VT-TPC101-RK99

Hardware User Manual

Product Version: 1.0

Date: 2024-02-07

For any question, please contact Vantron Technology, Ltd.

Change History

This table describes the version and release date.

Rev.	Date	Description	Author
1.0	2024-02-07	First release.	Lili Zhang

Foreword

Copyright

While all information contained herein have been carefully checked to assure its accuracy in technical details and printing, Vantron assumes no responsibility resulting from any error or features of this manual, or from improper uses of this manual or the software. Please contact our technical department for relevant operation solutions if there is any problem that cannot be solved according to this manual.

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Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Type	Description
▷	Notice	Important information and regulations
⚠	Caution	Caution for latent damage to system or harm to personnel

Statement & Disclaimer

It is recommended to read and comply with this manual which provides important guidance and helps decreasing the danger of injury, electric shock, fire, or any damage to the device.

Vantron assumes no legal liability of accidents resulting from failure of conforming to the safety instructions.

Limitation of Liability/Non-warranty

For direct or indirect damage to this device or other devices of Vantron caused by failure of conforming to this manual or the safety instructions on device label, Vantron assumes neither warranty nor legal liability even if the device is still under warranty.

The device should be installed, debugged and maintained by professionals.

The outside antennas are not permitted to be installed or to be changed by non-professionals. To run the device normally, only specified antennas are approved to be assembled together by professionals.

Unit shall be used with indoor-use antenna only. No antenna for this unit can be installed outdoor.

Safety Instructions

✧ Keep and comply with all operation instructions, warnings, and information.

✧ Pay attention to warnings on this device.

✧ Read the following precautions so as to decrease the danger of injury, electric shock, fire, or any damage to the device.

✧ Operations and service instructions are provided with the equipment.

✧ Unit shall be used with indoor-use antenna only. No antenna for this unit can be installed outdoor.

✧ The maximum operation temperature is 80°C.

Precautions

✧ Pay attention to the product labels/safety instructions printed on silk screens.

✧ Do not try repairing this product unless declared in this manual.

✧ Keep away from heat source, such as heater, heat dissipater, or engine casing.

✧ Do not insert other items into the slot (if any) of this device.

◆ Ensure ventilation of the ventilation slot.

◆ System fault may arise if other items are inserted into this device.

✧ Installation: ensure correct installation according to instructions from the manufacturer with recommended installation tools.

✧ Ensure ventilation and smoothness according to relevant ventilation standards.

Safety Instructions for Power Cables and Accessories

⚠️ Use Proper power source only. Start only with power source that satisfies voltage label and the voltage necessary according to this manual. Please contact technical support personnel of Vantron for any uncertainty about the requirements of necessary power source.

⚠️ Use tested power source. This product still contains a button lithium battery as a real-time clock after its external power source is removed and therefore should not be short-circuited during transportation or placed under high temperature.

⚠️ Place cables properly: Do not place cables at any place with extrusion danger.

⚠️ **Cleaning Instructions**

✧ Please power off before cleaning the device.

✧ Do not use spray detergent.

✧ Clean with a damp cloth.

✧ Do not try cleaning exposed electronic components unless with a dust collector.

✧ Support for special fault: Power off and contact technical support personnel of Vantron in case of the following faults:

  ➢ The device is damaged.

  ➢ The temperature is excessively high.

  ➢ Fault is still not solved after operations according to the manual.

Contents

1 Introduction

1.1   Product Description

Vantron offers both ARM and ATOM based Single Boards Computer (SBC) platforms including Cirrus Logic EP9315, RockChip RK3128, RK3368, RK3288, RK3399, Freescale iMX6, iMX8, TI OMAP35xx CortexA8 series, and Intel Skylake and ApolloLake processor boards. In additional to offering the standard SBCs, we also provide professional customization board design services. Our seamless project management, efficient error-free development process, strong fundamentals in technology, sufficient in human resources, and on-time delivery will guarantee the success in your project development.

Based on idea of "Application Ready" products and services, our embedded computers have embedded basic operation system which includes the drivers of its interfaces. So it is easy to be used by adding your application software only. It can speed Time to Market of your products, and save more cost.

1.2   Connector Description

This table respectively describes the valid signal of connectors on the Vantron board.

