Chipsee

Industrial PC

# PPC-A72-215-P

PN: CS19108R215P2

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# PPC-A72-215-P

## Front View

# Rear View

CAUTION
Hot surface!!
To prevent electric shock. Do not remove the cover repairs,maintenance work must be performed by professionals.
Chipsee
CAUTION
Hot surface

# Side View 1

# Side View 2

# Product Overview

The Cortex®-A72/53 series PPC-A72-215-P (PN: CS19108R215P2) is a high-quality industrial panel PC. It features a 21.5” ten-point capacitive touch screen with a resolution of 1920 x 1080 pixels and brightness of 250 cd/$m^2$.

Key Applications

- Human Machine Interface  HMI
- Mobile Applications
- Video Processing
- 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-A72-215-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®-A72 and a quad-core Cortex®-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.

> **Note**
>
> You can order PPC-A72-215-P 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.

- Buildroot Linux Qt5.14*
- Android 7.1
- Android 11
- Debian 10

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* (Formerly Chipsee Linux) 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 `ntfs-3g` 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-A72-215-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-A72-215-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.

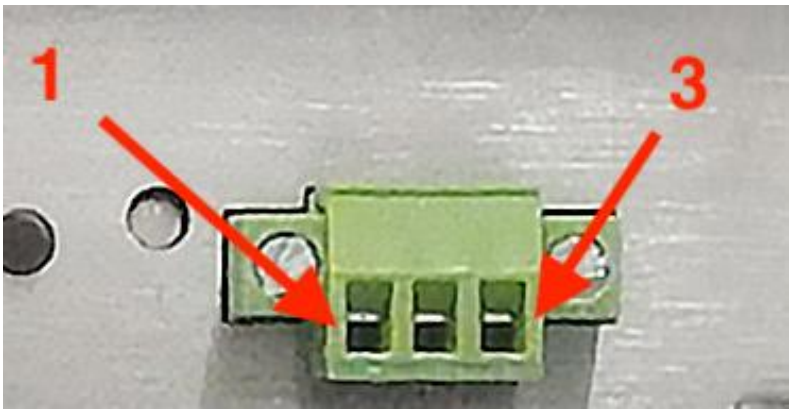
| PPC-A72-215-P | |
|---|---|
| **CPU** | Rockchip RK3399, Dual-core Cortex-A72 (1.8GHz), Quad-core Cortex-A53 (1.4GHz) |
| **RAM** | 4GB DDR3 |
| **eMMC** | 16GB |
| **Storage** | TF Card, Supports up to 128GB SDHC |
| **Display** | 21.5" LCD, 1920 x 1080, High Brightness: 250 cd/m$^2$ |
| **Touch** | 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 |
| **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** | 2.2A Max |
| **Power Consumption** | 16W Typical, 26.4W Max |
| **Working Temperature** | From 0°C to +50°C |
| **OS** | Android 7.1, Android 11, Buildroot Linux Qt5.14, Debian 10 |
| **Dimensions** | PPC-A72-215-P (PN: CS19108R215P2): 535 x 331 × 52.5mm |
| **Weight** | PPC-A72-215-P (PN: CS19108R215P2): 5500g |
| **Mounting** | PPC-A72-215-P (PN: CS19108R215P2): Panel, VESA |

Table 122 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-A72-215-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 **Positive Terminal** |
| Pin 2 | Negative Input | DC Power **Negative Terminal** |
| Pin 3 | Ground | **Power System Ground** |

Table 123 Power Connector

**Note**

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

# Touch Screen

The PPC-A72-215-P Industrial Panel PC uses a 10-point capacitive touch screen.

