Chipsee

Industrial PC

# EPC/PPC-A8-050-C

PN: CS80480T050

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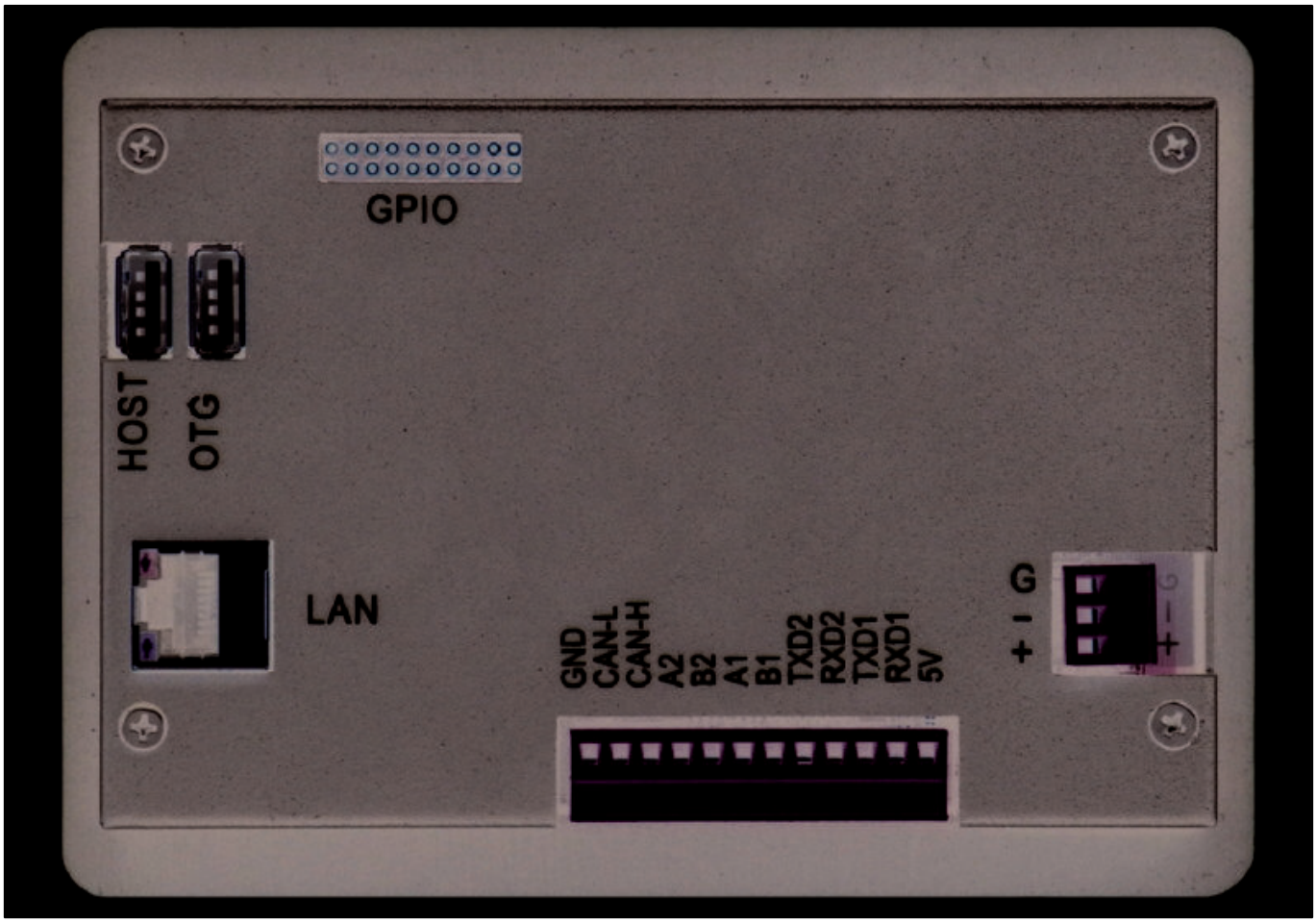
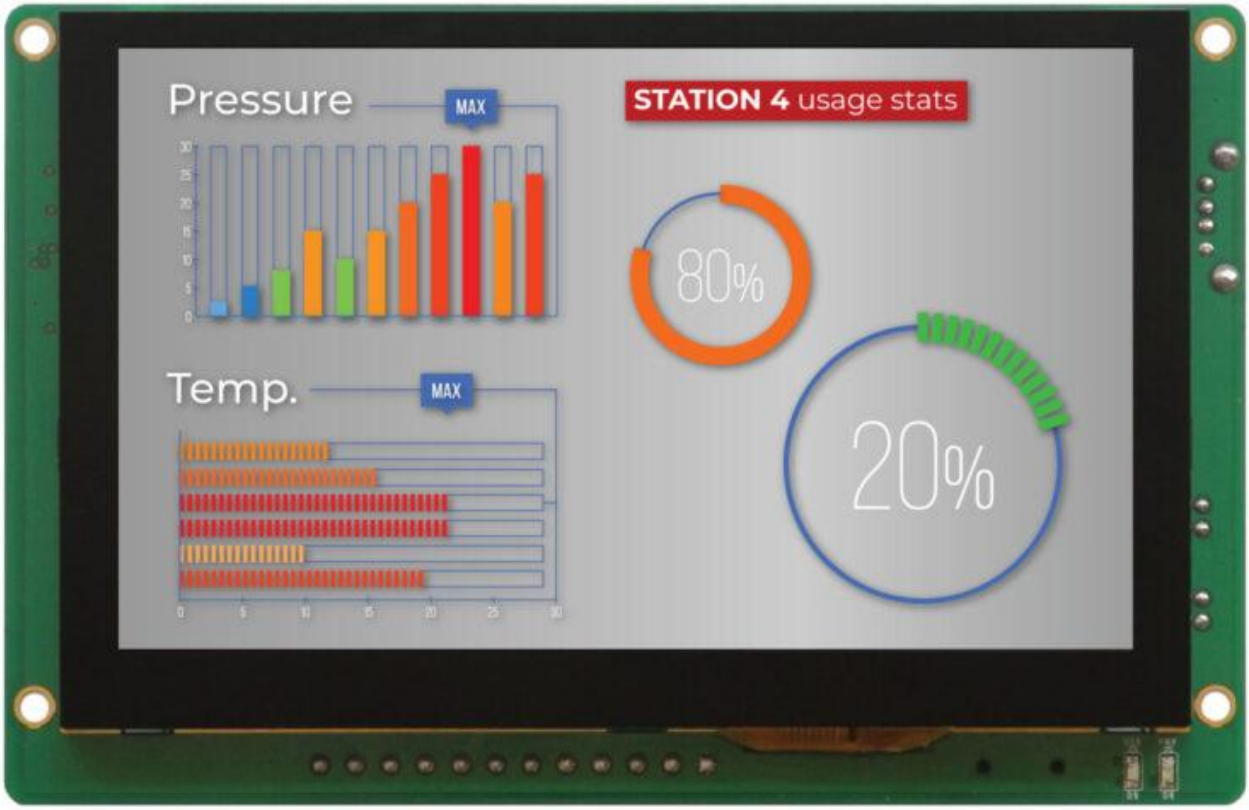
# EPC/PPC-A8-050-C