N/C	Not connect
GND	Ground
/	Active low signal
+	Positive of difference signal
-	negative of difference signal

I	Input
O	Output
I/O	input/output
P	Power or ground
A	Analog
OD	Open drain
CMOS	3.3 V CMOS
LVCMOS	Low Voltage CMOS
LVTTL	Low Voltage TTL

3.3V	3.3 V signal level
5V	5 V signal level
USB	5 V tolerant signal
PCIe	PCI Express signal, not 3.3 V tolerant
NC	No Connection

2 Overview

2.1 Introduction

Thank you for choosing Vantron. It is our commitment to provide our valued customers with the embedded devices equipped with the state-of-the-art technology and the best product services.

Tablet enables the interaction between operators/users and applications, connects industrial control products such as wireless, transducer, battery inside, storage, etc. Tablet adopts a display for displaying and input units such as touch screen, keyboard, audio, kind of sensors etc. for writing working parameters or inputting operation commands. As a digital device for realizing information interaction between human and machine, Tablet is composed of hardware and software. Based on its ample function interfaces and powerful user operational interface, it is very suitable for control units such as medical device, intelligent transportation, industrial field, etc..

Vantron's VT-Tablet products are based on the most advanced ARM and Intel Atom processors and have low-power consumption and high integration. The products are designed for applications such as industrials, medicals, and transportations etc. VT-TPC101-RK99 is an ARM based tablet with a 10.1 inch touch screen as such designed. The recommended usage scenario of VT-TPC101-RK99 is building automation with VESA bracket since it is equipped with POE power input. Please check more key technical features that listed in chapter 2.2 to find more usage scenario on your way.

2.2 Feature

Specification		
Power	Power input	1x 2/6mm DC jack. 12V-2.5A 1x PoE RJ45. 802.11-AT *DC input first when both power input are provided
System	CPU	Rockchip RK33399, ARM Dual-Core Coretex-A72 2.0GHz, Quad-core Coretex-A53 1.5GHz.
	GPU	Mail-T860MP4
	RAM	LPDDR4-1866, 4GB (2*2GB) default LPDDR4-1866, 2GB(2*1GB) optional
	ROM	32GB EMMC 5.1@HS200 default 16GB EMMC 5.1@HS200 optional
	EEPROM	1Kb EEPROM (Only for Hardware configuration information)

|		
	TPM	NA default Atmel™ TPM optional
Media Interface	Display	10.1' 1920*1200 6bit+FRC 16.7M colors 300nit LCD
	Touch	10.1' high resolution capacity touch screen
	HDMI	1x HDMI 2.0 type-A output
	Camera	1x 5MP front camera
	Audio	1x front analog MIC input 1x 3.5mm headphone jack(4-POLE with MIC, without key. Support high impedance handsets.) 2x 1W speaker output
Data Interface	USB	1x USB 3.0 type-C(support OTG, image burning) 1x USB 2.0 type-A(Host only)
	EtherNet	1x 10/100/1000 base RJ45(support POE 802.11AT)
Wireless Interface	WIFI	1x WiFi 802.11a/b/g/n/ac. Powered by AP6256 tsmc. With internal FPC antenna
	Bluetooth	1x BT5.0. Powered by AP6256 tsmc. With internal FPC antenna
	NFC	1x NFC host. Powered by PN7150. With internal FPC antenna at the bottom of the screen
Sensor	A/G sensor	1x 3-axia A/G sensor. Up to ±16G
Key	Recovery Key	1x recovery key
RTC	RTC	1x on-board RTC with battery, 5year battery life time
Watch Dog	Watch Dog	1x SOC integrated watch dog default 1x external watch dog optional
Environment Condition	Temperature	Operating: 0℃~+40℃ Storage: -20℃~+60℃
	Humidity	Operating: RH 20%-80% Storage: RH 20%-80%
	Water resistance	NA
	Certification	ROHS certificated 3C optional FCC optional

2.3   Order Information

Part Order Example	
VT-TPC101-RK99	ARM tablet,V4,RK3399,4GB LPDDR4/32GB EMMC5.1/10.1 inch 1920*1200 touch screen. WIFI/BT/NFC/POE/HDMI.White. ARM tablet,V4,RK3399,2GB LPDDR4/16GB EMMC5.1/10.1 inch 1920*1200 touch screen. WIFI/BT/NFC/POE/HDMI.Black.

Note: Please contact Vantron for more details. Vantron provides customization.