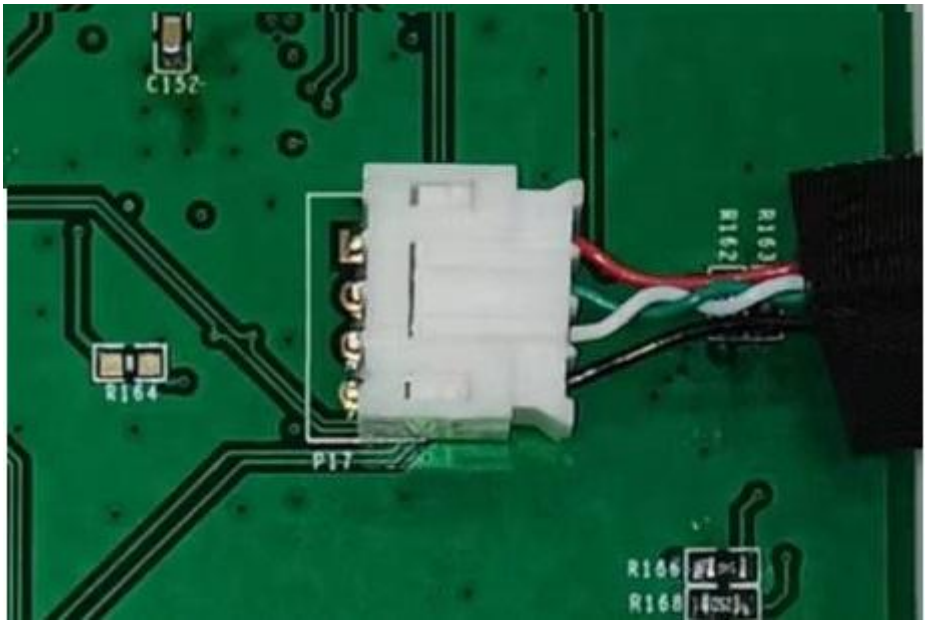



Figure 489: *Capacitive Touch Screen Connector*

**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:

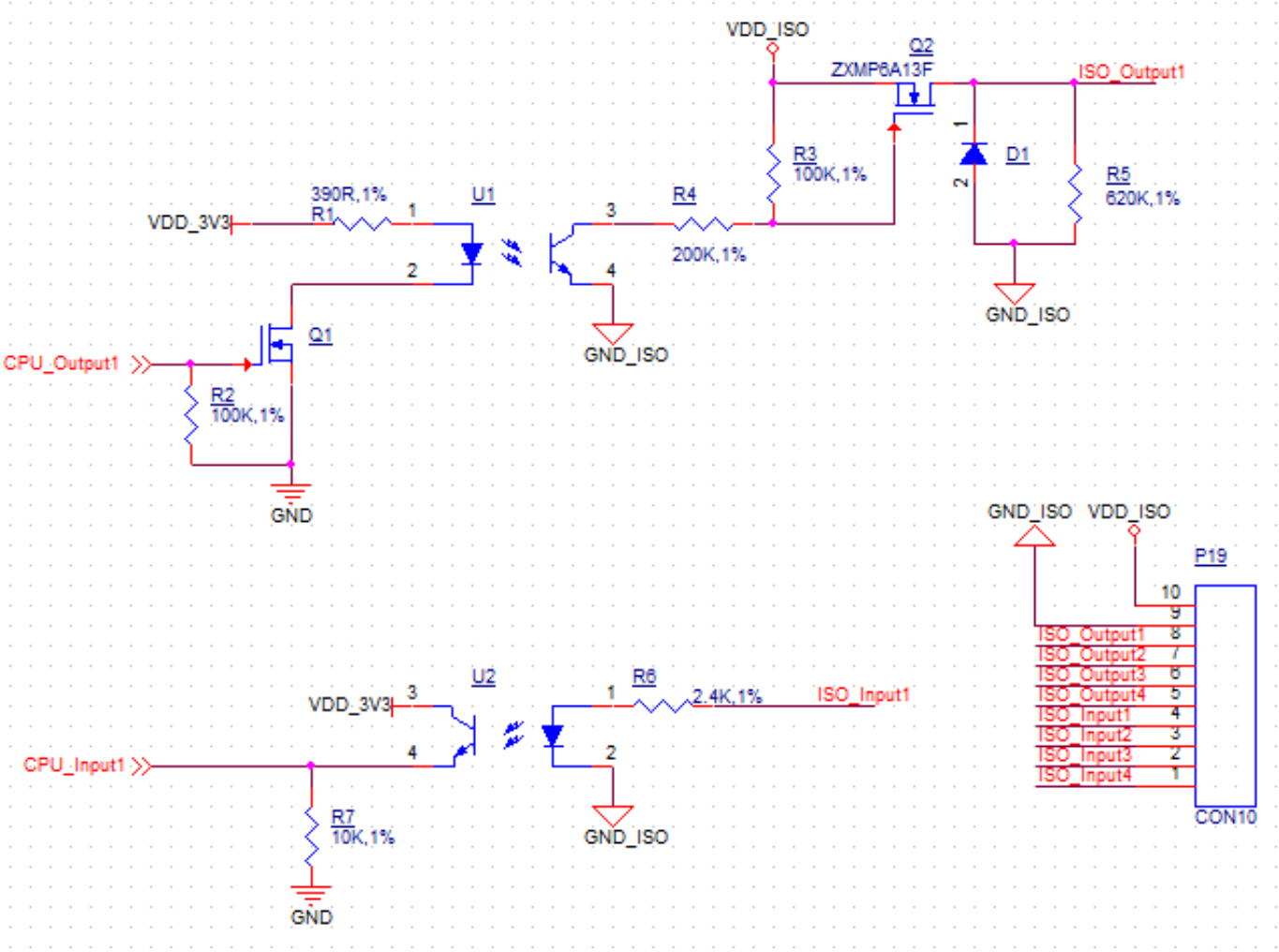
1. Use a high-quality Power Adapter Unit (PSU) with low EMR. You can also provide power from a battery.
2. Make sure that the PPC-A72-215-P Power Input connector (pin 3) is properly connected to the Power System Ground to provide sufficient EMI shielding and eliminate the problem entirely.
3. Bad GND 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-A72-215-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).

