



DeviceEdge\_AGX ORIN Series

# AIE-KX11/KX21/ KX12/KX22

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USER MANUAL

## Document Change History

Version	Date	Description	Authors
V1.0	2023/02/04	Initial Release.	Joann Tung

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Version 1.0

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- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Visit the Aetina website at <https://www.Aetina.com/support-warranty-policy.php> where you can find the latest information about the product.

## Contact Information

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Mail [sales@Aetina.com](mailto:sales@Aetina.com)

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This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Aetina, or which have been subject to misuse, abuse, accident or improper installation. Aetina assumes no liability under the terms of this warranty as a consequence of such events.

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If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Aetina products used other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy of the proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

## ESD Warning

This product, like all electronic products, uses the product that can be damaged by electrostatic discharge (ESD). When handling, care must be taken so that the devices are not damaged. Damage due to inappropriate handling is not covered by the warranty. The following precautions must be taken:

- Do not open the protective conductive packaging until you have read the following and are at an approved anti-static workstation.
- If working on a prototyping board, use a soldering iron or station that is marked as ESD-safe.
- Always disconnect the product from the prototyping board when it is being worked on.
- Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up an ESD - sensitive electronic component.
- Use an approved anti-static mat to cover your work surface.

## Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references:

1. All cautions and warnings on the equipment should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
6. Always completely disconnect the power before working on the system's hardware.
7. Keep this equipment away from humidity.
8. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
9. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
10. Be sure that the room in which you choose to operate your system has adequate air circulation. Ensure that the chassis cover is secure.
11. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If any of the following situations arises, please contact our service personnel:
  - Damaged power cord or plug
  - Liquid intrusion to the device
  - Exposure to moisture
  - Device is not working as expected or in a manner as described in this manual
  - The device is dropped or damaged
  - vi. Any obvious signs of damage displayed on the device

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# 1. Product Specification

DeviceEdge AGX Orin series – AIE-KX11/AIE-KX21/AIE-KX12/AIE-KX22 is a standard system, supporting for NVIDIA® Jetson AGX Orin. The system is with smart button for one-key recovery function to address critical system failure and real-time monitoring for status of device through the AIM (Aetina Intelligent Management).



## 1.1 Features

- Support NVIDIA® Jetson AGX Orin™ 32GB/64GB module
- DC 9~36V power input.
- 1 x GbE, 1 x 10GbE, and 2/4 x IEEE 802.3af GbE PSE ports
- Build in 1 x B-Key/1 x E-Key/1 x M-Key slot
- Out of Band function & recovery function support
- Operating Temperature -25°C ~ +70°C



## 1.2 Configuration

Table 1.1 Lists the SKU configuration currently available for the AIE-KX11/AIE-KX21/AIE-KX12/AIE-KX22.

### ■ System configuration

Specification	AIE-KX11/AIE-KX12	AIE-KX21/AIE-KX22
Module Compatibility	NVIDIA Jetson AGX ORIN 32GB	NVIDIA Jetson AGX ORIN 64GB
Storage	64GB eMMC 5.1	
Display	1 x HDMI Type A	
Audio	Line-out/Line-in/Mic (opt. with Daughter Board)	
LAN	1 x RJ-45 1GbE ports, 1 x RJ-45 10GbE port, 2/4 x RJ-45 IEEE802.3af GbE PSE ports	
USB	2 x USB 3.2 Gen1 Type A, 1 x USB 2.0 (DB-15), 1 x USB Type-C (OTG only), 1 x USB Type-C USB 3.2 Gen 1	
I/O Interfaces	2 x I2C, 1 x I2S, 1 x SPI, 5 x GPIO 1 x RS-232, 1 x RS-422 / RS-485 2 x CAN 2.0b	
Expansion	1 x M.2 B-Key 3042/3052 (LTE/5G - USB3) w/ micro sim holder: cellular function 1 x M.2 E-Key 2230 (PCIe/USB2): WIFI/BT function 1 x M.2 M-Key (NVMe) 2280: Storage 1 x microSD slot	
MISC. Function	1 x Power / Recovery (Optional) / Reset Button 2 x UART, 1 x UART3 (Debug only)	
Power Input /Connector	DC-in 9 to 36 VDC / 4-pin DC Jack Power Connector	
Power Consumption	Idle: TBD (Connect With Keyboard, Mouse and HDMI Display) Full Loading: TBD (Connect with keyboard, mouse and HDMI display with CPU and GPU 100% loading)	
Dimension (Wx Dx H)	210 x 124.7 x 84mm	
Mounting	Wall Mount / Din Rail (Optional)	
Net Weight	1969g	
Vibration	1 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis	
Shock	10 G, IEC 60068-2-27, half sine, 11 ms duration	

