

Industrial PC

# PPC-CM4-050



PN: CS12720RA4050

Revision 1.1

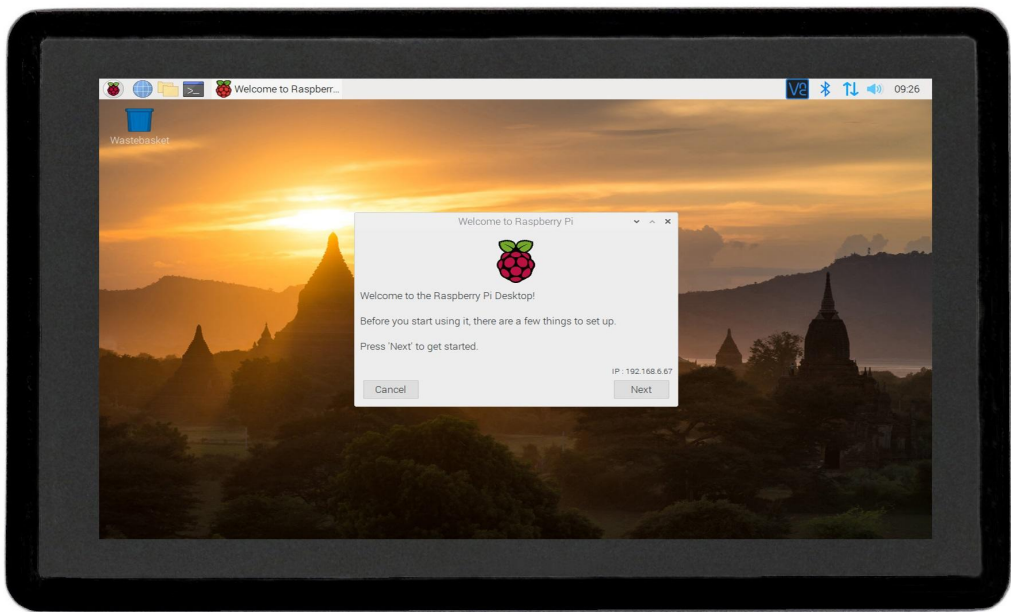
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# Contents

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1. PPC-CM4-050	3
1.1. Product Overview	4
1.2. Ordering Options	5
1.2.1. Pi® CM4 Module	5
1.2.2. Operating System	5
1.3. Specifications	6
1.4. Power Input	7
1.5. Touch Screen	8
1.6. Connectivity	8
1.6.1. RS232/RS485/CAN	9
1.6.2. USB Connectors	10
1.6.3. LAN Connectors	11
1.6.4. WiFi & BT Module	11
1.7. TF Card Slot	12
1.8. Audio Connectors	12
1.9. HDMI Connector	13
1.10. PROG Button	13
1.11. Mounting Procedure	13
1.11.1. CS12720RA4050P	14
1.12. Mechanical Specifications	14
1.12.1. CS12720RA4050P	14
1.13. Disclaimer	15
1.14. Technical Support	15