## Front View

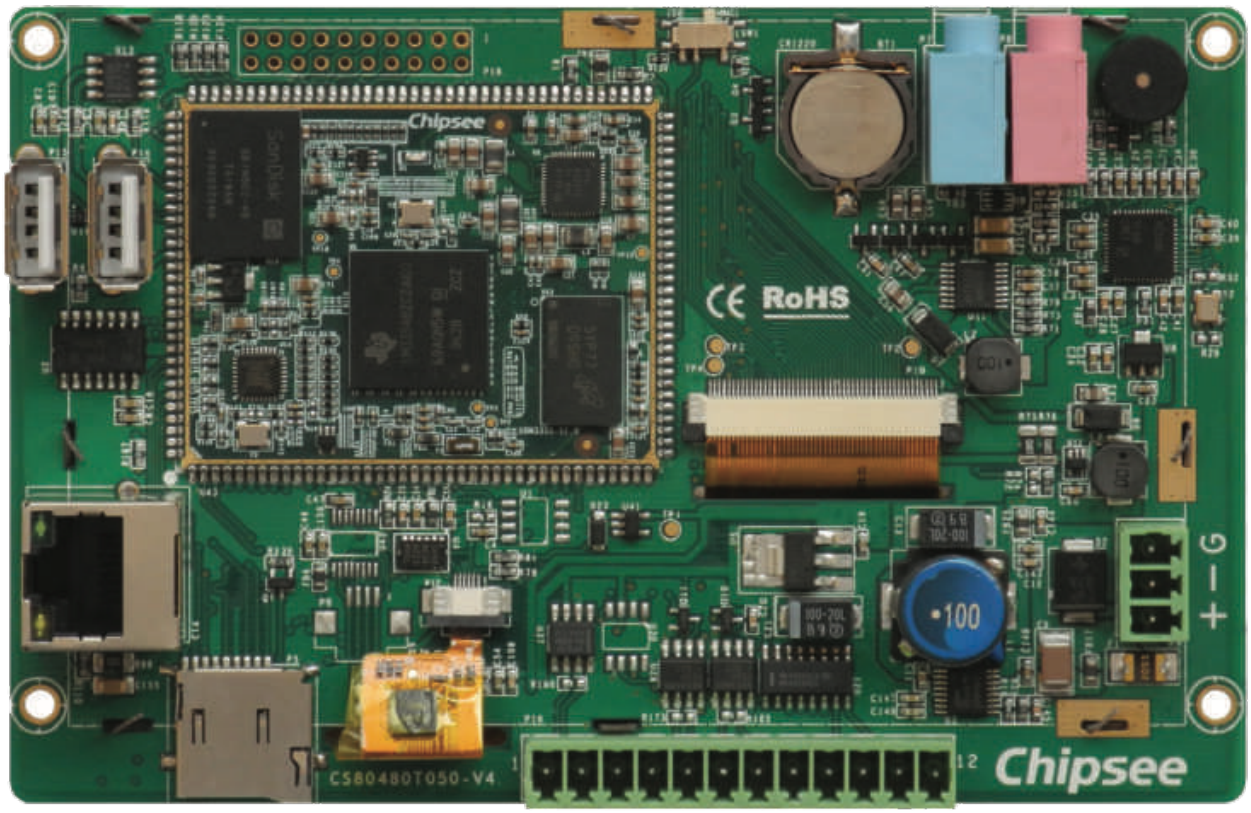
# Rear View


GPIO
HOST
OTG
LAN
GND
CAN-L
CAN-H
A2
B2
A1
B1
TXD2
RXD2
TXD1
RXD1
5V
G
-
+

# Front View (Embedded Variant)



# Rear View (Embedded Variant)



# Product Overview

The Cortex®-A8 series EPC/PPC-A8-050-C (PN: CS80480T050) is a high-quality industrial PC. This single board computer features a 5.0” ten-point capacitive and resistive touch screen with a resolution of 800 x 480 pixels and brightness of 250 cd/$m^2$.

Key Applications

- Human Machine Interface  HMI
- Process Control
- Process Monitoring
- HMI
- Infotainment
- Predictive Maintenance
- Machine Learning
- Machine Vision
- Automotive applications
- Gaming...

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-A8-050-C Industrial PC is based around the powerful CS-SOM335X-V3 System on Module (SoM), powered by the AM3354 Arm® Cortex®-A8 microprocessor unit (MPU). The AM33554 MPU is enhanced with image, graphics processing, peripherals and industrial interface options such as EtherCAT and PROFIBUS. The devices support high-level operating systems (HLOS).

The microprocessor unit (MPU) subsystem is based on the ARM Cortex-A8 processor and the PowerVR SGX™ Graphics Accelerator subsystem provides 3D graphics acceleration to support display and gaming effects.

The AM33554 MPU does not generate extensive heat, so even the thin aluminum housing on PPC version delivers sufficient thermal dissipation.

# 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 EPC/PPC-A8-050-C 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.

- Android 4.1
- Linux with Qt 4.8
- Linux with Qt 5.5
- Debian 7.4
- Debian 8.4
- Angstorm v2012.12

> **Warning**
>
> The Software Documentation section provides a detailed instruction how to install different OS 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-A8-050-C Industrial PC does not include WiFi/BT and/or 3G/4G modules by default. These modules are 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-A8-050-C Industrial PC offers a board 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.

