 x 2-pin Reset header 1 x 2-pin DC Fan header
Power requirement	12~19V DC input (5.5/2.5 mm)
Operation Temperature	0~50ºC
Non-Operation Temperature	-40~85ºC
Relative Humidity	0%~85%
Operating System Support	Mendel
Form Factor	3.37" x 2.125" (85 × 56 mm)

Tinker Edge R

Pico-ITX SBC, Rockchip RK3399Pro Hexa-core, NPU
for AI, 4GB SYS & 2GB NPU RAM, 16GB eMMC,
HDMI, MIPI-DSI, MIPI-CSI, 12-19V DC in

Features

· Arm® big.LITTLE™ A72+A53 Hexa-core SoC
· ML capability with Rockchip NPU
· Multiple MIPI-CSI & DSI / HDMI / Type-C (DP)
· 40-pin GPIOs & mPCIe for multiple expansions
· 12V~19V DC-in offers stable power delivery
· Linux & Android supported

Microsoft
Azure

Certified

Specifications

SoC	Rockchip RK3399Pro
CPU	Dual-core Arm® Cortex®-A72 @ 1.8 GHz + Quad-core Arm® Cortex®-A53 @ 1.4 GHz
GPU	Arm® Mali™-T860 MP4 GPU @ 800 MHz
NN Processor	Rockchip NPU
Memory	Dual-CH LPDDR4 4GB (SYSTEM) + LDPPR3 2GB (NPU) or Dual-CH LPDDR4 2GB (SYSTEM) + LDPPR3 1GB (NPU)Memory
Storage	16GB eMMC 1 x Micro SD (TF) card slot (push & pull)
Display	1 x HDMI with CEC hardware ready 1 x Type-C (DP) 1 x 22-pin MIPI DSI (4 lane)
USB	3 x USB3.2 Gen1 Type-A ports 1 x USB3.2 Gen1 Type-C OTG port
Camera Interface	1 x 22-pin MIPI CSI-2 (4 lane) 1 x 22-pin MIPI CSI-2/DSI (4 lane)
Connectivity	1 x RTL8211F-CG GbE LAN 1 x 802.11 a/b/g/n/ac & Bluetooth 5.0 (2T2R)
Expansions	1 x Mini PCIe slot (Full-Length, nano-SIM socket, for 4G/LTE)
Audio	1 x 3.5mm audio jack (with Mic & plug-in detection)
Internal I/O	1 x 40-pin headers includes: - up to 28 x GPIO pins - up to 2 x SPI bus - up to 2 x I²C bus - up to 2 x UART - up to 3 x PWM - up to 1 x PCM/I2S - up to 1 x S/PDIF TX - 2 x 5V power pins - 2 x 3.3V power pins - 8 x ground pins 1 x 2-pin Recovery header 1 x 2-pin Power-on header 1 x 2-pin Reset header 1 x 2-pin DC Fan header 1 x 2-pin RTC Battery header
Power requirement	Dual 12-19V DC input (5.5/2.5 mm Barrel jack, 4-Pin header)
Operation Temperature	0~60℃
Non-Operation Temperature	-40~85℃
Relative Humidity	0%~85%
Operating System Support	Debian 10 / Android 9
Form Factor	Pico-ITX, 3.9" x 2.8" (100 × 72 mm)

Tinker System 2

Arm SBC with Aluminum Case, Rockchip RK3399 Hexa-core,
LPDDR4 RAM, eMMC, HDMI, 12-19V DC in

Features

· Fanless design: Great heat conductive
  with fanless support
· Certified with RF Regulation: Wi-Fi (CE, FCC, VCCI, BSMI)
· High peripheral extensibility: Reserved I/O for antenna
  and accessory extension
· +12-19.5V DC-in offers stable power delivery
· Linux & Android supported

