premio

RETAIL AUTOMATION EDGE COMPUTING

Choosing Between Compact Edge Computing and AI Vision Computing for Smart Retail

FANLESS MINI COMPUTERS

BCO-500-SERIES

BCO 500 ROK | BCO 500 ADL | BCO 500 MTL

ENTRY LEVEL AI EDGE COMPUTERS

JCO-1000-SERIES

JCO-1000-ORN-A | JCO-1000-ORN-B | JCO-1000-ORN-C

POWERING SMART RETAIL APPLICATIONS

- POS & Self-Checkout
- Self-Service Kiosks
- Digital Signage
- Smart Vending
- Queue & People Counting
- Loss Prevention & Shelf Monitoring

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Introduction: Start with the Workload, Not the Product

Retail automation now extends well beyond conventional point-of-sale systems. A modern store may contain self-service ordering stations, checkout terminals, digital menu boards, information kiosks, smart vending systems, inventory terminals, surveillance cameras, and AI-assisted analytics platforms. Although these systems may all be described as edge-computing applications, they do not necessarily require the same computing architecture.

Some retail systems primarily execute conventional software. They run an operating system, display an interface, communicate with peripherals, manage transactions, play media, or exchange data with store and cloud platforms. These applications generally benefit from balanced processor performance, broad software compatibility, reliable connectivity, and a compact fanless design.

Other retail systems are built around computer vision. They continuously ingest video, execute trained neural-network models, and generate decisions or alerts from images. Queue monitoring, people counting, shelf analysis, and video-based loss prevention can therefore require a computing platform designed specifically for accelerated AI inference.

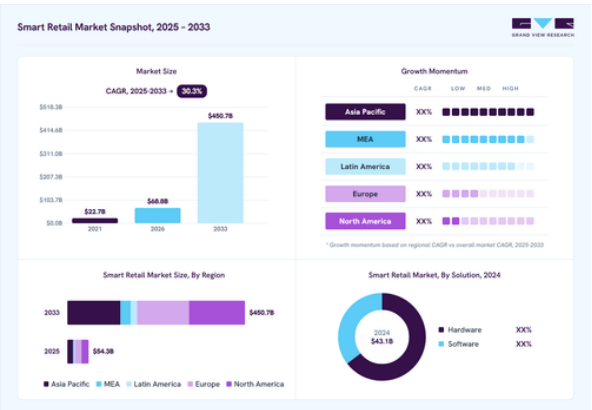


Figure 1: Global smart retail market growth, 2024–2033 (Source: Grand View Research)

According to Grand View Research, the global smart retail market was valued at USD 43.1 billion in 2024 and is projected to reach USD 450.7 billion by 2033, representing a compound annual growth rate of 30.3% from 2025 to 2033. The same research identifies smart payment systems, interactive kiosks, digital displays, surveillance cameras, edge computing, artificial intelligence, and sensor technologies as contributors to the expanding smart retail hardware market.

This projected expansion indicates that retailers will deploy increasingly diverse combinations of transactional systems, connected devices, interactive displays, and AI-enabled equipment. As the number of applications grows, selecting one computer for every workload can create unnecessary cost, complexity, or performance limitations. A more effective strategy is to classify the workload first and then select the architecture that best supports it.

This toolkit helps retail solution architects, system integrators, embedded engineers, and technical product managers answer two practical questions:

- Does the application require a general-purpose compact edge computer or a dedicated AI vision computer?
- When a general-purpose BCO-500 platform is appropriate, when a dedicated AI vision computer is appropriate and which processor variant best matches the application?

The purpose is not to declare one architecture universally superior. It is to help decision-makers select the platform whose processor, software environment, connectivity, and acceleration capabilities align most closely with the intended retail workload.

Chapter 1: Identify the Retail Application Before Selecting the Hardware

The first decision should be based on the application's primary processing task. A system that controls a kiosk and a system that analyzes several video streams may both operate inside the same store, but their compute requirements are fundamentally different.

For this toolkit, retail workloads are divided into two broad categories:

- **General-purpose retail edge computing**
- **AI vision computing**

General-purpose systems primarily run applications, interfaces, media, databases, or device-control software. AI vision systems primarily analyze images or video through accelerated neural-network inference.

