Chipsee

Industrial PC

# EPC/PPC-A72-101-C

PN: CS12800R101

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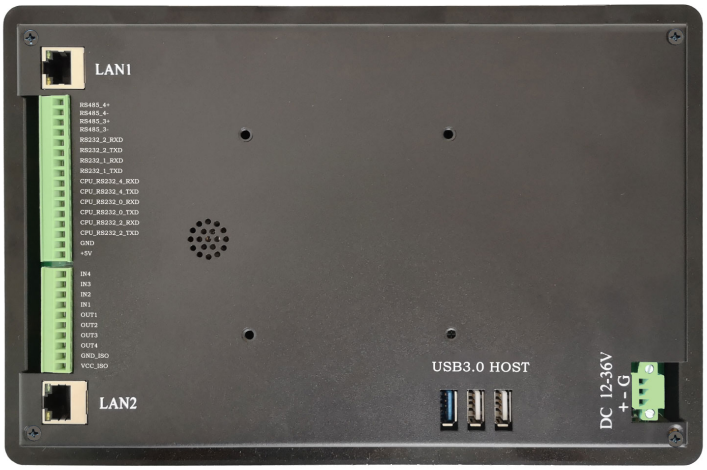
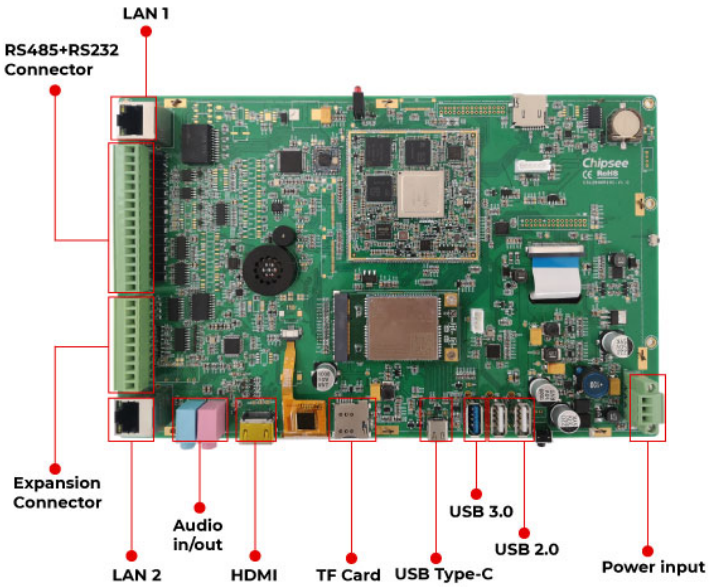
# EPC/PPC-A72-101-C

Front View




Rear View

Side View 1




Side View 2

# Product Overview

The Cortex®-A72/53 series EPC/PPC-A72-101-C (PN: CS12800R101) is a high-quality industrial panel PC. It features a 10.1” ten-point capacitive touch screen with a resolution of 1280 x 800 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 EPC/PPC-A72-101-C 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 The EPC/PPC-A72-101-C 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

* 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 `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 EPC/PPC-A72-101-C 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 EPC/PPC-A72-101-C 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.

| EPC/PPC-A72-101-C | |
|---|---|
| **CPU** | Rokchip RK3399, Dual-core Cortex-A72 (1.8GHz), Quad-core Cortex-A53 (1.4GHz) |
| **RAM** | 4GB DDR3 |
| **eMMC** | 16GB |
| **Storage** | TF Card, Supports up to 32GB SDHC |
| **Display** | 10.1" LCD, 1280 x 800, High Brightness: 250 cd/$m^2$ |
| **Touch** | 10-point capacitive touch screen |
| **USB** | 2 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 |

| EPC/PPC-A72-101-C | |
|---|---|
| **RTC** | Yes |
| **RS232** | 5 x RS2321 |
| **RS485** | 2 x RS485 (Optional 4 x RS485 at most, 1 debug port)1 |
| **GPIO** | 8 Channels |
| **WiFi/BT** | Integrated WiFi/BT Module |
| **HDMI** | 1 x HDMI |
| **4G/LTE** | Supported, Optional |
| **Power Input** | From 15V to 36V |
| **Current at 15V** | 500mA Max |
| **Power Consumption** | 7.5W Typical |
| **Working Temperature** | From -20°C to +70°C |
| **OS** | Android 7.1 |
| **Dimensions** | EPC-A72-101-C (PN: CS12800R101E): 245 x 155 x 11mm |
| | PPC-A72-101-C (PN: CS12800R101P): 280 x 185.5 x 27.5mm |
| **Weight** | EPC-A72-101-C (PN: CS12800R101E): 600g |
| | PPC-A72-101-C (PN: CS12800R101P): 1500g |
| **Mounting** | EPC-A72-101-C (PN: CS12800R101E): Embedded |
| | PPC-A72-101-C (PN: CS12800R101P): Panel |