Specifications

SoC	Rockchip RK3399
CPU	Dual-core Arm® Cortex®-A72 @ 2.0 GHz + Quad-core Arm® Cortex®-A53 @ 1.5 GHz
GPU	Arm® Mali™-T860 MP4 GPU @ 800 MHz
Memory	Dual-CH LPDDR4 2/4GB
Storage	16/32GB eMMC
Display	1 x HDMI with CEC hardware ready 1 x Type-C (DP)　　1 x 22-pin MIPI DSI (4 lane)
USB	3 x USB3.2 Gen1 Type-A ports 1 x USB3.2 Gen1 Type-C OTG port
Camera Interface	1 x 15-pin MIPI CSI-2 (2 lane)
Connectivity	1 x RTL8211F-CG GbE LAN 1 x 802.11 a/b/g/n/ac & Bluetooth 5.0 (2T2R)
Audio	1 x HDMI audio, 1 x I2S (40-pin), 1 x S/PDIF (40-pin)
Internal I/O	1 x 2-pin Recovery header 1 x 2-pin Power-on header 1 x 2-pin Reset header 1 x 2-pin Debug UART header 1 x 2-pin DC Fan header 1 x 2-pin RTC Battery header
Power requirement	12V~19.5V DC input (5.5/2.5 mm)
Operation Temperature	0~40℃
Non-Operation Temperature	-40~85℃
Relative Humidity	0%~85%
Operating System Support	Debian 10 / Android 11
Form Factor	3.583" x 2.638" x 1.772" (91 x 67 x 45 mm)

ALPR Edge AI Dev Kit

ASUS IoT ALPR Dev Kit is a comprehensive automatic license-plate recognition (ALPR) solution that includes both the necessary hardware and software to enable systems integrators (SIs) to create edge applications that mesh seamlessly with existing ALPR infrastructure. Powered by ASUS IoT Tinker Board Edge R, the single-board computer for AI applications, ALPR Dev Kit is capable of up to 99% accuracy with high, 100ms inference performance. It integrates easily with existing USB or IP cameras and, with built-in machine-learning (ML) technology, it's able to learn from each inference – delivering continuously improving detection. ASUS IoT is able to fine-tune the ALPR software to service specific needs or cater to particular demands, empowering ALPR Dev Kit to provide accurate, fast and tailor-made detection that is ideal for almost any scenario.

Highly-flexible mounting methods

Novelty license-plate noise reduction

Edge AI empowers ALPR accuracy

Usage Scenario

Parking Lot
· Access Control
· Vehicle-tracking
· EV-charge Monitoring
· Custom Vehicle Tags
· Parking Analysis Reports

Government / Security Service
· Access Control
· Monitoring Potential Threat
· Improve Law Enforcement
· Connect to Smart Home
· Real-time Notification

Retail / Hospitality
· Auto car wash or service
· Drive-thru Restaurant
· Upgrade retailers' existing camera to AI camera

Solution Portfolio

ASUS IoT Tinker Edge R

Rockchip RK3399Pro
CPU: Dual-core 1.8 GHz ARM Cortex A72 +
Quad-core 1.4 GHz ARM Cortex A53
GPU: 800 MHz ARM Mali T860 MP4
Rockchip NPU processor
Memory: 4 GB dual-channel LPDDR4 for system +
2 GB LPDDR3 for NPU
Operating system: Debian 9 / Android 9

ASUS IoT ALPR Software

Supported car-plate regions:
Taiwan, United Kingdom
Supported OS: Debian 9 on Tinker Edge R
Inference performance: 160 ms
Accuracy: 99% within 3- to 5-meter range, with custom retraining service available
Supported cameras: USB webcams, and IP cameras on a project-by-project basis.

MARKET READY SOLUTION

Face Recognition Edge AI Dev Kit

ASUS IoT Face Recognition Edge AI Dev Kit is a one-stop solution with latest AI technology to identify faces and other key personal markers. This solution provides precise and stable security monitoring, simplifies security processes and improves operational efficiency. Pairing the renowned ASUS IoT Tinker Board 2 with FaceMe® SDK from CyberLink, Face Recognition Edge AI Dev Kit creates a powerful package that's capable of recognition with up to 99% accuracy, and at fast 154 ms inference speeds. In addition, this solution is able to assess and infer attributes such as age, gender and head orientation. This enables a powerful platform for diverse business applications in enterprise, retail, hospitality and public space fields.