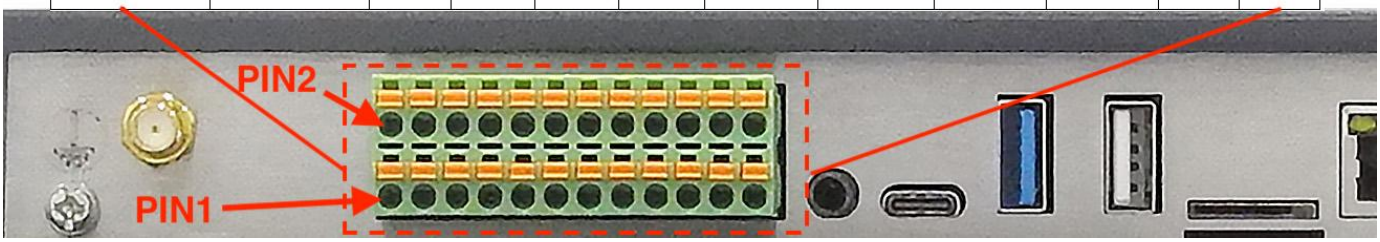
## RS232+RS485+CAN+GPIO Connector

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*

| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CPU_RS232_2_RXD | CPU_RS232_2_TXD | IN4 | IN3 | IN2 | IN1 | OUT4 | OUT3 | OUT2 | OUT1 | GND_ISO | VDD_ISO |
| 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 |
| CAN1_H | CAN1_L | RS485_4- | RS485_4+ | RS485_3- | RS485_3+ | RS232_2_RXD | RS232_2_TXD | RS232_1_RXD | RS232_1_TXD | GND | VCC5V |




