

Buying Guide

Digital Transformation In Manufacturing Optimized By **Rugged Edge Computers**



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Overview



Current Manufacturing Challenges

Manufacturers are facing production inefficiencies and overwhelmed by increasing demands.



Industry 4.0 Technologies

Adopting edge AI and Industry 4.0 technologies directly address manufacturing pain points.



Rugged Edge Solutions

Optimized edge computing hardware are the driving force to these Industry 4.0 applications.



Current Manufacturing Challenges



Declining Productivity

Overwhelmed production capacity with inefficient processes



Bottlenecked Logistics

Increasing demands outpaces available workforce



Factory Safety Blind Spots

Ineffective redundancy systems to ensure factory floor safety



Production Visibility Gaps

Lacked visibility to oversee full production statuses

Challenge #1

Declining Productivity, Rising Errors

Outdated machinery, manual quality control processes, and a lack of real-time monitoring can lead to costly delays and inefficiencies. With demand outmatching supply, the need for higher productivity and automation is needed to significantly maintain production outputs.



Maximized
Production Capacity



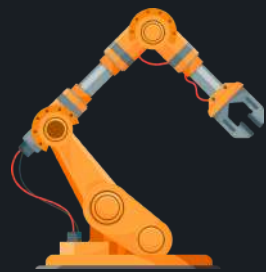
Inefficient Quality
Control



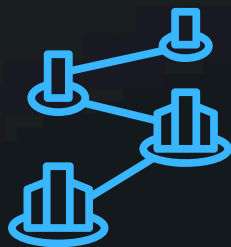
Lack of Machine
Control

Advanced Robotics: Automated For Increased Production

Intelligent robotic systems help automate repetitive and strenuous tasks in manufacturing, addressing production issues and improving efficiency.



Industrial robots and cobots to tackle repetitive tasks



Seamless scalability to meet growing demands



24/7 uptime capabilities



RCO-6000 Series

x86 AI Edge Inference Computer

The RCO-6000 Series maximizes performance and flexibility by leveraging modular EDGEBoost technologies. It can seamlessly be configured to meet both high-specification I/O and edge AI deployment requirements.

[Learn more >>](#)

- ▶ 13th Gen Intel Core Processor (35W TDP)
- ▶ Comprehensive IoT Connectivity
- ▶ EDGEBoost I/O (PoE Support, 10GbE, M12)
- ▶ EDGEBoost Node (GPU, NVMe Storage, PCIe Expansion)

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Smart Robotics



AGV/AMR



Automated Forklifts



NVR Surveillance

BCO-6000 Series

x86 Semi-Rugged Industrial Computer

The BCO-6000 Series features a slim low-profile design with plentiful IoT connectivity readily available on-board. It includes PCIe expansion, enabling support for a low-profile GPU or accommodate additional add-on cards. [Learn more >>](#)

- 13th Gen Intel Core Processor (35W TDP)
- Comprehensive IoT Connectivity
- PCIe Expansion for GPU Acceleration
- Slim, Low-Profile, and Short-Depth Chassis

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Smart Robotics



NVR Surveillance

Machine Vision: AI-Powered Metrology and Quality Inspection

Manual inspection is both time-consuming and prone to human error. By implementing machine vision metrology, inspection solutions can operate at high accuracy and consistency.



Streamlined a strenuous bottleneck in workshop automation



Increased defect detection accuracy and inspection quality



Continuous performance alleviates human errors and fatigue



VCO-6000 Series

x86 Machine Vision Computer

Capable of supporting dual full-height, full-length GPU configurations, the VCO-6000 Series provides maximum edge AI performance and PCIe expandability. It provides IoT connectivity for high fidelity vision cameras.

