HARDWARE QUICK START GUIDE

VIA AMOS-9100

Compact and fanless Hexa-Core Arm® system for demanding Edge AI, Autonomous Mobile Robot (AMR) and Guided Vehicle (AGV) applications

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Regulatory Compliance

FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his personal expense.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

Notice 3

The product described in this document is designed for general use, VIA Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.

Safety Precautions

- Always read the safety instructions carefully.
- Keep this User Manual for future reference.
- All cautions and warnings on the equipment should be noted.
- Keep this equipment away from humidity and direct sunlight.
- Put this equipment on a reliable flat surface before setting it up.
- Before connecting the equipment to a power source, check if it can provide power within the 12 - 24V range.
- Do not place the power cord where people will step on it.
- Always unplug the power cord before inserting any add-on card or module.
- If any of the following situations arise, get the equipment checked by authorized service personnel:
  - The power cord or plug is damaged.
  - Liquid has entered into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment is faulty or you cannot get it work according to User Manual.
  - The equipment has been dropped and damaged.
  - The equipment has an obvious sign of breakage.
- Do not operate the equipment in temperatures outside the -20°C ~ 60°C range or store the equipment in temperatures outside the -40°C ~ 85°C range. The equipment may get damaged.
- Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- Do not place anything over the power cord.
- Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating.

Box Contents

Items for AMOS-9100-2H11A0

- VIA AMOS-9100 system
- 2-pole Phoenix plug to DC jack
- LoRa antenna

Items for AMOS-9100-1H11A0

- VIA AMOS-9100 system
- 2-pole Phoenix plug to DC jack

Ordering Information

Part Number	Description
AMOS-9100-2H11A0	VIA AMOS-9100 system with 2.0GHz NVIDIA Jetson Orin NX Hexa-Core SoC, 8GB LPDDR5 DRAM, 128GB SSD, HDMI, 3 USB 3.2 Type A, USB 3.2 Gen 1, Micro USB 2.0 OTG, 2 GLAN with PoE, 2 COM, CAN/UART, DIO, Audio jack, LoRa, 3 M.2 slots, Micro SIM card slot, 12~24V DC-in
AMOS-9100-1H11A0	VIA AMOS-9100 system with 2.0GHz NVIDIA Jetson Orin NX Hexa-Core SoC, 8GB LPDDR5 DRAM, 128GB SSD, HDMI, 3 USB 3.2 Type A, USB 3.2 Gen 1, Micro USB 2.0 OTG, 2 GLAN, 2 COM, CAN/UART, DIO, Audio jack, 3 M.2 slots, Micro SIM card slot, 12~24V DC-in

Optional Accessories

Wireless Module Options

Part Number	Description
AMOS-9000-W101A1	Wi-Fi 6 module with antennas and assembly

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1. Introduction

Expedite and streamline your next-gen M2M and Edge-AIoT product development with the compact and rugged VIA AMOS-9100 fanless system. Powered by the advanced NVIDIA Jetson Orin NX Cortex®-A78AE hexa-core processor with 8GB LPDDR5 memory and 128GB of storage, the VIA AMOS-9100 system also features a powerful GPU and an AI processor that delivers up to 70 TOPS. Featuring multiple digital I/O and network connectivity options, and supporting a wide range of voltage and operating temperatures, makes the VIA AMOS-9100 a highly flexible and reliable platform for many smart and powerful commercial, consumer, and industrial applications, such as, Edge AI, Autonomous Mobile Robots (AMR) and Autonomous Guided Vehicles (AGV).

This user guide introduces the VIA AMOS-9100 system and provides instructions to quickly set up the system for use.

1.1 System Specifications

Processor

- 2.0GHz NVIDIA Jetson Orin NX Cortex®-A78AE Hexa-Core SoC

System Memory

- 8GB LPDDR5 DRAM

System Storage

- 128GB SSD

Graphics

- NVIDIA Ampere architecture GPU with 1024 CUDA® cores and 32 Tensor cores @ 765MHz
- Graphics engine supporting end-to-end lossless compression, tile caching, OpenGL® 4.6, OpenGL ES 3.2, Vulkan™ 1.10 and CUDA 10
- Supports H.265 video decoding up to 8K@30fps and video encoding up to 4K@60fps

AI Processor

- NVIDIA Deep Learning Accelerator (NVDLA) 2.0 (supports up to 70 TOPS) @ 610MHz
- Programmable Vision Accelerator (PVA) 2.0

Wireless Connectivity

- Optional LoRa (with radio support from 863-930MHz)