3 Product Description

3.1   Product Appearance
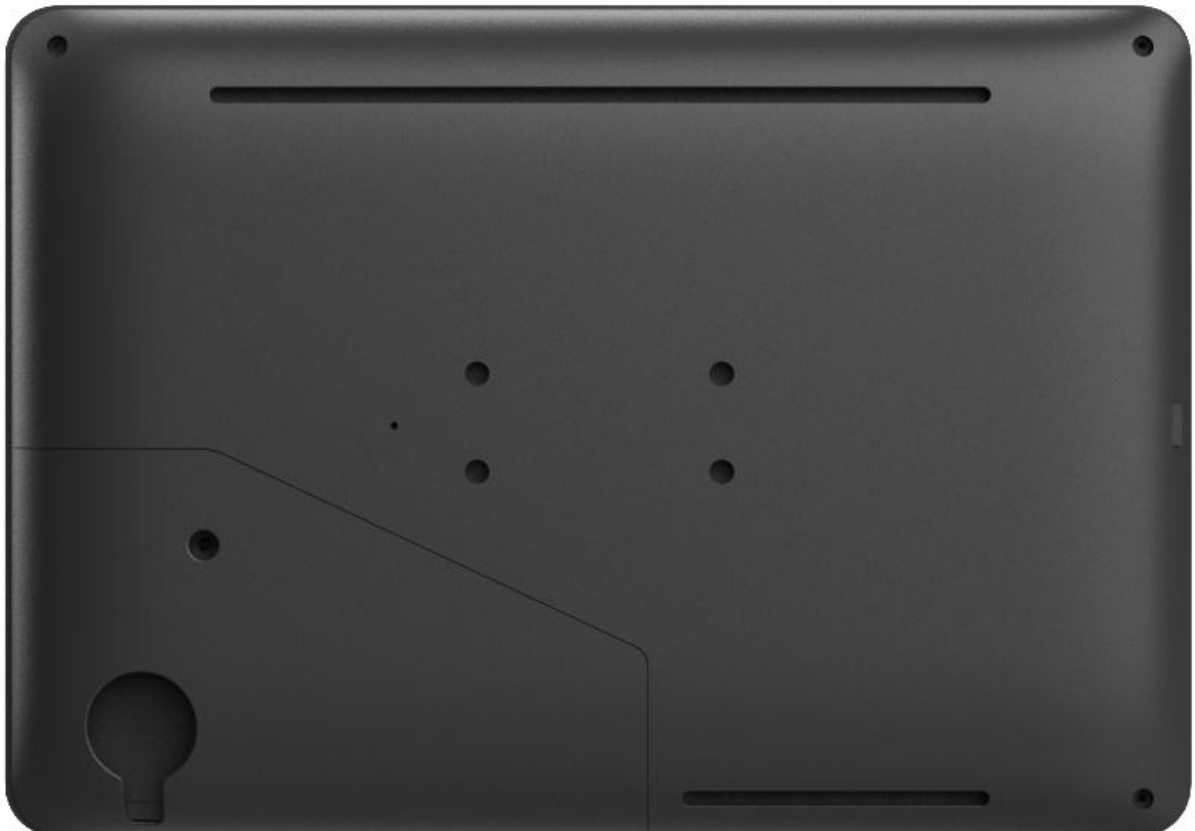
3.2 Device Interface

① 3.5mm audio jack. 4-pole. With Mic in. Without key.

② HDMI 2.0 type-A output.

③ USB 2.0 type-A. Host only.

④ USB3.0 type-C. OTG.

⑤ EtherNet 10/100/1000base RJ45. Support 802.11-AT PoE power input.

⑥ Recovery Key.

⑦ 12V~2.5A DC input. 2mm/6mm jack.

3.3 Structure

Download the structure document from Vantron technology or Vantron net site: www.vantrontech.com.cn

4 Hardware Description

This chapter describes the main hardware functions of this HMI, including power input, display & touch, speaker, WIFI & BT, LTE, Ethernet, USB, light & TOF Sensor, button and POS.

4.1　Power Input

VT-TPC101-RK99 tablet support DC jack power input as well as 802.11-AT PoE power delivery. When both power input are provided, DC jack power input will work while PoE will not work.

VT-TPC101-RK99 tablet should be configured with a 12V~2.5A DC power adapter or which can provided current over 2.5A. No over-voltage protection is equipped so abnormal power supply may cause the failure of powering on, and even the damage. The max constant power consumption will be lower than 28W. The Power input connectors are shown as Fig 4-1-1.