Table 115 Key Features

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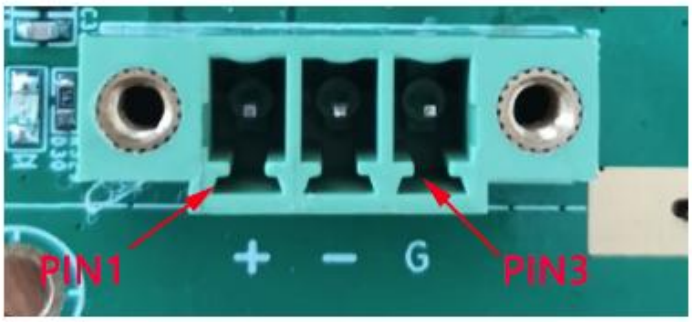
**1(1,2)**This product has 7 x UART channels in total. The default configuration is 5 x RS232 and 2 x RS485. UART can be swapped between RS232 and RS485 modes easily, so if you need different RS232/RS485 configuration, please get in touch with the Chipsee Technical Support at **support@chipsee.com**

# Power Input

The EPC/PPC-A72-101-C Industrial Panel PC can be powered by a wide range of input voltages: From 15V to 36V DC. The power input connector is a **3-pin, 3.81mm terminal**. The polarity and the pinout is clearly marked on the housing of the product as shown on the figure below.



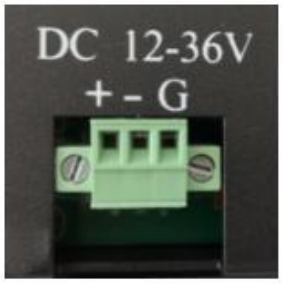




Figure 482: *Power Input*

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 116 Power Connector

**Note**

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

# Touch Screen

The EPC/PPC-A72-101-C Industrial Panel PC uses a 10-point capacitive touch screen.

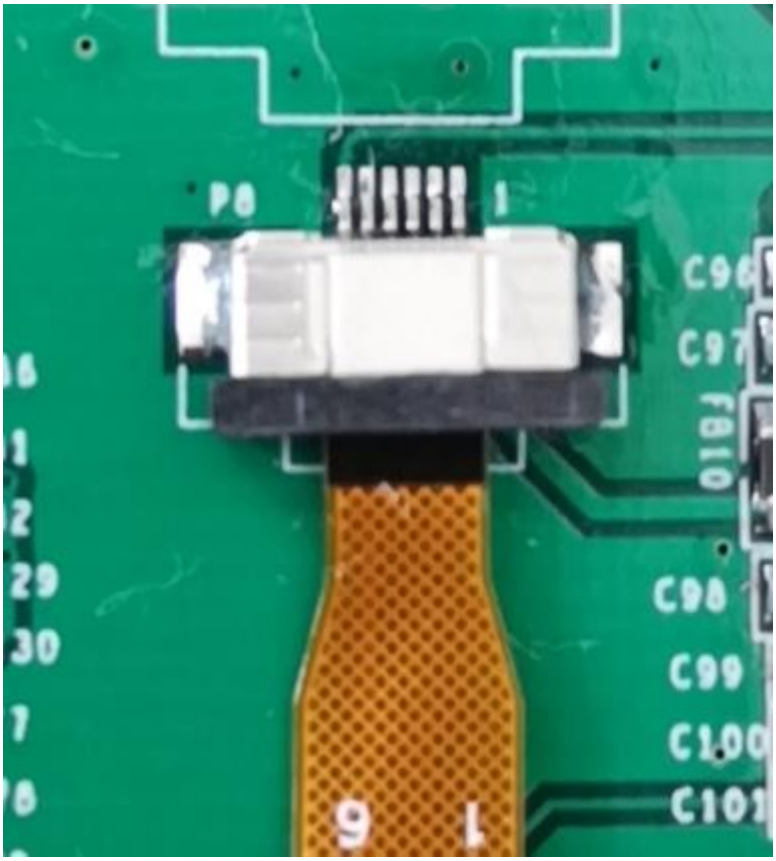



Figure 483: *Capacitive Touch Screen Connector*

**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 EPC/PPC-A72-101-C 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 problem 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 EPC/PPC-A72-101-C industrial PC. It has 2 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, and 7 x UART terminals (RS232/485).

## RS232+RS485 Connector

The serial communication interfaces (RS485 and RS232) are routed to a **16-pin 3.81mm terminal**, as illustrated in the figure below. Serial communication on both RS485 and RS232 interfaces can reach up to 115200 kbps.

