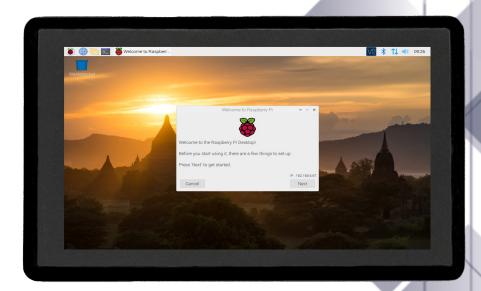


Industrial PC

# PPC-CM4-050



PN: CS12720RA4050P

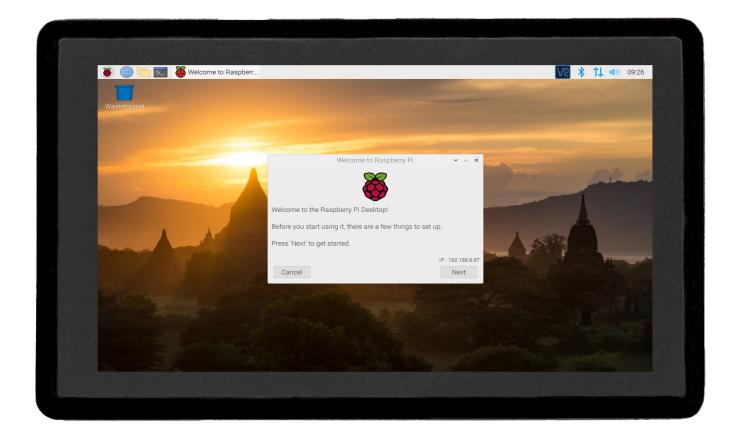
Content can change at anytime, check our website for latest information of this product. **www.chipsee.com** 

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## PPC-CM4-050

## Front View



## Rear View



## Side View 1



## Side View 2



PPC-CM4-050 Product Overview

### **Product Overview**

The Cortex<sup>®</sup>-A72 Raspberry Pi<sup>®</sup> series PPC-CM4-050 (PN: CS12720RA4050P) is a high-quality industrial Pi PC. This single board computer 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> Raspberry Pi Display.

#### **Key Applications**

- Human Machine Interface HMI
- Process Control
- Process Monitoring
- HMI
- IIoT node
- Environmental Monitoring
- PLC
- Automotive applications
- ATM...

It is available as a device hosed 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.

PPC-CM4-050 Ordering Options

## **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® 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 Raspberry Pi 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.

PPC-CM4-050 Specifications

## **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			
СРИ	Raspberry Pi <sup>®</sup> CM4; Quad Cortex-A72 at 1.5GHz		
Storage	Support for 1 x TF Card3		
RAM	2/4/8 GB, Based on CM4		
еММС	16/32 GB, Based on CM4		
Display	5" IPS LCD, 1280 x 720 resolution px, brightness 400 cd/m <sup>2</sup>		
Touch	5-point capacitive touch with 1mm Armored Glass		
USB	2 x USB 2.0 Host, 1 x Type-C		
LAN	1 x Giga LAN		
Audio	3.5mm Audio Out Connector, 2W Speaker Internal		
Buzzer	Onboard Buzzer, driven by GPIO		
RTC	High accuracy RTC with farad capacitor, can work 1 week after power off <b>(default)</b> . High accuracy RTC with lithium coin battery, can work 3 years after power off <i>(optional)</i> .		
RS232	Default to 2 x RS232, up to 4 x RS232		
RS485	Default to 2 x RS4851, these 2 x RS485 can be configured as 2 x RS232		
CAN	1 x CAN-BUS		
GPIO	Not Supported		
12C	Not Supported		
WiFi/BT	Supported but depending on the CM4 selected2		
ZIGBEE	No		
номі	1 x HDMI-D 2.0, can be driven upto 4Kp30		
SATA II	Not Supported		
3G/4G/LTE	Not Supported		
Camera	Yes, not mounted by default. Available on the board in the embedded PC. Requires a customized case to be exposed in an enclosed PC.		
Power Input	From 6V to 36V		
Current	500mA Max at 12V		

PPC-CM4-050 Specifications

PPC-CM4-050			
Power Consumption	6W Typical		
Working Temperature	From 0°C to +60°C		
os	Raspberry Pi OS		
Dimensions	CS12720RA4050P: 138.55 x 84.70 x 27.10mm		
Weight	CS12720RA4050P: 310g		
Mounting Method	CS12720RA4050P: Panel, VESA		

