

CT-XAR01

Mini-ITX Industrial Motherboard

Powered by Intel® Core™
Ultra Series 2 Processors
(Arrow Lake-S)



High-Performance Mini-ITX Industrial Motherboard for AI-Driven Edge Systems

The CT-XAR01 is engineered for AI-enabled edge deployments and data-intensive industrial workloads. Designed to simplify system integration while delivering strong compute performance and high-bandwidth I/O, it provides a reliable foundation for industrial automation, machine vision, and intelligent edge systems.



Deployment
Ready Solution



Industrial
Grade



Fast Time To
Market



Ruggedized Design



Powering Scalable Edge AI with Intel® Arrow Lake-S

Introducing the CT-XAR01, a next-generation Mini-ITX industrial motherboard engineered to accelerate edge AI and high-performance industrial computing. Powered by Intel® Core™ Ultra Series 2 processors (Arrow Lake-S), it integrates CPU, GPU, and a dedicated Neural Processing Unit (NPU) to optimize AI workloads with improved efficiency and intelligent task distribution.

Built on Intel's latest hybrid architecture, Arrow Lake-S advances heterogeneous computing by combining high-performance cores, efficient cores, and AI acceleration into a unified platform. This architecture enables balanced compute performance and power efficiency, making the CT-XAR01 ideal for real-time data processing, machine vision, and edge analytics applications.

The CT-XAR01 supports high-speed DDR5 memory with ECC capability, PCIe Gen 5 expansion, quad independent displays, triple 2.5GbE networking, and flexible M.2 connectivity. Its compact Mini-ITX form factor ensures scalability, reliability, and long-term deployment readiness for mission-critical industrial environments.

Key Features

- Intel® Core™ Ultra Series 2 (Arrow Lake-S) with integrated CPU, GPU & NPU
- Intel® W880 chipset with DDR5 ECC support up to 96GB
- 1x PCIe x16 Gen 5 with lane bifurcation (x16 or dual x8)
- Quad independent displays: 2x DP, HDMI, eDP/LVDS
- 3x Intel® 2.5GbE LAN with optional iAMT support
- M.2 M Key, B Key (with SIM), and E Key expansion
- MCIO PCIe Gen4 x4 high-speed expansion



AI-Driven Smart Factories



Industrial Automation & PLC Integration



Smart Retail Kiosks



Machine Vision and Metrology Systems



Edge AI Inference Systems



Industrial Gateways and Security Appliances

Advanced Hybrid Architecture Powered by Intel® Arrow Lake-S

Hybrid Core Architecture

The CT-XAR01, powered by Intel® Core™ Ultra Series 2 (Arrow Lake-S), introduces an advanced hybrid architecture designed for scalable edge AI and industrial performance.

Unlike traditional monolithic CPU designs, Arrow Lake-S integrates Performance-cores, Efficient-cores, integrated GPU, and a dedicated Neural Processing Unit (NPU) into a unified compute platform—enabling intelligent workload distribution across heterogeneous engines.

This architecture ensures optimized performance per watt while supporting high-demand industrial AI applications.



Powerful Multi-Core Design

Designed for next-generation industrial computing, the CT-XAR01 balances high performance and efficiency with:

- Up to 24 cores (8 Performance-cores + 16 Efficient-cores)
- Up to 24 threads
- Performance-cores up to 5.6 GHz

Performance-cores handle demanding tasks such as AI model execution, complex analytics, and data processing. Efficient-cores manage background services and multi-threaded workloads, improving power efficiency in continuous operation environments.

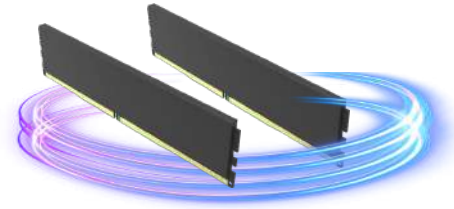
Integrated AI Acceleration

Up to 36 platform TOPS across CPU, GPU, and NPU, with a dedicated NPU delivering up to 13 TOPS for efficient edge AI acceleration.



High-Bandwidth DDR5 Memory

Equipped with dual DDR5 5600MT/s SO-DIMM support, the CT-XAR01 supports up to 96GB with ECC capability via the Intel® W880 chipset. ECC automatically detects and corrects single-bit memory errors, protecting against data corruption in 24/7 industrial environments.



Dual DDR5 5600MT/s SO-DIMM

Quad Independent Display Outputs

The CT-XAR01 supports up to four independent displays, enabling rich multi-screen visualization for industrial control, monitoring, and digital signage applications.

- 2× DisplayPort (up to 4096 × 2160 @ 60Hz)
- 1× HDMI (up to 4096 × 2160 @ 30Hz)
- 1× eDP (up to 3840 × 2160 @ 60Hz)
- 1× LVDS (up to 1920 × 1200 @ 60Hz)

