nROK 7280-7AC5IP/-5AC5IP

Fanless, IP 67 AI Powered In-Vehicle/Rail 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)
- 2 x 2.5" SSD, 1 x NVMe SSD (PCIe 4.0 x4) for data integrity
- DC 9V~36V/24V rail input with ignition control & 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, E-mark, EN 50155 and EN 45545-2 certified

Product Overview

The nROK 7280-xAC5IP is a rugged, IP67-rated, fanless in-vehicle/railway telematics 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-xAC5IP 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 PoE M12 X-coded ports, one port supporting PoE++, 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 9V to 36V/24V rail power input with isolation and IGN control, it is a sophisticated AI-powered telematics computer.

Designed for harsh environment, the nROK 7280-xAC5IP 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, E-mark, EN 50155, and EN 45545-2 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

- 2 x 2.5" SATA 3.0 SSD (15mm height, removable)
- 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 (LAN1)
  - 9Kbyte Jumbo frame
  - IEEE 802.3af/at/bt, total 80W, PSE 60W for LAN1
  - 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

- 1 x DC 2V/3A, terminal block

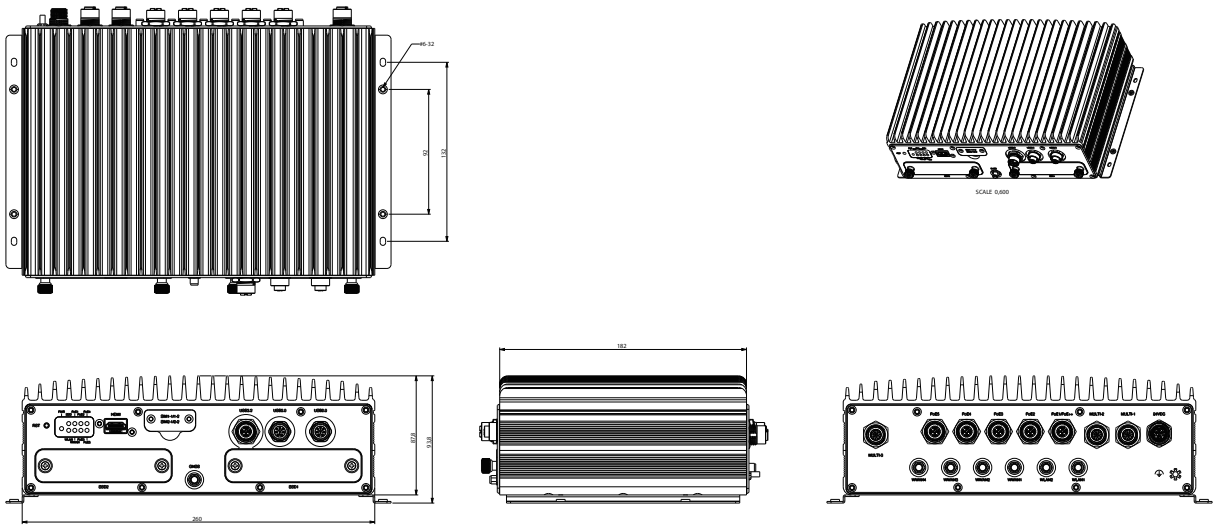
USB

- 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): ± 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
- DC 9V~36V/24V rail
- Cranking voltage: DC 6V~9V (less than 20 sec)
- Reverse protection, OCP & UVP (shut down once exceeding 36.5V)
- Ignition on/off control & programmable on/off delay timer
- Connector: K-coded

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 9V~36V/24V Rail 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°C~60°C/EN 50155 (OT2) (w/ PoE, fanless)
- Storage temperature: -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@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 7280-7AC5IP (P/N: 10A00728001X0)**
  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, 2 x 2.5"SSD, 4DI/4DO, 2 x CAN FD, DC 9V~36V/24V Rai, IGN control
- **nROK 7280-5AC5IP (P/N: 10A00728002X0)**
  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, 2 x 2.5"SSD, 4DI/4DO, 2 x CAN FD, DC 9V~36V/24V Rail, IGN control