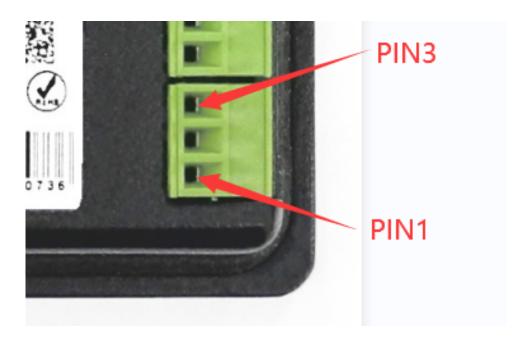
Table 400 Key Features

- 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

PPC-CM4-050 Power Input

## **Power Input**

The PPC-CM4-050 industrial Pi PC can be powered by a wide range of input voltages: From 6V to 36V DC. It is a **3 Pin, 3.81mm screw terminal** connector. As shown in the figure below.



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	Power System Ground	

Table 401 Power Connector



The system ground "**G**" is connected to power negative "-" on board.

PPC-CM4-050 Touch Screen

### **Touch Screen**

The PPC-CM4-050 industrial Pi PC uses a 5-point capacitive touch with 1mm Armored Glass screen. However, the Raspberry Pi OS supports only One-Point touch.

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



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.

PPC-CM4-050 Connectivity

## **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 Giga LAN (RJ45) Ethernet connector supporting up to 1 Gbps, and 4 x UART and 1 x CAN terminals (RS232/RS485/CAN).

### RS232/RS485/CAN

The serial communication interfaces (RS485, RS232, and CAN) are routed to a 12-pin 3.81mm terminal, as illustrated in the figure below.



RS232-RS485-CAN on the PPC-CM4-050 Industrial PC

PPC-CM4-050 RS232/RS485/CAN

#### Attention

- 1. RS485\_3 and RS485\_5 can control the input and output direction automatically. There's no need to control it from within the software.
- 2. The  $120\Omega$  match resistor for RS485 is already mounted by default.
- 3. The  $120\Omega$  match resistor for CAN is **NOT** mounted by default. Be sure to mount the match resistor when testing
- 4. The 2 x RS485 can be configured to 2 x RS232, if you want a custom configuration, you can contact us when placing an order.

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	
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 UARTO, RS232 RXD signal, Debug Port	
Pin 3	RS232_2_TXD	CPU UARTO, RS232 TXD signal Debug Port	
Pin 2	GND	System Ground	
Pin 1	+5V	System +5V Power Output, No more than 1A Current output	

Table 402 Connectivity Section

PPC-CM4-050 USB Connectors

#### **USB Connectors**

There are 2 x USB 2.0 Host, 1 x Type-C onboard, as shown in the figure below.



**USB HOST Connectors** 



#### **Attention**

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

The product has one USB Type-C OTG 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.



USB Type-C 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. Remember to unplug the Type-C cable after flashing OS, otherwise the USB hosts won't work.

PPC-CM4-050 LAN

#### **LAN**

The 1 x Giga LAN 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.



RJ45 LAN Connector



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

PPC-CM4-050 WiFi & BT Module

#### 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 WiFi/BT antenna, as illustrated in the figure below.



WiFi+BT Antenna



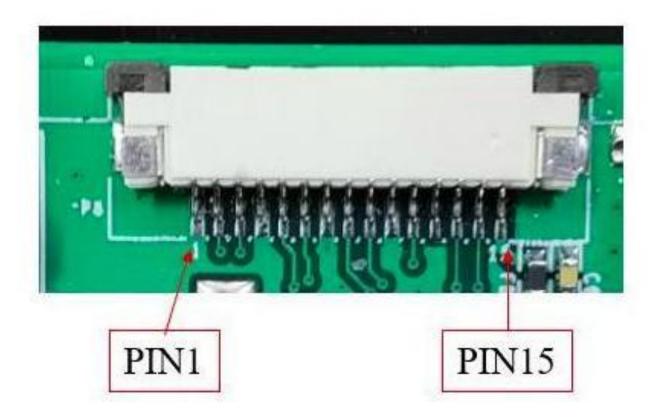
**Attention** 

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

PPC-CM4-050 Camera Connector

#### **Camera Connector**

The PPC-CM4-050 industrial Pi PC has a 15 Pin **Camera Connector**, as shown in the figure below. The camera signals come from CAM1. The table below gives details about the definition of every Pin.



