

Industrial PC

EPC/PPC-A9-097-C



PN: CS10768F097

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EPC/PPC-A9-097-C



Front View



Rear View

EPC/PPC-A9-097-C Product Overview



Front View (Embedded Variant)



Rear View (Embedded Variant)

Product Overview

The Cortex $^{\$}$ -A9 series EPC/PPC-A9-097-C (PN: CS10768F097) is a rugged, high-quality industrial panel PC. It features a 9.7" multi-point capacitive touch screen with a resolution of 1024 x 768 pixels.

Key Applications

- Human Machine Interface HMI
- Process Control
- Process Monitoring

EPC/PPC-A9-097-C Ordering Options

- HMI
- Infotainment
- Predictive Maintenance
- Machine Learning
- Machine Vision
- Automotive applications
- 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-A9-097-C Industrial Panel PC is based around the powerful CS-SOM-iMX6Q System on Module (SoM), powered by the i.MX6Q Arm[®] Cortex[®]-A9 quad-core Application Processor (APU). The i.MX6Q APU represents the latest achievement in integrated multimedia applications processors, delivering high-performance computing, an abundance of integrated peripherals, and high power efficiency.

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 -40 to +125°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-A9-097-C Industrial Panel PC from the official **Chipsee Store** or from your nearest distributor.

EPC/PPC-A9-097-C Operating System

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 4.3
- · Android 6.0
- Android 8.0
- Ubuntu 12.04
- Ubuntu 14.04
- Debian
- * Chipsee Linux is based on NXP Yocto framework 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 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-A9-097-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-A9-097-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-A9-097-C Hardware Features

iMX6Q, Arm® Cortex®-A9, 1GHz			
	iMX6Q, Arm [®] Cortex [®] -A9, 1GHz		
RAM 2GB DDR3	2GB DDR3		
eMMC 8GB	8GB		
Storage TF Card, Supports up to 32GB SDHC	TF Card, Supports up to 32GB SDHC		
Display 9.7" LCD, 1024 x 768, High Brightness: 500cd/m ²	9.7" LCD, 1024 x 768, High Brightness: 500cd/m ²		
Touch Capacitive Multi-Point Touch Screen	Capacitive Multi-Point Touch Screen		
USB 2 x USB 2.0 HOST, 1 x USB OTG	2 x USB 2.0 HOST, 1 x USB OTG		
LAN 2 x RJ45: 1 x GbE, Optional PoE Support; 1 x 100Mbps, Optional	ıl		
Audio 3.5mm Audio In/Out Connector, Internal 2W Speaker			
Buzzer Yes			
RTC Yes, Powered by CR2032 Button Battery			
RS232 2 x RS232			
RS485 3 x RS4851	3 x RS4851		
CAN 2 x CAN	2 x CAN		
GPIO 8 x General Purpose I/O (GPIO) channels	8 x General Purpose I/O (GPIO) channels		
WiFi/BT Integrated WiFi/BT Module	Integrated WiFi/BT Module		
HDMI 1 x HDMI			
SATA 1 x SATA II			
Expansion Port N/A			
4G/LTE Optional, Not mounted by default	Optional, Not mounted by default		
Power Input From 12V to 36V	From 12V to 36V		
Current at 15V 600mA Max (w/o 4G Module)			
Power Consumption 7W Typical			
Working Temperature From -20°C to +70°C			
OS Multiple Choices (Operating System)			
EPC-A9-097-C (PN: CS10768F097E): 226 x 172 x 26mm			
Dimensions			
PPC-A9-097-C (PN: CS10768F097P): 256 x 207 x 29mm			
PPC-A9-097-C (PN: CS10768F097P): 256 x 207 x 29mm EPC-A9-097-C (PN: CS10768F097E): 550g			
PPC-A9-097-C (PN: CS10768F097P): 256 x 207 x 29mm			
PPC-A9-097-C (PN: CS10768F097P): 256 x 207 x 29mm EPC-A9-097-C (PN: CS10768F097E): 550g Weight			

Table 6 Key Features

EPC/PPC-A9-097-C Power Input

This product has 5 x UART channels in total. The default configuration is 2 x RS232, 2 x RS485, and 1 x UART for WiFi/BT module. 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-A9-097-C 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**. 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.



