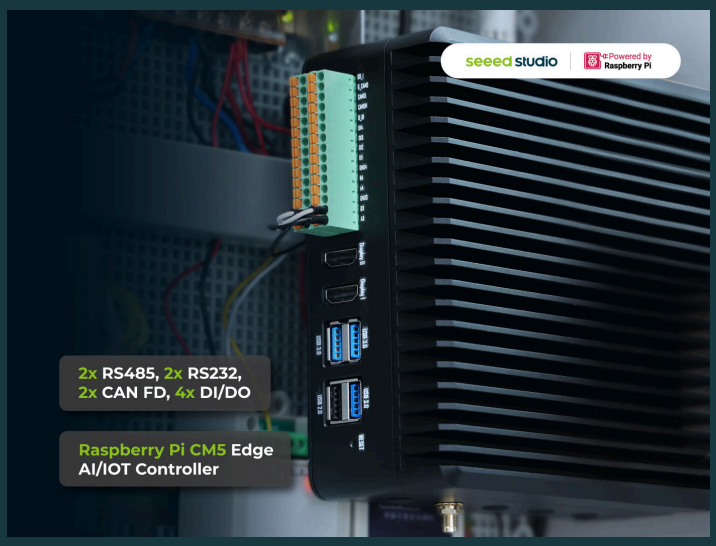
seeed studio

INDUSTRIAL PRODUCT DATASHEET

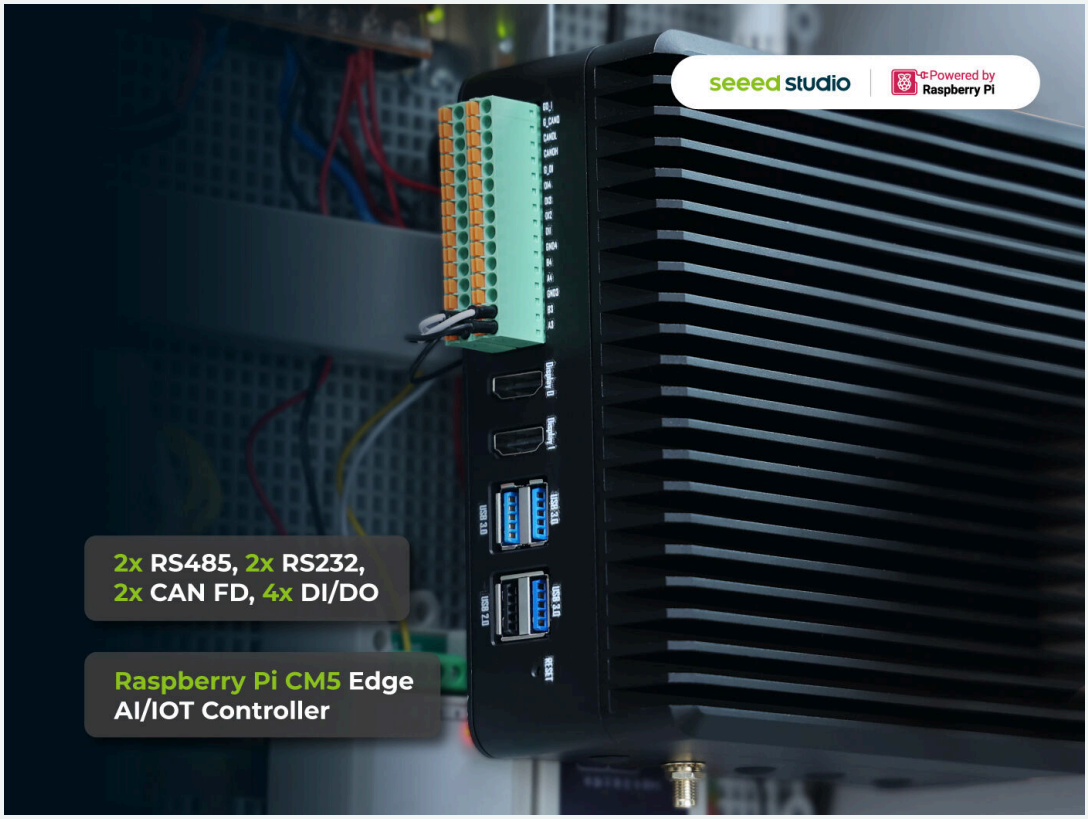
reComputer Industrial R21 & Optional Accessories - The Most Reliable and Powerful Raspberry Pi Edge AI/IOT Controller

The reComputer Industrial R21 delivers reliable, powerful Raspberry Pi CM5-based edge AI/IoT control with fanless wide-temperature operation, rich isolated I/O, optional Hailo-8 26 TOPS AI acceleration, and guaranteed production until...