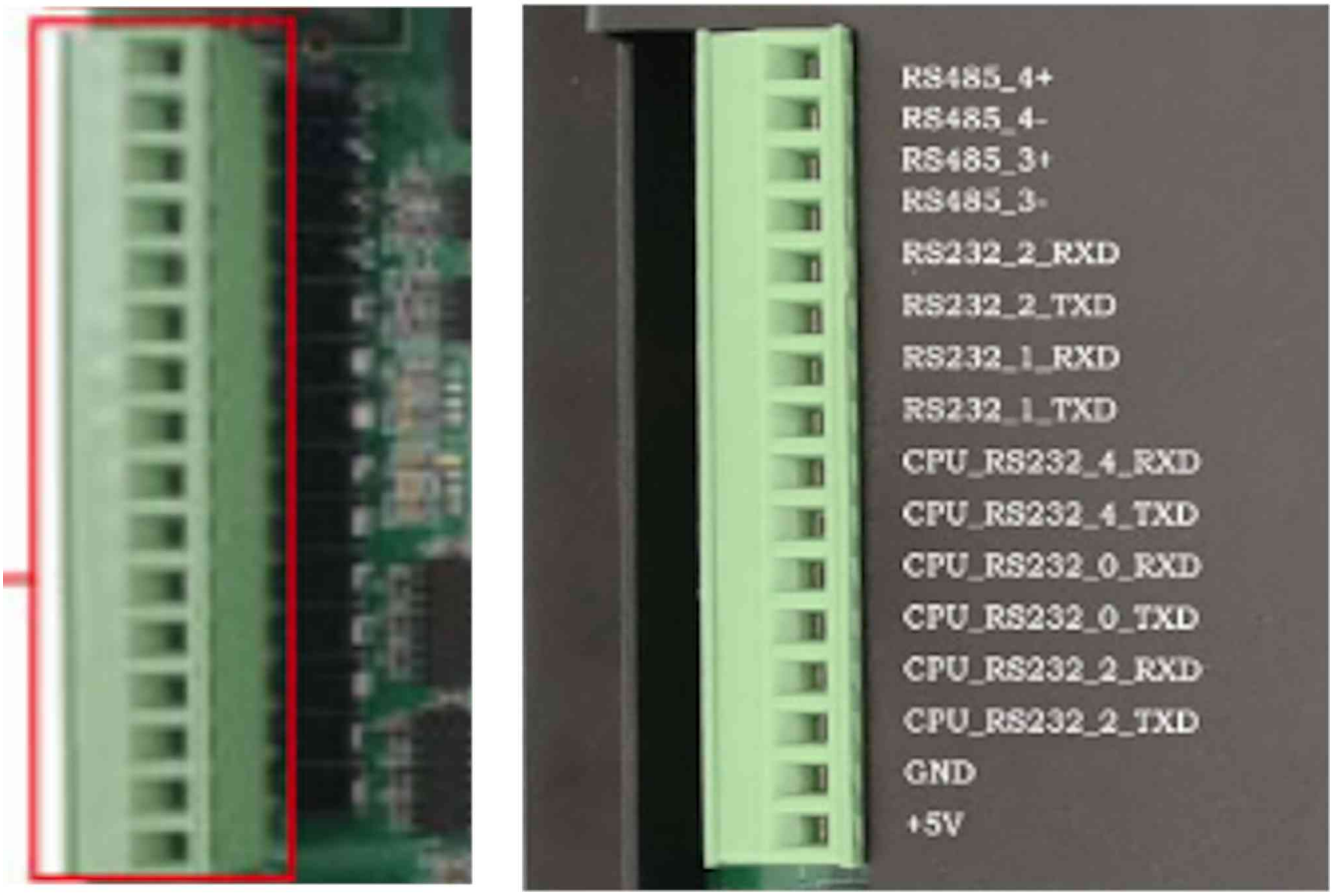



Figure 484: *Relation between serial pins on embedded vs. enclosed version*

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

| **RS232 / RS485 / CAN Pin Definition:** | | |
|---|---|---|
| **Pin Number** | **Definition** | **Description** |
| Pin 1 | RS485_4+ | USB UART4, RS485 +(A) signal |
| Pin 2 | RS485_4- | USB UART4, RS485 -(B) signal |
| Pin 3 | RS485_3+ | USB UART3, RS485 +(A) signal |
| Pin 4 | RS485_3- | USB UART3, RS485 -(B) signal |
| Pin 5 | RS232_2_RXD | USB UART2, RS232 RXD signal |
| Pin 6 | RS232_2_TXD | USB UART2, RS232 TXD signal |
| Pin 7 | RS232_1_RXD | USB UART1, RS232 RXD signal |
| Pin 8 | RS232_1_TXD | USB UART1, RS232 TXD signal |
| Pin 9 | CPU_RS232_4_RXD | CPU UART4, CPU RS232 RXD signal |
| Pin 10 | CPU_RS232_4_TXD | CPU UART4, CPU RS232 TXD signal |
| Pin 11 | CPU_RS232_0_RXD | CPU UART0, CPU RS232 RXD signal |
| Pin 12 | CPU_RS232_0_TXD | CPU UART0, CPU RS232 TXD signal |

| RS232 / RS485 / CAN Pin Definition: | | |
|---|---|---|
| Pin 13 | CPU_RS232_2_RXD | CPU UART2, CPU RS232 RXD signal |
| Pin 14 | CPU_RS232_2_TXD | CPU UART2, CPU RS232 TXD signal |
| Pin 15 | GND | System Ground |
| Pin 16 | +5V | System 5V output, up to 1A |

Table 117 Connectivity Section

## USB Connectors

There are 4 x **USB HOST connectors** onboard which includes 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, and 1 x USB Type-C, as shown in the figures below.