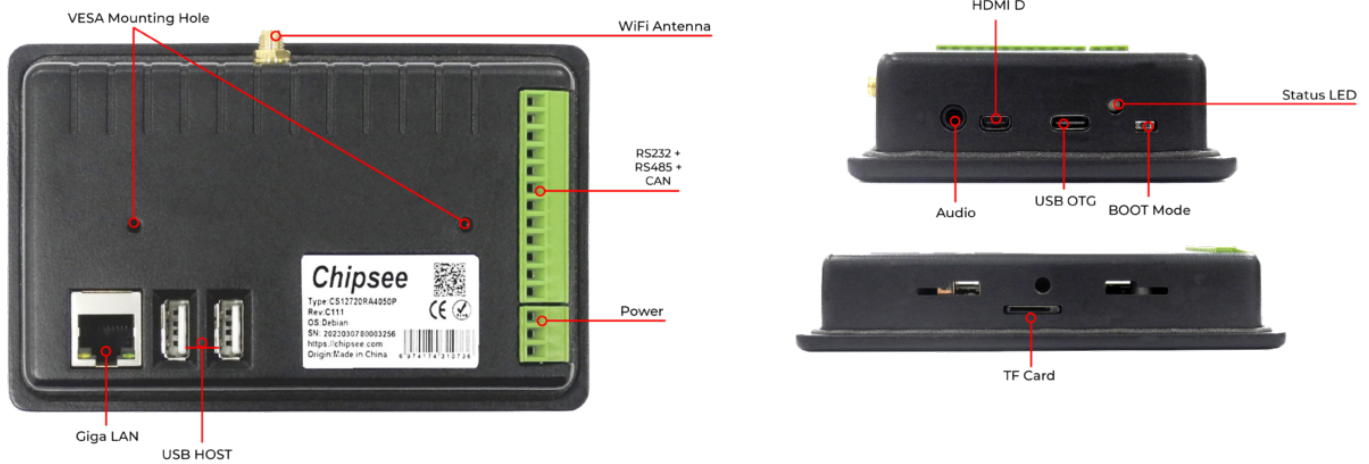
# PPC-CM4-050



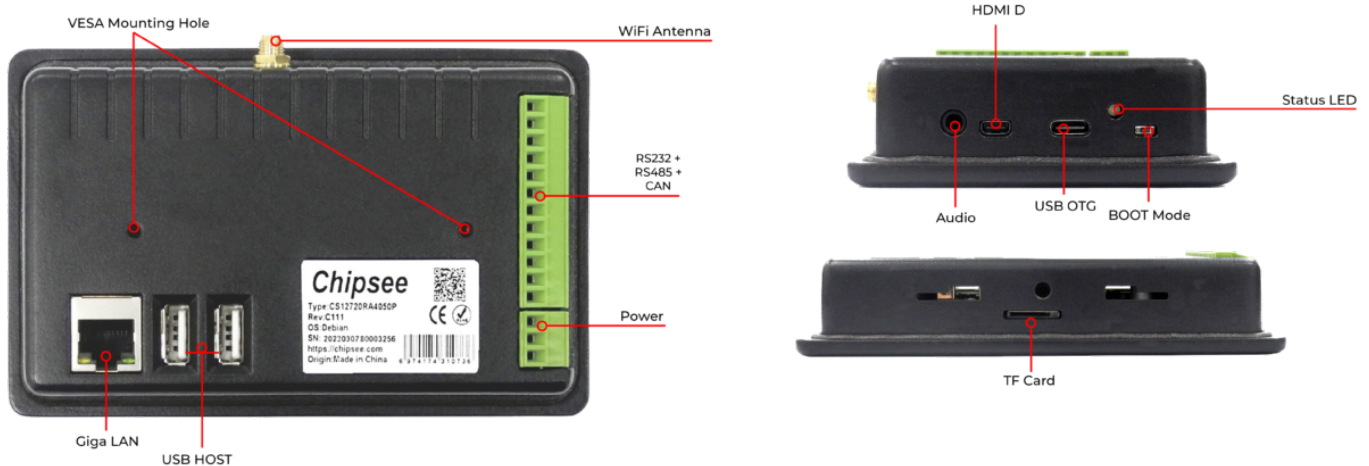
Front View



Rear View



Side View 1



Side View 2

## Product Overview

The Cortex<sup>®</sup>-A72 Raspberry Pi<sup>®</sup> series PPC-CM4-050 (PN: CS12720RA4050) is a high-quality industrial Pi PC. It features a 5" five-point capacitive touch screen with a resolution of 1280 x 720 pixels and brightness of 400 cd/m<sup>2</sup>.

### Key Applications

- Human Machine Interface HMI
- Process Control
- Process Monitoring
- HMI
- IIoT node

- Environmental Monitoring
- PLC
- Automotive applications
- ATM...

It is available both as an embedded solution and as a device housed in a casing with bezels, thus facilitating different installation options:

- Installation on an industrial cabinet
- Integration with the existing equipment

The PPC-CM4-050 industrial Pi PC is based around the powerful Raspberry Pi<sup>®</sup> Compute Module 4, powered by the Quad Cortex<sup>®</sup>-A72 processor with a processor speed of 1.5GHz.

