

HybriU Unibox B4

Product Manual



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Electronic components and circuits are sensitive to Electrostatic Discharge (ESD). While we incorporate ESD protection designs for major interfaces on our circuit board products, it is difficult to provide full ESD protection for every component and circuit. Therefore, it is recommended to observe ESD safety precautions when handling any circuit board assemblies (including the RTSO-6003). ESD safety precautions include, but are not limited to, the following:

- Storage and Transport: Keep the board in an anti-static bag during transportation and storage until it is ready for installation and deployment.
- Discharge Static: Discharge accumulated static electricity from your body before making physical contact with the board (e.g., by wearing a grounding wrist strap).
- Safe Environment: Handle the circuit board only within an ESD-safe area.
- Avoid Carpets: Avoid moving or handling the circuit board in carpeted areas.
- Handling Technique: Hold the board by its edges to avoid direct contact with the electronic components.

Precautions and After-Sales Service

Precautions

Please read this manual carefully before using the product and keep it in a safe place for future reference.

- Please observe and follow all warnings and instructions marked on the product.
- Please use the supplied power adapter to ensure stable voltage and current.
- Use this product in a cool, dry, and clean environment.
- Do not use the product in environments with drastic temperature changes to prevent condensation from damaging the components.
- Do not splash any liquid onto the product. The use of organic solvents or corrosive liquids for cleaning is prohibited.
- Do not use the product in dusty or messy environments. If the product will not be used for a long period, please package it properly.
- Do not use the product in environments with excessive vibration; dropping or striking the product may damage the circuits and components.
- Do not insert or remove the core board or peripheral modules while the power is on.
- Do not attempt to disassemble or repair the product yourself. If a malfunction occurs, please contact our company immediately for service.
- Do not make unauthorized modifications or use unapproved accessories. Any resulting damage will not be covered by the warranty.

After-Sales Service

1) Warranty Period

- Carrier Board & Core Module: 3 years (for non-user-induced damage).



- Other Peripherals (sold by the company): 1 year (for non-user-induced damage).

2) Warranty Terms

- Within 7 Days: In the event of non-user-induced damage to the product (carrier board or core module), our company will replace or repair it free of charge and cover the return shipping costs. (Note: Core modules require verification by NVIDIA to confirm eligibility for repair, which may result in a longer processing time. We will coordinate this as quickly as possible and apologize for any inconvenience.)
- 7 Days to 36 Months: In the event of non-user-induced damage to the product (carrier board or core module), our company will repair it free of charge and cover the return shipping costs. (Note: Core modules require verification by NVIDIA to confirm eligibility for repair, which may result in a longer processing time. We will coordinate this as quickly as possible and apologize for any inconvenience.)
- Over 3 Years OR User-Induced Damage (within 3 years): Upon receiving the product (carrier board), we will inspect it and inform the customer regarding the feasibility of repair and the associated costs. Once an agreement is reached, we will repair and return the product to the customer. Our company will cover the return shipping costs.
- Warranty Start Date:
 - Core Module: Based on the original factory shipment date.
 - Carrier Board: Based on the date of delivery signature/receipt.

Technical Support

1. Scope of Technical Support

- Electrical characteristics and usage of industrial carrier boards and modules released by our company.
- Hardware physical dimensions, related mechanical drawings, and pinout definitions for specific interfaces.
- Flashing verification for all BSP (Board Support Package) support packages provided by our company.
- Setup of the flashing environment and "getting started" usage guides released by our company.
- Drivers for various peripheral modules released by our company.
- Troubleshooting and after-sales repair services for our company's products.

2. Scope of Technical Discussion

Due to the broad scope and wide variety of knowledge involved in embedded systems, we cannot guarantee answers to every question. The following topics are excluded from formal technical support; we can only offer suggestions regarding them:

- General knowledge outside the scope of the tutorials released by our company.
- Specific software program design and development.
- Technical support for industrial carrier boards not released by our company.
- Driver support for industrial carrier boards not released by our company.
- Hardware principles and driver design for peripheral modules not released by our company.



3. Contact Methods for Technical Support

- Technical Support Email: techsupport@ambow.com

4. Technical Support Hours

Monday to Friday:

- Morning: 8:30 AM – 12:00 PM
- Afternoon: 1:00 PM – 5:30 PM

Our company observes national statutory holidays. Technical support may not be available during these periods. Please send your inquiries to the technical support email, and we will reply as soon as possible on the next business day.

5. Complaints and Suggestions

If you are unsatisfied with our service or have any suggestions, please provide feedback via email to techsupport@ambow.com. We are committed to continuous improvement.



