Solution Brief

IoT Edge
Banking and Retail

ASUS IoT Simplifies the Retail Edge with the Latest Intel® Processors

Fully customized uATX boards from ASUS IoT feature the latest 12th Gen Intel® Core™ processors for IoT Edge that maximize flexibility with an LGA-socketed system-on-chip (SoC) package

ASUS IoT

Retail environments are facing intensive competition from e-commerce and distribution warehouses like Amazon and the constant need to do more with less. IoT solutions for self-serve checkout, point of sale (POS), informational kiosks, and digital signage can help upgrade brick-and-mortar environments with more-engaging customer experiences and faster queue processing.

Many of these solutions have already made an impact, and their demand continues to grow. As of 2022, the valuation of self-checkout systems is USD 3.44B, with a projected compound annual growth rate (CAGR) of 13.3 percent by 2030.[1] Retailers will be looking for manufacturers who can design and deploy the right IoT solutions for their environments to take on future challenges and stay competitive with e-commerce and distribution warehouses.

"We already have a board in production for a leading manufacturer of retail kiosks and self-checkout systems. We're very excited to work with more customers and to showcase our capabilities with the 12th Gen Intel® Core™ platform."

—KuoWei Chao, general manager of the ASUS IoT business unit

Challenges: Retail manufacturers need flexibility, performance, and reliability

IoT-enabled self-checkout, kiosks, and other systems are increasingly taking on more functionality that requires additional processing power. Systems need to support barcode scanners, thermal printers, credit card readers, and internet connectivity to help automate till reconciliations, inventory management, and analytics operations. Also, every brick-and-mortar environment has a unique floor plan and unique needs. Retail manufacturers need to be able to offer customized solutions with stable supply chains to minimize the disruption from deploying new technology.

Solution: 12th Gen–enabled ASUS uATX boards meet manufacturer's needs with a bespoke offering

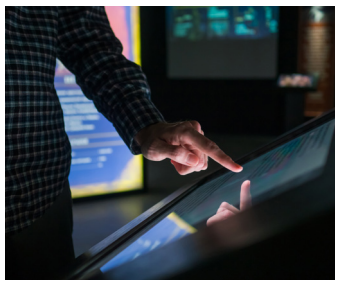
ASUS IoT is embracing the latest 12th Gen Intel® Core™ processors for IoT Edge with custom uATX board designs that they tailor for the needs of each retail manufacturer customer. With this offering, retail manufacturers can build the ideal self-checkout, POS, digital signage, and kiosk solutions for their customers. The processor is key to the offering because it delivers higher performance[2] to handle more concurrent workloads, flexibility to support more connected devices, and platform stability with long-life availability[3] and support for embedded-use conditions on select SKUs.

"We already have a board in production for a leading manufacturer of retail kiosks and self-checkout systems," says KuoWei Chao, general manager of the ASUS IoT business unit. "We're very excited to work with more customers and to showcase our capabilities with the 12th Gen Intel Core platform." With 12th Gen–enabled uATX boards, ASUS IoT can offer a fit-for-form solution to manufacturers that will meet all their needs while providing performance headroom for customer growth. Retailers will also benefit from advanced security features and high-resolution video output to drive engaging customer interactions at their brick-and-mortar locations.

ASUS Retail uATX Motherboard Use Cases

Point of sale (POS) terminals

E-catalog digital signage



Interactive/wayfinding kiosks

Self-checkout

Figure 1: The ASUS IoT uATX motherboard enabled by 12th Gen Intel® Core™ processors for IoT Edge provides high-performance and expansive connectivity to support several dedicated and proven retail solutions.

How it works

ASUS IoT works with retail manufacturers to design, validate, and deploy uATX board solutions featuring the latest 12th Gen Intel Core processors for IoT Edge. The company also offers postdeployment support, with connections to hundreds of local repair centers all around the globe, including 100+ repair centers in the Americas and 150+ repair centers in Europe, the Middle East, and Africa (EMEA). Along every step of the journey, ASUS IoT works with Intel to align product road map availability and match feature sets to use cases such as self-checkout, POS, digital signage, and kiosks. "Intel has been exceptional at offering their expertise and guidance for applications across industries," says Chao. "Many of our customers have used Intel for a long time, and they continue to trust our services and quality because they're backed by Intel. I seldom hear a preference for any other technology provider."

