

**Industrial PC** 

# PPC-A72-121-P



PN: CS10768R121P



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# PPC-A72-121-P



Front View



**Rear View** 

PPC-A72-121-P Product Overview



Side View 1



Side View 2

# **Product Overview**

The Cortex $^{\$}$ -A72/53 series PPC-A72-121-P (PN: CS10768R121P) is a high-quality industrial panel PC. It features a 12.1" ten-point capacitive touch screen with a resolution of 1024 x 768 pixels and brightness of 400 cd/m $^{2}$ .

### **Key Applications**

- Human Machine Interface HMI
- Mobile Applications
- Video Processing

PPC-A72-121-P Ordering Options

- Machine Learning
- Video Gaming
- Process Control
- Process Monitoring
- ATM...

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

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

The PPC-A72-121-P Industrial Panel PC is based around the powerful CS-SOM-RK3399 System on Module (SoM), powered by the Rockchip RK3399 low-power processor which integrates a dual-core Cortex<sup>®</sup>-A72 and a quad-core Cortex<sup>®</sup>-A53 with a separate NEON coprocessor.

The RK3399 supports multi-format video decoders and has a high-performance dual-channel external memory interface (DDR3/DDR3L/LPDDR3/LPDDR4) capable of sustaining demanding memory bandwidths. It also provides a complete set of peripheral interfaces.

# 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 Hardware Features section provides information about the default options bundled with the product.



You can order The PPC-A72-121-P Industrial Panel PC from the official **Chipsee Store** or from your nearest distributor.

# Operating System

This product comes with a pre-installed OS of your choice. Please see the list below for the supported OSes, which can be also obtained from the Software Documentation section, along with the detailed installation instructions.

- Chipsee Linux\*
- Android 7.1
- Debian 10

PPC-A72-121-P Optional Features

- \* Chipsee Linux is based on buildroot that has been integrated with:
  - 1. Chipsee Hardware Test Application
  - 2. An initialization script for GPIO/Buzzer/Audio
  - 3. Multiple libraries, such as the libQt5Sql to develop Qt application with SQL
  - 4. Various packages, such as the <a href="ntfs-3g">ntfs-3g</a> to use NTFS file system



#### Warning

The Software Documentation section provides a detailed instruction on how to install different OSes on your own. However, bear in mind that Chipsee can't take the responsibility of inadequate installation procedure. If you "brick" your device, please contact Chipsee Technical Support at support@chipsee.com for further assistance

### **Optional Features**

The PPC-A72-121-P Industrial Panel PC does not include 4G/LTE module by default. The module is optional and can be selected at the Chipsee store during the ordering process.



#### Warning

Installation, repair, and maintenance tasks should be performed by trained personnel only. Chipsee does not bear any responsibility for damage caused by inadequate handling of the product.

## Hardware Features

The PPC-A72-121-P Industrial Panel PC offers a broad range of performance and connectivity options for scalable integration, providing expandability to meet future needs. Some of the key features are listed in the table below.

PPC-A72-121-P		
СРИ	Rockchip RK3399, Dual-core Cortex-A72 (1.8GHz), Quad-core Cortex-A53 (1.4GHz)	
RAM	4GB DDR3	
еММС	16GB	
Storage TF Card, Supports up to 128GB SDHC		
Display	12.1" LCD, 1024 x 768, High Brightness: 400 cd/m <sup>2</sup>	
Touch	10-point capacitive touch screen	
USB	1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C	
LAN	1 x RJ45, GbE	
Audio	3.5mm Audio In/Out Connector, 2W Internal Speaker	
Buzzer	Yes	

PPC-A72-121-P Power Input

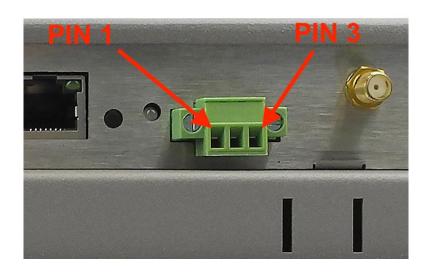
PPC-A72-121-P				
RTC	Yes			
RS232	3 x RS232 (Optional 5 x RS232 at most, 1 debug port)1			
RS485	2 x RS4851			
GPIO	8 Channels			
WiFi/BT	Integrated WiFi/BT Module			
4G/LTE	Supported, Optional			
Power Input	From 12V to 36V			
Current at 15V	1500mA Max			
Power Consumption	18W Typical			
Working Temperature	From 0°C to +60°C			
os	Android 7.1, Debian 10, Buildroot Linux Qt5.14			
Dimensions	PPC-A72-121-P (PN: CS10768R121P): 320 * 260 * 55.5mm			
Weight	PPC-A72-121-P (PN: CS10768R121P): 3100g			
Mounting PPC-A72-121-P (PN: CS10768R121P): Panel, VESA				