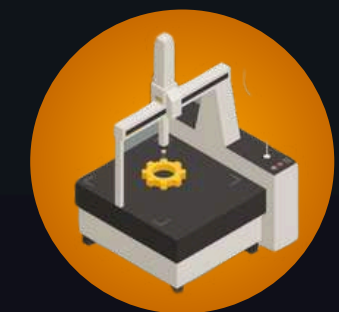
[Learn more >>](#)

- ▶ 13th Gen Intel Core Processor (35W TDP)
- ▶ Dual FHFL GPU Supported
- ▶ PCIe Gen 4 Expansion
- ▶ Hot-swappable NVMe SSD Bays

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Smart Robotics



Quality Inspection

Human-Interface Machines (HMI): Real-Time Telematics & Control With SCADA

HMIs give factory operators full control over machinery and actionable insights, enabling real-time monitoring and precise adjustments to boost productivity and efficiency.



Displays real-time data telematics



Accessibility to machinery controls and analytics



Improves status awareness of machinery



Industrial Touch Panel PCs



HMI Integration

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Industrial Touch Panel PCs are HMI solutions that allow factory personnel to control and access real-time data insights with SCADA systems. These HMIs feature IoT-centric connectivity and industrial-grade reliability. [Learn more >>](#)



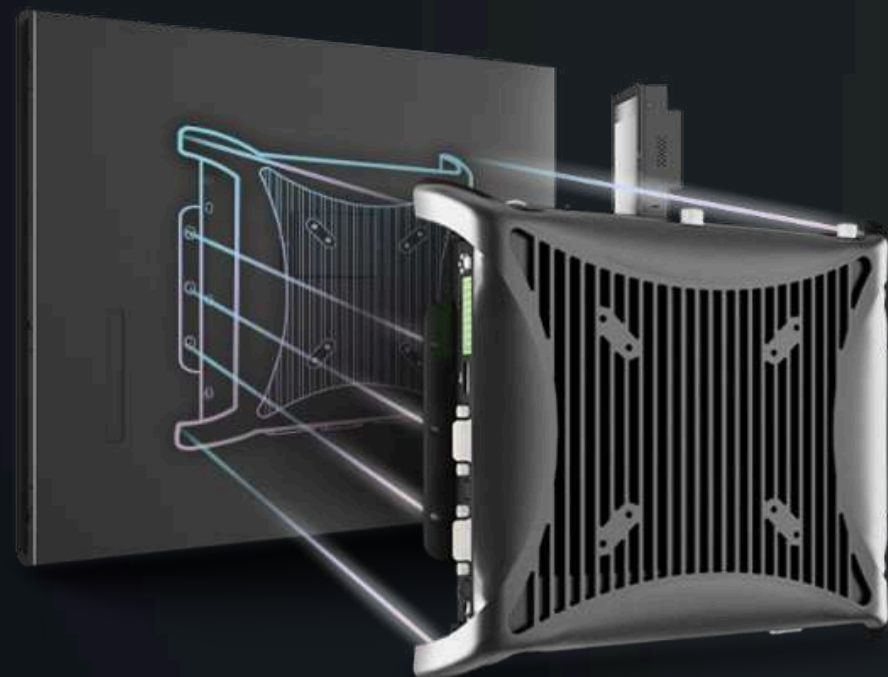
VIO Series

IP65 Modular Panel PC

Intel Celeron & Core Processors

IoT-Centric Connectivity

MDM Modular Technology



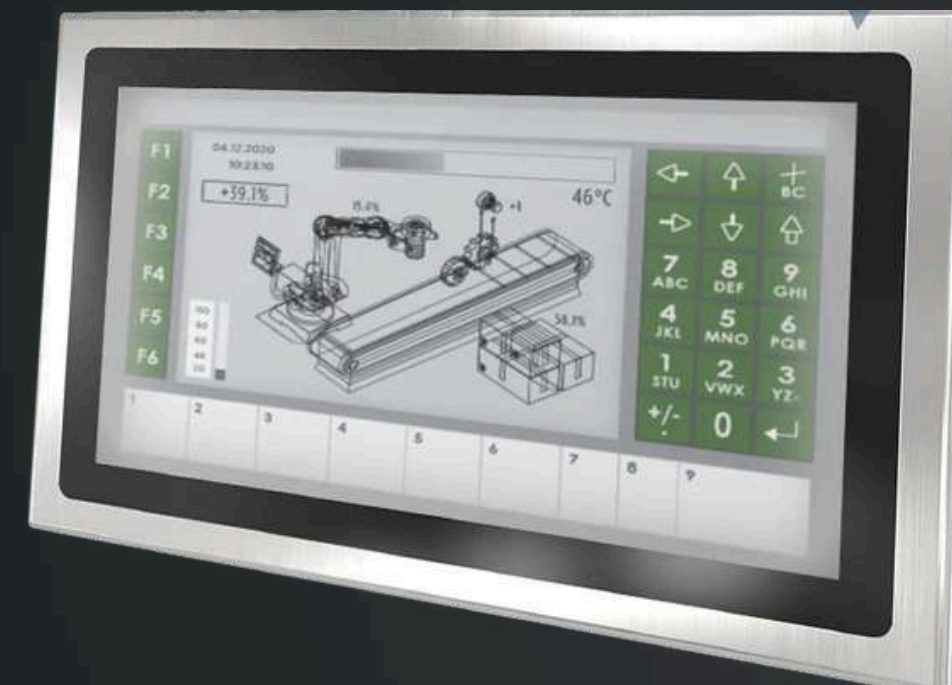
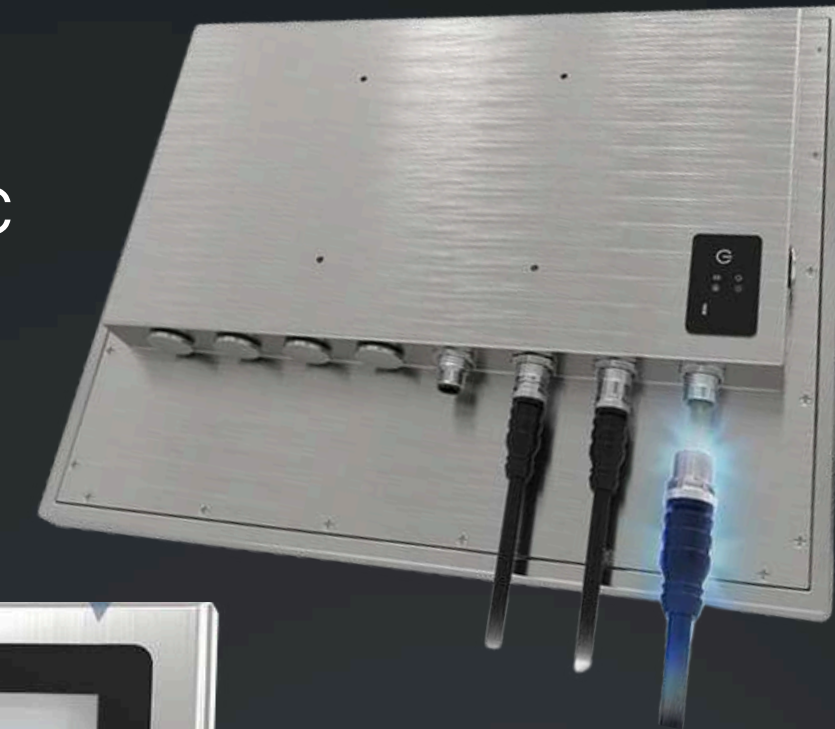
SIO Series