Product Introduction

1. Overview

The OK-B4 is a complete system customized based on the RTSO-6003 V30 carrier board. It supports the NVIDIA Jetson Orin NX module and features 3x USB 3.0 ports, 2x USB 2.0 ports, 2x HDMI outputs, 1x HDMI input, 4x independent Gigabit PoE ports, and Wi-Fi 6 wireless networking.

1.1 Product Features

Model	OK-B4
Interface	
Supported Core	ORIN NX 16GB
USB	3x USB 3.0 Type-A ports: Support USB 3.0 signals, provide 1.5A output current. 2x USB 2.0 Type-A ports: Support USB 2.0 signals, provide 1.5A output current.
Mirco USB	1x Micro USB 2.0 port: Supports USB Device mode, used for system flashing.
HDMI Out	2x HDMI 2.0 Type-A ports: Support dual simultaneous 4K60 output.
HDMI In	1x HDMI Input port: Supports 1080P HDMI capture input.
Ethernet	1x Gigabit Ethernet: (10/100/1000 BASE-T) 4x Independent Gigabit Ethernet connectors: (Support PoE)
WiFi	Wi-Fi 6: Supports 2.4G/5.8G dual-band and AP mode.
SSD	Built-in M.2 2280 NVMe SSD interface
Comm. Ports	1x Communication Port interface containing: 1x RS-485, 1x CAN, 1x RS-232, 4x Isolated I/O ports (Note: CAN function is unavailable when paired with a Nano core)
RTC	Built-in RTC battery
Fan	Supports active fan cooling
Buttons	1x Recovery button, 1x Power button
LED	4x LEDs
Dimensions	219mm*157mm*132mm
Power Req.	+52V
Op. Temp.	0~+70℃
Weight	Approx. 1375g