Face Detection

Face Recognition

Face Attributes

Mask Detection & Recognition

Anti-spoofing

Usage Scenario

Enterprise
· Door Access Control
· Attendance Management
· Meeting Room Capacity Management

Retail
· Customer Segmentation
· VIP-targeted Marketing
· Emotion Detection
· Heatmap Analysis
· Mask Detection

Hospitality
· Membership Management
· Contactless Check-in/out
· Mask Detection

Factory & Warehouse
· Door Access Control
· Contactless Delivery or Restocking
· Forbidden Zone Monitoring

Solution Portfolio
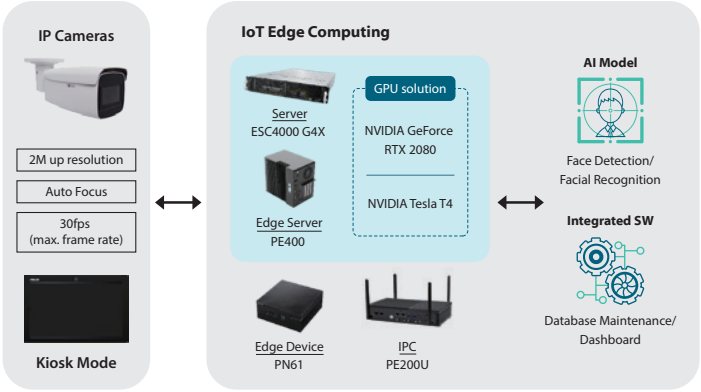
ASUS IoT Tinker Board 2

Rockchip RK3399
CPU: Dual-core ARM Cortex A72 @ 1.8 GHz and Quad-core Arm Cortex A53 @ 1.4 GHz
GPU: Arm Mali T860 MP4 @ 800 MHz
Memory: Dual-channel LPDDR4 2/4 GB
Operating system: Debian 10 / Android 11

CyberLink FaceMe®

FaceMe® Facial Recognition by CyberLink

Accuracy rate (TAR) of 99.7% at 10-4 FAR
Highly ranked in NIST FRVT 1:1
Face recognition, including masked faces
Android OS 10
CyberLink FaceMe SDK

AI Security Solution

ASUS IoT AI Security Solution is a face recognition system powered by artificial intelligence that enables accurate and stable security monitoring. Ideal for schools and workplaces of all types, AI Security Solution simplifies security processes and improves operational efficiency to deliver comprehensive yet easy to manage security package.

IP Cameras

2M up resolution
Auto Focus
30fps (max. frame rate)

Kiosk Mode

IoT Edge Computing

Server ESC4000 G4X

GPU solution
NVIDIA GeForce RTX 2080
NVIDIA Tesla T4

Edge Server PE400

Edge Device PN61

IPC PE200U

AI Model
Face Detection/ Facial Recognition

Integrated SW
Database Maintenance/ Dashboard

Usage Scenario

Building
· Access Control
· Office Access
· Visitor self-check-in

Enterprise
· Attendance Management
· Access Control

Surveillance
· Restricted Area Control
· Anti-trailing
· Intrusion Detection
· Asset Protection

## Product Advantage

Quick Photo Validation

Photo Scoring System
90% 59%

ID Classification
Employee Guest

SOFTWARE & SERVICES

ASUS IoT Cloud Console

ASUS IoT Cloud Console (AICC) is a unified platform for managing and analyzing big data collected by IoT devices running different operating systems. With an intuitive user interface and advanced data-encryption technology, AICC enables you to collect and analyze comprehensive information in a variety of smart-technology sectors, such as transportation, retail and farming, to assist you in making the best decisions at the right times to seize business opportunities.
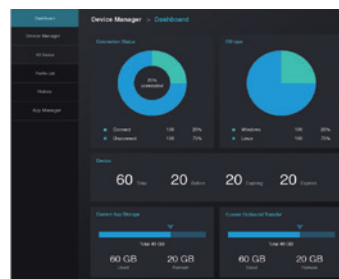
Dashboard Menu   **Visualization Chart**

Usage Scenario

Smart Traffic
Remotely manage traffic monitors on highways and overpasses to analyze traffic flow.

Smart Retail
Manage POS systems and data-analysis boxes in retail stores.

Smart Farms
Collect and analyze information about soil, temperature, sunlight and more.

Product Advantage

Intuitive Interface   Reliability   Data Monitoring   Responsive Web Design   Free Trial
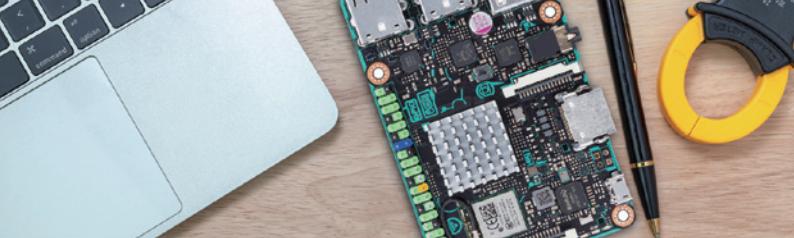
ASUS Industrial Android FOTA