Figure 485: *USB 2.0 HOST Connectors (embedded/enclosed PC version)*

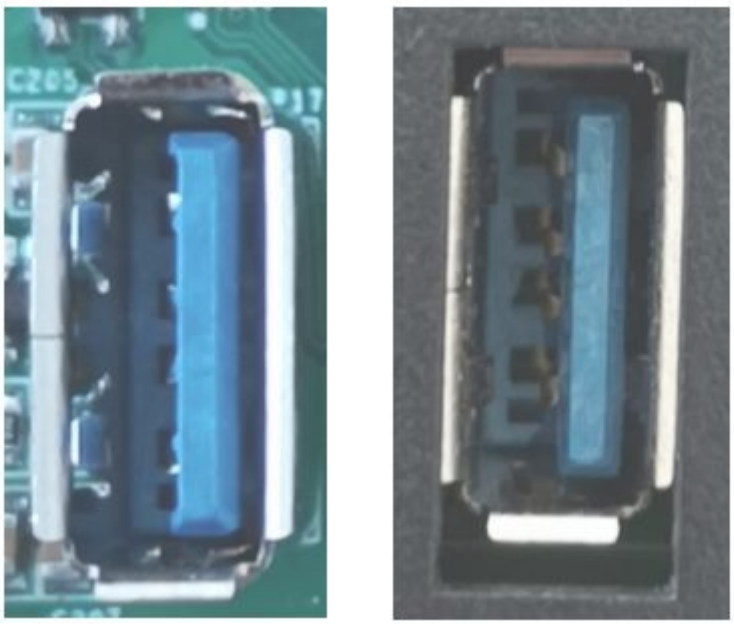


Figure 486: *USB 3.0 HOST Connectors (embedded/enclosed PC version)*

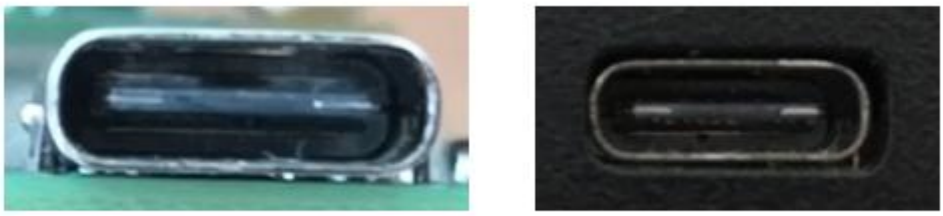


Figure 487: *USB Type-C Connector (embedded/enclosed PC version)*

**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 the figure below. The integrated Ethernet interface supports up to 1 Gbps data throughput.

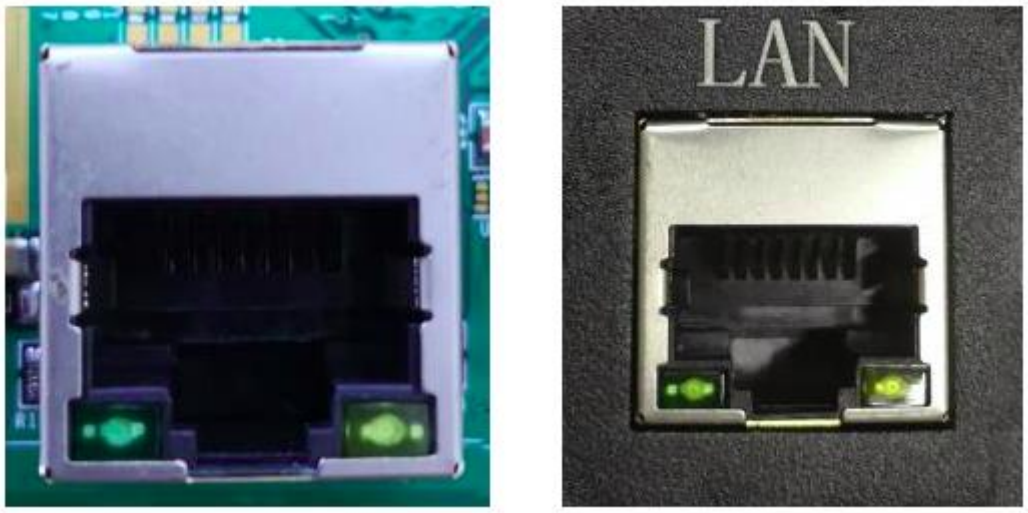



Figure 488: *RJ45 LAN Connector*

**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 EPC/PPC-A72-101-C 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).

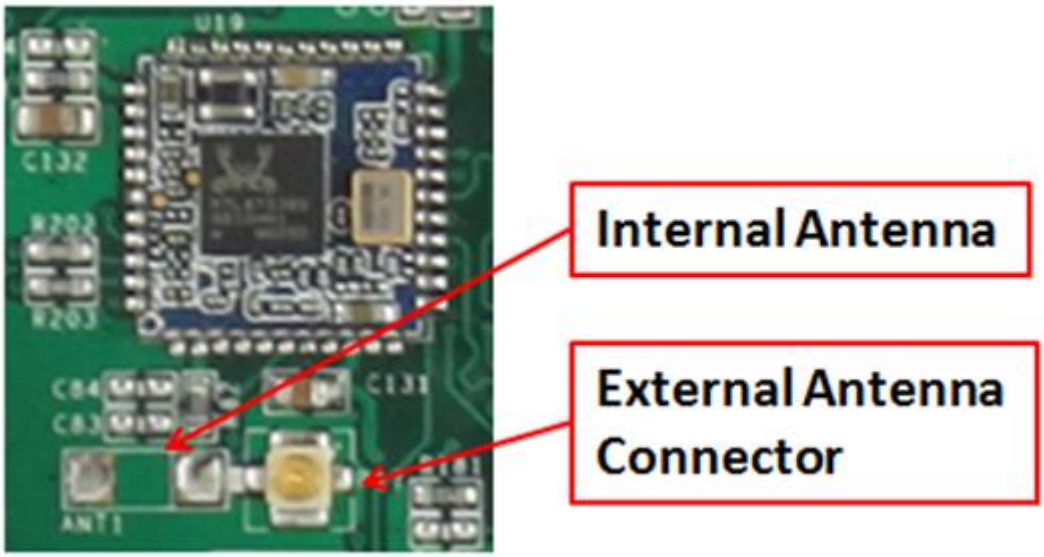



Figure 489: *RTL8273 WiFi/BT Module*

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

Figure 490: *WiFi+BT Antenna*

## 4G/LTE Module

The EPC/PPC-A72-101-C 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 EPC/PPC-A72-101-C.