## Ordering Options

Chipsee products can be customized during the ordering process. The product will be shipped with the pre-installed factory defaults if no extra requirements are specified. The table in the [Specifications](#) section provides information about the default options bundled with the product.

### Note

You can order [PPC-CM4-050](#) from the official [Chipsee Store](#) or from your nearest distributor.

## Pi<sup>®</sup> CM4 Module

The Pi<sup>®</sup> Compute Module 4 appears in different versions depending on the size of the DDR4 and eMMC.

The PPC-CM4-050 industrial Pi PC does not include the CM4 Raspberry Pi<sup>®</sup> module by default. If you would like to purchase it with a CM4, you can select it at the Chipsee store during the ordering process.

## Operating System

This product comes with a pre-installed Debian OS. Chipsee software engineers have created all the drivers, so every hardware feature is readily available for any standard development tool.

If your project requires a different OS, please [Contact us](#), and we'll make a [customized version](#) that suits your needs.

## Specifications

The PPC-CM4-050 industrial Pi PC offers a broad range of performance and connectivity options for scalable integration, providing expandability according to future needs. Some of the key features are listed in the table below.

PPC-CM4-050	
<b>CPU</b>	Raspberry Pi® CM4, CM4 Lite; Quad Cortex-A72 at 1.5GHz
<b>Storage</b>	1 TF Cards slots <sup>3</sup>
<b>RAM</b>	Based on CM4
<b>eMMC</b>	Based on CM4
<b>Display</b>	5" IPS LCD, 1280 x 720 resolution px, brightness 400 cd/m <sup>2</sup>
<b>Touch</b>	5-point capacitive touch with 1mm Armored Glass
<b>USB</b>	2 x USB 2.0 Host, 1 x Type-C
<b>LAN</b>	1 x Channel Giga LAN
<b>Audio</b>	3.5mm Audio Out Connector, 2W Speaker Internal
<b>Buzzer</b>	Onboard Buzzer, driven by GPIO
<b>RTC</b>	Yes, High Accuracy RTC with Lithium Button Coin battery (lithium battery not included)
<b>RS232</b>	2 x RS232
<b>RS485</b>	2 x RS485 <sup>1</sup>
<b>CAN</b>	1 x CAN-BUS
<b>GPIO</b>	Not Supported
<b>WiFi/BT</b>	Supported but depending on the CM4 selected <sup>2</sup>
<b>HDMI</b>	1 x HDMI-D 2.0, can be driven upto 4Kp30
<b>3G/4G/LTE</b>	Not Supported
<b>I2C</b>	Not Support
<b>Camera</b>	Yes, not mounted by default
<b>Power Input</b>	From 9V to 36V
<b>Current at 12V</b>	500mA Max
<b>Power Consumption</b>	6W Typical
<b>Working Temperature</b>	From 0°C to +60°C
<b>OS</b>	Debian
<b>Dimensions</b>	CS12720RA4050P: 138.55 x 84.70 x 27.10mm
<b>Weight</b>	CS12720RA4050P: 310g



Table 214 Key Features

- 1

The RS485 circuit controls the Input and Output direction automatically, there's no need to control it from within the software.
- 2

The default product without the CM4 does not include a Wi-Fi/BT module. You can include a CM4 that has the Wi-Fi/BT module at the Chipsee store during the ordering process.
- 3

Chipsee designed TF card slots for storage expansion, as the TF card for storage expansion use same pins with WiFi, it can't be used with WiFi at same time

## Power Input

The PPC-CM4-050 industrial Pi PC can be powered by a wide range of input voltages: From 9V to 36V DC. It is a **3 Pin, 3.81mm screw terminal** connector. The polarity and the pinout is clearly marked on the housing of the CS12720RA4050P version, as shown in the figures below.