Android has become one of the fastest-growing IoT standard OS as it's open source, touch-panel friendly and also a part of the Google ecosystem. However rigorous Android architecture also cause higher systemic risk if software update ongoing without expert assistance. ASUS IoT Industrial Android FOTA Service offers single window support system to ensure the efficiently of OTA update. The ASUS IoT Industrial Android FOTA (firmware over-the-air) wireless firmware update supports embedded systems developed with Tinker Board and enables you to update the system firmware, operating system and drivers remotely. ASUS IoT Industrial Android FOTA reduces the need for onsite personnel support and system disassembly, and removes the possibility of operation errors and safety concerns caused by manual USB updates.

City Surveillance
Smart cameras or IP cameras in most embedded systems have computer vision and security concern. With the ASUS Industrial Android FOTA update system, cameras can receive stable updates of AI and computer-vision algorithms, giving you the ability to update the visual interaction content according to the needs of different scenes.

Retail
In retail industry, a smart vending machine may have a BI engine that enables it to perform tasks, such as recognizing the environment, identifying users, and providing different responses based on the characteristics of individual users or the environment. If the smart vending machine needs to support a new payment service, the BI engine can update the firmware and software remotely through ASUS Industrial Android FOTA simultaneously, improving the efficiency of maintenance.

Robotics
For better joint movement and environmental perception, robots can have dozens or even hundreds of built-in sensors. Each sensor is operated by a software driver. ASUS Industrial Android FOTA can update the drivers for all sensors remotely as needed to ensure that the optimal robot movement.

Product Advantage

Solid service experience with over 20 million devices upgrade in mobile market

Single Interface with global content delivery network

Enhanced system flexibility, remote functions and long-term maintenance

Report Management with progress, quantity and problem

AI
SOLUTION

ASUS IoT
AISDetector

Powered by AI technology, detection models can be established in as little as one minute, with just a small amount of good product data. The solution is ideal for replacing traditional manual-inspection pipelines, and is suitable diverse production processes. It also creates digitally-traceable production records, enabling the digital transformation of manufacturing.

Main Function

Deep learning   Edge AI   AI Model in 1 min   Traceable records

System Diagram

Before — Manual

· Lack of digitized data
· Variable manual-testing standards
· High labor cost

After — ASUS IoT

· Instant production history
· Consistent automated-testing standards
· Visual information

Key Features

Build AI model in one minute*

Three 30-second good-product training sessions is enough to build a **complete AI model** ready for anomaly detection, with GPU acceleration required.

*i9 CPU, 32GB RAM

Instant AI analysis

By learning good products, the solution quickly simulates the ability of human beings to judge defects, avoiding the outflow of abnormal products.

Waveform analysis

Anomalous signals can be detected for analog signals such as vibration, voiceprints, voltages and current. Both online measurement and offline data import are supported.

Easy to use

The **training mode** enables AI models to be built in just four steps, while the **inference mode** prevent the operator from accidentally interacting with the management interface.

ASUS IoT
AISVision

A toolkit for AI-powered machine vision and AI model generation. AISVision comprises "AI model training an AI inference runtime and batch-training scheduling."

Pre-defined procedures: Ready for labeling, model training and verification.

No-code required: Build AI models in moments, without the need for specialist knowledge.

Easy integration and deployment: Simple knowledge aggregation and retraining based on domain needs, and ongoing data analysis, visualization, and database management.
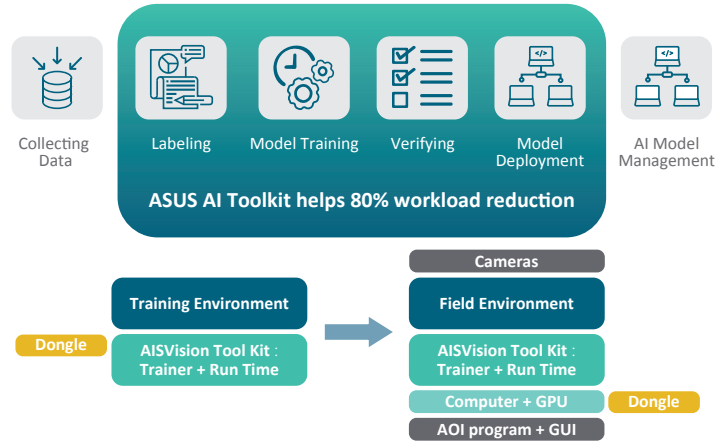
Main Function