Audio

- Realtek ALC5616-CGT High Definition Audio Codec

USB

- VIA VL817-Q7 USB 3.2 Gen1 Hub Controller

Video

- Integrated HDMI 2.0b Transmitter

Ethernet

- Realtek RTL8111H-CG Gigabit Ethernet Transceiver

IMU

- 6-Axis IMU TDK ICM-42607 for navigation

Onboard I/O

- 1 x M.2 M Key for an M.2 M Key 2280 PCIe/NVMe SSD
- 1 x M.2 B Key slot for a 4G LTE/5G mobile broadband module
- 1 x M.2 E Key for a Wi-Fi module
- 1 x RTC battery
- 8 x DIP switches for RS-232/422/485 selection

Front Panel I/O

- 1 x HDMI 2.0 port
- 2 x USB 3.2 Type A ports
- 2 x Gigabit Ethernet ports (supports optional PoE)
- 1 x Micro SIM card slot
- 1 x 3.5mm audio jack (supports Line-out and MIC-in)
- 1 x Power button with LED
- 1 x 2-pole Phoenix DC jack

Back Panel I/O

- 2 x COM ports (supports RS-232/422/485)
- 1 x CAN/UART port (supports 2 UART and 1 CAN)
- 1 x 12-pin DIO port
- 6 x Antenna holes

Right Panel I/O

- 1 x USB 3.2 Gen 1 port (for software upgrade)
- 1 x Micro USB 2.0 OTG port (for debugging)
- 1 x Software Upgrade Button
- 1 x Reset button
- 1 x Ground connector

Left Panel I/O

- 1 x USB 3.2 Type A port
- 1 x Antenna connector

Power Supply

- DC 12 ~ 24V

System Software

- JetPack SDK 6.1

Operating Temperature

- -20°C ~ 60°C

Storage Temperature

- -40°C ~ 85°C

Operating Humidity

- 0 ~ 95% (relative humidity; non-condensing)

Mechanical Construction

- Aluminum alloy metal chassis

Dimensions

- 160.05mm(W) x 66.7mm (H) x 105.2mm (D) (6.30" x 2.62" x 4.14")

Weight

- 1.3kg (3lbs)

Compliance

- CE, FCC, BSMI, UKCA, VCCI

Note:
As the operating temperature provided in the specifications is a result of testing performed in a testing chamber, a number of variables can influence this result. Please note that the working temperature may vary depending on the actual situation and environment. It is strongly recommended to execute a solid testing program and take all variables into consideration while building the system. Please ensure that the system is stable at the required operating temperature in terms of application.

