

nROK 7280-7WIC5IP/-5WIC5IP

Fanless, IP 67 AI Powered
Railway Computer Powered by
Intel® Core™ Ultra Processor (Series 1)



Main Features

- Powered by Intel® Core™ Ultra processor, up to 26 TOPS AI computing power
- Fanless, IP67 rated and rugged design
- 5 x 2.5GbE PoE, M12 X-coded, one port supporting PoE++ (IEEE 802.3bt)
- Expandable to 2 x WWAN and 2 x WLAN for enhanced mobile router performance
- Support 100/1000Base-T1 Automotive Ethernet (optional)
- 1 x 2.5" SSD, 1 x M.2 Key B+M SSD and 1 x NVMe SSD (PCIe 4.0 x4) for data integrity
- DC 24V~110V input w/ power isolation, ignition control and OCP/OVP
- Wide range operating temperature of -40°C~60°C/EN 50155 (OT2)
- MIL-STD military standard for anti-vibration/shock
- CE/FCC, UKCA, EN 50155 and EN 45545-2 certified

Product Overview

The nROK 7280-xWIC5IP is a rugged, IP67-rated, fanless railway telematics/gateway computer designed for demanding operational settings. Powered by Intel® Core™ Ultra processor with up to 26 TOPS AI computing power, it delivers 30% more CPU performance than its predecessor, making it ideal for critical railway applications like in-time safety monitoring, ATP/ATO assistance, and security surveillance.

The nROK 7280-xWIC5IP is engineered for continuous 24/7 operation in challenging conditions. Its compact, durable build ensures reliable performance in confined spaces. It features diverse I/O, including five 2.5GbE M12 X-coded PoE++ ports, multiple waterproof USB 3.2/2.0 ports, two isolated CAN FD, four serial ports, and one HDMI® display port. With 2.5" NVMe SSD support, four extension slots, and a wide-range DC 24V to 110V power input with isolation and IGN control, it is a sophisticated AI-powered railway computer.

Designed for harsh environments, the nROK 7280-xWIC5IP operates within a -40°C to 60°C/EN 50155 (OT2) temperature range, meets MIL-STD-810H military standards for vibration and shock, and is certified by CE/FCC Class A, UKCA, EN 50155, EN 45545-2 and LVD for regulatory compliance.

Specifications

CPU

- Intel® Core™ Ultra processors (Series 1)
 - Intel® Core™ Ultra 7 processor 155H, PBP 28W
 - Intel® Core™ Ultra 5 processor 125H, PBP 28W
- NPU
 - 2 x 2048 MACs computing performance
- Graphics
 - Intel® Arc™ graphics
 - Max resolution: 4096x2160@60Hz (HDMI®)
 - DirectX: 12.2, OpenGL: 4.6

Memory

- 2 x DDR5 5600 SO-DIMM, 8GB default, up to 32GB per DIMM

Storage

- 1 x 2.5" SATA 3.0 SSD (15mm height)
- 1 x M.2 Key B+M 2242 SSD (SATA 3.0)
- 1 x M.2 Key M 2280 NVMe SSD (PCIe 4.0 x4)

Expansion Slots

- 1 x Mini PCIe slot (PCIe 4.0, USB 2.0)
- 1 x Mini PCIe slot (PCIe 4.0, USB 2.0), BOM option for M.2 Key B (USB 3.2/2.0), supports nano-SIMs
- 1 x M.2 Key B 3042/3052 (USB 3.2/2.0), supports nano-SIMs for LTE/5G module
- 1 x M.2 Key E 2230 (PCIe 4.0 x2, USB 2.0)

Display

- 1 x HDMI® 2.0a, up to 3840x2160@60Hz
- 1 x VGA, up to 1920x1200@60Hz, wafer-type reserved