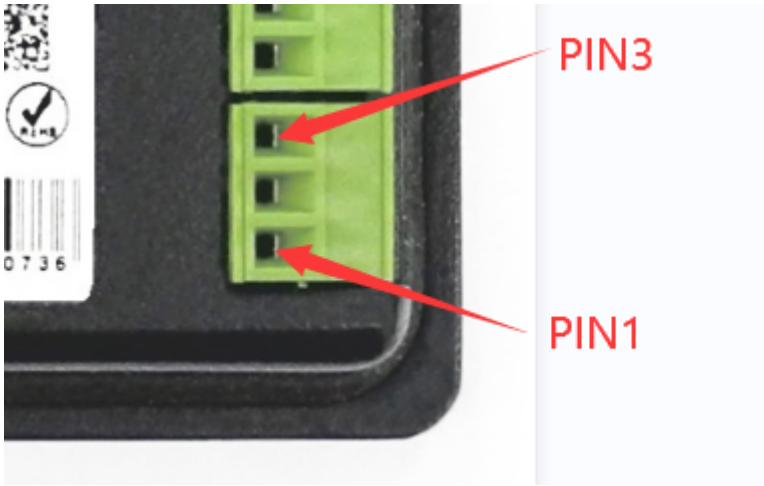


Figure 909: Power Input

Note that the “+” sign represents the positive power input, and it is printed both at the casing and as a silk-screen on the board of the embedded version. The “-” terminal is shorted to the ground.

Power Input Definition		
Pin Number	Definition	Description
Pin 1	Positive Input	DC Power <b>Positive Terminal</b>
Pin 2	Negative Input	DC Power <b>Negative Terminal</b>
Pin 3	Ground	<b>Power System Ground</b>

Table 215 Power Connector

**Note**

The system ground “G” is connected to power negative “-” on board.  
The central pin is positive.

## Touch Screen

The PPC-CM4-050 industrial Pi PC uses a 5-point capacitive touch screen. However, the Debian OS supports only One-Point touch.

The figure below shows the capacitive touch screen connected to the motherboard via the **FPC connector**.



Figure 910: *Capacitive Touch Connector*

**Attention**

A capacitive touch screen is susceptible to power noise and Electromagnetic Radiation (EMR). It may cause LCD ripples or even capacitive touch malfunction. If using a capacitive multi-touch test application, you might notice the touch points float erratically across the display. There are several solutions to this problem:

1. Use a high-quality Power Adapter Unit (PSU) with low EMR. You can also provide power from a battery.
2. Make sure that the PPC-CM4-050 Power Input connector (pin 3) is properly connected to the Power System Ground to provide sufficient EMI shielding and eliminate the problem entirely.
3. Bad GND problems can also be confirmed by touching pin 3 of the Power Input connector with one hand while operating the capacitive touch screen with the other hand. In this case, the operator's body acts as the Power System Ground.

## Connectivity

There are many connectivity options available on the PPC-CM4-050 industrial Pi PC. It has 2 x USB 2.0 Host, 1 x Type-C, 1 x Channel Giga LAN (RJ45) Ethernet connector supporting up to 1 Gbps, and 4 x UART terminals (RS232/RS485/CAN).



RS232/RS485/CAN

The serial communication interfaces (RS485, RS482, and CAN) are routed to a **12-pin 3.81mm terminal**, as illustrated on the figure below.