Camera Connector

Camera Connector Pin Definition:			
Pin Number	Definition	Description	
Pin 1	GND	Power Ground	
Pin 2	CAM1_DN0	CAM1_DN0	
Pin 3	CAM1_DP0	CAM1_DP0	
Pin 4	GND	Power Ground	
Pin 5	CAM1_DN1	CAM1_DN1	
Pin 6	CAM1_DP1	CAM1_DP1	
Pin 7	GND	Power Ground	
Pin 8	CAM1_CN	CAM1 Clock signal Negative	
Pin 9	CAM1_CP	CAM1 Clock signal Positive	
Pin 10	GND	Power Ground	
Pin 11	CAM GPIO	CAM GPIO, use for disable camera power and module	

PPC-CM4-050 Camera Connector

Camera Connector Pin Definition:			
Pin 12	NC	Not connected	
Pin 13	SCL0	CPU I2C SCL0 signal	
Pin 14	SDA0	CPU I2C SDA0 signal	
Pin 15	+3.3V	System +3.3V Power Output, No more than 500mA Current output	

Table 403 Camera Connector Pin-out



#### Attention

1. The camera connector is supported but not mounted by default. It's available on the PCB but not exposed on the case, please contact us when placing an order if you need to use camera on the PPC-CM4-050.

PPC-CM4-050 TF Card Slot

### **TF Card Slot**

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



TF (micro SD) Card Slot



#### Attention

- 1. The SD is used for memory extension. It can't be used for system boot-up.
- 2. This storage extension SD uses the same pins as WiFi on CM4, SD storage and WiFi **can't** be used at the same time.
- 3. The product does not come shipped with the TF card by default.

PPC-CM4-050 **Audio Connectors** 

### **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.



Audio Connector



**Attention** 

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

PPC-CM4-050 HDMI Connector

## **HDMI Connector**

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



Figure 944: HDMI Connector

PPC-CM4-050 PROG Button

### **PROG Button**

The PPC-CM4-050 industrial Pi PC has one button for entering usb download mode, as shown in the figure below.

When booting **with** the button being pressed, the Raspberry Pi will boot from the USB connector. You can use this feature to download the OS software to the internal eMMC. When booting **without pressing** the button, the Raspberry Pi will boot from the 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 reflash the OS from the Software Documentation.



PROG Button

PPC-CM4-050 Mounting Procedure

## **Mounting Procedure**

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

#### CS12720RA4050P

You can mount CS12720RA4050P with the Vesa (75  $\times$  75mm) and Panel mounting methods, as shown in the figure below.

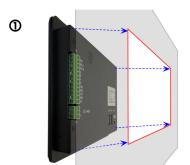






Figure 945: Panel mounting



#### **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.

PPC-CM4-050 Mechanical Specifications

## **Mechanical Specifications**

#### CS12720RA4050P

For CS12720RA4050P, the outer mechanical dimensions 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.

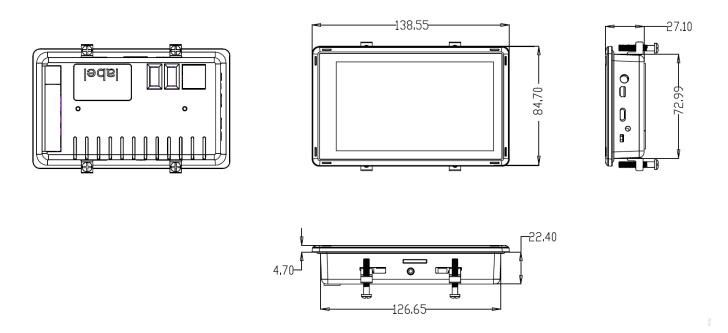


Figure 946: CS12720RA4050P Technical Drawing

PPC-CM4-050 3D Model

## **3D Model**

PPC-CM4-050 3D model can be viewed in the online doc in a web browser, **if you are reading from the PDF** version, please visit the online doc PPC-CM4-050, select hardware documentation, drag the navigation bar to the 3D Model section.

PPC-CM4-050 Disclaimer

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