Security

- TPM 2.0
 - Infineon SLB 9672VU2.0 FW15.23

2.5GbE PoE++

- 5 x 2.5GbE M12 X-coded PoE connector
 - Support iAMT/WoL/PXE (PoE1)
 - 9Kbyte Jumbo frame
 - IEEE 802.3af/at/bt, total 80W, PSE 60W for PoE1
 - Support PTP (IEEE 1588)
 - Controller: Intel® I226-IT

Audio

- 1 x Line out, unbalanced stereo, left/right channel
- 1 x MIC in, stereo
- M12 A-coded
- 1 x Line in, wafer reserved
- Codec: Realtek ALC888S-VD2-GR

DC Out

- DC 12V/3A, terminal block

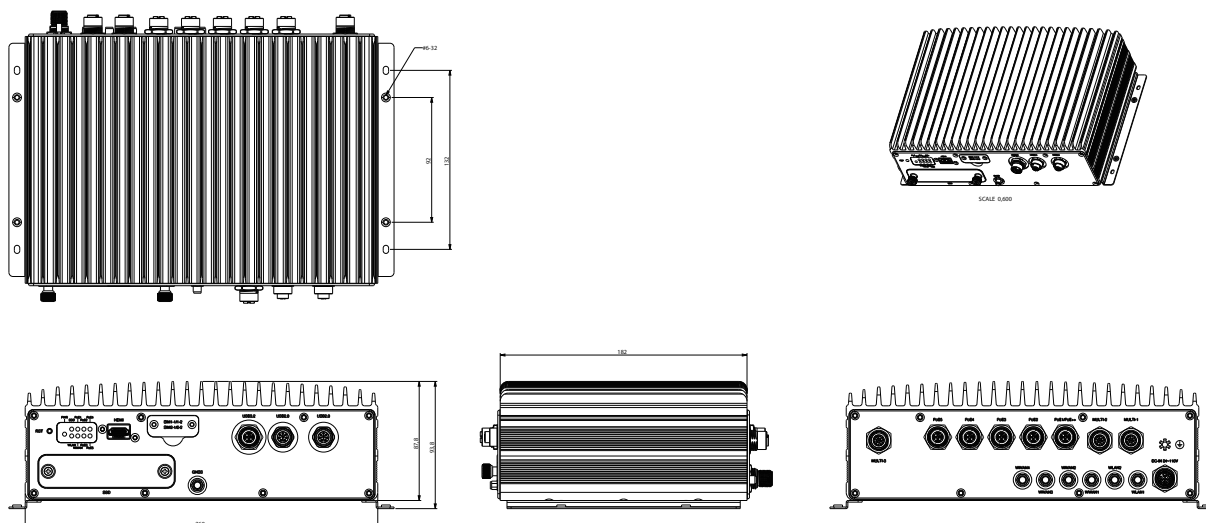
USB

- 1 x USB 3.2 Gen 1
 - M12 X-coded
 - 5V@900mA
 - Up to 5Gbit/s link speed & compliance with USB 2.0 (LS/FS/HS link speed)
- 4 x USB 2.0
 - 2 x M12 A-coded
 - 5V@500mA each

Serial Port

- 2 x COM port (COM1, COM2), supports RS-232 (Tx/Rx)/422/485
- 2 x COM port (COM3, COM4), supports RS-232 (Tx/Rx)
- Connector: M12 A coded/17-pin
- RS-232 working voltage, ± 9V, baud rate up to 115.2kb/s
- 2-wire/4-wire RS-485 (baud rate: 300Kbps~115.2Kbps)

Dimension Drawing



MEMS Sensor

- 3D accelerometer and 3D gyroscope, ST LSM6DSLTR

DI/DO (isolation)

- 4-bit input
 - Source: DC 9V~36V (12V@0.6mA/24V@1.2mA)
 - External: DC 0V~33V pull-high, high level, DC 3.3V~33V; low level, DC 0V~2V
- 4-bit output
 - Source: DC 9V~36V (nominal 35mA@24V)
 - External: DC 5V~36V pull-high, sink current w/ 220mA for each bit, 500mA max (@25C)
- Source or external can be selected by DIP S/W (default: source type)