A closer look at the 12th Gen Intel® Core™ processor for IoT edge

Performance

- LGA-socket processor with built-in platform controller hub (PCH)
- Up to 14 cores and 20 threads, with performance hybrid architecture[4]
- Up to DDR5-4800 memory

Graphics

- Intel® Iris® Xe graphics with 96 execution units
- Support for 4x 4K60 displays (or one 8K display) with Pipelock video synchronization

Expansion

- Up to 8x PCIe 4.0 lanes and 12x PCIe 3.0 lanes
- Up to 4x Thunderbolt™ 4/USB4 ports
- Integrated 1GbE LAN, with optional discrete 2.5GbE LAN and Intel® Wi-Fi 6E

Manageability and stability

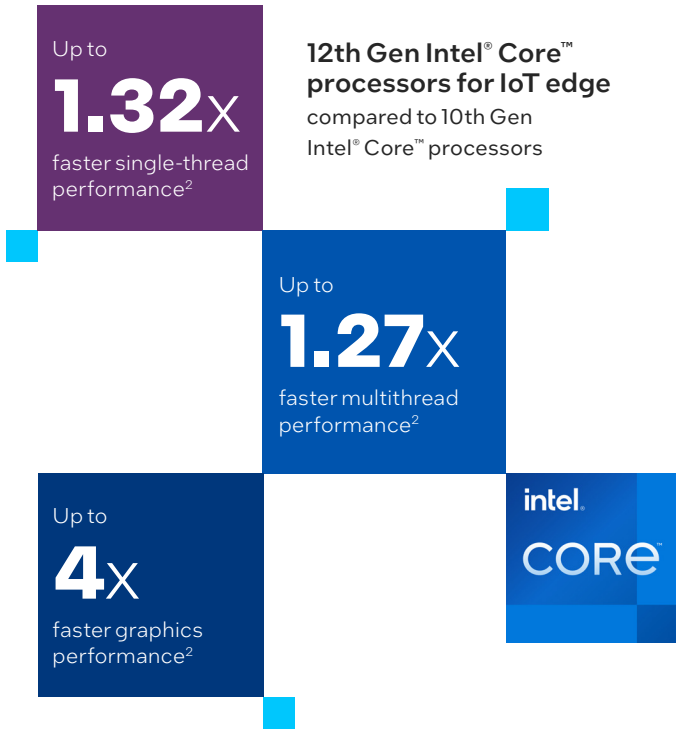
- Intel vPro® platform enabled with Intel® Active Management Technology (Intel® AMT)
- Long-life availability[3]

Design flexibility in an LGA socket

The 12th Gen Intel Core processor for IoT Edge is a multichip package—processor and platform controller hub (PCH) in a single chip—that combines the higher performance and processor base power of an LGA-socket processor with system-on-chip (SoC) compactness. This configuration enables ASUS IoT to design motherboards that pack full features and functionality into a single small form factor board that can fit virtually anywhere, such as on the back of a digital signage display.

Higher performance and more memory for better multitasking

The multichip package also features performance hybrid architecture,[4] with up to six multithread Performance-cores (P-cores) for primary workloads and up to eight single-thread Efficient-cores (E-cores) that specialize in background tasks. Together, the platform with up to 14 cores and 20 threads delivers efficient multitasking to support multiple apps and workloads on a single platform while delivering up to 1.32x faster single-thread performance and up to 1.27x faster multithread performance compared to previous-generation processors.[2]



10th Gen Intel® Core™ processors are the previous generation in this series for IoT edge. For workloads and configurations, visit intel.com/PerformanceIndex. Results may vary.

Integrated graphics support rich 4K60 visual display

Digital signage and interactive kiosks are becoming essential to helping brick-and-mortar retail stores deliver engaging content, directions, and interactivity to experience-hungry customers. ASUS IoT uATX boards enabled by 12th Gen Intel Core processors for IoT Edge feature integrated Intel® Iris® Xe graphics with up to 96 graphics execution units. The processor platform can support up to four concurrent 4K60 displays or one display at 8K resolution and deliver up to 4x faster graphics performance compared to previous-generation processors.[2] As a result, retail manufacturers can deliver crisp images and interfaces for interactive floor plans, product displays, and checkout screens without the need for an expensive discrete GPU.

PCIe 4.0 connectivity and Thunderbolt™ 4/ USB4 for more connected devices

POS self-service checkout stations need to support multiple peripheral devices, including barcode scanners, thermal printers, credit card readers, a high-definition display and internet connectivity for bank authorizations, till reconciliations, inventory management, and more. The 12th Gen processor platform supports up to 8x PCIe 4.0 lanes and 12x PCIe 3.0 lanes, up to four Thunderbolt 4/USB4 ports, and integrated 1GbE/discrete 2.5GbE LAN or optional support for Intel® Wi-Fi 6E. On top of this, ASUS IoT adds in serial connection interfaces, including RS-232, RS-422, and RS-485, depending on the retail manufacturer's needs.

Hardware-enabled security helps lock down the platform

Intel® Converged Security and Management Engine on 12th Gen Intel Core processors for IoT Edge is an isolated management engine that operates below the OS and authenticates firmware while helping protect software assets from attackers, malware, and tampering. With this capability, ASUS IoT can lock down the motherboard to prevent unauthorized CPU replacements or unwanted changes to the firmware and BIOS. Each device can perform predictably and be resistant to unwanted changes while ASUS IoT pledges postdeployment service should any such updates or replacements be needed.

