



Thundercomm EB5 Edge AI Box

Hardware User Manual

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Revision History

Revision	Date	Description
1.0	Jan 25, 2021	Initial release
1.1	May 25, 2021	Update the pictures of figure
1.2	June 7,2021	Update some points
1.3	June 8,2021	Update some points
1.4	June 22,2021	Change description of Phoenix terminal
1.5	June 28,2021	Update certification related information.

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About This Document

- Illustrations in this documentation might look different from your product.
- Depending on the model, some optional accessories, features, and software programs might not be available on your device.
- Depending on the version of operating systems and programs, some user interface instructions might not be applicable to your device.
- Documentation content is subject to change without notice. Thundercomm makes constant improvements on the documentation of your computer, including this guidebook.
- Button, tool, and key names appear in bold font, for example, click **Save** or press **Enter**.
- Folders and files are formatted in italic, for example, *turbox_flash_flat.sh*.

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Chapter 1. Safety and Warranty

Read this chapter first before installing, operating, or maintaining equipment developed by Thundercomm.

1.1. General safety precautions

- To ensure the safety of person and equipment, follow all the safety precautions on the device identification and in this manual when installing, operating, and maintaining equipment.
- Notes, warnings, and hazards in the manual do not represent all safety matters that should be observed. It is intended only as a supplement to all safety considerations.

1.1.1. Local laws and regulations

When you operate the device, please comply with local laws and regulations. Safety precautions in this manual are intended only as a supplement to local safety regulations.

1.1.2. Basic installation requirements

The person responsible for installing and maintaining Thundercomm equipment must first be trained strictly and know all kinds of safety precautions. He must also master the correct operating methods before he can install, operate, and maintain the equipment.

- Only qualified and trained personnel are allowed to install, operate and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and repair equipment.
- Replacing and changing equipment or parts, including software, must be done by a person certified or authorized by Thundercomm.
- The operator shall promptly report to the person in charge any failure or error that may cause a safety problem.

1.1.3. Grounding requirements

The following requirements apply only to equipment requiring grounding:

- When installing equipment, it is necessary to first ground; When removing the equipment, remove the ground wire last.
- Do not destroy the ground conductor.
- Do not operate equipment without a grounded conductor installed.
- The equipment shall be permanently attached to the protected area. Check electrical connections before operating equipment. Please ensure that the equipment is reliably grounded.

1.1.4. On operator

- Do not operate equipment and cables during thunderstorms.
- When thunderstorm weather, you should unplug the AC power connector, prohibit the use of fixed terminals, do not touch the terminal and antenna connector.
Instructions: The above two requirements apply to wireless fixed station terminals.
- To avoid shock hazards, do not connect safety extra low Voltage (SELV) circuit terminals to communication network voltage (TNV) circuit terminals.
- It is forbidden to look directly at the fiber outlet with the open eye to prevent the laser beam from burning the eye.
- Before operating the equipment, you should wear antistatic work clothes and anti-static gloves or wristbands. Remove conductive objects such as jewelry and watches to avoid being shocked or burned.
- If there is a fire, you should evacuate the building or equipment area and press the fire alarm bell, or call the fire

alarm number. No re-entry into the burning building is allowed under any circumstances.





1.1.5. On equipment

- Before operation, the equipment should be reliably fixed on the floor or other stable objects, such as walls or mounting frames.
- Do not block the vent when the system is running.
- When installing the panel, if the screws need to be tightened, you must use tools.
- After installing the equipment, please clear the empty packing materials in the equipment area.

1.1.6. Marks on equipment

Refer to the table below to comprehend safety signs.

Table 1-1.Safety sign list

Graphic	Name	Instructions
	Warning signs	The logo indicates that improper operation may result in equipment damage or personal injury.
	External ground marking	This mark is the grounding mark outside the equipment. The two ends of the grounding cable are connected to different equipment, which means that the equipment must be earthed at the connecting point, so as to ensure the normal operation of the equipment and the personal safety of operators.
	Internal ground mark	This mark is the grounding mark inside the equipment. Both ends of the grounding cable are connected to different components of the same equipment, which means that the equipment must be grounded through the connecting point to ensure the normal operation of the equipment and the personal safety of operators.
	Antistatic mark	This mark indicates an electrostatic sensitive area. Do not touch the device with your bare hands. When operating in this area, take strict anti-static measures, such as wearing anti-static wrist bands or anti-static gloves.

1.1.7. Electrical safety

- **High Pressure**



Notice:

- High voltage power supply provides power for the operation of equipment. Direct contact with high voltage power supply or indirect contact with high voltage power supply through wet object will bring fatal danger.
- Improper and incorrect operation of high voltage may cause accidents such as fire or electric shock.