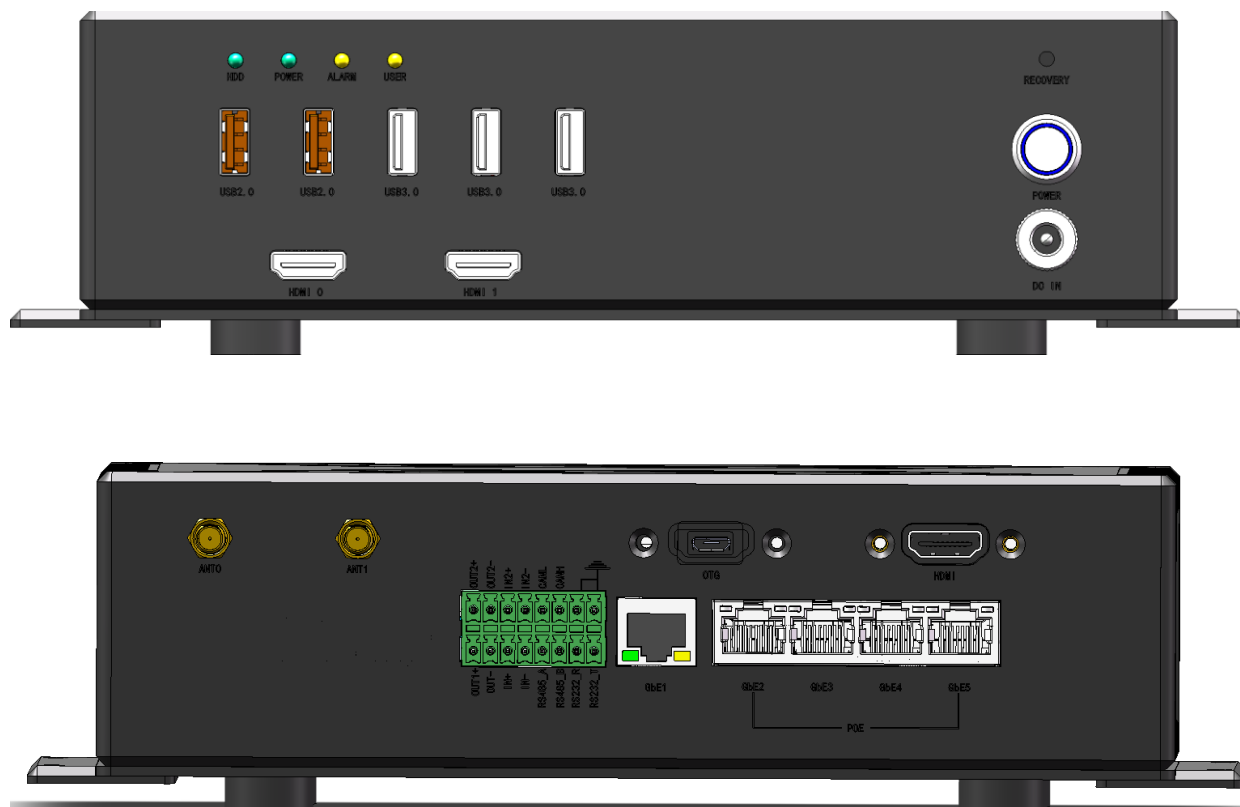


1.2 Ordering Information

Ordering Model	Functional Description
OK-B4	Supports Orin NX module, 1x GbE, 4x GbE (PoE 802.3af/at), 4x GPIO (2x Isolated Input, 2x Isolated Output), 1x RS-485, 1x RS-232, 1x CAN, 3x USB 3.0, 2x USB 2.0, 1x USB OTG, 2x HDMI Output, 1x SSD, 1x HDMI Input, 3x Buttons, RoHS Certified. Includes RealTimes RTS Linux4Tegra software support package.
Power Adapter	DC +52V

Product Specification

1. External Interface Functions and Locations



1.1 Interface Functions

Label / Indicator	Function Description
HDMI0 HDMI1	HDMI Output Ports
USB3.0	USB3.0 Ports
USB2.0	USB2.0 Ports
HDMI	HDMI Input Port
Gbe1	Native Gigabit Ethernet Port
Gbe2-5	4x Independent Gigabit Ethernet Ports (PoE)
OTG	Micro USB 2.0 (USB-OTG) Port
DC IN	Power Input Port
POWER Button	Power On/Off Button
RECOVERY Button	System Flashing (Recovery) Button
	Communication Port (RS-232, RS-485, CAN, 4x I/O ports)

1.2 LED Indicators

Label / Indicator	Function Description	Status
USER Yellow	User Indicator	Off (Steady)
ALARM Green	Alarm Indicator	Blinking - Normal
POWER Yellow	Power Indicator	Blinking - Normal
HDD Gren	HDD Indicator	Blinks during NVMe read/write activity

2 Interface Definitions

2.1 M.2 KEY M Slot

Function	M.2 KEY M Interface (2280)			
Label	P9			
Type/Model	M2 Connector 1-2199230-4			
Pin Definition				
	Pin	Signal	Pin	Signal
	1	GND	2	3V3
	3	GND	4	3V3
	5	NC	6	NC
	7	NC	8	NC
	9	GND	10	LED
	11	NC	12	3V3
	13	NC	14	3V3



	15	GND	16	3V3
	17	NC	18	3V3
	19	NC	20	NC
	21	GND	22	NC
	23	NC	24	NC
	25	NC	26	NC
	27	GND	28	NC
	29	PER1_N	30	NC
	31	PER1_P	32	NC
	33	GND	34	NC
	35	PET1_N	36	NC
	37	PET1_P	38	NC
	39	GND	40	SMB_CLK
	41	PER0_N	42	SMB_DATA
	43	PER0_P	44	ALERT*
	45	GND	46	NC
	47	PET0_N	48	NC
	49	PET0_P	50	PERST#
	51	GND	52	CLKREQ#
	53	REFCLK_N	54	PEWAKE#
	55	REFCLK_P	56	NC
	57	GND	58	NC
	67	NC	68	SUSCLK(32KHZ)
	69	NC	70	3V3
	71	GND	72	3V3
	73	GND	74	3V3
75	GND			
Note:				
1. The M.2 Key M slot is used for installing an SSD.				

2.2 Mini pcie Slot

Function	Mini pcie interface			
Label	J25			
Type/Model	Mini pcie connector 91304-90-052R2			
Pin Def.	Pin	Signal	Pin	Signal
	1	WAKE#	2	3.3V
	3	NC	4	GND
	5	NC	6	NC
	7	CLKREQ#	8	UIM_PWR
	9	GND	10	UIM_DATA



	11	REF CLK-	12	UIM_CLK
	13	REF CLK+	14	UIM_RESET
	15	GND	16	UIM_VPP
	17	NC	18	GND
	19	NC	20	W_DISABLE1#
	21	GND	22	PERST#
	23	PERn0	24	3.3V
	25	PERp0	26	GND
	27	GND	28	NC
	29	GND	30	SMB_CLK
	31	PETn0	32	SMB_DATA
	33	PETp0	34	GND
	35	GND	36	USB_D-
	37	GND	38	USB_D+
	39	3.3V	40	GND
	41	3.3V	42	LED_WWAN#
	43	GND	44	NC
	45	NC	46	NC
	47	NC	48	NC
	49	NC	50	GND
	51	NC	52	3.3V
Notes: 1. The Mini PCIe slot is used for installing the HDMI input capture card				