| EPC/PPC-A8-050-C | |
|---|---|
| **CPU** | AM3354ZCZ100, Arm® Cortex®-A8, 1GHz |
| **RAM** | 512MB DDR3 |
| **eMMC** | 4GB |
| **Storage** | TF Card, Supports up to 32GB SDHC |
| **Display** | 5.0” LCD, 800 x 480 resolution px, brightness 250 cd/m$^2$ |
| **Touch** | 10-point capacitive and resistive touch |
| **USB** | 1 x USB 2.0 Host, 1 x USB OTG |
| **LAN** | 1 x Channel 100M LAN |
| **Audio** | 3.5mm Audio In/Out Connector |
| **Buzzer** | Yes |
| **RTC** | Yes |
| **RS232** | 2 x RS232 |
| **RS485** | 2 x RS4851 |
| **CAN** | 1 x CAN1 |
| **GPIO** | 8 Channels |
| **WiFi/BT** | USB WiFi (optional) |
| **Expansion Port** | 1 x 20-pin (PCB Footprint) |
| **3G/4G/LTE** | N/A |
| **Power Input** | From 6V to 36V |
| **Current at 12V** | 400mA Max |
| **Power Consumption** | 3.5W Typical |
| **Working Temperature** | From -20°C to +70°C |
| **OS** | Multiple Choices (Operating System) |
| **Dimensions** | EPC-A8-050-C (PN: CS80480T050E): 134.2 x 86.82 x 28mm |
| | PPC-A8-050-C (PN: CS80480T050P): 150 x 110 x 26.5mm |
| **Weight** | EPC-A8-050-C (PN: CS80480T050E): 210g |
| | PPC-A8-050-C (PN: CS80480T050P): 440g |

| EPC/PPC-A8-050-C | |
|---|---|
| **Mounting** | EPC-A8-050-C (PN: CS80480T050E): Embedded |
| | PPC-A8-050-C (PN: CS80480T050P): Panel |

Table 234 Key Features

**1(1,2)**The RS485 and CAN channels may be customized to the following arrangement:

- 2 x RS485, 1 x CAN (Default)
- 1 x RS485, 2 x CAN

# Power Input

The EPC/PPC-A8-050-C Industrial PC can be powered by a wide range of input voltages: From 6V 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 PPC version, as well as on the PCB itself of the EPC version, as shown in the figure below.

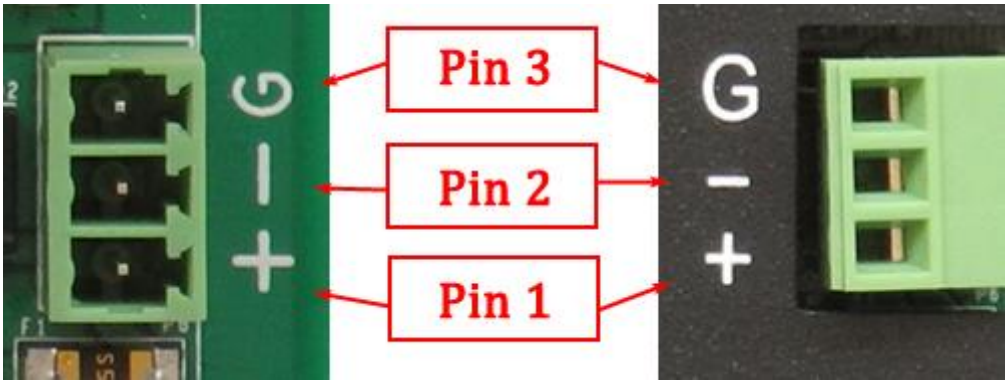



Figure 670: *Power Input (embedded/enclosed version)*

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 235 Power Connector

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

# Touch Screen

The EPC/PPC-A8-050-C Industrial PC uses a 10-point capacitive and resistive touch screen. The figure below shows the capacitive or resistive screen connected to the motherboard via the **FPC connector**.

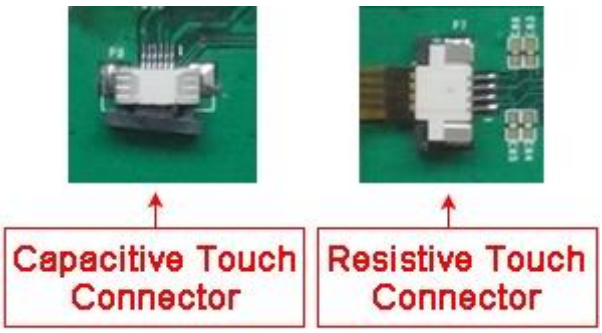



Figure 671: *Capacitive or Resistive Touch Connector*

**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 EPC/PPC-A8-050-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-A8-050-C industrial PC. It has 1 x USB 2.0 Host, 1 x USB OTG (can be customized to 2 x Host), 1 x Channel 100M LAN (RJ45) Ethernet connector supporting up to 1 Gbps, and 5 x UART terminals (RS232/RS485).

