ASUS IoT IN SEARCH OF INCREDIBLE

Accelerating AIoT Transformation

Intelligent Edge Computing and AI Solutions

2024 EDITION

Product Guide

ASUS IoT
IN SEARCH OF INCREDIBLE

iot.asus.com

Made in Taiwan

intel. partner
Titanium

TABLE OF CONTENT

ABOUT ASUS

ASUS is a global technology leader that provides the world's most innovative and intuitive devices, components and solutions to deliver incredible experiences that enhance the lives of people everywhere. With its team of 5,000 in-house R&D experts, ASUS is world-renowned for continuously reimagining today's technologies for tomorrow, garners more than 11 awards every day for quality, innovation and design, and is ranked among Fortune's World's Most Admired Companies.

Over 16,000
Employees worldwide

5,000+
World-class R&D team

200+
Countries

A VISIONARY APPROACH TO UBIQUITOUS COMPUTING TECHNOLOGY

In the contemporary landscape of ubiquitous computing, ASUS has seamlessly integrated itself, embracing the interconnected fabric of our digital era. Rooted in a robust foundation of personal and mobile computing, we've extended our purview to encompass IoT computing, cloud computing, and advanced AI computing, aiming to contribute to a more enriched future for people's lives.

Personal Computing | Mobile Computing | IoT Computing | Edge Computing | AI Computing

Worldwide Recognition

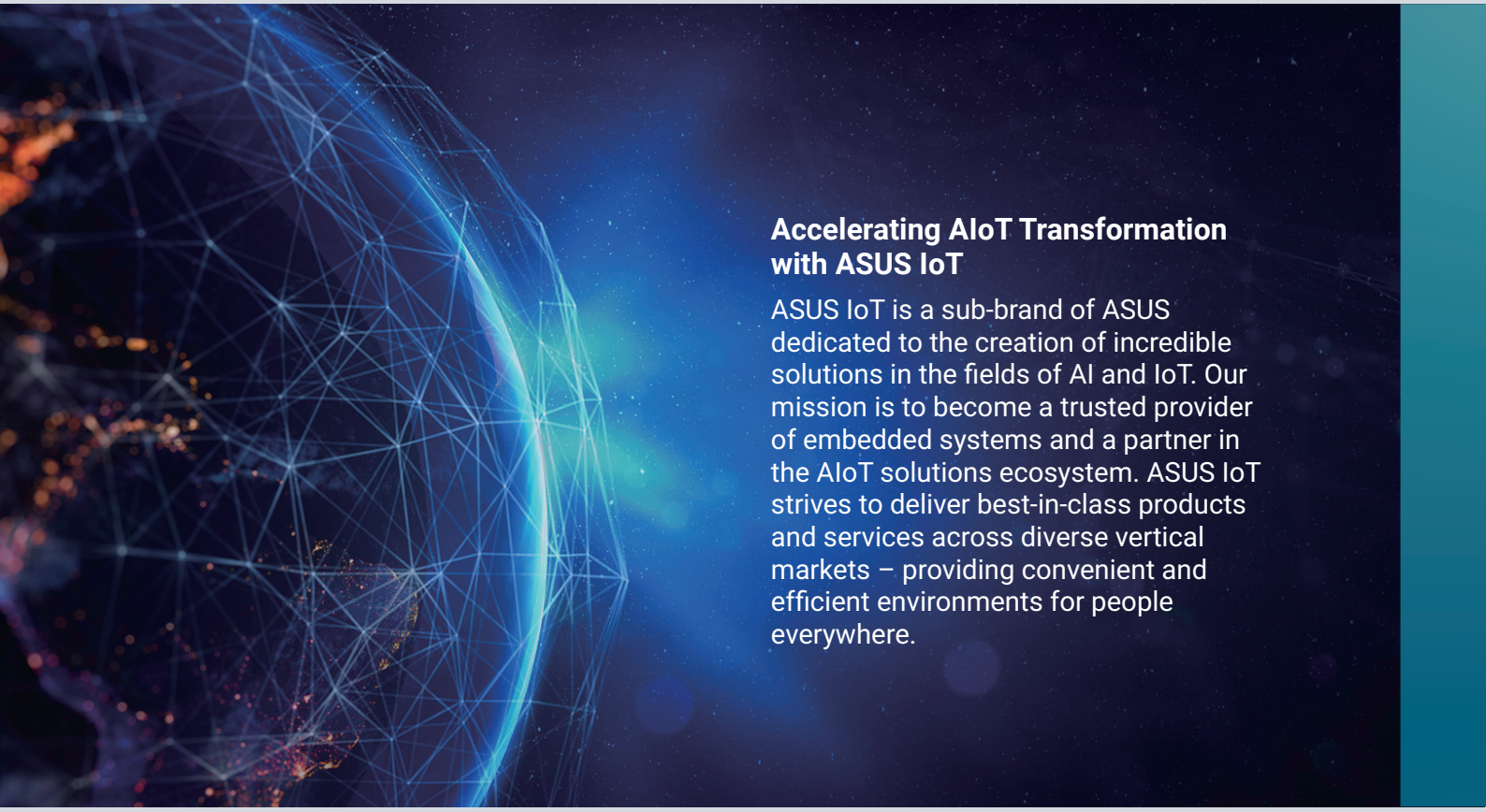
An ever-growing portfolio of products, solutions, and services that continue to garner global accolades

FORTUNE One of the World's Most Admired Companies (for 8 years)

Interbrand Best Global Taiwan Brand (for 9 years)

Forbes World's Best Employers 2022

ABOUT
ASUS IoT



Accelerating AIoT Transformation with 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 a partner in the AIoT solutions ecosystem. ASUS IoT strives to deliver best-in-class products and services across diverse vertical markets – providing convenient and efficient environments for people everywhere.

- Exceptional AI technology
- Innovative technology and flexible design
- Strong partnerships for assured timely production and stable supply chain
- Exclusive technical support
- Committed to longevity
- Exceptional quality control for compatibility and safety

DESIGN & MANUFACTURING SERVICE

ASUS IoT

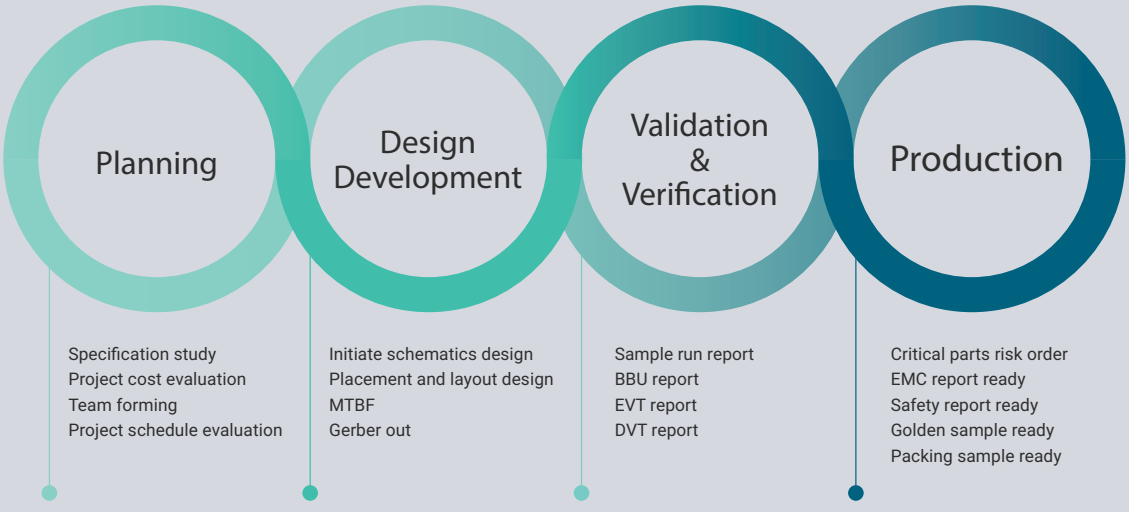
ASUS is known for creating products and services that exceed industry standards. Our engineers design to exacting standards to guarantee quality, and we use only the best components to ensure real-world performance and reliability. Along with offering customized production at low or high volumes, ASUS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



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
- Emissions tests - EMC, EMI
- Power tests - Line voltage and frequency, power consumption, power line disturbance
- Function tests - BIOS for UEFI, system utilities, OS, and external hardware compatibility

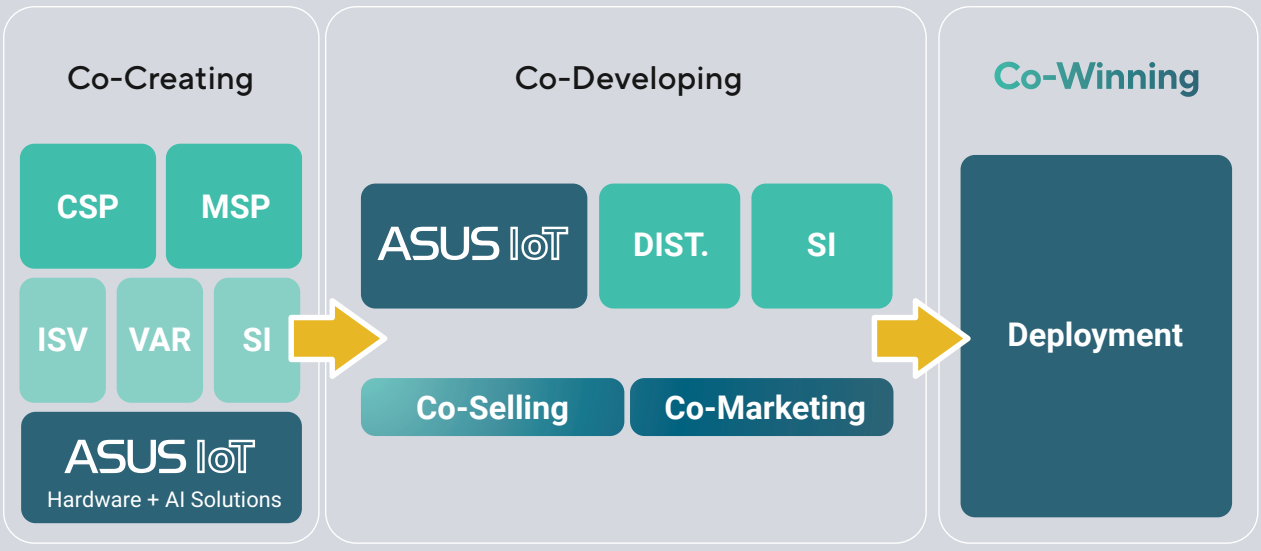
ASUS factories are certified by ISO 9001, ISO 14001, OHSAS 18001, ISO 13485, QC 080000, and ISO/TS 16949 and ASUS offers customers the opportunity to visit our production facilities. To schedule a visit, please contact with your local ASUS representative.

ABOUT
ASUS IoT

REVOLUTIONIZING AIOT THROUGH COLLABORATIVE SOLUTIONS

ASUS IoT's approach with the AIoT Partner Alliance Program aims to transform AI and IoT with a collaborative model. Focused on joint creation development, it combines hardware, AI software, design and quality for complete market solutions. The ASUS AIoT Alliance Program unites industry partners for end-to-end AIoT solutions, providing benefits like training, project engagement, customer support, and marketing resources.

Become a parter



- Create domain-focused solutions by integration

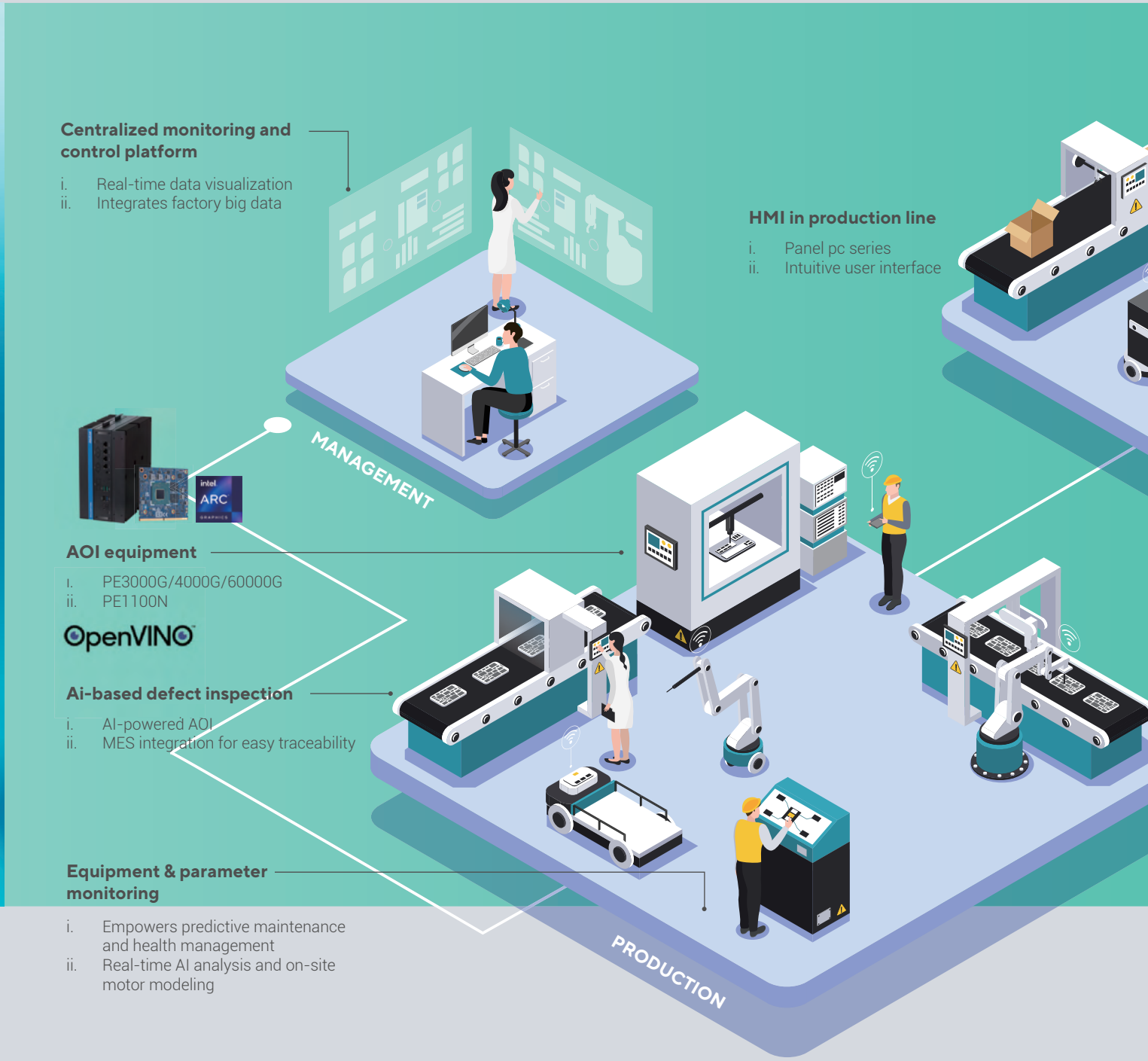
- Encourage mutual referrals
- Accelerate adoption
- Create business opportunities

- Deploy & scale
- Bounce

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.

ASUS in
Smart Manufacturing



AI-based EHS solution

i. Intuitive dashboard to visualize potential risks
ii. Leverage AI technology to increase workplace safety

ASUS in **Smart Retail**

Intelligent vending machine

i. Innovative technology and flexible design
ii. Outstanding design capabilities

Self-checkout

i. Efficient checkout process
ii. Lower overhead, increased productivity

Chapter 7 Edge AI and Rugged Edge Computers

Chapter 8 NUCs and Mini PCs

Chapter 10 Industrial Motherboards & Single Board Computers

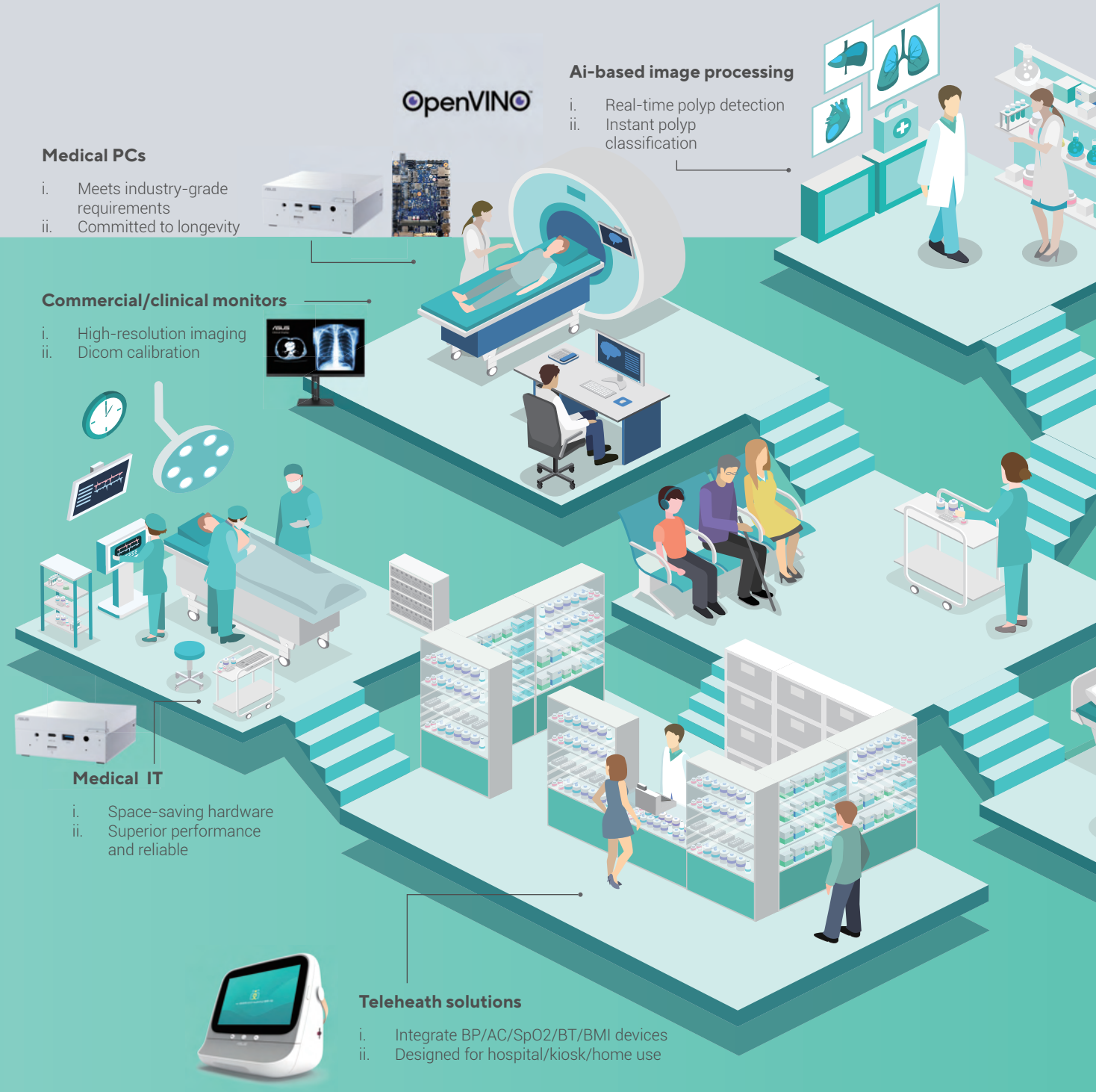
Chapter 11 Tinker Series

Chapter 5 AISVision

Chapter 6 ALPR Edge AI Dev Kit


AI-based behavior analysis
i. Customer traffic-pattern recognition
ii. Personalized shopping recommendations
Digital signage
i. Reliable fanless design
ii. 24/7 reliability
Digital menu
i. 4K triple-display support
Self-service ordering
i. Empowers customers to tailor own orders
ii. Integration with loyalty programs
Service robots
i. Customer assistance and guidance
Automated inventory scanning
ATM
$ 6.68
Electronic shelf labeling solution
i. Real-time price updates
ii. Integration with inventory management
AI-based smart replenishment
i. Integrate ai technology into existing processes
ii. Optimize efficiency for increased profitability
OpenVINO

ASUS in
Smart Healthcare



Chapter 10 Industrial Motherboards & Single Board Computers

Medical PCs

ASUS HealthHub Computers

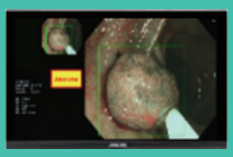
Commercial / Clinical Monitors Computers

ASUS VivoWatch Computers

ASUS Handheld Ultrasound Solution

Portable ultrasound solutions

i. Compact and lightweight design
ii. Wireless connectivity



Wearables
Health monitoring apps

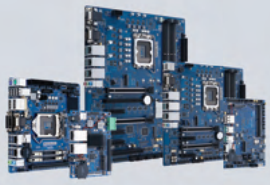
i. Continuous vital-sign tracking
ii. Health data synchronization

Smart nursing cart

i. Mobile point-of-care solution

ASUS in
Smart City

Chapter 7 Edge AI and Rugged Edge Computers



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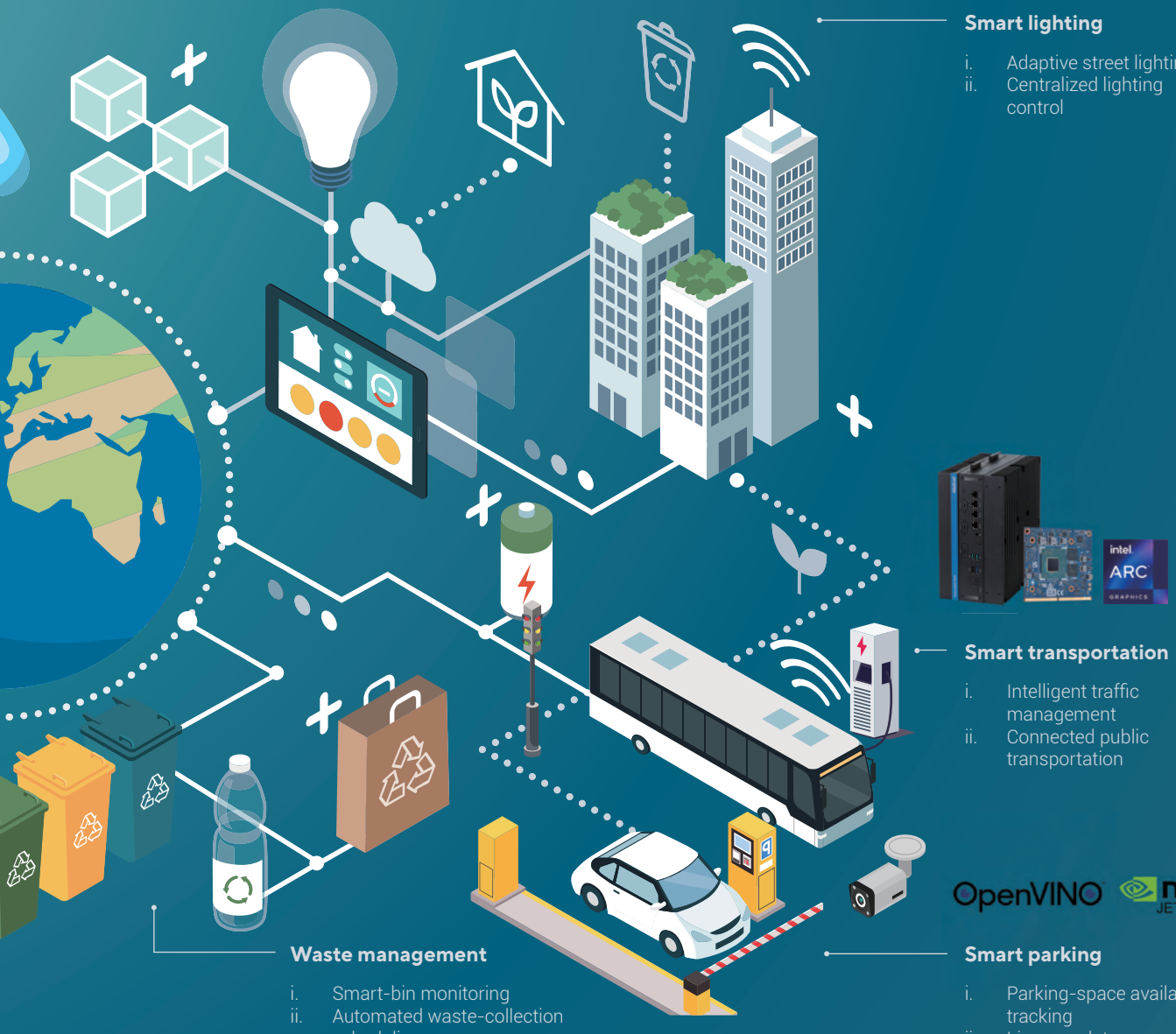
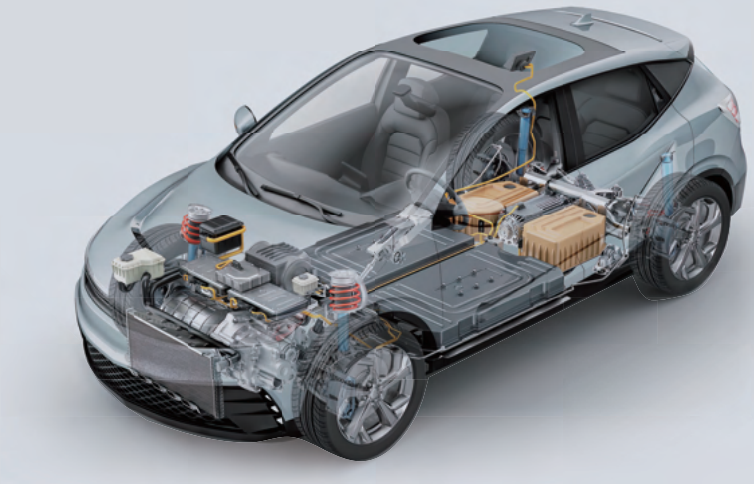


APPLICATION STORIES

Smart manufacturing

Smart inspection of each and every screw and nut: San Shing Fastech uses AI to implement zero-defect management

San Shing Fastech Corp, a global leader in the nut industry, grappled with the challenge of meeting the 'zero-defect' inspection requirements of an automotive manufacturer, fueling the quest for an advanced AI solution to enhance quality control.



SOLUTION FEATURES

- ASUS IoT AISVision, an easy-to-use AI toolkit and SDK for computer vision, suitable for model training and inference
- Zero-code machine-learning toolkit, generate AI model in only four steps
- ASUS's unique AI technique for supervised and unsupervised learning

CUSTOMER BENEFITS

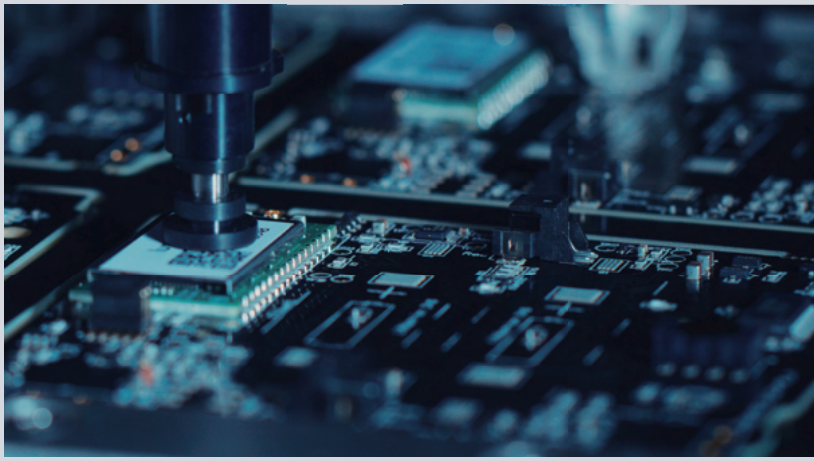
- Boost quality inspection efficiency to achieve Zero PPM
- Empowers in-house R&D team to rapidly develop and deploy an AI-powered visual-inspection system

Smart manufacturing

Unicomp and ASUS IoT create high-speed computing, massive image processing, and high-performance X-ray inspection system

X-ray inspection, integral in manufacturing and research, has evolved with Unicomp's LX9200, partnering with ASUS IoT for high-precision needs in semiconductors and new energy, driving automation and increasing demand for large-scale testing.

EBS-4U700



SOLUTION FEATURES

- ASUS IoT EBS-4U700 designed for enhanced performance, reliability and efficient high-speed data processing
- Powered by Intel® Core™ i9/i7 (14th/13th/12th gen) processors for optimized IIoT performance
- ASUS IoT CToS provides rapid time-to-market and production flexibility

CUSTOMER BENEFITS

- Empowers a robust X-ray inline automatic inspection system
- Boosts inspection capacity for quicker and more precise results
- Ensures reliability and efficiency, meeting diverse industrial demands

Smart factory

DIP-process defects inspection with AI

A Chinese electronic manufacturing facility's DIP process relies on manual visual inspection post-soldering, leading to a significant human labor burden.

AISDID 100

SOLUTION FEATURES

- AI modeling with a handful of samples
- Automatic reading of serial numbers and essential machine-readable information
- Designed for pre-wave soldering, reducing rework
- MES management for production alignment and traceability

CUSTOMER BENEFITS

- Enhance DIP production
- Quick setup, with no reprogramming for diverse products
- Trim inspection time, boosting operator flexibility
- Refine post-solder rework, minimize board damage

Smart factory

SMT line enhancement with AI re-inspection

To address a high AOI overkill rate in its SMT line, a Vietnamese company utilizes AI technology from ASUS IoT. This solution collaborates with AOI, focusing on RLC component overkill reduction without replacing the existing AOI system.

SOLUTION FEATURES

- Pre-trained AI model for easy deployment
- Significantly reduce RLC components AOI overkill rate, saving 80-90% overkill
- Reduce operator (OP) manpower and allow flexible OP usage
- Compatible with TRI 3rd-gen AOI machines

CUSTOMER BENEFITS

- Achieve a 76% reduction in re-inspection time, enhancing overall operational efficiency
- Transition from manual re-inspection to a more efficient and accelerated workflow
- Improve overall operational efficiency and output quality with streamlined re-inspection

APPLICATION STORIES

Smart factory

High-precision backplane docking pin-defect inspection

Streamlining the inspection of high-density backplane docking pins, our all-in-one station enhances precision during assembly, minimizing oversights before shipment.

SOLUTION FEATURES

- High-precision photo capture with minimal distortion using a telecentric lens
- Automatic object pin alignment and photo capture
- Inspection for pin bending, missing pins and foreign-object defects

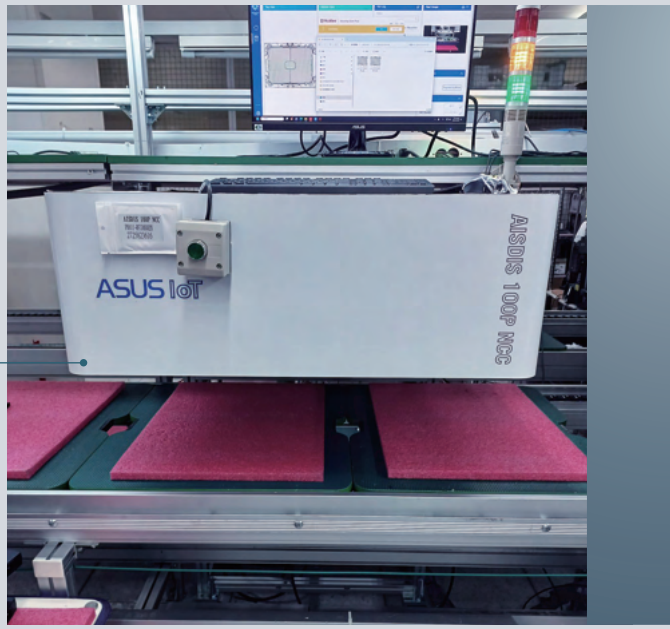
CUSTOMER BENEFITS

- Ensure high precision for top-notch product quality
- Automatic processes and inspections to prevent human errors
- Flexibility in production processes and locations with a cart-type design

Smart factory

Automatic optical in-line CPU-socket pin inspection with AI

Conventional visual inspection of CPU socket pins risks worker fatigue. Our solution, using automatic optical inspection, guarantees accuracy, eliminating the chance of injuries and fatigue-induced oversights.