Retail Application Decision Guide

Retail application	Primary processing requirement	Initial platform recommendation
POS terminal	Operating retail and transaction software	BCO-500 Series
Self-service kiosk	Interface, application, and peripheral control	BCO-500 Series

Retail application	Primary processing requirement	Initial platform recommendation
Self-checkout station	Transaction software and connected devices	BCO-500 Series
Digital signage	Media playback and content management	BCO-500 Series
Smart vending system	Application and machine control	BCO-500 Series
Store automation gateway	Data aggregation and device communication	BCO-500 Series
AI-assisted kiosk	Application processing with moderate local AI	BCO-500-MTL

Retail application	Primary processing requirement	Initial platform recommendation
Queue monitoring	Camera-based detection and analytics	JCO-1000-ORN
People counting	Computer-vision inference	JCO-1000-ORN
Shelf monitoring	Image or video analysis	JCO-1000-ORN
Video-based loss prevention	Continuous AI surveillance analysis	JCO-1000-ORN
Camera-assisted checkout	Real-time vision inference	JCO-1000-ORN

These recommendations are architectural starting points. Final suitability depends on the software stack, number and type of peripherals, camera interfaces, model complexity, environmental requirements, and expected performance.

Point-of-Sale Terminals

A POS terminal normally runs transaction software and connects to devices such as barcode scanners, payment terminals, customer displays, receipt printers, and network services. Its primary requirement is dependable application execution rather than continuous deep-learning inference.

For this type of workload, an x86 BCO-500 configuration is the logical starting point. The BCO-500-ADL offers Intel Alder Lake-N processor choices, DDR5 memory, dual independent display outputs, four USB 3.2 ports, two COM ports, and dual 2.5GbE LAN. These specifications may support the application, display, and peripheral requirements common to retail terminals, although compatibility with each payment device and software package must be validated separately.

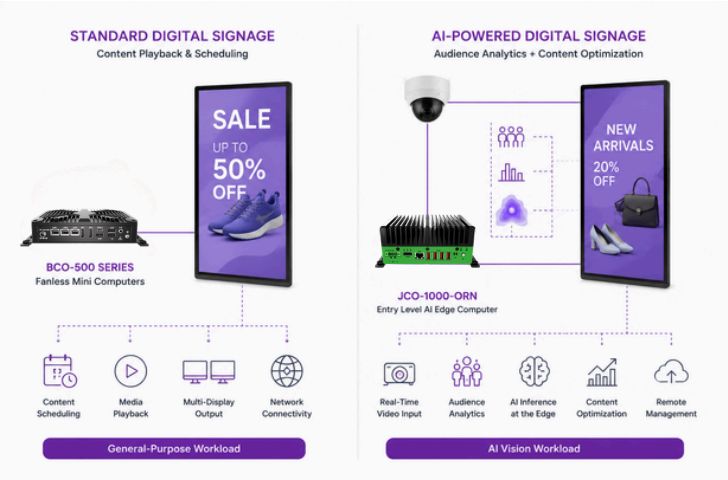
Self-Service Kiosks and Self-Checkout

Self-service systems combine an application interface with touch input, displays, scanners, payment equipment, printers, and network connectivity. Their workload is typically centered on business software and peripheral coordination.

A BCO-500 system is therefore generally more appropriate than a dedicated Jetson AI computer when the kiosk does not continuously analyze camera data. The exact BCO-500 variant should be selected according to operating system requirements, application performance, display configuration, and whether modest local AI acceleration is needed.

A kiosk that runs a standard Windows application may favor the BCO-500-ADL or BCO-500-MTL. An Android- or Linux-based kiosk designed around an ARM software stack may instead be suited to the BCO-500-ROK.

Digital Signage

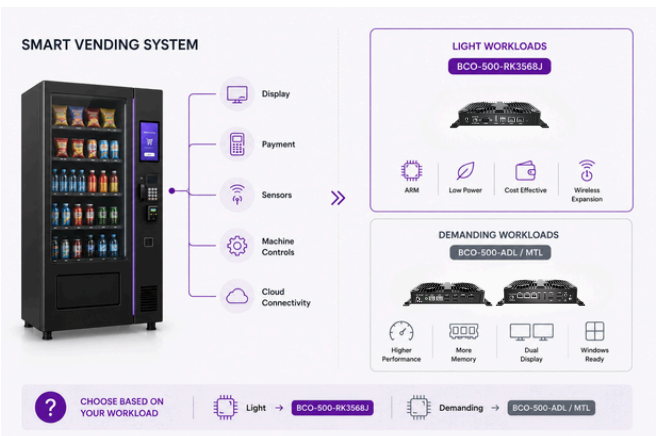


Digital signage requires reliable display output, media playback, content scheduling, network connectivity, and dependable application execution. These tasks differ significantly from AI inference, even when the signage system displays high-resolution multimedia content.

The BCO-500-RK3568J provides one HDMI output, while the BCO-500-ADL supports one HDMI port and one DisplayPort for dual independent displays. The BCO-500-MTL provides two DisplayPort outputs. The appropriate model depends on the required operating system, display interfaces, number of displays, application software, and overall processing requirements.