NOTE: The ambient temperature and derating should be considered when choosing the power adapter.

NOTE: Please make sure that the source PoE supply meets the 802.11-AT standard at least or this tablet may powered off due to insufficient power supply when running heavy load.

NOTE:Please make sure to use CAT-6 or better network cable.

NOTE: Do not hot swap the power supply between DC jack and PoE.

The power input DC jack is shown as "⑦"

The power input PoE connector is shown as "⑤"

Fig 4-1-1 Power input connector

4.2 Display & Touch

VT-TPC101-RK99 tablet support a 10.1" LCD touch screen. This screen consists of two parts including a LCM panel and a touch panel. The touch panel is frame fit structurally.

The technical parameter of the LCM panel is shown as Tab 4-2-1.

Tab 4-2-1 Technical parameter of the LCM panel

Item	Content	Unit
Panel visible size (Diagonal)	10.1"	Inch
Viewing direction	Full View	/
Resolution	1920*1200	RGB pixel
Display mode	Normally black	/
Luminance	350 typ.	Cd/m^2
Contrast ratio	1000 typ.	/
Color depth	6-bit + FRC=8-bit 16.7M colors	/
Response time(Tr+Tf)	25 typ.	ms
Sub pixel size	37.6*112.8	μm

The technical parameter of the touch panel is shown as Tab 4-2-2.

Tab 4-2-1 Technical parameter of the LCM panel

Item	Content	Unit
Touch point	10	point
Thoroughfare	TX-24 RX-15	/
Surface hardness	6H	/

ⓘ NOTE: The protection glass cover may decrease the brightness of this screen, 300 typ. cd/m^2 brightness is approved with touch panel.

4.3 HDMI

VT-TPC101-RK99 tablet provides a standard HDMI 2.0 output. The connector is HDMI type-A. This port can drive up to 4K@60Hz in 8-bit video output.

▷ NOTE: The main image output is MIPI TX which is linked to the internal LCM. When this HDMI output is linked to an external display the image of these two display will be the same.

▷ NOTE: The HDMI interface only supports signal output but signal input.

The HDMI 2.0 output connector is shown as "②"

Fig 4-3-1 HDMI 2.0 output connector
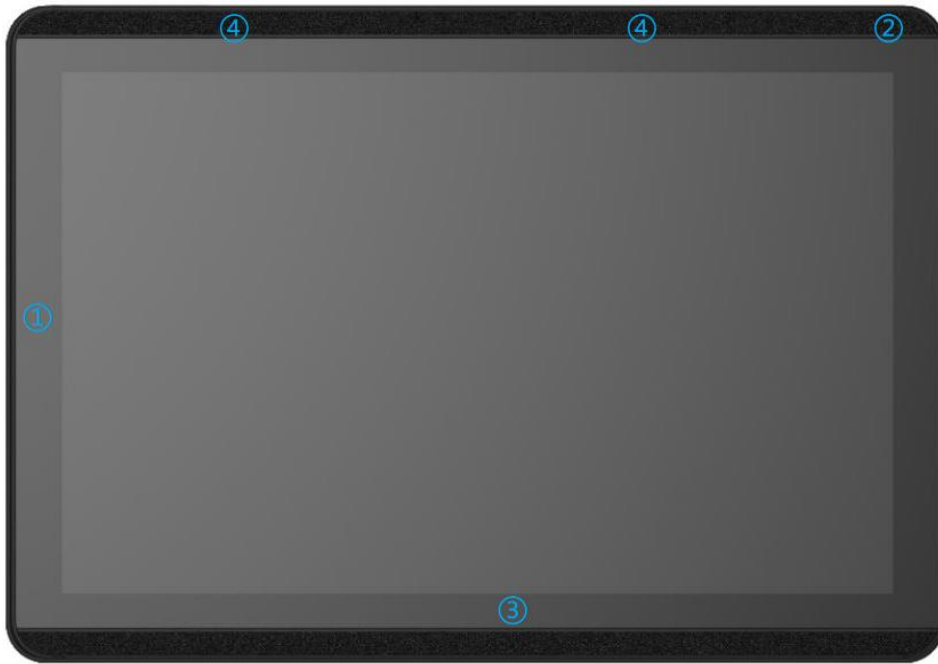
4.4 Camera

VT-TPC101-RK99 tablet integrates a front camera, Supporting photo and video usage.