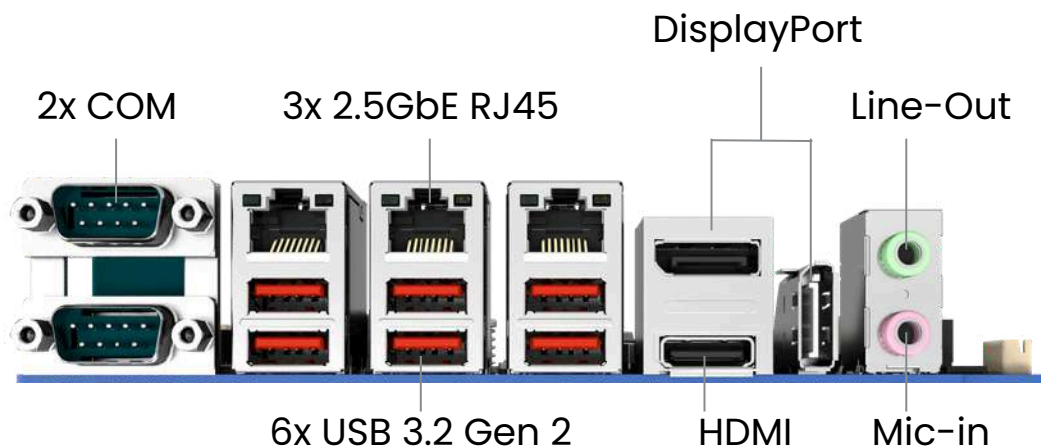


Rich Industrial I/O Connectivity

Designed to support the connectivity demands of modern industrial environments, the CT-XAR01 delivers a comprehensive range of high-speed and legacy interfaces for seamless system integration. Key I/O features include:



- 3× Intel® 2.5GbE LAN (1× I226-LM with iAMT, 2× I226-V)
- 6× USB 3.2 Gen 2 Type-A (10 Gbps)
- Up to 6× COM ports (2× RS-232/422/485 + 4× internal RS-232)
- 8-bit GPIO for industrial control integration





Triple Wireless & 5G Expansion for Connected Industrial Edge

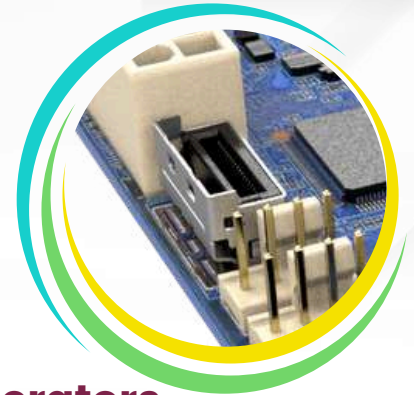
With versatile wireless expansion options, the CT-XAR01 enables flexible connectivity for modern industrial deployments, supporting cellular and short-range networking for distributed edge systems:

- M.2 B-Key for 4G / 5G cellular modules
- Nano SIM slot for cellular connectivity
- M.2 E-Key for Wi-Fi and Bluetooth modules



MCIO High-Speed PCIe Expansion

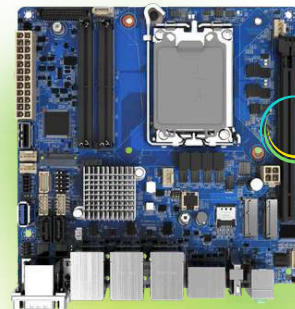
In addition to traditional I/O, the CT-XAR01 integrates 1x MCIO (PCIe Gen 4 x4) interface, enabling high-bandwidth modular expansion for advanced networking, storage, or accelerator integration within compact industrial systems.



PCIe Gen 5 Expansion for Next-Gen AI Accelerators

The CT-XAR01 features a PCIe Gen 5 x16 slot, delivering significantly higher bandwidth than previous generations to support demanding AI and data-intensive workloads. This next-generation interface enables high-performance GPUs and accelerators, including NVIDIA Blackwell, for scalable edge AI processing.

- 1x PCIe x16 Gen 5 slot
- Supports next-gen GPUs, including NVIDIA Blackwell
- Supports x16 or dual x8 riser cards
- Lockable connector for industrial stability



1x PCIe x16 Gen 5 slot



Industrial-Grade Durability

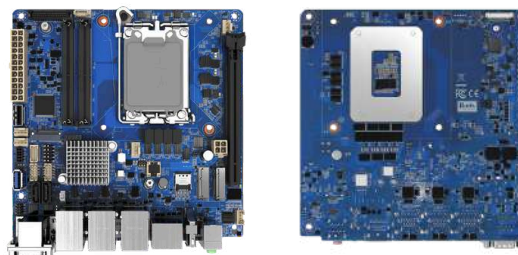
The CT-XAR01 is built for reliable operation in demanding industrial environments, supporting continuous workloads with an operating temperature range of 0°C to 60°C and compliance with key industrial regulatory standards.



We Design,
Manufacture, and
Service Customers
Around the World



CT-XAR01 Mini-ITX Industrial Motherboard



Model	CT-XAR01
CPU	Intel® Arrow Lake-S Core Ultra 9/7/5 Series Processor
Memory	2x 262-pin DDR5 5600MT/s ECC & non-ECC SODIMM. Max Up to 96GB
Storage	1x M.2 M Key (PCIe x4 NVMe, SATA-3.0), 2280
Display	2x DP up to 4096 x 2160@60Hz 1x eDP / 1x HDMI
Rear I/O	3x 2.5GbE RJ45, 2x RS-232/422/485, 2x DP, 1x HDMI 6x USB 3.2 Gen 2 Type A,
Internal I/O	2x RS-232 Pin header
Expansion	1x E key (PCIe x1 & USB 2.0), 2230 1x B key (PCIe x2 NVMe, USB3.0), 2242/3042/3052 with SIM Holder
Operating Systems	Windows 10/11 Linux Ubuntu 22.04 / 24.04.01 LTS
Operating Temperature	0°C to 60°C
TPM	TPM 2.0
Dimension	170 x 170mm