Digital signage becomes a different architectural consideration when it incorporates real-time computer vision. A system dedicated to scheduling and displaying content remains a general-purpose edge computing workload. However, when the deployment continuously analyzes camera feeds for functions such as audience measurement, occupancy detection, or customer behavior analysis, the AI inference workload should be evaluated separately. In these scenarios, a dedicated NVIDIA Jetson-based platform such as the JCO-1000-ORN Series may be a more suitable architecture for the vision-processing component, while the BCO-500 Series continues to manage signage playback and application control.

Smart Vending and Retail Device Control

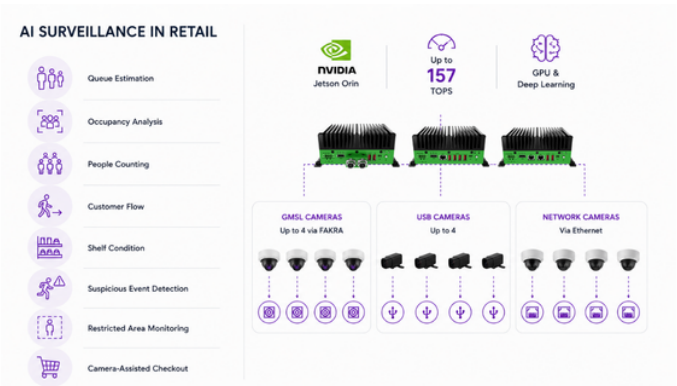


Smart vending systems can combine displays, payment devices, inventory sensors, machine controls, and cloud connectivity. The computing workload may remain relatively light when the system primarily manages interfaces, communications, and connected equipment.

The ARM-based BCO-500-RK3568J can be considered for Android or Linux deployments where its fixed memory and storage configuration meets the application requirements. It includes a Rockchip RK3568J quad-core Cortex-A55 processor, 4 GB LPDDR4 memory, 64 GB eMMC storage, two USB 3.0 ports, three configurable RS-232/422/485 ports, subject to final SKU confirmation, two Gigabit Ethernet ports, HDMI, CAN bus, and M.2 expansion for supported wireless connectivity.

More demanding vending applications, particularly those developed for Windows or requiring greater memory capacity, may be better aligned with an Intel-based BCO-500 variant.

AI Surveillance and Video Analytics



AI surveillance differs from ordinary video recording. It involves executing algorithms that detect, classify, or track objects and events within live or recorded camera streams.

Retail applications may include:

- Queue-length estimation
- Occupancy analysis
- People counting
- Customer-flow measurement
- Shelf-condition detection
- Suspicious-event identification
- Restricted-area monitoring
- Camera-assisted checkout

These workloads can benefit from the GPU, deep-learning accelerators, and NVIDIA software ecosystem available through Jetson Orin modules. Premio's JCO-1000-ORN Series supports Jetson Orin Nano and Orin NX module configurations, with available AI performance depending on the module and configured operating mode. Premio lists a maximum of up to 157 TOPS for supported high-end configurations rather than for every JCO-1000-ORN system.

The number and type of cameras must also be evaluated at the model level. For example, Premio identifies the JCO-1000-ORN-B configuration as supporting four GMSL cameras through onboard FAKRA connectors. This capability should not be generalized to every JCO-1000-ORN variant, and USB, network, or GMSL camera compatibility should be confirmed during system design.

The First Decision

A useful first question is:

Is the computer mainly running a retail application, or is it mainly interpreting camera data?

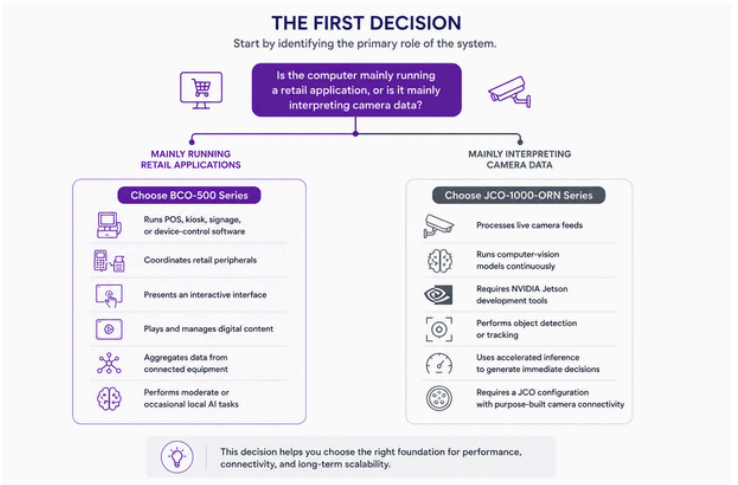
Choose the BCO-500 Series as the starting point when the system primarily:

- Runs POS, kiosk, signage, or device-control software
- Coordinates retail peripherals
- Presents an interactive interface
- Plays and manages digital content
- Aggregates data from connected equipment
- Performs moderate or occasional local AI tasks

Choose the JCO-1000-ORN Series as the starting point when the system primarily:

- Processes live camera feeds
- Runs computer-vision models continuously
- Requires NVIDIA Jetson development tools
- Performs object detection or tracking
- Uses accelerated inference to generate immediate decisions

Requires a JCO configuration with purpose-built camera connectivity.