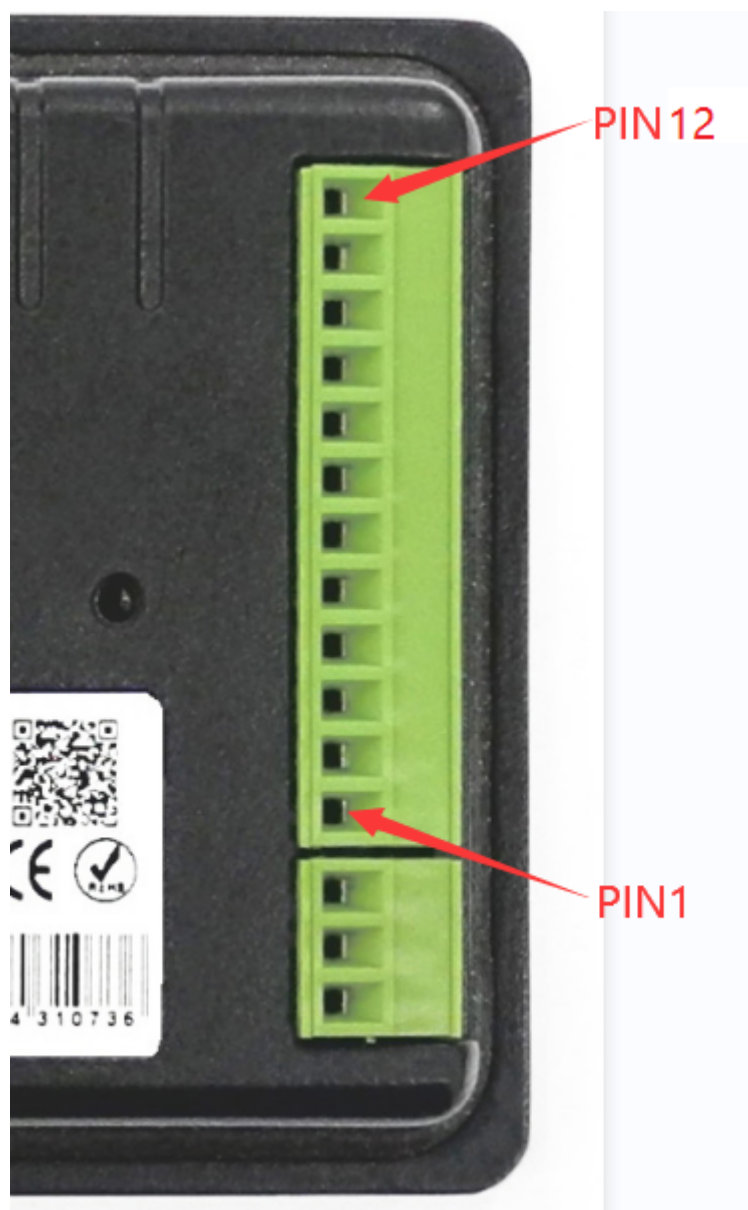


Figure 911: Relation between serial pins on embedded vs. enclosed version of the PPC-CM4-050 Industrial PC

The table below offers more detailed description of every pin and its definition:

RS232 / RS485 / CAN Pin Definition:		
Pin Number	Definition	Description
Pin 12	CAN1_H	CAN H signal
Pin 11	CAN1_L	CAN L signal
Pin 10	RS485_4-	CPU UART5, RS485 -(B) signal
Pin 9	RS485_4+	CPU UART5, RS485 +(A) signal

RS232 / RS485 / CAN Pin Definition:		
Pin 8	RS485_3-	CPU UART3, RS485 -(B) signal
Pin 7	RS485_3+	CPU UART3, RS485 +(A) signal
Pin 6	RS232_0_RXD	CPU UART2, RS232 RXD signal
Pin 5	RS232_0_TXD	CPU UART2, RS232 TXD signal
Pin 4	RS232_2_RXD	CPU UART0, RS232 RXD signal, Debug Port
Pin 3	RS232_2_TXD	CPU UART0, RS232 TXD signal Debug Port
Pin 2	GND	System Ground
Pin 1	+5V	System +5V Power Output, No more than 1A Current output

Table 216 Connectivity Section

### ⚠ Attention

1. RS485\_3 and RS485\_4 can control the input and output direction automatically. There's no need to control it from within the software.
2. The 120Ω match resistor for the RS485 and CAN bus is NOT mounted by default.

## USB Connectors

There are 2 x Type A **USB HOST connectors** onboard, as shown on the figure below.



Figure 912: USB HOST Connectors

### ⚠ Attention

1. These two USB host connectors can drive 500mA for each channel at most.
2. When you connect this product to the HOST PC by a USB Type-C cable, the USB HUB will be disabled. As a result, the 2 USB host connectors will not work.

