

Industrial PC

EPC/PPC-A7-070HB-C



PN: CS10600U070

Revision 1.1

www.chipsee.com

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EPC/PPC-A7-070HB-C



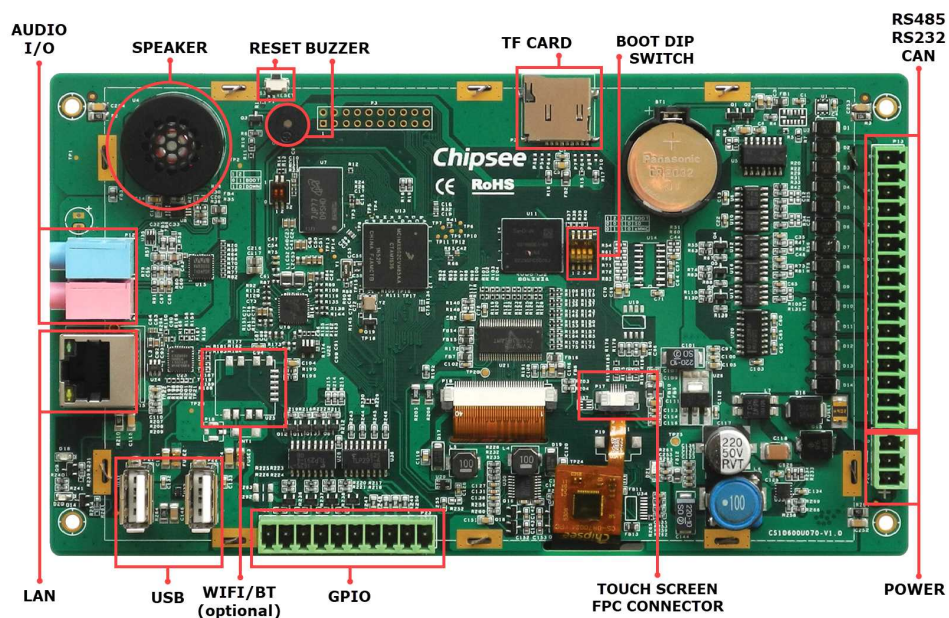
Front View



Rear View



Front View (Embedded Variant)



Rear View (Embedded Variant)

Product Overview

The Cortex[®]-A7 series EPC/PPC-A7-070HB-C (PN: CS10600U070) is a rugged, high-quality industrial panel PC. It features a 7.0" multi-point capacitive touch screen with a resolution of 1024 x 600 pixels.

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 housed in an aluminum casing with bezels, thus facilitating different installation options:

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

The EPC/PPC-A7-070HB-C Industrial Panel PC offers a very low power consumption, despite its high-speed processing capabilities. It is powered by the i.MX6UL Arm® Cortex®-A7, an ultra-low power Application Processor Unit (APU) from NXP, running at up to 528 MHz.

This product also features a broad range of connectivity options, providing a high level of scalability for various use cases. It is the perfect solution for power-constrained applications on the Edge, acting as a robust control unit for collecting, processing, and aggregating field data. The i.MX6Q APU is part of NXP's EdgeVerse™ edge computing platform.

The NXP i.MX6UL APU does not generate extensive heat, so even the thin aluminum housing on PPC version delivers sufficient thermal dissipation. With its junction temperature from -20 to +140°C, the APU itself is well suited for extended temperature range in both automotive and factory environments.

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-A7-070HB-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. It supports Linux Qt5.5 and Debian 8.10, which can be obtained from the [Software Documentation](#) section, along with the detailed installation instructions.

Warning

The Software Documentation provides a detailed instruction how to install different OS on your own. However, bear in mind that Chipsee cannot take the responsibility of inadequate installation procedure. If you “brick” your device, please contact Chipsee Technical Support at support@chipsee.com and ask for help

Optional Features

By default The EPC/PPC-A7-070HB-C Industrial Panel PC does not include 3G/4G module. However, the Wi-Fi/BT module is optional and can be pre-installed during the ordering process, as per request. Note that enclosed version of the A7-70HB-C (PPC-A7-70HB) comes with a specially designed hole for mounting a standard (SMA) WiFi antenna connector.

