ATC 3750-IP7-WI6CR

High Performance NVIDIA® Jetson AGX Orin™
Edge AI Computer for Railway Applications





Main Features

- Built-in NVIDIA® Jetson AGX Orin™ SOM, up to 200/275 INT8 Sparse TOPS AI performance
- Designed to be IP67 rated, rugged, and compact
- 6 x GbE PoE+ port for IP CAM/LiDAR sensors, optional 1 x 10GbE port
- HEVC/H.265 hardware decode, supports up to 7 x 4K30
- Wide range operating temperature of -25°C~70°C (OT3)
- Ultra-speed PCIe 4.0 x4 NVMe SSD for data integrity
- Expansible for GNSS, LTE/5G NR & Wi-Fi 5/6
- DC 24V~110V with ignition control & OCP/OVP for Rail
- NEXCOM Acceleration Linux (NAL) integrated w/ JetPack 6.1
- Military standard of MIL-STD-810H for anti-vibration/shock
- CE/FCC, UKCA, EN 45545-2, EN 50155 (EN 50121-3-2, EN 61373, OT3) certified

Product Overview

AI has become an essential component of automated vehicle technologies. With its built-in high performance NVIDIA® Jetson AGX Orin™ SOM, the ATC 3750-IP7-WI6CR can deliver up to 200/275 TOPS workload on Artificial Intelligence (AI) processing and inference, supporting AI aided transportation applications such as railway safety assurance which can be collaborating with existing ATP/ATO.

Thanks to NEXCOM's excellent thermal solutions, the ATC 3750-IP7-WI6CR can work through its defined TDP (15W to 60W) in harsh environments without a fan kit to achieve 200/275 TOPS workload performance.

The ATC 3750-IP7-WI6CR is an IP67 rated, rugged, compact-size rail AI powered computer that features DC 24V to 110V with IGN control, 6 PoE+ and one optional 10GbE for accessing IP CAM/LiDAR sensors, and rich peripheral ports, USB 3.2, isolation CAN bus, RS-232, Console, DI/DO, OTG and HDMI®. With the installation of 5G NR, Wi-Fi 5/6 modules, the ATC 3750-IP7-WI6CR can collaborate with CPS for AI model re-training, making it suitable for deployment sophisticated in railway/rolling stock applications. In harsh environments, the ATC 3750-IP7-WI6CR can operate at a wide temperature range of -25°C to 70°C and meet the MIL-STD-810H military standard for anti-vibration and shock. For regulation, the ATC 3750-IP7-WI6CR is certified by CE/FCC Class A, UKCA and EN 50155/EN 45545-2.

Specifications

NVIDIA® Jetson AGX Orin™ SOM

- Jetson AGX Orin™ 32GB
  - CPU: 8-core Arm® Cortex®-A78AE v8.2 64-bit, 2MB L2 + 4MB L3
  - GPU: 1792-core NVIDIA® Ampere architecture with 56 Tensor Cores
  - Memory: 32GB 256-bit LPDDR5, 204.8GB/s
  - AI performance: 200 INT8 Sparse TOPS
  - 2 x NVDLA v2.0 engines: 1.4 GHz, 46 INT8 Sparse TOPS each
  - Video encode: 1 x 4K60/3 x 4K30/6 x 1080p60/12 x 1080p30 (H.265)
  - Video decode: 1 x 8K30/2 x 4K60/4 x 4K30/9 x 1080p60/ 18 x 1080p30 (H.265)
- Jetson AGX Orin™ 64GB
  - CPU: 12-core Arm® Cortex®-A78AE v8.2 64-bit, 3MB L2 + 6MB L3
  - GPU: 2048-core NVIDIA® Ampere architecture with 64 Tensor Cores
  - Memory: 64GB 256-bit LPDDR5, 204.8GB/s
  - AI performance: 275 INT8 Sparse TOPS
  - 2 x NVDLA v2.0 engines: 1.6 GHz, 52.5 INT8 Sparse TOPS each
  - Video encode: 2 x 4K60/4 x 4K30/8 x 1080p60/16 x 1080p30 (H.265)
  - Video decode: 1 x 8K30/3 x 4K60/7 x 4K30/11 x 1080p60/ 22 x 1080p30 (H.265)
- OpenGL 4.6+, OpenGL ES 3.2, CUDA® 10.2+, and Vulkan 1.2+
- NVIDIA® JetPack 6.1