SOLUTION FEATURES

- In-line inspection during barebone assembly and testing
- Automatic socket alignment and photo capture
- Detects pin bending, missing pins and foreign objects

CUSTOMER BENEFITS

- High precision for superior product quality
- Automated processes to prevent human errors
- In-line production flexibility for various socket configurations

Smart transportation

ALPR applications take advantage of ASUS IoT PE1000N's combination of powerful compute performance and high efficiency

The ASUS IoT PE1000N Edge computer offers a potentially game-changing solution for smart parking and traffic enforcement in Korea. Tailored for automated license-plate recognition (ALPR) applications, this compact edge-computing solution ensures resilience and efficiency in technology-driven initiatives.

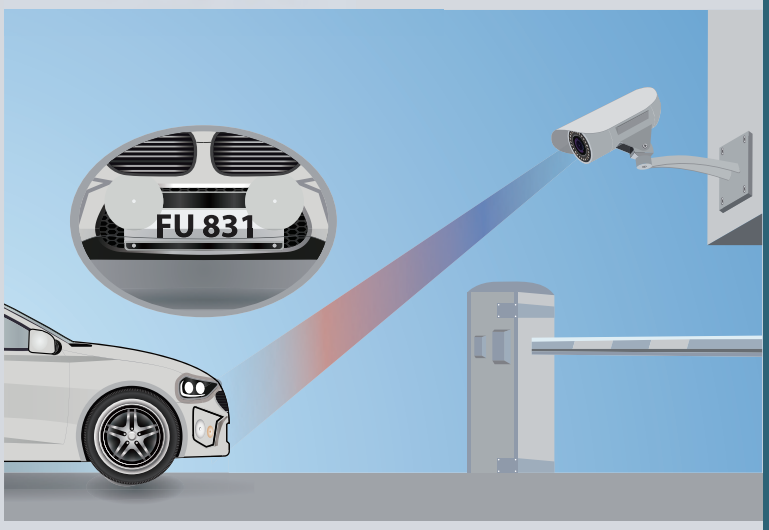
PE1000N

SOLUTION FEATURES

- ASUS IoT PE1000N with NVIDIA® Jetson for precise ALPR image analytics
- Compact design with efficient cooling for reliable outdoor operation
- ASUS IoT guarantees availability of both product and technical support for five years

CUSTOMER BENEFITS

- Reliable outdoor operation, eliminating overheating for improved performance
- Effortless integration with existing infrastructure and optimized utilization of previous investments



Smart transportation

ASUS IoT and Fortune Electric collaborate on AI-powered EV-charging station technology in Taiwan

ASUS IoT collaborates with Fortune Electric to transform the EV-charging landscape in Neihu, Taiwan, using the ASUS IoT Tinker Edge R and ALPR Edge AI DevKit for up to 99.99% accurate license-plate recognition.

SOLUTION FEATURES

- The ALPR Edge AI DevKit precisely recognizes license plates, adeptly addressing challenges like insufficient lighting, poor weather, reflections, blurring and license-plate-bezel issues
- AI-powered technology enhances billing accuracy
- Compact, versatile design seamlessly integrates with external devices

CUSTOMER BENEFITS

- Meets time-saving, hassle-free operations for a smoother experience
- Increases efficiency, providing an improved overall experience

ASUS IoT ALPR Edge AI DevKit

APPLICATION STORIES

Smart city

Innovating for progress: ASUS IoT and PE1000N drive smart city initiatives in Bình Dinh province

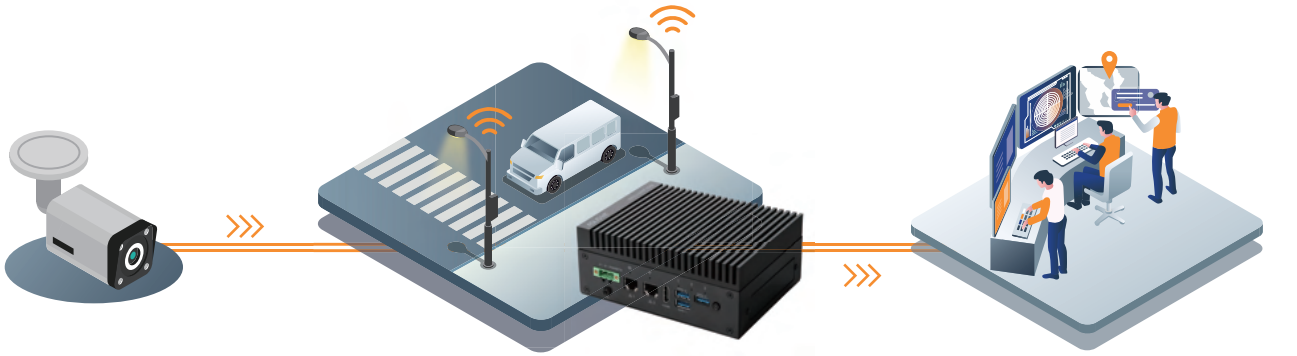
Bình Dinh province in Vietnam is actively pursuing smart city initiatives to drive tourism and sustainable growth. The establishment of the Binh Dinh Smart City Monitoring Center addresses challenges of traffic and urbanization.

SOLUTION FEATURES

- ASUS IoT PE1000N for efficient vehicle data collection
- Real-time monitoring, equipment oversight and violation proof capabilities
- Energy-efficient computing for cost-effective operations

CUSTOMER BENEFITS

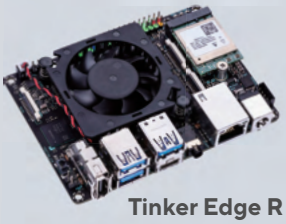
- Effectively reduces traffic congestion, shortens passenger travel time, saves fuel consumption and contributes significantly to carbon emission reduction
- Crucial role in emergency response for enhanced security
- The monitoring center attracts experts and investments, fostering regional growth



Smart city

The power of partnership: ASUS IoT and Skidata transform access control and parking at Brazilian business park

The Perini Business Park in Brazil sought to address slow entry processes for its 10,000+ daily visitors. In collaboration with ASUS IoT, Skidata implemented a smart access control and parking-management solution, ensuring fast, touchless entry and improving daily parking management for over 4,500 vehicles.



Tinker Edge R

SOLUTION FEATURES

- Co-developed by ASUS IoT and Skidata
- Compact and powerful design, energy-efficient at 1.5 watts maximum by Tinker Edge R
- Fast access in under 15 seconds with license plate recognition, achieving up to 99% accuracy with high-inference performance
- Real-time monitoring and statistical insights for business park management

CUSTOMER BENEFITS

- Streamlined access enhances visitor experience
- Improved parking management for 4,500+ vehicles daily
- Valuable data insights support park management
- Scalable solution for real-time occupancy detection

Smart healthcare

ASUS IoT PE200U enhances patient safety in operating rooms

Smart Sensing Ltd., incubated by HKSTP, specializes in AIoT solutions for smart cities and business intelligence. Its adoption of the PE200U industrial PC from ASUS IoT addresses healthcare challenges, specifically minimizing the risk of retained foreign objects during clinical procedures.

PE200U

SOLUTION FEATURES

- ASUS IoT PE200U industrial PC with AI-powered item recognition
- Compact size, stable computing and low power consumption
- Fanless thermal design for hygiene control and quiet operation
- Diverse I/O interface, expansion options for medical devices

SOLUTION FEATURES

- Reduced hospital equipment check-up time
- Lowered risk of guidewire retention for enhanced patient safety
- Accurate and prompt recognition of used guidewires
- ASUS IoT's smart hospital development boosts efficiency and patient-centric environments

Smart healthcare

ASUS IoT EBE-4U: Powerful, stable performance at the heart of digital radiography

A prominent Chinese medical equipment manufacturer, with over 20 years of industry presence, seeks global expansion by establishing a comprehensive medical imaging and dental equipment platform. It faced challenges with its existing control computer for digital radiography (DR) and required an efficient and reliable solution.

EBE-4U

SOLUTION FEATURES

- Industrial-grade hardware performance and medical sector expertise for optimal functionality
- EBE-4U's 19-inch 4U rackmount chassis is tailored for medical computing applications.
- High-performance Intel® H110 chipsets ensure effective DR image processing
- Access one-stop consulting and after sales service for comprehensive support

CUSTOMER BENEFITS

- Achieves enhanced performance and stability for DR equipment
- Delivers improved overall performance, leading to lower costs
- Enhances DR rack control with versatile connectivity for increased operational efficiency

APPLICATION STORIES

Smart retail

Bringing automated intelligence to store operations

ASUS IoT and Macnica DHW collaborate to bring automation to food retail, providing heightened operational efficiency, reduced wastage and increased profitability through the smart replenishment and electronic shelf-labeling solutions.

EBE-4U

SOLUTION FEATURES

- AI-driven 24/7 restocking with real-time alerts
- Dynamic e-paper pricing label updates
- Eliminates manual inspections for reduced labor costs
- GDPR-compliant image processing ensures accuracy
- Designed by Macnica DHW for reliability and adaptability

CUSTOMER BENEFITS

- Optimal stock levels and efficient pricing
- Cost-effective operations and increased profitability
- Scalable solutions for diverse retail environments

Smart retail

Smart inspection of each and every Screw and nut: San Shing Fastech uses AI to implement zero-defect

In the Industry 4.0 era, the retail sector leverages digital transformation, focusing on AI applications like people-counting, facial recognition and object analysis. ASUS IoT collaborates with TMA Innovation to offer a smart retail solution, enhancing customer experience, automating analytics, and providing real-time data insights.

SOLUTION FEATURES

- People-counting, facial recognition, and emotional analysis
- Real-time monitoring, heatmaps, and automatic alerting
- Automated AI systems for cost-effective and accurate results
- ASUS IoT-Intel EBS-I70, a compact box PC with extreme CPU/GPU performance

CUSTOMER BENEFITS

- Utilization of data for statistical analysis
- Improved facility management
- Increased operational efficiency
- Reduced operational cost

EBS-I70

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ASUS IoT
IN SEARCH OF INCREDIBLE

CHAPTER 4

New Product Highlights

PE8000G

Intel® Core™ processors (13th/12th gen)-based rugged edge AI GPU computer supporting up to dual 450W GPU cards

- Supports up to dual 450W GPU card for real-time AI inferencing at the edge
- 13th/ 12th Gen Intel® Core™, 16C/24T 35W/65W CPU, Intel R680E chipset
- Up to 64GB ECC/ non-ECC DDR5 4800 SDRAM
- 1 x M.2 M key (NVMe), 1 x M.2 B key (5GNR), 1 x M.2 E key (WiFi6)
- Military-grade (MIL-STD-810H) durability, and exceptional thermal design ensuring reliable operation under -20°C to 60°C
- 8 to 48V wide-range DC input with built-in ignition power control and power monitoring

PE5101D

Intel® Core™ processors (13th/12th gen)-based rugged high-performance edge computer with Intel® R680E Chipset supporting 2.5” hot-swappable HDD tray, RAID 0/1, and up to 200W graphics card

- Supports 13th/ 12th Gen Intel® Core™ CPU with R680E chipset
- Supports dual 2.5” hot-swappable HDD tray & RAID 0/1
- Rich I/O with 3 x 2.5 GbE, 10 x USB, 6 x COM
- PCIe x16 & PCIe x4 expansion slots support up to 200W GPU card
- 8 to 48V wide-range DC-in with built-in ignition power control
- Wide operating temperature range: -25° C to 60° C

PE3000G

Intel® Core™ processors (12th gen)/NVIDIA® or Intel® MXM GPU-based rugged fanless edge AI computer

- Supports NVIDIA® Ampere/Turing™ or Intel®Arc™ A-series MXM GPU, for varied edge AI computing
- 12th Gen Intel® Core™ 45W CPU, up to 64GB DDR5 4800 SDRAM
- Patented system architecture and thermal design to ensure -20°C to 60°C fanless operation*
- 3 x 2.5 GbE and 1 x GbE ports with optional PoE+ support
- 1 x M.2 M key (NVMe), 1 x M.2 B key (4G/5G NR), 1 x M.2 E key (WiFi 6)
- 8 to 48V wide-range DC-in input with built-in Ignition power control
- MIL-STD-810H and withstand 5 Grms vibration

* R.O.C Patent No. M638395

PE5100D

Intel® Core™ processors (13th/12th gen)-based rugged high-performance edge computer with Intel® R680E Chipset supporting 2.5” hot-swappable HDD tray, RAID 0/1, and rich I/O

- Supports13th/12th Gen Intel® Core™ CPU with R680E chipset
- Supports dual 2.5” hot-swappable HDD tray & RAID 0/1
- Rich I/O with 3 x 2.5 GbE, 10 x USB, 6 x COM
- 8 to 48V wide-range DC-in w/ built-in ignition power control
- Wide operating temperature range: -25°C to 70°C

PE2200U

Intel® Core™ Ultra processors (Series 1)-based compact fanless edge computer with diverse connectivity, up to 64GB DDR5, 2-4 x LAN, 4 x COM, 7 x USB, and 9-36V DC

- Supports Intel® Core™ Ultra 100U-series processor offering tremendous performance
- Rugged embedded computer with industrial compact fanless design
- Various wireless connectivity options: Wi-Fi 5/6, Bluetooth, 4G/5G and GPS
- Rich expansion capacity including POE and CANbus expansion module for diversified demand
- Wide range of power inputs (9-36V) and operating temperatures (-20°-60°C)

PE1000S

Intel Atom® processor x6000 Series-based or Celeron J6412-based ultra-compact and rugged fanless DIN-rail gateway featuring 2.5 GbE and PoE+

- Intel® Atom® x6000 Series or Celeron® J6412 processor with DDR4 up to 32 GB
- Ultra-compact design supports DIN-rail mount
- Rich I/O with up to 4 x 2.5 GbE, 6 x USB, 6 x COM
- Wide voltage range: 9 to 36V
- Wide operating temperature range: -25°C to 70°C

R680EA-IM-Z

Intel® Core™ processors (14th/13th/12th gen)-based ATX, with Intel® R680E Chipset, integrated I/O shield, dedicated V-core and M.2 heat sink design, three 2.5GbE LAN ports, auto BIOS recovery, EC and iBMC integrated and wide operating temperature

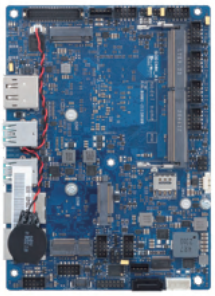
- Support up to 125W Intel® CPU (14th/13th/12th Gen)
- 4 x U-DIMM up to 128GB DDR5 4400 MHz
- 2 x PCIe x16 slots and 3 x PCIe x4 slots
- 2 x 2280 NVMe M.2 Slots
- 3 x 2.5G RJ45
- OOB smart management, EC and iBMC integrated
- Ruggedized DIMM lock and PCIe bracket
- 7-year longevity supply

**Preliminary Design*

X642ES-IM-A

Intel Atom® processor-based 3.5” SBC with DDR4 SO-DIMM, DP, HDMI, LVDS/eDP, dual LAN, multiple COM, and 9V to 36V wide DC input

- Up to six COM ports, includes two RS-232/422/485 and four RS232
- Supports three display configuration via DP/HDMI/LVDS
- Supports I2C, SMBus and GPIO
- Wide temperature range endurance: -40-85°C



N97T-IM-A

Intel® Processor N97-based Thin mini-ITX, ultra thin design with 25mm in height, low power consumption and 9V to 36V wide DC input

- One SO-DIMM up to 16GB DDR5 4800 MHz
- Intel UHD Graphics (12th gen), up to 4K/60 Hz
- Supports three display configuration via multiple interface HDMI/DP/LVDS/eDP(optional)
- 7-year longevity supply
- Wide temperature range: 0-60°C

MDS-M700

Intel® Core™ processors (13th/12th gen)-based medical-grade AI system, with four PCIe slots, ultra-low noise, patient-centric design, uninterrupted protection and alcohol resistance.

- 13th CPU processor and A5000/A4000 GPU card for high loading speeds and minimal noise
- Three Ethernet ports for various data transmissions
- Supports four Display Port connections
- M.2 2230/2280 expansion slot
- CE, FCC, CCC, and IEC 60601-1/-2 compliant device

EBS-500W

Intel® Core™ Ultra processors-based Box PC, AI-Capable, DDR5 5600 MHz, DP, HDMI, USB-C, LVDS/eDP, dual-LAN, multiple COM, M.2 B/E/M key, nano-SIM and 9V to 36V wide DC input

- AI-capable and power-efficient
- Configured with a USB-C port supporting USB3.2 Gen2 (DP 1.4 Alt. Mode) and additional display
- Equipped with three M.2 slots for LTE/5G/Wi-Fi 6E/BT 5.2
- Wide range of power inputs (9~36V) and operating temperatures (-20~60℃)

EBS-P300

Intel® Celeron® processor J6412-based extremely-light and adaptable box PC with LPDDR4, eMMC, dual HDMI, dual COM ports, dual USB 3.2, dual USB2.0, M.2, and TPM

- Fanless design for rugged environments
- Supports 2.5GbE and 1Gbe Ethernet for various data transmission.
- Fixing holes for antenna, wall mount, DIN-rail kit (optional)
- Excellent expansibility with essential I/O ports on front/back side bezel
- TPM 2.0 on board or optional

CHAPTER 5
AI Solutions

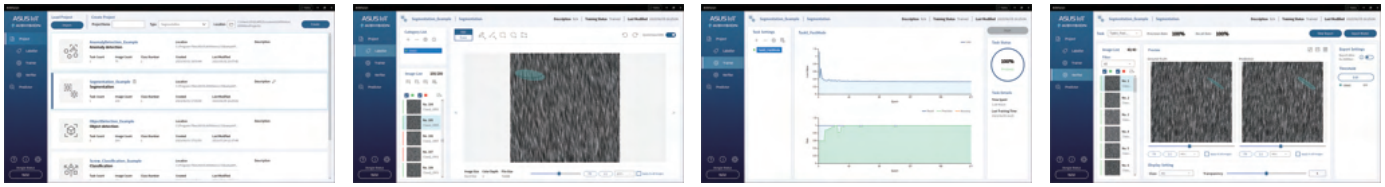
AISVision

An easy-to-use AI toolkit and SDK for computer vision, AI model training and inference.

ASUS IoT AISVision, a user-friendly toolkit, streamlines computer-vision development with AI techniques, offering Trainer and Runtime modes for simplified AI model creation, batch training and inference, while its API empowers developers to build AI applications and export results for analysis or visualization.

Zero-code AI training in just four steps

User-friendly labeling, high-precision algorithms, a no-code training tool and flexible inferencing, supporting NVIDIA® GPUs and Intel® OpenVINO™ — all integrated through AISVision API (C, C++, C#).



Choose model > Label image > Train model > Verify model

Flexible model training configuration

Use AISVision default setting to train AI model or use configurable hyperparameter to come out a customized training steps, support supervised (classification, object detection, segmention) and unsupervised learning (anomaly detection).

Dual inference architecture

Unique model capabillites, backed by NVIDIA® and Intel® OpenVINO framework, empowers efficient, high-accuracy inferencing in any scenario.

Intuitive labelling tool

Easy-to-use and intuitive integrated labelling, including pen, polygon, ellipse, rectangle and line tools.

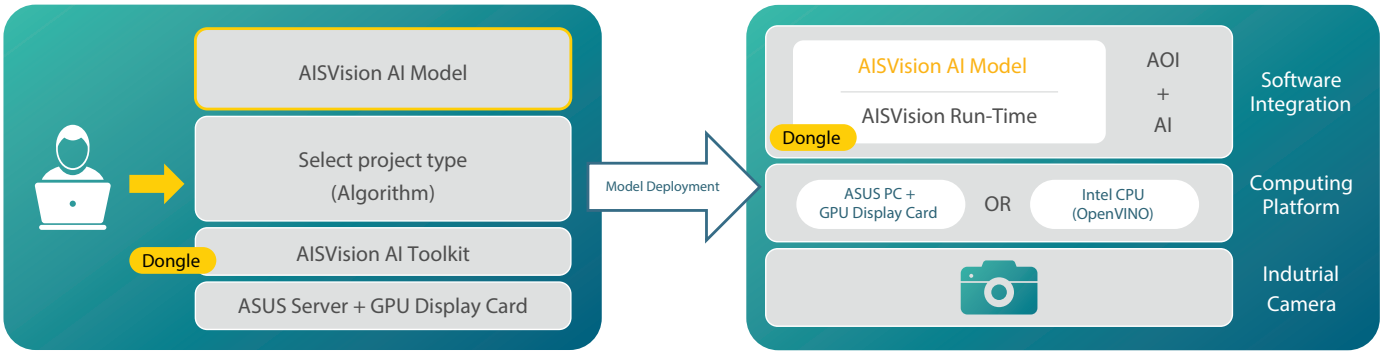
User-friendly software development

Strong API support for customized development, including C, C++, and C#.

Efficient Training, Deployment, and Analysis

Efficiently generate AI model on an NVIDIA GPU server via AISVision AI Toolkit. Developers configure the GPU or Intel OpenVINO inference engine, utilizing the AISVision API for AOI image analysis. Activation requires a dongle for seamless integration.

System Diagram – How AISVision works?



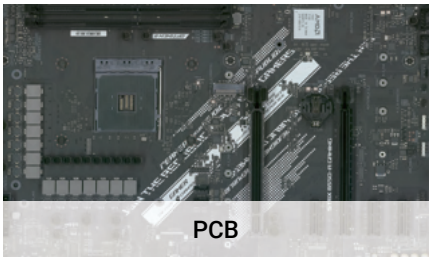
Training Server **Inference Engine**

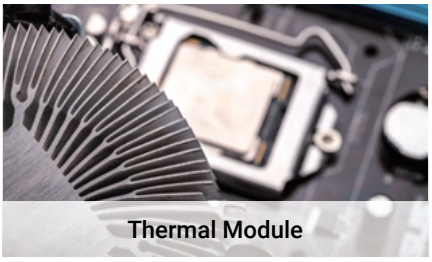

Metal

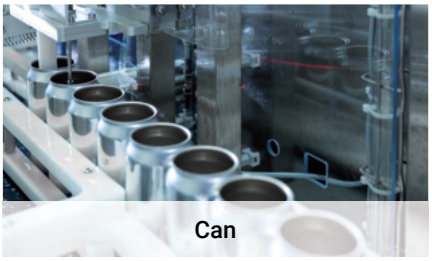

Plastic

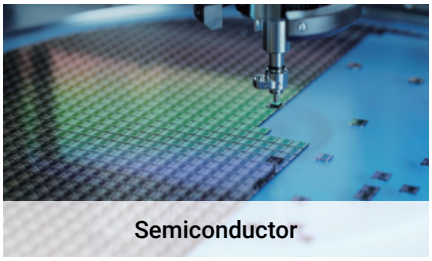

Wood


EMS


PCB


Thermal Module


Can


Semiconductor


Steel


Machine Tool


Retail

AISEHS

AI-powered vision-analysis technology
empowers a safer tomorrow, today

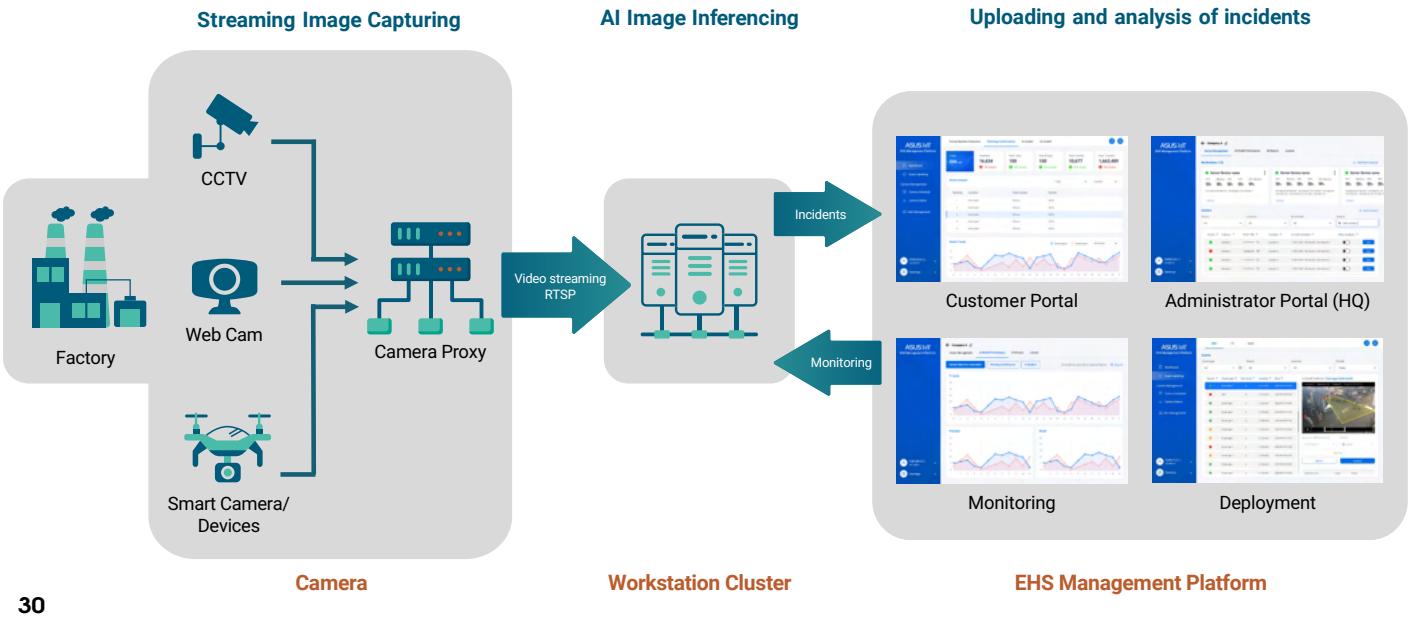
ASUS IoT AISEHS is an enterprise-level intelligent risk-analysis platform, engineered with advanced, AI-powered, computer-vision-analysis technology. It connects with security-monitoring systems to effectively manage field safety, such as dangerous machine operations, perilous behavior, unsuitable personal protective equipment (PPE) and more.

- **Versatile AI Detection:**
  Adjusts model settings for diverse scenarios, integrating multiple models for comprehensive workplace safety on a unified platform.

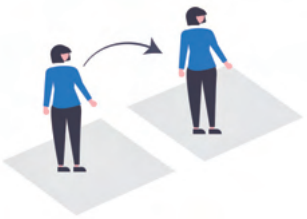
- **Real-time Alerts and Permissions:**
  Provides continuous detection, real-time assistance, and flexible role-based permissions for optimized resource allocation.

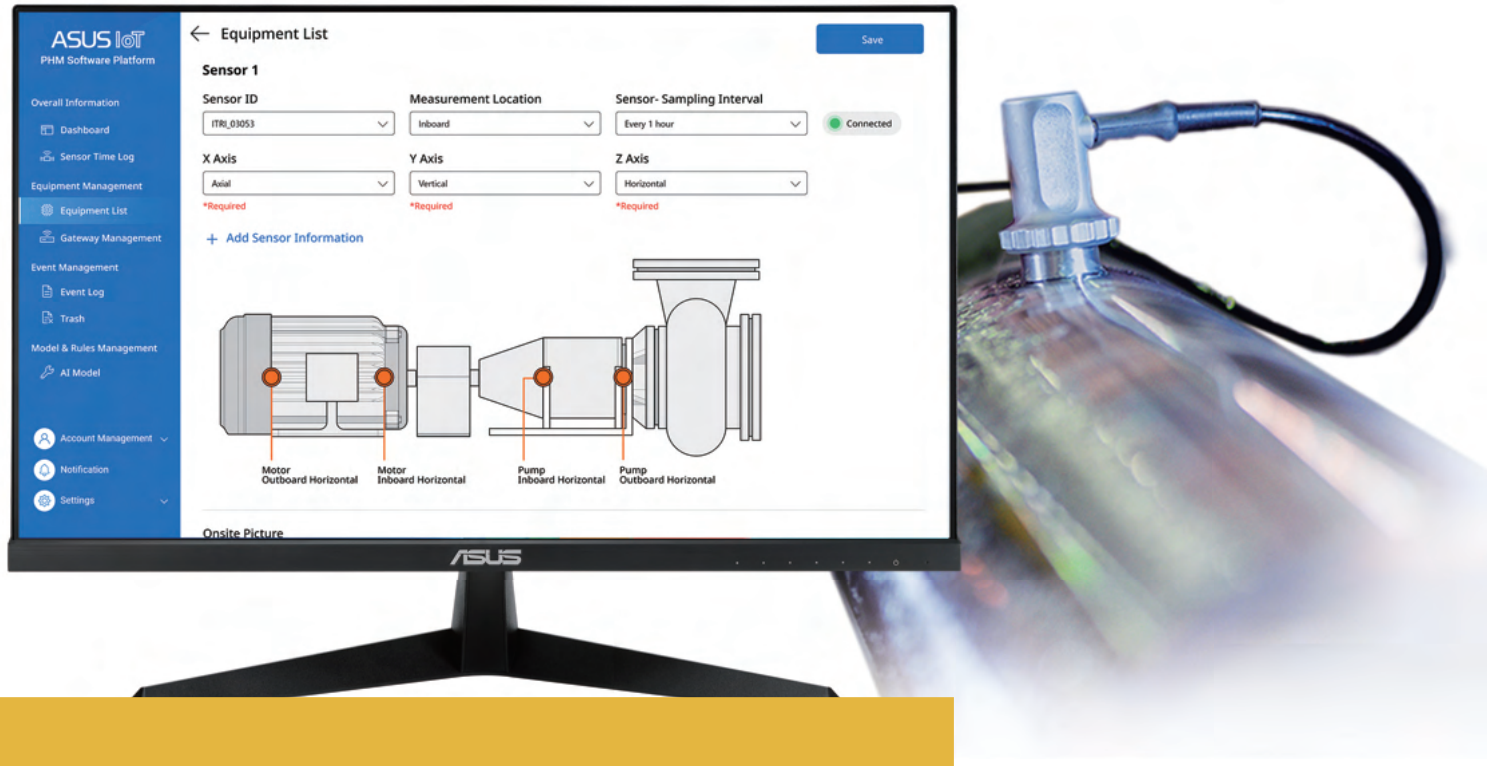
- **Preventive Efficiency:**
  Records events and presents trends for proactive risk prevention, aiding in future planning and management.

- **Resource Management Scheduler:**
  Enhances efficiency with task scheduling, allowing flexible adjustments for better control over operational costs.



10 AI missions

Personal protective equipment Detects specialized equipment or clothing worn by individuals.			**People counting** Counts the number of personnel in the area, with maximum and minimum numbers for the control area.
People fence Monitors whether individuals are entering unauthorized areas.			**Vehicle fence** Monitors whether vehicles (including cars, trucks, motorcycles and trains) are entering unauthorized designated areas.
Flame detection Monitors for the presence of flames.			**Smoke detection** Monitoring for the presence of smoke.
Human-machine interface Detects entry into forbidden areas or incorrect postures when operating machinery.			**Point confirmation** Detects if personnel are following specific safety practices via physical gesturing.
Dangerous-object detection Monitors the environment for the presence of dangerous item, such as knives or guns.			**Detection of risky behaviors** Monitors for risky behaviors, including falls, violent behavior, fatigue actions and more.



