

TREK-50N

NVIDIA® Jetson Orin™ NX Edge AI Computer for In-Vehicle & Harsh Environments



Features

- In-vehicle Edge AI computer with NVIDIA® Jetson Orin™ NX
- In-vehicle power design: 12V/24V automotive power design compliant with ISO 7637-2 and E-Mark
- Rugged design compliant with IP67, EN 60721-3-5 (5M3) vibration and shock standards, -20°C to 70°C operating temperature without airflow
- Supports 2 x CAN FD and either 4 x GMSL2 or 4 x PoE
- Modular design supports Automotive Ethernet, RF communication, and C-V2X

Introduction

As a rugged IP67 edge AI in-vehicle computer, the TREK-50N is powered by NVIDIA® Jetson Orin™ NX, delivering up to 100 TOPS of outstanding AI inference performance. It is designed for applications in commercial vehicles and heavy duty machinery. To meet the needs of various vision-based AI applications, TREK-50N supports 4 GMSL2 or 4 PoE ports. TREK-50N inherits the trusted design of the TREK series, featuring an ISO 7637-2 compliant automotive power design, EN 60721-3-5 (5M3) vibration and shock resistance, IP67-rated water and dust protection, and an operating temperature range of -20°C to 70°C.

Specifications

Standard Version

| | | |
|---------------------------------|---|--|
| Processor | CPU | Jetson Orin NX 8GB 6-core Arm® Cortex®-A78AE v8.2 64-bit CPU (Orin NX 16GB by request) |
| | GPU | 1024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores |
| | Memory | 8GB/16GB 128-bit LPDDR5 DRAM |
| Storage | M.2 | 1 x M.2 2280 M-Key (NVMe, PCIe x1) |
| Display | SDP2.0 | 12V/2A power output for TREK-303 FL & TREK-306 FL 1 x high-resolution video, 1 x audio signal, 1 x USB 2.0 1 x power button and 1 x reset button (via the smart display) |
| | HDMI | 1 x HDMI (by request, either SDP2.0 or HDMI) |
| IO | Indicated LED | 1 x LED - Power on (Solid Red) - Power off (No Lights) |
| | Standard IO | 1 x USB Type-C for System Recovery 1 x USB3.0 typeA 1 x RJ45 Giga LAN 1 x HDMI or Smart Display Port 2.0 |
| | VIO2.0 (via VIO cable) | 1 x ignition and power input 1 x J1708 (supports J1587) 2 x CANFD; compliant with CANbus, J1939, OBD-II/ISO-15765 specifications |
| | Generic I/O 2.0 (via generic I/O cable) | 2 x 4-wire RS-232/RS-485 (default RS232 + 485) 6 x isolated DI (dry/wet), 4 x isolated DO 1 x line-out, 1 x mic-in |
| | PoE Ports | 4 x RJ-45 for 10/100 Base-T(X) PoE, 802.3af/at compliant Power output shared by all cameras/devices is limited to 30W |
| | GMSL Ports | 4 x FAKRA Z GMSL2 (by SKU, either PoE Ports or GMSL Ports) |
| | GNSS Antenna | 1 x FAKRA connector (C-code) |
| Develop Tools | SDK | iVS DevStack |
| OS | Linux | Ubuntu 22.04 / JetPack 6.1 |
| RF (WLAN/WWAN via RF extension) | WLAN/Bluetooth | 1 x full-size mini PCIe (PCIe/USB 2.0) for 802.11a/b/g/n/ac Wi-Fi 5 + Bluetooth V5.0 combo module 1 x M.2 2230 (A+E Key) for 802.11a/b/g/n/ac/ax Wi-Fi 6 + Bluetooth V5.0 above combo module |
| | WWAN | 1 x full-size mini PCIe (USB 2.0) for 4G module (LTE Cat-4, HSPA+, GSM/GPRS/EDGE) 1 x externally accessible mini SIM card socket with cover, 1 x embedded SIM (available upon request) 1 x M.2 3042/3052 (B key, USB 3.0) for 4G/5G module |
| | GNSS | Built-in u-blox NEO-M9L (ADR), GPS management (via MRM SDK) |
| | Antenna | 4 x FAKRA connectors for 2 x Wi-Fi + Bluetooth (I/Z-code), 2 x WWAN/LTE (D/L-code) with Wi-Fi/WWAN MIMO support |
| Others (via IO extension) | Automotive Ethernet | 2 x Automotive Ethernet |
| | V2X | 1 x C-V2X or 1 x DSRC |
| Expansion | Internal slot | 1 x M.2 3042 Key B (USB 2.0, USB 3.1) 1 x M.2 2230 Key E (USB 2.0, PCIe) |
| | Voltage Input | 12V/24V automotive power (9-32V) ISO 7637-2 and SAE J1113 compliant |
| Power Supply | Vehicle Power Management (VPM) | System power on/off/hibernate management (programmable ignition on/off/delay) Supports wake-up events System power protection System monitoring and Device Diagnostic Tool |
| | Dimension | 280 x 82.5 x 182 mm |
| Mechanical | Weight | 3.3 kg |
| | IP rating | Generic & IP67 (by SKU) |
| Environmental | Vibration/Shock | MIL-STD-810H, EN60721-3-5 (5M3: Shock 100G Gms, Random Vibration 3Grms) |
| | EMC | CE, FCC, RCM, CCC |