- **Thunderstorm Weather**

This requirement applies only to wireless base stations or devices with skylines.



Notice: It is forbidden to operate the tower and mast under the thunderstorm, otherwise there will be danger of life.

- **Big Leakage Current**



Notice:

- The equipment must be grounded before the power is switched on, otherwise it will endanger the safety of person and equipment.
- If there is a "large leakage current" sign pasted near the power terminal of the equipment, the protective grounding terminal of the equipment housing must be grounded before connecting the AC input power to prevent the leakage current of the equipment from causing electric shock to the human body.

- **Power Cord**



Notice:

- Do not install or remove the power cord live. The moment the power core touches the conductor, it will produce electric arc or spark, which can lead to fire or eye injury.
- The power switch must be turned off before the power cord is installed or removed.
- Before connecting the power cord, make sure that the power cord label is correctly identified before connecting.

- **Fuse**



Notice: To ensure the safe operation of the equipment, when the fuse on the equipment is blown, the fuse of the same model and specification should be replaced.

- **Electrostatic Discharge**

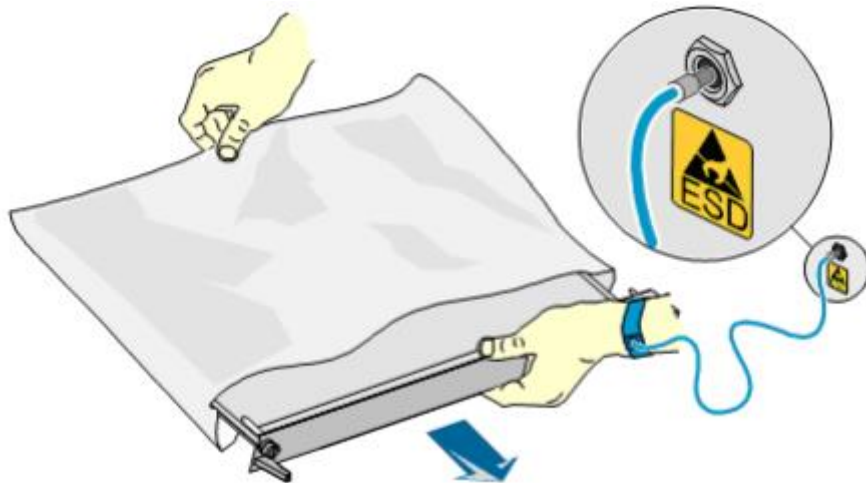


Notice:

- Static electricity generated by the human body will damage electrostatic sensitive components on the single board, such as large-scale integrated circuit (LSI) and so on.
- In the case of human body movement, clothing friction, shoes and floor friction or holding ordinary plastic products, the human body will generate electrostatic electromagnetic field, not easy to disappear before discharge.
- Before touching the equipment and holding the single board or special integrated circuit (ASIC) chip, the anti-static wrist band must be worn and the other end of the anti-static wrist band must be well grounded to prevent the body's electrostatic damage to sensitive components.

- **Anti-static wristband:**

Figure 1-1. Anti-static wristband



1.2. Safety and caution information

AC Power Adapter: Risk of electric shock, fire, or burn if using an AC adapter other than the one provided with this device, Indoor use only and in dry locations. Device must only be repaired by a professional, do not open enclosure. The rated parameter of the adapter is 19v / 6.32a, 120W, please use the socket with grounding wire.

- Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.
- Failure to use the included power adapter shall violate regulatory compliance requirements and may expose the user to safety hazards.

Medical: This device may interfere with the operation of some pacemakers, hearing aids or other medical devices. To reduce the risk, maintain a separation distance of 20cm (8 inches) between the device and the medical device. Refer to the medical device for additional information.

Modify: Modification of the wireless solution, thermal solution, device components or enclosure shall violate regulatory compliance requirements and may induce safety hazards.

Chapter 2. Introduction

2.1. Overview

EB5 Edge AI box is a lightweight edge device, featuring powerful AI and video decode capabilities. It supports device-edge-cloud synergy, remote algorithm and application deployment, FOTA and DM. It can be widely used in complex environments such as industrial park, urban residential areas and shopping mall.

EB5 is Thundercomm lightweight edge device for a wide range of edge applications, featuring strong AI computing performance, flexible configuration, wide temperature range support, environmental adaptability, and easy maintenance and management. EB5 is mainly used as edge gateway and edge intelligent analysis device to deploy in various edge application scenarios such as smart building, smart car, smart re.