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 |
| 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 |

| RS232 / RS485 / CAN / GPIO Pin Definition: | | |
|---|---|---|
| Pin 24 | VDD_ISO | Isolated Power Input,support 5V~24V |

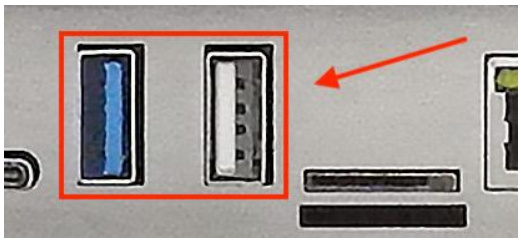
Table 124 Connectivity Section

**Attention**

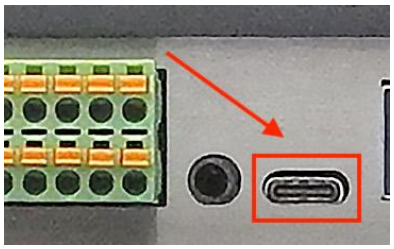
- The 120Ω match resistor for **CAN** bus is **NOT mounted** by default.
- The 120Ω match resistor for **RS485** is **already mounted** by default.
- This product supports changing 2 x RS485 to 2 x RS232 and supports up to 5 x RS232 (include one debug port).
- The GPIO has been opt-isolated, you can 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 x **USB HOST connectors** onboard which includes 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C , as shown in the figures below.



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



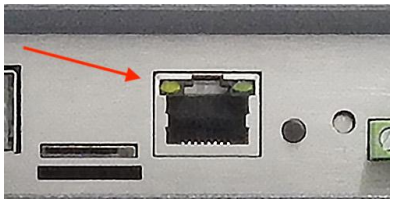
*USB Type-C Connector (enclosed PC version)*

**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).

## WiFi & BT Module

The PPC-A72-215-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).

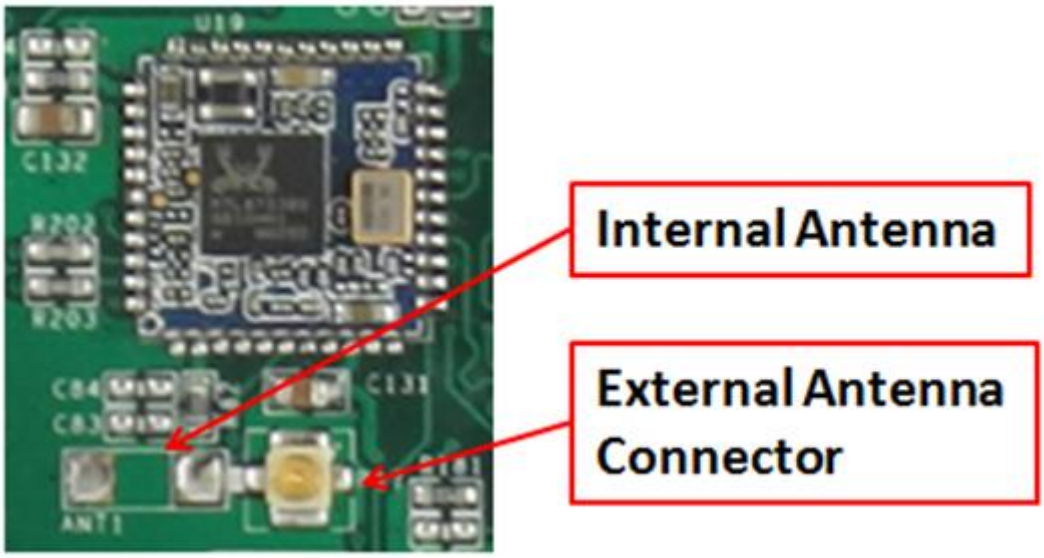
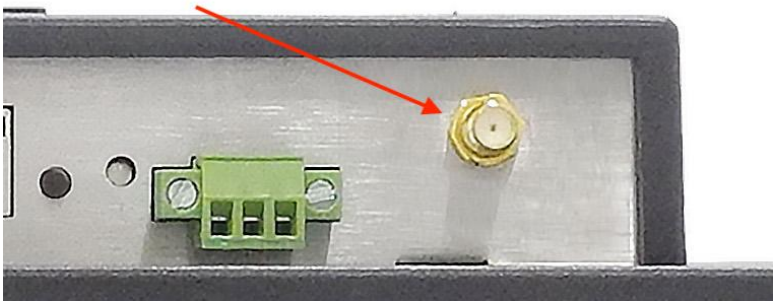