Deep learning	Edge AI	AI models	Anomaly detection	Model management

System Diagram

Collecting Data | Labeling | Model Training | Verifying | Model Deployment | AI Model Management

ASUS AI Toolkit helps 80% workload reduction

Dongle

| Training Environment |
| AISVision Tool Kit : Trainer + Run Time |

Cameras
| Field Environment |
| AISVision Tool Kit : Trainer + Run Time |
| Computer + GPU | Dongle |
| AOI program + GUI |

Key Features

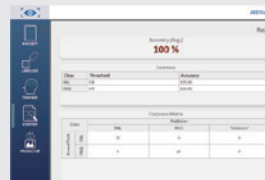### Four-Steps no-code development

Unique AI computer vision-technology, requires just handful samples to build AI models for precision inspection.

Multiple AI functions

Compose supervised and unsupervised learning for segmentation, classification, object detection, and anomaly detection.

Easy verification and results export

AI model efficiency verification mechanism, with option to produce self-selecting reports in HTML.

Designed for secondary development

On-premises re-training capability for data privacy, plus versatile API for further development and C, C++, and C# support.
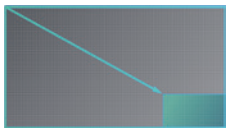
Workflow

TensorFlow Model
32-bit float number

TRAIN → TensorFlow Model **EXPORT** → Frozen graph
.pb file

Quantization aware training

or

1. **CONVERT**

Post-training quantization

TensorFlow Lite
8-bit fixed number
.tflite file

2. **COMPLIE** → Edge TPU Model
.tflite file

3. **DEPLOY**

Applications

Manufacturing

Retail

Transportation

Surveillance

ASUS IoT
AI Accelerator PCIe Card

The first PCI Express® expansion card with multiple Coral Edge TPUs for AI inferencing. Designed for inferencing at the edge, it runs API-based transfer-learning from a pre-trained model to achieve a fine-tuned model. Rapid response, easy to use, running multiple AI models in parallelize.

AI model   Partition model   Execute in separate TPUs
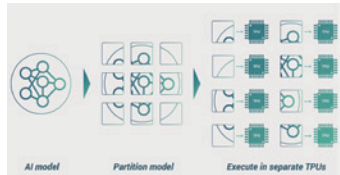
Machine learning performance is enhanced with its pipelining technology. AI Accelerator PCIe Card is designed for applications that require fast response or large-model execution, pipelining techniques enable you to partition models into several smaller models.
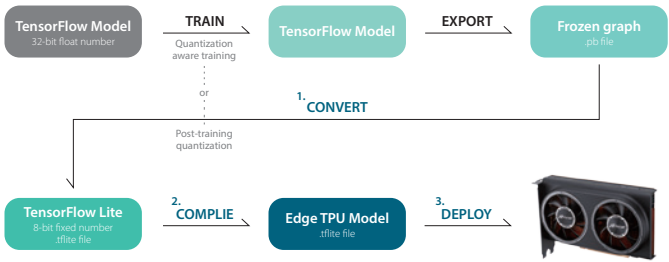
Parallel ML inferences with low latency

Maximize ML result with small datasets

Prototype AI applications in minutes

Specification

Main Chip	Core	Google® Coral Edge TPU Processor
PCIe Interface	Technology	PCI Express 3.0 x16
Software	Supported Framework	TensorFlow Lite
	Precision	INT8
	Performance	CRL-G18U-P3DF: 32 TOPS
		CRL-G116U-P3DF: 64 TOPS
Thermal Solution	FAN design	Active Fan
Power	Power Connector	1 x 6-pin 12V External Power
		CRL-G18U-P3DF: 36 W
	Power Consumption	CRL-G116U-P3DF: 52 W
Operating System	Linux	Ubuntu 18.04, Debian 10
		*For latest OS support list, please check https://iot.asus.com/
Environment	Operating Temperature	0~55°C
	Non-Operating Temperature	-40~85°C
	Relative Humidity	0%~85%
Dimension	Width	42.1 mm
	Height	126.3 mm
	Depth	186.3 mm
Weight	Weight	CRL-G18U-P3DF: 516 g
		CRL-G116U-P3DF: 530 g