Table 91 Key Features

**1(1,2)**This product has 5 x UART channels in total. The default configuration is 3 x RS232 and 2 x RS485, including 1 debug port. UART can be swapped between RS232 and RS485 modes easily, so if you need a different RS232/ RS485 configuration, please get in touch with the Chipsee Technical Support at **support@chipsee.com** 

# Power Input

The PPC-A72-121-P Industrial Panel PC can be powered by a wide range of input voltages: From 12V to 36V DC. The power input connector is a **3-pin**, **3.81mm terminal**.



#### 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 a PCB 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 92 Power Connector



#### Note

The system ground " $\mathbf{G}$ " is connected to power negative "-" on board.

## Touch Screen

The PPC-A72-121-P Industrial Panel PC uses a 10-point capacitive touch screen.

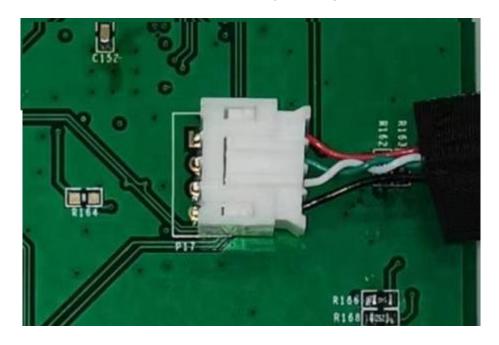


Figure 424: Capacitive Touch Screen Connector



#### **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.

PPC-A72-121-P Connectivity

2. Make sure that the PPC-A72-121-P Power Input connector (pin 3) is properly connected to the Power System Ground to provide sufficient EMI shielding and eliminate the problem entirely.

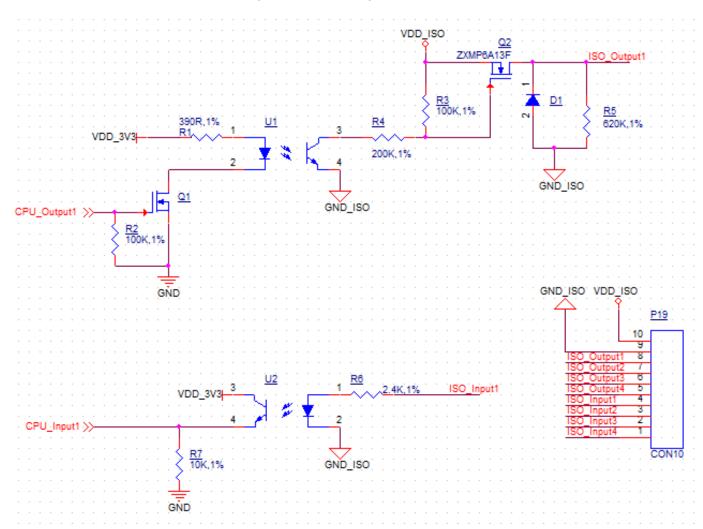
3. Bad GND problems can also be confirmed by touching pin 3 of the Power Input connector with one hand while operating the capacitive touch screen with the other hand. In this case, the operator's body acts as the Power System Ground.

# Connectivity

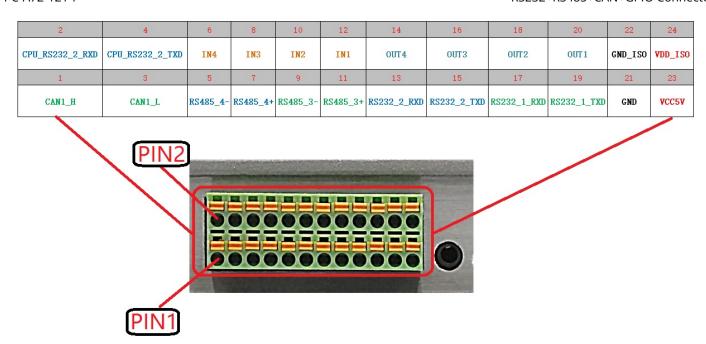
There are many connectivity options available on the PPC-A72-121-P industrial PC. It has 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C, 1 x network connector (RJ45) supporting up to 1 Gbps, 8 x GPIO and 5 x UART terminals (RS232/485).