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

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

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

## GPIO Port

The EPC/PPC-A72-101-C Industrial Panel PC has a 10 Pin 3.81mm **GPIO Connector**, as shown on the figure below, that is labeled as P18 on the PCB. The table below gives details about the definition of every Pin.

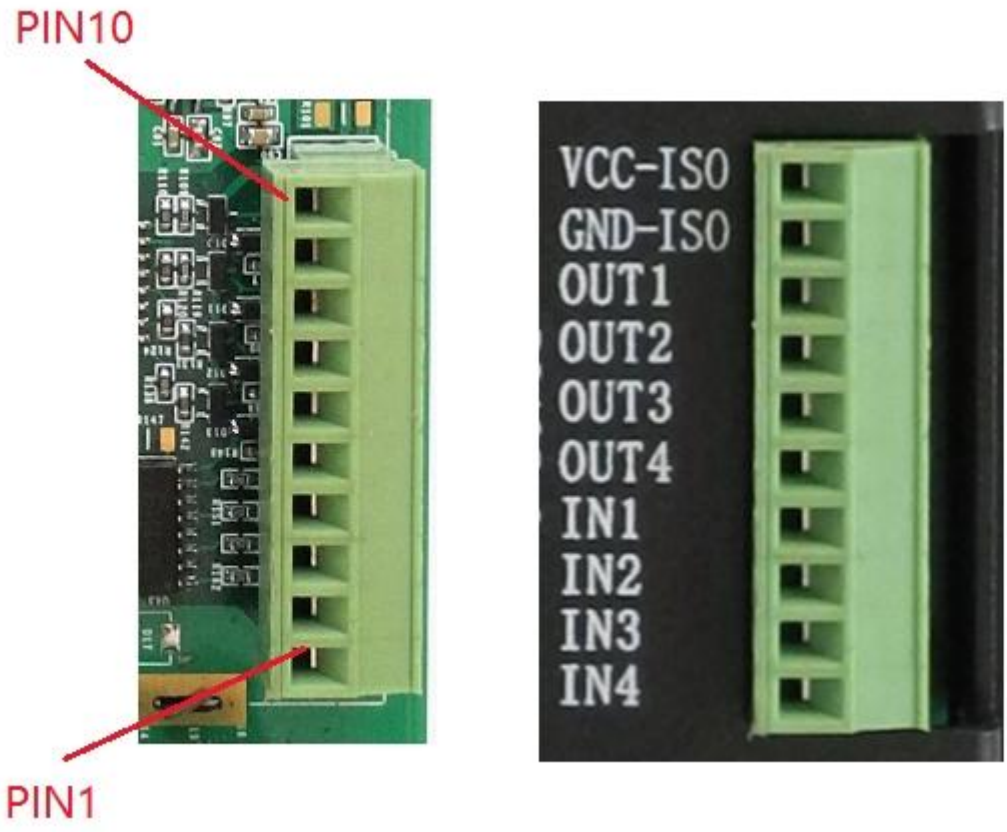
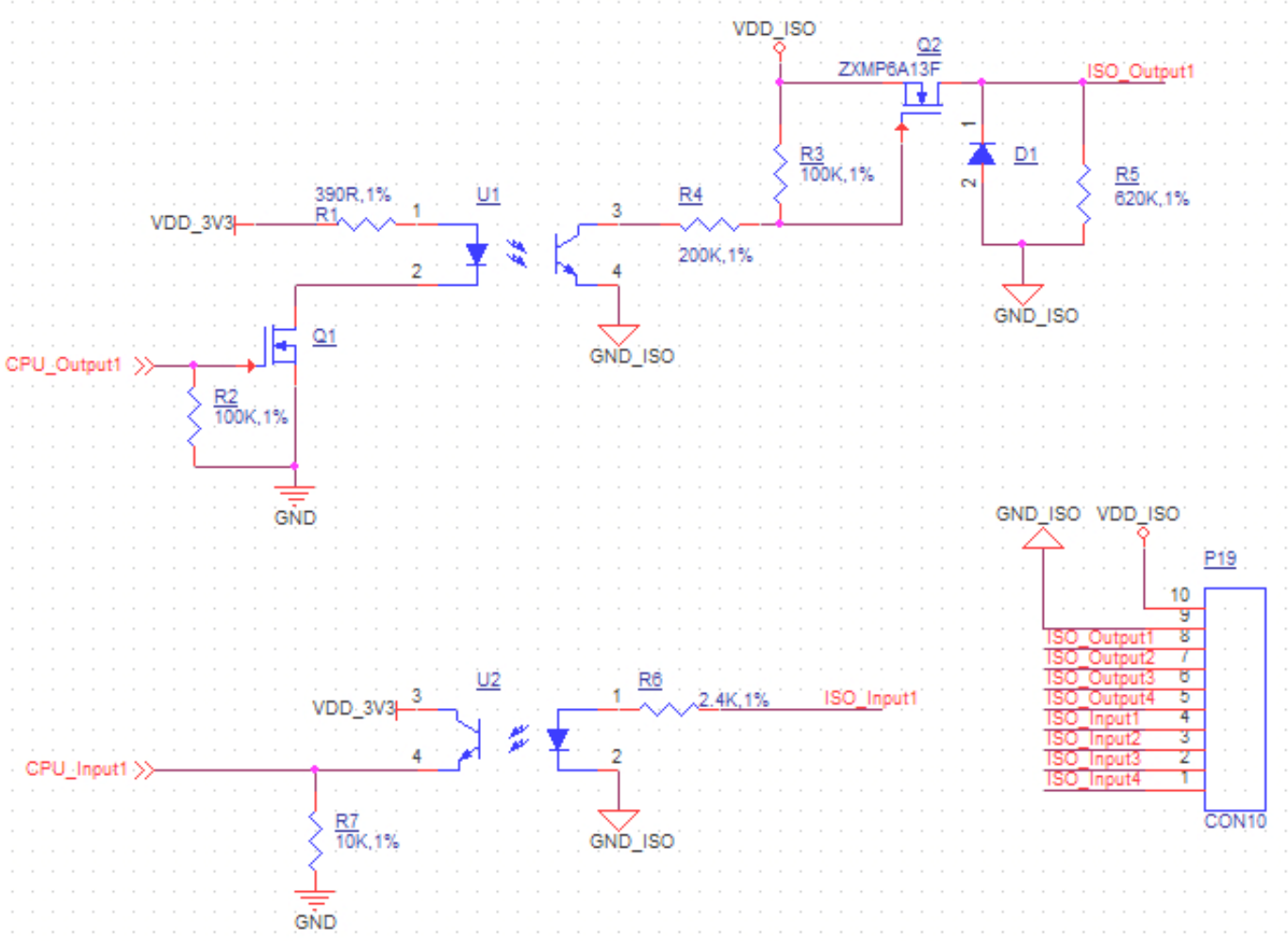