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Temperature	Operating Temperature: -25°C ~ +70°C Storage Temperature: -40°C ~ +85°C
Humidity	5 to 90% @ 40°C Related Humidity, Non-condensing

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## 2. Hardware Information

### 2.1 I/O Interface

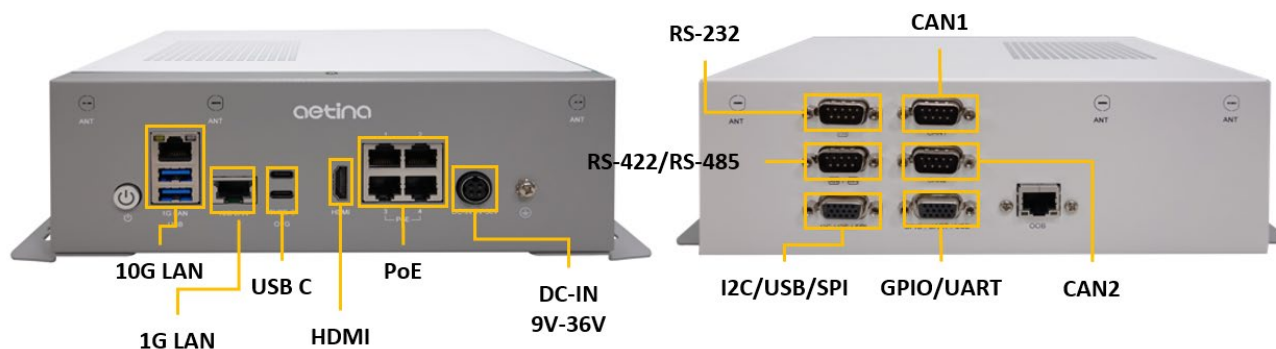


Figure 2.1 I/O Interface

### 2.2 External Connector Summary

Location	External Connector	Description
Front	Power	Power pushbutton
	DC IN	Power Connector 9V-39V
	LAN	10G LAN
	LAN	1G LAN
	HDMI	RJ-45 Gigabit Ethernet connector (PoE PD function)
	USB	USB3.2 Gen1 Type-A connector
	USB	USB 3.2 Type-C Gen 2 USB 2.0 Type-C (OTG only)
Rear	DB-15	DB15 female connector
	DB-9	DB 9 male connector
	Recovery	Recovery pushbutton
	Reset	Reset pushbutton
	SIM Slot	SIM Card Slot
	SD Slot	SD Card Slot