Chapter 2: Choose Between General-Purpose Edge Computing and AI Vision Computing

After identifying the application, the next step is to select the computing architecture.

The primary distinction is not simply CPU versus GPU. The decision also involves operating-system compatibility, software ecosystem, model deployment, memory, connectivity, camera interfaces, environmental requirements, power design, and remote maintenance.

BCO-500 Series: Compact Computing for Retail Applications and Device Control

The BCO-500 Series is a family of compact, fanless industrial computers offered with ARM and Intel processor platforms. Within this toolkit, it represents the general-purpose retail edge-computing path.

The series is suitable for evaluation in deployments where the system must execute retail applications, control displays, communicate with connected devices, and process data locally. Because the family includes three different processor architectures, engineers can select a configuration according to the required operating system, performance level, memory, I/O, and AI capability.

The BCO-500 family should not be treated as one identical specification. The RK3568J, ADL, and MTL variants differ materially in processor architecture, memory configuration, display outputs, networking, expansion, temperature range, and software environment.

Key BCO-500 Family Considerations

Compact fanless configurations

ARM and Intel processor choices

Variant-specific operating systems

Display and peripheral connectivity

M.2 expansion options

Wall or DIN-rail mounting options

Wide-voltage DC input

Variant-specific operating temperatures

Integrated AI acceleration on MTL

Application-focused rather than Jetson-focused architecture

When the BCO-500 Path Makes Sense

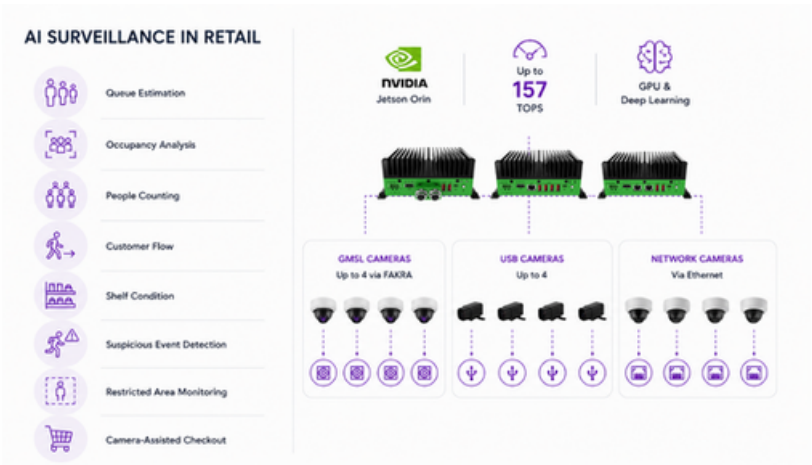
The BCO-500 Series is the logical starting point when the project requires a compact computer for applications such as POS, kiosks, signage, smart vending, retail gateways, and store controllers.

That recommendation remains subject to software validation. Premio's product specifications establish what processors, memory, I/O, display outputs, and expansion interfaces are available, but they do not certify compatibility with every third-party retail application, payment device, display, or peripheral.
Explore compact computing for retail operations.

JCO-1000-ORN Series: Dedicated Edge AI for Vision-Based Retail Systems

The JCO-1000-ORN Series is an NVIDIA Jetson Orin-based family designed for edge AI workloads. Within this toolkit, it represents the dedicated AI vision path for retail projects that require accelerated inference and camera-based analysis.

Premio offers configurations based on Jetson Orin Nano and Jetson Orin NX modules. Available AI performance varies by module, memory capacity, power mode, and software configuration. Premio describes performance upto 67 TOPS for Orin Nano Super modules and 7upto 157 TOPS for Orin NX Super modules on JCO-1000-ORN Series.



The JCO-1000-ORN Series is built on NVIDIA Jetson Orin Nano and Orin NX modules, providing access to the NVIDIA Jetson software ecosystem. These capabilities make the JCO-1000-ORN a candidate for retail vision systems, but application performance must still be benchmarked. TOPS alone does not determine how many camera streams or models a system can process. Results depend on camera resolution, frame rate, model architecture, numerical precision, preprocessing, tracking, memory use, thermal conditions, and required latency.

