ATC 3750-IP7-WI8MR

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
- 8 x MIPI/GMSL2 & 2.5GbE port (X-coded) for MIPI CAM/IP CAM/ LiDAR sensors
- HEVC/H.265 hardware decode, supports up to 7 x 4K30
- Wide range operating temperature of -25°C~70°C
- Ultra-speed PCIe 4.0 x4 NVMe SSD for data integrity
- Expansible for GNSS, LTE/5G NR & Wi-Fi 5/6
- DC 24V~110V w/ isolation, ignition control & OCP/OVP
- NEXCOM Acceleration Linux (NAL) integrated w/ JetPack 6.1
- Military standard of MIL-STD-810H for anti-vibration/shock
- CE/FCC, UKCA, EN 50155 (EN 55011, EN 50121-3-2, EN 61373, OT3), EN 45545-2 certified

Product Overview

AI has become an essential component of automated railway vehicle technologies. With its built-in high performance NVIDIA® Jetson AGX Orin™ SOM, the ATC 3750-IP7-WI8MR can deliver up to 200/275 TOPS workload on Artificial Intelligence (AI) processing and inference, supporting applications such as railway safety assurance, operation optimization, maintenance management, and self-driving train.

Thanks to NEXCOM's excellent thermal solutions, ATC 3750-IP7-WI8MR can work through its defined TDP (15W~60W) in harsh environments without a fan kit to achieve 200/275 TOPS workload performance.

The ATC 3750-IP7-WI8MR is an IP67 rated, rugged, compact-size railway AI powered computer that features DC 24V~110V (power isolation) with IGN control, 8 MIPI/GMSL2 for accessing MIPI CAM/LiDAR sensors, and rich peripheral ports: GbE/2.5GbE, 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-WI8MR can collaborate with CPS for AI model re-training, making it suitable for deployment in sophisticated applications such as railway vehicle relevant applications. In harsh environments, the ATC 3750-IP7-WI8MR can operate at a wide temperature range of -25°C~70°C and meet the MIL-STD-810H military standard for anti-vibration and shock. For regulation, the ATC 3750-IP7-WI8MR is certified by CE/FCC Class A, UKCA, EN 50155, and 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 (PCIe 4.0 x4), NVMe SSD

Expansion

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

Display

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

G-Sensor

- 3D accelerometer and 3D gyroscope, ST LSM6DSLTR

MIPI/GMSL2

- 8 x MIPI SerDes/GMSL2 port (different CAM brands cannot be used interchangeably)
- Controller: Maxim MAX96712
- e-con Systems® GMSL2 camera:
  - STURDeCAM21
  - STURDeCAM25
  - STURDeCAM31
- Appro GMSL2 camera:
  - E-09 (IMX415 (4K) + ISPi (YUV) + MAX9295)
  - E-10 (IMX335 (5M) + ISPi (YUV) + MAX9295)
  - E-11 (AR0234 (2.3M) + ISPi (YUV) + MAX9295)
- StereoLabs camera:
  - ZED X (stereo CAM)
  - ZED X One (mono CAM)
- Leopard GMSL2 camera:
  - LI-AR0234CS-GMSL2-OWL
  - LI-AR0234CS-STEREO-GMSL2-30 (stereo CAM)
- PoC (Power over Cable)
- External cable length: 15 meters
- Connector: FAKRA Z-coded