Figure 493: *GPIO Connector*



*Isolated GPIO reduced schematic*

| GPIO Connector Pin Definition: | | |
|---|---|---|
| **Pin Number** | **Definition** | **Description** |
| Pin 10 | VCC_ISO | Isolated Power +5V Output |
| Pin 9 | GND_ISO | Isolated Ground |
| Pin 8 | OUT1 | Isolated Output 1 |
| Pin 7 | OUT2 | Isolated Output 2 |
| Pin 6 | OUT3 | Isolated Output 3 |
| Pin 5 | OUT4 | Isolated Output 4 |
| Pin 4 | IN1 | Isolated Input 1 |
| Pin 3 | IN2 | Isolated Input 2 |
| Pin 2 | IN3 | Isolated Input 3 |
| Pin 1 | IN4 | Isolated Input 4 |

Table 118 GPIO Connector Pin-out

**Attention**

- The GPIO Connector is optional.You can **Contact us** if you need it.
- The GPIO has been Opt-Isolated and it uses the 5V Logic by default. 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.

# TF Card Slot

The EPC/PPC-A72-101-C Industrial Panel PC features 1 x **TF Card (micro SD) slot**. It can address up to 128GB of memory.

Figure 494: *TF (micro SD) Card Slot*

**Note**

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

## Audio Connectors

The EPC/PPC-A72-101-C Industrial Panel PC features some audio peripherals, as well. It has 1 x **3.5mm audio input jack** and 1 x **3.5mm audio output jack**.

The pink connector is the audio input jack (line-in) and the blue connector is the audio output jack (line-out, typically around -10 dBV) as shown on the figure below.

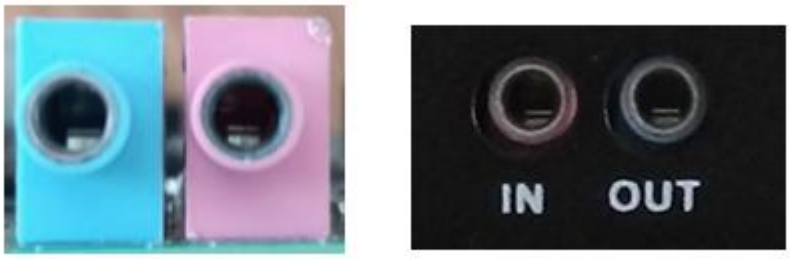



Figure 495: *Audio I/O (embedded/enclosed PC version)*

In addition, EPC/PPC-A72-101-C features a miniature 2W embedded speaker for audio reproduction, as well as a small buzzer for alarm/notification sounds.

Figure 496: *2W Micro Speaker and Buzzer*

## HDMI Connector

The EPC/PPC-A72-101-C Industrial Panel PC is equipped with 1 x **HDMI connector**. The HDMI connector allows connecting an additional (external) monitor. HDMI output resolution can be configured by the software.

Figure 497: *HDMI Connector*

# Power Button

The EPC/PPC-A72-101-C 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.