Key JCO-1000-ORN Considerations

- Jetson Orin Nano and NX options
- Configuration-dependent AI performance
- NVIDIA Jetson software ecosystem
- Four USB 3.2 Gen 2 ports
- NVMe storage support
- Isolated digital I/O
- CAN bus connectivity
- Wireless expansion options
- Variant-specific camera interfaces
- Optional or model-specific remote management

Premio lists four USB 3.2 Gen 2 ports, one 4K-capable HDMI output, NVMe storage through an M.2 M-key interface, isolated DIO, CAN bus, and wireless expansion options for the series. It also identifies out-of-band management on the JCO-1000-ORN-A configuration and four-camera GMSL support on the JCO-1000-ORN-B configuration. These features should therefore be attributed to the applicable configuration rather than assumed across every model.

When the JCO-1000-ORN Path Makes Sense

The JCO-1000-ORN Series should be evaluated when the retail project depends on:

- Continuous neural-network inference
- Object detection or tracking
- Camera-driven automation
- NVIDIA Jetson software compatibility
- Local processing of sensitive or time-critical video
- Configuration-specific GMSL camera support
- Accelerated vision workloads that exceed an integrated NPU's intended role

Explore JCO-1000-ORN >>

When the JCO-1000-ORN Path Makes Sense

Project requirement	Recommended starting point	Reason
Android-based terminal or	BCO-500-RK3568J	ARM platform with listed
Mainstream Windows or Linux	BCO-500-ADL	Balanced x86 CPU, DDR5, dual
Higher-performance x86	BCO-500-MTL	Core Ultra platform with

Project requirement	Recommended starting point	Reason
Occasional or moderate local AI	BCO-500-MTL candidate	Integrated CPU, GPU, and NPU
Continuous computer-vision	JCO-1000-ORN candidate	Jetson Orin acceleration and
Four GMSL camera inputs	JCO-1000-ORN-B candidate	Premio specifies onboard four-
USB-connected AI cameras	JCO-1000-ORN candidate	Four USB 3.2 Gen 2 ports are listed,
POS and peripheral	BCO-500-ADL or MTL	x86 compatibility and multiple
Digital signage without vision	BCO-500 variant	General-purpose display and
Signage with continuous	Separate or combined	Media playback and AI vision have

Questions to Ask Before Finalizing the Architecture

- Which operating system and application framework are mandatory?
- Is AI a secondary feature or the system's primary workload?
- How many cameras will be connected?
- Which camera interfaces are required?

- What model, resolution, frame rate, and latency target must be supported?
- Which peripherals must operate simultaneously?
- How many displays and independent outputs are required?
- What memory and storage capacity will the application need?
- What mounting, power-input, and temperature conditions apply?
- How will deployed systems be updated and recovered remotely?

Chapter 3: Select the Right BCO-500 Model

Once a project has been classified as a general-purpose edge-computing workload, the next decision is selecting the appropriate BCO-500 variant.

The three models do not simply represent low, medium, and high performance. They serve different software environments and integration priorities.

BCO-500-RK3568J: ARM Computing for Android and Linux Deployments

The BCO-500-RK3568J, also presented by Premio within the BCO-500-ROK family, is an ARM-based fanless compact computer built around the Rockchip RK3568J system-on-chip.

Premio specifies a quad-core Arm Cortex-A55 processor operating at up to 2.0 GHz, 4 GB of LPDDR4 memory, 64 GB of onboard eMMC storage, one HDMI output, two USB 3.0 ports, two Gigabit Ethernet ports, two configurable serial ports, CAN bus, and M.2 expansion for supported cellular and Wi-Fi/Bluetooth modules. The listed operating-system options are Android 13 and Debian 11.

This variant is best considered when the retail application has been developed for ARM and its fixed 4 GB memory and 64 GB eMMC configuration are sufficient.

Recommended Evaluation Scenarios

Android digital signage
Linux-based information terminals
Smart vending controllers
Compact IoT gateways
Device-control applications
ARM-based retail interfaces

Key Features

Rockchip RK3568J processor
Quad-core Cortex-A55 architecture
Four-gigabyte LPDDR4 memory
Sixty-four-gigabyte eMMC storage
Android and Linux support
HDMI display output
Dual Gigabit Ethernet
CAN and serial connectivity

Important Limitation

The RK3568J model should not be selected only because it is low power or compact. Engineers must first confirm ARM application compatibility, available memory, storage requirements, peripheral drivers, and the supported operating-system image.

BCO-500-ADL: Balanced x86 Computing for Mainstream Retail Systems

The BCO-500-ADL is an Intel Alder Lake-N-based fanless computer offered with Intel N97 and Core i3-N305 processor options.