The technical parameter of the camera is shown as Tab 4-4-1.

Tab 4-4-1 technical parameter of the camera

Item	Content	Unit
Sensor	OV5648	/
Sensor type	CMOS	/
Sensor size	1/4 (Diagonal)	inch
Focusing	Auto	/
F/	2.0	/
FOV	80	°
BFL	1.24	mm
Object distance	0.2~1.8	m
Resolution	≥200(center)	IW/PH

Sensitivity	600	Mv/Lux-sec
Max. Image resolution	2592*1944	pixel

The front camera is shown as "①"

Fig 4-4-1 Location of the front camera

4.5   Speaker & MIC

VT-TPC101-RK99 tablet integrates a dual channel audio speaker on the standard model. Two extra bass can be customized for better audio performance.

The technical parameter of the standard speakers is shown as Tab 4-5-1.

Tab 4-5-1 technical parameter of the standard speakers

| Item	Content	Unit
Rated input power	1	watt
Max input power	1.5	watt
Impedance	8±15%	Ω
Sound Pressure Level	90±3 1.0W/0.1M at 2KHZ(0dB SPL=20µPa)	dB
Resonant Frequency	900±20%	Hz

	(IN 1CC BOX)	
Frequency Range	Fo~20K (Output S.P.L. -10dB)	Hz
Distortion	< 10% (at 1K Hz, input 1.0W,　IN 1CC BOX)	/

VT-TPC101-RK99 tablet integrates an analog MIC on the front cover.

The technical parameter of the analog MIC is shown as Tab 4-5-2.

Tab 4-5-2 technical parameter of the analog MIC

Item	Content	Unit
Type	analog	/
Sensitivity	-38±3 (1KHz)	dB
Sound Pressure Level	110	dB
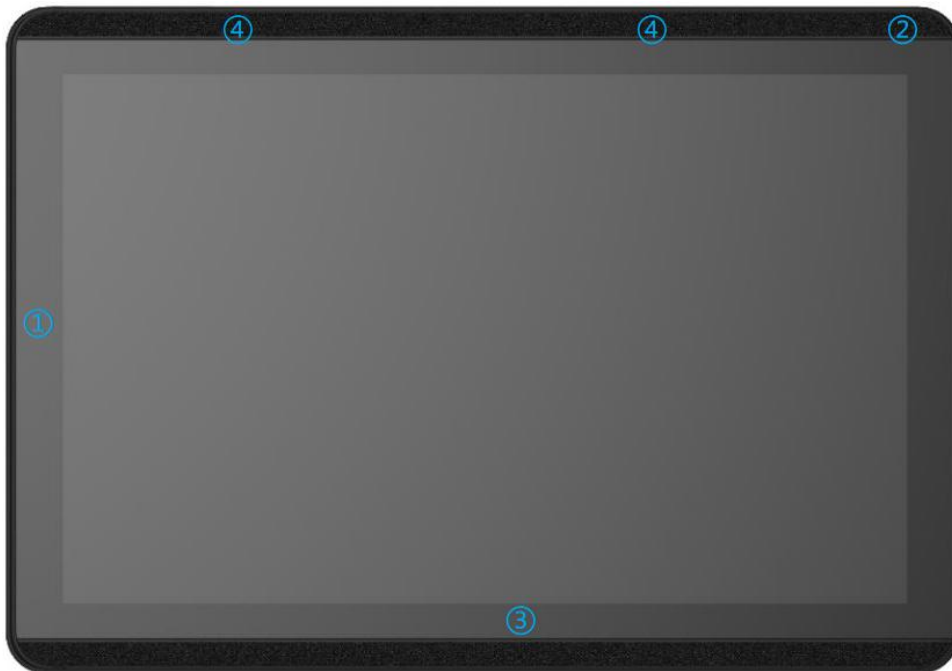
The location of speakers is shown as "④"

The location of analog MIC is shown as "②"

4.6　　3.5mm Audio Jack

VT-TPC101-RK99 tablet integrates one 3.5mm Audio jack. This 3.5mm jack is an output only jack and can drive high impedance headphones up to 120Ω. The MIC on 3.5mm headphone is supported, while keys on 3.5mm headphone are not supported.