## RS232/RS485/CAN

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

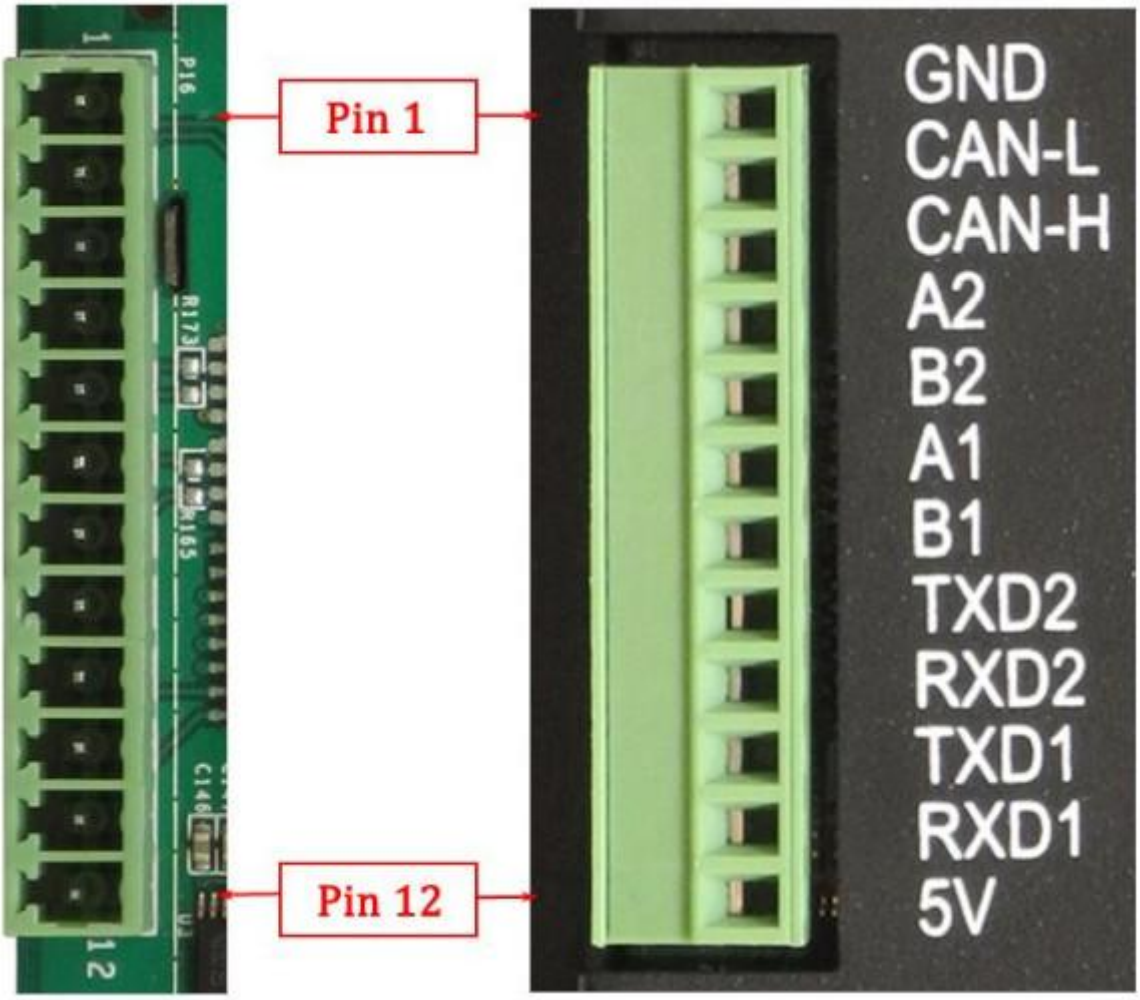



Figure 672: *Relation between serial pins on embedded vs. enclosed version of the* EPC/PPC-A8-050-C *Industrial PC*

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

| **RS232 / RS485 / CAN Pin Definition:** | | |
|---|---|---|
| **Pin Number** | **Definition** | **Description** |
| Pin 12 | +5V | Isolated +5V Power Output, No more than 200mA Current output |

| RS232 / RS485 / CAN Pin Definition: | | |
|---|---|---|
| Pin 11 | RXD1 | UART0 of CPU, RS232 RXD Signal |
| Pin 10 | TXD1 | UART0 of CPU, RS232 TXD Signal |
| Pin 9 | RXD2 | UART1 of CPU, RS232 RXD Signal |
| Pin 8 | TXD2 | UART1 of CPU, RS232 TXD Signal |
| Pin 7 | B1 | UART2 of CPU, RS485 B Signal |
| Pin 6 | A1 | UART2 of CPU, RS485 A Signal |
| Pin 5 | B2 | UART4 of CPU, RS485 B Signal |
| Pin 4 | A2 | UART4 of CPU, RS485 A Signal |
| Pin 3 | CAN_H | DCAN0 of CPU, CAN H Signal |
| Pin 2 | CAN_L | DCAN0 of CPU, CAN L Signal |
| Pin 1 | GND | Isolated Ground Output |

Table 236 Connectivity Section

## USB Connectors

There are 2 x Type A **USB HOST connectors** onboard, as shown on the figure below.