1.2 System Layout

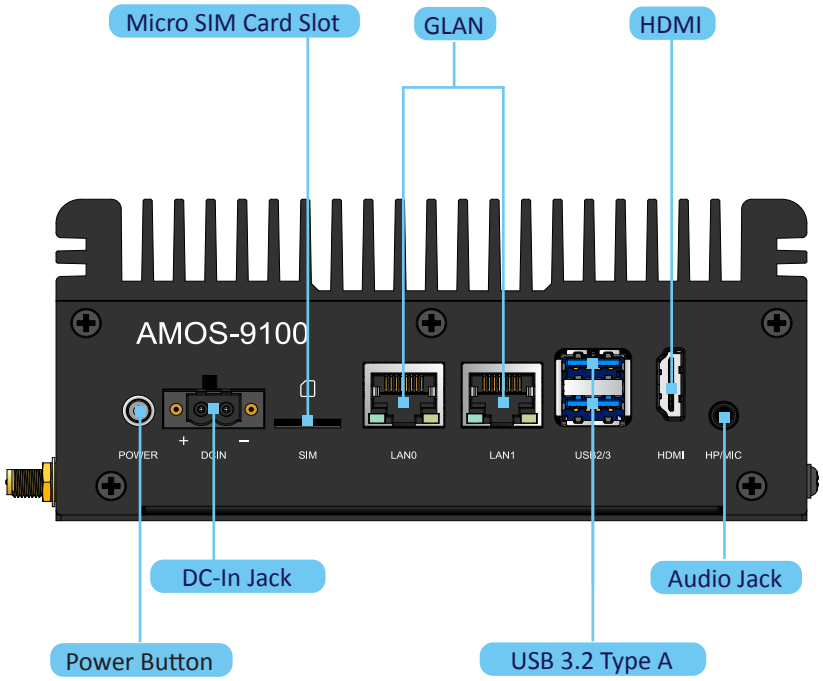

Figure 01: VIA AMOS-9100 system front panel I/O

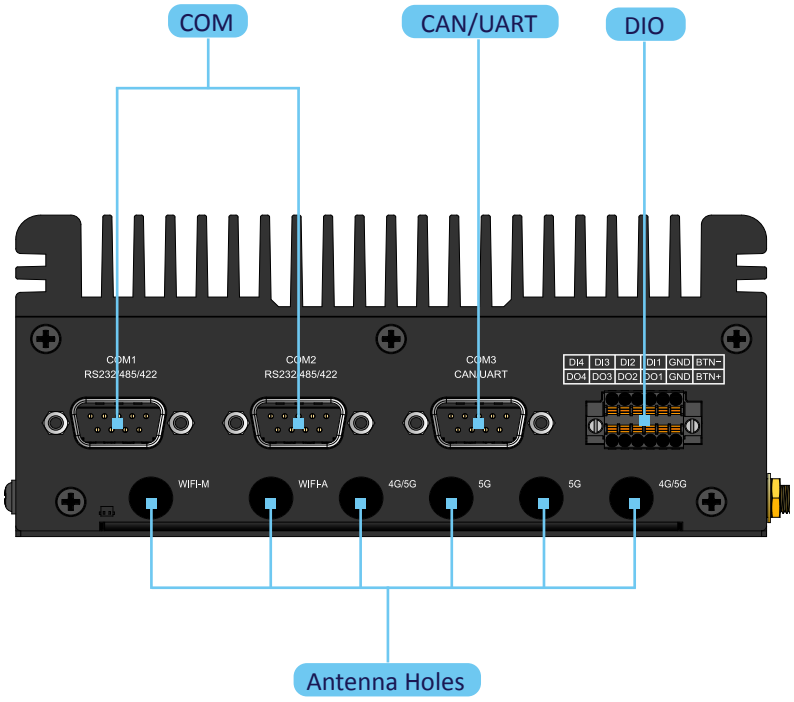

Figure 02: VIA AMOS-9100 system back panel I/O

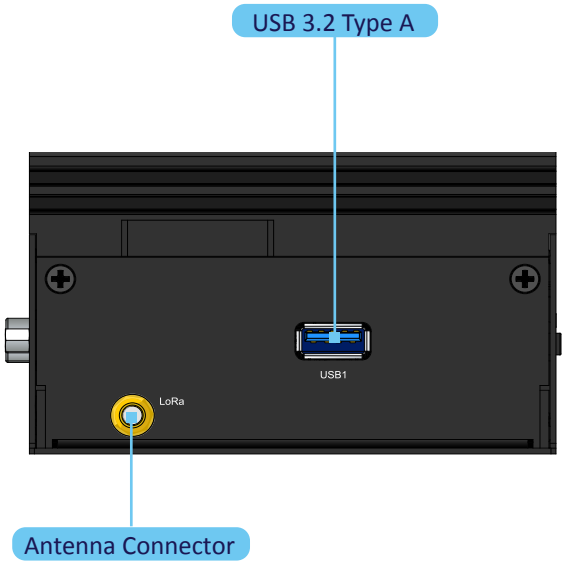

Figure 03: VIA AMOS-9100 system left panel I/O

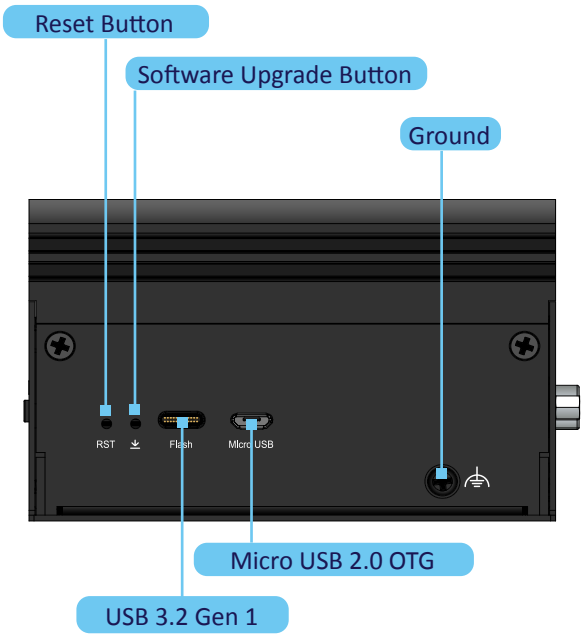

Figure 04: VIA AMOS-9100 system right panel I/O

1.3 System Dimensions

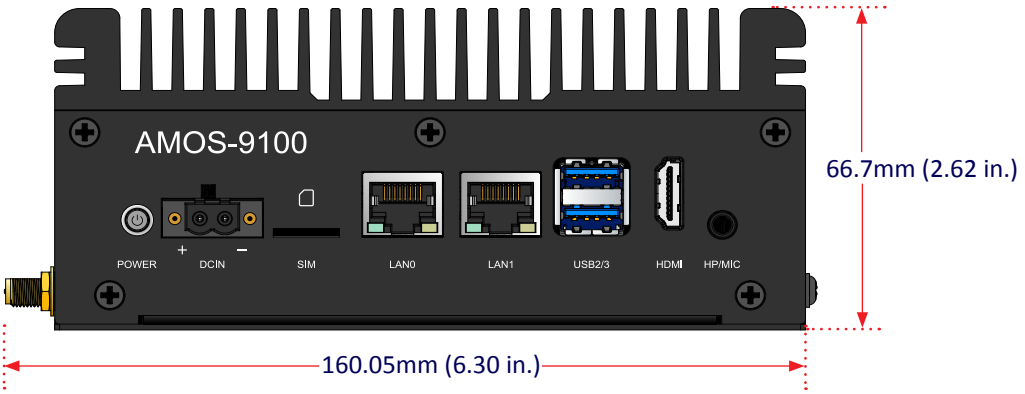

Figure 05: Dimensions of the VIA AMOS-9100 system (front panel I/O)

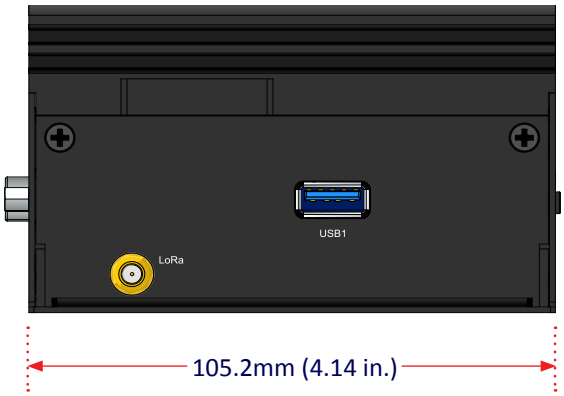

Figure 06: Dimensions of the VIA AMOS-9100 system (left panel I/O)

2. Hardware Installation

2.1 System Installation

Check the following and install the VIA AMOS-9100 system on the target surface:

- The target surface is flat, reliable and away from direct sunlight.
- A power source is available nearby and it supports a 100 ~ 240V AC-to-DC adapter providing power at DC 12V or 24V.
- The environmental temperature is within the -40°C ~ 85°C range and the humidity is within the 0 ~ 95% range (relative and non-condensing).

2.2 Installing the LoRa Antenna

The VIA AMOS-9100 system's standard package **(part number: AMOS-9100-2H11A0)** includes a LoRa antenna.

Figure 07: LoRa antenna

To install the LoRa antenna on the VIA AMOS-9100 system, follow the steps below:

Step 1

Locate the antenna connector on the VIA AMOS-9100 system's left panel.

Step 2

Gently screw the LoRa antenna on the antenna connector and fold it upwards for the best reception.

Figure 08: Installed LoRa antenna

2.3 Connecting the System to a Power Source