CAN bus

- 2 x CAN FD, compatible with CAN 2.0A/2.0B
- Up to 5Mb/s in data transmit, 2.5KV isolated
- IEC 61000-4-2 Electrostatic Discharge (ESD): $\pm 6\text{KV}/8\text{KV}$ (contact/air)

GNSS

- u-blox NEO-M9N GNSS module (VIOB-GPS-07) for GPS/Glonass/QZSS/Galileo/Beidou
- Optional DR (Dead Reckoning) function, NEO-M9V (VIOB-GPS-DR07)

Power Supply

- DC 24V~110V isolated power input
- Reverse protection, OCP & UVP
- Ignition on/off control & programmable on/off delay timer

I/O ports, Front-Plate

- 1 x Reset button
- 9 x LED Indicator
- 4 x nano-SIM (SIM1-1, SIM1-2, SIM2-1, SIM2-2), w/ a door
- 1 x USB 3.2 M12 X-coded
- 4 x USB 2.0 (2 x M12 A-coded)
- 1 x HDMI[®]
- 2 x 2.5" SSD bay
- 1 x PR-SMA for GNSS

I/O ports, Rear-Plate

- Multi1 port M12 A-coded (2 x CANFD, 4 x DI/ 4 x DO, heater LED)
- Multi2 port M12 A-coded (2 x RS-232/422/485 & 2 x RS-232)
- Multi3 port M12 A-coded (12V/3A DC-OUT, PWR/RST trigger, Line out/ Mic in, optional DR)
- 5 x 2.5GbE M12 X-coded PoE connector
- 1 x DC 24V~110V power input, K-coded
- 2 x PR-SMA for Wi-Fi ant., 4 x SMA for LTE/5G ant.

Internal Heater

- Activation threshold: less than -25°C
- Remote heater on/off signal, wafer reserved

Dimension & Weight

- Dimensions:
 - 260.0mm (W) x 182.0mm (D) x 87.8mm (H) (w/o mount bracket)
 - 280.0mm (W) x 182.0mm (D) x 93.8mm (H) (w/ mount bracket)
- Weight: 6.2kg

Environment

- Operating temperature: $-40^{\circ}\text{C}\sim 60^{\circ}\text{C}$ /EN 50155 (OT2) (w/ PoE, fanless)
- Storage temperature: $-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$
- Relative humidity: 10%~95% (non-condensing)

Vibration & Shock

- Vibration in operating:
 - MIL-STD-810H, 514.8C Procedure 6, Category 4
 - IEC 60068-2-64: 2.0g@5Hz~500Hz
- Vibration in storage:
 - MIL-STD-810H, 514.8E Procedure 1, Category 24, 7.7g
- Shock:
 - MIL-STD-810H, 516.8 Procedure I, trucks and semi-trailers=40g
 - Crash hazard: Procedure V, ground equipment=75g

Certifications

- CE approval, FCC Class A, UKCA, E-mark, EN 50155 and EN 45545-2 certified

Operating System

- Windows 11
- Windows 10, 64bit
- Windows 10 IoT Enterprise, 64bit
- Linux (Ubuntu 22.04, Linux 5.19)

Ordering Information

• nROK 7280-7WIC5IP (P/N: 10A00728000X0)

Intel[®] Core[™] Ultra 7 processor 155H, IP67 rated, 5 x 2.5GbE PoE++, 1 x USB 3.2, 4 x USB 2.0, 4 x Serial, 1 x 2.5"SSD, 4DI/4DO, 2 x CAN FD, DC 24V~110V power isolation, IGN control

• nROK 7280-5WIC5IP (P/N: 10A00728003X0)

Intel[®] Core[™] Ultra 5 processor 125H, IP67 rated, 5 x 2.5GbE PoE++, 1 x USB 3.2, 4 x USB 2.0, 4 x Serial, 1 x 2.5"SSD, 4DI/4DO, 2 x CAN FD, DC 24V~110V power isolation, IGN control