ASUS IoT platform expansion support with 12th Gen Intel® Core™ processors for IoT edge

Rich display
Up to 4x 4K60 displays or 1x 8K display

POS devices
Barcode scanner, thermal printer, credit card reader

Internet connectivity
Integrated 1GbE/discrete 2.5GbE LAN, optional Intel® Wi-Fi 6E

Remote manageability
Intel vPro® platform ready with Intel® Active Management Technology

Intel vPro® platform-enabled remote manageability

Select SKUs of the 12th Gen Intel Core platform are Intel vPro technology-enabled and support the ability to update or repair systems remotely. ASUS IoT offers uATX boards with this feature set enabled so that retail manufacturers can either provide Intel vPro platform-enabled support to their customers or pass these capabilities forward to the customers themselves. In the former scenario, retail manufacturers could potentially offer a fully managed service for kiosks and self-checkout stations with remote IT support in a complete, value-added offering.

Supply chain stability helps maximize validation cycle value

Backed by Intel, ASUS IoT uATX boards with the 12th Gen platform feature long-life availability[3] of up to seven years. Once retail manufacturers have validated and verified a solution offering, they can continue to rely on a steady supply chain of uATX boards with 12th Gen processors for years afterward. ASUS IoT also helps manufacturers prepare for future cycles by issuing end-of-life (EOL) notices up to one year in advance and last-buy-order (LBO) notices six months in advance.

Conclusion: Customized uATX boards simplify entry into retail IoT

ASUS IoT boards with 12th Gen Intel Core processors for IoT deliver a balanced combination of performance and flexibility for many retail edge solutions. By working directly with ASUS IoT, manufacturers can get a fits-just-right motherboard to complete their self-checkout, digital signage, or kiosk offering that they can produce at scale, with a global infrastructure of service and support backing them up. This solution can help established retail manufacturers maintain their competitive advantage or help new manufacturers find a competitive advantage and gain a foothold in a growing market.

Learn more

Explore ASUS IoT offerings and contact a representative at **iot.asus.com/industries/retail**.

Discover the value of 12th Gen Intel Core processors for IoT edge at **intel.com/12thgeniot**.

About ASUS IoT

ASUS IoT, a subbrand of ASUS, is dedicated to the creation of incredible solutions for AI and IoT embedded systems. ASUS IoT strives to deliver best-in-class products and services by partnering with customers in the development of fully integrated and rapid-time-to-market applications.

iot.asus.com

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Notices and disclaimers

1. "Self-checkout Systems Market Size, Share & Trends Analysis Report by Component (Systems, Services), by Type (Cash Based, Cashless Based), by Application, by Region, And Segment Forecasts, 2022-2030," Grand View Research, 2022, grandviewresearch.com/industry-analysis/self-checkout-systems-market.
2. Performance results are based on Intel measurements as of June 2022.

   12th Gen Intel® Core™ processor
   Processor: Intel® Core™ i7-12800HL PL1=45W, (6P+8E) 14C20T turbo up to 4.8 GHz
   Graphics: Intel® Iris® Xᵉ graphics with up to 96 EUs
   Memory: DDR5-4800 64 GB
   Storage: Samsung SSD 970 EVO Plus 1 TB
   Platform/motherboard: Intel® Alder Lake PS DDR5 RVP
   OS: Windows 10 Enterprise LTSC 21H2
   BIOS: ADLPFWI1.R00.3137.B00.2203291427 03/29/2022
   CPUz microcode: 416h

   10th Gen Intel® Core™ processor
   Processor: Intel® Core™ i7-10700 PL1=65W TDP, 8C16T, turbo up to 4.8 GHz
   Graphics: Intel® UHD Graphics 630
   Memory: DDR4-2933 64 GB
   Storage: Samsung SSD 970 EVO Plus 1 TB
   Platform/motherboard: ASRock IMB-1221-L Mini-ITX
   OS: Windows 10 Enterprise LTSC 21H2
   BIOS: AMI UEFI 03/23/2021
   CPUz microcode: CAh

   Workloads

   SPEC CPU2017 is a benchmark from the SPEC consortium (spec.org) that measures computer performance and throughput using compute-intensive application subtests.

   3DMark Fire Strike measures DirectX 11 gaming performance for PCs and includes two graphics tests, a physics test, and a combined test that stresses the CPU and GPU.

   MLPerf Inference Edge v1.1/Mobile with Offline Scenario using OpenVINO™ 2021.4.1 framework is a benchmark suite for measuring how fast systems can process inputs and produce results using a trained model on Intel® UHD Graphics. Result not verified by MLPerf. MLPerf name and logo are trademarks. See mlperf.org for more information.
3. Intel does not commit or guarantee product availability or software support by way of road map guidance. Intel reserves the right to change road maps or discontinue products, software, and software support services through standard EOL/PDN processes. Contact your Intel account rep for additional information.
4. Performance hybrid architecture combines two new core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die. Select 12th Gen Intel® Core™ processors (certain 12th Gen Intel® Core™ i5 processors and lower) do not have performance hybrid architecture, only P-cores.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. For more complete information about performance and benchmark results, visit intel.com/PerformanceIndex.

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