AISPHM

Predictive Maintenance of Rotating Machinery

ASUS IoT AISPHM employs AI and vibration analysis for advanced predictive maintenance on rotating equipment. Detecting issues in real-time, it adapts to diverse operational needs, reducing downtime and extending equipment life for continuous improvement in production, whether on-site or in the cloud.

Low to no code for exceptional simplicity

Combining ISO-10816-3 with FFT spectrum AI modeling

Dedicated AI models are established for each device, continuously monitoring their operational status. Any deviations from the original AI model are recorded as abnormal events.

Web-based private and public cloud architecture

A fully containerized architecture enhances deployment flexibility across multiple platforms, including PCs,smartphones, and tablets.

Cost-effective CPU-based modeling and inferencing

Intel i5 or equivalent machines can support data processing for up to 120 sensors without the need for additional GPU resources.

Supports the EdgeX open-source framework

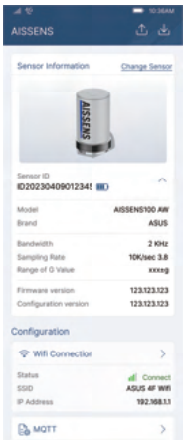
For diverse industrial applications, modules can be developed for data reuse without the need for extensive code refactoring.

AISSENS

6K wireless vibration / temperature sensor

AISSENS 100AW, a state-of-the-art 6K wireless vibration/temperature sensor, is a cornerstone in the realm of condition monitoring. Designed to excel in the early identification of gear, belt, and bearing anomalies, its tri-axial 6K vibration sensitivity is pivotal for implementing strategic maintenance protocols. This approach not only guarantees operational continuity but also significantly extends the lifespan of machinery. By adopting condition monitoring, organizations can transition from routine preventive measures to a more dynamic, data-driven maintenance strategy, optimizing resource allocation and minimizing unexpected downtime.

- Tri Axial 6K Vibration
- 2.4G Wi-Fi / BLE
- Battery Powered
- IP68
- 2 Years battery operation
- Magnetic mount
- -20~85°C
- 71.9mm x 45mm. 300g



AISSENS Connect
(Android APP)

AISSENS View
(Windows Utility)

AISDetector

Product quality analysis and anomaly-detection solutions

AISDetector, powered by advanced AI, efficiently identifies abnormal signals with minimal high-quality sensor data, eliminating the need for prior AI expertise. Handling diverse signal types, it streamlines the process from sensor data preprocessing to model training, enabling developers to swiftly create superior AI models through an intuitive interface within minutes for enhanced abnormal signal identification.

Rapid AI Model Generation

Train a model in minutes using just five 30-second high-quality signal data samples.

*compatible with 13th Intel® Core™ i3 processors and above

Instant AI Analysis

Quickly obtain AI models with AISDetector and perform real-time data inference through the web API.

Versatile Data Support

AISDetector handles diverse time series data, including sound, vibration, voltage, or current from various sensors.

Effortless Integration

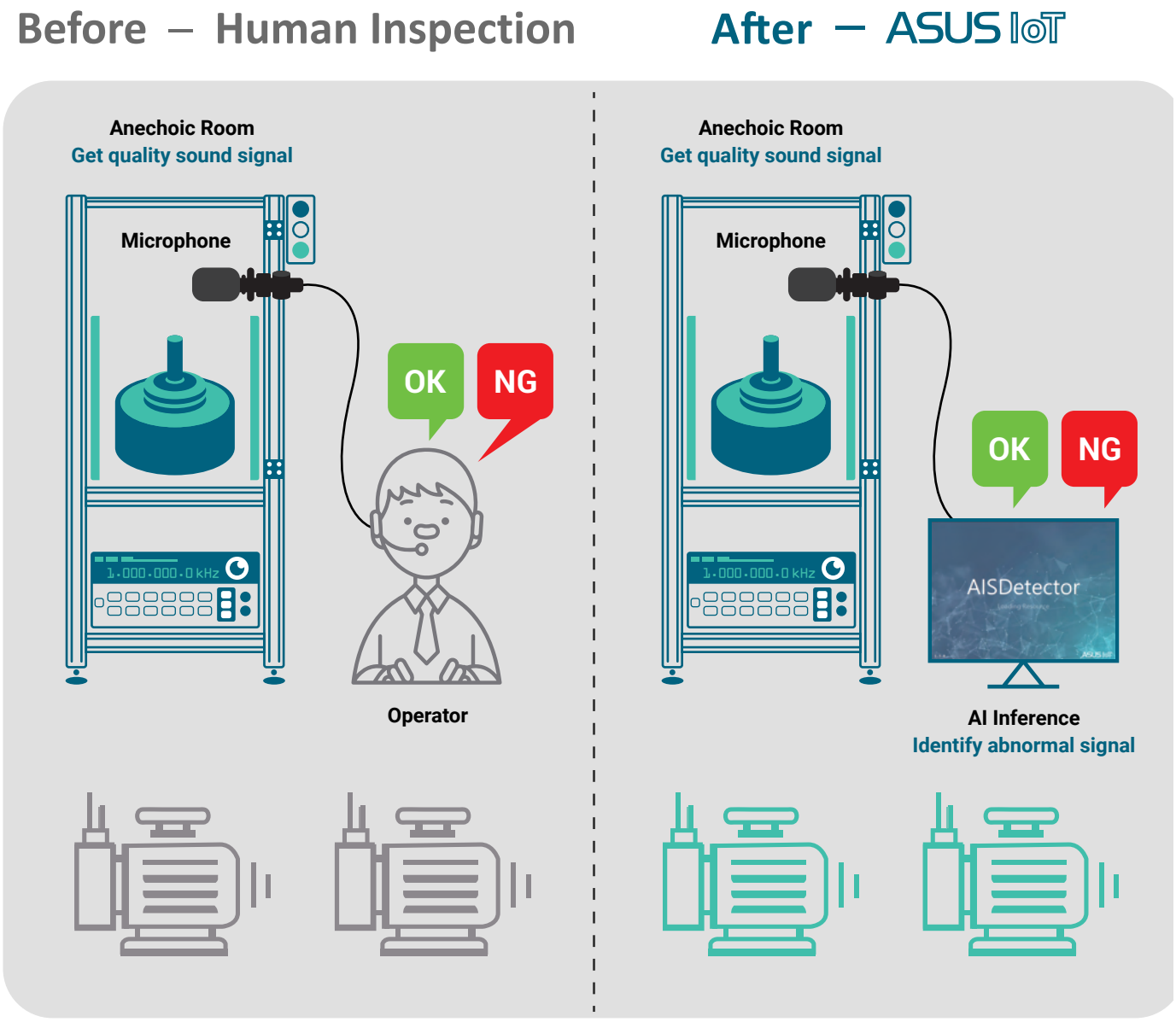
Seamlessly integrate AISDetector into your system using a rich web API available in C, C++, C#, and Python.

AISDetector Revolutionizes Motor Quality Inspection

In a crucial instance of monitoring air conditioner motor operation sounds, our client examined DC/AC motor parts using traditional QC and acoustic test, contributing to operational challenges and posing hurdles for internal quality assurance and result consistency.

Challenges

1. Operators, tasked with making daily decisions for 1000 motors based on sound inspection, face inherent risks of human errors.
2. The manual inspection process, with its extended learning period.



Solution Features:

Empowers developers to efficiently identify abnormal signals using advanced AI techniques that leverage time series data, including sound, vibration, voltage, or current from sensors, providing a reliable alternative to human inspection.

Customer Benefits:

The implementation ensures not only a streamlined and error-free inspection process but also significantly reduces the learning curve for operators, thereby enhancing productivity.

CHAPTER 6
Market Ready Solutions

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. Power by ASUS IoT Tinker Board Edge R and PE1000N for AI applications, ALPR Dev Kit is capable of up to 99% accuracy with high, 160ms 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

Warehousing Logistics

- Dock occupation detection
- Tally control
- Vendor access management

Solution Portfolio

ASUS IoT PE1000N

NVIDIA Jason Nano
CPU: 4 x Arm® Cortex®-A57
GPU: 128-core NVIDIA Maxwell
Memory: 4GB 64-bit LPDDR4
Operating system: Ubuntu

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

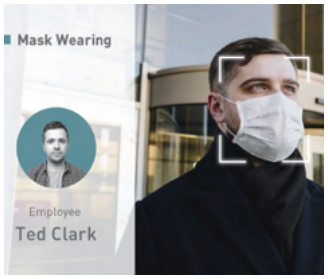
Supported car-plate regions: Taiwan, China and EU countries
Supported OS: Debian, Jetpack, and Ubuntu Inference performance: 160 ms
Accuracy: 99% within 3- to 5-meter range, with custom retraining service available
Supported cameras: USB webcams, and IP cameras on a project-by-project basis

Face Recognition Edge AI Dev Kit

The ASUS IoT Face Recognition Edge AI Dev Kit employs advanced AI technology for precise face and marker identification. Offering accurate AI models and APIs, it streamlines development, enhancing operational efficiency. Paired with ASUS IoT Tinker Board and PE1000N series, it achieves up to 99% recognition accuracy with fast inference speeds. Supporting Android and Linux, it caters to diverse biological system needs, making it a potent platform for enterprise, retail, hospitality, and public spaces applications.

Face Detection

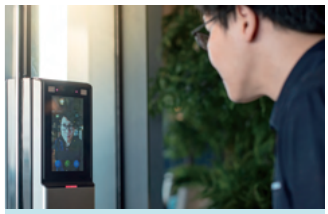
Face Recognition



Mask Detection & Recognition

Anti-spoofing

Usage Scenario

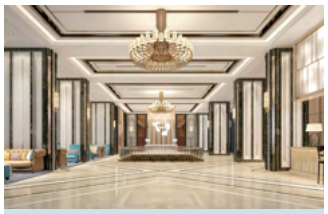


Enterprise

- Door access control
- Attendance management
- Meeting room capacity management

Retail

- Mask detection
- Blacklist check



Hospitality

- Membership Management
- Contactless check-in/out
- Mask detection

Factory & Warehouse

- Door access control
- Blacklist check
- Stranger warning

Solution Portfolio

ASUS IoT PE1000N

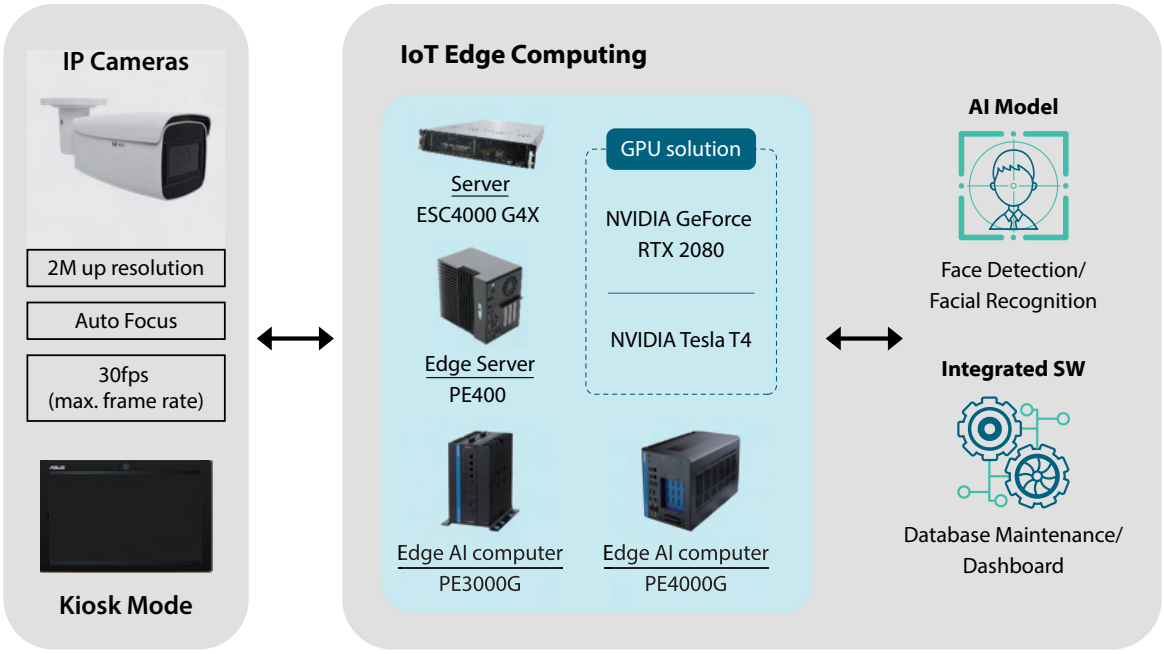
NVIDIA Jason Nano
CPU: 4 x Arm® Cortex®-A57
GPU: 128-core NVIDIA Maxwell
Memory: 4GB 64-bit LPDDR4
Operating system: Ubuntu

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

Face Recognition Solution

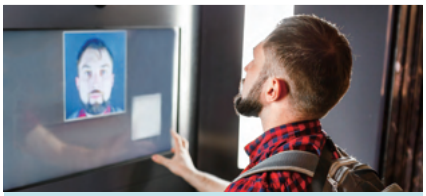
ASUS IoT Face Recognition Solution is a one-stop solution for accurate and stable security monitoring. Face Recognition Solutions are ideal for all types of buildings and workplaces, providing a backend management system that is easy to manage and monitor, simplifying security processes and improving operational efficiency.



Usage Scenario

Building

- Access control
- Visitor self-check-in



Enterprise

- Attendance management
- Access control

Surveillance

- Restricted area control
- Intrusion detection

Product Advantage

Quick Photo Validation

Photo Scoring System

ID Classification

CHAPTER 7

Edge AI and Rugged Edge Computers

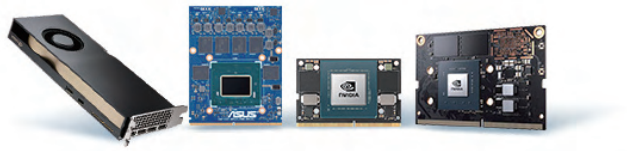
Revolutionize Computing Power with

EDGE AI SYSTEMS

intel. partner Titanium

The Game-Changing Platform for AI Applications

ASUS IoT edge AI systems combine GPU computing with AIoT potential. They offer embedded MXM GPU modules from both NVIDIA® and Intel®, NVIDIA® Jetson-based platforms, and GPU computing platforms for diverse market needs. With unparalleled performance, they enable real-time AI inferencing at the edge, transforming industries. Designed with a rugged, fanless, anti-vibrationbuild, wide temperature support and low power consumption, they excels in demanding edge AI applications like factory automation, machine vision, video analytics, and autonomous vehicles. ASUS IoT ensures robustness and reliability for the most challenging scenarios, driving innovation and efficiency in this new era.



POWERFUL & SCALABLE GPU COMPUTING

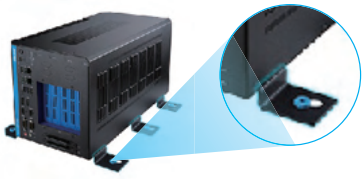
ASUS IoT pioneers the industry's first edge AI system that supports up to dual 450-watt GPUs. ASUS IoT systems benefit from support for Intel Arc™ A-series MXM, NVIDIA PCIe® GPU cards, and Jetson SoM, offering a choice of power-efficient options through to extreme high-throughput solutions.

LATEST COMPUTING PLATFORM

ASUS IoT edge AI systems are available in a variety of form factors embedded with the latest Intel 14th/13th/12th Gen CPUs and NVIDIA Jetson Orin™ series, meeting the dynamic requirements of the market.

INDUSTRIAL FEATURE SET & RICH I/O

Supports PoE, isolated DIO, multiple COM ports, CAN bus, and more, enabling seamless connectivity for a wide range of applications.



ANTI-VIBRATION DESIGN

With a robust mechanical design featuring structured support, GPU retainer, cable screw lock, and damping bracket, ASUS IoT edge AI systems excel at in-vehicle situations for smooth and uninterrupted operation.

ROBUST POWER DESIGN

Innovative high-current tolerance power design ensures extreme reliability under a wide range of DC inputs and power-hungry GPU computing. Support for ignition power control adds further stability.

EXCLUSIVE THERMAL DESIGN

The patented system design effectively diffuses heat from the CPU, GPU, and all peripherals, delivering extreme ruggedness with a fanless structure. This ensures stable operation while the fanless design further reduces dust generation and thus enhances durability.

CERTIFICATION COMPLIANCE

Rest assured with our system-validated certification readiness. Our edge AI systems comply with MIL-STD 810H and offer vibration resistance up to 5 Grms.

SOFTWARE SUPPORT FOR EASY INTEGRATION

Simplify the integration process with comprehensive software support, including APIs, middleware, and device control toolkits tailored for various vertical applications.

Edge AI GPU Computers

		PE8000G	PE6000G	PE4000G
				
Case	Dimension	225 x 288 x 443 mm	225 x 221 x 443 mm	225 x 198 x 350 mm
	Weight	12.2 kg	9.2 kg	8 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
System	Processor	Intel® Core™ i9-12900E/ i9-12900TE Intel® Core™ i7-12700E/ i7-12700TE Intel® Core™ i5-12500E/ i5-12500TE Intel® Core™ i3-12100E/ i3-12100TE	Intel® Core™ i9-12900E/ i9-12900TE Intel® Core™ i7-12700E/ i7-12700TE Intel® Core™ i5-12500E/ i5-12500TE Intel® Core™ i3-12100E/ i3-12100TE	Intel® Core™ i9-12900E/ i9-12900TE Intel® Core™ i7-12700E/ i7-12700TE Intel® Core™ i5-12500E/ i5-12500TE Intel® Core™ i3-12100E/ i3-12100TE
	Chipset	R680E	R680E	R680E
	Graphics	Intel® UHD Graphics 770	Intel® UHD Graphics 770	Intel® UHD Graphics 770
	Memory	2 x SO-DIMM, up to 64GB ECC/ non-ECC DDR5 SDRAM	2 x SO-DIMM, up to 64GB ECC/ non-ECC DDR5 SDRAM	2 x SO-DIMM, up to 64GB ECC/ non-ECC DDR5 SDRAM
I/O Interface	PoE	-	-	-
	Ethernet	1x Intel® i219-LM (1 GbE) 1x Intel® i226-IT (2.5 GbE)	1x Intel® i219-LM (1 GbE) 1x Intel® i226-IT (2.5 GbE)	1x Intel® i219-LM (1 GbE) 1x Intel® i226-IT (2.5 GbE)
	Display Port	2x HDMI 2x DP	2x HDMI 2x DP	2x HDMI 2x DP
	Serial Port	2x COM: RS-232/422/485 4x COM: RS-232 (optional)	2x COM: RS-232/422/485 4x COM: RS-232 (optional)	2x COM: RS-232/422/485 4x COM: RS-232 (optional)
	USB 2.0	2x USB2.0, type A	2x USB2.0, type A	2x USB2.0, type A
	USB 3.2/ 3.1	1x USB 3.2 Gen2x2 (20G), type C 4x USB 3.2 Gen2x1 (10G) ,type A 2x USB 3.2 Gen1 (5G), type A	1x USB 3.2 Gen2x2 (20G), type C 4x USB 3.2 Gen2x1 (10G) ,type A 2x USB 3.2 Gen1 (5G), type A	1x USB 3.2 Gen2x2 (20G), type C 4x USB 3.2 Gen2x1 (10G) ,type A 2x USB 3.2 Gen1 (5G), type A
	Audio	Mic in; Line out	Mic in; Line out	Mic in; Line out
	Digital I/O	4x DI, 4 x DO support isolation (optional)	4x DI, 4 x DO support isolation (optional)	4x DI, 4 x DO support isolation (optional)
Storage Interface	SATA HDD	4 x hot-swappable 2.5” HDD/SSD	4 x hot-swappable 2.5” HDD/SSD	2 x hot-swappable 2.5” HDD/SSD
	mSATA	1 (mux with mPCIe)	1 (mux with mPCIe)	1 (mux with mPCIe)
	M.2 (M-key)	1	1	1
	eMMC	-	-	-
	SD Card	-	-	-
Expansion	mPCIe	1 (mux with mSATA)	1 (mux with mSATA)	1 (mux with mSATA)
	M.2 (E-key)	1	1	1
	M.2 (B-key)	1	1	1
	SIM	3	3	3
	PCI/ PCIe	7 x PCIe slots (1 x PCIe Gen4 x16 + 3 x PCIe Gen3 x4 + 2 x Gen3 x1 or 2 x PCIe Gen4 x8 + 3 x PCIe Gen3 x4 + 2 x PCIe Gen3 x1)	5 x PCIe slots (1 x PCIe Gen4 x16 + 3 x PCIe Gen4 x4 or 2 x PCIe Gen4 x8 + 3 x PCIe Gen4 x4, auto detect)	4 x PCIe Gen4 slot (1 x PCIex16 + 2 x PCIex4 or 2 x PCIex8 + 2 x PCIex4, auto-detect)
	MXM	-	-	-
Power Supply	DC Input	8-48V DC	8-48V DC	8-48V DC
	Ignition Control	Integrated	Integrated	Integrated
Environmental	Operating Temp.	-20~60°C with 35W CPU -20~55°C with 65W CPU	-20~60°C with 35W CPU -20~55°C with 65W CPU	-20~60°C with 35W CPU -20~55°C with 65W CPU
	Certification	CE, FCC, CB, BSMI	CE, FCC, CB, BSMI	CE, FCC, CB, BSMI
	Shock & Vibration	MIL-STD 810H	MIL-STD 810H	MIL-STD 810H, and 5-500 Hz; 3+ Grms

		PE3000G	PE1100N	PE1000N
				
Case	Dimension	240 x 230 x 125.7 mm	152 x 114 x 72 mm	152 x 114 x 62 mm
	Weight	8.2 kg	1.4 kg	1.4 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	-	-
System	Processor	Intel® Core™ i7-12800HE Intel® Core™ i5-12600HE Intel® Core™ i3-12300HE	NVIDIA® Jetson Orin™ Nano NVIDIA® Jetson Orin™ NX	NVIDIA® Jetson Nano™ NVIDIA® Jetson TX2 NX NVIDIA® Jetson Xavier™ NX
	Chipset	-	-	-
	Graphics	Intel® Iris® Xe Graphics eligible (i7/i5) Intel® UHD Graphics (i3)	NVIDIA® Ampere GPU with Tensor Cores	NVIDIA® Maxwell™ GPU / NVIDIA® Pascal™ GPU / NVIDIA® Volta™ GPU"
	Memory	2x SO DIMM, up to 64GB DDR5 SDRAM	LPDDR5	LPDDR4 / LPDDR4X
I/O Interface	PoE	3x IEEE 802.3at (25.50 W) by Intel® I226-IT (2.5 GbE) ; 1x IEEE 802.3at (25.50 W) by Intel® I219-LM (1 GbE)	-	-
	Ethernet	3x Intel® i226-IT (2.5 GbE) 1x Intel® i219-LM (1 GbE)	1x NVIDIA SoM (1 GbE) 1x RTL8153BI-CG (1 GbE)	1x NVIDIA SoM (1 GbE) 1x RTL8153BI-CG (1 GbE)
	Display Port	2x HDMI 1.4 2x DP ++ 4x DP* * The four DP ports are only functional when supported by an optional MXM GPU module	1x HDMI -	1x HDMI -
	Serial Port	2x COM: RS-232/ 422/ 485, DB9 2x COM: RS 232, DB9 (optional)	2x COM: RS-232/422/485, DB9 1x CAN bus, DB9	2x COM: RS-232/422/485, DB9 1x CAN bus, DP9 (by SKU)
	USB 2.0	1x USB 2.0, type A	1x USB 2.0, Micro-USB for OS Flash 2x USB 2.0, Pin Header (Internal)	1x USB 2.0, Micro-USB for OS Flash 2x USB 2.0, Pin Header (Internal)
	USB 3.2/ 3.1	3x USB 3.2 Gen2 x1 (10 G), type A	3x USB 3.2 Gen1(5G), Type-A	3x USB 3.2 Gen1 (5G), Type-A
	Audio	Mic in; Line out	-	-
	Digital I/O	4x DI, 4 x DO support isolation (optional)	4 x DI, 4 x DO (2x5 Terminal Block, w/ isolation)	4 x DI, 4 x DO (2x5 Terminal Block, w/ isolation)
Storage Interface	SATA HDD	2 x hot-swappable 2.5" HDD/SSD	-	-
	mSATA	-	-	-
	M.2 (M-key)	1 (NVMe)	1	1
	eMMC	-	-	16 GB
	SD Card	-	-	1
Expansion	mPCIe	1	-	1
	M.2 (E-key)	1	1	1
	M.2 (B-key)	1	1	-
	SIM	2	2	2
	PCI/ PCIe	-	-	-
	MXM	1	-	-
Power Supply	DC Input	8-48V DC	12-24V DC	12-24V DC
	Ignition Control	Integrated	-	-
Environmental	Operating Temp.	-20~60°C with 45W CPU and 60W MXM	-20~50°C with 25W SOM (max)	-20~60°C with 20W SOM (max)
	Certification	CE, FCC, CB, BSMI (Optional SKU for CE, FCC Class B)	CE, FCC, CB, BSMI	CE, FCC, CB, BSMI
	Shock & Vibration	MIL-STD 810H, and 5-500 Hz; 5 Grms	5~500 Hz; 3 Grms	5~500 Hz; 3 Grms

Rugged Edge Computers

		PE5101D	PE5100D	PE1000S	PE2200U
					
Case	Dimension	242 x 241.4 x 137mm	242 x 241.4 x 79mm	56 x 110.2 x 160mm 63 x 110.2 x 160mm (PoE SKU)	254 x 147 x 57 mm
	Weight	5.81 kg	5.07 kg	1.017kg / 1.265kg (PoE SKU)	2.45 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
System	Processor	Intel® Core™ i9-13900TE Intel® Core™ i7-13700TE Intel® Core™ i5-13500TE Intel® Core™ i3-13100TE	Intel® Core™ i9-13900TE Intel® Core™ i7-13700TE Intel® Core™ i5-13500TE Intel® Core™ i3-13100TE	Intel® Atom® X6425E Intel® Atom® X6413E Intel® Celeron® J6412	Intel® Core™ Ultra processor 100U series
	Chipset	R680E	R680E	-	-
	Graphics	Intel® UHD Graphics 770	Intel® UHD Graphics 770	Intel® UHD Graphics for 10th Gen Intel® Processors	-
	Memory	2 x SO-DIMM (supports DDR5 ECC/ non-ECC, up to 4800 MHz, max. 64GB)	2 x SO-DIMM (supports DDR5 ECC/ non-ECC, up to 4800 MHz, max. 64GB)	1 x SO-DIMM, DDR4 supports up to 3200 MHz, max 32 GB	2 x SO DIMM, DDR5 5600 MHz, supports up to 64GB
I/O Interface	PoE	-	-	2 x Intel® i226-IT (PoE SKU)	2 x Intel® i210-IT (optional)
	Ethernet	3 x Intel® i226-IT (2.5 GbE)	3 x Intel® i226-IT (2.5 GbE)	2 x Intel® i226-IT (2.5 GbE)	1 x Intel® i219-LM (1 GbE) 1 x Intel® i226-IT (2.5 GbE)
	Display Port	1x HDMI 2x DP	1x HDMI 2x DP	1x HDMI 1x DP	1x HDMI 1x DP
	Serial Port	2x COM: RS-232/422/485 4x COM: RS-232	2x COM: RS-232/422/485 4x COM: RS-232	1x COM: RS-232/422/485 3 x 3-wire RS-232 or 1 x RS-422/485 2 x RS-232 (optional, mux with GPIO)	4x COM: RS-232/422/485
	USB 2.0	2 x USB 2.0, type A	2 x USB 2.0, type A	2 x USB 2.0, type A	2 x USB 2.0, type A
	USB 3.2/ 3.1	6 x USB 3.2 Gen 2 (10Gbps) 2 x USB 3.2 Gen 1 (5Gbps)	6 x USB 3.2 Gen 2 (10Gbps) 2 x USB 3.2 Gen 1 (5Gbps)	2 x USB 3.2 Gen 2 (10Gbps) 2 x USB 3.2 Gen 1 (5Gbps)	1 x USB 3.2 Gen2x2 (20G), type C 4 x USB 3.2 Gen 2, type A
	Audio	Mic in; Line out	Mic in; Line out	-	Mic in; Line out
	Digital I/O	4x DI, 4 x DO support isolation (optional)	4x DI, 4 x DO support isolation (optional)	1 x 8bit GPIO, DB9 (optional, mux with GPIO)	1 x 8bit GPIO, DB9
Storage Interface	SATA HDD	2 x hot-swappable 2.5" HDD/SSD	2 x hot-swappable 2.5" HDD/SSD	1 x 2.5" HDD/SSD (standard SKU only)	1 x 2.5" HDD/SSD
	mSATA	-	-	-	-
	M.2 (M-key)	1 (NVMe)	1 (NVMe)	1 (NVMe/SATA)	1 (NVMe)
Expansion	mPCIe	1	1	-	-
	M.2 (E-key)	1	1	1	1
	M.2 (B-key)	1	1	1	1
	SIM	2	2	1	1
	PCI/ PCIe	1 x PCIex16 + 1 x PCIex4	-	-	-
Power Supply	DC Input	8-48V DC	8-48V DC	9-36V DC	9-36V DC
	Ignition Control	Integrated	Integrated	POE SKU only	-
Environmental	Operating Temp.	-20~70°C	-20~70°C	-25°C to 70°C -25°C to 60°C (PoE SKU)	-20~60°C
	Certification	CE, FCC, UKCA, BSMI, CB, CCC	CE, FCC, UKCA, BSMI, CB, CCC	CE, FCC, UKCA, BSMI, CB, CCC	CE, FCC, UKCA, BSMI, IC, CB, CCC
	Shock & Vibration	MIL-STD 810H, and 5-500 Hz; 3+ Grms	MIL-STD 810H, and 5-500 Hz; 3+ Grms	MIL-STD 810H, and 5-500 Hz; 5+ Grms	MIL-STD 810H