The VIA AMOS-9100 system requires a 12V or 24V DC input power supply. A 2-pole Phoenix plug to DC jack power cable is provided in the VIA AMOS-9100 system's standard package for connecting to a compatible 100 ~ 240V AC-to-DC power adapter. Follow the steps described below to connect the VIA AMOS-9100 system to a power source:

Step 1

Insert the Phoenix plug of the provided power cable into the DC-in jack labeled "DCIN" on the front panel of the VIA AMOS-9100 system.

Step 2

Insert a compatible power adapter's DC connector into the opposite end of the power cable.

Figure 09: Connecting the power cable to the system

Step 3

If the power adapter does not come with a cable or wire for grounding, a grounding wire can be connected between the ground connector located on the right panel of the VIA AMOS-9100 system and a grounding source.

Step 4

Switch ON the power source and press the "POWER" button on the VIA AMOS-9100 system's front panel.

Figure 10: The "POWER" button

3. Technical Support and Assistance

- For utility downloads, the latest documentation, and information about the VIA AMOS-9100 system, please visit our website at https://www.viatech.com/en/edge/via-amos-9100/.
- For technical support and additional assistance, always contact your local sales representative or system distributor, or go to https://www.viatech.com/en/support/drivers/ for technical support.
- For OEM clients and system integrators developing a product for long-term production, other code and resources may also be made available. Visit webpage https://www.viatech.com/en/contact/ to submit a request.

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