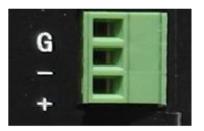


Figure 17: Power Input Section (embedded/enclosed version)

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 7 Power Connector



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

Touch Screen

The EPC/PPC-A9-097-C Industrial Panel PC uses a ten-point multitouch capacitive screen. *Figure 2* shows the capacitive screen connected to the motherboard via the **FPC connector**.

EPC/PPC-A9-097-C Connectivity



Figure 18: 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-A9-097-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-A9-097-C industrial PC. It has 2 x HOST USB Type A connectors, 1 x USB OTG Type Mini B, 2 x network connector (RJ45) supporting up to 1 Gbps, and 5 x UART terminals (RS232/485). This device also features two CAN interfaces.

RS232/RS485/CAN

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

EPC/PPC-A9-097-C RS232/RS485/CAN

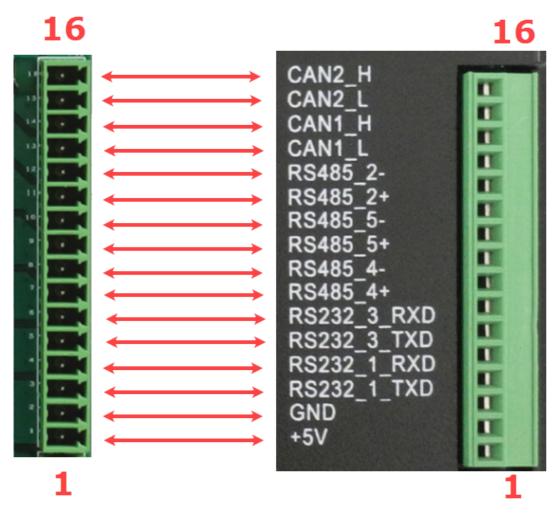


Figure 19: Serial pins connector

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		
Pin 14	CAN1_H	CPU CAN Channel 1 H signal		
Pin 13	CAN1_L	CPU CAN Channel 1 L signal		
Pin 12	RS485_2-	CPU UART2, RS485 –(B) signal 2		
Pin 11	RS485_2+	CPU UART2, RS485 +(A) signal 2		
Pin 10	RS485_5-	CPU UART5, RS485 -(B) signal		
Pin 9	RS485_5+	CPU UART5, RS485 +(A) signal		
Pin 8	RS485_4-	CPU UART4, RS485 –(B) signal		
Pin 7	RS485_4+	CPU UART4, RS485 +(A) signal		
Pin 6	RS232_3_RXD	CPU UART3, RS232 RXD signal		
Pin 5	RS232_3_TXD	CPU UART3, RS232 TXD signal		
Pin 4	RS232_1_RXD	CPU UART1, RS232 RXD signal		

EPC/PPC-A9-097-C USB Connectors

Pin 3	RS232_1_TXD	CPU UART1, RS232 TXD signal	
Pin 2	GND	System Ground	
Pin 1 +5V		System 5V output, up to 1A	

Table 8 Connectivity Section

2(1,2)UART2 signal is used by the onboard WiFi/BT module, so the I/O port function is disabled by default. If you need the I/O port function instead, please contact Chipsee Technical Support at **support@chipsee.com** for assistance.



Note

 120Ω termination resistors are not mounted or included with the device.

USB Connectors

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





Figure 20: USB HOST Connectors (embedded/enclosed PC version)

There is also 1 x Type Mini B **USB OTG connector**, configured as slave by default.





Figure 21: USB OTG 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.

EPC/PPC-A9-097-C LAN Connectors

LAN Connectors

LAN (RJ45) connector provides Ethernet connectivity over standardized Ethernet cables. The integrated Ethernet interface supports up to 1 Gbps data throughput. Power over Ethernet (PoE) is not supported.





Figure 22: RJ45 LAN Connectors (embedded/enclosed PC version)



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-A9-097-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 23: RTL8273 WiFi/BT Module

The enclosed (PPC) variant of the product also includes an SMA connector for an external WiFi/BT antenna, as illustrated in the figure below.