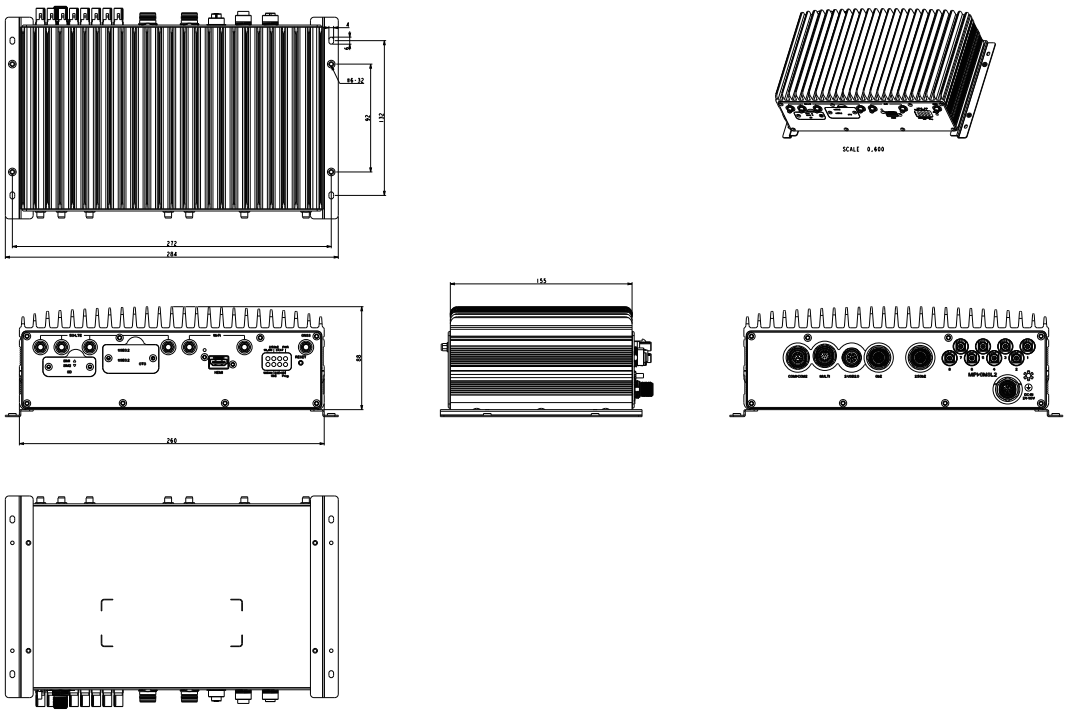
Multi-Gigabit

- 1 x GbE port, 1 x 2.5GbE port
- 9Kbyte Jumbo frame
- IEEE 1588 supported
- LAN controller: Intel® I226-I
- X-coded connector

USB

- 2 x USB 3.2 Gen 2, Type A
  - 5V@900mA each
  - Up to 10Gbit/s link speed & compliance with USB 2.0 (LS/FS/HS link speed)

Dimension Drawing



- 2 x USB 2.0
- 1 x OTG, Micro-USB

Serial Port
- 1 x RS-232 (Tx, Rx, RTS, CTS, DTR, DSR)/422/485
- 1 x RS-232 (Tx, Rx, RTS, CTS)
- 1 x Console (Tx, Rx)
- RS-232 working voltage ± 9V, baud rate up to 115.2kb/s

DI/DO
- 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)
  - 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

Watch Dog Timer
- Yes, through MCU

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

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

Power Supply
- DC 24V~110V w/ power isolation, K-coded connector
- Ignition on/off control & programmable on/off delay timer

I/O Ports, Front-Plate
- 1 x Reset button
- 8 x LED Indicator
- 2 x USB 3.2, Type-A (w/ a door)
- 2 x nano-SIM slot
- 1 x HDMI®
- 1 x SD
- 1 x OTG
- 2 x RP-SMA for Wi-Fi
- 4 x SMA for LTE/5G
- 1 x SMA for GNSS

I/O Ports, Rear-Plate
- 1 x COM1/COM2 (M12 A-coded)
- 1 x MULTI (CAN FD, DI/DO, DR, GPS/PPS, M12 A-coded)
- 2 x USB 2.0 (M12, A-coded)
- 1 x GbE (M12, X-coded)
- 1 x 2.5GbE (M12, X-coded)
- 8 x MIPI/GMSL2 (FAKRA Z-coded)
- DC 24V~110V input, K-coded

Dimension & Weight
- Dimensions: 260.0mm (W) x 155.0mm (D) x 88.0mm (H) w/o mount bracket
- Weight: 4.5kg

Environment
- Operating temperature: -25°C~70°C (TDP 15W~60W, 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-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, and 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 adapter cable, 20cm
- M12 adapter cable to COM1/COM2, 20cm
- M12 adapter cable to 2 USB 2.0, 20cm
- X-coded adapter cable to 1/2.5GbE, 20cm

Ordering Information

- **ATC 3750-IP7-WI8MR (P/N: 10AT0375006X0)**
  NVIDIA® Jetson AGX Orin™ 32GB, 64GB eMMC, 1 x GbE, 1 x 2.5GbE, 2 x USB 3.2/2.0, 1 x RS-232/422/485, 1 x RS-232, OTG/Console, DC 24V~110V w/ isolation for rail
- **ATC 3750-IP7-WI8MR-64 (P/N: 10AT0375007X0)**
  NVIDIA® Jetson AGX Orin™ 64GB, 64GB eMMC, 1 x GbE, 1 x 2.5GbE, 2 x USB 3.2/2.0, 1 x RS-232/422/485, 1 x RS-232, OTG/Console, DC 24V~110V w/ isolation for rail