

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 (OT3)
- ♦ Ultra-speed PCIe 4.0 x4 NVMe SSD for data integrity
- ♦ Expandable 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 to 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 to 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 to 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 slot (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

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) + ISP (YUV) + MAX9295)
 - E-10 (IMX335 (5M) + ISP (YUV) + MAX9295)
 - E-11 (AR0234 (2.3M) + ISP (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

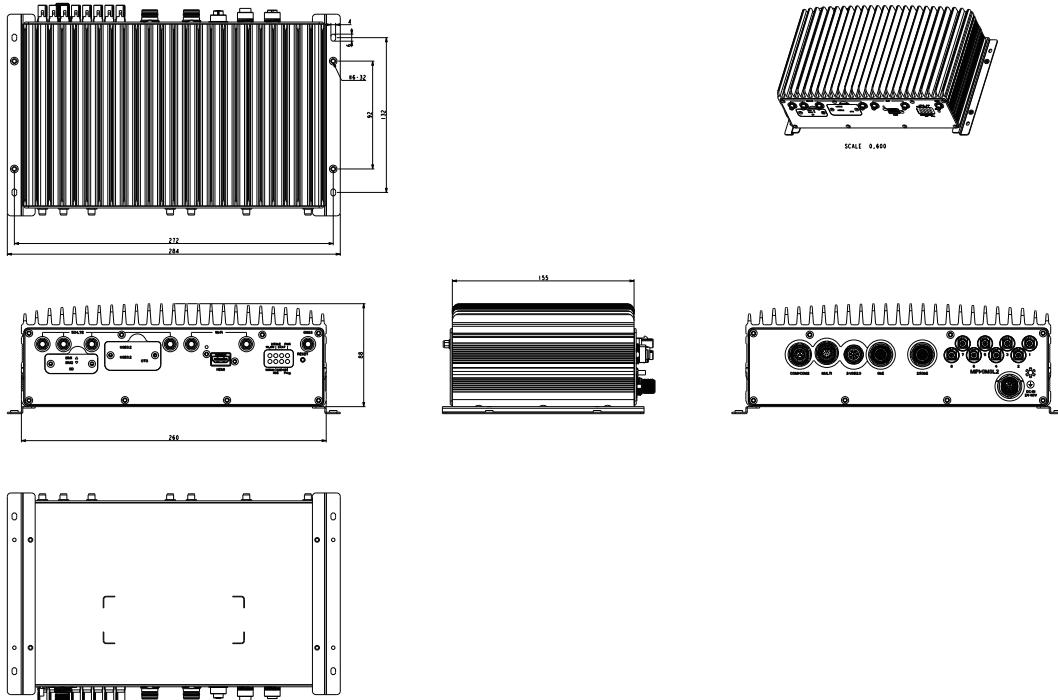
Multi-Gigabit

- ♦ 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 10Gb/s link speed & compliance with USB 2.0 (LS/FS/HS link speed)
- ♦ 2 x USB 2.0
- ♦ 1 x OTG, Micro-USB

Dimension Drawing



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 6 1000-4-2 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
- ♦ OCP & UVP

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
- ♦ 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 COM port1/2 M12 A-coded
- ♦ 1 x Multi port M12 A-coded (CAN FD, DI/DO, DR, GPS/PPS)

♦ 2 x USB 2.0 M12 A-coded

- ♦ 1 x 1GbE M12 X-coded connector
- ♦ 1 x 2.5GbE M12 X-coded connector
- ♦ 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 (OT3) (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, 30cm
- ♦ M12 adapter cable to COM1/COM2, 30cm
- ♦ M12 adapter cable to 2 USB 2.0, 30cm
- ♦ X-coded LAN adapter cable, 60cm

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