2.3 4x Independent Gigabit Ethernet Ports (PoE)

Function	4x Independent Gigabit Ethernet Ports (PoE)			
Label	Gbe2-Gbe5			
Type/Model	4x Independent Gigabit Ethernet Ports (PoE)			
Pins Def.	引脚	信号	引脚	信号
	1	NET1_MDCT3	2	NET1_MD3-
	3	NET1_MD3+	4	NET1_MD2+
	5	NET1_MD2-	6	NET1_MDCT2
	7	NET1_MDCT4	8	NET1_MD4+
	9	NET1_MD4-	10	NET1_MD1-
	11	NET1_MD1+	12	NET1_MDCT1
	13	NET1_VDC1+	14	NET1_VDC1-
				



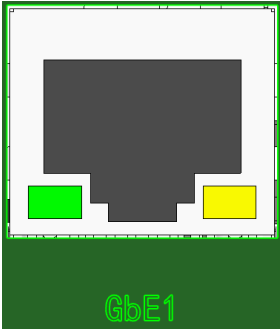
15	NET1_VDC2+	16	NET1_VDC2-
17	NET1_LED_G+/O-	18	NET1_LED_G-/O+
19	NET1_LEDG+	20	NET1_LEDG-
21	NET2_MDCT3	22	NET2_MD3-
23	NET2_MD3+	24	NET2_MD2+
25	NET2_MD2-	26	NET2_MDCT2
27	NET2_MDCT4	28	NET2_MD4+
29	NET2_MD4-	30	NET2_MD1-
31	NET2_MD1+	32	NET2_MDCT1
33	NET2_VDC1+	34	NET2_VDC1-
35	NET2_VDC2+	36	NET2_VDC2-
37	NET2_LED_G+/O-	38	NET2_LED_G-/O+
39	NET2_LEDG+	40	NET2_LEDG-
41	NET3_MDCT3	42	NET3_MD3-
43	NET3_MD3+	44	NET3_MD2+
45	NET3_MD2-	46	NET3_MDCT2
47	NET3_MDCT4	48	NET3_MD4+
49	NET3_MD4-	50	NET3_MD1-
51	NET3_MD1+	52	NET3_MDCT1
53	NET3_VDC1+	54	NET3_VDC1-
55	NET3_VDC2+	56	NET3_VDC2-
57	NET3_LED_G+/O-	58	NET3_LED_G-/O+
59	NET3_LEDG+	60	NET3_LEDG-
61	NET4_MDCT3	62	NET4_MD3-
63	NET4_MD3+	64	NET4_MD2+
65	NET4_MD2-	66	NET4_MDCT2
67	NET4_MDCT4	68	NET4_MD4+
69	NET4_MD4-	70	NET4_MD1-
71	NET4_MD1+	72	NET4_MDCT1
73	NET4_VDC1+	74	NET4_VDC1-
75	NET4_VDC2+	76	NET4_VDC2-
77	NET4_LED_G+/O-	78	NET4_LED_G-/O+
79	NET4_LEDG+	80	NET4_LEDG-

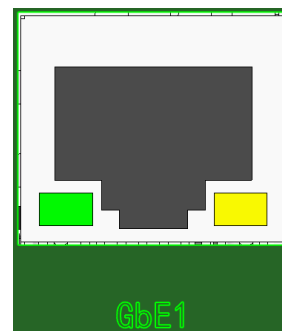
Notes:

1. The Gigabit Ethernet (PoE) ports consist of 4 extended independent Gigabit Ethernet interfaces.
2. PoE Standards: Supports IEEE 802.3af-2003 and IEEE 802.3at-2009. Each port supports a maximum power output of 36W (requires a power adapter with sufficient capacity).
3. ORIN NX / ORIN NANO Core: Port mapping from left to right is eth0, eth1, eth2, eth3

2.4 RJ45 Integrated Gigabit Ethernet Port

Function	RJ45 Integrated Gigabit Ethernet Port			
Label	Gbe1			
Type/Model	RJ45/ 48F-01GY2DPL2NL			
Pins Def.				
	Pin	Signal	Pin	Signal
	1	MDI0+	2	MDI0-
	3	MDI1+	4	MDI1-
	5	CT1	6	CT2
	7	MDI2+	8	MDI2-
	9	MDI3+	10	MDI3-
	11	3.3V	12	GBE_LED_LINK
	13	GBE_LED_ACT	14	3.3V
	Note: 1. This RJ45 integrated Gigabit Ethernet port is the native network interface. 2. ORIN NX / ORIN NANO Core: eth4.			