## 2.2.1 External I/O Interface

### ■ Power

Item	Detail
Location	Front
Type	Pushbutton



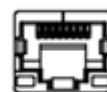
### ■ Power input connector

Item	Detail
Location	Front
Type	9V to 36V 4-pin DC Jack



### ■ 10G LAN / 1G LAN

Item	Detail
Location	Front
Type	RJ-45 Connector



### ■ HDMI

Item	Detail
Location	Front
Type	RJ-45 Connector



### ■ Dual USB3.2 Gen1 Type-A connector

Item	Detail
Location	Front
Type	Type-A USB connector
Pin	Refer to USB Standard



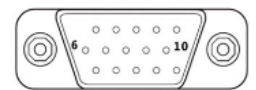
### ■ Dual Type-C connector

Item	Detail
Location	Front
Type	Type-C USB connector
Pin	Refer to USB Standard



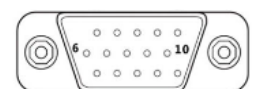
■ DB15 female connector

Item	Detail
Location	Rear
Type	I2C/USB/SPI
Pin NO.	Description
1	SPI_MOSI
2	SPI_SCK
3	SPI_MISO
4	SPI_CS1
5	SPI_CS0
6	I2C_1_CLK
7	I2C_1_DAT
8	I2C_2_CLK
9	I2C_2_DAT
10	3.3V
11	USB_DM
12	USB_DP
13	5V
14	GND
15	GND



■ DB15 female connector

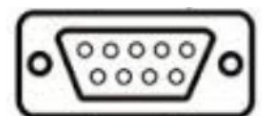
Item	Detail
Location	Rear
Type	GPIO/UART
Pin NO.	Description
1	GPIO1
2	GPIO2
3	GPIO3
4	GPIO4



5	GPIO5
6	UART1_TX
7	UART1_RX
8	UATR1_CTS
9	UATR1_RTS
10	3.3V
11	UATR4_RT
12	UATR4_TX
13	5V
14	GND
15	GND

■ **GPIO connector: DB9 male connector**

Item	Detail
Location	Rear
Type	RS-422/RS-485
Pin NO.	Description
1	TxD+
2	TxD-
3	RxD-/Data-
4	RxD+/Data+
5	GND
6	NA
7	NA
8	NA
9	NA



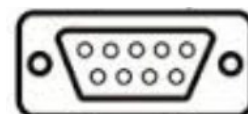
■ **GPIO connector: DB9 male connector**

Item	Detail
Location	Rear

Type	RS-232
<b>Pin NO.</b>	<b>Description</b>
1	NA
2	RX
3	TX
4	NA
5	GND
6	NA
7	RTS
8	CTS
9	NA

■ GPIO connector: DB9 male connector

Item	Detail
Location	Rear
Type	CAN 1
<b>Pin NO.</b>	<b>Description</b>
1	
2	CAL_L
3	GND
4	
5	
6	
7	CAL_H
8	
9	



■ GPIO connector: DB9 male connector

Item	Detail
Location	Rear

Type	CAN 2
<b>Pin NO.</b>	<b>Description</b>
1	
2	CAL_L
3	GND
4	
5	
6	
7	CAL_H
8	
9	

■ AI button (One-key recovery pushbutton)

Item	Detail
Location	Side
Type	Pushbutton

iTons



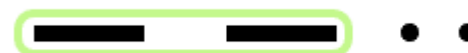
■ Reset & Recovery button

Item	Detail
Location	Side
Type	Pushbutton



■ SIM & SD Card slot

Item	Detail
Location	Rear
Type	Performed socket





## 2.3 Power Consumption

The power consumption shown as below is the theoretical value with AGX Orin module installed on AIE-KX11/AIE-KX21/AIE-KX12/AIE-KX22.