#### RS232+RS485+CAN+GPIO Connector

The serial communication interfaces (RS485, RS232, and CAN) are routed to a **12-pin 3.81mm terminal**, as illustrated in the figure below. Serial communication on both RS485 and RS232 interfaces can reach up to 115200 kbps.



Isolated GPIO reduced schematic



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

RS232 / RS485 / CAN / GPIO Pin Definition:		
Pin Number	Definition	Description
Pin 1	CAN1_H	CAN H signal
Pin 2	CPU_RS232_2_RXD	CPU UART2, CPU RS232 RXD signal
Pin 3	CAN1_L	CAN L signal
Pin 4	CPU_RS232_2_TXD	CPU UART2, CPU RS232 TXD signal
Pin 5	RS485_4-	USB UART4, RS485 -(B) signal
Pin 6	IN4	Isolated Input 4
Pin 7	RS485_4+	USB UART4, RS485 +(A) signal
Pin 8	IN3	Isolated Input 3
Pin 9	RS485_3-	USB UART3, RS485 -(B) signal
Pin 10	IN2	Isolated Input 2
Pin 11	RS485_3+	USB UART3, RS485 +(A) signal
Pin 12	IN1	Isolated Input 1
Pin 13	RS232_2_RXD	USB UART2, RS232 RXD signal
Pin 14	OUT4	Isolated Output 4
Pin 15	RS232_2_TXD	USB UART2, RS232 TXD signal
Pin 16	OUT3	Isolated Output 3
Pin 17	RS232_1_RXD	USB UART1, RS232 RXD signal
Pin 18	OUT2	Isolated Output 2
Pin 19	RS232_1_TXD	USB UART1, RS232 TXD signal

PPC-A72-121-P USB Connectors

RS232 / RS485 / CAN / GPIO Pin Definition:		
Pin 20	OUT1	Isolated Output 1
Pin 21	GND	System Ground
Pin 22	GND_ISO	Isolated Ground
Pin 23	VCC5V	System 5V output, up to 1A
Pin 24	VDD_ISO	Isolated Power Input,support 5V~24V

Table 93 Connectivity Section



#### Attention

- The  $120\Omega$  match resistor for **CAN** bus is **NOT mounted** by default.
- The  $120\Omega$  match resistor for **RS485** is **already mounted** by default.
- This product supports changing 2 x RS485 to 2 x RS232 and supports up to 5 x RS232 (include one debug port).
- The GPIO has been opt-isolated, you can use an external isolated power input but the power input range should be from 5V to 24V DC.
- The 4 output channels can drive at most 500mA current on each channel.

#### **USB Connectors**

There are  $2 \times USB + OST = 0$  onboard which includes  $1 \times USB = 0$  HOST,  $1 \times USB = 0$  HOST,  $1 \times USB = 0$  Type-C, as shown in the figures below.



USB 2.0 and USB 3.0 HOST Connectors (enclosed PC version)

PPC-A72-121-P LAN Connectors



USB Type-C Connector (enclosed PC version)



#### Warning

Be careful not to touch surrounding electronic components accidentally while plugging in USB devices into the embedded IPC version.

#### 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.



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-A72-121-P WiFi & BT Module

#### WiFi & BT Module

The PPC-A72-121-P Industrial Panel PC is equipped with the popular **Realtek RTL8723 WiFi/BT module** that supports BT/BLE 4.0 (with backward compatibility), as well as 802.11bgn 2.4 GHz Wireless LAN (WLAN).

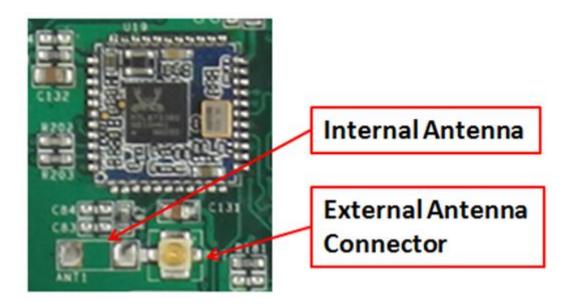
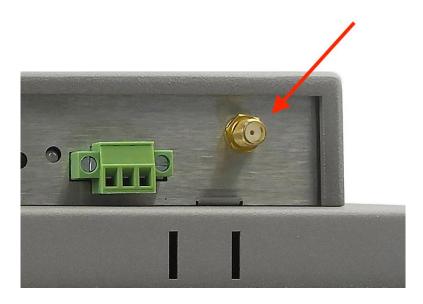


Figure 425: RTL8273 WiFi/BT Module

The product includes an SMA connector for an external WiFi/BT antenna, as illustrated in the figure below.