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Overview



The reComputer Industrial R21 is a reliable and powerful Raspberry Pi CM5-based edge AI/IoT controller featuring fanless cooling from -20°C to 65°C, industrial-grade protection (IP40, aluminum alloy), and rich isolated connectivity including 2x RS485, 2x RS232, 2x CAN FD, 4x DI, 4x DO, Gigabit Ethernet with PoE, and optional wireless expansion. With an optional Hailo-8 AI accelerator delivering up to 26 TOPS, it enables real-time AI vision processing for applications such as industrial automation, smart transportation, smart building, smart retail, and AI-powered video analytics.

Key Features

Note:

- Options marked with * require additional purchase according to the bundle.
- For 4G functionality, both a 4G module and a 4G antenna must be selected.
- For GPS functionality, both a 4G module and a GPS antenna must be selected.
- For LoRaWAN® functionality, LoRaWAN® module must be selected.
- **Price Increase Announcement**
  Date: March 2, 2026
  Due to increased demand for modules and SSDs, reComputer' pricing is expected to rise by approximately $20–$80 in the coming weeks. Please confirm your orders and requirements accordingly to help secure availability.

- **Powerful Performance with Raspberry Pi CM5:** Broadcom BCM2711 quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz. Features up to 16GB RAM and 32GB eMMC.
- **Robust Heat Dissipation:** High-performance fanless cooling, engineered to handle the intense heat of AI workloads and ensure stable operation from -20°C to 65°C.
- **Industrial-Grade Reliability:** High Accuracy RTC, hardware watchdog and optional UPS supercapacitor. Optional TPM/ATECC608A. IP40, aluminum alloy enclosure provides industrial-grade protection. Supports DIN-rail and wall mounting. Guaranteed production until at least December 2036.
- **AI-Optimized Computing:** With the optional Hailo-8 AI accelerator, it delivers up to 26 TOPS, enabling real-time, high-performance AI vision processing across multiple channels.
- **Rich Industrial Connectivity:**2x RS485, 2x RS232, 2x CAN FD, 4x DI, 4x DO, all isolated.1x 10M/100M/1000M Ethernet (PoE), 1x 10M/100M Ethernet. 2x HDMI 2.0. 3x Type-A USB3.0, 1x Type-A USB2.0, 1x Type-C USB2.0 (for OS update). 1x Nano SIM card slot.
- **Versatile Wireless Connectivity:** On chip Wi-Fi and BLE. Flexible expansion via Mini-PCIe for LTE, LoRa®, Zigbee. M.2 B-Key for 4G/5G.

Seeed Studio Tutorial of AI Kit with Raspberry Pi: From Zero to Hero

This course is designed to teach you how to harness the power of AI on the Raspberry Pi, with a focus on using an AI kit to perform computer vision tasks. You'll learn how to integrate AI into real-world IoT applications, from object detection and image classification to more complex visual recognition tasks.

We will guide you step-by-step through setting up your Raspberry Pi, using AI frameworks, and deploying these models in various practical scenarios.

Note: The first 200 units of each reComputer Industrial R SKU on this bundle page are NPI production units and currently do not support UPS functionality. UPS support will be added in subsequent mass production units. If UPS functionality is required, please contact Customer Service.