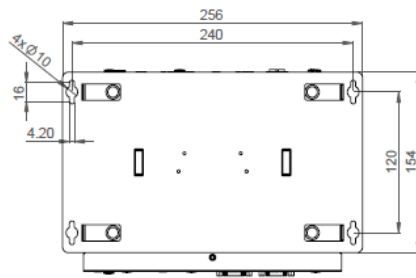
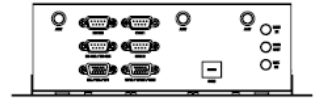
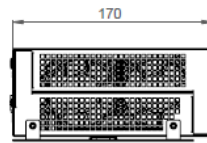
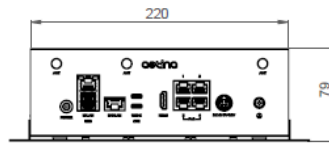
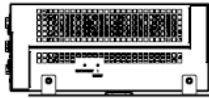
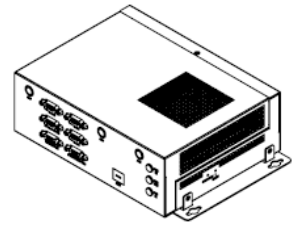
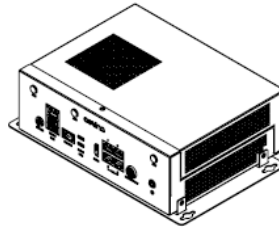
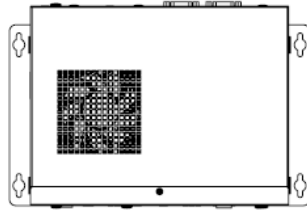
Specification	Theoretical Maximum System power
Idle	TBD (Connect with keyboard, mouse, and HDMI display)
Full loading	TBD (Connect with keyboard, mouse and HDMI display with CPU and GPU 100% loading)

Please refer to the following power consumption of individual I/O interface according to your use case.

Type	Theoretical Maximum System power
USB 3.2 Gen1 Type A	9 (X2)
USB TypeC	4.5
HDMI	0.25
M.2 E KEY	2
M.2 M KEY	7
M.2 B KEY	3
CAN Bus	1
SD Card	0.72
RJ45(PHY)	0.83
RJ45(10G)	3.43

## 2.4 Mechanical Dimensions

### ■ System & Mounting Dimensions



Legend		Revision	
Author	John Kim	Rev. 001	2011/01/01
Designer	John Kim	Rev. 002	2011/01/01
Checker	John Kim	Rev. 003	2011/01/01
Approver	John Kim	Rev. 004	2011/01/01
AIE-KX11 / AIE-KX21 / AIE-KX12 / AIE-KX22		AIE-KX12 / 0022	

### 3. Software Installation

Aetina NVIDIA Jetson products have built-in BSP so the users don't have to install it after getting the products. Since we develop our own BSP, the users may need to follow the BSP installation SOP to re-install/upgrade/downgrade the BSP. Please download the BSP installation SOP at below link.

Download link:

[https://apc01.safelinks.protection.outlook.com/ap/b-59584e83/?url=https%3A%2F%2Faetina-my.sharepoint.com%2F%3Ab%3A%2Fp%2Fchris\\_luo%2FEcu4HzTo3TVPjirBOS\\_\\_zrIBI2OkJlpbWVKDBzezXfZ1pg%3Fe%3DqK7oN9&data=05%7C01%7Caustin\\_lin%40aetina.com%7C2c65e12b802a486b7a5708da4db4e151%7Ceeb3fd622863430288e58bc8e4a45676%7C0%7C0%7C637907736520268414%7CUnknown%7CTWFpbGZsb3d8eyJWljoimc4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IkhhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=8FvnfkuVobPENqF3KhyEh2qKppeu4pzFIF37lXr%2F3s4%3D&reserved=0](https://apc01.safelinks.protection.outlook.com/ap/b-59584e83/?url=https%3A%2F%2Faetina-my.sharepoint.com%2F%3Ab%3A%2Fp%2Fchris_luo%2FEcu4HzTo3TVPjirBOS__zrIBI2OkJlpbWVKDBzezXfZ1pg%3Fe%3DqK7oN9&data=05%7C01%7Caustin_lin%40aetina.com%7C2c65e12b802a486b7a5708da4db4e151%7Ceeb3fd622863430288e58bc8e4a45676%7C0%7C0%7C637907736520268414%7CUnknown%7CTWFpbGZsb3d8eyJWljoimc4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IkhhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=8FvnfkuVobPENqF3KhyEh2qKppeu4pzFIF37lXr%2F3s4%3D&reserved=0)

## 4. Initial Setup

Before using AIE-KX11/AIE-KX21/AIE-KX12/AIE-KX22, please follow the steps below to have initial setup.