2.5 HDMI2.0 Output Interface

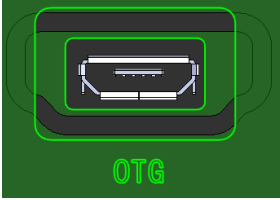
Function	HDMI2.0 Interface			
Label	HDMI0 HDMI1			
Type/Model	HDMI TYPEA Interface			
Pins Def.				
	Pin	Signal	Pin	Signal
	1	TMDS DATA2+	2	TMDS DATA2 SHIELD
	3	TMDS DATA2-	4	TMDS DATA1+
	5	TMDS DATA1 SHIELD	6	TMDS DATA1-
	7	TMDS DATA0+	8	TMDS DATA0 SHIELD
	9	TMDS DATA0-	10	TMDS CLOCK+
	11	TMDS CLOCK SHIELD	12	TMDS CLOCK-
	13	CEC	14	RESERVED
	15	SCL	16	SDA
	17	DDC/CEC_GND	18	+5V POWER
	19	HOT PLUG DETECT		





2.6 USB2.0 OTG

Function	Flashing Interface			
Label	OTG			
Type/Model	Micro USB Connector			
Pins Def.				
	Pin	Signal	Pin	Signal
	1	VBUS	2	DN
	3	DP	4	
	5	GND		



The diagram shows a top-down view of a Micro USB connector. It is a dark grey rectangular plug with a green outline. Inside the plug, there are four pins: two on the left (labeled 1 and 3) and two on the right (labeled 2 and 4). The label 'OTG' is written in green text below the connector.



2.7 System Flashing Interface

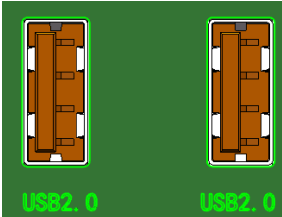
Function	USB3.0			
Label	USB3.0			
Type/Model	USB Type-A Interface			
Pins Def.				
	Pin	Signal	Pin	Signal
	1	VBUS1	2	D1-
	3	D1+	4	GND
	5	SSRX1-	6	SSRX1+
	7	GND	8	SSTX1-
	9	SSTX1+		
	Note: 1. 3x USB 3.0 ports are extended via a single USB 3.0 HUB and share bandwidth. Interface power output capability: 5V 1.5A.			





2.8 USB2.0 Interface

Function	USB2.0			
Label	USB2.0			
Type/Model	USB Type-A Interface			
Pins Def.				
	Pin	Signal	Pin	Signal
	1	VBUS1	2	D1-
	3	D1+	4	GND
Note: 2x USB 3.0 ports are extended via a single USB 3.0 HUB and share bandwidth. Interface power output capability: 5V 1.5A.				



2.9 Comm. Ports

Function	Comm. Ports (485, 232, CAN, Isolated GPIO)																																							
Label																																								
Type/Model	3.5mm Double-level Green Terminal Block / KF2EDGKRH-3.5-2*8P																																							
Pins Def.	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>OUT1+</td><td>2</td><td>OUT2+</td></tr><tr><td>3</td><td>OUT1-</td><td>4</td><td>OUT2-</td></tr><tr><td>5</td><td>IN1+</td><td>6</td><td>IN2+</td></tr><tr><td>7</td><td>IN1-</td><td>8</td><td>IN2-</td></tr><tr><td>9</td><td>RS485_A</td><td>10</td><td>CAN_L</td></tr><tr><td>11</td><td>RS485_B</td><td>12</td><td>CAN_H</td></tr><tr><td>13</td><td>RS232_RX</td><td>14</td><td>GND</td></tr><tr><td>15</td><td>RS232_TX</td><td>16</td><td>GND</td></tr></table>				Pin	Signal	Pin	Signal	1	OUT1+	2	OUT2+	3	OUT1-	4	OUT2-	5	IN1+	6	IN2+	7	IN1-	8	IN2-	9	RS485_A	10	CAN_L	11	RS485_B	12	CAN_H	13	RS232_RX	14	GND	15	RS232_TX	16	GND
	Pin	Signal	Pin	Signal																																				
	1	OUT1+	2	OUT2+																																				
	3	OUT1-	4	OUT2-																																				
	5	IN1+	6	IN2+																																				
	7	IN1-	8	IN2-																																				
	9	RS485_A	10	CAN_L																																				
	11	RS485_B	12	CAN_H																																				
	13	RS232_RX	14	GND																																				
	15	RS232_TX	16	GND																																				
Note: 1. Pin 1 Location: Indicated by the red box in the image on the right. 2. Port Number Mapping for OUT1, OUT2, IN1, IN2: 3. Xavier NX Port Mapping: IN1: GPIO-465; IN2: GPIO-441; OUT1: GPIO-461; OUT2: GPIO-458 4. Orin Nano / Orin NX Port Mapping: IN1: GPIO-401; IN2: GPIO-454; OUT1: GPIO-355; OUT2: GPIO-352 5. RS-485 Port: ttyTHS1; RS-232 Port: ttyTHS0																																								