		PE2100U	PE2000U	PE2100S (Preliminary)	PE2000S
					
Case	Dimension	254 x 147 x 57 mm	254 x 147 x 57 mm	254 x 147 x 57 mm	254 x 147 x 57 mm
	Weight	2.45 kg	2.45 kg	2.45 kg	2.45 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
System	Processor	Intel® Core™ i7-1365UE Intel® Core™ i5-1345UE Intel® Core™ i3-1315UE	Intel® Core™ i7-1265UE Intel® Core™ i5-1245UE Intel® Core™ i3-1215UE	Intel® Atom® x7211RE Intel® Atom® x7213RE Intel® Atom® x7433RE Intel® Atom® x7835RE	Intel® Processor N97 Intel® Processor N200 Intel® Core™ i3-N305 Intel Atom® x7425E
	Chipset	-	-	-	-
	Graphics	Intel® Iris® Xe Graphics eligible	Intel® Iris® Xe Graphics eligible	Intel® UHD Graphics	Intel® UHD Graphics
	Memory	2 x SO-DIMM, DDR5 4800 MHz, supports up to 64GB	2 x SO-DIMM, DDR5 4800 MHz, supports up to 64GB	1x SO-DIMM, up to 16GB DDR5 SDRAM	1x SO-DIMM, up to 16GB DDR5 SDRAM
I/O Interface	PoE	2 x Intel® i210-IT (optional)	2 x Intel® i210-IT (optional)	2x IEEE 802.3af (12.95 W) by Intel® i210-IT (1 GbE) (Optional)	2x IEEE 802.3af (12.95 W) by Intel® i210-IT (1 GbE) (Optional)
	Ethernet	1x Intel® i219-LM (1 GbE) 2x Intel® i210-IT (optional) 1x Intel® i225-V (2.5 GbE)	1x Intel® i219-LM (1 GbE) 2x Intel® i210-IT (optional) 1x Intel® i225-V (2.5 GbE)	1x Intel® i226-IT (2.5 GbE) 1x Intel® i210-IT (1 GbE) 2x Intel® i210-IT (1 GbE) (Optional)	2x Intel® i210-AT (1 GbE) 2x Intel® i210-IT (1 GbE) (Optional)
	Display Port	2x HDMI 1x DP	2x HDMI 1x DP	1x HDMI 2.0 1x DP1.4	1x HDMI 2.0 1 x DP1.2
	Serial Port	2x COM: RS-232/422/485 2x COM: RS-232	2x COM: RS-232/422/485 2x COM: RS-232	2x COM: RS-232/422/485, DB9 4x COM: RS-232, DB9 2x COM: RS232 (Optional)	2x COM: RS-232/422/485, DB9 4x COM: RS-232, DB9
	USB 2.0	2 x USB 2.0, type A	2 x USB 2.0, type A	2x USB 2.0, type A	2x USB 2.0, type A
	USB 3.2/ 3.1	4 x USB 3.2 Gen 2, type A	4 x USB 3.2 Gen 2, type A	2x USB 3.2 Gen2 (10 G), type A 2x USB 3.2 Gen1 (5 G), type A	4x USB 3.2 Gen 2 (10 G), type A
	Audio	Mic in; Line out	Mic in; Line out	1 x Mic in / 1 x Line out	1 x Mic in / 1 x Line out
	Digital I/O	1 x 8bit GPIO, DB9	1 x 8bit GPIO, DB9	1 x 8bit GPIO, DB9	1 x 8bit GPIO, DB9
Storage Interface	SATA HDD	1 x 2.5" HDD/SSD	1 x 2.5" HDD/SSD	1x 2.5" HDD/SSD	1x 2.5" HDD/SSD
	mSATA	-	-	-	-
	M.2 (M-key)	1 (NVMe/SATA)	1 (NVMe/SATA)	1 (NVMe/SATA)	1
Expansion	mPCIe	1	1	-	1
	M.2 (E-key)	1	1	1	1
	M.2 (B-key)	-	-	-	-
	SIM	1	1	1	1
	PCI/ PCIe	-	-	-	-
Power Supply	DC Input	12-24V DC	12-24V DC	9-36V DC	9-36V DC
	Ignition Control	-	-	-	-
Environmental	Operating Temp.	-20~60°C	-20~60°C	-20~60°C	0~50°C
	Certification	CE, FCC, VCCI, BSMI, RCM, UL, CB, CCC	CE, FCC, VCCI, BSMI, RCM, UL, CB, CCC	CE, FCC, CB, BSMI	CE, FCC, CB, BSMI
	Shock & Vibration	MIL-STD 810H	MIL-STD 810H	MIL-STD 810H, and 5-500 Hz; 5 Grms	MIL-STD 810H, and 5-500 Hz; 5 Grms

Rugged Edge Computers

		PE200U	PE200S	PE400D
				
Case	Dimension	254 x 147 x 57 mm	254 x 147 x 57 mm	176.6 x 210 x 250 mm
	Weight	2.45 kg	2.45 kg	6.8 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
System	Processor	Intel® Core® i7-8665UE Intel® Core® i5-8365UE Intel® Core® i3-8145UE	Intel® Atom® X7-E3950 Intel® Atom® X5-E3940 Intel® Atom® X5-E3930	Intel® Core™ i9-10900E / Intel® Core™ i7-10700E Intel® Core™ i5-10500E / Intel® Core™ i3-10100E Intel® Xeon® W-1290TE
	Chipset	-	-	W480E
	Graphics	Intel® UHD Graphics 620	Intel® HD Graphics 505	Intel® UHD Graphics 630
	Memory	1 x SO-DIMM, DDR4 2400 MHz, supports up to 32GB	1 x SO-DIMM, DDR3L 1866 MHz, supports up to 8GB	2 x SO-DIMM, up to 64GB ECC/ non-ECC DDR4 SDRAM
I/O Interface	PoE	2 x Intel® i210-IT (optional)	2 x Intel® i210-IT (optional)	-
	Ethernet	1 x Intel® i219 (1 GbE) 1 x Intel® i211-AT (1 GbE) 2 x Intel® i210-IT (optional)	2 x Intel® i210-IT (1 GbE) 2 x Intel® i210-IT (optional)	3 x Intel® i210-IT (1 GbE)
	Display Port	1x HDMI 1x DP	1x HDMI 1x DP	1 x HDMI 2.0 1 x HDMI 1.4 1 x DP 1.2
	Serial Port	2x COM: RS-232/422/485 4x COM: RS-232 (optional)	2x COM: RS-232/422/485 4x COM: RS-232 (optional)	3x COM: RS-232/422/485, DB9 1x COM: RS-232/422/485, DB9
	USB 2.0	4 x USB 2.0, type A (optional)	2 x USB 2.0, type A (optional)	-
	USB 3.2/ 3.1	4 x USB 3.2 Gen 2, type A	4 x USB 3.2 Gen 1	4x USB 3.2 Gen1 (5 G), type A 2x USB 3.2 Gen2 (10 G), type A
	Audio	Mic in; Line out	Mic in; Line out	1 x Mic in / 1 x Line out
	Digital I/O	1 x 8bit GPIO, DB9	1 x 8bit GPIO, DB9	4x DI, 4 x DO support isolation
Storage Interface	SATA HDD	1 x 2.5" HDD/SSD	1 x 2.5" HDD/SSD	2 x hot-swappable 2.5" HDD/SSD
	mSATA	1 (mux with mPCIe)	-	1 (mux with mPCIe)
	M.2 (M-key)	1 (NVMe/SATA)	1	1 (NVMe/SATA)
Expansion	mPCIe	1 (mux with mSATA)	1	1 (mux with mSATA)
	M.2 (E-key)	1	1	1
	M.2 (B-key)	1	-	-
	SIM	1	1	2
	PCI/ PCIe	-	-	3x PCIe slot *2 configuration: 1x PCIex16 + 1x PCIex4 or 2 x PCIex8 + 1x PCIex4, auto-detect *Max. length<192mm; Max. 100W power supply from mainboard for total 3 slots
Power Supply	DC Input	12-24V DC	12-24V DC	9-36V DC
	Ignition Control	-	-	-
Environmental	Operating Temp.	-20~60°C	-20~60°C	20~60°C
	Certification	CE, FCC, VCCI, BSMI, RCM, KCC, UL,CB, CCC	CE, FCC, VCCI, BSMI, UL,CB, CCC	CE (IEC 61000-6-2/4), FCC, VCCI, RCM, BSMI, UL, CB, CCC
	Shock & Vibration	Vibration:0.21Grms, 5~500 Hz, 20min duration Shock:50 G, half sine 11ms duration	Vibration:0.21Grms, 5~500 Hz, 20min duration Shock:50 G, half sine 11ms duration	Vibration: 0.5 Grms, sine, 5-500 Hz (with SSD) Shock: 50 Grms, half sine, 11ms(with SSD)

Arm-based Gateways

		PE100A	PV100A
			
Case	Dimension	55.5 x 145 x 78 mm	216 x 112 x 70.5 mm
	Weight	0.775 kg	1.62 kg
	Chassis Construction	Aluminum alloy with heavy duty metal	Aluminum alloy with heavy duty metal
System	Processor	NXP® i.MX 8M ARM Cortex-A53 Quad core , 1.3 GHz	NXP® i.MX 8M ARM Cortex-A53 Quad core , 1.3 GHz
	Memory	4 GB LPDDR4 onboard	2 GB LPDDR4 onboard
I/O Interface	Ethernet	1x Intel® i210-AT (1 GbE) 1 x Realtek® RTL8211 (1 GbE)	1x Intel® i210-IT (1 GbE) 1 x Realtek® RTL8211 (1 GbE)
	Display Port	1x HDMI	1x HDMI
	Serial Port	1x COM: RS-232/422/485 (by terminal block) 1x COM: RS-232 (by terminal block)	1x COM: RS-232/422/485 (DB9) 2x COM: RS-232/422/485 (by HDC) 1x COM: RS-232/422 (DB9)
	USB 3.2/ 3.1	2x USB 3.2 Gen1, type A 1x USB 3.2 Gen1, support OTG, type C	2x USB 3.2 Gen1, type A 1x USB 3.2 Gen1, support OTG, type C
	Audio	-	Mic in; Line out (by HDC)
	Digital I/O	4x DI, 4 x DO support isolation	4x DI, 4 x DO support isolation (by HDC)
Storage Interface	mSATA	1 (mux with mPCIe)	1 (mux with mPCIe)
	eMMC	16GB	16GB
	SD Card	1	1
Expansion	mPCIe	1 (mux with mSATA)	1 (mux with mSATA)
	M.2 (E-key)	1	1
	M.2 (B-key)	-	1
	SIM	1	1
Power Supply	DC Input	12-24V DC	9-36V DC
	Ignition Control	-	Integrated
Environmental	Operating Temp.	-20~60°C	-25~75°C
	Certification	CE, FCC, VCCI, BSMI, RCM, KCC, UL,CB, CCC	E-Mark, SO-7637-2, SAE J1455, EN50155, CE, FCC, CB, BSMI, UL, CCC
	Shock & Vibration	Vibration:0.21Grms, 5~500 Hz, 20min duration Shock:50 G, half sine 11ms duration	MIL-STD 810H

CHAPTER 8
NUC

SMALLER, FASTER, BETTER, AI READY

The ASUS NUC represents a commitment to continuous improvement in technology, prioritizing user-friendly product design. Developed through a partnership between ASUS and Intel, the compact ASUS NUC integrates the power of a full-sized computer with top-notch quality, reliability, modular design, extended lifespan, smart cooling solutions, and advanced AI capabilities. Its versatility shines through an array of configurations catering to diverse user needs, from power users to casual home use. With a focus on supporting diverse businesses and enhancing PC applications, the ASUS NUC aspires to make a lasting impact in the ever-evolving tech landscape.

MADE FOR MANUFACTURING

Empowering edge-embedded solutions for autonomous manufacturing, error detection, and mitigation. NUC Rugged is designed for tough, dirty environments.

A BIG HELP FOR HEALTHCARE

Powering medical imaging devices, patient monitors, and bedside terminals with powerful performance.

HELPING TRANSPORTATION RUN

Ideal for interactive digital screens, wayfinding kiosks, and more, with powerful graphics, computing, and connectivity.

RELIABLE COMPUTE POWER FOR RETAIL

Ensures continuous operation of digital signage, even during unexpected failures. Powers up to four extended displays for menus, kiosks, and more.

.

Elevate your Edge Solutions

WITH ASUS NUC

SMALLER, FASTER, BETTER, AI READY

Exploring the Latest NUC Family

ASUS **NUC 14 PRO**

Delivers best-in-class performance thanks to the all-new Intel®Core™ Ultra processor family. With certified Bluetooth® dongle-free connectivity and three AI engines, NUC 14 Pro delivers robust computing capabilities. It is a comprehensively capable mini PC, built with Intel vPro® Enterprise for exceptional security, manageability and stability.

ASUS **NUC 13 PRO**

Offers exceptional performance, rich I/O, and enduring reliability for edge-computing applications in factories, retail stores, hospitals and more. Businesses benefit from advanced features like power control, hardware alarm clock, hardware KVM, boot redirection, beyond-firewall support, cloud-based manageability, remote PC remedy and unattended system control.

ASUS **NUC 13 RUGGED**

Features both Intel® Processor N50 and Intel Atom® processors, and offers the perfect combination of performance, connectivity and reliability in a fanless, dust-resistant ruggedized chassis designed to protect against shock. The tall chassis is able to withstand extended external ambient temperatures between 0-50°C, ensuring uninterrupted performance in the most challenging conditions.

Compact, Fanless, Reliable Built For Indoor Industrial Appliction

INTRODUCING ASUS PL SERIES MINI PCs

ASUS PL Series mini PCs are designed mainly for indoor industrial applictions. PL Series mini PCs are subjected to strict testing standards, offer legacy connectivity and long product life cycles to cater to a diverse range of uses.

Target Market

Digital Signage - Advantages

- Enjoy stunning 4K resolution for crystal-clear visuals
- Triple display support through HDMI ports, allowing for expanded multitasking

Kiosk & Store OA - Avantages

- Supports operational ambient temperatures up to 50°C, ensuring reliable performance in various environments
- Compact in size with a durable metal chassis, providing a robust and space-efficient solutiondelivering faster Ethernet connectivity

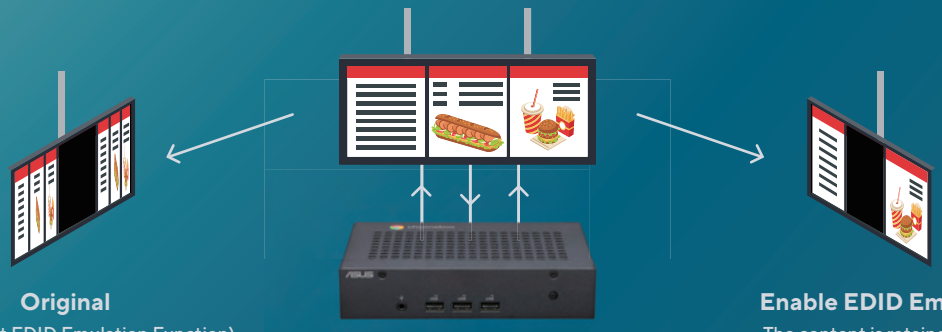
IoT Control Unit - Advantages

- Triple LAN ports featuring 2.5GbE LAN deliver faster Ethernet connectivity
- Wi-Fi 6E networking ensures stable and high-speed data transfers
- Rigorously tested for 24/7 reliability, ensuring long-term performance

Advanced Output Management

EDID Emulation

ASUS Mini PC PL64-D1 features EDID (Extended Display Identification Data) emulation, it retains your signage format regardless of display power or connectivity interruptions. With EDID emulation, you can get your fine signage content back after display is temporary disconnected or connected. It makes PL64-D1 perfectly fit for signage usages



Original
(Without EDID Emulation Function)
The content may broken)

Once a Monitor is unconnented

Enable EDID Emulation
The content is retained, once you reconnect the display, you can get it back and final

MODEL	 PL64-D1	 Fanless Chromebox CF40
OPERATING SYSTEM	Windows®11 Pro 64Bit, Windows®11 64Bit, Windows®IoT Enterprise or W/O OS	ChromeOS Chrome Enterprise
CPU	Intel® Core™ i7-1255U, i5-1235U, i3-1215U, Celeron® 7305 (cTDP 15W)	Intel JSL N4500
CHIPSET	Integrated	Integrated
GRAPHICS	Integrated - Intel® Iris® Xe Graphics (i7/i5) or Intel® UHD Graphics (i3/ Celeron 7305) * *Intel® Iris® Xe Graphics requires 128-bit dual channel memory for optimal performance	–
MEMORY	2 x SO-DIMM , DDR4-3200MHz memory (up to 32GB*2)	LPDDR4X 4G/8G/16G
STORAGE	1 x M.2 2280, up to PCIe Gen4x4, 256G~1TB SSD *Support NVMe	eMMC 32G/64G/128G
WIRELESS NETWORK	Intel® WiFi 6E/ 6 and Bluetooth® 5, 2*2	Intel® Wi-Fi 6 AX201
LAN	3 x Intel® I225VLAN,10/100/1000/2500Mbps, each ports support up to 30W output (802.3at)	Gb LAN
AUDIO	Realtek® ALC3251 HD Audio CODEC	-
FRONT I/O PORTS	3 x USB 3.2 Gen 2 2 x USB2.0 1 x PoE port 802.3at/30W 1 x Audio Jack (Line out/ Mic in/ Headphone out)	3 x USB 3.2 Gen1 Type A 1 x Audio Jack (Mic/Headphone Jack)
REAR I/O PORTS	3 x HDMI 2.0 Port 2 x PoE ports 802.3at/30W 1 x EDID reset 2 x Antenna Jack 1 x DC-in	2 x USB 3.2 Gen1 Type-A 2 x HDMI 1 x USB 3.2 Gen 1 Type-C (DP/PD in) 1 x RJ45 1 x DC-in 1 x Recovery button 1 x Kensington slot
SIDE I/O	1 x USB 2.0 1 x Kensington lock	–
TPM	fTPM 2.0 or TPM module onboard (Optional)	–
POWER	150W	65W
DIMENSION / WEIGHT	199.7mm x 119.7mm x 33.9mm (0.81L) /TBD	166.2 x 119.7 x 33.9 mm /775g
OPERATING TEMPERATURE	0-50° C(only for models that support 16 GB memory and below) 0-35° C (for all other models)	–

CHAPTER 9
Modularized Systems

ASUS IOT
CONFIGURE TO ORDER SERVICES (CTOS)

Meet your specific needs and optimize your systems

ASUS IoT CTOS process flow

How to start your personalized ASUS IoT CTOS tech journey

1. **Choose your foundation**
   Begin your customization journey by selecting products from our foundational list.
2. **Fine-tune hardware**
   Customize your device with the necessary hardware configurations – including processors, memory and storage — aligning with your performance standards.
3. **Personalize software**
   Tailor your tech experience by choosing pre-installed operating systems, software packages and drivers to ensure your system suits your workflow.
4. **Enhance with accessories**
   Improve your setup with various accessories —extra ports, expansion cards and so on — customizing your device to meet specific needs.
5. **Connect with local support**
   In the final stage, review your configuration, then contact ASUS local support. We're here to provide ASUS CTOS products and solutions tailored just for you.

Application

Crafting your unique service experience!

ASUS CTOS redefines service by offering personalized choices in hardware, software and accessories. Our ecosystem partners, with robust expertise, deliver swift and diverse solutions locally. Join us for a unique tech service tailored to your needs!

ASUS CTOS strengths and highlights

FAST AND REAL-TIME SUPPORT

1. **SWIFT SUPPORT WITHOUT TIME-ZONE LIMITATIONS**
   Our local technical support team enables us to deliver fast and efficient support services, resulting in reduced downtime and improved system availability and stability.

2. **OVER 25 REGIONAL SERVICE CENTERS**
   We track customer needs and offer timely assistance and solutions.

DEDICATED RD TEAM

1. **HIGH-SPEED AND SPECIALIZED R&D SUPPORT**
   Our dedicated CTOS R&D team enables us to promptly address CTOS customer needs and adapt our research and development direction effectively.

   Benefiting from our extensive experience in CTOS projects, the ASUS IoT R&D team excels in addressing customer issues and providing expert advice.

FLEXIBLE CTOS SOLUTIONS

1. **ONE-STOP INTEGRATE SOLUTIONS**
   Key parts can be added to ensure that solution aligns with customers' business processes.

2. **PROVIDE KPS WITH COMPETITIVE PRICING AND EXPEDITED DELIVERY**
   By leveraging the ASUS group vendor pool, we have multiple supplier options reduces the risk of relying on a single supplier and allows for better price and quality comparisons.

AI Medical System

	MDS-M700
	
Dimension	320 x 335 x 145 mm
MB	Micro-ATX
Qualified MB	Q670EM-IM-A
CPU	LGA1700 for Intel® 13th/ 12th Gen. Core™ i9/ i7/ i5/ i3/ Pentium® /Celeron® Processors
Displays	4 DP++ 1.4, support up to 3840 x2160 @ 60Hz
Memory	DDR5 4400MT/s (2DPC - 1DIMM 1R & 2R) 4000MT/s (2DPC - 2DIMM 1R) 3600MT/s (2DPC - 2DIMM 2R)
OP. temperature	0°C~40°C
Voltage	Medical PSU 500W
COM, USB	2 x USB 3.2 (Rear) 4 x USB 3.2 (Rear) 1 x Serial Port (Rear) 3 x USB 3.2 (Internal) 4 x USB 2.0 (Internal) 9 x Serial Port (Internal)
Expansion slot	1 x PCIe 5.0 x16 Slot (1 x16 mode/2 x8 mode) 1 x PCIe 4.0 x4 Slot (x4 mode) 1 x PCIe 5.0 x16 Slot (x8 mode) 1 x PCIe 4.0 x4 Slot (x4 mode)

Fanless Embedded Computers

	EBS-P300	EBS-P300W	EBS-S300W
			
Dimension	137 x 81 x 44.45 mm	137 x 81 x 61 mm	186 x 135 x 70 mm
CPU	Intel® Celeron® J6412	Intel® Atom™ x6425RE Intel® Atom™ x6425E Intel® Atom™ x6413E Intel® Atom™ x6211E	Intel® Atom™ x6425E Intel® Atom™ x6413E Intel® Atom™ x6211E
LAN	2 x RJ45	2 x RJ45	2 x RJ45
Displays	1 x HDMI 2.0 1 x HDMI 1.4	1 x HDMI 2.0 1 x HDMI 1.4	1 x HDMI 2 .0, supports up to 4K x 2K @ 60 Hz 1 x DP++1.2, supports up to 4096 x 2160 @ 60 Hz
Memory	1 x LPDDR4 support max. 8GB, on board	1 x LPDDR4 support max. 8GB, on board	1 x DDR4 SO-DIMM support max. 32GB
OP. temperature	0°C~60°C standard (-20°C~60°C extend)	0°C~60°C standard (-40°C~60°C extend)	0°C~60°C standard (-40°C~60°C extend)
Voltage	12V-24V	12V-24V	9V-36V
COM, USB	2 x USB 3.2 2 x USB 2.0 2 x RS232/422/485	2 x USB 3.2 2 x USB 2.0 2 x RS232/422/485	4 x USB 3.2 2 x USB 2.0 2 x RS232/422/485 4 x RS232
Expansion slot	1 x 2230 M.2 E key for WIFI/BT device 1 x 2242 M.2 B Key (Support PCIE & SATA Storage)	1 x 2230 M.2 E key for WIFI/BT device 1 x 2242 M.2 B Key (Support PCIE & SATA Storage)	1 x 2230 M.2 E key (USB2.0, PCIe) for WIFI/BT device 1 x 3042/3052 M.2 B key (USB 2.0) for LTE device with on-board Nano-SIM slot 1 x 2280 M.2 M key (Support PCIE & SATA Storage)

Fanless Embedded Computers

	EBS-S500W	EBS-S100
		
Dimension	186 x 135x 70 mm	186 x 135 x 62 mm
CPU	Intel® Core™ Ultra 7 processor 165U Intel® Core™ Ultra 5 processor 135U	Intel® Atom™ x7425E Intel® Core™ i3-N305 Intel® Processor N200 Intel® Processor N97
LAN	2 x RJ45	2 x RJ45
Displays	1 x HDMI 2.0, supports up to 4K x 2K @ 60 Hz 1 x DP1.4a, supports up to 4096 x 2304 @ 60 Hz	1 x HDMI 2.0, supports up to 4K x 2K @ 60 Hz 1 x DP1.4a, supports up to 4096 x 2304 @ 60 Hz
Memory	2 x DDR5 SO-DIMM support max. 64GB	1 x DDR5 SO-DIMM support max. 16GB
OP. temperature	-20°C~60°C standard	0°C~40°C standard (0°C~50°C extend)
Voltage	9V-36V	9V-36V
COM, USB	4 x USB 3.2 2 x USB 2.0 4 x RS232/422/485 1 x USB-C (USB3.2, DP 1.4 Alt. Mode)	4 x USB 3.2 2 x USB 2.0 2 x RS232/422/485 4 x RS232
Expansion slot	1 x 3042/3052 M.2 B Key for LTE/5G device connected to Nano-SIM socket 1 x 2230 M.2 E key for WIFI 6E/BT 5.2 device 1 x 2280 M.2 M key for PCIe storage	1 x 2230 M.2 E Key for TPU/WIFI/BT device 1 x 2242/2280 M.2 M Key for SATA storage 1 x Mini PCIe with on-board Nano-SIM slot

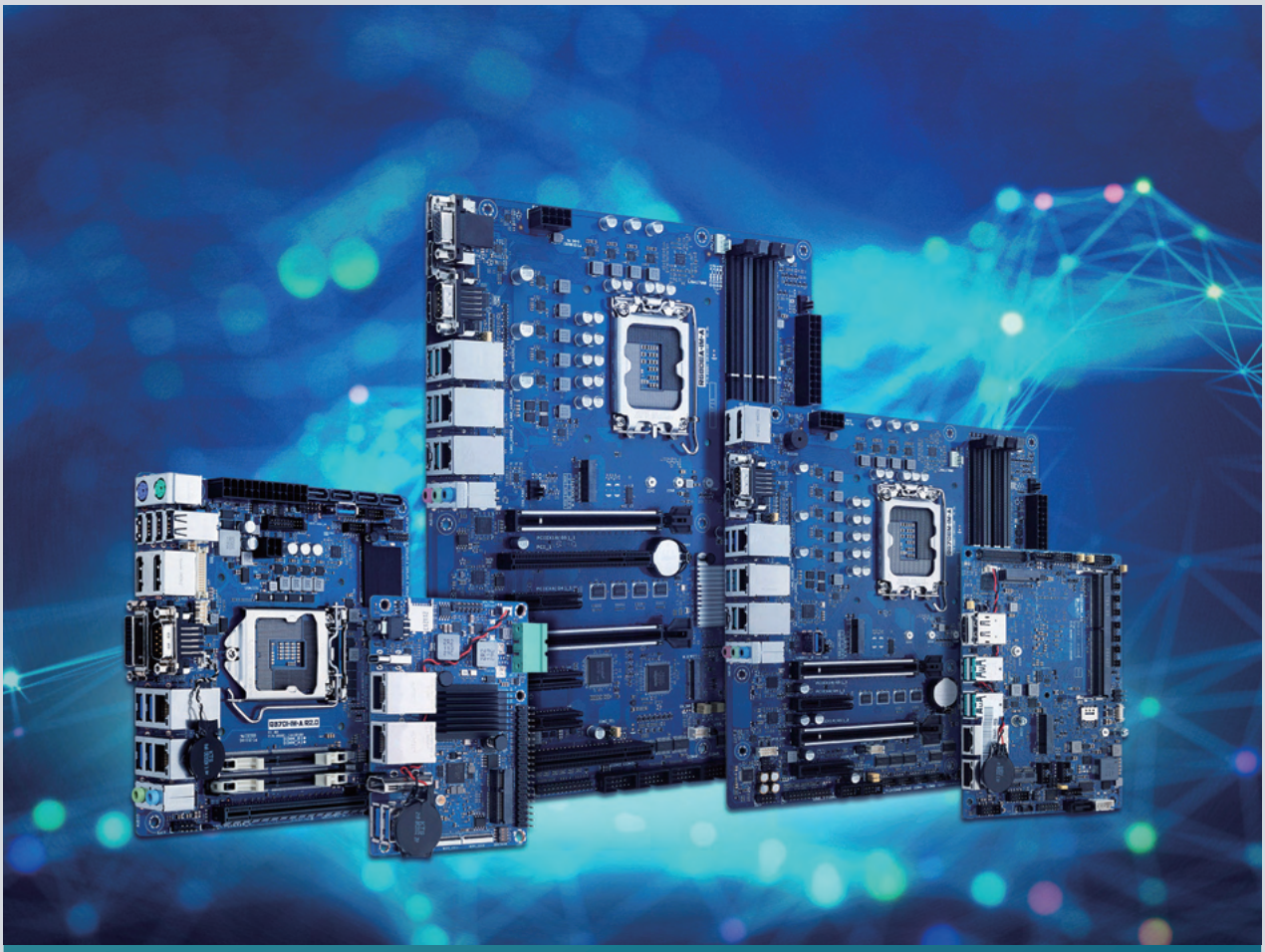
Embedded Computers

	EBS-A700	EBS-A710 (Q1'24)	EBS-I10
			
MB	ATX, Micro-ATX	ATX, Micro-ATX	Mini-ITX
Qualified MB	H610A-IM-A H610M-IM-A	Q670EA-IM-A Q470A-EM-A H610A-IM-A H110A-IM-AB H310A-EM-A	H310I-IM-A
Dimensions	330 x 196 x 445 mm	316.5 x 164 x 380 mm	255 x 230 x 88 mm
External I/O	2 x USB 2.0 2 x LED Indicators 1 x Power Button 1 x System Reset Button 4 x COM Ports 2 x Accessible USB Ports	*Depend on compatible motherboard design*	2 x USB 2.0 2 x Audio Jack* 5 x COM Ports 1 x HDMI 1 x DP 2 x Gbe RJ45 4 x USB 3.2 2 x Audio Jack
Storage Capability	2 x 3.5" HDD 1 x 2.5" SSD 1 x 5.25" CD-ROM	1 x 3.5" HDD 1 x 2.5" Slim HDD	1 x 2.5" HDD 1 x 2280 M.2 M Key
Expansion Slot	7 x Full Height Slots	7 x Full Height Slots	1 x Low-profile add-on card (NV A2000)
Cooling	1 x 2025 Fan 2 x 5010 Fan	1 x 12030 Fan	2 x 6010 Fan
Power Supply	500W Gold ATX PSU	250W Gold or 350W Gold Flex ATX PSU	250W Gold or 350W Gold Flex ATX PSU
Environment	0°C~40°C	0°C~40°C	0°C~40°C

Embedded Computers

	EBS-I100	EB-ITX-B	EBE-4UG
			
MB	Mini-ITX	Mini-ITX	ATX, Micro-ATX
Qualified MB	J6412I-EM-B	Q470EI-IM-A R3.0	Q670EA-IM-A Q470EA-IM-A Q170A-IM-A H610A-IM-A H310A-EM-A H110A-IM-AB
Dimensions	200 x 69 x 200 mm	310 x 109 x 252 mm	430 x 175 x 457 mm
External I/O	1 x HDMI 1 x VGA 1 x DP 4 x USB 3.1 4 x USB 2.0 6 x COM 2 x GbE RJ45 2 x Audio Jack 1 x Power Button 2 x LED Indicators 1 x Remote Button 1 x 2-pin Phoenix DC Jack	2 x USB 2.0 2 x LED Indicators 3 x COM 1 x DVI-D 2 x DP 4 x USB 3.2 4 x USB 2.0 2 x GbE RJ45 2 x Audio Jack 2 x PS/2	2 x USB 2.0 1 x Power Switch 1 x System Reset Button 2 x LED Indicators
Storage Capability	2 x 2.5" SSD	1 x 3.5" or 1 x 2.5" HDD	2 x 3.5" HDD 1 x 3.5" Slim HDD (19 mm)
Expansion Slot	1 x Low Profile Slot	2 x PCIe x8 Add-on Card Slots 1 x 2230 M.2 E Key for WIFI/BT device 1 x 2242/2260/2280 M.2 M Key	7 x Full Height Slots
Cooling	Fanless	2 x 6010 Fan	1 x 12025 Fan
Power Supply	65W 12V Power Adapter	250W Gold Flex ATX PSU	300W Bronze ATX PSU or 500W Gold ATX PSU
Environment	0~40°C	0~40°C	0~40°C

	EBE-4U
	
MB	ATX, Micro-ATX, Mini-ITX
Qualified MB	Q670EA-IM-A Q470EA-IM-A Q170A-IM-A H610A-IM-A H310A-EM-A H110A-IM-AB
Dimensions	430 x 177 x 450 mm
Front I/O	2 x USB 2.0 1 x Power LED Indicator 1 x Reset LED Indicator
Storage Capability	2 x 3.5" HDD 1 x 3.5" Slim HDD (19 mm)
Expansion Slot	7 x Full Height Slots
Cooling	1 x 12025 Fan
Power Supply	300W Bronze ATX PSU or 500W Gold ATX PSU
Environment	0°C~40°C



Industrial Motherboards & Single Board Computers

Superior Technology

Excellent Quality

High Compatibilities and Reliability

Configure-To-Order Services (CTOS) and Customization Service

ASUS IoT provides robust, long-lifecycle industrial motherboards and single-board computers designed for reliable 24/7 operation in challenging environments. Our products feature industrial-grade components, providing a full range of form factors, comprehensive connectivity and outstanding design capabilities – offering both standard and customized solutions for diverse applications.