The product has one USB Type-C connector that works as a slave by default. You can use it to establish a connection with the host PC and for downloading the system to the eMMC of CM4 module.



Figure 913: *USB OTG Connector*

#### **Warning**

1. Be careful not to touch surrounding electronic components accidentally while plugging in USB devices into the embedded Industrial PC version.
2. Unplug the Type-C cable after you download the system, which will cause USB Host doesn't work.

## LAN Connectors

**LAN (RJ45) connector** provides Ethernet connectivity over standardized Ethernet cables as shown in the figure below. The integrated Ethernet interface supports up to 1 Gbps data throughput. These Giga LAN signals come from the CM4 module directly.

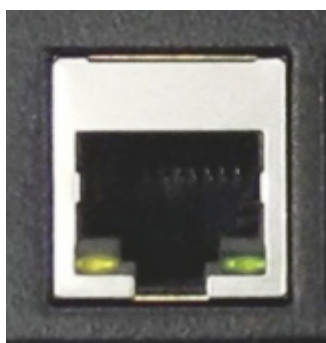


Figure 914: *RJ45 LAN Connectors*

#### **Note**

Use CAT5 or better cables to achieve full data throughput over maximum distance defined by the 1000BASE-T standard (100m).

## WiFi & BT Module

The default PPC-CM4-050 without the CM4 does not include a Wi-Fi/BT module. If you include a CM4 that has the Wi-Fi/BT module, the product will have Wi-Fi/BT feature. The enclosed (CS12720RA4050P) variant of the product also includes an SMA connector for an external Wi-Fi/BT antenna, as illustrated in the figure below.

Figure 915: *WiFi+BT Antenna*

#### ⚠ Attention

The product does not come shipped with the Wi-Fi/BT module by default.

## TF Card Slot

The PPC-CM4-050 industrial Pi PC features 1 x **TF Card (micro SD) slot**: SD, TF slots can address up to 128GB of memory.

Figure 916: *TF (micro SD) Card Slot*

#### ⚠ Attention

1. The SD is used for memory extension. It can't be used for system boot-up.
2. The product does not come shipped with the TF Card by default.

## Audio Connectors

The PPC-CM4-050 industrial Pi PC features some audio peripherals. It has 1 x **3.5mm audio output jack**.

Also, the PPC-CM4-050 industrial Pi PC has a miniature 2W internal speaker for audio reproduction, as well as a small buzzer for alarm/notification sounds.

Figure 917: *Audio Connector*

**Attention**

By plugging in the headphone cable, the internal speaker will be disabled automatically.

## HDMI Connector

The PPC-CM4-050 industrial Pi PC supports 1 x HDMI-D 2.0 interfaces capable of driving 4K images.



Figure 918: *HDMI Connector*

## PROG Button

The PPC-CM4-050 industrial Pi PC has one button on the board marked as PROG, shown in the figure below.

When button is pressed before power, the Raspberry Pi will boot from the USB connector. You can use this function to download the OS software to the internal eMMC.

When button is released before power, the Raspberry Pi will boot from internal eMMC.

There is no need to press the button during regular operation. However, if you need to reinstall the OS, please refer to the detailed information on how to re-flash the OS from the [Software Documentation](#).



Figure 919: *PROG Button*

## Mounting Procedure

The PPC-CM4-050 industrial Pi PC can be mounted with 2 x M4 screws, enabling simplified installation onto any standard mounting fixture.

## CS12720RA4050P

You can mount CS12720RA4050P with the Vesa (75 x 75mm) and Panel mounting methods, as shown on the figure below.

