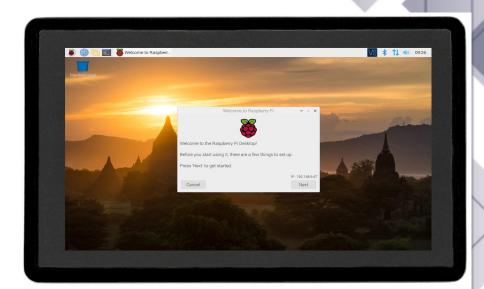


**Industrial PC** 

# **PPC-CM4-050**



PN: CS12720RA4050

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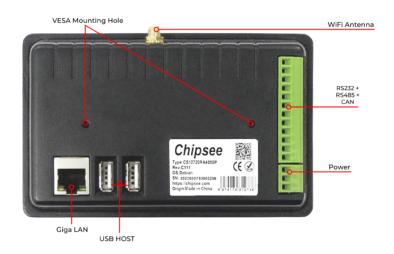
## PPC-CM4-050



Front View

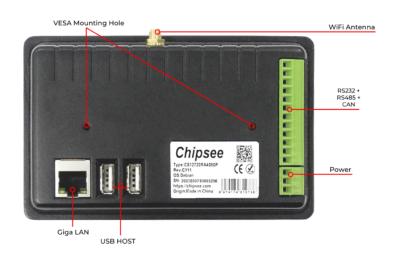


**Rear View** 





#### Rear View





Side View

PPC-CM4-050 Product Overview

#### **Product Overview**

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

#### **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 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 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.

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, CM4 Lite; Quad Cortex-A72 at 1.5GHz			
Storage	1 TF Cards slots3			
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 Channel Giga LAN			
Audio	3.5mm Audio Out Connector, 2W Speaker Internal			
Buzzer	Onboard Buzzer, driven by GPIO			
RTC	Yes, High Accuracy RTC with Lithium Button Coin battery (lithium battery not included)			
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			
I2C	Not Supported			
WiFi/BT	Supported but depending on the CM4 selected2			
ZIGBEE	No			
НДМІ	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.			
Power Input	From 9V to 36V			
Current at 12V	500mA Max			
Power Consumption	6W Typical			
Working Temperature	From 0°C to +60°C			

PPC-CM4-050 Specifications

PPC-CM4-050		
OS	Debian	
Dimensions	CS12720RA4050P: 138.55 x 84.70 x 27.10mm	
Weight	CS12720RA4050P: 310g	

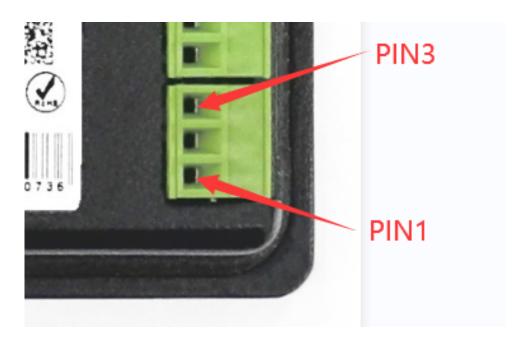
Table 214 Key Features

- 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

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 9V 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 215 Power Connector



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

PPC-CM4-050 Touch Screen

#### **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.



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

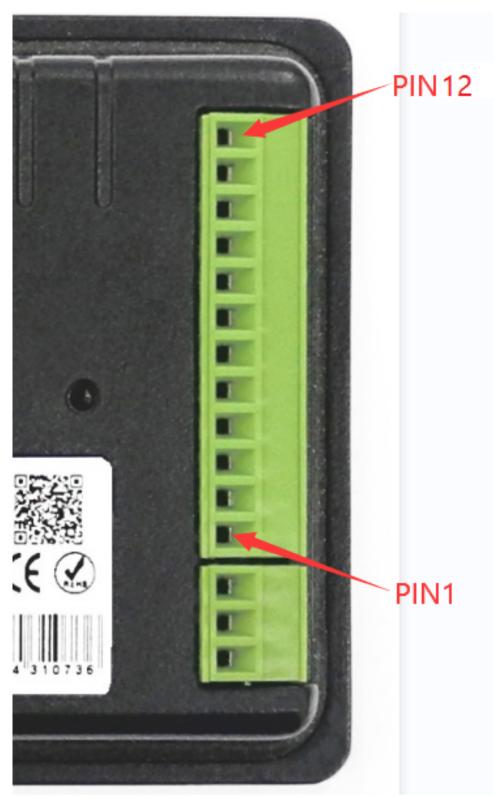
### Connectivity

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 Channel 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.

PPC-CM4-050 RS232/RS485/CAN



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

#### 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 CAN.

PPC-CM4-050 USB Connectors

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 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

#### **USB** Connectors

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



**USB HOST Connectors** 

#### $\Lambda$

#### **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.

PPC-CM4-050 LAN Connectors

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.

#### 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.



RJ45 LAN Connector



#### Note

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



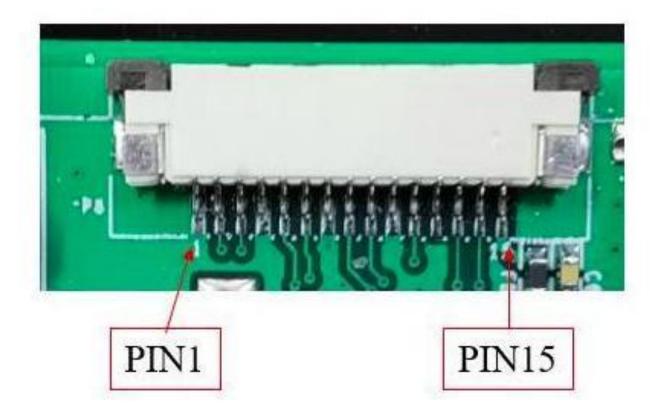
#### Attention

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

#### 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.

PPC-CM4-050 Camera Connector



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		
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 217 Camera Connector Pin-out

PPC-CM4-050 Camera Connector



#### **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.

**TF Card Slot** PPC-CM4-050

### 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. The product does not come shipped with the TF card by default.
- 3. This storage extension SD uses the same pins as WiFi on CM4, SD storage and WiFi can't be used at the same time.

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 (enclosed PC version)* 



**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 909: 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 x 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.

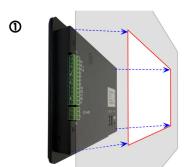






Figure 910: Panel mounting



#### **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.

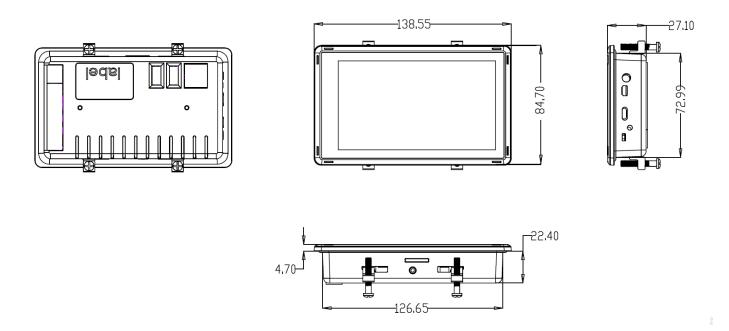


Figure 911: CS12720RA4050P Technical Drawing

PPC-CM4-050 Disclaimer

#### Disclaimer

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