Meet Your Specific Needs And Optimize Your Systems

Deep partnership with key vendors

- Close partnerships with Intel, AMD, NVIDIA and ARM for product development
- Participation in the IC vendor's early access program ensures dedicated support
- Pioneers in bringing leading products to the industrial market

Leverage OneASUS expertise to accelerating your business

- Embracing the OneASUS philosophy, we leverage expertise across diverse business units, covering servers, clients, graphics cards, laptops and and more
- Recognized for world-leading BIOS development, including vBIOS

Accelerated innovation and quality advancements

- By leveraging all the ASUS resources with IC vendors, ASUS IoT delivers excellent quality, reliability, high compatibility, and accelerated time to market

Tailored CTOS and customization services

- BIOS/vBIOS modification, BOM and layout adjustments
- Dedicated R&D for Configure-To-Order Services (CTOS)
- Comprehensive design and manufacture services tailored to specific needs

Unleashing success:

A proven application in action

Active-fan heatsink for in-flight entertainment

- 3.5” single-board computer (SBC) for embedded applications
- Custom thermal solution combining heatsink and active fan, suitable for enclosure integration
- Rapid design and validation ensuring timely delivery

Panel integration product kit for COVID-19 test machines

- Tailored BIOS to match panel specifications
- High-value solution for panel integration product kit
- Expert panel-testing team
- Accelerated time to market with 12th-gen CPU technology

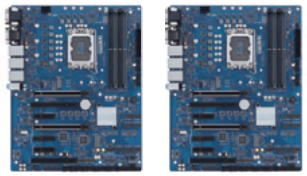
Outdoor EV charger in challenging environments

- Efficient operation in extremely high-temperature environments, including Southeast Asia
- Swift provision of transition boards during global IC shortage periods

ATM for limited spaces

- Fan-less mini-ITX industrial motherboard with a compact design
- Customized BIOS services and solutions are available
- Unique thermal design enabling 100% CPU-load operation

ATX

		R680EA-IM-A, Q670EA-IM-A	Q470A-EM-A	Q470EA-IM-A
				
Processor System	CPU	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 11th/10th Gen (Socket LGA1200) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 10th Gen (Socket LGA1200) Intel® Core™ i9/i7/i5/i3 Processors
	Chipset	Intel® R680E / Q670E Chipset	Intel® Q470 Chipset	Intel® Q470E Chipset
Memory	Technology	DDR5	DDR4	DDR4
	Max.	128GB	128GB	128GB
	Socket	4 x U-DIMM	4 x U-DIMM	4 x U-DIMM
Display	Display Port	2	2	2
	HDMI	1	1	1
	VGA	1	N/A	1
Expansion Slot	PCIe	1 x PCIe 5.0 x16 slot (1 x16 mode/ 2 x8 mode) 1 x PCIe 4.0 x4 slot (x4 mode, open slot) 1 x PCIe 5.0 x16 slot (x8 mode) 1 x PCIe 3.0 x4 slot (x4 mode, open slot) 1 x PCIe 4.0 x4 slot (x4 mode, open slot)	2 x PCIe 3.0/2.0 x16 slots (1 x16 mode/ 2 x8 mode) 3 x PCIe 3.0/2.0 x4 slots (x4 mode) 1 x PCIe 3.0/2.0 x1 slot (x1 mode)	2 x PCIe 3.0/2.0 x16 slots (1 x16 mode/ 2 x8 mode)
	PCI	2	1	2
	M.2	1 x M.2 M key, type 2242/2260/2280 (PCIe x4 /SATA mode) 1 x M.2 E key, type 2230 for WIFI/BT device (only support Intel® CNVi)	1 x M.2 M key, type 2242/2260/2280 (PCIe x4/ SATA mode)	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)
Ethernet	Speed Controller	10/100/1000/2500 Mbps 1 x Intel® i210AT 1 x Intel® i226V 1 x Intel® i226LM (Intel vPro supported)	10/100/1000/2500 Mbps 1 x Intel® i219LM (1 GbE), support WOL/PXE 1 x Realtek® RTL8111H	10/100/1000/2500 Mbps 1 x Intel® i219LM (1 GbE), support WOL/PXE 1 x Intel® i225V (2.5 GbE), support WOL/PXE
Storage	SATA port	7, up to 6Gb/s	4, up to 6Gb/s	6, up to 6Gb/s
	RAID	0,1,5,10	PCIe 0,1,5 / SATA 0,1,5,10	0,1,5,10
Rear I/O	Display Port	2	2	2
	HDMI	1	1	1
	VGA	1	N/A	1
	USB3.2 Gen2	6 (5 x Type-A, 1 x Type-C)	N/A	4 (3 x Type-A, 1 x Type-C)
	USB3.2 Gen1	0	4 x Type-A	N/A
	USB2.0	0	2	2
	Ethernet	3 x RJ45	2 x RJ45	2 x RJ45
	Serial Port	1 (RS232/422/485)	1 (RS232/422/485)	1 (RS232/422/485)
	Audio jack	3 (Line-Out, Line-In, Mic in)	3 (Line-Out, Line-In, Mic in)	3 (Line-Out, Line-In, Mic in)
Internal I/O	COM Header	5 (1 x RS232/422/485, 4 x RS232)	5 (RS232)	5 (1 x RS232/422/485, 4 x RS232)
	USB3.2 Gen1	2 x Headers support additional 4 x USB3.2 Gen1 ports	1 x Header support additional 2 x USB3.2 Gen1 Port	1 x Header support additional 2 x USB3.2 Gen1 ports
	USB2.0	2 x Headers support additional 4 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports 1 x Vertical connector	2 x Headers support additional 4 x USB2.0 ports 1 x Vertical connector
	CPU Fan/ Chassis Fan	1 x Header (PWM Mode) / 3 x Headers (PWM Mode)	1 x Header (PWM Mode) / 3 x Headers (PWM Mode)	1 x Header (PWM Mode) / 3 x Headers (PWM Mode)
	Buzzer	1	1	1
	PS/2	1	1	1
	AT/ATX Select Jumper	1	1	1
	Power connector	1 x 24-pin ATX Power connector 1 x 8-pin ATX 12V Power connector	1 x 24-pin ATX Power connector 1 x 8-pin ATX 12V Power connector	1 x 24-pin ATX Power connector 1 x 8-pin ATX 12V Power connector
Power	Power Type	AT/ATX mode	ATX	AT/ATX mode
Environment	Operating Temperature	0~60°C	0~50°C	0~60°C

		Q170A-IM-A	H310A-EM-A	H610A-IM-A
				
Processor System	CPU	Intel® Core™ 7th/6th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 9th/8th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors
	Chipset	Intel® Q170 Chipset	Intel® H310 chipset	Intel® H610 Chipset
Memory	Technology	DDR4	DDR4	DDR4
	Max.	32GB	64GB	64GB
	Socket	2x U-DIMM	2 x U-DIMM	2 x U-DIMM
Display	Display Port	0	1	1
	HDMI	1	1	1
	VGA	1	1	1
Expansion Slot	PCIe	1 x PCIe 3.0 /2.0 x16 slot 1 x PCIe 3.0/2.0 x16 slot (x 4 mode) 1x PCIe 3.0/2.0 x4 slot	1x PCIe 3.0/2.0 x16 slot 3x PCIe 2.0 x1 slots	1 x PCIe 5.0 x16 slot 1 x PCIe 3.0/2.0 x16 slot (x4 mode) 1x PCIe 3.0/2.0 x1 slot
	PCI	3	3	4
	M.2	1 x M.2 M key, type 2242/2260/2280 (SATA mode)	1 x M.2 socket 3 with M key, type 2242/ 2260/2280 storage devices (SATA mode)	1 x M.2 M key, type 2242/2260/2280 (PCIe x1/ SATA mode)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000Mbps	10/100/1000 Mbps
	Controller	1 x Intel® i219LM 1 x Intel® i210AT	1 x Intel® i219V 1x Realtek® RTL8111H	1 x Intel® i219V 1 x Intel® i210AT
Storage	SATA port	4, up to 6Gb/s	4, up to 6Gb/s	4, up to 6Gb/s
	RAID	PCIe 0,1,5 / SATA 0,1,5,10	-	-
Rear I/O	Display Port	2	1	1
	HDMI	1	1	1
	VGA	1	1	1
	USB3.2 Gen2	N/A	4	2
	USB3.2 Gen1	4	0	2
	USB2.0	6	2	6
	Ethernet	2 x RJ45	2	2 x RJ45
	Serial Port	2 (RS232/422/485)	2 (RS232/422/485)	2 (RS232/422/485)
	Audio jack	3 (Line-Out, Line-In, Mic in)	2 (Line-Out, Mic in)	2 (Line-Out, Mic in)
Internal I/O	COM Header	6 (RS232)	4 (RS232)	4 (RS232)
	USB3.2 Gen1	0	0	0
	USB2.0	2 x Headers support additional 4 x USB2.0 ports 2 x Stick sockets	1 x Header support additional 2 x USB2.0 ports 1 x Stick socket 1 x Single socket	1 x Header support additional 2 x USB2.0 ports
	CPU Fan/ Chassis Fan	1 x Header (PWM Mode) / 1 x Headers (PWM + DC Mode)	1 x Header (PWM Mode) / 1 x Header (PWM Mode)	1 x Header (PWM Mode) / 2 x Headers (PWM Mode)
	Buzzer	0	1	1
	PS/2	0	1	1
	AT/ATX Select Jumper	1	0	1
	Power connector	1 x 24-pin ATX Power connector 1 x 4-pin ATX Power connector	1 x 24-pin EATX Power connector 1 x 4-pin EATX 12V Power connector	2 x 4-pin ATX Power connectors 1 x 24-pin ATX Power connector
Power	Power Type	ATX	ATX	ATX
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C

ATX

		H110A-IM-AB	H110A-IM-A	R680EA-IM-Z
				
Processor System	CPU	Intel® Core™ 7th/6th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 7th/6th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors
	Chipset	Intel® H110 chipset	Intel® H110 chipset	Intel® R680E Chipset
Memory	Technology	DDR4	DDR4	DDR5 (2DPC)
	Max.	32GB	32GB	128GB
	Socket	2 x U-DIMM	2 x U-DIMM	4 x U-DIMM
Display	Display Port	0	0	2
	HDMI	1	1	1
	VGA	1	1	1
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot (x16 mode) 1 x PCIe 2.0 x16 slot (x4 mode)	1 x PCIe 3.0/2.0 x16 slot (x16 mode) 1 x PCIe 2.0 x16 slot (x4 mode)	1 x PCIe 5.0 x16 slot (1 x16 mode/ 2 x8 mode) 1 x PCIe 3.0 x4 slot (x2 mode, open slot) 1 x PCIe 5.0 x16 slot (x8 mode) 1 x PCIe 4.0 x4 slot (x4 mode, open slot) 1 x PCIe 4.0 x4 slot (x4 mode, open slot)
	PCI	5	5	2
	M.2	1 x M.2 M key, type 2242/2260/2280 (SATA mode)	1 x M.2 M key, type 2242/2260/2280 (SATA mode)	2 x M.2 M key, type 2242/2260/2280 (PCIe x4 /SATA mode) 1 x M.2 E key, type 2230 for WIFI/BT device (only support Intel® CNVi)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000/2500 Mbps
	Controller	1 x Intel® i219V 1 x Intel® I211AT, supports WOL/PXE	1 x Intel® i219V 1 x Intel® I211AT, supports WOL/PXE	1 x Intel® i210AT 2 x Intel® i226V 1 x Intel® i226LM (Intel vPro supported)
Storage	SATA port	3, up to 6Gb/s	3, up to 6Gb/s	6, up to 6Gb/s
	RAID	-	-	0,1,5,10
Rear I/O	Display Port	-	-	2
	HDMI	1 (colay with DP, optional)	1 (colay with DP, optional)	1
	VGA	1	1	1
	USB3.2 Gen2	4	4	4 (3 x type A, 1 x Type C)
	USB3.2 Gen1	0	0	0
	USB2.0	0	0	0
	Ethernet	2	2	4 x RJ-45
	Serial Port	2 (RS232/422/485)	2 (RS232/422/485)	1 (RS232/422/485)
	Audio jack	3 (Line-Out, Line-In, Mic in)	3 (Line-Out, Line-In, Mic in)	3 (Line-Out, Line-In, Mic in)
Internal I/O	COM Header	6 (RS232)	6 (RS232)	5 (1 x RS232/422/485, 4 x RS232)
	USB3.2 Gen1	0	0	3 x Headers support additional 6 x USB3.2 Gen1 ports
	USB2.0	2 x Headers support additional 4 x USB2.0 ports 2 x Stick sockets	2 x Headers support additional 4 x USB2.0 ports 2 x Stick sockets	1 x Headers support additional 2 x USB2.0 ports
	CPU Fan/ Chassis Fan	1 x Header (PWM Mode) / 1 x Headers (PWM Mode)	1 x Header (PWM Mode) / 1 x Headers (PWM + DC Mode)	1 x Header (PWM Mode) / 3 x Headers (PWM Mode)
	Buzzer	1	0	1
	PS/2	0	0	0
	AT/ATX Select Jumper	1	1	1
	Power connector	2 x 4-pin ATX Power connectors 1 x 24-pin ATX Power connector	1 x 4-pin ATX Power connector 1 x 24-pin ATX Power connector	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector
Power	Power Type	AT/ATX mode	AT/ATX mode	AT/ATX mode
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C

Micro-ATX

		H110M-IM-A	Q670M-EM-A (Q1'24)	Q370M-IM-A
				
Processor System	CPU	Intel® Core™ 7th/6th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 9th/8th Gen (Socket LGA1151) Intel® Core™ i9/i7/i5/i3 Processors
	Chipset	Intel® H110 Chipset	Intel® Q670 chipset	Intel® Q370 Chipset
Memory	Technology	DDR4	DDR4	DDR4
	Max.	32GB	32GB	64GB
	Socket	2x U-DIMM	4 x U-DIMM	4 x U-DIMM
Display	Display Port	0	2, Supports 4096 x 2304 @60Hz	2, Supports 4096 x 2304 @60Hz
	HDMI	0	1	1, Supports 4096 x 2160 @24Hz / 2560 x 1600 @60Hz
	VGA	1, Supports 1920 x 1200 @60Hz	0	0
Expansion Slot	PCIe	2 x PCIe 2.0 x 1 slots 1 x PCIe 3.0/2.0 x16 slot (x16 mode) 1 x full mini-PCIe slot 1 x SIM Card slot (N)	1 x PCIe 4.0 x16 slot 1 x PCIe 4.0 x1 slot 1 x PCIe 4.0 x16 slot (x4 speed)	1 x PCIe 3.0/2.0 x16 slot 2 x PCIe 3.0/2.0 x1 slots 1 x PCI slot
	M.2	1 x M.2 E key, type 2230 for WIFI/BT Device	1 x M.2 M key, type 2242/2260/2280 (PCIe 4.0 x4/SATA mode) 1 x M.2 M key, type 2242/2260/2280 (PCIe 4.0 x4 mode)	2 x M.2 M Key, type 2242/2260/2280 with IRST support (SATA/PCIe mode) *SATA mode ready for Intel® Optane Memory* 1 x M.2 E Key, type 2230 Wi-Fi Devices Support
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	2 x Realtek® 8111H	1 x Intel® I219LM (vPRO) 1 x Realtek RTL 8111H	1 x Intel® I219LM, supports WOL/PXE
Storage	SATA port	2 x SATA + 1 x mSATA	4, up to 6Gb/s	6, up to 6Gb/s
	RAID	-	PCIe 0,1,5 / SATA 0,1,5,10	PCIe 0,1,5 / SATA 0,1,5,10
Rear I/O	Display Port	0	2	2
	HDMI	0	1	1
	VGA	1	4	0
	USB3.2 Gen2	0	4	0
	USB3.2 Gen1	6	4	2, support additional 4 x USB 3.2 Gen1 ports
	USB2.0	10	2	1, support additional 2 x USB2.0 ports
	Ethernet	2 x RJ45	2 x RJ45	1 x RJ45
	Serial Port	1 (RS232)	3 (RS232)	2 (RS232)
	PS/2	0	0	1 x keyboard port, 1 x mouse port
	Audio jack	Line-Out, Line-In, Mic-In	Line-Out, Line-In, Mic-In	Line-Out, Line-In, Mic-In
Internal I/O	COM Header	10 (RS232)	5 (RS232)	2 (RS232)
	USB3.2 Gen1	0	1 x Header support additional 2 x USB3.2 Gen1 ports	2 x Headers support additional 4 x USB3.2 Gen1 ports
	USB2.0	2 x Headers support additional 4 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports	1 x Headers support additional 2 x USB2.0 ports
	CPU Fan / Chassis Fan	1 x (PWM Mode) / 1 x (PWM Mode)	1 x (PWM Mode) / 2 x (PWM Mode)	1 x (PWM Mode) / 2 x (PWM Mode)
	TPM Header	1 (SPI)	1	N/A (IC Onboard)
	LPT port header	0	0	1
	Buzzer	0	1	0
	PS/2	0	1	0
	AT/ATX Select Jumper	1	1	0
Power	Power Type	1 x 4-pin ATX 12V Power connector 1 x 24-pin EATX Power connector	1 x 8-pin ATX Power connector 1 x 24-pin ATX Power connector	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C

Micro-ATX

		H610M-IM-A	H310M-IM-A
			
Processor System	CPU	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 9th/8th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors
	Chipset	Intel® H610 chipset	Intel® H310 Chipset
Memory	Technology	DDR4	DDR4
	Max.	64GB	32GB
	Socket	2 x U-DIMM	2 x U-DIMM
Display	Display Port	1, Supports 4096 x 2160 @60Hz	0
	HDMI	2, Supports 4096 X 2160 @60Hz	0
	VGA	1, Supports 1920 x 1200 @60Hz	0
Expansion Slot	PCIe	1 x PCIe 5.0 x16 slot 1 x PCIe 3.0/2.0 x4 slot (x1 speed)	1 x PCIe 3.0/2.0 x16 slot 2 x PCIe 2.0 x1 slots
	M.2	1 x M.2 M key, type 2242/2260/2280 (SATA/PCIe x4 mode)	1 x M.2 M key, type 2260/2280 (SATA/PCIe x2 mode)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	1 x Realtek® 8111H, 1 x Intel® i219V	1 x Realtek® RTL8111H
Storage	SATA port	4, up to 6Gb/s	4, up to 6Gb/s
	RAID	-	-
Rear I/O	Display Port	1	0
	HDMI	2	0
	VGA	1	0
	USB3.2 Gen2	2	0
	USB3.2 Gen1	2	2
	USB2.0	0	4
	Ethernet	2 x RJ45	1 x RJ45
	Serial Port	2 (RS232/422/485)	1 (RS232)
	PS/2	0	1 x keyboard port, 1 x mouse port
	Audio jack	Line-Out, Mic-In	Line-Out, Line-In, Mic-In
Internal I/O	COM Header	4 (RS232)	1 (RS232)
	USB3.2 Gen1	N/A	1 x Header support additional 2 x USB3.2 Gen1 ports
	USB2.0	2 x Headers support additional 4 x USB2.0 ports 1 x Stick socket	1 x Header support additional 2 x USB2.0 ports
	CPU Fan / Chassis Fan	1 x (PWM Mode) / 1 x (PWM Mode)	1 x (PWM Mode) / 1 x (PWM Mode)
	TPM Header	1 (SPI)	1 (LPC)
	LPT port header	0	0
	Buzzer	0	0
	PS/2	1	0
	AT/ATX Select Jumper	1	0
Power	Power Type	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector	1 x 4-pin ATX 12V Power connector 1 x 24-pin ATX Power connector
Environment	Operating Temperature	0~60°C	0~60°C

Mini-ITX-x86

		Q370I-IM-A R3.0	Q670EI-IM-A	Q470EI-IM-A R3.0	W480EI-IM-A R3.0
					
Processor System	CPU	Intel® Core™ 9th/8th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 10th Gen (Socket LGA1200) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 10th Gen (Socket LGA1200) Intel® Core™ i9/i7/i5/i3 Processors
	Chipset	Intel® Q370 chipset	Intel® Q670E Chipset	Intel® Q470E Chipset	Intel® W480E Chipset
Memory	Technology	DDR4	DDR5	DDR4	DDR4
	Max.	64GB	64GB	64GB	64GB
	Socket	2 x SO-DIMM	2 x SO-DIMM *R680E support ECC memory	2 x SO-DIMM	2 x SO-DIMM
Display	Display Port	2	3	2	2
	HDMI	0	0	0	0
	VGA	0	1	0 (1 x DVI-D)	0 (1 x DVI-D)
	eDP/LVDS	1	1 x Header (eDP & LVDS can be switched by BIOS)	1 x Header (eDP & LVDS can be switched by BIOS)	1 x Header (eDP & LVDS can be switched by BIOS)
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot	1 x PCIe x16 slot	1 x PCIe 3.0/2.0 x16 slot	1 x PCIe 3.0/2.0 x16 slot
	M.2	1 x M.2 E key, type 2230 for WIFI/BT device (support Intel® CNVi, PCIe) 1 x M.2 M key, type 2242/2260/2280 (PCIe & SATA mode)	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)	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)	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 Controller	10/100/1000 Mbps 1 x Intel® i210AT 1 x Intel® I219LM	10/100/1000/2500 Mbps 1 x Intel® i210AT 1 x Intel® I225LM (Intel vPro supported)	10/100/1000 Mbps 1 x Intel® I210AT 1 x Intel® I219LM	10/100/1000 Mbps 1 x Intel® I211AT 1 x Intel® I219LM
Storage	SATA port	4, up to 6Gb/s	4, Up to 6Gb/s	3, Up to 6Gb/s	3, Up to 6Gb/s
	RAID	PCIe 0,1,5 / SATA 0,1,5,10	PCIe 0,1,5 / SATA 0,1,5,10	PCIe 0,1,5 / SATA 0,1,5,10	PCIe 0,1,5 / SATA 0,1,5,10
Rear I/O	Display Port	2	3	2	2
	HDMI	0	1	0	0
	VGA	0	0	0	0
	USB3.2 Gen2	0	3 (2 x Type-A + 1 x Type-C)	3 (2 x Type-A + 1 x Type-C)	3 (2 x Type-A + 1 x Type-C)
	USB3.2 Gen1	4	1 (Type-A)	1 (Type-A)	1 (Type-A)
	USB2.0	4	4 (Type A)	4 (Type A)	4 (Type A)
	Ethernet	2	2	2	2
	Serial Port	1 (RS232/422/485)	1 (RS232/422/485)	1 (RS232/422/485)	1 (RS232/422/485)
	PS/2	1 x Keyboard, 1x Mouse	1 x Keyboard, 1x Mouse	1 x Keyboard, 1x Mouse	1 x Keyboard, 1x Mouse
	Audio jack	Line-Out, Mic-In	Line-Out, Mic-In	Line-Out, Mic-In	Line-Out, Mic-In
Internal I/O	COM Header	3 (RS232)	4 (1 x RS232/422/485, 3 x RS232)	4 (1 x RS232/422/485, 3 x RS232)	4 (1 x RS232/422/485, 3 x RS232)
	USB3.2 Gen1	1 x Header support additional 2 x USB3.2 Gen1 ports 1 x Stick socket	1 x Header support additional 2 x USB3.2 Gen1 ports 1 x Stick socket	1 x Header support additional 2 x USB3.2 Gen1 ports 1 x Stick socket	1 x Header support additional 2 x USB3.2 Gen1 ports 1 x Stick socket
	USB2.0	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports
	CPU Fan/ Chassis Fan	1 (PWM Mode) / 1 (PWM + DC Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)
	TPM Header	1 (SPI)	1 (SPI)	1 (SPI)	1 (SPI)
	AT/ATX Select Jumper	1	0	1	1
Power	Power Type	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C	0~60°C

Mini-ITX-x86

		N100I-EM-A	H610I-EM-A	H610I-IM-A	H310I-IM-A R3.0
					
Processor System	CPU	Intel® Processor N100	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/ i5/i3 Processors	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Core™ 9th/8th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors
	Chipset	N/A	Intel® H610 Chipset	Intel® H610 Chipset	Intel® H310 Chipset
Memory	Technology	DDR4	DDR4	DDR4	DDR4
	Max.	16GB	64GB	64GB	32GB
	Socket	1 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM
Display	Display Port	N/A	1	1	2
	HDMI	1	0	2	1
	VGA	1	2	0	0
	eDP/LVDS	LVDS (co-lay with eDP)	1	1	1
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x1 slot	1 x PCIe 4.0 x16 slot	1 x PCIe 4.0 x16 slot	1 x PCIe 3.0 x16 slot
	M.2	1 x M.2 E key, type 2230 for WIFI/BT device (PCIe x1 /USB2.0) 1 x M key, type 2242/ 2260/ 2280 (SATA/ PCIex1)	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 support NVME)	1 x M.2 E key, type 2230 for WIFI/BT device 1 x M.2 M key, type 2242/2260/2280 (PCIe x4/SATA mode)	1 x M.2 E key, type 2230 for WIFI/BT device 1 x M.2 M key, type 2242/2260/2280 (PCIe & SATA mode)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	1 x Realtek RTL8111H, supports WOL/PXE	2 × RTL8111H	1 x Intel® i210AT 1 x Intel® i219V	1 x Intel® i210AT 1 x Intel® i219V
Storage	SATA port	2, Up to 6Gb/s	2, Up to 6Gb/s	2, Up to 6Gb/s	4, up to 6Gb/s
	RAID	-	-	-	-
Rear I/O	Display Port	0	1	1	2
	HDMI	1	2	2	1
	VGA	0	0	0	0
	USB3.2 Gen2	2	4	1	0
	USB3.2 Gen1	2	0	0	4
	USB2.0	2	2	2	0
	Ethernet	1	2	2	2
	Serial Port	2	2	2	2
	PS/2	0	0	0	0
	Audio jack	Line-Out, Mic-In	Line-Out, Mic-In	Line-Out, Mic-In	Line-Out, Mic-In
Internal I/O	COM Header	3 (RS232)	4 (RS232)	4 (RS232)	4 (RS232)
	USB3.2 Gen1	1 x Header support additional 2 x USB3.2 Gen1 port	0	0	1 x Header support additional 2 x USB3.2 Gen1 port
	USB2.0	1	2 x Headers support additional 4 x USB2.0 ports 1 x Vertical connecter	2 x Headers support additional 4 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports
	CPU Fan/ Chassis Fan	0 / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)
	TPM Header	1 (SPI)	1 (SPI)	1 (SPI)	1 (SPI)
	AT/ATX Select Jumper	0	0	0	1
Power	Power Type	1 x 4-pin ATX power connector, DC in mode	1 x 24-pin ATX Power connector	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector	1 X 4-pin ATX Power connector, 1 X 24-pin ATX Power connector
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C	0~60°C

		R680EI-IM-A	N5105I-IM-A R2.0	J3455I-CM-A R2.0
				
Processor System	CPU	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Celeron® Processor N5105	Intel® Celeron® Processor J3455
	Chipset	Intel® R680E / Q670E Chipset	Integrated	Integrated
Memory	Technology	DDR5	DDR4	DDR3
	Max.	64GB	32GB	8GB
	Socket	2 x SO-DIMM **R680E support ECC memory*	2 x SO-DIMM	2 x SO-DIMM
Display	Display Port	3	0	0
	HDMI	0	1	1
	VGA	1	1	1
	eDP/LVDS	1 (eDP & LVDS can be switched by BIOS)	1	1
Expansion Slot	PCIe	1 x PCIe 3.0/2.0 x16 slot	1 x PCIe 3.0 / 2.0 slot 1 x Mini PCIe slot (support PCIex1/USB2.0 mode, connect to SIM holder)	1 x PCIe 2.0 x4 (x1 mode) slot
	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)	0	1 x M.2 E key, type 2230 for WIFI/BT device
Ethernet	Speed	10/100/1000/2500 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	1 x Intel® i210AT (co-lay i211AT) 1 x Intel® I225LM (Intel vPro supported)	1 x Realtek® RTL8111H, support WOL/PXE	1 x Realtek® RTL8111H, supports PXE/WOL
Storage	SATA port	4, Up to 6Gb/s	2, Up to 6Gb/s	2 , up to 6Gb/s
	RAID	PCIe 0,1,5 / SATA 0,1,5,10	-	-
Rear I/O	Display Port	3	0	0
	HDMI	1	1	1
	VGA	3 (2*Type A, 1*Type C)	1	1
	USB3.2 Gen2	1 (Type A)	0	0
	USB3.2 Gen1	4 (Type A)	4	4
	USB2.0	2 x RJ45	0	0
	Ethernet	1 (RS232/422/485)	1 x RJ45	1 x RJ45
	Serial Port	2	3	1
	PS/2	1 x Keyboard, 1x Mouse	0	1 x Keyboard, 1x Mouse
	Audio jack	Line-Out, Mic-In	Line-Out, Mic-In	Line-Out, Line-In, Mic-In
Internal I/O	COM Header	4 (1 x RS232/422/485, 3 x RS232)	3 (RS232: Ring/5V/12V Select, switched by jumper)	1 (RS232)
	USB3.2 Gen1	1 x Header support additional 2 x USB3.2 Gen1 port 1 x Stick socket	0	1 x Header support additional 2 x USB3.2 Gen1 port
	USB2.0	1 x Header support additional 2 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports
	CPU Fan/ Chassis Fan	1 (PWM Mode) / 1 (PWM Mode)	0 / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM + DC Mode)
	TPM Header	1 (SPI)	1 (SPI)	1 (LPC)
	AT/ATX Select Jumper	0	0	0
Power	Power Type	1 x 8-pin ATX 12V Power connector 1 x 24-pin ATX Power connector	1 x 4-pin ATX Power In connector (DC In Mode)	1 X 4-pin ATX Power connector 1 X 24-pin EATX Power connector
Environment	Operating Temperature	0~60°C	0~60°C	0~50°C