Figure 490: *RTL8273 WiFi/BT Module*

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



*WiFi+BT Antenna SMA*

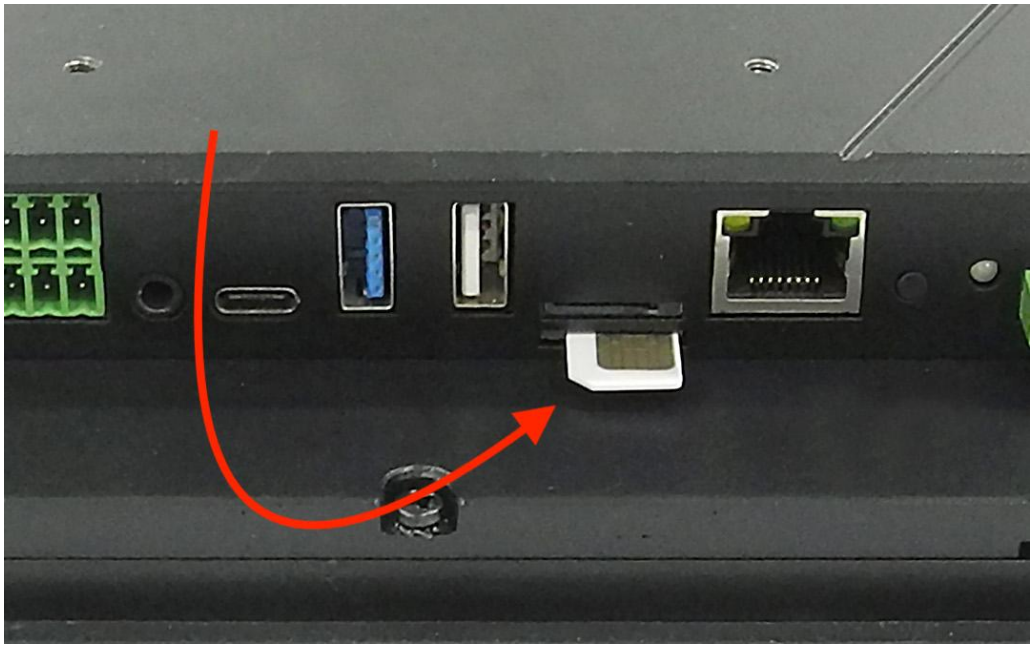
## 4G/LTE Module

The PPC-A72-215-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 Antenna Connector to ensure 4G/LTE works on the PPC-A72-215-P. SIM card does NOT support hot plug. Power off before inserting or removing SIM card.

Figure 491: *mini-PCIe Connector & 4G Module*

Figure 492: *SIM Card Holder & 4G Antenna*

*SIM Card Holder*



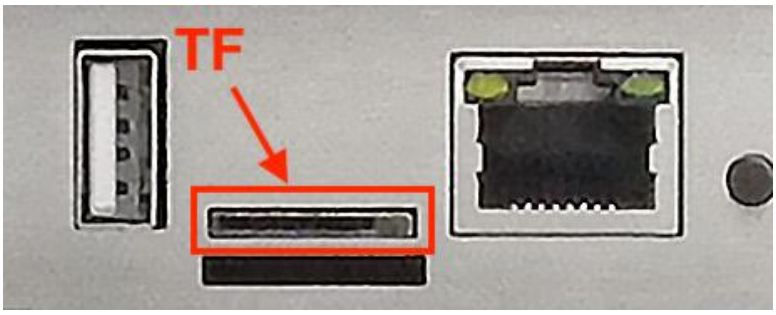
*SIM Card Direction*

**Attention**

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

# TF Card Slot

The PPC-A72-215-P Industrial Panel PC features 1 x **TF Card (micro SD) slot**. It can address up to 128GB of memory.