Premio lists up to 32 GB of DDR5 memory, one DisplayPort, one HDMI port, dual independent displays, two 2.5GbE LAN ports, four USB 3.2 ports, two COM ports, M.2 B-key and E-key expansion, TPM 2.0 support, and a 12-36VDC input range. Operating-temperature specifications vary by processor configuration, with Premio listing up to -10°C to 50°C for the N97 configuration and -10°C to 45°C for the N305 configuration.

This combination makes the ADL variant a strong general-purpose candidate for x86 retail applications that require balanced performance and multiple peripheral interfaces.

Recommended Evaluation Scenarios

- POS terminals
- Self-service kiosks
- Self-checkout controllers
- Digital menu systems
- Price-checking terminals
- Store management computers
- Dual-display applications
- Retail data gateways

Key Features

- Intel N97 or N305
- Up to 32GB DDR5
- Dual independent displays
- Four USB 3.2 ports
- Dual 2.5GbE networking
- Two serial ports
- TPM 2.0 support
- Wide-voltage DC input

Important Limitation

The BCO-500-ADL does not provide the same dedicated AI architecture as a Jetson Orin platform. It may run CPU- or graphics-based analytics depending on the software, but it should not be positioned as a replacement for a dedicated AI vision computer without application benchmarks.

BCO-500-MTL: Core Ultra Computing with Integrated AI Acceleration

The BCO-500-MTL is the highest-performance BCO-500 option considered in this toolkit. It uses Intel Core Ultra Series 1 processors and integrates CPU, Intel Arc graphics, and an Intel AI Boost NPU.

Premio lists up to 48 GB of DDR5 memory, three Intel 2.5GbE LAN ports, two independent DisplayPort outputs, one USB Type-C Gen 1 port, two USB 3.2 Gen 1 ports, one USB 2.0 port, two COM ports, NVMe or SATA storage support through M.2, wireless expansion, TPM 2.0 support, and a 12-24VDC input range.

The MTL architecture can be evaluated for applications that combine conventional x86 software with local AI features. Examples may include classification, audio processing, recommendation interfaces, or other workloads supported by the selected AI framework.

Recommended Evaluation Scenarios

- AI-assisted kiosks
- Intelligent digital signage
- Interactive retail terminals
- Advanced store controllers
- Local analytics applications
- Higher-performance edge software
- Multi-network retail gateways
- Applications using an integrated NPU

Key Features

- Intel Core Ultra processors
- Integrated Intel AI Boost
- Integrated Intel Arc graphics
- Up to 48GB DDR5
- Triple 2.5GbE networking
- Dual DisplayPort outputs
- USB Type-C connectivity
- NVMe storage support

Important Limitation

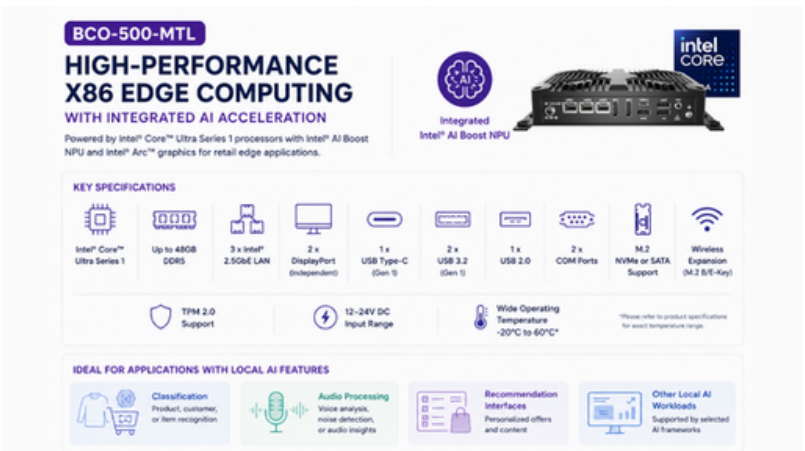
An integrated NPU and a Jetson Orin platform serve different deployment profiles. The presence of an NPU does not automatically make the BCO-500-MTL appropriate for continuous multi-camera inference. Engineers should benchmark the actual model and compare latency, throughput, power use, and framework support before selecting it for vision analytics.