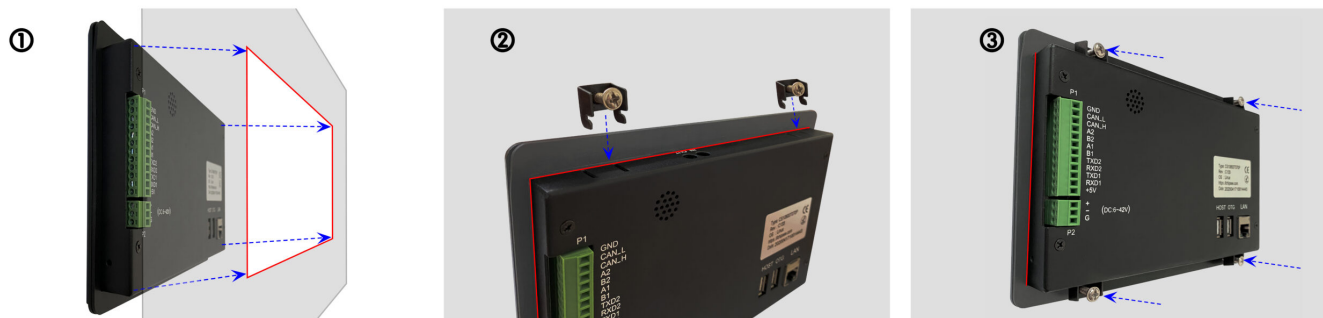


Figure 920: *Panel mounting*

### ⚠ Attention

Please make sure the display is not exposed to high pressure when mounting into an enclosure.

You can find detailed information about mounting in the [Mount IPC Guide](#).

## Mechanical Specifications

### CS12720RA4050P

The outer mechanical dimensions of CS12720RA4050P are 138.55 x 84.70 x 27.10mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.

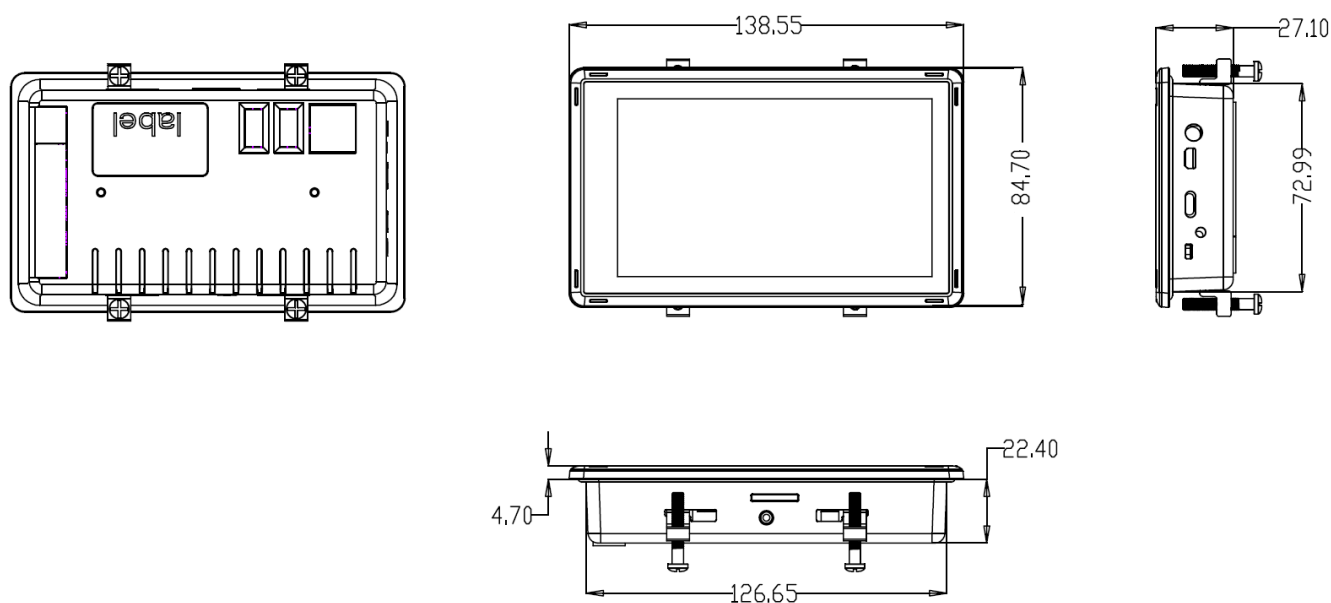




Figure 921: CS12720RA4050P *Technical Drawing*

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