Mini-ITX-AMD

		R2314I-IM-A	V1605I-IM-B / R1505I-IM-B	R1606I-IM-B
			 	
Processor System	CPU	AMD Ryzen™ Embedded R2314	AMD Ryzen™ Embedded V1605B/R1505G	AMD Ryzen™ Embedded V1606G
Memory	Technology	DDR4 up to 2667 MHz, ECC support	DDR4 up to 2667 MHz, ECC support	DDR4 up to 2667 MHz, ECC support
	Max.	32GB	32GB	32GB
	Socket	2 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM
Display	Display Port	4, max. resolution 3840x2160 @60Hz	4, max. resolution 3840x2160 @60Hz	3, max. resolution 3840x2160 @60Hz
	Multiple displays	4 x DP(default) 3 x DP+LVDS (optional) 3 x DP+eDP (optional)	4 x DP(default) 3 x DP+LVDS (optional) 3 x DP+eDP (optional)	4 x DP(default) 3 x DP+LVDS (optional) 3 x DP+eDP (optional)
Expansion Slot	PCIe	1x PCIe 3.0 x8 slot (x8 mode)	1x PCIe 3.0 x8 slot (x8 mode)	1x PCIe 3.0 x8 slot (x8 mode)
	M.2	1 x M.2 E key, type 2230 (PCIe x1, USB 2.0) 1 x M.2 M key, type 2242/2260/2280 (PCIe x2, SATA)	1 x M.2 E key, type 2230 (PCIe x1, USB 2.0) 1 x M.2 M key, type 2242/2260/2280 (PCIe x2, SATA)	1 x M.2 M key, type 2242/2260/2280 (PCIe x2, SATA)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	2 x Realtek® 8111H, support WOL/PXE	2 x Realtek® 8111H, support WOL/PXE	2 x Realtek® 8111H, support WOL/PXE
Storage	SATA port	1 , up to 6Gb/s	1, up to 6Gb/s	1, up to 6Gb/s
Rear I/O	Display Port	4	3	4
	USB3.2 Gen2	2	2	2
	USB2.0	2	2	2
	Ethernet	1	1	1
	Serial Port	2 (RS232/422/485)	2 (RS232/422/485)	2 (RS232/422/485)
	Audio jack	2	2	2
Internal I/O	COM Header	4 (RS-232) COM3 colay CCtalk & COM4 colay TTL (Option)	4 (RS-232) COM3 colay CCtalk & COM4 colay TTL (Option)	4 (RS-232) COM3 colay CCtalk & COM4 colay TTL (Option)
	USB3.2 Gen1	1 x Type A vertical connector	1 x Type A vertical connector (V1605I-IM-B)	0
	USB2.0	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports
	CPU Fan/ Chassis Fan	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)
	TPM Header	1 (SPI)	1 (SPI)	1 (SPI)
	AT/ATX Select Jumper	1	1	1
Power	Power Type	DC-in 12V ~ 24V	DC-in 12V ~ 24V	DC-in 12V ~ 24V
Environment	Operating Temperature	0~60°C	0~50°C	0~60°C

		R1505I-IM-A	R1305I-IM-B	V1605I-IM-A
				
Processor System	CPU	AMD Ryzen™ Embedded R1505	AMD Ryzen™ Embedded R1305	AMD Ryzen™ Embedded V1605
Memory	Technology	DDR4 up to 2667 MHz, ECC support	DDR4 up to 2667 MHz, ECC support	DDR4 up to 2667 MHz, ECC support
	Max.	32GB	32GB	32GB
	Socket	2 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM
Display	Display Port	3, max. resolution 3840x2160 @60Hz	3, max. resolution 3840x2160 @60Hz	4, max. resolution 3840x2160 @60Hz
	Multiple displays	4 x DP(default) 3 x DP+LVDS (optional) 3 x DP+eDP (optional)	4 x DP(default) 3 x DP+LVDS (optional) 3 x DP+eDP (optional)	4*DP(default), 3DP+LVDS (optional), 3DP+eDP (optional)
Expansion Slot	PCIe	1x PCIe 3.0 x8 slot (x8 mode)	1x PCIe 3.0 x8 slot (x8 mode)	1x PCIe 3.0 x8 slot (x8 mode)
	M.2	1 x M.2 M key, type 2242/2260/2280 (PCIe x2, SATA)	1 x M.2 M key, type 2242/2260/2280 (PCIe x2, SATA)	1 x M.2 E key, type 2230 (PCIe x1, USB 2.0) 1 x M.2 M key, type 2242/2260/2280 (PCIe x2, SATA)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	2 x Realtek® 8111H, support WOL/PXE	2 x Realtek® 8111H, support WOL/PXE	2 x Realtek® 8111H, support WOL/PXE
Storage	SATA port	1, up to 6Gb/s	1, up to 6Gb/s	1, up to 6Gb/s
Rear I/O	Display Port	3	3	3
	USB3.2 Gen2	2	2	2
	USB2.0	2	2	2
	Ethernet	1	1	1
	Serial Port	2 (RS232/422/485)	2 (RS232/422/485)	2 (RS232/422/485)
	Audio jack	2	2	2
Internal I/O	COM Header	4 (RS-232) COM3 colay CCtalk & COM4 colay TTL (Option)	4 (RS-232) COM3 colay CCtalk & COM4 colay TTL (Option)	4 (RS-232) COM3 colay CCtalk & COM4 colay TTL (Option)
	USB3.2 Gen1	1 x Type A vertical connector (V1605I-IM-A)	0	1 x Type A vertical connector (V1605I-IM-A)
	USB2.0	1 x Header support additional 2 x USB2.0 ports 1 x type A vertical connector (R1505I-IM-A)	1 x Header support additional 2 x USB2.0 ports 1 x type A vertical connector	1 x Header support additional 2 x USB2.0 ports 1 x type A vertical connector (R1505I-IM-A)
	CPU Fan/ Chassis Fan	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)
	TPM Header	1 (SPI)	1 (SPI)	1 (SPI)
	AT/ATX Select Jumper	1	1	1
Power	Power Type	DC-in 12V ~ 24V	DC-in 12V ~ 24V	DC-in 12V ~ 24V
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C

Thin Mini-ITX

		H610T-EM-A	N97T-IM-A	J6412T-IM-A
				
Processor System	CPU	Intel® Core™ 14th/13th/12th Gen (Socket LGA1700) Intel® Core™ i9/i7/i5/i3 Processors	Intel® Processor N97	Intel® Celeron® Processor J6412
Memory	Technology	DDR4	DDR5	DDR4
	Max.	32GB	16GB	32GB
	Socket	2 x SO-DIMM	1 x SO-DIMM	2 x SO-DIMM
Display	Display Port	3	1 (Default) 1 (optional by request , colay with HDMI)	1 (Default) 1 (optional by request , colay with HDMI)
	HDMI	0	1	1
	VGA	0	0	0
	eDP/LVDS	1 (colay with LVDS)	LVDS: 1 (Default), eDP (optional by request, colay with LVDS)	LVDS: 1 (Default), eDP (optional by request, colay with LVDS)
Expansion Slot	Mini PCIe	0	0	1 x Full/Half-size PCIe mini card slot (w/ SIM holder) (PCIE x1 mode)
	PCIe	0	PCIe 3.0/2.0 x1	PCIe 3.0/2.0 x1
	M.2	1 x E key, type 2230 for WIFI/BT device (PCIE & CNVi) 1 x M key, type 2242/2260/2280 (PCIE x4 / SATA mode)	1 x E key, type 2230 for WIFI/BT device (PCIE x1 & USB2.0 & CNVI) 1 x M key, type 2242/2260/2280 (PCIE x2/ SATA mode) supports NVMe	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	0	0	1 x Full-size SD card slot
Ethernet	Speed Controller	10/100/1000 Mbps 1 x Realtek® 8111H 1 x Intel® I219V	10/100/1000 Mbps 2 x Realtek RTL8111H (Support WOL/PXE)	10/100/1000 Mbps 2 x Realtek RTL8111H (Support WOL/PXE)
Storage	SATA port	3	2	1
	mSATA	N/A	0	0
Rear I/O	Display Port	3	1	1
	HDMI	0	1	1
	VGA	0	0	0
	USB3.2 Gen2	0	0	3
	USB3.2 Gen1	4	2	0
	USB3.0	0	0	0
	Ethernet	2	2	2
	Audio jack	Default Line-out, switch to line-in by BIOS	Default Line-out, switch to line-in by retasking	Default Line-out, switch to line-in by BIOS
	Power Input	DC 12V	DC 9V-36V	DC 12V
Internal I/O	COM Header	4 (1 x RS232/422/485, 3 x RS232)	6 (1 x RS232/422/485, 5 x RS232)	6 (1 x RS232/422/485, 5 x RS232)
	USB2.0 Header	2 x Headers support additional 4 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports
	CPU Fan / Chassis Fan Header	1 (PWM Mode) / 1 (PWM Mode)	0 / 1 (PWM Mode)	0 / 1 (PWM Mode)
	LVDS Signal Header	0	1	1
	System Panel Header	1	0	0
	Chassis Intrusion Header	1	1	1
	Speaker	1	1	1
	Stereo Out	0	2	2
	TPM	1 (IC Onboard)	1 (SPI)	1 (SPI)
Power	Power Type	12V & 19V DC in	9V-36V DC-in (1x external DC jack; 1 x internal 4-pin power connector)	12V DC-in (1x external DC jack; 1 x internal 4-pin power connector)
Environment	Operating Temperature	0~60°C	0~60°C	0~60°C

		J3455T-IM-A R2.0	N3350T-IM-A	N4200T-IM-A	H110T-CM-A R2.0
					
Processor System	CPU	Intel® Celeron® Processor J3455	Intel® Celeron® Processor N3350	Intel® Pentium® Processor N4200	Intel® Core™ 7th/6th Gen (Socket LGA1151) Intel® Core™ i7/i5/i3 Processors
Memory	Technology	DDR3L	DDR3L	DDR3L	DDR4
	Max.	8GB	8GB	8GB	32GB
	Socket	2 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM
Display	Display Port	1 (colay with VGA)	1 (colay with VGA)	1 (colay with VGA)	1, Supports up to 4096 x 2160 @ 60 Hz
	HDMI	1	1	1	1, Supports up to 4096 x 2160 @ 24 Hz / 2560 x 1600 @ 60 Hz
	VGA	1 (colay with DP++)	1 (colay with DP++)	1 (colay with DP++)	0
	eDP/LVDS	LVDS: 1 (Default), eDP (optional by request, colay with LVDS)	LVDS: 1 (Default), eDP (optional by request, colay with LVDS)	LVDS: 1 (Default), eDP (optional by request, colay with LVDS)	1, Supports up to 1920 x1200 @ 60Hz
Expansion Slot	Mini PCIe	1 x Full/Half-size PCIe mini card slot (w/ SIM holder)	1 x Full/Half-size PCIe mini card slot (w/ SIM holder)	1 x Full/Half-size PCIe mini card slot (w/ SIM holder)	0
	PCIe	1 x PCIe 2.0 x1 (colay with M.2 E key)	1 x PCIe 2.0 x1 (colay with M.2 E key)	1 x PCIe 2.0 x1 (colay with M.2 E key)	0
	M.2	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device (colay with PCIe)	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device (colay with PCIe)	1 x M.2 Socket 1 with E key, type 2230 for WIFI/BT device (colay with PCIe)	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)
	SD card	0	0	0	0
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	2 x Realtek® 8111H, supports WOL/PXE	2 x Realtek® 8111H, supports WOL/PXE	2 x Realtek® 8111H, supports WOL/PXE	1 x Realtek RTL8111H 1 x Intel I219V, support WOL/PXE
Storage	SATA port	2	2	2	2 x SATA 6Gb/s port(s) 1 x SATA PWR CONN
	mSATA	1 x Full/Half-size mSATA slot (shared with Mini PCIe)	1 x Full/Half-size mSATA slot (shared with Mini PCIe)	1 x Full/Half-size mSATA slot (shared with Mini PCIe)	0
Rear I/O	Display Port	1	1	1	1
	HDMI	1	1	1	1
	VGA	1	1	1	0
	USB3.2 Gen2	0	0	0	0
	USB3.2 Gen1	4	4	4	0
	USB3.0	0	0	0	4
	Ethernet	2	2	2	2 x RJ-45
	Audio jack	Default Line-out, switch to line-in by BIOS	Default Line-out, switch to line-in by BIOS	Default Line-out, switch to line-in by BIOS	1 x Line-Out, 1 x MIC-In
	Power Input	DC 12V	DC 12V	DC 12V	DC 12V
Internal I/O	COM Header	6 (5 x RS232, 1 x RS232/422/485)	6 (5 x RS232, 1 x RS232/422/485)	6 (5 x RS232, 1 x RS232/422/485)	1 (RS232)
	USB2.0 Header	2 x Headers support additional 4 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports	3 x Headers support additional 5 x USB2.0 ports
	CPU Fan / Chassis Fan Header	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM Mode)	1 (PWM Mode) / 1 (PWM + DC Mode)
	LVDS Signal Header	1	1	1	1
	System Panel Header	1	1	1	1
	Chassis Intrusion Header	1	1	1	1
	Speaker	1	1	1	1
	Stereo Out	0	0	0	1
	TPM	1 (SPI)	1 (IC Onboard)	1 (SPI)	1 (SPI)
Power	Power Type	AT/ATX mode and DC in	AT/ATX mode and DC in	AT/ATX mode and DC in	DC in mode (12V/9V)
Environment	Operating Temperature	0~60°C	0~60°C	0~50°C	0~50°C

3.5-inch SBC

		C381ES-IM-AA	C7126ES-IM-AA / C5124ES-IM-AA C3121ES-IM-AA / C7125S-IM-AA C5123S-IM-AA / C3121S-IM-AA	C7136ES-IM-AA C5134ES-IM-AA C3131ES-IM-AA	C786ES-IM-AA R2.0 C583ES-IM-AA R2.0
					
Processor System	CPU	Intel® Core™ i7-8665UE/i5-8365UE/ i3-8145UE Processor	Intel® Core™ 12th Gen (Socket LGA1700) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ 12th Gen (Socket LGA1700) Intel® Core™ i7/i5/i3 Processors	Intel® Core™ i7-8665UE/i5-8365UE/ i3-8145UE Processor
Memory	Technology	DDR4	DDR5	DDR5	DDR4
	Max.	32GB	64GB	64GB	32GB
	Socket	1 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM	1 x SO-DIMM
Display	Display Port	DP 1.2a up to 4096 x 2304 @ 60 Hz	DP1.2 up to 4096 x 2304 @ 60 Hz	DP1.2 up to 4096 x 2304 @ 60 Hz	DP 1.2a up to 4096 x 2304 @ 60 Hz
	HDMI	HDMI 1.4 up to 4096 x 2160 @ 24 Hz	HDMI 2.0 up to 4096 x 2160 @ 60 Hz	HDMI 2.0 up to 4096 x 2160 @ 60 Hz	HDMI 1.4 up to 4096 x 2160 @ 24 Hz
	eDP/LVDS	LVDS (co-lay with eDP)	LVDS (co-lay with eDP)	LVDS (co-lay with eDP)	LVDS (co-lay with eDP)
Expansion Slot	PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket
	M.2	1 x E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M key, type 2242 (PCIe & SATA mode)	1 x E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M key, type 2280/2242 (PCIE & SATA mode)	1 x E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M key, type 2280/2242 (PCIE & SATA mode)	1 x E key, type 2230 for WIFI/BT device and Intel® CNVi 1 x M key, type 2242 (PCIe & SATA mode)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	1 x Intel® i219LM, supports vPro/ WOL/PXE 1 x Intel® i211AT, supports WOL/PXE	1 x Intel® I219LM & 1 x Intel® I225V	1x Intel® I219LM & 1x Intel® I225V	1 x Intel® i219LM, supports vPro/ WOL/PXE 1 x Intel® i211AT, supports WOL/PXE
Storage	SATA port	1 x SATA Gen 3.0, up to 6Gb/s	1 x SATA Gen 3.0, up to 6 Gb/s	1 x SATA Gen 3.0, up to 6 Gb/s	1x SATA Gen 3.0, up to 6Gb/s
	RAID	-	SATA 0, 1 Support	SATA 0, 1 Support	-
Rear I/O	Display Port	1	1	1	1
	HDMI	1	2	2	1
	USB3.2 Gen2	4	4	4	4
	USB-C	0	0	0	0
	USB2.0	6	2	2	6
	Ethernet	2	2	2	2
Internal I/O	COM Header	9 (2 x RS232/422/485, 4 x RS232)	4 (2 x RS232/422/485 w/ ring, 1 x RS232 w/ Ring/5V/12V, 1 x RS232 w/ring)	4 (2 x RS232/422/485 w/ ring, 1 x RS232 w/ Ring/5V/12V, 1 x RS232 w/ring)	6 (2 x RS232/422/485, 4 x RS232)
	USB2.0	2 x Headers support additional 4 x USB2.0 ports	1 x Headers support additional 2 x USB2.0 ports	1 x Headers support additional 2 x USB2.0 ports	2 x Headers support additional 4 x USB2.0 ports
	Chassis Fan	1	1	1	1
	TPM Header	1 (SPI)	1 (SPI)	1 (SPI)	1 (SPI)
	Others	N/A	1 x SATA Power Connector	1 x COM RS232 Ring/5V/12V Selection Jumper	N/A
Power	Power Type	1 x 4-pin ATX Power connector	1 x 4-pin ATX Power connector	1 x 4-pin ATX Power connector	1 x 4-pin ATX Power connector
Environment	Operating Temperature	-20~60°C	-20~60°C	-20~60°C	-20~60°C

		C381S-IM-AA	C7146ES-IM-AA (Q1'24)	C5143ES-IM-AA (Q1'24)	X642ES-IM-AA X641ES-IM-AA X621ES-IM-AA
					
Processor System	CPU	Intel® Core™ i7-8665UE/i5-8365UE/ i3-8145UE Processor	Intel® Core™ Ultra 7 Processor 165U	Intel® Core™ Ultra 5 Processor 135U	Intel Atom x6211E/x6413E/x6425E Processor
Memory	Technology	DDR4	DDR5	DDR5	DDR4
	Max.	32GB	64GB	64GB	32GB
	Socket	1 x SO-DIMM	2 x SO-DIMM	2 x SO-DIMM	1 x SO-DIMM
Display	Display Port	DP 1.2a up to 4096 x 2304 @ 60 Hz	DP 1.4 up to 4096 x 2160 @ 60 Hz	DP 1.4 up to 4096 x 2160 @ 60 Hz	DP1.2 up to 4096 x 2160 @ 60 Hz
	HDMI	HDMI 1.4 up to 4096 x 2160 @ 24 Hz	HDMI 2.0 up to 4096 x 2160 @ 60 Hz	HDMI 2.0 up to 4096 x 2160 @ 60 Hz	HDMI 2.0 up to 4096 x 2160 @ 60 Hz
	eDP/LVDS	LVDS (co-lay with eDP)	LVDS (co-lay with eDP)	LVDS (co-lay with eDP)	LVDS (default), eDP (optional)
Expansion Slot	PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket 1x E key, type 2230 for WIFI/BT device and Intel® CNVi	N/A	N/A	N/A
	M.2	1x M key, type 2242 (PCIe & SATA mode)	1 x B Key, type 3042/3052 for LTE/5G connected to Nano-SIM socket (PCIe x1) 1 x E key, type 2230 for Wi-Fi 6E/BT 5.2 (USB 2.0/ PCIe x1/ CNVi) 1 x M key, type 2280 Gen 4 (PCIe x4)	1 x B Key, type 3042/3052 for LTE/5G connected to Nano-SIM socket (PCIe x1) 1 x E key, type 2230 for Wi-Fi 6E/BT 5.2 (USB 2.0/ PCIe x1/ CNVi) 1 x M key, type 2280 Gen 4 (PCIe x4)	1 x E key, type 2230 for WIFI/BT device 1 x M key, type 2280 (SATA mode & PCIe x2 mode) 1 x M.2 B key (USB 2.0)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000/2500 Mbps	10/100/1000/2500 Mbps	10/100/1000 Mbps
	Controller	1 x Intel® i219LM, supports vPro/ WOL/PXE 1 x Intel® i211AT, supports WOL/PXE	1 x Intel® i219LM, 1 x Intel® I226IT	1 x Intel® i219LM, 1 x Intel® I226IT	2 x Intel® i210IT, supports WOL/PXE
Storage	SATA port	1x SATA Gen 3.0, up to 6Gb/s	1 x SATA Gen 3.0, up to 6Gb/s	1 x SATA Gen 3.0, up to 6Gb/s	1 x SATA Gen 3.0, up to 6Gb/s
	RAID	-	SATA 0, 1 Support	SATA 0, 1 Support	-
Rear I/O	Display Port	1	1	1	1
	HDMI	1	1	1	1
	USB3.2 Gen2	4	4	4	4
	USB-C	0	1	1	0
	USB2.0	6	2	2	0
	Ethernet	2	2	2	2
Internal I/O	COM Header	6 (2 x RS232/422/485, 4 x RS232)	4 (RS232/422/485)	4 (RS232/422/485)	6 (2 x RS232/422/485, 4 x RS232)
	USB2.0	2 x Headers support additional 4 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports
	Chassis Fan	1	1	1	1
	TPM Header	1 (SPI)	1 (SPI)	1 (SPI)	1 (SPI)
	Others	N/A	1 x SATA Power Header 1 x LVDS Panel Power selection Jumper 2 x COM RS232 Ring/5V/12V Selection Jumper	1 x SATA Power Header 1 x LVDS Panel Power selection Jumper 2 x COM RS232 Ring/5V/12V Selection Jumper	N/A
Power	Power Type	DC power input	DC power input, 12V-24V	DC power input, 12V-24V	DC power input, 12V-24V
Environment	Operating Temperature	-20~70°C	-40~85°C	-40~85°C	-40~85°C

3.5-inch SBC

		N97S-IM-AA / N200S-IM-AA N305S-IM-AA / X742ES-IM-AA	N420S-IM-AA R3.0	E395S-IM-AA/DC R3.0	E395S-IM-AA R3.0 E394S-IM-AA R3.0 E393S-IM-AA R3.0
					
Processor System	CPU	Intel® Processor N97/N200/N305 Intel® Atom® x7425E Processor	Intel® Pentium® N4200 Processor	Intel® Atom® x5-E3930 Processor	Intel® Atom® x7-E3950 Processor
Memory	Technology	DDR5	DDR3L	DDR3L	DDR3L
	Max.	16GB	8GB	8GB	8GB
	Socket	1 x SO-DIMM	1 x SO-DIMM	1 x SO-DIMM	1 x SO-DIMM
Display	Display Port	DP1.2 up to 4096 x 2304 @ 60 Hz	DP1.2 up to 4096 x 2160 @ 60 Hz	DP1.2 up to 4096 x 2160 @ 60 Hz	DP1.2 up to 4096 x 2160 @ 60 Hz
	HDMI	HDMI 2.0 up to 4096 x 2160 @ 60 Hz	HDMI1.4b up to 3840 x 2160 @ 30 Hz	HDMI1.4b up to 3840 x 2160 @ 30 Hz	HDMI1.4b up to 3840 x 2160 @ 30 Hz
	eDP/LVDS	LVDS(co-lay with eDP)	LVDS(co-lay with eDP)	LVDS(co-lay with eDP)	LVDS(co-lay with eDP)
Expansion Slot	PCIe	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket	1 x Full-Length Mini PCIe slot with on-board Nano-SIM socket
	M.2	1 x E key, type 2230 forTPU/WIFI/BT device (PCIE/USB/CNVi) 1 x M key, type 2280/2242 (SATA mode)	1 x M.2 E key, type 2230 for WIFI/BT device 1 x M.2 M key, type 2242 (SATA mode)	1 x M.2 E key, type 2230 for WIFI/BT device 1 x M.2 M key, type 2242 (SATA mode)	1 x M.2 E key, type 2230 for WIFI/BT device 1 x M.2 M key, type 2242 (SATA mode)
Ethernet	Speed	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps	10/100/1000 Mbps
	Controller	2 x Intel® i210AT, supports WOL/PXE	2 x Intel® i210IT, supports WOL/PXE	2 x Intel® i210IT, supports WOL/PXE	2 x Intel® i210IT, supports WOL/PXE
Storage	SATA port	1 x SATA Gen 3.0, up to 6 Gb/s	1 x SATA Gen 3.0, up to 6Gb/s	1 x SATA Gen 3.0, up to 6Gb/s	1 x SATA Gen 3.0, up to 6Gb/s
	RAID	-	-	-	-
Rear I/O	Display Port	1	1	1	1
	HDMI	1	1	1	1
	USB3.2 Gen2	4	4	4	4
	USB-C	0	0	0	0
	USB2.0	2	0	0	0
	Ethernet	2	2	2	2
Internal I/O	COM Header	6 (2 x RS-232/422/485, 4x RS-232)	6 (2 x RS-232/422/485, 4x RS-232)	6 (2 x RS-232/422/485, 4x RS-232)	6 (2 x RS-232/422/485, 4x RS-232)
	USB2.0	2	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports	1 x Header support additional 2 x USB2.0 ports
	Chassis Fan	1 (PWM + DC Mode)	1 (PWM + DC Mode)	1 (PWM + DC Mode)	1 (PWM + DC Mode)
	TPM Header	1 (SPI); Intel® PTT	1 (SPI)	1 (SPI)	1 (SPI)
	Others	N/A	N/A	N/A	N/A
Power	Power Type	DC power input, 9V-36V	DC power input, 12V-24V	DC power input, 12V-24V	DC power input, 12V-24V
Environment	Operating Temperature	0~ 60°C	-20~60°C	-40~85°C	-40~85°C

Pico-ITX

X6425REP-IM-AA, X642EP-IM-AA, X641EP-IM-AA, X621EP-IM-AA

Processor System	CPU	Intel Atom® x6211E X6211e/X6413E/X6425E/ X6425RE Processor
Memory	Technology	LPDDR4
	Max.	8GB
	Socket	On board
Display	HDMI	2
	eDP/LVDS	LVDS (co-lay with eDP)
Expansion Slot	M.2	1 x 2230 M.2 E key (WIFI/BT) 1 x M.2 B key
Ethernet	Speed Controller	10/100/1000 Mbps 1x Intel® I226-IT 1x Intel® I210-IT
Rear I/O	HDMI	2
	USB3.2 Gen1	2
	USB2.0	2
	Ethernet	2
	Serial Port	2
Internal I/O	Serial Port	2 (RS232/422/485)
	USB2.0	1
	GPIO	1
	System Panel	1
	Display Panel VCC Power Selection Jumper	1
	I2C Connector	I2C (Default) / SMBUS (Optional)
	Backlight Control	1
	Clear CMOS	1
	AT/ATX Select	1
	TPM	TPM2.0, On board (Infineon SLB 96xx, optional)
Power	Power Type	Lockable Phoenix Terminal
Environment	Operating Temperature	-40~85°C

ARB-SBC

IMX8P-IM-A R2.0

Processor System	CPU	NXP® i.MX 8 M ARM Cortex-A53 core
	Chipset	Integrated
Memory	Technology	LPDDR4
	Max.	4GB
	Socket	On board
Display	Display Port	0
	HDMI	1, Supports HDMI 2.0 up to 3840 x 2160 @ 60 Hz
	MIPI DSI	1, Supports MIPI DSI (4 lane) up to 1920 x 1080 @60Hz
	eDP/LVDS	0
Expansion Slot	PCIe	0
	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 Controller	10/100/1000 Mbps 1 x Realtek® RTL8211, supports WOL 1 x Intel I210-AT, supports WOL
Storage	SATA port	0
	eMMC	1 x 16GB onboard eMMC
	RAID	-
Front I/O	Display Port	0
	HDMI	1
	USB3.2 Gen2	0
	USB3.2 Gen1	2 x Type A, 5V/2A 1 x Type C OTG, 5V/1.5A
	USB2.0	0
	Ethernet	2
	Audio jack	0
	PS/2	0
	Power Button	0
	Reset Button	1
	Power Connector	1
Internal I/O	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
	TPM Header	1
	MIPI DSI	1, Supports MIPI DSI up to 1920 x 1080 @ 60 Hz
	MIPI CSI	2, support Two MIPI-CSI Camera Inputs (4-lane each)
Power	Power Type	DC Power input
Environment	Operating Temperature	-20~60°C

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		Tinker Board 3N PLUS	Tinker Board 3N	Tinker Board 3N LITE
				
System	SoC	Rockchip RK3568J	Rockchip RK3568B2	Rockchip RK3568B2
	CPU	Quad-core Arm® Cortex®-A55 @ 1.8 GHz	Quad-core Arm® Cortex®-A55 @ 2.0 GHz	Quad-core Arm® Cortex®-A55 @ 2.0 GHz
	GPU	Arm® Mali™-G52 2EE @ 800 MHz	Arm® Mali™-G52 2EE @ 800 MHz	Arm® Mali™-G52 2EE @ 800 MHz
	NPU	Rockchip NPU (1 TOPS)	Rockchip NPU (1 TOPS)	Rockchip NPU (1 TOPS)
	Memory	2GB / 4GB / 8GB LPDDR4X	2GB / 4GB / 8GB LPDDR4X	2GB / 4GB / 8GB LPDDR4X
Storage	Memory Card	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/pull)
	eMMC	32GB /64GB	32GB /64GB	32GB /64GB
	SPI Flash	16MB	16MB	-
Ethernet	Ethernet	2 x GbE LAN RTL8211FI	2 x GbE LAN RTL8211F	1 x GbE LAN RTL8211F
	PoE	1 x PD mode, 802.3at 25W (option)	1 x PD mode, 802.3at 25W (option)	-
Connectivity	Wi-Fi/BT	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key
	Cellular/GPS	4G / 5G (Optional)	4G / 5G (Optional)	-
Display	HDMI	1 x HDMI™ 2.0 (4096x2160)	1 x HDMI™ 2.0 (4096x2160)	1 x HDMI™ 2.0 (4096x2160)
	DP	-	-	-
	LVDS/eDP	1 x 40-pin header LVDS (1920x1080) / eDP (2560x1600)	1 x 40-pin header LVDS (1920x1080) / eDP (2560x1600)	1 x 40-pin header LVDS (1920x1080) / eDP (2560x1600)
	MIPI DSI	-	-	-
	Multi Output	HDMI + LVDS / HDMI + eDP	HDMI + LVDS / HDMI + eDP	HDMI + LVDS / HDMI + eDP
Camera	MIPI CSI-2	-	-	-
Wired Interface	USB	1 x USB 3.2 Gen1 Type-C® OTG 2 x USB 3.2 Gen1 Type-A 2 x USB 2.0 Pin header	1 x USB 3.2 Gen1 Type-C® OTG 2 x USB 3.2 Gen1 Type-A 2 x USB 2.0 Pin header	1 x USB 3.2 Gen1 Type-C® OTG 2 x USB 3.2 Gen1 Type-A 2 x USB 2.0 Pin header
	Audio	1 x 3.5mm Phone Jack 1 x 4-pin Stereo Speaker, 4ohm, 2 x 3W 1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)	1 x 3.5mm Phone Jack 1 x 4-pin Stereo Speaker, 4ohm, 2 x 3W 1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)	1 x 3.5mm Phone Jack 1 x 4-pin Stereo Speaker, 4ohm, 2 x 3W 1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)
Expansion	M.2 E-Key	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT
	mPCIe	-	-	-
	M.2 B-Key	3042, 3052 (PCIe 3.0x1, USB3, USB2, SIM) for 4G/5G	3042, 3052 (PCIe 3.0x1, USB3, USB2, SIM) for 4G/5G	-
	SIM slot	1 x Nano SIM slot	1 x Nano SIM slot	-
Serial Interface	COM	1 x RS-232/422/485 header 2 x RS-232 header with flow control	1 x RS-232/422/485 header 2 x RS-232 header with flow control	1 x RS-232/422/485 header 1 x RS-232 header with flow control
	CAN	1 x CAN Bus 2.0B header	1 x CAN Bus 2.0B header	-
Other Internal I/O & Header	GPIO	1 x 14-pin GPIO headers: - 1 x 5V - 1 x 3.3V - 1 x GND - 2 x ADC (8 bit) - up to 2 x UART - up to 1 x SPI bus (2 select) - up to 1 x I2C bus - up to 4 x PWM - up to 1 x PCM/I2S - up to 1 x S/PDIF TX	1 x 14-pin GPIO headers: - 1 x 5V - 1 x 3.3V - 1 x GND - 2 x ADC (8 bit) - up to 2 x UART - up to 1 x SPI bus (2 select) - up to 1 x I2C bus - up to 4 x PWM - up to 1 x PCM/I2S - up to 1 x S/PDIF TX"	1 x 14-pin GPIO headers: - 1 x 5V - 1 x 3.3V - 1 x GND - 2 x ADC (8 bit) - up to 2 x UART - up to 1 x SPI bus (2 select) - up to 1 x I2C bus - up to 4 x PWM - up to 1 x PCM/I2S - up to 1 x S/PDIF TX"
	Keys	1 x 4-pin Power-on & Reset header 1 x 2-pin Recovery Mode header 1 x 2-pin Maskrom (eMMC) header 1 x Maskrom (SPI) DIP switch	1 x 4-pin Power-on & Reset header 1 x 2-pin Recovery Mode header 1 x 2-pin Maskrom (eMMC) header 1 x Maskrom (SPI) DIP switch	1 x 4-pin Power-on & Reset header 1 x 2-pin Recovery Mode header 1 x 2-pin Maskrom (eMMC) header
	Debug	1 x 3-pin Debug UART header	1 x 3-pin Debug UART header	1 x 3-pin Debug UART header
	IR receiver	1 x 3-pin IR receiver header	1 x 3-pin IR receiver header	1 x 3-pin IR receiver header
	RTC	1 x RTC header	1 x RTC header	1 x RTC header
	FAN	1 x 4-pin DC Fan header	1 x 4-pin DC Fan header	1 x 4-pin DC Fan header
	LED	3 x LEDs side view	3 x LEDs side view	3 x LEDs side view
	Others	- 1 x Panel VCC power select jumper - 1 x 5V Panel Backlight header	- 1 x Panel VCC power select jumper - 1 x 5V Panel Backlight header	- 1 x Panel VCC power select jumper - 1 x 5V Panel Backlight header
Power Input		12~24V DC, Barrel Jack (5.5/2.5mm) & 4-Pin Header	12~24V DC, Barrel Jack (5.5/2.5mm) & 4-Pin Header	12~24V DC, Barrel Jack (5.5/2.5mm) & 4-Pin Header
Dimensions		100 x 100 mm	100 x 100 mm	100 x 100 mm
Operation temperature		-45˚C ~ 85˚C	0˚C ~ 60˚C	0˚C ~ 60˚C
Non operation temperature		-45˚C ~ 85˚C	-45˚C ~ 85˚C	-45˚C ~ 85˚C
Non operation humidity		10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)
Operating System		Linux Debian, Android, Yocto	Linux Debian, Android, Yocto	Linux Debian, Android, Yocto