Specifications (Cont.)

| | | |
|-------------------|--|---|
| Environmental | Safety | UL/cUL, CB, CCC |
| | Vehicle Regulation | E-Mark (E13), ISO 7637-2, SAE-J1113-11 RS test (Level 1) : ISO 11452-2 BCI test (Level 1) : ISO 11452-4 |
| | RF Regulation | CE (RED), FCC ID, IC ID |
| | Operating Temperature* | -20 ~ 70 °C (Orin NX 8G/16G 10W), w/o airflow -20 ~ 60 °C (Orin NX 8G/16G MAXN), w/o airflow |
| | Storage Temperature | -40 ~ 85°C |
| DeviceOn iService | Compatible with DeviceOn iService remote device management, supporting but not limited to the following features: OTA software installation, remote SSH, device anomaly monitoring, and device control | |

* The product has successfully passed QA testing with an operating temperature range of -25°C to 75°C and -25°C to 65°C. The 5°C variation in the specifications is intended to ensure more reliable and trustworthy operating conditions.

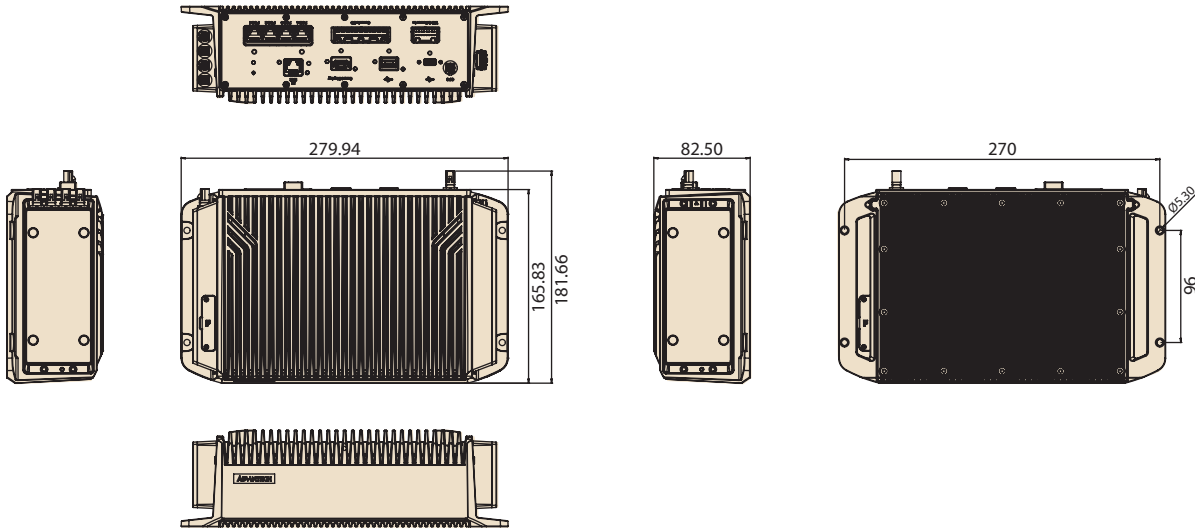
IP67 Version

| | | |
|---------------------|--|--|
| Processor | CPU | Jetson Orin NX 8GB 6-core Arm® Cortex®-A78AE v8.2 64-bit CPU |
| | GPU | 1024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores |
| | Memory | 8GB/16GB 128-bit LPDDR5 DRAM |
| Storage | M.2 | 1 x M.2 2280 M-Key (NVMe, PCIe x1) |
| Display | Smart Display Port 2.0 | M12, X-code, 8pin, female 12V/2A power output for TREK-303 FL & TREK-306 FL 1 x high-resolution video, 1 x audio signal, 1 x USB 2.0 1 x power button and 1 x reset button (via the smart display) |
| | HDMI | 1 x HDMI (by request, either SDP2.0 or HDMI) |
| IO | Indicated LED | 1 x LED - Power on (Solid Red) - Power off (No Lights) |
| | Power In | M12, L-code, 5pin, Male Ignition and power input |
| | CANFD | M12, A-code, 8pin, female 1 x J1708 (supports J1587) 2 x CANFD; compliant with CANbus, J1939, OBD-II/ISO-15765 specifications |
| | DI/COM | M12, A-code, 17pin, female 2 x 4-wire RS-232/RS-485 (default RS232 + 485) 6 x isolated DI (dry/wet) |
| | DO/Audio | M12, A-code, 17pin, male 4 x isolated DO 1 x line-out, 1 x mic-in |
| | Standard IO | 1 x USB Type-C for System Recovery 1 x USB3.0 typeA 1 x RJ45 Giga LAN 1 x HDMI or Smart Display Port 2.0 |
| | PoE Ports | M12, D-code, 4pin, female 4 x 10/100 Base-T(X) PoE, 802.3af/at compliant Power output shared by all cameras/devices is limited to 30W |
| | GMSL Ports | 4 x FAKRA Z GMSL2 |
| Develop Tools | SDK | iVS DevStack |
| OS | Linux | Ubuntu 22.04 / JetPack 6.1 |
| RF Communication | GNSS | u-blox NEO-M9L (Automotive Dead Reckoning) |
| | Antenna | 1 x FAKRA connector (C-code) |