Product Gallery



















Specification

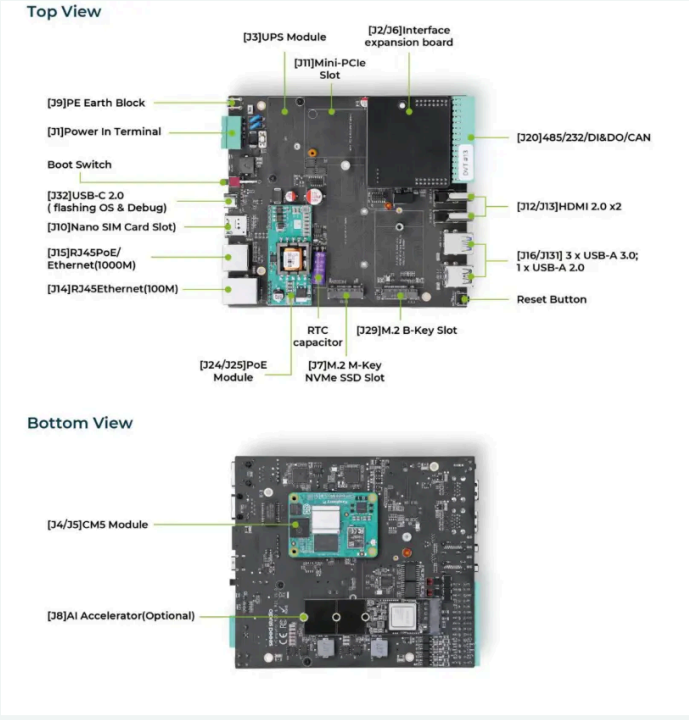
Hardware Specification		
Product Series	R21xx-12	R21xx-10
CPU	Raspberry Pi Compute Module 5, 2.4GHz quad-core 64-bit Arm Cortex-A76	
AI Processor	1x Pre-installed Hailo-8 M.2 AI Acceleration, 26TOPS	*
Operating System	Raspbian, Debian	
Memory & Storage	2GB/4GB/8GB/16GB RAM, 16GB/32GB/64GB eMMC	
System Specification		
Power Input	DC 9V~36V, 2-pin Terminal Block	
PoE(as powered device)	IEEE 802.3 at Standard 25.5W PoE	
Power Switch	No	
Reboot Switch	Yes	
Interface		
Ethernet & USB	1x 10/100/1000 Mbps(supports PoE PD); 1x 10/100 Mbps IEEE 802.3/802.3u	
	3x USB-A 3.0 Host; 1x USB-A 2.0 Host; 1x USB-C 2.0 (For flashing OS & Debug)	
COM and I/O	2x RS485(Isolated); 2x RS232(Isolated); 2x CAN FD(Isolated)	
	4x DI Ports(Isolated), input Voltage: 5~24V DC; 4x DO Ports(Isolated), output Voltage: <60V DC	
SIM Card	1x Nano SIM Card Slot	

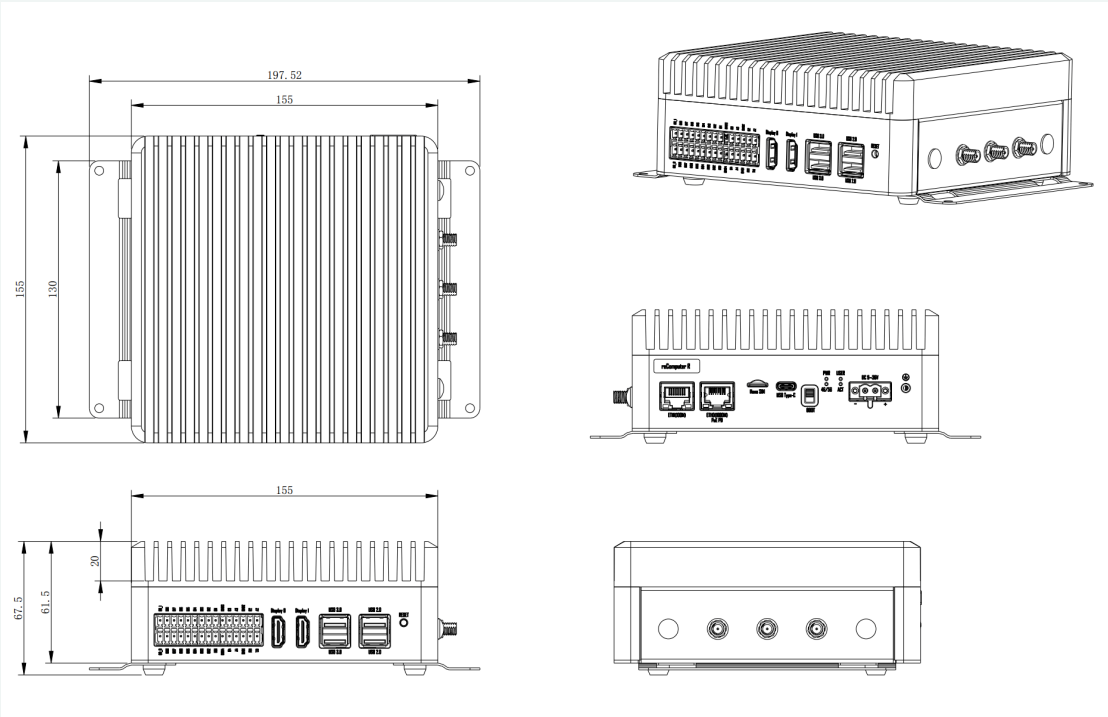
M.2 Slot	1x M.2 M-key 2280 Slot for NVMe SSD; 1x M.2 M-key 2280 Slot for AI Accelerator (pre-installed Hailo-8 M.2 AI Acceleration 26TOPS); 1x M.2 B-key 3042/3052 Slot for 5G/4G LTE	1x M.2 M-key 2280 Slot for NVMe SSD ; 1x M.2 M-key 2280 Slot for AI Accelerator; 1x M.2 B-key 3042/3052 Slot for 5G/4G LTE
Mini-PCIe	1x Mini-PCIe for LoRa module	
Control & Indication	4x LEDs; 1x Buzzer; 1x Reset Button	
HDMI	2 x HDMI 2.0	
Wireless Communication	Wi-Fi 2.4/5.0 GHz(On-chip); BLE 5.0(On-chip);	
	USB LoRa®*/SPI LoRa®*	
	4G LTE/5G*	
	USB Zigbee*	
Standards		
EMC	ESD: EN61000-4-2, Level 3; EFT: EN61000-4-4, Level 2; Surge: EN61000-4-5, Level 2	
Certification	CE, FCC, TELEC, RoHS, REACH	
Device Specification		
Ingress Protection	IP40	
Temperature	Operating Temperature -20~65°C Storage Temperature -40~85°C	
Operating Humidity	10~95% RH	
Reliability	SuperCAP UPS LTC3350 Module*	
	Hardware Watchdog: 1~255s	
	High Accuracy RTC	
Security	Encryption Chip TPM 2.0*	
	ATECC608A*	
Heat Dissipation	Fanless	
Warranty	2 years	
Production Lifetime	Until December 2036	
Dimension(W x H x D) & Weight(Net)	197.5 mm x 155 mm x 67.5 mm, 1280g	
Enclosure	6063 aluminum alloy heat sink, 5052 aluminum alloy enclosure	
Mounting	DIN-rail/Wall	
Statement	Options marked with * require additional purchase according to the bundle.	

