nROK 7280-7WIC5IP/-5WIC5IP

Fanless, IP67 AI-Powered Railway Computer with Intel® Core™ Ultra Meteor Lake H

Main Features

- Powered by Intel® Core™ Ultra Meteor Lake H, up to 26 TOPS AI computing power
- Fanless, IP67 rated and rugged design
- 5 x 2.5GbE M12 X-coded, up to PoE++ (IEEE 802.3bt) support
- Supports 100/1000Base-T1 Automotive Ethernet (optional)
- Expandable to 2x WWAN and 2x WLAN for enhanced mobile router performance
- 2.5" SSD, Key B+M SSD and NVMe SSD (PCIe 4.0 x4) for data integrity
- 24V~110V DC w/ power isolation, ignition control & OCP/OVP
- Wide range operating temperature of -40°C~60°C
- 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 an Intel® Core™ Ultra Meteor Lake H series 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 5 x 2.5GbE M12 X-coded PoE++ ports, multiple waterproof USB 3.2/2.0 ports, 2 isolated CAN FD, 4 serial ports, and 1 x HDMI display port. With 2.5" NVMe SSD support, 4 extension slots, and a wide-range 24~110VDC power input with isolation and IGN control, it is a sophisticated AI-powered railway computer.

Designed for harsh environment, the nROK 7280-xWIC5IP operates within a -40°C to 60°C 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 Meteor Lake H
  - Core™ Ultra 7 processor 155H, 28W
  - Core™ Ultra 5 processor 125H, 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 defualt, up to 32G per DIMM

Storage

- 1 x 2.5" SATA 3.0 SSD (15mm height)
- 1x 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 SLB9672VU2.0FW15.23

2.5GbE PoE++

- 5 x independent 2.5GbE M12 X-coded PoE port
  - iAMT/ WoL/ PXE support (PoE1)
  - 9Kbyte Jumbo frame
  - IEEE 802.3af/at/bt, total 80W, PSE 60W for PoE1
  - PTP (IEEE 1588) support
  - 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

- 12V DC/3A, terminal block

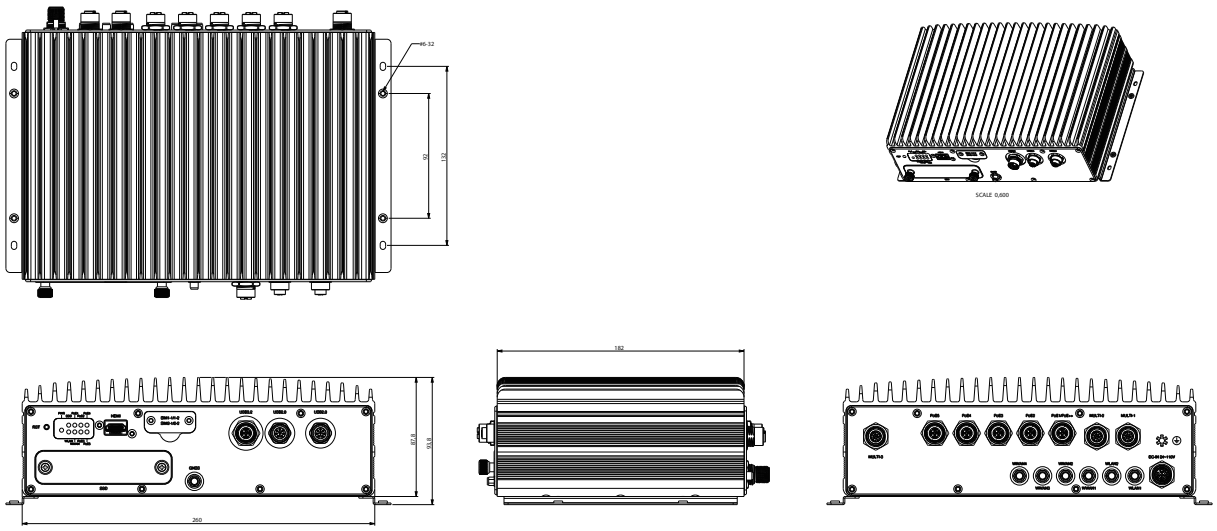
USB

- 1 x USB 3.2 Gen 1
  - USB host, 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
  - USB host, 2 x M12 A-coded
  - 5V@500mA each

Serial Port

- 2 x COM port (DB9), supports full RS-232 (Tx/Rx/RTS/CTS)/422/485
- 1 x COM port (DB9), supports full RS-232 (drawing out Tx/Rx)
- 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: 300~115.2Kbps)

Dimension Drawing



MEMS Sensor
- 3D accelerometer and 3D gyroscope, ST LSM6DSLTR

DI/DO (isolation)
- 4-bit input
  - Source: 9~36V DC (12V@0.6mA/24V@1.2mA)
  - External: 0~33V DC pull-high, high/low level 3.3 – 33/ 0 - 2 VDC
- 4-bit output
  - Source: 9~36V DC (nominal 35mA@24V)
  - External: 5~36V DC 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): ± 6KV/8KV (contact/air)

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

Power Supply
- Nominal voltage: DC 9V to 36V, 24V/Rail
- Cranking voltage: DC 6V to 9V (less than 20 sec)
- Reverse protection, OCP & UVP (shut down once exceeding 36.5V)
- Ignition on/off control & programmable on/off delay timer
- Optional for remote power on/off control

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

I/O ports, Rear-Plate
- Multi1-port, A-coded (2 x CANFD, 4 x DI/ 4 x DO, heater LED)
- Multi2-port, A-coded (2 x RS-232/422/485 & 2 x RS-232)
- Multi3-port, A-coded (12V/3A DC-OUT, PWR/RST trigger, Line out/MIC in, optional DR)
- 5 x 2.5GbE PoE, X-coded
- 9~36V DC/ 24V Rail, 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

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

Environment
- Operating temperatures: -40°C~60°C (45W CPU w/ PoE, fanless)
- Storage temperatures: -40°C~85°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@5~500Hz
- 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® Meteor Lake H (155H), IP67 rated, 5 x 2.5GbE PoE++, 1 x USB3.2, 4 x USB 2.0, 4 x Serial, 1 x 2.5"SSD, 4DI/4DO, 2 x CAN FD, 24~11VDC/ power isolation, IGN control

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

  Intel® Meteor Lake H (125H), IP67 rated, 5 x 2.5GbE PoE++, 1 x USB3.2, 4 x USB 2.0, 4 x Serial, 1 x 2.5"SSD, 4DI/4DO, 2 x CAN FD, 24~110VDC/ power isolation, IGN control