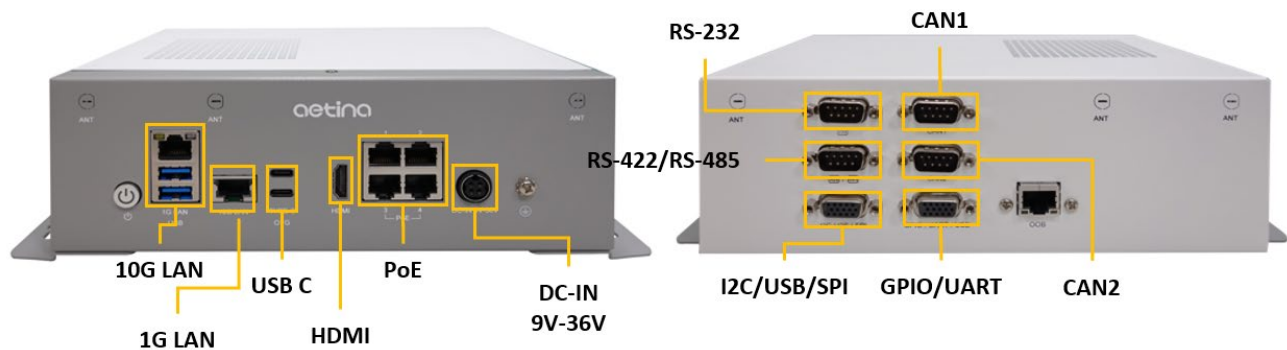
### 4.1 Prepare the Materials

Please prepare the materials list below.

- A monitor with HDMI and respective cables
- USB keyboard and mouse
- Ethernet cable

### 4.2 Hardware Connection

Here is the AIE-KX11/AIE-KX21/AIE-KX12/AIE-KX22 below and for the initial setup, users will need to connect LAN port, keyboard and mouse via USB interface, HDMI interface, and power connector.



### 4.3 Setup Details

1. Connect to the monitor while powering off
2. Power on and automatically enter the OS
3. Log in to the Ubuntu 18.04 OS via credentials below

Username: nvidia

Password: nvidia

For more information on how to use Ubuntu and NVIDIA Jetson modules, please visit [Ubuntu](#) and [NVIDIA](#) website.

# 5. EdgeEye

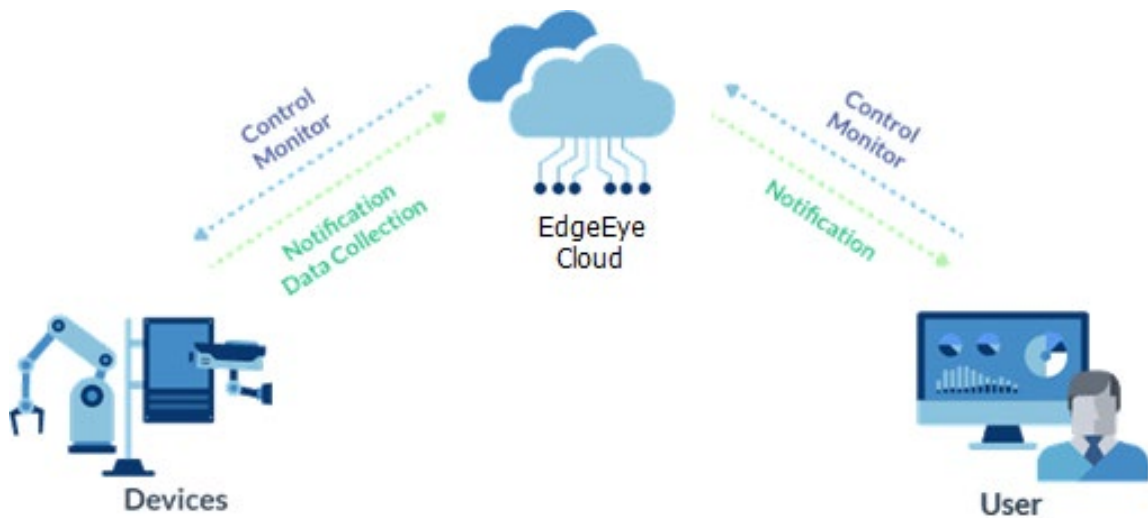
## 5.1 Aetina 360 Edge Administration Platform