Hardware Overview



1. 2x RS485(Isolated) 4 x Isolated DI Ports
   2x RS232(Isolated) 4 x Isolated DO Ports
   2x CAN FD(Isolated)
2. 2 x HDMI 2.0
3. 3 x USB-A 3.0 Host 1 x USB-A 2.0 Host
4. Reset Hole
5. 5 x Reserved Antenna Ports for Wireless
6. 1 x 10/100/1000 Mbps(supports PoE PD)
   1 x 10/100 Mbps IEEE 802.3/802.3u
7. Nano SIM Card Slot
8. USB-C 2.0 (For flashing OS & Debug)
9. Reboot Switch
10. 4 x LED indicators
11. DC 9V~36V, 2-pin Terminal Block
12. Grounding point





Applications

- **Manufacturing & Industrial Automation:** With rich industrial interfaces, the controller integrates seamlessly with different sensors, PLCs, and machinery, enabling efficient process monitoring and control. It supports multiple communication protocols for real-time data acquisition and remote equipment management, fostering a smarter and more efficient factory.
- **AI-Powered Video Analytics & Surveillance:** Integrated into NVR systems for real-time video analytics, including anomaly detection, object detection, crowd monitoring and behavior analysis, enhancing situational awareness and security efficiency.
- **Smart Transportation:** Acts as an AI/IoT gateway for real-time processing of visual data from multiple sensors and camera feeds at the edge, enabling intelligent traffic flow analysis and smart parking management to enhance transportation monitoring management capabilities.
- **Smart Building:** Integrates sensors and IoT devices to monitor and optimize building systems such as lighting, HVAC, and security. Uses AI for energy efficiency, predictive maintenance, and occupant comfort, enhancing building management.
- **Smart Retail:** Create innovative smart retail solutions using AI-driven features like real-time visual product recognition, personalized shopping experiences, and advanced customer behavior analytics for optimized store operations.

Part List

reComputer Industrial R21xx	x 1
Mounting Bracket	x 2
Bracket Screw	x 4
DIN-rail Clip	x 1
DC Power Female Jack to Screw Terminal Adapter	x 1
12V/3A Power Adapter (with 4 interchangeable adapter plugs)	x 1
15*2-pin Terminal Block Connector (Male)	x 1
120Ω Resistor	x 5
Wi-Fi/BLE Antenna	x 1
User Manual	x 1

Resource Links

- https://www.seeedstudio.com/reComputer-Industrial-R21-The-Most-Reliable-and-Powerful-Raspberry-Pi-Edge-AI-IOT-Controller.html
- Seeed Raspberry Pi Flyer
- reComputer_Industrial_R2100_User_Mannual
- reComputer_Industrial_R2100_Schematic
- reComputer_Industrial_R2000/2100_3D_File
- Seeed Raspberry Pi Flyer-CN
- Seeed reComputer Industrial R Series Flyer

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