Figure 2-1. Top View



Figure 2-2. Front View



Figure 2-3. Rear View



Figure 2-4. Side View

Note: The manual is a generic version, this product does not have a 5G NR band.

2.2. Key features

Easy to use for edge scenes

- Real-time: EB5 can deal with the data locally and provide real-time response.
- Low bandwidth: EB5 can only transfer necessary information to the cloud.
- Privacy protection: you can decide to save your information either to the cloud or to local directories. All information sent to the cloud can be encrypted.
- Support standard containers engine.
- Support rapid deployment of third-party algorithms and applications (under development).

24-channel video analysis (under development)

- Support 24-channel 1080p@30FPS decoding.
- Support 16-channel 1080p@30FPS coding.

Strong environmental adaptability (Support for edge environment deployment)

- Industrial protection grade: IP40 Level design.

Flexible Ethernet connection selection (under development)

- Support optional 5G module.

High reliability

- All firmware in the system supports cluster backup. (under development)
- Support software and hardware fault detection and Alarm. (under development)
- Provide cluster backup solution, built-in cluster backup software. (under development)

Remote maintenance and upgrade

- Remote view of IP cameras surveillance video screen connected to EB5.
- Configure the camera parameters of IP cameras remotely.
- Remote firmware upgrade for EB5.

2.3. Usage scenario

EB5 can be used in many scenarios, including safe city, smart safety supervision, smart transportation, smart manufacturing, smart retail, smart care, etc. Typical architectures in these application scenarios are as follows:

- Terminal: Wirelessly connect to IPC (IP Camera) or other front-end devices.
- Edge: Edge implements value information extraction, storage and uploading.
- Cloud: Data center model management, development, and application.



Figure 2-5. Usage Scenario Diagram

2.4. Product specifications

Table 2-1.EB5 Specifications

Item	Specifications
OS	Ubuntu18.04
Platform (Snapdragon™ QRB5165, AI Performance: 15 TOPS)	CPU: Qualcomm® Kryo™ 585 CPU, CPU Clock Speed: up to 2.84GHz
	GPU: Qualcomm® Adreno™ 650 GP
	DSP: Qualcomm® Hexagon™ 698 Processor
	VPU: Adreno™ 665 VPU, H264 & H265 codec support; video decoding: 8k@60fps; video encode: 8k@30fps
	ISP: Qualcomm Spectra™ 480 image processing
System Memory	RAM: 8GB, LPDDR5(POP)
Storage	Flash: 128G UFS3.0 on board
	Expansion: SD Card, SSD
Display	2x HDMI out, 1080p@60fps
USB	4x USB 3.0 Type A, 1x USB3.1 Type C(OTG)
Micro SD	1x Micro SD Slot
SIM	1x NanoSIM card slot*
Ethernet	2x Gigabit ethernet(10/100M/1000M)
COM Port	2x RS232, 2x RS485
CAN	2x CAN bus
DI/DO	8 DI/DO(4 DI, 4 DO)
Wireless Connectivity	WIFI: 802.11a/b/g/n/ac/ax, 2x2 MIMO
	5G: M.2 5G module(optional), multimode support:2G/3G/4G/5G NR sub-6*
	Antenna: 6x Antenna connector (2x for WIFI,4x for 5G*)
Audio	1x MIC, 1x Earphone
Debug Port	1x Micro USB (for debug)
Input & Indicators	Buttons: Power key, Reset key
	LEDs: Power status, WIFI status,5G status
Others	CR2032 RTC Battery
DC input	19V DC (can support 12v~24v DC)
Mechanical	Waterproof: IP40 Level Design
	Dimension: 200mm*235.5mm*44mm
	Net weight: 2200g(box body only), 2638g(body and adaptor included)
	Mount: Desktop, Wall Mount
Environment	Operation Temperature: -10-50 centigrade *
	Storage Temperature: -20-70 centigrade
	Storage Humidity: 10%~90%, non-condensing
	Anti-Vibration: 0.5Grms @ 5 ~ 500 Hz, random
Certification	CE, FCC**, JATE/Telec, RoHS/Reach

Note:

*: Test under typical application.

The manual is a generic version, this product does not have a 5G NR band.

**： 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.

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

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.

To maintain compliance with FCC's RF Exposure guidelines, this equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

RF Exposure Information(RED)

To maintain compliance with CE's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

The band 5150-5350 MHz for this device are restricted to indoor use only within all European Union countries.

Hereby,[Thundercomm Technology Co., Ltd] declares that the radio equipment type [EB5] is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: www.thundercomm.com.



Max EIRP for EU

2.4G Wifi: 19.71dBm

5G Wifi: 20.42dBm

5.8G Wifi: 13.47dBm

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