### Introduction

EdgeEye, the Aetina 360 Edge Administration Platform, is a browser-accessed management platform that allows you to monitor and manage edge IOT device around the world. EdgeEye can monitor device's hardware components' utilization and capacity and send notifications immediately. EdgeEye accomplishes this by gathering data from all connected devices and storing it on a central server, either in the cloud or on one's intranet. From there, the data is easily accessible from internet-connected cell phones, tablets, or laptops anywhere.

EdgeEye also can remote control edge device, reboot and shutdown device remotely.

Using EdgeEye can reduce management labor and time. Control and manage edge IOT devices anytime and anywhere.



## 5.2 Feature

### Edge Device Management

Monitor edge devices' hardware status, such as CPU, GPU, Memory' s utilization and capacity.

### Alert Notification

Customized alert threshold and when getting abnormal data from edge devices, send warning notification immediately.

### Remote Controlling

Reboot and shut down edge device through the operating system's command from server when needs.

### User-Friendly Operation Interface

User can set and arrange monitoring data format by their needs.

Group devices control and Scheduler

## 5.3 System Requirements

### Web Service

Web browsers support HTML5, CSS3, JavaScript:

Microsoft Edge 103.0+

Google Chrome:9.0+

Firefox:15.0+

Safari:5.1+

### Server

Hardware Minimum Requirements:

Intel® Core™ i3 2.3 Ghz CPU or above | 4 GB RAM | 20 GB root partition for the system | 100 GB data storage

Operating System:

Ubuntu 14.04+ | Docker 17.03+

### Client

Support all Aetina products

## 5.4 Order Information

Model name	Description
AIE-KX11-1-A1	AIE-KX11 w/ AGX ORIN 32G, 1 x HDMI, 2 x USB-A, 1 x USB-MICRO AB, 1 x RJ-45 GbE PORT, 1 x RJ-45 10GbE PORT, 2 x RJ-45 IEEE802.3af GbE PSE PORT, 2 x FAN, 9 to 36V DC INPUT, -25°C to +70°C
AIE-KX21-1-A1	AIE-KX21 w/ AGX ORIN 64G, 1 x HDMI, 2 x USB-A, 1 x USB-MICRO AB, 1 x RJ-45 GbE PORT, 1 x RJ-45 10GbE PORT, 2 x RJ-45 IEEE802.3af GbE PSE PORT, 2 x FAN, 9 to 36V DC INPUT, -25°C to +70°C
AIE-KX12-1-A1	AIE-KX12 w/ AGX ORIN 32G, 1 x HDMI, 2 x USB-A, 1 x USB-MICRO AB, 1 x RJ-45 GbE PORT, 1 x RJ-45 10GbE PORT, 4 x RJ-45 IEEE802.3af GbE PSE PORT, 2 x FAN, 9 to 36V DC INPUT, -25°C to +70°C
AIE-KX22-1-A1	AIE-KX22 w/ AGX ORIN 64G, 1 x HDMI, 2 x USB-A, 1 x USB-MICRO AB, 1 x RJ-45 GbE PORT, 1 x RJ-45 10GbE PORT, 4 x RJ-45 IEEE802.3af GbE PSE PORT, 2 x FAN, 9 to 36V DC INPUT, -25°C to +70°C



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