Explore the right BCO-500 configuration >>

BCO-500 Model Decision Matrix

Decision factor	**BCO-500-ROK**	BCO-500-ADL	BCO-500-MTL
Processor architecture	ARM	Intel x86	Intel Core Ultra x86
Listed OS direction	Android 13, Debian 11	Validate required x86 OS image	Validate required x86 OS image
Maximum listed memory	4 GB fixed	Up to 32 GB	Up to 48 GB
Primary positioning	Efficient ARM edge computing	Balanced general-purpose computing	Higher-performance, AI-assisted computing

Decision factor	**BCO-500-ROK**	BCO-500-ADL	BCO-500-MTL
Displays	One HDMI	One DP and one HDMI	Two DisplayPort
Ethernet	Two Gigabit ports	Two 2.5GbE ports	Three 2.5GbE ports
Integrated AI resources	RK3568J SoC	CPU and integrated	CPU, Arc GPU, and
Best initial fit	Android/Linux device	POS, kiosks, and signage	Advanced x86 and
Continuous vision	Requires validation;	Requires validation;	Benchmark carefully
Dedicated Jetson	No	No	No



Chapter 4: Select the Right JCO-1000-ORN Model

Once your project has been identified as an AI vision workload, the next step is selecting the appropriate JCO-1000-ORN configuration.

Although all JCO-1000 models are powered by NVIDIA Jetson Orin Nano or Orin NX modules, they are designed for different deployment scenarios. The primary differences are not AI performance, but camera connectivity, networking, remote management, and industrial certifications. Selecting the right model depends on how your AI application will connect to cameras, where it will be deployed, and how it will be managed over its lifecycle.

JCO-1000-ORN-A: Flexible AI Computing for USB Camera Deployments

The JCO-1000-ORN-A is designed for Edge AI applications using USB or Ethernet-connected cameras. It provides four USB 3.2 Gen 2 ports, one Gigabit Ethernet port, CAN bus, and HDMI output. It also supports an Out-of-Band (OOB) management (SKU Dependent) configuration for remote monitoring and recovery; confirm whether the OOB module is standard or optional for the selected SKU. Unlike the ORN-B and ORN-C models, the ORN-A does not support GMSL2 cameras.

Recommended Evaluation Scenarios

- AI-powered retail kiosks
- Smart checkout with USB cameras
- Queue monitoring using USB cameras
- AI gateways
- Pilot AI deployments
- Remote Edge AI systems requiring OOB management

Key Features

- Up to 4× USB 3.2 Gen 2
- Optional OOB remote management
- NVIDIA Jetson Orin Nano or NX
- 1× RJ45 LAN
- Compact fanless design
- 9–36 VDC input

Important Limitation

The JCO-1000-ORN-A does not support GMSL2 cameras. If your deployment requires multiple synchronized industrial cameras over long cable distances, consider the JCO-1000-ORN-B or C instead.

JCO-1000-ORN-B: Multi-Camera Vision for Retail AI Analytics

The JCO-1000-ORN-B is optimized for applications requiring multiple industrial cameras. It supports up to four GMSL2 cameras through Mini FAKRA connectors, making it well suited for computer vision systems that continuously analyze multiple video streams. It also provides dual Ethernet ports, CAN bus, and industrial certifications for more demanding deployments.

Recommended Evaluation Scenarios

- Multi-camera self-checkout
- Shelf monitoring
- Queue analytics
- People counting
- Loss prevention
- Computer vision research

Key Features

- Up to 4× GMSL2 camera support
- Dual RJ45 LAN
- NVIDIA Jetson Orin Nano or NX
- CAN bus
- Industrial certifications
- 9–36 VDC input

Important Limitation

The JCO-1000-ORN-B does not include the Out-of-Band (OOB) management module available on the A model. Remote management should therefore be implemented through software or external management tools if required.

JCO-1000-ORN-C: Mobile and Vehicle-Mounted AI Systems

The JCO-1000-ORN-C shares the multi-camera capabilities of the B model but replaces standard RJ45 Ethernet with rugged M12 Ethernet connectors for environments where vibration, moisture, and shock resistance are important. It is designed for transportation, mobile robotics, and outdoor AI deployments rather than conventional indoor retail environments.

Recommended Evaluation Scenarios

- Mobile retail vehicles
- Autonomous delivery robots
- Smart transportation
- Outdoor AI systems
- Harsh industrial environments

Key Features

- 4× GMSL2 camera support
- Dual M12 LAN
- Jetson Orin Nano or NX
- Rugged industrial design
- E-Mark certification
- Wide DC power input

Important Limitation

For most fixed indoor retail deployments, the additional ruggedized networking provided by the C model may not be necessary. The B model is typically the more appropriate starting point unless the environment requires vehicle-grade connectivity.