Storage

- 64GB eMMC 5.1 flash storage, 200MHz (HS400 or HS533)
- 1 x Accessible SD card (SDXC-I/UHS-I, SD 3.0)
- 1 x M.2 Key M 2280 (PCIe4.0 x4) NVMe SSD

Expansion

- 1 x Full size Mini PCIe slot (PCIe 4.0, USB 2.0)
- 1 x M.2 Key B 3042/3052 (USB 3.2/2.0), 2 x nano-SIM
- 1 x M.2 Key E 3030 (PCIe 4.0, USB 2.0) for Wi-Fi 5/6

Display

- 1 x HDMI® 2.0a/b, up to 3840x2160@60Hz, water-proof type

G-Sensor

- 3D accelerometer and 3D gyroscope, ST LSM6DSLTR

PoE+

- 6 x 1GbE M12 X-coded PoE connector
  - 9Kbyte Jumbo frame
  - IEEE 802.3af/at, total 80W
  - IEEE1588 supported
  - PSE on/off & Watt monitoring
  - GIGA LAN switch: KSZ9477STXI

USB

- 2 x USB 3.2 Gen 2:
  - M12 X-coded connector
  - 5V@900mA each
  - Up to 10Gbit/s link speed & compliance with USB 2.0 (LS/FS/HS link speed)
- 1 x OTG, Micro-USB

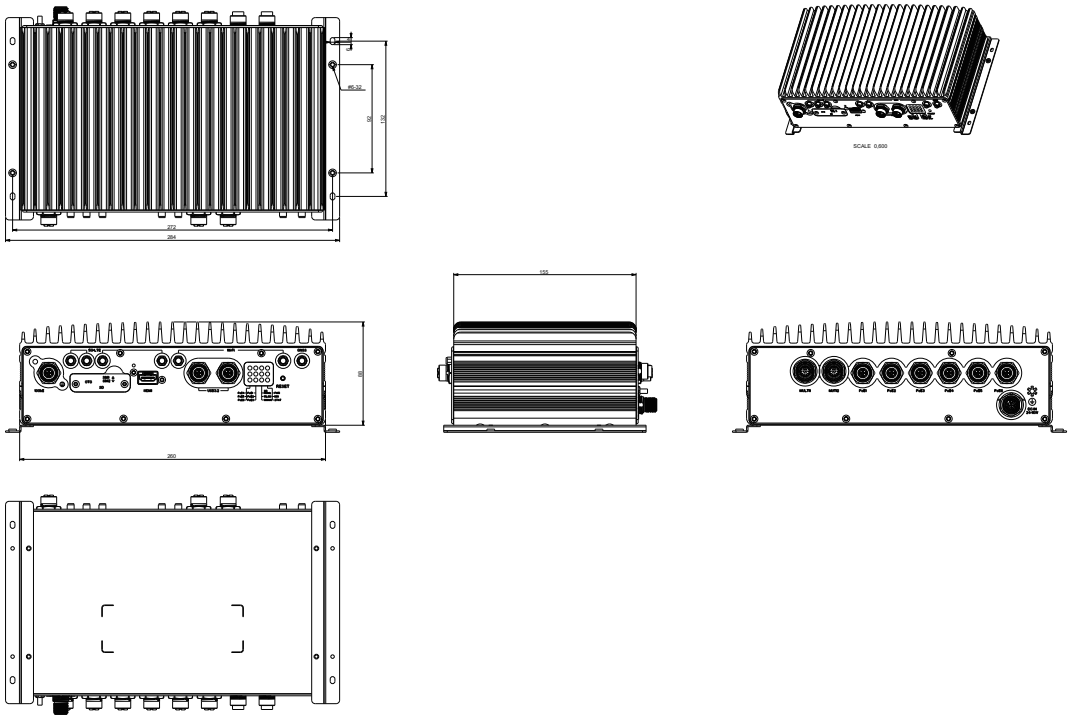
Serial Port

- 2 x RS-232 (Tx, Rx, RTS, CTS)
- 1 x Console (Tx, Rx)
- RS-232 working voltage ± 9V, baud rate up to 115.2kb/s
- M17 A-coded connector

