

# AVA-RAGX

## Fanless AIoT Video Analytics Platform with NVIDIA Jetson AGX Xavier for Railway

### Features

- NVIDIA Jetson AGX Xavier with 32 TOPs AI performance
- 4xM12 GbE with PoE, 1x lockable HDMI output, 4x USB 3.0
- 1x M.2 B-key for LTE/5G; 1x M.2 A/E key 2230 for Wi-Fi
- 2x CAN DB-9 CAN-FD from AGX module, with isolation
- Power with ignition control
- Nominal Voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN50155 compliant)

Preliminary



### Specifications

#### • System

##### System on Module

NVIDIA Jetson AGX Xavier, 100x87mm

##### Processor

8-core NVIDIA Carmel ARM® v8.2 64-bit CPU, 2.26GHz  
8MB L2 + 4MB L3

##### GPU

512-core NVIDIA Volta GPU with 64 Tensor Cores, 1.37GHz

##### Memory

32GB 256b LPDDR4x on module

##### Storage

32GB on module

#### • Front Interfaces

##### Ethernet

4x GbE connector in M12 Female X-coded connectors  
Support PoE IEEE 802.3at by BOM option, PSE total max. power 40W for 4 ports  
Isolation 1.5kVac (2100Vdc) include POE power

##### USB

2x USB 3.0 in connector with lock

##### Serial Ports

1x DB-9 RS-232/422/485 originated from AGX module, TX, RX, CTS, RTX

##### DIO

1x thermal block 4 input/4 output for 24VDC~110VDC, Isolation 1.5kVdc  
Signals must be separated with a creepage and clearance distance to all other PCB tracks, components and enclosure that can withstand  $\geq 1.5kVdc$   
Short protection for DO  
DI voltage:  
Input low(0) at value < 5V  
Input high(1) at Value > 12V  
Max input current is 4mA  
DO max. working voltage is 110V  
DO max. current 250mA

##### CAN

1x DB-9 CAN-FD from AGX module, with isolation  
1x DB-9 CAN-FD from AGX module, with isolation by pin-header

#### • Rear Interfaces

##### Display

1x HDMI 2.0 with lock at rear side

##### USB

1x 2.0 OTG port for change environment image  
2x USB 3.0 for maintenance

##### Power Inlet

1x 4-pin S-coded M12

##### USIM

1x USIM socket, external accessible, mini-SIM (25x15mm, 2FF)

##### Antenna

4+2x SMA antenna reserved on rear side

#### • Internal Interfaces

##### Storage expansion

1x Socket 1, Key M (PCIe Gen3 x4) 2280 for Storage

##### SD Card

1x Micro SD

##### Expansion

1x M.2 B-key 3042 (reserve mechanical design for 3052 for LTE/5G) through USB 3.0  
Ideally use FR1(sub-6GHz), solution can be SIMCOM SIM8202G 3042, need to reserve 4x 5G antenna.  
1x M.2 A/E key 2230 for Wi-Fi (PCIe x1)/BT (USB2.0)  
Wi-Fi 5:EnLibNA2174\_M2I (29-E2174-9000) (Primary)  
Wi-Fi 5: Intel AC9260 (29-E9260-2020) (Secondary)

##### TPM

Support TPM 2.0

##### RTC

Real time clock (RTC) with golden cap backup (charge holds 48h)

## Specifications

### • Power

#### Button

Power, Reset, and Recovery buttons on rear

#### Power Input

+24/36/72/110VDC with M12 4-pin S code connector  
(16.8V to 137.5V, EN50155 compliant)

#### Ignition input

Ignition control

#### Compliance

Compliant to Interruptions of voltage supply according EN50155 SEC. 5.1.1.4  
Class S2 & C1 >= 10ms  
Power Consumption < 160W at 100% GPU loading

#### GND

M6 threaded stainless steel stud for protective grounding on rear

### • Operating System

#### Operating System

Ubuntu 18.04

### • Mechanical

#### Mounting

Wall mount & Din rail

#### Dimensions

287.7mm x 190mm x 78.3mm (WxDxH)

#### IP

IP20

#### Weight

<= 5 kg

### • Environmental Chamber/Shock/vibration

#### Operating Temperature

-25°C to 70°C, up to +85°C for 10min

#### Storage Temperature

-40°C to 85°C

#### Humidity Operating

10% to 95% relative humidity (non-condensing)

#### Humidity Storage

5% to 95% relative humidity (non-condensing)

#### Environmental

EN50155:2017

Low temperature storage test – EN50155 13.4.6 (Ref. to IEC60068-2-1)

Low temperature start-up test – EN50155 13.4.4 (Ref. to IEC60068-2-1)

Dry heat test – EN50155 13.4.5 (Ref. to IEC60068-2-2)

Cyclic damp heat test – EN50155 13.4.7 (Ref. to IEC60068-2-30)

Shock and Vibration test – EN50155 13.4.11 (Ref. to IEC61373)

Altitude test - EN50125-1:2014 (EN50125-1\_4.2 (Ref. to IEC 60068-2-13)

RoHS 2.0 & REACH

### • Environmental EMC / Safety

#### EMI/EMC

EN 50155:2017 Clause 4.3.6

EMC: with reference to EN 50121-1:2017; EN 50121-3-2:2016

EN 61000-4-2:2009; EN 61000-4-3:2006 + A1:2008 + A2:2010

EN 61000-4-4:2012; EN 61000-4-5:2014 + A1: 2017

EN 61000-4-6:2014 + AC: 2015FCC 47 CFR, Part 15, Subpart B, Class A

Safety: EN50124-1:2017

#### Safety

EN 50124 Compliance

#### Fire Protection

Compliant to EN45545-2:2013+A1:2015 (HL 1-3 TBD)

### • Miscellaneous

#### LEDs

1x Power On

6x User defined LEDs on front interfaces

Green: U1, U2, U3, U6

Orange: U5

Yellow: U4

#### MTBF

TBD >250K Hours @25°C according to IEC/TR 62380

#### Conformal Coating

All PCBs conformal coated both sides – type HumiSeal 1B73 Coating (AR)  
Acrylic

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## Mechanical Drawing