EPC/PPC-A9-097-C 4G/LTE Module



Figure 24: WiFi+BT Antenna

4G/LTE Module

The EPC/PPC-A9-097-C Industrial Panel PC is equipped with a **mini-PCle 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-A9-097-C. SIM card does **NOT** support hot plug. **Power off** before inserting or removing SIM card.



Figure 25: 4G/LTE Module







Figure 26: SIM Card Holder and 4G/LTE Antenna Connector

EPC/PPC-A9-097-C GPIO Connector



SIM Card Direction



Attention

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

GPIO Connector

The EPC/PPC-A9-097-C Industrial Panel PC has a 10 Pin 3.81mm **GPIO Connector**, as shown on the figure below, that is labeled as P28 on the PCB. The table below gives details about the definition of every Pin.



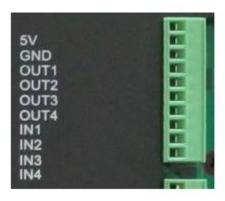


Figure 27: GPIO Connector

GPIO Connector Pin Definition:			
Pin Number	Definition	Description	
Pin 1	VCC	Isolated Power +5V Output	
Pin 2	GND	Isolated Ground	
Pin 3	OUT1	Isolated Output 1	
Pin 4	OUT2	Isolated Output 2	

EPC/PPC-A9-097-C TF Card Slot

GPIO Connector Pin Definition:			
Pin 5	OUT3	Isolated Output 3	
Pin 6	OUT4	Isolated Output 4	
Pin 7	IN1	Isolated Input 1	
Pin 8	IN2	Isolated Input 2	
Pin 9	IN3	Isolated Input 3	
Pin 10	IN4	Isolated Input 4	

Table 9 GPIO Connector Pin-out



Attention

- 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-A9-097-C Industrial Panel PC features 1 x **TF Card (micro SD) slot**. It can address up to 32GB of memory.

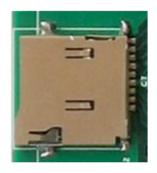




Figure 28: TF (micro SD) Card Slot



Note

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

Audio Connectors

The EPC/PPC-A9-097-C Industrial Panel PC features some audio peripherals, as well. It has 1 \times **3.5mm audio input jack** and 1 \times **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.

EPC/PPC-A9-097-C HDMI Connector





Figure 29: Audio I/O (embedded/enclosed PC version)

In addition, EPC/PPC-A9-097-C features a miniature 2W embedded speaker for audio reproduction, as well as a small buzzer for alarm/notification sounds.

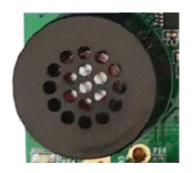




Figure 30: 2W Micro Speaker and Buzzer

HDMI Connector

The EPC/PPC-A9-097-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 31: HDMI Connector

Boot DIP Switch

The EPC/PPC-A9-097-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.

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 reflash the OS can be found in the Software Documentation.

EPC/PPC-A9-097-C Mounting Procedure

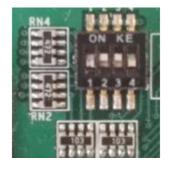


Figure 32: Boot DIP Switch

Boot Config Select				
DIP SW	1	2	3	4
SD	1	0	0	0
еММС	1	1	0	1
Download	0	1	1	0

Table 10 Boot Configuration Selection

Mounting Procedure

The EPC/PPC-A9-097-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.

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

Mechanical Specifications

EPC-A9-097-C

The outer mechanical dimensions of EPC-A9-097-C are 226 x 172 x 26mm (W x L x H).

PPC-A9-097-C

For PPC-A9-097-C, the outer mechanical dimensions are 256 x 207 x 29mm (W x L x H).

Panel Mounting

EPC/PPC-A9-097-C PPC-A9-097-C







Figure 33: Fixing PPC-A9-097-C industrial PC into panel



With the PPC-A9-097-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.

A (

Caution

- When you use product EPC-A9-097-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.

EPC/PPC-A9-097-C Disclaimer

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