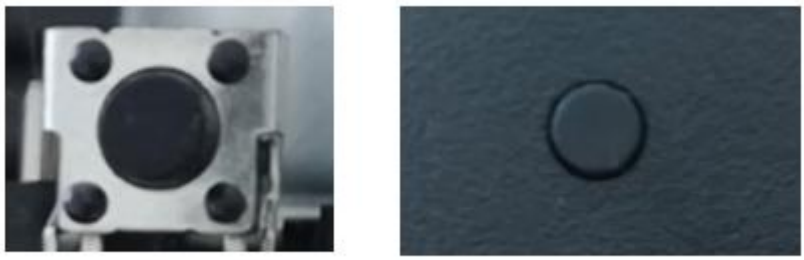


Figure 498: *Power Button*

# Mounting Procedure

The EPC/PPC-A72-101-C Industrial Panel PC can be mounted with 8 x M4 screws, enabling simplified installation onto any standard mounting fixture. Other mounting options might also be supported according to the table in the Hardware Features section.

## EPC-A72-101-C

You can mount EPC-A72-101-C with the Embedded mounting method, as shown on the figure below.

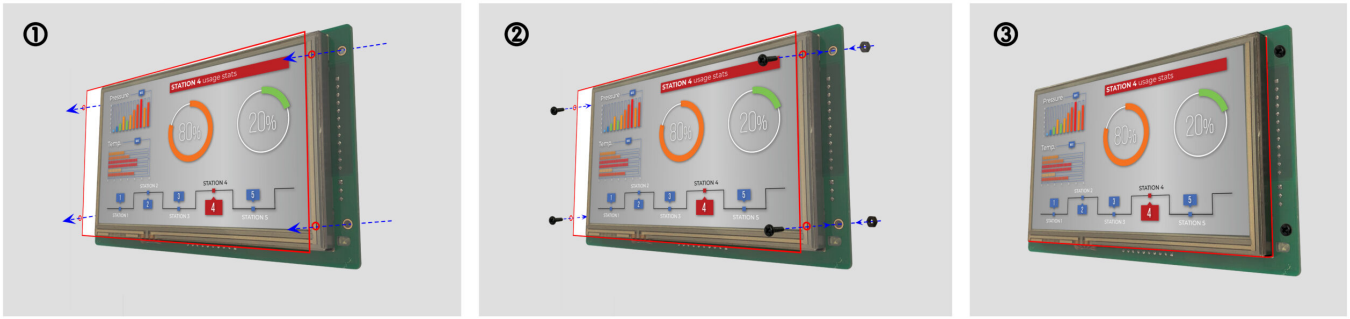



Figure 499: *Embedded mounting*

## PPC-A72-101-C

You can mount PPC-A72-101-C with the Panel mounting methods, as shown on the figure below.

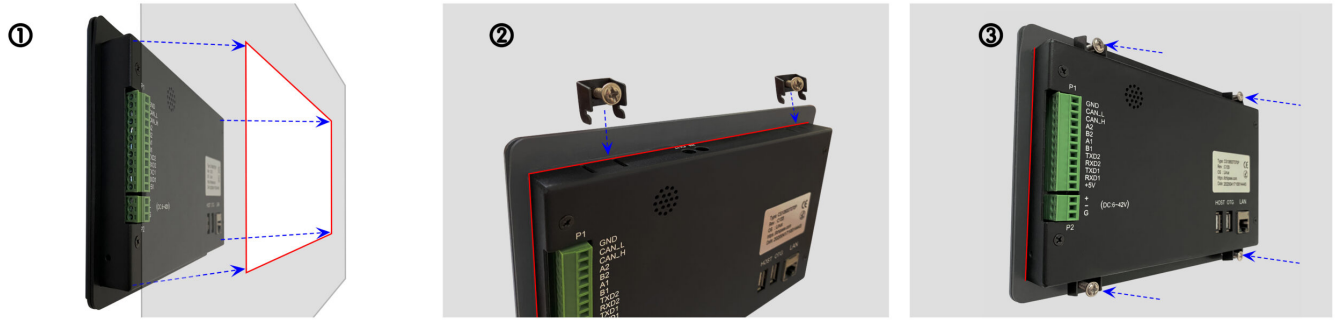



Figure 500: *Panel mounting*

**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

## EPC-A72-101-C

The outer mechanical dimensions of EPC-A72-101-C are 245 x 155 x 11mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.