IP66/IP69K Washdown Panel PC

Intel Celeron & Core Processors

Type 316 Stainless Steel Enclosure

M12 Connection Types



Industrial Touch Panel PCs



HMI Integration

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HIO Series

IP65 Open-Frame Touchscreen PC

Intel N97 Processor

Seamless OEM System Integration

Open-Frame Panel Mount

AIO Series

IP65 All-In-One Touchscreen PC

Intel N97 Processor

Simple All-in-One Solution

IoT-Centric Connectivity

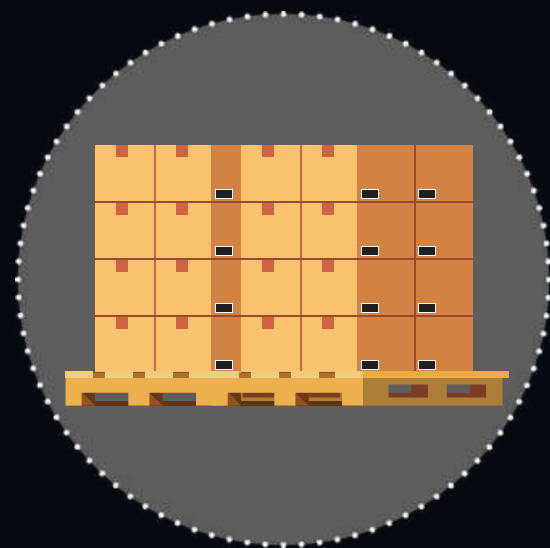
[Learn more >>](#)



Challenge #2

Bottlenecked Logistics

Modern production facilities face growing logistics and material handling challenges as traditional manual transport methods struggle to keep up with demand, leading to inefficiencies and bottlenecks.



Overwhelmed
Material Handling



Lack of Traceability
& Management



Increasing Demand
Outpaces Workforce

AGV & AMRs: Automated Material Handling Vehicles

To overcome manual production and logistics challenges, AGVs, AMRs, and automated forklifts were integrated, enabling efficient 24/7 material handling and warehousing.



Alleviate major warehousing bottlenecks



Heightened logistical efficiency and effectiveness



Improve overall workplace safety



JCO-6000 Series

NVIDIA Jetson Edge AI Computer

Powered an NVIDIA Jetson AGX Orin, the JCO-6000 delivers high-performance for edge AI workloads, plentiful IoT connectivity with EDGEBoost I/O, and support for GMSL vision cameras all within a fanless construction. [Learn more >>](#)

- NVIDIA Jetson AGX Orin (32GB/64GB)
- Up to 4x EDGEBoost I/O (PoE Support, 10GbE, USB 3.2)
- 8x Mini-Fakra connectors for GMSL Cameras
- Out-of-Band (OOB) Management



AGV/AMR



Automated Forklifts



NVR Surveillance

Challenge #3

Factory Safety Blind Spots

Modern manufacturing environments often face safety challenges, struggling with power outages that disrupt production and put worker safety at risk. The lack of effective monitoring and backup systems is creating uncertainty in keeping operations running smoothly.



Unpredictable
Disruptions



Worksite Safety
Concerns



Reactive Response
Times

Smart Security & Surveillance: Proactive AI-Powered Monitoring

Safety is crucial in industrial environments. AI-powered NVR surveillance systems provide early warnings, helping prevent accidents and protect critical assets.



Early detection and warning of facility and personnel distress



Proactive monitoring and protection of assets



Enhancing operational efficiency with AI



JCO Series

NVIDIA Jetson Edge AI Computers



NVR Surveillance



The JCO Series leverages NVIDIA Jetson Orin that combines the CPU, RAM, and GPU into a SoM design for a ruggedized and energy-efficient solution to streamline edge AI workloads. It provides unique features including support for GSML cameras, out-of-band management, and modular EDGEBoost I/O technology. [Learn more >>](#)

JCO-1000 Series



- NVIDIA Jetson Orin Nano (4GB/8GB)
- 40 TOPS of AI Performance
- Ultra-compact form factor

JCO-3000 Series



- NVIDIA Jetson Orin NX (8GB/16GB)
- 100 TOPS of AI Performance
- Comprehensive IoT Connectivity

JCO-6000 Series



- NVIDIA Jetson AGX Orin (32GB/64GB)
- 275 TOPS of AI Performance
- Up to 4x EDGEBoost I/O
- 8x GSML Cameras

SuperCap Power Protection: Mission-Critical Redundancy

Harsh industrial environments create power challenges for mission-critical operations. Supercapacitor UPSs provide industrial-grade redundant power, protecting against outages and ensuring machine and data integrity.