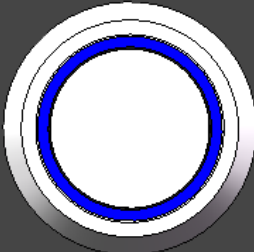
	6. CAN Interface: Mapped to can0. (Note: The CAN interface function is unavailable when paired with the Jetson Nano core).	
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2.10 Power Input Interface

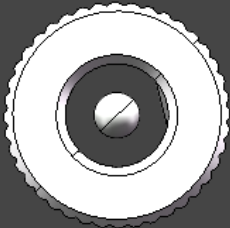
Function	Power Input InterfaceDC											
Label	DC IN											
Type/Model	DC2.5 Socket											
Pins Def.	<table><tr><th>Pin</th><th>Signal</th><th>Pin</th><th>Signal</th></tr><tr><td>1</td><td>Center Positive</td><td>2</td><td>Outer Negative</td></tr></table>				Pin	Signal	Pin	Signal	1	Center Positive	2	Outer Negative
	Pin	Signal	Pin	Signal								
	1	Center Positive	2	Outer Negative								
Note: 1. Device Power Supply: +48-52V												

○

RECOVERY

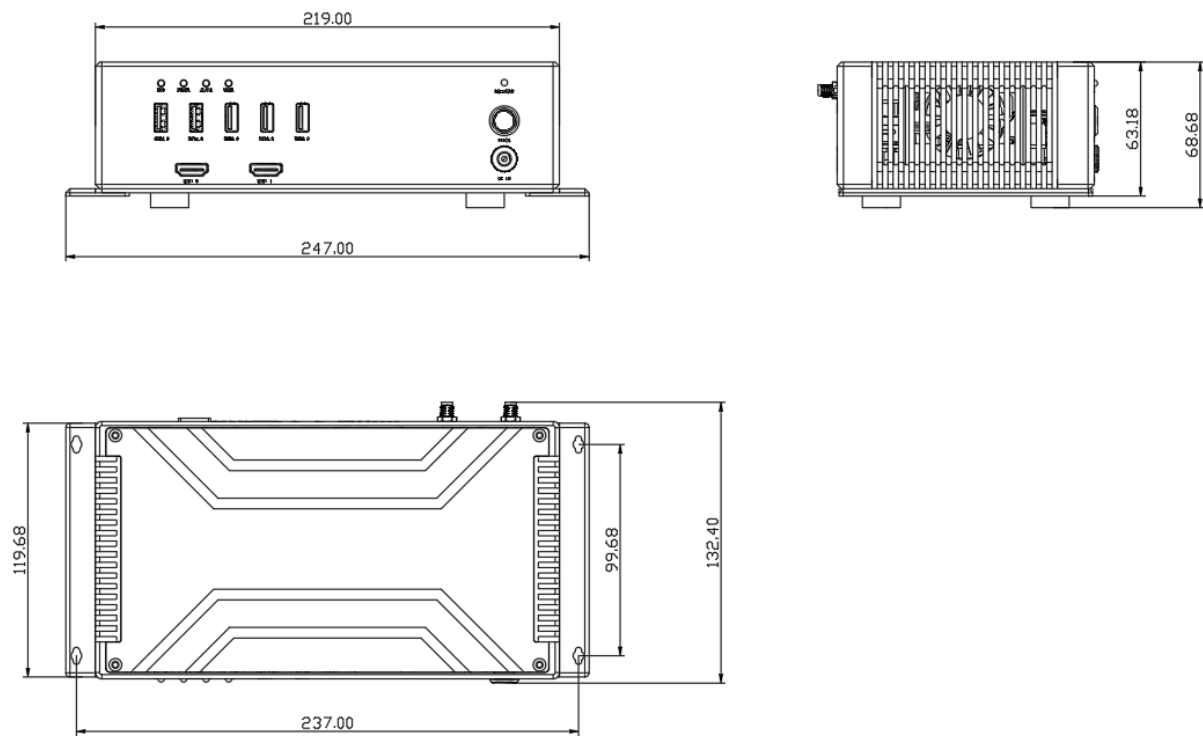


POWER



DC IN

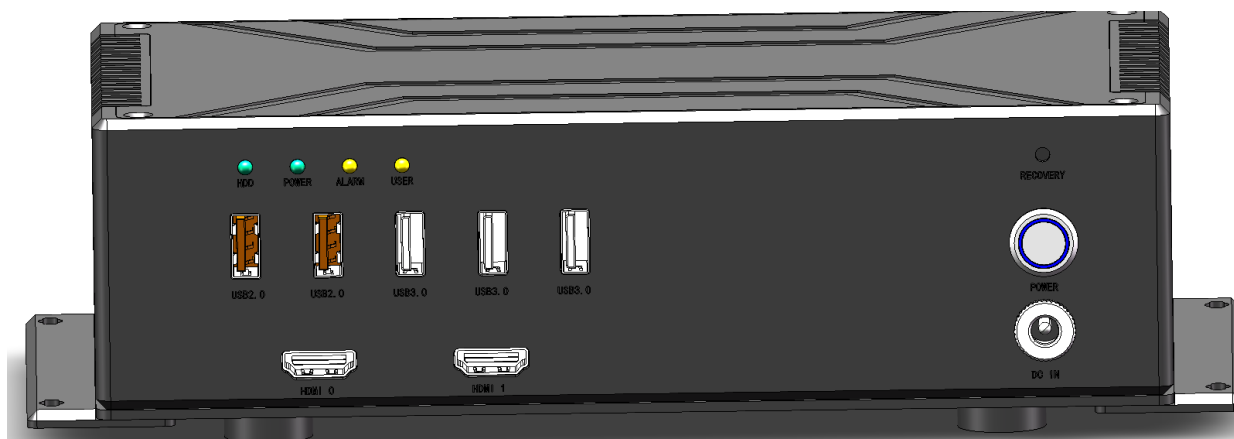
3. Product Dimension Diagram



Software Kit Information

1. Installation and Usage

1.1 System Installation View



1.2 Board Usage Instructions

Before using the OK_B4 device, you must ensure that the Jetson ORIN NX core module is installed with an operating system loaded with the RealTimes BSP.

Power Supply Instructions:

The OK_B4 device requires a power supply of +48V to +52V. If PoE devices are to be used, the device must be connected to a +52V power source; otherwise, the PoE function will not operate correctly.

Installation Steps:

- Ensure that the power to all external systems is turned off.
- Install the ORIN NX core module into the 260-pin SO-DIMM connector. During installation, ensure the connectors are properly aligned, apply even force, and install the fixing screws.
- Connect the necessary external cables (e.g., HDMI cable to the monitor, power input cable for the system, USB cables for keyboard and mouse, etc.).
- Connect the power cable to the power source.
- Press the POWER button to turn on the device; the system will begin to operate.
- For systems without a protective enclosure, avoid moving the entire setup after the system is powered on. Strictly avoid physical contact with the circuit board and its electronic components.