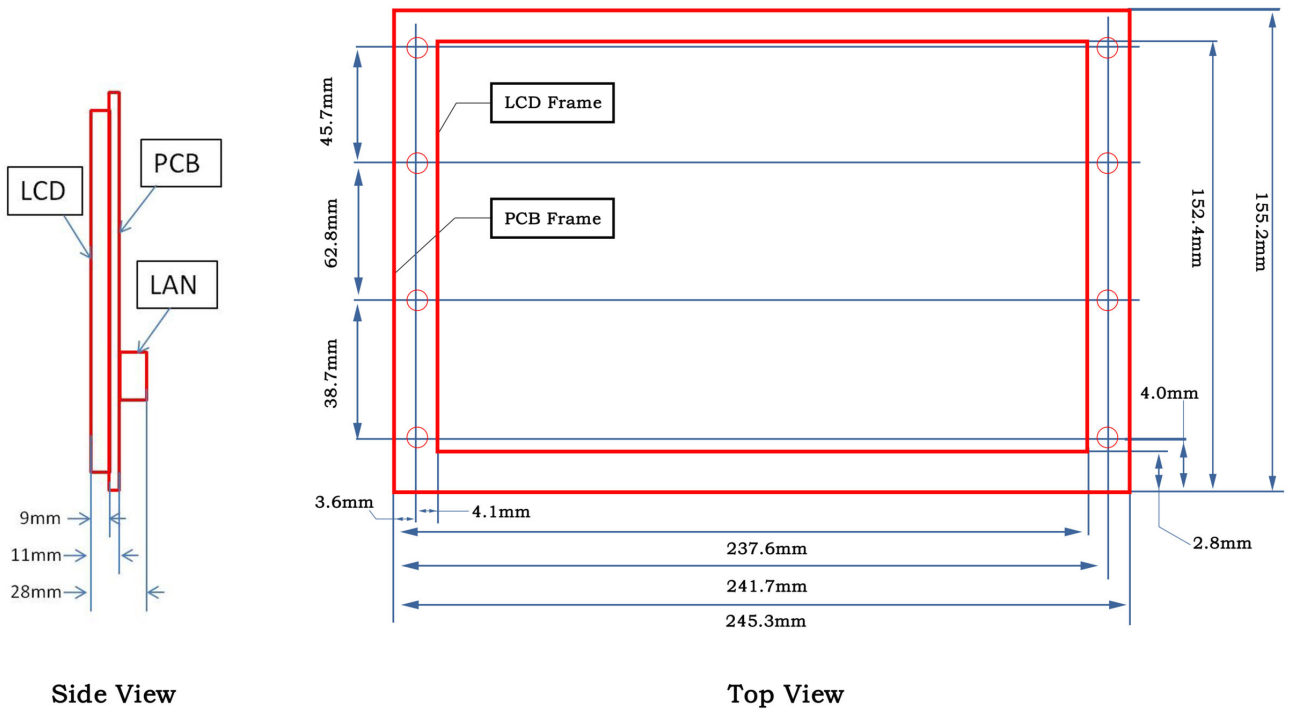



Figure 501: EPC-A72-101-C *Technical Drawing*

## PPC-A72-101-C

For PPC-A72-101-C, the outer mechanical dimensions are 280 x 185.5 x 27.5mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.

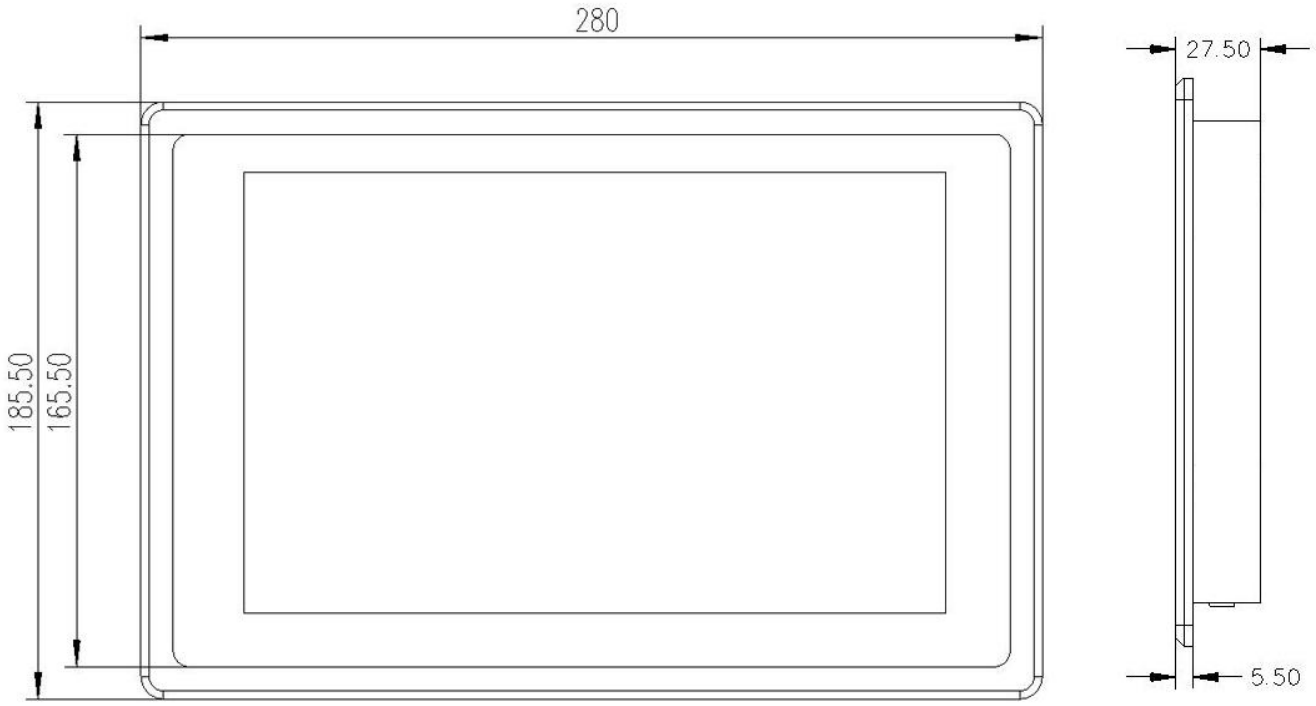



Figure 502: PPC-A72-101-C *Technical Drawing*

**Caution**

- When you use product EPC-A72-101-C, you should not touch the circuit board on the back of the product if the product is powered ON.
- Also, when the product is powered OFF, please take anti-static measures before touching the circuit board.

# 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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