DI/DO (isolation)

- 4-bit input
  - Source: DC 9V~36V (12V@1.1mA/24V@2.2mA)
  - 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)

Dimension Drawing



- External: DC 5V~27V pull-high, sink current w/ 220mA for each bit, 500mA max (@25C)
- Source or external can be selected by software (default: source type)

CAN bus
- 2 x CAN FD, compatible with CAN 2.0A/2.0B
- IEC 61000-4-2 Electrostatic Discharge (ESD): ± 8KV/15KV (contact/air)
- Up to 5Mb/s in data transmit, 2.5KV isolated

10GbE, M12 X-coded (optional)
- Ethernet PHY: Marvell AQR113C-BO-I
- 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX/10BASE-T
- Compliant with IEEE 802.3az
- 9Kbyte Jumbo frame
- IEEE1588 supported

Watch Dog Timer
- Yes, through MCU

Remote ATX PWR & Reset Trigger
- Reserved, wafer-type

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

DC Power
- 5V/2A, wafer type

Power Supply
- Nominal voltage: DC 24V~110V isolated power input
- OCP & UVP
- Ignition on/off control & programmable on/off delay timer
- Optional for remote power on/off control

I/O Ports, Front-Plate
- 12 x LED Indicator
- 2 x USB 3.2 M12 X-coded
- 1 x 10GbE M12 X-coded connector (optional)
- 1 x Water-proof HDMI®, 1 x SD
- 2 x nano-SIM, 1 x SD, 1 x OTG (a door to cover)

I/O Ports, Rear-Plate
- DC 24V~110V power isolation, K-coded
- 6 x 1GbE M12 X-coded PoE connector
- 1 x M17 A-coded (Multi-1): 2 x CAN FD + 4 x DI + 4 x DO
- 1 x M17 A-coded (Multi-2): 2 x RS-232 + 1 x Console + remote PWR button/RESET + DR
- 1x SMA for GNSS
- 2 x RP-SMA for Wi-Fi
- 2 x SMA for LTE/5G

Dimension & Weight
- Dimensions: 260.0mm (W) x 172.8mm (D) x 87.0mm (H) w/ mount bracket
- Weight: 3.5kg

Environment
- Operating temperature: -25°C~70°C (OT3) (TDP 15W~60W, fanless, w/ 80W PoE)
- 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-810G, 514.6E Procedure 1, Category 24, 7.7g
- Shock:
  - MIL-STD-810G, 516.6 Procedure I, trucks and semi-trailers=40g
  - Crash hazard: Procedure V, ground equipment=75g

Certifications
- CE approval, FCC Class A, UKCA, EN 50155, EN 45545-2 certified

Operating System
- NEXCOM Aided Linux (NAL) w/ Jetpack 6.1 integrated
  - NEXCOM custom functions (GNSS, 5G/NR, 6-axis sensor, MCU control)
  - Ubuntu 22.04 (L4T 36.3, Linux Kernel 5.15)

External Cable (optional)
- Multi-1 adapter cable, 30cm
- Multi-2 adapter cable, 30cm
- K-code power cable, 30cm
- X-coded LAN adapter cable, 60cm
- X-coded USB 3.2 adapter cable, 30cm

Ordering Information

- **ATC 3750-IP7-WI6CR (P/N: 10AT0375011X0)**
  NVIDIA® Jetson AGX Orin™ 32GB, 64GB eMMC, 6 x PoE+ (X-coded), 2 x USB 3.2, 2 x RS-232, OTG/Console, IP67, isolation DC 24V~110V for rail

- **ATC 3750-IP7-WI6CR-64 (P/N: 10AT0375012X0)**
  NVIDIA® Jetson AGX Orin™ 64GB, 64GB eMMC, 6 x PoE+ (X-coded), 2 x USB 3.2, 2 x RS-232, OTG/Console, IP67, isolation DC 24V~110V for rail