NOTE: Speakers and 3.5mm jack are driven by the same audio codec. The audio signal output will switch to 3.5mm jack from speakers after plugging of 3.5mm jack.

The 3.5mm audio jack is shown as "①"

Fig 4-6-1 3.5mm audio jack

4.7　　USB 3.0 type-C OTG

VT-TPC101-RK99 tablet integrates one standard USB 3.0 type-C port which supports OTG. This USB type-C is also used as the system image downloading an debugging port. When using as a HOST, this port can delivery current up to 1A(5V~1A) with DCP.

CAUTION: System can NOT be powered by this USB type-C power input. Do not plug any external power in that has a voltage over 5.5V but without CC configuration thought this type-C port otherwise this machine may be damaged.

NOTE: This USB type-C port is NOT a full function USB port so it does not support video output/input or audio output/input.

The USB 3.0 type-C port is shown as "④"

Fig 4-7-1 USB type-C port

4.8   USB 2.0 type-A Host

VT-TPC101-RK99 tablet integrates one standard USB 2.0 type-A port which can only be used as HOST. This port can delivery current up to 0.5A(5V~0.5A) with DCP.

The USB 2.0 type-A port is shown as "③"

Fig 4-8-1 USB type-C port

4.9   EtherNet 10/100/1000 base RJ45 with PoE

VT-TPC101-RK99 tablet integrates one EtherNet RJ45 port which can be configured to 10/100/1000 base automatically. This RJ45 port can also be used as power input when no power input is plugged in the DC jack. Up to 30W power can be delivered since this tablet meets the 802.11-AT standard.

NOTE: Please make sure that the source PoE supply meets the 802.11-AT standard at least or this tablet may powered off due to insufficient power supply when running heavy load.

ⅈ NOTE:Please make sure to use CAT-6 or better network cable.

ⅈ NOTE: Do not hot swap the power supply between DC jack and PoE.

The RJ45 port is shown as "⑤"

Fig 4-9-1 RJ45 port

4.10 WIFI & Bluetooth

VT-TPC101-RK99 tablet integrates one on-board WIFI & BT module and matched FPC antenna as default.

The technical parameter of the WIFI is shown as Tab 4-10-1.

Tab 4-10-1 technical parameter of the WIFI

Item	Content	Unit
Generation	WIFI-5	/
WLAN standard	802.11a/b/n/ac	/
TX/RX	1TX/1RX	/
Frequency range	2.40G~2.4835 5.15~5.35 5.47~5.85	GHz

The technical parameter of the Bluetooth is shown as Tab 4-10-2.

Tab 4-10-2 technical parameter of the Bluetooth

Item	Content	Unit
Generation	BT-5.0	/
Bluetooth standard	BDR(1Mbps)、EDR(2、 3Mbps)、LE(1Mbps、	/

	2Mbps)	
Channel	Classic bluetooth:79 BLE:40	Channel(s)

NOTE: This antenna of WIFI & Bluetooth is located inner this tablet so do NOT embedded this tablet in the wall or wireless performance will degrade seriously.

4.11 NFC

VT-TPC101-RK99 tablet integrates one on-board NFC module and matched FPC antenna as default. This NFC can used be HOST only instead of label.
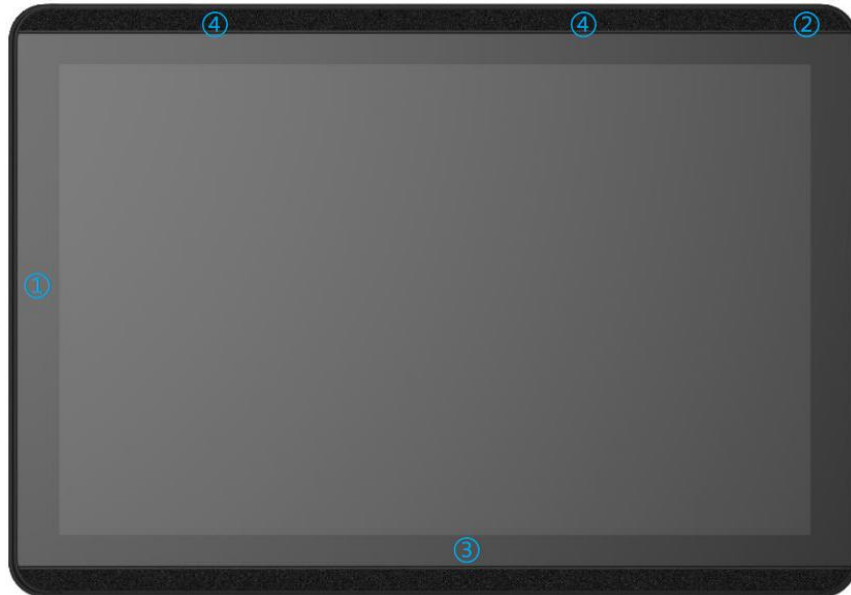
The technical parameter of the NFC is shown as Tab 4-11-1.