Ensures power reliability in extreme industrial environments



Preserves critical data and system integrity during outages



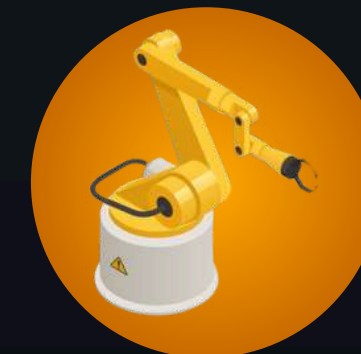
Prevents abrupt shutdowns that can lead to system failure



ECO-1000 Series EDGEBoost EnergyPack

The ECO-1000 Series is an industrial-grade utilizing supercapacitor technology to effectively provide power sustainability in industrial deployments. It features high power density and an extensive lifecycle for reliable power safety in mission-critical operations. [Learn more >>](#)

- Instantaneous Power Backup
- Configurable Smart Power Management Modes
- 10-Year Operating Lifecycle Longevity
- World-Class Safety Certifications (UL Listed, FCC, CE)



Smart Robotics



NVR Surveillance

Challenge #4

Production Visibility Gaps

Modern manufacturing environments often face safety challenges, struggling with power outages that disrupt production and put worker safety at risk. The lack of effective monitoring and backup systems is creating uncertainty in keeping operations running smoothly.



Lack of Real-Time
Visibility



Inefficient Machinery
Coordination



Fragmented
Communications

Industrial IoT Gateways: Real-Time Data Telematics

Manufacturing facilities face challenges in tracking production due to limited real-time visibility and disconnected machinery networks. Integrating systems for efficient tracking and management is essential for smoother operations.



Enhanced real-time data visualization



Centralized production floor monitoring



Data-driven analytics and actionable decision-making



IoT Gateways

x86 Fanless Mini Computers



Control Center



These fanless mini computers serve as industrial IoT gateways by consolidating IoT devices and real-time performance with embedded Intel processors. Its ultra-compact size and power-efficiency make them ideal for space-constrained deployments. [Learn more >>](#)

RCO-1000 Series



- Intel Atom x6425E Processor (12W TDP)
- EDGEBoost I/O (USB, COM, DIO, HDMI)
- Super-Rugged Durability

BCO-1000 Series



- Intel N97 Processor (12W TDP)
- IoT-Centric Connectivity On-Board
- Semi-Rugged Durability

JCO-1000 Series



- NVIDIA Jetson Orin Nano (4GB/8GB)
- 40 TOPS of AI Performance
- Super-Rugged Durability

Private 5G Network: Low-Latency Wireless Communications

With a renovated Industry 4.0-ready facility, it was essential to connect all technologies through a wireless network. In challenging environments, a private 5G network ensures ultra-reliable, low-latency connectivity for real-time communications.



Real-time communication between Industry 4.0 solutions



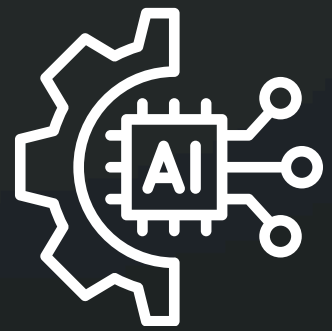
Fully optimized network and bandwidth utilization



Scalable network infrastructure for future developments

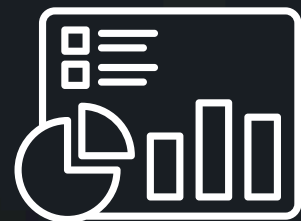


Benefits of Digital Transformation in Manufacturing



AI-Enhanced Productivity

Addressed major bottlenecks with edge AI and industry 4.0 technologies such as advanced robotics and machine vision



Achieved Operational Visibility

Enhanced control centers with full factory operations visibility and real-time telematics for actionable insights



24/7 Uptimes

Industry 4.0 technologies allow for reliable 24/7 operations to meet growing demand