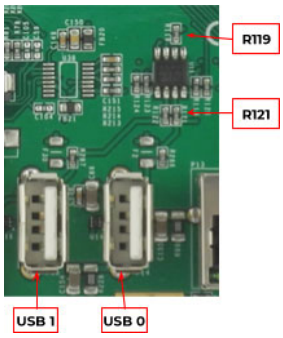



Figure 673: *USB HOST Connectors (embedded/enclosed PC version)*

**Note**

The OTG Connector is defined as HOST by default. If customer needs it work as OTG (slave), please solder a 0Ω 0603 Package Resistor to **R119** and **R121** as shown in the above.

**Warning**

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

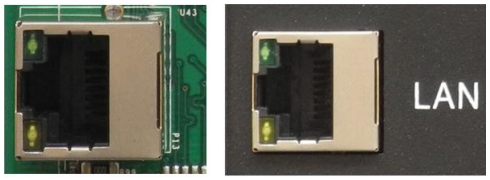



Figure 674: *RJ45 LAN Connectors (embedded/enclosed PC version)*

**Note**

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

## Expansion Port

The EPC/PPC-A8-050-C Industrial PC has 1 x **Expansion Port** as shown on the figure below. It is an unpopulated PCB footprint with the standard 2.54mm (1”) pitch holes. The Expansion Port provides direct access to some of the processor pins, as described in the table below.

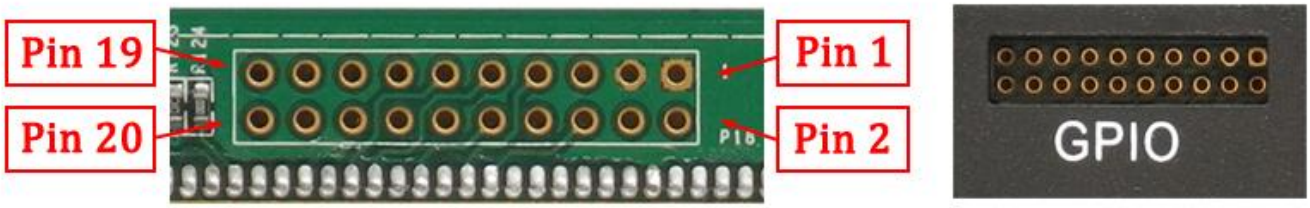



Figure 675: *Expansion Port*

| Expansion Connector Pinout | | | | | |
|---|---|---|---|---|---|
| **PIN** | **Function** | **CPU PIN** | **PIN** | **Function** | **CPU PIN** |
| 1 | GND | Power Ground | 2 | VDD_5V0 | +5V Power |
| 3 | GND | Power Ground | 4 | VDD_3V3 | +3.3V Power |
| 5 | GPMC_A1 | V14 | 6 | GPMC_A3 | T14 |
| 7 | GPMC_A2 | U14 | 8 | GPMC_A5 | V15 |
| 9 | GPMC_A4 | R14 | 10 | GPMC_A7 | T15 |
| 11 | GPMC_A6 | U15 | 12 | GPMC_A8 | V16 |
| 13 | SPI0_D1 | B16 | 14 | SPI0_D0 | B17 |
| 15 | SPI0_CS0 | A16 | 16 | SPI0_CLK | A17 |
| 17 | AIN4 | C8 | 18 | AIN5 | B8 |
| 19 | AIN6 | A8 | 20 | AIN7 | C9 |

Table 237 Expansion Connector Pinout

**Warning**

Since the PCB traces of the port are connected to the processor directly, be careful not to cause electrostatic discharge or over voltage on the pins, as it may damage the processor. Take all the necessary precautions while working with electrostatic-sensitive equipment.

# TF Card Slot

The EPC/PPC-A8-050-C Industrial PC features 1 x **TF Card (micro SD) slot**. It can address up to 32GB of memory.