| RF Extension Module | WLAN/Bluetooth | 1 x full-size mini PCIe (PCIe/USB 2.0) for 802.11a/b/g/n/ac Wi-Fi 5 + Bluetooth V5.0 combo module 1 x M.2 2230 (A+E Key) for 802.11a/b/g/n/ac/ax Wi-Fi 6 + Bluetooth V5.0 above combo module |
| | WWAN | 1 x full-size mini PCIe (USB 2.0) for 4G module (LTE Cat-4, HSPA+, GSM/GPRS/EDGE) 1 x externally accessible mini SIM card socket with cover, 1 x embedded SIM (available upon request) 1 x M.2 3042/3052 (B key, USB 3.0) for 4G/5G module |
| | Antenna | 4 x FAKRA connectors for 2 x Wi-Fi + Bluetooth (I/Z-code), 2 x WWAN/LTE (D/L-code) with Wi-Fi/WWAN MIMO support |
| | Others (via IO extension) | Automotive Ethernet V2X |
| Expansion | Internal slot | 1 x M.2 3042 Key B (USB 2.0, USB 3.1) 1 x M.2 2230 Key E (USB 2.0, PCIe) |
| | Voltage Input | 12V/24V automotive power (9-32V) ISO 7637-2 and SAE J1113 compliant |
| Power Supply | Vehicle Power | System power on/off/hibernate management (programmable ignition on/off/delay) |
| | Management (VPM) | Supports wake-up events System power protection System monitoring and Device Diagnostic Tool |
| | Dimension | 280 x 82.5 x 182 mm |
| Mechanical | Weight | 3.6 kg |
| | IP rating | IP67 |
| Environmental | Vibration/Shock | MIL-STD-810H, EN60721-3-5 (5M3: Shock 100G 6ms, Random Vibration 3Grms) |
| | EMC | CE, FCC, RCM, CCC |
| | Safety | UL/cUL, CB, CCC |
| | Vehicle Regulation | E-Mark (E13), ISO 7637-2, SAE-J1113-11 RS test (Level 1) : ISO 11452-2 BCI test (Level 1) : ISO 11452-4 |
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Dimensions

Unit: mm



Standard version

4ch PoE



4ch GMSL



IP67 version

4ch PoE



4ch GMSL



Ordering Information

| Part Number | Description |
|--------------------|---|
| TREK-50N-GOPLXF-10 | Standard Ver., Jetson Orin NX 8GB, NVMe 128G, PoE Ports, GPS, VIO cable |
| TREK-50N-GPPLXF-10 | IP67 Ver., Jetson Orin NX 8GB, NVMe 128G, PoE Ports, GPS, VIO cable |

Optional Accessories

| Part Number | Description | Qty |
|-------------------|---|-----|
| 1700030180-11 | Generic I/O cable, supports RS-232/RS-485/line-out/mic-in/DI/DO [for Standard Ver.] | 1 |
| 1700030201-21 | VIO cable, supports power cable and 2 × CAN/J1708 cable [for Standard Ver.] | 1 |
| 1751000735-01 | FAKRA GPS antenna, 5 m | 1 |
| 1700030387-11 | Power cable (20 cm) with 30 cm vehicle I/O (use with adapter) [for Standard Ver.] | 1 |
| 96PSA-A150W12W7-4 | ADP A/D 100–240V 150W 12V LOCKABLE DC JACK (indoor use with AC power adapter) [for Standard Ver.] | 1 |
| 1700036309-01 | IP67 Power Cable, 100cm [for IP67 Ver.] | 1 |