Tab 4-11-1 technical parameter of the NFC

Item	Content	Unit
Standard	NFCIP-1 and NFCIP-2	/
Frequency	13.56	MHz
Max read distance	1	cm

NOTE: The NFC antenna is at the bottom of this tablet in landscape mode.

The NFC antenna is shown as "③"

Fig 4-11-1 Location of NFC antenna

4.12 A/G sensor

VT-TPC101-RK99 tablet integrates one A/G sensor so this tablet supports auto rotation. To be mentioned, the default display direction is vertical with the camera on the top of the tablet. You can change the direction or disable auto rotation in android system.

4.13 RTC

VT-TPC101-RK99 tablet integrates one on-board RTC(real time clock) and a CR1225 standard coin battery socket. The max battery lifetime is 5 years. You can replace the coin battery by removing the back cover after the battery is dead.

5 Hardware Operation Note

This chapter provides a guide to set up the tablet. For more details, see hardware description.

5.1   Environment

Before the tablet is powered on, please confirm whether the environmental conditions meet the requirements. Environmental requires are as follows:

● Operation Temperature: 0°C ~ +40°C
● Operation humidity: 0%~90%RH

5.2   Power Input

Please confirm the power input is 12V DC, and the reference current is 2.5A. There are two ways of powering the tablet:

● 2mm/6mm DC jack with external 12V~2.5A DC power adapter
● RJ45 connector with external PoE supply that supporting 802.11-AT thought CAT 6 (or better) network cable.

Do not use unauthorized or incompatible power adapters to charge the device, otherwise fire or other danger may be caused.

Do not hot swap the power supply between DC jack and PoE.

5.3   Wireless

Please confirm the antenna areas shown in the following figure are not be cover by any metal.
This antenna of WIFI & Bluetooth is located inner this tablet so do   NOT embedded this tablet in the wall or wireless performance will degrade seriously.
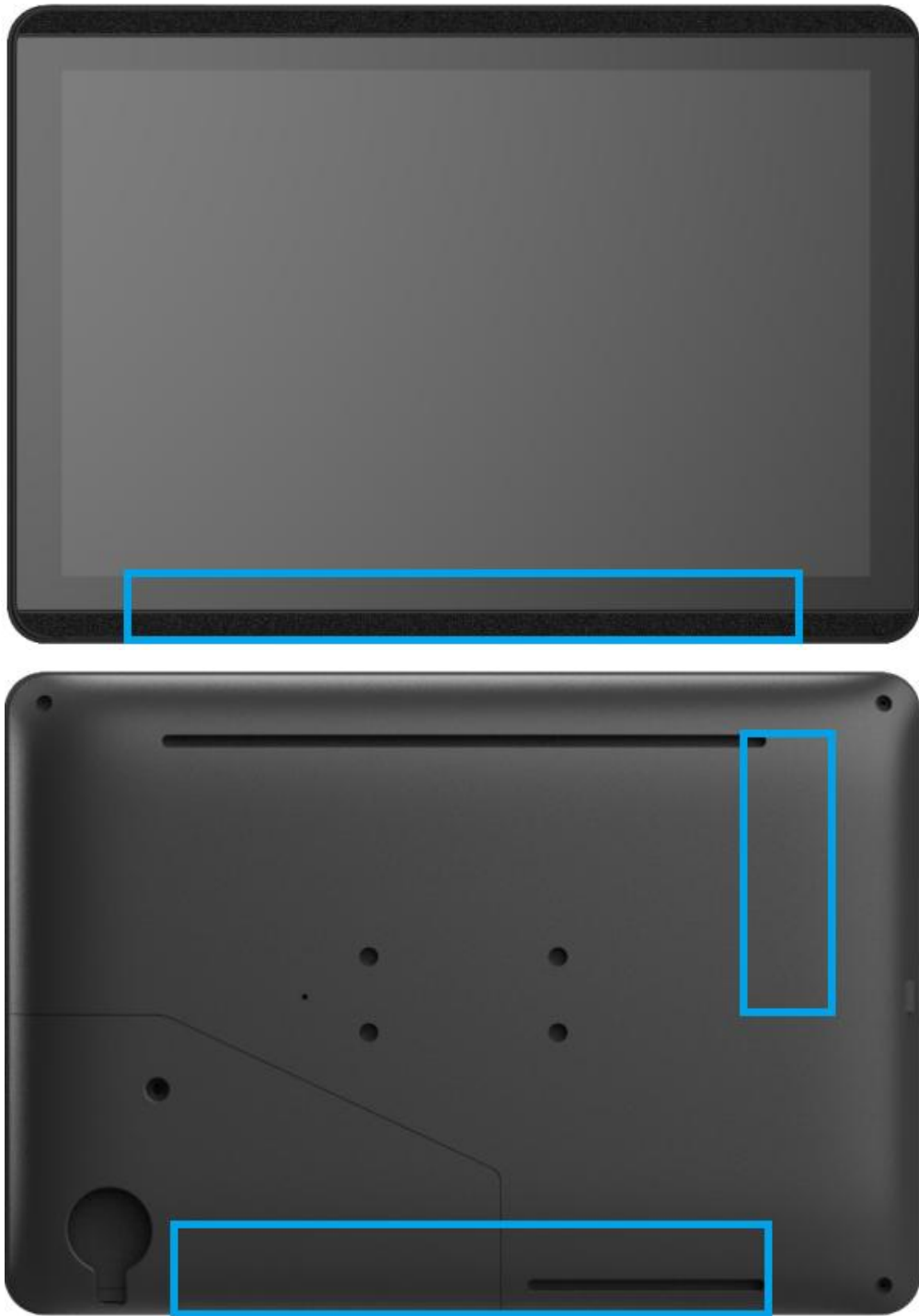
Fig 5-3-1 Location of antenna