Power Modes:

The Jetson ORIN NX module is designed to optimize power efficiency and supports various software-defined power modes. These modes restrict the module's power budget to approximately 5W, 10W, or 15W by limiting GPU and CPU frequencies as well as the number of active CPU cores to pre-defined levels.

1.3 Recovery Mode

The Jetson ORIN NX core module can operate in Normal Mode and Recovery Mode. Recovery Mode allows for operations such as file system updates, kernel updates, boot loader updates, and BCT updates.

The steps to enter Recovery Mode are as follows:

- a) Turn off the system power supply.
- b) Connect the Micro USB OTG port to a USB port on the Host (PC) development computer using a USB cable.
- c) Press and hold the Recovery button. While holding, apply power to the system. Continue holding the button for at least 3 seconds, then release the Recovery button.
- d) The system will then enter Recovery Mode, and subsequent operations can be performed.

2. Board Support Package (BSP)

When the OK_B4 device is running on a system flashed with the official stock NVIDIA Linux for Tegra (L4T), interfaces including HDMI, Gigabit Ethernet, USB 2.0, Serial Ports, and GPIO are supported by default. However, to enable full functionality for all OK_B4 interfaces, the accompanying driver patches must be installed.

The official NVIDIA L4T software package (used for system flashing) can be downloaded from the following link:

<https://developer.nvidia.com/embedded/linux-tegra>

3. Additional Information

3.1 Jetpack

The NVIDIA JetPack SDK is the most comprehensive solution for building AI applications. It includes the latest and previous versions of software libraries and APIs, examples, developer tools, and documentation for Jetson products.

3.1.1 Jetpack Component Summary

This section briefly introduces each component of JetPack. For more details on these components, please refer to the [JetPack Online Documentation](#).