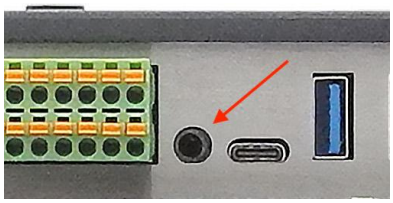

*TF (micro SD) Card Slot*

**Note**

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

# Audio Connectors

The PPC-A72-215-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.

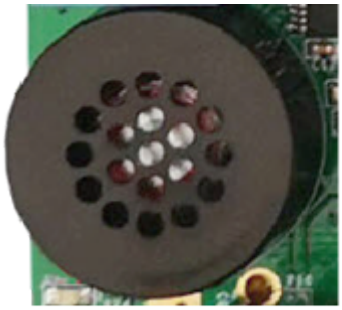
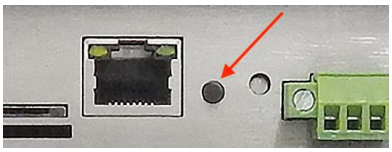


Figure 493: *2W Micro Speaker and Buzzer*

# Power Button

The PPC-A72-215-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.



*Power Button*

# Mounting Procedure

The PPC-A72-215-P Industrial Panel PC can be mounted with 4 x **M4** (6mm) screws using the **VESA** (100x100mm or 75x75mm).

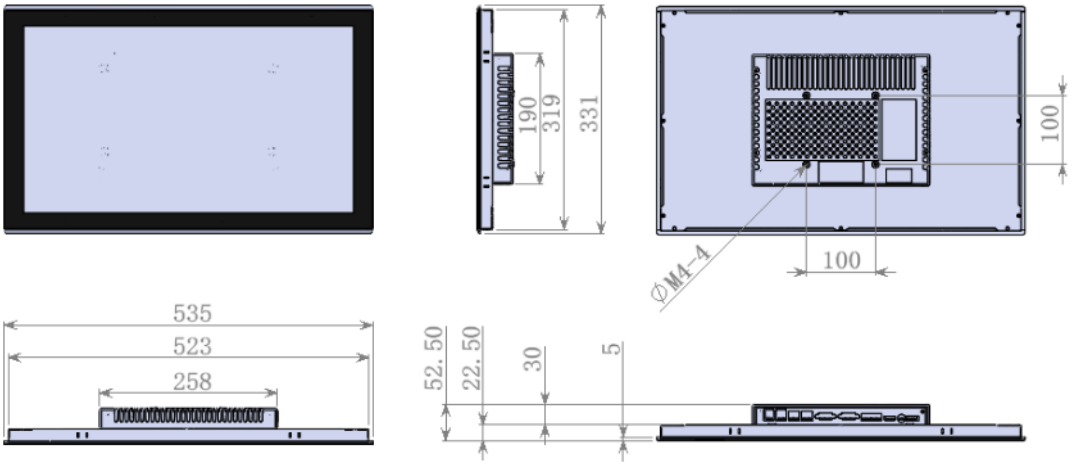
The PPC-A72-215-P Industrial Panel PC can be mounted with **panel mounting** method, enabling simplified installation onto any standard mounting fixture.

> **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-A72-215-P, the outer mechanical dimensions are 535 x 331 × 52.5mm (W x L x H).




*Mechanical Drawing* (PPC-A72-215-P)

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