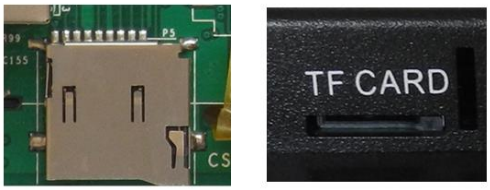



Figure 676: *TF (micro SD) Card Slot*

**Note**

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

# Audio Connectors

The EPC/PPC-A8-050-C Industrial PC features some audio peripherals, as well. It has 1 x **3.5mm audio input jack** and 1 x **3.5mm audio output jack**.

On the embedded panel PC version, 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). On the enclosed panel PC version, both audio input and audio output are clearly marked on the figure below.

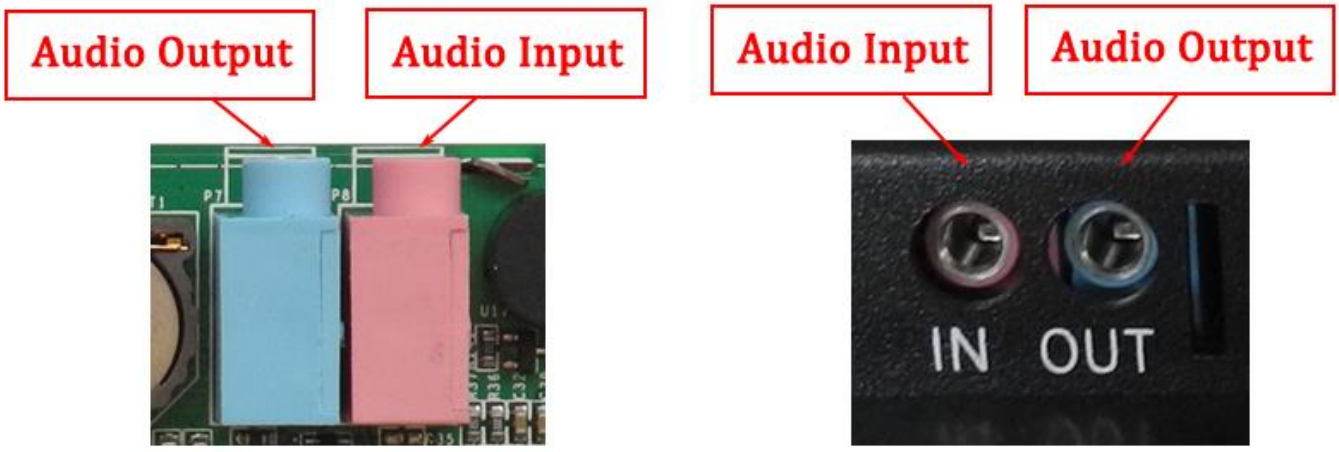



Figure 677: *Audio I/O (embedded/enclosed PC version)*

# Boot DIP Switch

The EPC/PPC-A8-050-C Industrial PC supports boot from SD card. If you want to reflash the Operating System (OS), you can use the TF card for that purpose, combined with the **DIP switch** settings as illustrated in the figure below.

There is no need to alter the DIP switch settings during regular operation. However, if you need to reinstall the OS, please refer to the table below. Detailed information on how to re-flash the OS can be found in the Software Documentation.

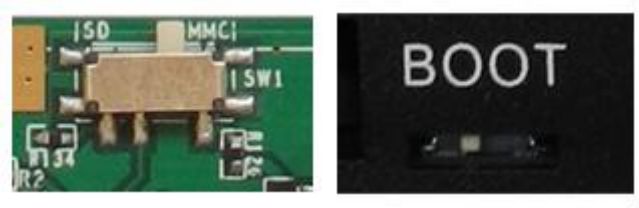



Figure 678: *Boot DIP Switch*

| Boot Config Select | | | | |
|---|---|---|---|---|
| **DIP SW** | **1** | **2** | **3** | **4** |
| **SD** | 1 | 0 | 0 | 0 |
| **eMMC** | 1 | 1 | 0 | 1 |
| **Download** | 0 | 1 | 1 | 0 |

Table 238 Boot Configuration Selection

# Mounting Procedure

The EPC/PPC-A8-050-C Industrial PC can be mounted with 4 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.

You can find detailed information about mounting in the Mount IPC Guide.

# Mechanical Specifications

## EPC-A8-050-C

The outer mechanical dimensions of EPC-A8-050-C are 134.2 x 86.82 x 28mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.