OS Image

JetPack includes a reference file system derived from Ubuntu. (Development Kit system; no installation required)

Libraries and APIs:

- TensorRT and cuDNN: For high-performance deep learning applications.
- CUDA: For multi-domain GPU-accelerated applications.
- NVIDIA Container Runtime: For containerized GPU-accelerated applications.
- Multimedia API package: For camera applications and sensor driver development.
- VisionWorks, OpenCV, and VPI: For visual computing applications.
- Sample Applications.

3.1.2 How to Install Jetpack

Progress Overview

Installing JetPack onto your Jetson device requires you to follow these steps:

1. Download and install NVIDIA SDK Manager on a Linux host.
2. Connect your Jetson device to the Linux host (via Micro USB or Network on the same subnet).
3. Test if your device can be connected via SSH.
4. Use SDK Manager to select and install the required components.

Download and install NVIDIA SDK Manager on the Linux host:

You must have an internet-connected Linux host to run SDK Manager and flash the developer kit.

Supported Host OS: Ubuntu Linux x64 Version 18.04 or 16.04.

Download and Install:

SDK Manager installation package: **sdkmanager-[version].[build#].deb**

Current version (example): **sdkmanager_1.2**.

Installation command:

```
$ sudo apt install ./sdkmanager-[version].[build#].deb
```

Connect your Jetson device to the Linux host:

Prepare your Jetson device for setup as follows (If the device system is not initialized, system user initialization is required after powering on):

- Connect a monitor, keyboard, and mouse to the Jetson device (RTSO-6003 V2.0 + Xavier NX core) (please refer to the interface descriptions above).
- Use a USB cable to connect the Linux host to the Micro USB OTG (J31) interface of the OK_B4 device (or connect via network on the same subnet).
- During setup, SDK Manager will provide an Internet connection to your Jetson device via the Micro USB or network connection.

- Connect the included power adapter to the DC jack or the green terminal block of the Jetson device, and plug the AC cable into a power outlet.

Test if your device can be connected via SSH:

If connecting via Micro USB:

Enter lsusb in the Linux host terminal; you should see nvidia corp. You should be able to access the device via ping or ssh commands:

```
$ ping 192.168.55.1# or  
$ ssh <jetson_user>@192.168.55.1
```

If connecting via Network:

Check the device IP address on the Feiyun Smart Box (OK-B4) side to ensure it is on the same subnet as the Linux host, and ensure the device can be accessed via ping or ssh.

```
$ ping <jetson_ip>  
# or  
$ ssh <jetson_user>@192.168.55.1
```

(Note: The IP address in the final SSH command above reflects the source text, but typically the specific LAN IP should be used for network connections).

3.2 Developer Tools

JetPack includes the following developer tools. Some are used directly on the Jetson system, while others run on the Linux host connected to the Jetson system.

Application Development and Debugging Tools:

- [NSight Eclipse](#) Edition: For GPU-accelerated application development. Runs on the Linux host. Supports all Jetson products.
- [CUDA-GDB](#): For application debugging. Runs on the Jetson system or Linux host. Supports all Jetson products.
- [CUDA-MEMCHECK](#): For debugging application memory errors. Runs on the Jetson system. Supports all Jetson products.

Application Analysis and Optimization Tools:

- [NSight Systems](#): For application multi-core CPU profiling. Runs on the Linux host. Helps improve application performance by identifying slower parts of the code. Supports all Jetson products.
- [NVIDIA® Nsight™ Compute Kernel Profiler](#): An interactive profiling tool for CUDA applications. It provides detailed performance metrics and API debugging via a user interface and command-line tools.
- [NSight Graphics](#): A console-grade tool for graphics application debugging and profiling (specifically for optimizing OpenGL and OpenGL ES programs). Runs on the Linux host. Supports all Jetson products.

3.3 Documentation

Documentation relevant to developers using JetPack includes:

- [JetPack Documentation](#)
- [VisionWorks Documentation](#)
- [Nsight Eclipse Edition Documentation](#)
- [CUDA-GDB Documentation](#)
- [CUDA-MEMCHECK Documentation](#)
- [TensorRT Documentation](#)
- [cuDNN Documentation](#)
- [CUDA Toolkit](#)
- [NVIDIA Container Runtime](#)
- [OpenCV Documentation](#)
- [Jetson Linux Multimedia API Reference](#)
- [Nsight Systems](#)
- [nvprof](#)
- [Visual Profiler](#)
- [Nsight Graphics](#)
- [Nsight Compute CLI](#)
- [VPI-Vision Programming Interface](#)

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.