		Tinker Board 3S	Tinker Board 3	Tinker Board 2S
				
System	SoC	Rockchip RK3566	Rockchip RK3566	Rockchip RK3399
	CPU	Quad-core Arm® Cortex®-A55 @ 1.8 GHz	Quad-core Arm® Cortex®-A55 @ 1.8 GHz	Dual-core Arm® Cortex®-A72 @ 2.0 GHz + Quad-core Arm® Cortex®-A53 @ 1.5 GHz
	GPU	Arm® Mali™-G52 2EE @ 800 MHz	Arm® Mali™-G52 2EE @ 800 MHz	Arm® Mali™-T860 MP4 @ 800 MHz
	NPU	Rockchip NPU (1 TOPS)	Rockchip NPU (1 TOPS)	-
	Memory	2GB/ 4GB LPDDR4X	2GB/ 4GB LPDDR4X	2GB / 4GB LPDDR4
Storage	Memory Card	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/pull)
	eMMC	16GB	-	16GB / 32GB
	SPI Flash	-	-	-
Ethernet	Ethernet	1 x GbE LAN RTL8211F	1 x GbE LAN RTL8211F	1 x GbE LAN RTL8211E/F
	PoE	-	-	-
Connectivity	Wi-Fi/BT	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key
	Cellular/GPS	-	-	-
Display	HDMI	1 x HDMI™ 2.0 (4096x2160)	1 x HDMI™ 2.0 (4096x2160)	1 x HDMI™ 2.0 (4096x2160)
	DP	-	-	1 x DP Alt Mode via USB Type-C® (4096x2160)
	LVDS/eDP	-	-	-
	MIPI DSI	1 x 22-pin (4 lane, 1920x1080)	1 x 22-pin (4 lane, 1920x1080)	1 x 22-pin (4 lane, 1920x1080)
	Multi Output	-	-	HDMI + Type-C / HDMI + DSI / Type-C + DSI
Camera	MIPI CSI-2	-	-	1 x 15-pin (2 lane)
Wired Interface	USB	1 x USB 3.2 Gen1 Type-A 2 x USB 2.0 Type-A 1 x USB 2.0 Micro-B (Device only) 1 x USB2.0 Pin header	1 x USB 3.2 Gen1 Type-A 2 x USB 2.0 Type-A 1 x USB 2.0 Micro-B (Device only) 1 x USB2.0 Pin header	1 x USB 3.2 Gen1 Type-C® OTG 3 x USB 3.2 Gen1 Type-A
	Audio	1 x 3.5mm Phone Jack 1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)	1 x 3.5mm Phone Jack 1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)	1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)
Expansion	M.2 E-Key	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT
	mPCIe	-	-	-
	M.2 B-Key	-	-	-
	SIM slot	-	-	-
Serial Interface	COM	-	-	-
	CAN	-	-	-
Other Internal I/O & Header	GPIO	1 x 40-pin headers: - 2 x 5V power - 2 x 3.3V power - 8 x Ground pins - 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	1 x 40-pin headers: - 2 x 5V power - 2 x 3.3V power - 8 x Ground pins - 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	1 x 40-pin headers: - 2 x 5V power - 2 x 3.3V power - 8 x Ground pins - 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
	Keys	1 x 4-pin Power-on & Reset header 1 x 2-pin Recovery Mode header 1 x Maskrom DIP switch	1 x 4-pin Power-on & Reset header 1 x 2-pin Recovery Mode header 1 x Maskrom DIP switch	1 x 2-pin Power-on & Reset header 1 x 2-pin Recovery Mode header
	Debug	1 x 3-pin Debug UART header	1 x 3-pin Debug UART header	1 x 2-pin Debug UART header
	IR receiver	-	-	(in GPIO)
	RTC	1 x RTC header	1 x RTC header	1 x RTC header
	FAN	1 x 2-pin DC Fan header	1 x 2-pin DC Fan header	1 x 2-pin DC Fan header
	LED	3 x LEDs side view	3 x LEDs side view	3 x LEDs
	Others	-	-	-
Power Input		12~19V DC, Barrel Jack (5.5/2.5mm)	12~19V DC, Barrel Jack (5.5/2.5mm)	12~19V DC, Barrel Jack (5.5/2.5mm)
Dimensions		3.37" x 2.125" (85 x 56 mm)	3.37" x 2.125" (85 x 56 mm)	3.37" x 2.125" (85 x 56 mm)
Operation temperature		0˚C ~ 60˚C	0˚C ~ 60˚C	0˚C ~ 60˚C
Non operation temperature		-40˚C ~ 85˚C	-40˚C ~ 85˚C	-40˚C ~ 85˚C
Non operation humidity		10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)
Operating System		Linux Debian, Android, Yocto	Linux Debian, Android, Yocto	Linux Debian, Android, Yocto

Tinker Board Series

		Tinker Board 2	Tinker Board S R2.0	Tinker Board R2.0
				
System	SoC	Rockchip RK3399	Rockchip RK3288.CG-W	Rockchip RK3288.CG-W
	CPU	Dual-core Arm® Cortex®-A72 @ 2.0 GHz + Quad-core Arm® Cortex®-A53 @ 1.5 GHz	Quad-core Arm® Cortex®-A17 @ 1.8 GHz	Quad-core Arm® Cortex®-A17 @ 1.8 GHz
	GPU	Arm® Mali™-T860 MP4 @ 800 MHz	Arm® Mali™-T760 MP4 @ 600 MHz	Arm® Mali™-T760 MP4 @ 600 MHz
	NPU	-	-	-
	Memory	2GB / 4GB LPDDR4	2GB LPDDR3	2GB LPDDR3
Storage	Memory Card	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/push)	Micro SD (TF) card slot (push/push)
	eMMC	-	16GB / 32GB	-
	SPI Flash	-	-	-
Ethernet	Ethernet	1 x GbE LAN RTL8211E/F	1 x GbE LAN RTL8211E/F	1 x GbE LAN RTL8211E/F
	PoE	-	-	-
Connectivity	Wi-Fi/BT	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key	Wi-Fi 4 & BT 4.2	Wi-Fi 4 & BT 4.2
	Cellular/GPS	-	-	-
Display	HDMI	1 x HDMI™ 2.0 (4096x2160)	1 x HDMI™ 1.4 (3840x2160)	1 x HDMI™ 1.4 (3840x2160)
	DP	1 x DP Alt Mode via USB Type-C® (4096x2160)	-	-
	LVDS/eDP	-	-	-
	MIPI DSI	1 x 22-pin (4 lane, 1920x1080)	1 x 15-pin (2lane, 1280x720)	1 x 15-pin (2lane, 1280x720)
	Multi Output	HDMI + Type-C / HDMI + DSI / Type-C + DSI	HDMI + DSI	HDMI + DSI
Camera	MIPI CSI-2	1 x 15-pin (2 lane)	1 x 15-pin (2 lane)	1 x 15-pin (2 lane)
Wired Interface	USB	1 x USB 3.2 Gen1 Type-C® OTG 3 x USB 3.2 Gen1 Type-A	4 x USB 2.0 Type-A	4 x USB 2.0 Type-A
	Audio	1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)	1 x 3.5mm Phone Jack 1 x HDMI™ audio 1 x S/PDIF TX pin (contact point) 1 x PCM/I2S pins (from GPIO)	1 x 3.5mm Phone Jack 1 x HDMI™ audio 1 x S/PDIF TX pin (contact point) 1 x PCM/I2S pins (from GPIO)
Expansion	M.2 E-Key	2230 (PCIe 2.0x1, USB2) for Wi-Fi/BT	-	-
	mPCIe	-	-	-
	M.2 B-Key	-	-	-
	SIM slot	-	-	-
Serial Interface	COM	-	-	-
	CAN	-	-	-
Other Internal I/O & Header	GPIO	1 x 40-pin headers: - 2 x 5V power - 2 x 3.3V power - 8 x Ground pins - 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	1 x 40-pin headers: - 2 x 5V power - 2 x 3.3V power - 8 x Ground pins - up to 28 x GPIO pins - up to 2 x SPI bus - up to 2 x I2C bus - up to 4 x UART - up to 2 x PWM - up to 1 x PCM/I2S	1 x 40-pin headers: - 2 x 5V power - 2 x 3.3V power - 8 x Ground pins - up to 28 x GPIO pins - up to 2 x SPI bus - up to 2 x I2C bus - up to 4 x UART - up to 2 x PWM - up to 1 x PCM/I2S"
	Keys	1 x 2-pin Power-on & Reset header 1 x 2-pin Recovery Mode header	1 x 2-pin Power-on header 1 x 2-pin Recovery Mode header	1 x 2-pin Power-on header 1 x 2-pin Recovery Mode header
	Debug	1 x 2-pin Debug UART header	1 x 2-pin Debug UART Contact Point	1 x 2-pin Debug UART Contact Point
	IR receiver	(in GPIO)	-	-
	RTC	1 x RTC header	-	-
	FAN	1 x 2-pin DC Fan header	-	-
	LED	3 x LEDs	3 x LEDs	3 x LEDs
	Others	-	1 x 2-pin contact points includes: - 1 x PWM signal - 1 x S/PDIF signal	1 x 2-pin contact points includes: - 1 x PWM signal - 1 x S/PDIF signal
Power Input		12~19V DC, Barrel Jack (5.5/2.5mm)	5V, Micro USB Power Input	5V, Micro USB Power Input
Dimensions		3.37" x 2.125" (85 x 56 mm)	3.37" x 2.125" (85 x 56 mm)	3.37" x 2.125" (85 x 56 mm)
Operation temperature		0˚C ~ 60˚C	0˚C ~ 60˚C	0˚C ~ 60˚C
Non operation temperature		-40˚C ~ 85˚C	-40˚C ~ 85˚C	-40˚C ~ 85˚C
Non operation humidity		10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)
Operating System		Linux Debian, Android, Yocto	Linux Debian, Android, Yocto	Linux Debian, Android, Yocto

		Tinker Edge R	Tinker Edge T	Tinker V
				
System	SoC	Rockchip RK3399Pro	NXP i.MX 8M	Renesas RZ/Five
	CPU	Dual-core Arm® Cortex®-A72 @ 1.8 GHz + Quad-core Arm® Cortex®-A53 @ 1.4 GHz	Quad-core Arm® Cortex®-A53 @ 1.5 GHz	RISC-V Single-core AndesCore™ AX45MP 1.0 GHz
	GPU	Arm® Mali™-T860 MP4 @ 800 MHz	GC7000 Lite	-
	NPU	Rockchip NPU (3 TOPS)	Google Edge TPU (4 TOPS)	-
	Memory	2GB / 4GB LPDDR4 (SYSTEM) 1GB / 2GB LPDDR3 (NPU)	1GB LPDDR4	1GB DDR4
Storage	Memory Card	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/pull)	Micro SD (TF) card slot (push/pull)
	eMMC	16GB	8GB	none / 16GB
	SPI Flash	-	-	none / 16MB
Ethernet	Ethernet	1 x GbE LAN Realtek RTL8211F	1 x GbE LAN Realtek RTL8211F	2 x GbE LAN Realtek RTL8211FI
	PoE	-	-	-
Connectivity	Wi-Fi/BT	Wi-Fi 5 & BT 5.0 (2T2R), default occupied M.2 E key	Wi-Fi 5 & BT 4.2 (2T2R)	-
	Cellular/GPS	4G (Optional)	-	-
Display	HDMI	1 x HDMI™ 2.0 (4096x2160)	1 x HDMI™ 2.0 (4096x2160)	-
	DP	1 x DP Alt Mode via USB Type-C® (4096x2160)	-	-
	LVDS/eDP	-	-	-
	MIPI DSI	1 x 22-pin (4 lane, 1920x1080)	1 x 22-pin (4 lane, 1920x1080)	-
	Multi Output	HDMI + Type-C / HDMI + DSI / Type-C + DSI	HDMI + DSI	-
Camera	MIPI CSI-2	1 x 15-pin (2 lane)	2 x 24-pin (4 lane)	-
Wired Interface	USB	1 x USB 3.2 Gen1 Type-C® OTG 3 x USB 3.2 Gen1 Type-A	1 x USB 3.2 Gen1 Type-C® OTG 2 x USB 3.2 Gen1 Type-A	1 x USB 2.0 Micro-B OTG 1 x USB 2.0 Micro-B
	Audio	1 x 3.5mm Phone Jack 1 x HDMI™ audio 1 x S/PDIF TX pin (from GPIO) 1 x PCM/I2S pins (from GPIO)	1 x HDMI™ audio 1 x S/PDIF TX pin 1 x PCM/I2S pins (from GPIO)	-
Expansion	M.2 E-Key	-	-	-
	mPCIe	Full (USB2, SIM) for 4G	-	-
	M.2 B-Key	-	-	-
	SIM slot	1 x Nano SIM slot	-	-
Serial Interface	COM	-	-	2 x RS-232 (10-pin terminal block)
	CAN	-	-	2 x CAN Bus (6-pin terminal block
Other Internal I/O & Header	GPIO	1 x 40-pin headers: - 2 x 5V Power pins - 2 x 3.3V Power pins - 8 x Ground pins - 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	1 x 40-pin headers: - 2 x 5V Power pins - 2 x 3.3V Power pins - 8 x Ground pins - 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	1 x 20-pin headers: - 1 x 3.3V Power pin - 5 x Ground pins - 1 x SPI bus - up to 4 x GPIO pins - up to 2 x I2C bus - up to 2 x UART - up to 2 x ADC
	Keys	1 x 2-pin Power-on header 1 x 2-pin Reset header 1 x 2-pin Recovery Mode header	1 x 2-pin Reset header 1 x Boot mode switch	1 x 2-pin Power-on header 1 x 2-pin Reset header
	Debug	-	-	JTAG pin header
	IR receiver	(in GPIO)	-	-
	RTC	1 x RTC header	-	-
	FAN	1 x 2-pin DC Fan header	1 x 2-pin DC Fan header	1 x 2-pin DC Fan header
	LED	3 x LEDs	4 x LEDs	3 x LEDs side view
	Others	1 x 2-pin NPU Debug UART header	-	-
Power Input		12~19V DC, Barrel jack (5.5/2.5mm) & 4-pin header	12~19V DC, Barrel jack (5.5/2.5mm)	10~24V DC, Barrel Jack (5.5/2.5 mm)
Dimensions		Pico-ITX, 3.9" x 2.8" (100 × 72 mm)	3.37" x 2.125" (85 × 56 mm)	Pico-ITX, 3.9" x 2.8" (100 × 72 mm)
Operation temperature		0˚C ~ 60˚C	0˚C ~ 50˚C	-20˚C ~ 60˚C
Non operation temperature		-40˚C ~ 85˚C	-40˚C ~ 85˚C	-40˚C ~ 85˚C
Non operation humidity		10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)	10% ~ 85% (Non condensing)
Operating System		Linux Debian, Android	Mendel	Linux Debian, Yocto

Tinker Board Series - Accessories

MIPI to LVDS Converter Board

Input Interface		22-pin MIPI DSI (4 lane)
Output	Interface	LVDS (3.3V/5V)
	Resolutions	HD, FHD
	Blacklight	Supported (5V/12V)
	Config Jumper	- LVDS power select jumper (3.3V/5V) - Backlight power select jumper (5V/12V) - Backlight power enable jumper (High/Low Active)
Power input		- 12V~24V (5.5/2.5 DC Jack) - 12V~24V (Phoenix Jack)
Power output (supply Tinker)		- 5V pin header - 12V pin header
Dimension		3.37" x 2.125" (85 x 56 mm)

POE SPLITTER BOARD

PoE Standard		802.3at (Type 2 "PoE+")
Input	PoE Lan Input	RJ-45 (10/100/1000)
Output	Lan Output	RJ-45 (10/100/1000)
	DC Power Output (supply Tinker)	25.5 W (max) - 5V pin header - 12V pin header
Dimension		3.37" x 2.125" (85 x 56 mm)

Tinker System 3N

Arm-based fanless edge system, with versatile applicability for industrial use, provided low power consumption, and rich interfaces make IIoT and IoRT feasible, flexible, and productive

- Fanless design for great heat conductivity
- Certified with RF regulation for WiFi (CE, FCC, VCCI, BSMI)
- High expandability, including Dual-LAN, COM, CAN and M.2 for cellular module
- Wide range DC power 12-24V and -40-60°C operating-temperature range
- Embedded design with wall mount and DIN rail clip
- Linux, Android, and Yocto supported

Tinker System 2

Arm-based embedded system, featuring 64-bit Armv8 architecture, offers enhanced computing performance with low power consumption

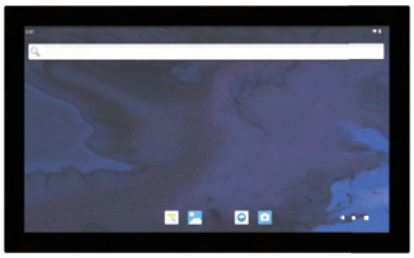
- Fanless design for great heat conductivity
- Certified with RF regulation for WiFi (CE, FCC, VCCI, BSMI)
- High peripheral extensibility: Reserved I/O for antenna and accessory extension
- Wide 12-19.5V DC inputs offers stable power delivery
- Linux, Android and Yocto supported

CHAPTER 12

Panel PCs

PP-156W-3568

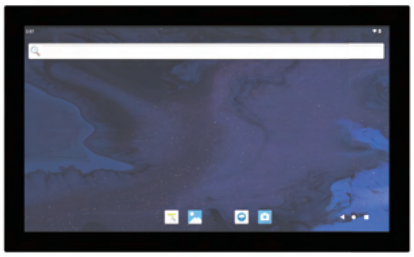
ARM System 15.6” Panel PC provides an industrial-grade touch display with front IP65, multi-serial ports support, wide operating temperature, plug-and-play integrated into Automation, Industry applications embedded solution



- Fanless design with embedded Rockchip RK3568 processor
- 15.6-inch, 1920x1080, projected-capacitive multi-touch display
- Android, Linux Debian and Yocto operating systems supported
- Rich connectivity, including HDMI, dual GbE Lan, dual RS-232, one RS-232/422/485 and one CAN bus
- Supports IEEE 802.3af/at PoE-PD module (optional)
- Wide 12-24V DC power inputs supported
- Wide -20-60°C operating-temperature range

PP-156W-3399

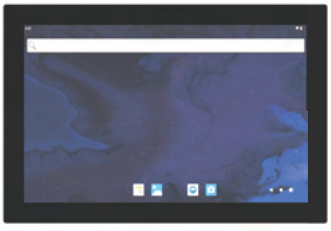
ARM System 15.6” Panel PC provides an industrial-grade touch display with front IP65, plug-and-play integrated into kiosks, and commercial applications embedded solution



- Fanless design with embedded Rockchip RK3399 processor
- 15.6-inch, 1920x1080, projected-capacitive multi-touch display
- Cross-platform compatibility with both Linux Debian and Android
- Supports HDMI output up to 4K UHD video resolution
- Supports IEEE 802.3af/at PoE-PD module (optional)
- Supports VESA, Wall and Panel mounting (optional)

PP-101W-3399

ARM System 10.1” Panel PC providese an industrial-grade touch display with front IP65, plug-and-play integrated into kiosks, and commercial applications embedded solution



- Fanless design with embedded Rockchip RK3399 processor
- 10.1-inch, 1280x800, projected-capacitive multi-touch display
- Cross-platform compatibility with both Linux Debian and Android
- Supports HDMI output up to 4K UHD video resolution
- Supports IEEE 802.3af/at PoE-PD module (optional)
- Supports VESA, Wall and Panel mounting (optional)

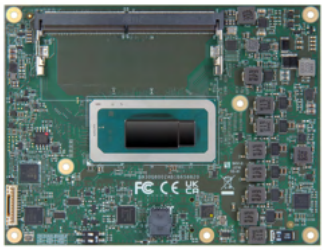
CHAPTER 13

Computer-On-Modules

Type 6 COM Express Module

RPLB6-IM-A

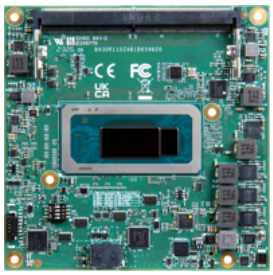
COM Express Type 6 basic-size module with 13th gen Intel® H/P/U processor , DDR5 SO-DIMM, PCIe 4.0, USB 3.2 Gen2, 2.5Gb Ethernet, discrete TPM 2.0, eDP and SATA



- 13th Gen Intel® Core™ Celeron® (13th gen) processors in Intel 7 lithography
- Up to 6X performance core +8x efficient core, and up to 96X graphic execution units
- 2 x DDR5-5200 non-ECC SO-DIMMs up to 96GB
- 1 x PCIe 4.0 x8(H series), 2 x PCIe 4.0 x4
- Options for industrial temperature range -40°C up to +85°C
- Options for onboard PCIe NVMe SSD

RPLC6-IM-A

COM Express Type 6 compact-size module based on 13th gen Intel® Core™ processors family (U/P/H) with DDR5 SO-DIMM, DDI, PCIe 4.0, USB4, USB 3.2 Gen 2, 2.5 GbE TSN Ethernet, discrete TPM 2.0, eDP and SATAIII

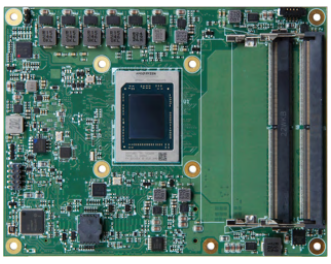


- 13th gen Intel® Core™ processors series family (U/P/H) processors
- Up to 14C/20T, and up to 96X graphic execution units
- 2 x DDR5-4800 non-ECC SO-DIMMs up to 64GB, 2 x PCIe 4.0 x4, and 8 x PCIe 3.0 x1
- 4 x USB 3.2 Gen 2, 8 x USB 2.0, 2 x SATAIII, 3 x DDI, VGA, eDP/LVDS, 2 x USB4 (optional)
- Industrial temperature range -40°C to +85°C (optional)
- Onboard PCIe NVMe SSD (optional)

Type 7 COM Express Module

RV3B7-IM-A

COM-Express® Type 7 Basic module with AMD® Embedded Ryzen™ V3000 CPU Family equipped on-module NVME SSD



- AMD® Embedded Ryzen™ V3000 processor
- 2 x DDR5 4800 MT/s SO-DIMM, 2 x 10G KR port
- 10W-54W cTDP with -40-85 °C support on selected SKUs
- Up to 16x PCIe 4.0 lanes for high-speed interconnection
- Optional on-module PCIe x2 NVME storage

ICLB7-IM-A

COM Express Type 7 basic module based on Intel® Xeon® D-1700 processors with three channels and four SO-DIMM slots

- Intel® Xeon® D-1700 processors for edge IoT
- Intel® Deep Learning Boost and Time Coordinated Computing
- 4 x USB2.0/3.2 Gen 2×1, 2 x SATAIII, 4 x 10G KR, 2 x UART
- Three memory channels with maximum four SODIMM slots
- Selected SKUs support -40°C to 80°C extended temperature range for extreme environments

Type 10 COM Express Module

EHLMA-IM-A

Intel® Atom® x6000-series SoC based on Type 10 Mini COM-Express® module with LPDDR4 SDRAM

- Intel® Atom® x6000E-series processor
- LPDDR4-3200 MT/s on-board memory up to 16GB with in-band ECC support
- Dual 4k display, eDP/LVDS/HDMI/DPI interfaces
- 4 x PCIe 3.0 x1, 2 x USB 3.1, 8 x USB 2.0 and 2 x SATA III
- 2.5GbE with Intel TCC/TSN support
- Wide voltage input from 4.75V to 20VDC
- Industrial temperature range from -40°C to 85°C on selected SKUs

APLMA-IM-A

Intel® Atom® E3900-series SoC based on Type 10 Mini COM-Express® module with LPDDR4 SDRAM, eMMC and USB 3.0

- Intel® Atom® E3900, Pentium® N4200 or Celeron® N3350 processor
- Supports LPDDR4-2400 MT/s on-board memory up to 8GB
- Supports DDI, LVDS/eDP display interfaces
- Support 8 x USB 2.0 or 4 x USB 2.0 and 3 x USB 3.0, 2 x SATA III and 4 x PCIe 2.0 x1
- Supports wide voltage input from 4.5V to 20V
- Supports a wide -40°C to 85°C extended temperature range (via E39XX SKUs)

COM-HPC Module

ICLHE-IM-A

COM-HPC server, Size E module with Intel® Xeon® D-2700 processor

- Intel® Xeon® D-2700 processors for edge IoT computing
- AI/deep-learning accelerated data analytics with Intel AVX-512 and VNNI
- 8 x 10G KR, 4 x USB2.0/3.2 Gen 2×1, 2 x SATAIII, 2 x UART
- Eight DIMM slots and maximum 1024GB memory support
- Selected SKUs support -40-80°C for extended-temperature applications

RPLHC-IM-A

COM-HPC Size C client module with with Intel® 13th /14th gen socket-type processor, plus DDR5 SO-DIMM, DDI, PCIe 5.0, USB 3.2 Gen2, 2.5G Ethernet, discrete TPM 2.0, eDP and SATA

- Intel® Core™ (13th gen), Pentium® or Celeron®-series socket-type processors in Intel 7 lithography
- Up to 8X Performance cores and 16X Efficiency cores, and up to 32X graphic execution units
- 4 x DDR5 ECC/non-ECC SO-DIMM up to 128GB capacities
- 1 x PCIe 5.0 x16, 4 x PCIe 4.0 x4, 3 x PCIe 3.0 x4 4x USB3.2 Gen2 x2, 2x SATA, 3x DDI and eDP

CHAPTER 14

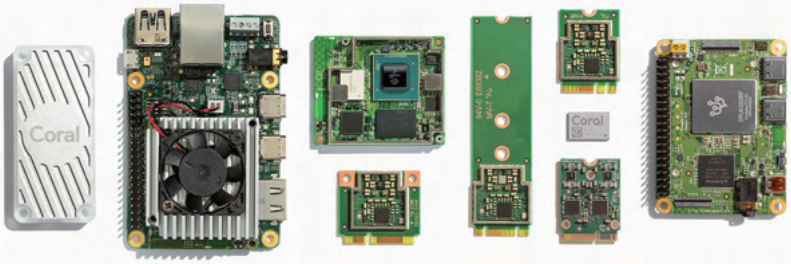
GPU & AI Accelerator Cards

Coral Edge TPU

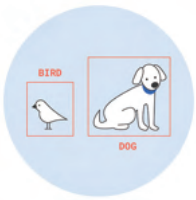
Build your own edge AI applications from sketch to reality

ASUS IoT is dedicated to providing ideal solutions for the era of IoT and AI. Together with Google technology and the Coral toolkit, the Coral Edge TPU empowers you to build products that are efficient, private, fast, and offline.

Coral | ASUS IoT



Solutions for on-device intelligence



Object detection

Draw a square around the location of various recognized objects in an image.

Pose estimation

Estimate the poses of people in an image by identifying various body joints.

Image segmentation

Identify various objects in an image and their location on a pixel-by-pixel basis.

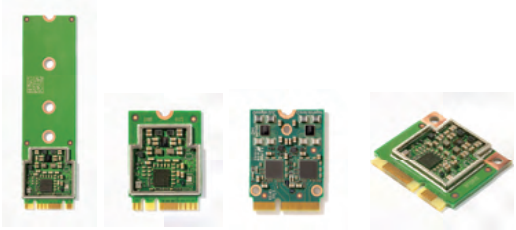
Key phrase detection

Listen to audio samples and quickly recognize known words and phrases.

Discover the form-factor fit for your AI applications

Coral M.2/mPCIE Module

Integrate the Edge TPU into legacy and new systems using a Mini PCIe or M.2 interface.



Coral USB Accelerator

A USB accessory that brings machine learning inferencing to existing systems.

Accelerator Module

A solderable multi-chip module including the Edge TPU.

Coral Dev Board Micro Series

A microcontroller board with a camera, mic and Coral Edge TPU.

PoE board

Wireless board

Coral System-on-Module (SoM)/Dev Board

A fully-integrated system for accelerated ML applications.