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-A7-070HB-C Industrial Panel 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-A7-070HB-C | |
|--------------------|--|
| CPU | i.MX6UL, Arm® Cortex®-A7, 528MHz |
| RAM | 512MB DDR3 |
| eMMC | 4GB |
| Storage | TF card supports up to 32GB SDHC |
| Display | 7.0" LCD, 1024 x 600 , High Brightness: 500cd/m ² |
| Touch | Capacitive Touch (Five-Point) |
| USB | 2 x USB 2.0 Host |
| LAN | 1 x RJ45, up to 100Mbps |
| Audio | 3.5mm Audio In/Out Connectors, Internal 2W Speaker |
| Buzzer | Yes |

| EPC/PPC-A7-070HB-C | |
|---------------------|---|
| RTC | Yes, Powered by CR2032 Button Battery |
| RS232 | 2 x RS232 |
| RS485 | 3 x RS485 |
| CAN | 2 x CAN |
| GPIO | 4 x Input, 4 x Output, PSU, Isolated |
| WiFi/BT | Optional On-Board WiFi (RTL8723) |
| Power Input | From 6V to 36V |
| Current at 12V | 500mA Max |
| Power Consumption | 5W Typical |
| Working Temperature | -20°C to +70°C |
| OS | Linux, Debian |
| Dimensions | EPC-A7-070HB-C (CS10600U070E): 190 x 112 x 28mm |
| | PPC-A7-070HB-C (CS10600U070P): 205 x 135 x 28mm |
| Weight | EPC-A7-070HB-C (CS10600U070E): 340g |
| | PPC-A7-070HB-C (CS10600U070P): 730g |
| Mounting | EPC-A7-070HB-C (CS10600U070E): Embedded |
| | PPC-A7-070HB-C (CS10600U070P): Panel |

Table 68 Table 1: Key Features

- 1
- This product has 5 x UART channels in total. The default configuration is 2 x RS232, 3 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-A7-070HB-C Industrial Panel PC can be powered by a wide range of input voltages: from 6 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 *Figure 1*.




Figure 334: Figure 1: Power Input Section (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 69 Table 1: Power Connector

 **Note**


The system ground “G” is not connected to power negative “-” on board, we connect “-” and “G” by using one 10MR resistor and one 1000pF capacitor.

Touch Screen

The EPC/PPC-A7-070HB-C Industrial Panel PC uses a five-point multitouch capacitive screen. *Figure 2* shows the capacitive screen connected to the motherboard via the **FPC connector**.



Figure 335: Figure 2: Capacitive 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 multitouch 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-A7-070HB-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-A7-070HB-C industrial PC. It has 2 x HOST USB Type A connectors, 1 x network connector (RJ45) supporting up to 100 Mbps, and 5 x UART terminals (RS232/485). This device also features two CAN interfaces, and a set of opto-isolated GPIO pins for various purposes.

RS232/RS485/CAN

The serial communication interfaces (RS485, RS482, and CAN) are routed to a **16-pin 3.81mm terminal**, as illustrated on *Figure 3*. Serial communication on both RS485 and RS422 interfaces can reach up to 115200 kbps.



Figure 336: Figure 3: Relation between serial pins on embedded vs. enclosed version of the A7-70HB-C IPC

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

| RS232 / RS485 / CAN Pin Definition: | | |
|-------------------------------------|------------|----------------------------|
| Pin Number | Definition | Description |
| Pin 16 | CAN2_H | CPU CAN Channel 2 H signal |
| Pin 15 | CAN2_L | CPU CAN Channel 2 L signal |