JCO-1000-ORN Model Decision Matrix

Deployment requirement	ORN-A	ORN-B	ORN-C
Four high-speed USB	Yes	No	No
Four GMSL2 cameras	No	Yes	Yes
RJ45 Ethernet	1 port	2 ports	No

JCO-1000-ORN Model Decision Matrix

Deployment requirement	ORN-A	ORN-B	ORN-C
M12 Ethernet	No	No	2 ports
OOB support	Yes	No	No
E-Mark and EN 50121-3-2	No	Yes	Yes

Chapter 5: Retail Scenarios That Clarify the Decision

Scenario 1: Deploying a Self-Order Restaurant Platform

A restaurant operator plans to modernize several locations with touchscreen ordering kiosks, digital menu boards, kitchen displays, receipt printers, and networked payment devices. The ordering application already runs on an x86 operating system and must support multiple USB and serial peripherals. Although the system may later add recommendation features, continuous camera inference is not part of the initial design. The engineering team therefore classifies the project as application-centric rather than vision-centric. A compact x86 edge computer becomes the preferred architecture, with the final processor selected according to software performance, memory, display, and peripheral requirements.

The team compares the balanced ADL platform with the higher-performance MTL platform. ADL is sufficient for the standard ordering and display workload, while MTL remains an option for locations expected to add supported local AI functions. The deployment avoids introducing a Jetson environment where the primary need is conventional application compatibility.

Recommended starting point: BCO-500-ADL, with BCO-500-MTL evaluated for supported AI-assisted functions.

Scenario 2: Building an AI-Enabled Supermarket Analytics System

A supermarket wants to estimate queue lengths, count visitors, monitor selected shelves, and identify events that may require staff attention. Several cameras will generate continuous video streams, and the analytics software has been developed using NVIDIA tools. The required workload includes object detection, tracking, and real-time alert generation. This makes the camera analytics engine fundamentally different from the store's POS terminals and digital displays.

The engineering team evaluates Jetson Orin Nano and Orin NX configurations based on its trained models, stream count, frame rates, and latency targets. It also examines which JCO-1000-ORN configuration provides the necessary camera interfaces, rather than assuming that every model supports the same camera arrangement. The final system is benchmarked with representative video before deployment.

Recommended starting point: A workload-appropriate JCO-1000-ORN configuration.

Chapter 5: Practical Implementation Checklist for Smarter Retail Compute Decisions

This checklist is designed to help decision-makers evaluate application, software, connectivity, AI, and deployment requirements before selecting a BCO-500 or JCO-1000-ORN configuration.

□ Primary Processing Task: Define whether the system mainly executes retail applications and controls connected devices or continuously analyzes images through trained neural-network models. — Is the workload application-centric or vision-centric?

□ Operating-System Compatibility: Confirm that the required retail software, middleware, device drivers, security tools, and management agents support the operating system available for the selected processor architecture. — Has the complete software stack been tested on the proposed platform?

□ **Processor Architecture:** Determine whether the application was developed for ARM or x86 before comparing memory, I/O, and acceleration specifications across the three BCO-500 variants. — Can the application run natively on the selected processor?

□ **AI Workload Definition:** Document the neural-network model, framework, numerical precision, inference frequency, preprocessing steps, latency target, and expected number of simultaneous workloads. — What measurable AI performance must the computer deliver?

□ Camera Configuration: Record every camera's interface, resolution, frame rate, cable requirements, synchronization needs, and environmental placement before selecting a JCO-1000-ORN model. — Does the chosen configuration provide the required camera connectivity?
□ Peripheral Inventory: List all touchscreens, scanners, payment devices, printers, sensors, displays, audio devices, and serial equipment that must operate at the same time. — Are enough compatible ports available without excessive hubs or adapters?

□ Display Requirements: Specify the number of independent screens, physical connectors, maximum resolutions, orientation, and media workload expected from the retail application. — Does the selected model support the entire display arrangement?
□ Memory and Storage: Calculate operating-system, application, database, media, logging, and AI-model requirements with sufficient capacity for updates and future functionality. — Are the model's fixed or maximum capacities adequate?

□ **Network Architecture:** Determine whether the system requires Gigabit or 2.5GbE networking, redundant connections, cellular communication, Wi-Fi, Bluetooth, or isolated management access. — Are the required network interfaces native or supported through expansion?
□ **Environmental Conditions:** Compare expected temperature, airflow, dust, vibration, mounting space, and power quality with the published specifications of the exact product configuration. — Can the unit operate reliably at the installation site?

□ **Remote Maintenance:** Establish how administrators will monitor health, deploy software, restart applications, and recover systems across geographically distributed stores. — Does the chosen model and software stack support the required recovery process?

□ Performance Validation: Test the complete application with representative peripherals, video streams, models, and environmental conditions before approving the platform for volume deployment. — Has the architecture been validated with a realistic pilot?

Completing this checklist reduces the risk of choosing a platform based only on processor branding or peak performance figures. The correct retail computer is the one that satisfies the complete application, software, interface, environmental, and lifecycle requirements with appropriate performance headroom.

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