6 Software Description

The software loading system is pre-installed in VT-TPC101-RK99. Please refer to the software manual for more software information.

7 Tips

⚠ Waste Disposal

It is recommended to disassemble the device before abandoning it in conformity with local regulations. Please ensure that the abandoned batteries are disposed according to local regulations on waste disposal. Do not throw batteries into fire (explosive) or put in common waste canister. Products or product packages with the sign of "explosive" should not be disposed like household waste but delivered to specialized electrical＆electronic waste recycling/disposal center. Proper disposal of this sort of waste helps avoiding harm and adverse effect upon surroundings and people's health. Please contact local organizations or recycling/disposal center for more recycling/disposal methods of related products.

Comply with the following safety tips:

⚠ Do not use in combustible and explosive environment

Keep away from combustible and explosive environment for fear of danger.

⚠ Keep away from all energized circuits.

Operators should not remove enclosure from the device. Only the group or person with factory certification is permitted to open the enclosure to adjust and replace the structure and components of the device. Do not change components unless the power cord is removed. In some cases, the device may still have residual voltage even if the power cord is removed. Therefore, it is a must to remove and fully discharge the device before contact so as to avoid injury.

⚠ Unauthorized changes to this product or its components are prohibited.

In the aim of avoiding accidents as far as possible, it is not allowed to replace the system or change components unless with permission and certification. Please contact the technical department of Vantron or local branches for help.

⚠ Pay attention to caution signs.

Caution signs in this manual remind of possible danger. Please comply with relevant safety tips below each sign. Meanwhile, you should strictly conform to all safety tips for operation environment.

FCC compliance statement

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.

Exposure to radio frequency energy：

The radiated output power of this device meets the limits of FCC radio frequency exposure limits. This device should be operated with a minimum separation distance of 20 cm (8 inches) between the equipment and a person's body.

NOTE: 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.

Appendix A: How to Contact Us

If you have any problem or want to know more about our products, visit **www.vantrontech.com** or contact us.

US Office: Vantron Technology, Inc.

Address: 440 Boulder Court, Suite 300,

Pleasanton, CA 94566, USA

Tel: 925-621-8758

Email: sales@vantrontech.com

China Office: Vantron Technology, Ltd

Tel: 86-28-8512-3930/3931, 8515-7572/6320

Email: sales@vantrontech.com.cn