| RS232 / RS485 / CAN Pin Definition: | | |
|-------------------------------------|-------------|----------------------------------|
| Pin 14 | CAN1_H | CPU CAN Channel 1 H signal |
| Pin 13 | CAN1_L | CPU CAN Channel 1 L signal |
| Pin 12 | RS485_5- | CPU UART5, RS485 -(B) signal |
| Pin 11 | RS485_5+ | CPU UART5, RS485 +(A) signal |
| Pin 10 | RS485_4- | CPU UART4, RS485 -(B) signal |
| Pin 9 | RS485_4+ | CPU UART4, RS485 +(A) signal |
| Pin 8 | RS485_3- | CPU UART3, RS485 -(B) signal |
| Pin 7 | RS485_3+ | CPU UART3, RS485 +(A) signal |
| Pin 6 | RS232_2_RXD | CPU UART2, RS232 RXD signal |
| Pin 5 | RS232_2_TXD | CPU UART2, RS232 TXD signal |
| Pin 4 | RS232_1_RXD | CPU UART1, RS232 RXD signal |
| Pin 3 | RS232_1_TXD | CPU UART1, RS232 TXD signal |
| Pin 2 | GND | System Ground |
| Pin 1 | +5V | System Power Output 5V, up to 1A |

Table 70 Table 2: Connectivity Section

 **Note**

120Ω termination resistors are mounted on the device default, if you don't need it, contact us before order.

USB HOST Connectors

There are 2 x Type A **USB HOST connectors** onboard, as shown on *Figure 4*.



Figure 337: *Figure 4: USB Connectors (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 (Figure 4). The integrated Ethernet interface supports up to 100 Mbps data throughput. Power over Ethernet (PoE) is not supported.



Figure 338: Figure 5: RJ45 LAN Connectors (embedded/enclosed PC version)

WiFi & BT Module

The EPC/PPC-A7-070HB-C Industrial Panel PC does not include an embedded WiFi/BT module. However, it has an onboard footprint accommodating for easy installation of 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 339: RTL8723 WiFi/BT Module PCB Footprint

The enclosed (PPC) variant of the product has a specially designed connector hole for a standard SMA connector, allowing an external WiFi antenna to be connected.

GPIO

The EPC/PPC-A7-070HB-C Industrial Panel PC features a **10-pin 3.81 mm terminal** that provides 8 x opto-isolated GPIO pins, of which 4 x are output, and 4 x are input pins. The 10-

pin terminal also includes an isolated PSU input in the range of 5 to 24 VDC. The exact pinout is given in *Table 3*, below.

The GPIO **HIGH** output level corresponds to the voltage connected at the Isolated Power Input, while the GPIO **LOW** output level corresponds to the isolated Ground Input. Each GPIO output can drive loads up to 500mA, enough to drive various applications directly, such as relays or solenoid valves.