WiFi+BT Antenna SMA

### 4G/LTE Module

The PPC-A72-121-P Industrial Panel PC is equipped with a **mini-PCIe connector** that can connect to a 4G/LTE module. The customer will also need a SIM Card Holder and a 4G/LTE

PPC-A72-121-P 4G/LTE Module

Antenna Connector to ensure 4G/LTE works on the PPC-A72-121-P. SIM card does NOT support hot plug. Power off before inserting or removing SIM card.

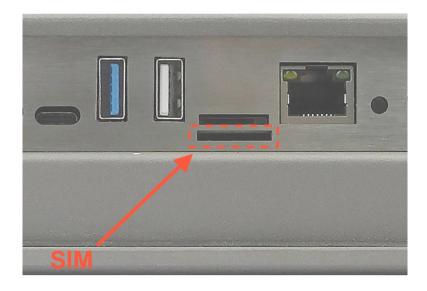


Figure 426: mini-PCIe Connector & 4G Module



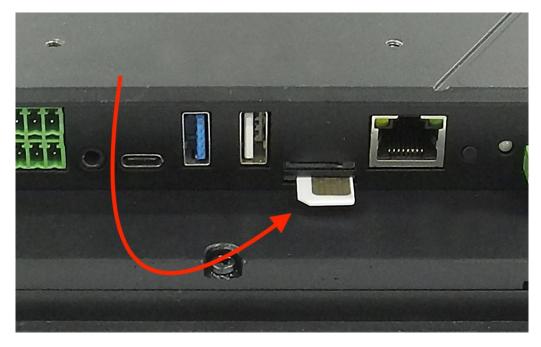


Figure 427: SIM Card Holder & 4G Antenna



SIM Card Holder

PPC-A72-121-P TF Card Slot



SIM Card Direction



#### Attention

The product does not come shipped with the 4G/LTE module by default.

# TF Card Slot

The PPC-A72-121-P Industrial Panel PC features 1 x **TF Card (micro SD) slot**. It can address up to 128GB of memory.



TF (micro SD) Card Slot



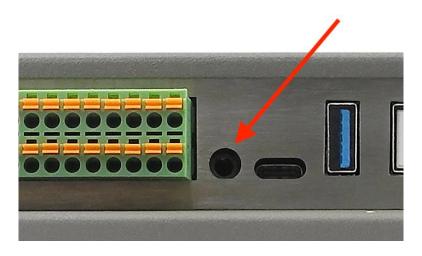
#### Note

The product does not come shipped with the TF Card by default.

PPC-A72-121-P Audio Connectors

### **Audio Connectors**

The PPC-A72-121-P Industrial Panel PC features some audio peripherals. It has a **3.5mm audio input/output jack**, an **internal speaker**, as well as a small **buzzer**.



Audio Connector (enclosed PC version)



#### **Attention**

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

The miniature 2W embedded speaker is handy for audio reproduction, the small buzzer can play alarm/notification sounds.



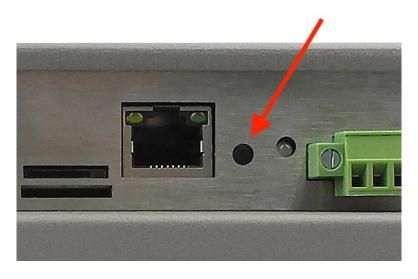


Figure 428: 2W Micro Speaker and Buzzer

### **Power Button**

The PPC-A72-121-P Industrial Panel PC has a power button, as shown on the figure below. You can use the button to power ON or OFF the industrial PC.

PPC-A72-121-P Mounting Procedure



Power Button

# Mounting Procedure

The PPC-A72-121-P Industrial Panel PC can be mounted with  $4 \times M4$  (6mm) screws using the **VESA** (100x100mm or 75x75mm).

The PPC-A72-121-P Industrial Panel PC can be mounted with **panel mounting** method, enabling simplified installation onto any standard mounting fixture.



### 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

For PPC-A72-121-P, the outer mechanical dimensions are 320 \* 260 \* 55.5mm (W x L x H).

PPC-A72-121-P Disclaimer

### Disclaimer

This document is provided strictly for informational purposes. Its contents are subject to change without notice. Chipsee assumes no responsibility for any errors that may occur in this document. Furthermore, Chipsee reserves the right to alter the hardware, software, and/or specifications set forth herein at any time without prior notice and undertakes no obligation to update the information contained in this document.

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