MXM

		MXM-M23B-E5	MXM-M23B-P7	MXM-M23B-P5
				
Graphic Core	GPU	Intel® Arc™ A730M	Intel® Arc™ A570M	Intel® Arc™ A530M
	Memory	12GB GDDR6, 192 bit, 336 GB/s	8GB GDDR6, 128 bit, 256 GB/s	8GB GDDR6, 128 bit, 224 GB/s
GPU Computing	Xe-Cores	24	16	12
	Matrix Engines (XMX)	384	256	192
	Vetor Eneines (XVE)	384	256	192
	Graphice Engine	DX12 Ultimate, OpenGL 4.6, OpenCL 3.0, AV1, H.264/ H.265 (HEVC)	DX12 Ultimate, OpenGL 4.6, OpenCL 3.0, AV1, H.264/ H.265 (HEVC)	DX12 Ultimate, OpenGL 4.6, OpenCL 3.0, AV1, H.264/ H.265 (HEVC)
Display	Display Outputs	4 x DisplayPort 1.4/ 2.0* (Optional 4x HDMI 2.0/ 2.1*)**	4 x DisplayPort 1.4/ 2.0* (Optional 4x HDMI 2.0/ 2.1*)**	4 x DisplayPort 1.4/ 2.0* (Optional 4x HDMI 2.0/ 2.1*)**
	Interface	MXM 3.1, PCIe 4.0 x16 support	MXM 3.1, PCIe 4.0 x16 support	MXM 3.1, PCIe 4.0 x16 support
Mechaicals	Dimensions	82 (W) x 105 (D) x 6.2 (H) mm	82 (W) x 105 (D) x 6.2 (H) mm	82 (W) x 105 (D) x 6.2 (H) mm
	Form Factor	Standard MXM 3.1 Type B	Standard MXM 3.1 Type B	Standard MXM 3.1 Type B
Environmental	Operatin Temp.	Standard: 0°C to 55°C	Standard: 0°C to 55°C	Standard: 0°C to 55°C
	Starage Temp.	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
	Power Consumpation	80W - 120W TGP	75W - 95W TGP	65W - 95W TGP
SW support	OS Support	Windows 11, 10 64-bit, Ubuntu 22.04 LTS	Windows 11, 10 64-bit, Ubuntu 22.04 LTS	Windows 11, 10 64-bit, Ubuntu 22.04 LTS

*Depend on the design of MXM carrier
**For optional HDMI support, please contact ASUS IoT

		MXM-M23A-M7	MXM-M23A-M5
			
Graphic Core	GPU	Intel® Arc™A370E	Intel® Arc™A350E
	Memory	4GB GDDR6, 64 bit, 112 GB/s	4GB GDDR6, 64 bit, 112 GB/s
GPU Computing	Xe-Cores	8	6
	Matrix Engines (XMX)	128	96
	Vetor Eneines (XVE)	128	96
	Graphice Engine	DX12 Ultimate, OpenGL 4.6, OpenCL 3.0, AV1, H.264/ H.265 (HEVC)	DX12 Ultimate, OpenGL 4.6, OpenCL 3.0, AV1, H.264/ H.265 (HEVC)
Display	Display Outputs	4 x DisplayPort 1.4/ 2.0* (Optional 4x HDMI 2.0/ 2.1*)**	4 x DisplayPort 1.4/ 2.0* (Optional 4x HDMI 2.0/ 2.1*)**
	Interface	MXM 3.1, PCIe 4.0 x8 support	MXM 3.1, PCIe 4.0 x8 support
Mechaicals	Dimensions	82 (W) x 70 (D) x 6.2 (H) mm	82 (W) x 70 (D) x 6.2 (H) mm
	Form Factor	Standard MXM 3.1 Type A	Standard MXM 3.1 Type A
Environmental	Operatin Temp.	Standard: 0°C to 55°C	Standard: 0°C to 55°C
	Starage Temp.	-40°C to 85°C	-40°C to 85°C
	Power Consumpation	35W-50W TGP	25W-35W TGP
SW support	OS Support	Windows 11, 10 64-bit, Ubuntu 22.04 LTS	Windows 11, 10 64-bit, Ubuntu 22.04 LTS

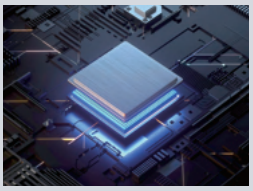
*Depend on the design of MXM carrier
**For optional HDMI support, please contact ASUS IoT

CHAPTER 15
Intelligent
Integrated
Solutions

UNLEASHING AI

OPTIMIZING EFFICIENCY AND ELEVATING PRODUCT QUALITY

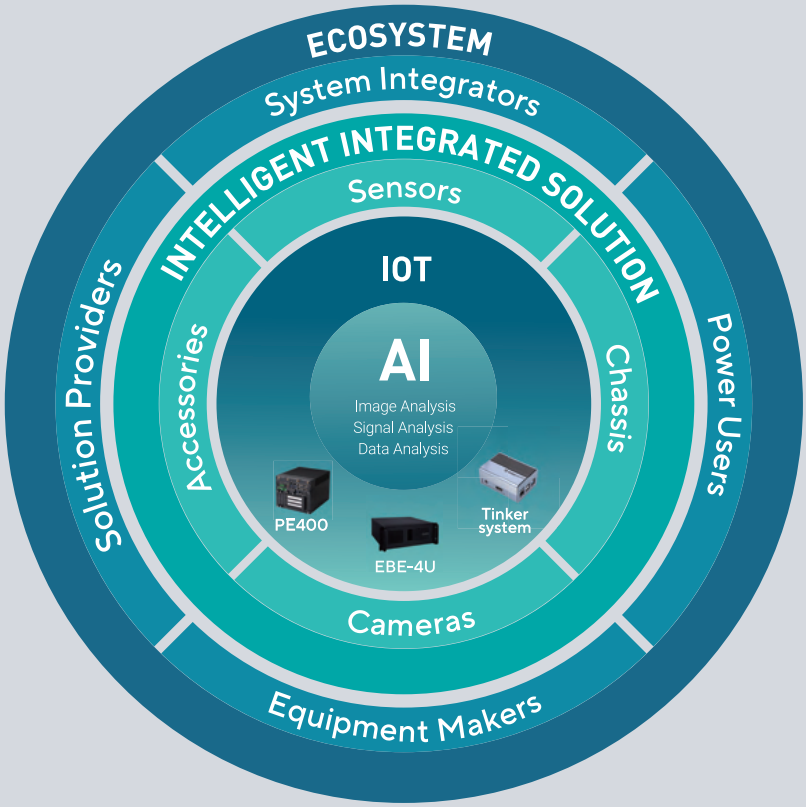
Intelligent Integrated Solutions (IIS) is dedicated to seamlessly incorporating artificial intelligence (AI) and its applications into EMS production or product inspection equipment. Our primary objectives include elevating product quality, optimizing operational efficiency, and reducing production costs. We achieve these goals through comprehensive ground-up hardware/software integration or by seamlessly integrating AI capabilities into existing equipment. Our expertise lies in harnessing the power of AI to enhance the overall performance of production and inspection processes.



SEMICONDUCTORS

INJECTION MOLDING

PACKAGING



EMS

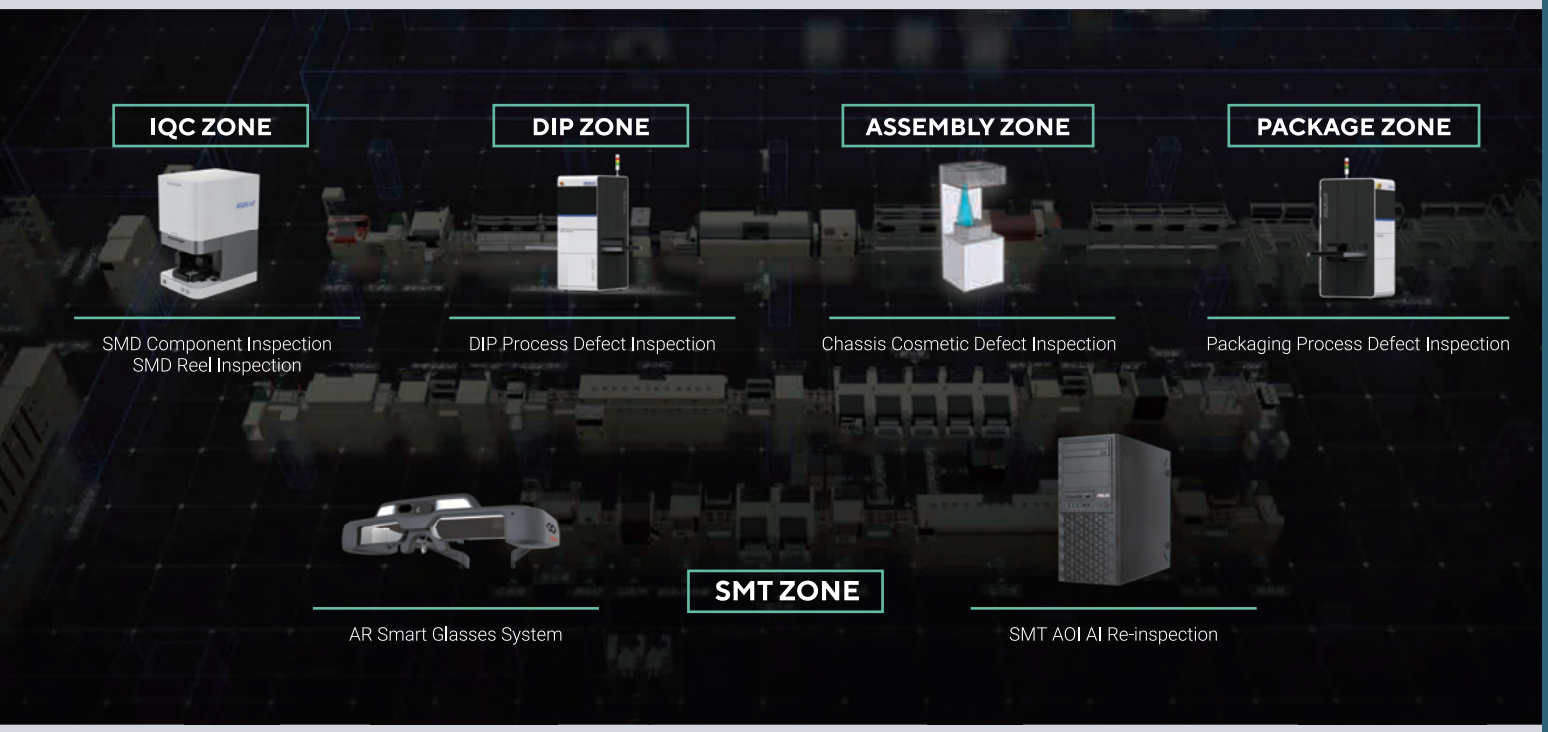
METAL PROCESSING

FOOD AND BEVERAGE

THE FOCUS OF OUR INTELLIGENT INTEGRATED SYSTEMS

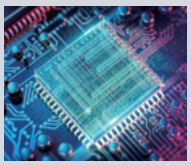
Four key categories - Defect Inspection with AI, AI for AOI Re-inspection, Board Warpage Inspection, and AR Smart Glasses System.

DEFECT INSPECTION	AI FOR AOI RE-INSPECTION	BOARD WARPAGE INSPECTION	AR SMART GLASSES



INTELLIGENT INTEGRATED SOLUTIONS FOR EMS FACTORIES

These solutions harness the power of ASUS AI technology, requiring as little as a single photo for training AI models. They present both an intuitive user interface (UI) and smooth user experience (UX), and achieve low under-kill and high precision.

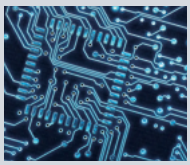


SINGLE-PHOTO AI MODEL TRAINING

Efficient, diverse training data Improved AI accuracy

FRIENDLY UI AND SMOOTH UX

Intuitive, streamlined interface User-focused design



LOW UNDER-KILL AND HIGH PRECISION

Minimal false negatives Precision enhancement

ASUS AI DEFECT-INSPECTION SUCCESS

Securing orders from leading EMS customers in Taiwan, China and Vietnam, the IIS team is committed to advancing faster, more accurate, and cost-effective solutions. Our goal is to continuously enhance end-to-end PCBA production quality through cutting-edge AI technology.

Defect Inspection with AI – DID 100

Features:

- Suitable for various types of PCBAs
- Both front- and back-view camera inspection
- Just a handful of golden samples to train AI projects for inspection
- In-line inspection prevents PCBAs with defective DIP components from wave soldering
- Automatic retention of production data for further tracking

Specifications:

Vision system	Method	AI algorithm, image comparison
	Camera	15KP color-line-scan camera x 2
	Lens	(Front) 40um/px; (Back) 35.7um/px
	Imaging resolution	0.04mm
	Lighting	White LED light
Inspection performance	Imaging Speed	50mm/sec
Board handling	Max PCB Size	550mm x 510mm
	PCB thickness	0.6-2.4mm
	Max PCBA height	125mm
	Conveyor height	710-790mm
Functions	Recognition	Bar codes: Code 39, code 93, code 128, UPC-A Two-dimensional barcodes: QR code, DataMatrix
	Inspection	Missing, reverse polarity, rotation, skew, bent pin/pin loss
Industrial computer	PC	ASUS workstation
	Display	24" LCD
	OS	Windows 10 Pro
Dimensions	WxHxD	1500mm (L, conveyor included) x 1100.2mm (W) x 1860mm (H) 747mm (L, conveyor not included) x 1100.2mm (W) x 1860mm (H)
	Weight	180 kg

Defect Inspection with AI – DIP 100

Features:

- Just a handful of samples for AI modeling
- Automatically reads serial number and other necessary machine-readable information
- Designed for pre-packaging mainboards
- Connect to MES for production alignment and traceability

Specifications:

Vision system	Method	AI algorithm, image comparison
	Camera	15KP color-line-scan camera
	Lens	40um/px M95 mount
	Imaging resolution	0.04mm
	Lighting	White LED light
Inspection performance	Imaging Speed	50mm/sec
Board handling	Max PCB Size	610 x 510mm
	PCB thickness	0.6-2.4mm
	Max PCBA height	125mm
	Conveyor height	710-790mm
Functions	Recognition	Bar codes: Code 39, code 93, code 128, UPC-A Two-dimensional barcodes: QR code, DataMatrix
	Component	Missing, Polarity, Rotation, Shift, Defective, Upside down, Foreign materials
Industrial computer	PC	ASUS workstation
	Display	24" LCD
	OS	Windows 10 Pro
Dimensions	WxHxD	745 x 1800 x 943mm 1500mm (L) x 943mm (W) x 1800 (H, conveyor included) 745mm (L) x 943mm (W) x 1800 (H, conveyor not included)
	Weight	150 kg

Defect Inspection with AI

SMD Incoming Quality Inspection – DIQ 100

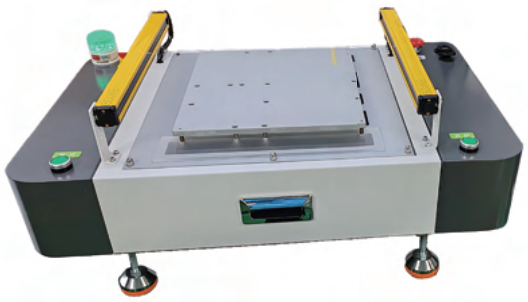
Features:

- Designed to assist with incoming SMD-type component-specification inspection
  * Pre-trained OCR model for surface marking, color dot, and dimensions
  * Inspection performed in 10 seconds

Specifications:

Vision system	Method	AIS special algorithm
	Sensor	26MP camera
	Resolution	26MP camera, +/-0.02mm in laser
Inspection performance	Scanning speed	10 sec/pc
SMD material handling	SMD part size	3x2mm (min) 50x50mm (max)
	SMD part thickness	0.3-10mm
Functions	Inspection	Surface marking, color dot and dimensions
Industrial computer	PC	ASUS PE400D i9-10900E
	Display	24" LCD x 1
	OS	Windows 10 IoT
	Office	None
Dimensions	WxHxL	450mm (W) x 620mm (H) x 350mm (L)
	Weight	22 kg

Board Warpage Inspection - DIW100



Features:

- Suitable for various types of PCBAs
- Board Warpage Inspection
  * Each project user can independently set the tolerance for board warpage.
  * Rapid inspection, measuring only three lines, is sufficient to identify board warpage issues.

Specifications:

Vision system	Method	AIS special algorithm
	Sensor	Micro Laser Distance Sensor * 3
	Resolution	0.1mm
Inspection performance	Scanning speed	150mm/sec
Board handling	PCB Size	@Desktop motherboard model: ITX, mATX, ATX, EATX @Server motherboard model: ITX, mATX, ATX, EATX, 500mm x 630mm
	PCB Thickness	0.6-2.4 mm
	Max PCBA Height	Front: 45mm Back: 10mm
Functions	Inspection	Board Warpage
Industrial computer	PC	ASUS MiniPC N6005/16GB RAM/256GB SSD + 1TB HDD
	Display	24" LCD x 1
	OS	WIN11
	Office	None
Dimensions	WxHxD	@Desktop motherboard model: 788mm x 482mm x 300mm @Server motherboard model: 995mm x 775mm x 300mm
	Weight	@Desktop motherboard model: 40 kg @Server motherboard model: 50 kg

SMT post AOI re-inspection – DIR 100

Features:

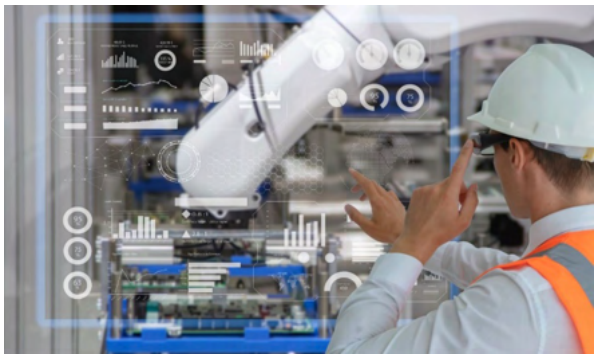
- Pre-built AI model, capable to be pre-installed in E500 workstation
- Resister, Capacitor, Inductor type of component post-reflow oven AOI defect re-inspection on missing, Tombstone, Cold-solder, Side-stood, Skew and short
- Capable for TRI* TR7700Q SII 3rd-gen AOI software inter-operation

  * TRI is 3rd party name and trademark

Specifications:

Vision system	Method	AIS purposely design and built AI algorithm and inference model
	Sensor	Nil
	Resolution	Nil
Inspection performance	Scanning speed	Seamlessly respond within TRI 3rd-gen AOI software working cycle time
File format handling	Input file format	JPG and XML file
	Output file format	JSON
Functions	Inspection	SMT post-reflow oven re-inspection
Industrial computer (embedded)	Computing	ASUS E-500 G9 i9-11900K
	Display	24" LCD x 1
	OS	Windows 11 Pro
	Office	None
Dimensions	WxHxL	190mm (W) x 435mm (H) x 423mm (L)
	Weight	12.1 kg

AR Smart Glasses System – ARG1000



Features:

- **Smart inspection - mobile situation room (Machine condition and manufacturing dashboards)**
  AR glasses swiftly scan QR codes on equipment or dashboards, providing instant access to vital information. This enables hands-free machine inspections and maintenance, enhancing operational efficiency.

- **Remote collaboration**
  AR glasses facilitate seamless remote guidance for training, maintenance, and issue resolution. On-site operators connect with experts who guide them in real-time through the backend system, ensuring prompt issue resolution.

Specifications:

Smart inspection	Operation	Gesture support requires Jorjin J7EF+ Voice support requires MX1,MC1,AR01-BTR (explosion proof)
	QR code	V
	Identity authentication	V
	Machine condition	V
	Manufacturing dashboards	V
Remote collaboration	Video-call function	One-way video streaming (AR glasses => server) Two-way voice-call function (AR glasses <=> server) Voice calls between smart glasses Video recording Video wall with up to four AR glasses simultaneously Photo transmission Network environment check, and network-bandwidth optimization if needed
	Push messages	One-on-one voice push Group-voice push
	Remote collaboration	Electronic whiteboard AR glasses support the display of SOP files (PDF/images/MP4)

Recommended Hardware Specifications:

AR glasses	Supports Jorjin J7EF PLUS, BT-45C, MX1, MC1, AR01-BTR (explosion proof)
Smart phone	Supports ASUS ROG Phone 6 Supports Android 8.0 or above USB Type-C, supporting DisplayPort Alt Mode
PC	Minimum requirements： Processor: Intel Core i5 or above Memory: 8GB or above OS: Windows 10/Windows 11, 64-bit editions Internet speed: 100Mbps or above

CHAPTER 16

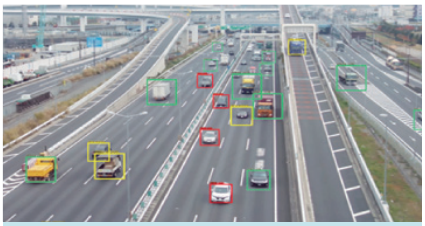
Software & Services

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



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

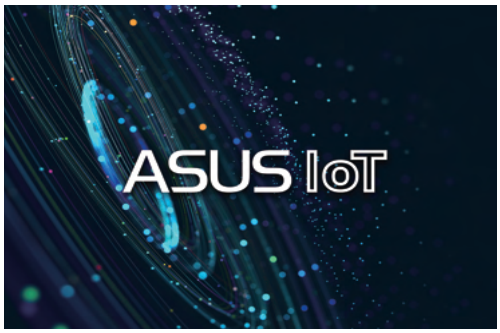
Data Monitoring

Responsive Web Design

Free Trial

ASUS Android & Linux FOTA

ASUS IoT and Tinker Board's Android & Linux FOTA is an advanced system for seamless updates. Tailored for ASUS IoT devices and Tinker Boards, it streamlines firmware updates without manual intervention. Users receive timely notifications, and the FOTA mechanism provides flexibility for update installation, aligning with user preferences. Security is paramount, ensuring a protected IoT and Tinker Board ecosystem with prompt delivery of patches for vulnerabilities. In essence, ASUS IoT and Tinker Board's FOTA prioritizes user convenience and security for an optimized and secure experience.



ASUS Official Image Update

Offers seamless official image updates for devices, ensuring an easy way to keep devices current with the latest features and security enhancements directly from ASUS.

Customized Image Updates via a Single Cloud Portal

Provides personalized image updates via a single cloud portal, empowering users to tailor device updates to specific preferences for a flexible and user-centric experience.

On-Premises Image Update

Enables on-premise image updates, giving organizations local control for firmware deployment, ensuring heightened security and meeting strict data governance requirements.

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

ASUS IoT Middleware

ASUS IoT Middleware simplifies system customization and application development on ASUS IoT platforms, by providing easy-to-use tools to configure and protect systems. It takes just a few clicks to configure a plethora of interfaces and options, including GPIO, UART, I2C, I2S, SPI, PWM, boot logo, power-on schedule, fan-trigger thresholds, watchdog and more.

The suite also provides a rich set of APIs that empower you to take full advantage of ASUS hardware. These include an SDK, sample code and programming guides. It also offers cross-platform support for Windows, Linux and Android.

In addition to the provision of industrial protocols such as Modbus, MQTT, BACnet, ASUS IoT Middleware enables automatic network recovery and network failover to eliminate worries about disconnections — and ensuring that systems are always online and available.

Key Features

Config & Protection Tools

- Easily builds and testing
- Watchdog and fan control
- Scheduled power cycling

API

- Fully access ASUS IoT hardware
- Supports Windows, Linux, Android
- EAPI supported

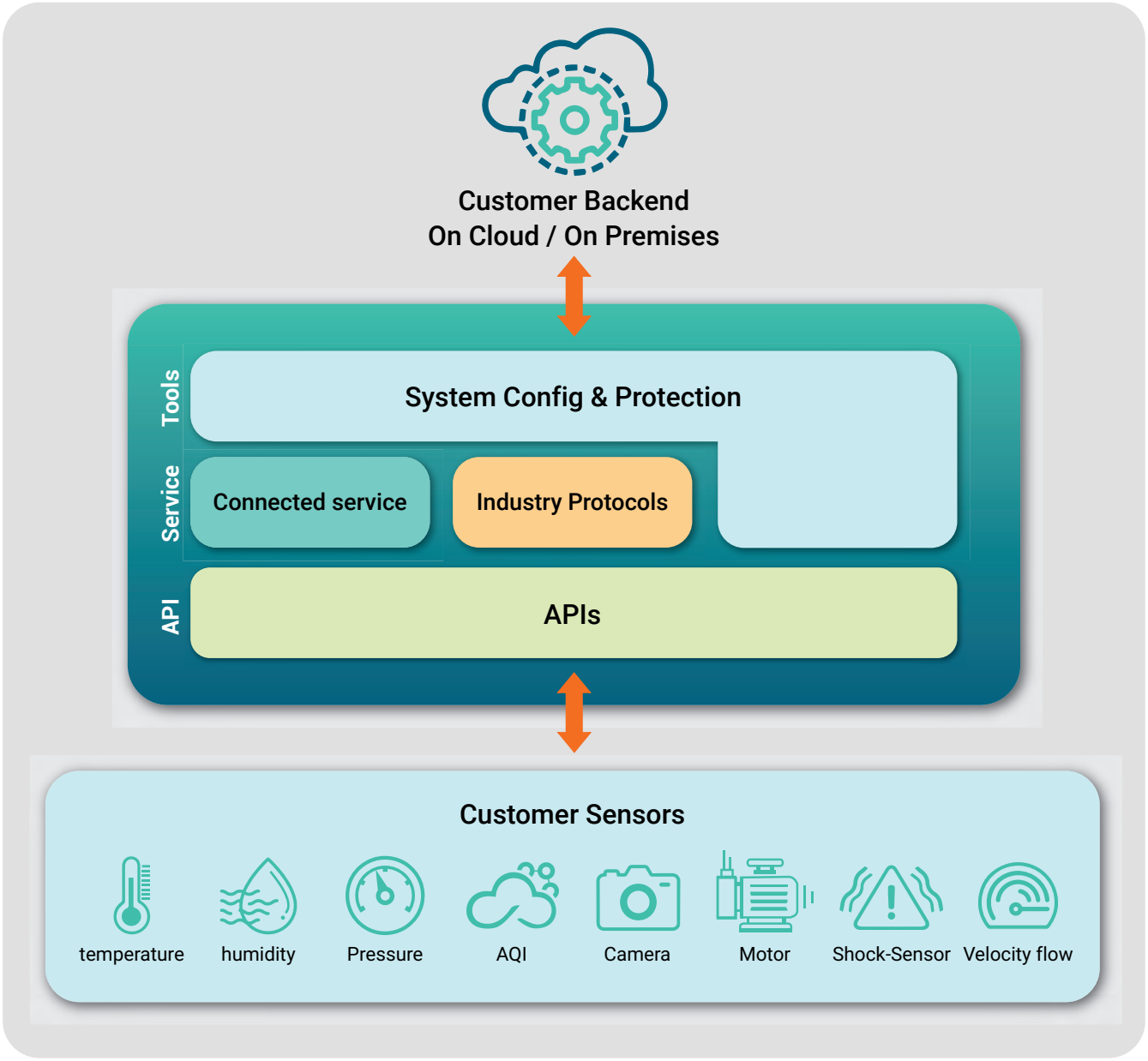
Always Connected

- Network auto-recover
- Network auto-failover
- Always connected

Protocols & Framework

- Supports Modbus, MQTT, and BACnet
- Connects sensors and backends
- Pluggable edge intelligence

System Diagram



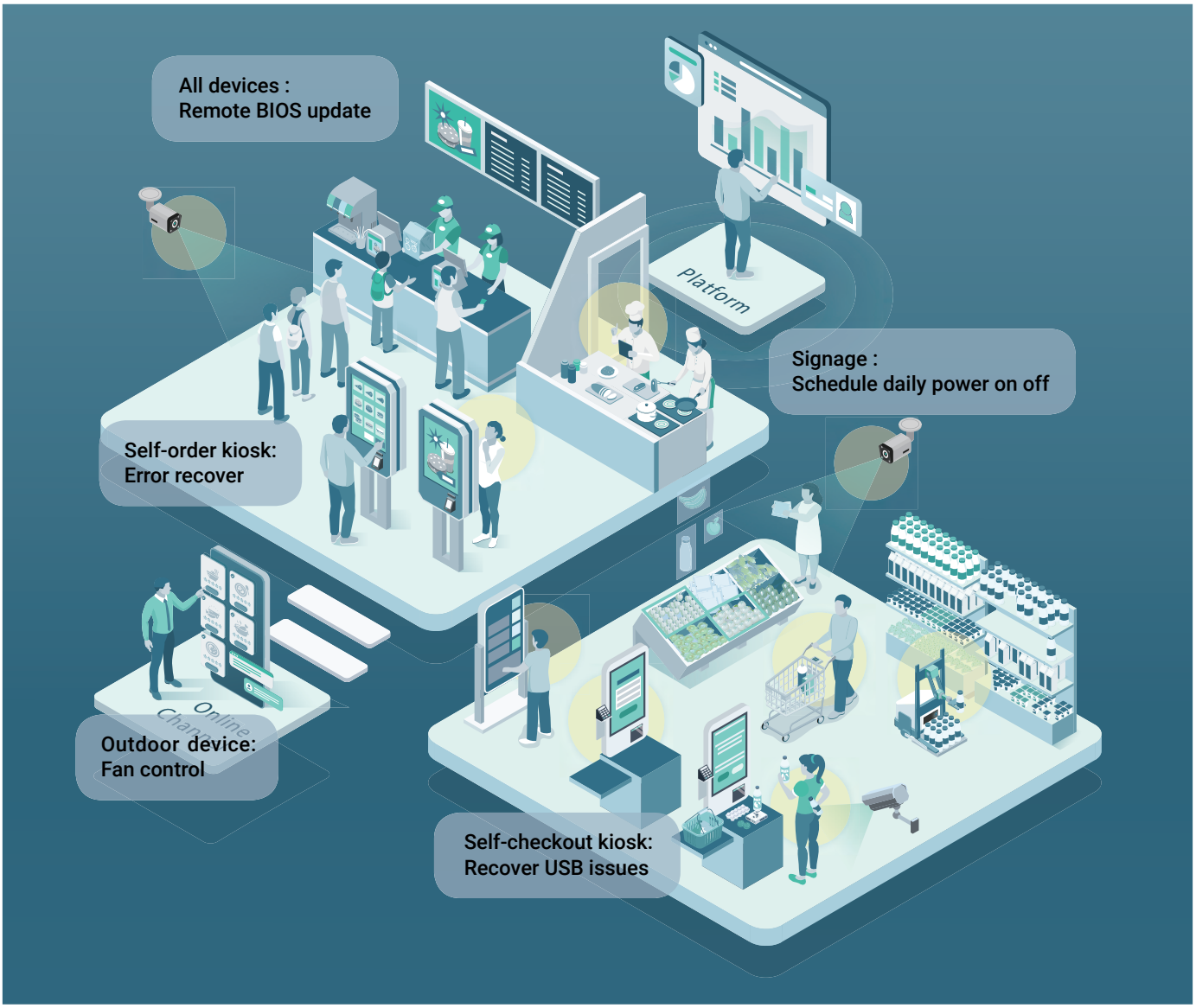
Key Features

Function	API classes
System monitoring and Protection	Hardware monitor and board-info API
	Fan-control API
	Scheduled power-cycling API
	Watchdog API
	Buzzer API
Peripheral	G sensor / RTC / COM / Wakeup API
	GPIO (DIO) API
	I²C API
	SPI API
	UART API
	PWM API
Connectivity	Automatic network recovery
	Automatic networks failover
Protocols and framework	Sensor framework
	Protocols (MQTT, Modbus, BACnet)

AICC EDGE

On-Prem Secure | Schedule Routine Tasks | Remote Monitor and Update

Introducing AICC EDGE, revolutionary software designed to optimize your IoT operations through **on-premises infrastructure**, **schedule routine tasks**, **remote monitor and update**. Our integrated design ensures your sensitive IoT data is secured on premises, **effortless routine tasks management**, and super-convenient remote control and update.



AICC EDGE offers a supercharged solution with **operational intelligence** and management tools. Our comprehensive **routine automation** includes remote monitoring, control, troubleshooting, app deployment and device management for streamlined IoT deployments.

The key features of AICC EDGE include **on-premises infrastructure**, **schedule routine tasks**, **remote monitor and update** to address diverse use cases, from monitoring outdoor drive-through kiosks to conducting remote BIOS updates. Elevate your IoT operational efficiency with our comprehensive solution.

Remote control software optimizes IoT operations **Securely**, **Effortlessly**, and **Remotely** in retail and industry.

Scenarios and Key Features

On-Prem for sensitive IoT data

Schedule routine tasks

All devices:
Performs remote BIOS updates.

Outdoor drive-through kiosk:
Monitors temperature and controls fans.

Self-order kiosk:
Detects and recovers from App errors.

Signage:
Schedules daily power on/off.

Self-checkout kiosk:
Recovers USB issues or locks USB.

Self-order kiosk:
Implements watchdog and recovery mechanisms.

Schedule routine tasks. Effortless management