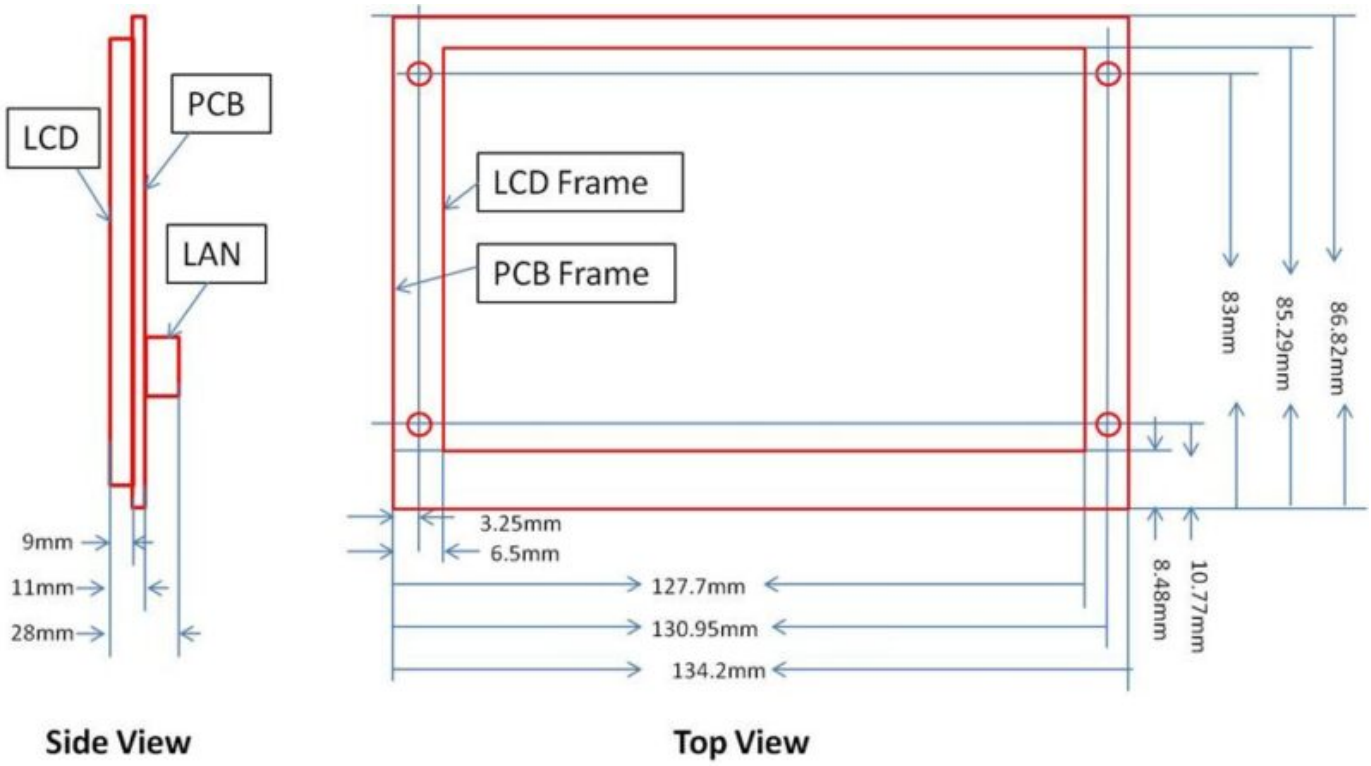



Figure 679: EPC-A8-050-C *Technical Drawing*

## PPC-A8-050-C

For PPC-A8-050-C, the outer mechanical dimensions are 150 x 110 x 26.5mm (W x L x H).

## Panel Mounting

Figure 680: *Fixing* PPC-A8-050-C *industrial PC into panel*

**Note**

With the PPC-A8-050-C industrial PC, the operator can fix the PC into the panel by pushing it from the front inside the panel as described in the figure above. The recommended maximum thickness of the panel material is 8mm.

1. Make sure the Panel PC is configured correctly. The Boot Switch is sitting inside the housing. To use it, the Panel PC has to be unmounted from the panel.
2. Push the Panel PC straight into the Panel Hole until the unit sits flat on the panel as shown in the figure above.
3. Use the mounting fixtures to lock the Panel PC into it's place.

# 3D Model

EPC/PPC-A8-050-C 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 EPC/PPC-A8-050-C, select hardware documentation, drag the navigation bar to the 3D Model section.

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