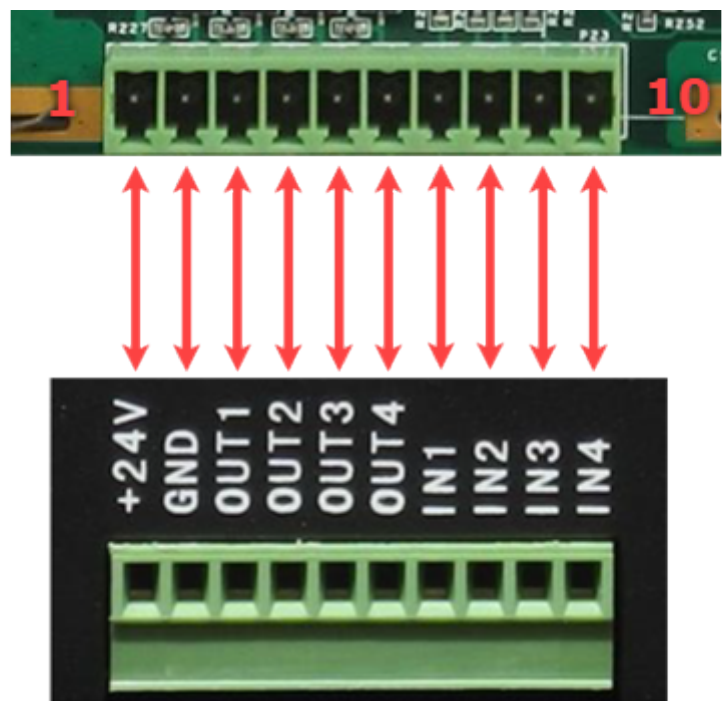


Figure 340: *Figure 7: GPIO Terminal (embedded/enclosed PC version)*

| GPIO Pin Definition: | |
|----------------------|-----------------------------------|
| Pin Number | Definition |
| Pin 1 | Isolated Power Input ² |
| Pin 2 | Isolated Ground Input |
| Pin 3 | OUT1 |
| Pin 4 | OUT2 |
| Pin 5 | OUT3 |
| Pin 6 | OUT4 |
| Pin 7 | IN1 |
| Pin 8 | IN2 |
| Pin 9 | IN3 |
| Pin 10 | IN4 |

Table 71 Table 3: GPIO Pinout

2

If the isolation is not a requirement, it is possible to use a non-isolated PSU instead.

It is also possible to use the onboard 5V power supply: it can be re-routed to the *Isolated Power Input* pin by populating R292 and R293 PCB footprints with 0Ω resistors.

Note that in this case, the *Isolated Power Input* pin will become an output for the onboard 5V power supply.

TF Card Slot

The EPC/PPC-A7-070HB-C Industrial Panel PC features 1 x **TF Card (micro SD) slot** as illustrated in *Figure 8*. It can address up to 32GB of memory.

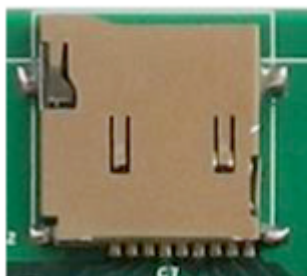


Figure 341: *Figure 8: TF (micro SD) Card Slot*

Note

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

Audio Connectors

The EPC/PPC-A7-070HB-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**.

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 (*Figure 9*)



Figure 342: *Figure 9: Audio I/O (embedded/enclosed PC version)*

In addition, EPC/PPC-A7-070HB-C features a miniature 2W embedded speaker for audio reproduction, as well as a small buzzer for alarm/notification sounds (*Figure 9a*).

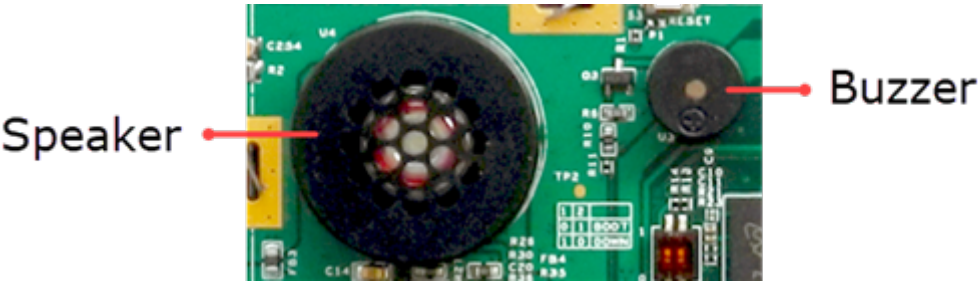


Figure 343: Figure 9a: 2W Micro Speaker and Buzzer

Boot DIP Switch

The EPC/PPC-A7-070HB-C Industrial Panel 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 (Figure 10).

There is no need to alter the DIP switch settings during regular operation. However, if you need to reinstall the OS, please refer to Table 4 below. Detailed information on how to reflash the OS can be found in the [Software Documentation](#).

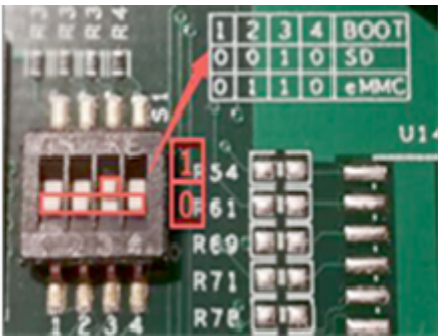


Figure 344: Figure 10: Boot DIP Switch

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

Table 72 Table 4: Boot Configuration Selection

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