

Industrial PC

PPC-A76-070



PN: CS10600-RK3588-070P

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PPC-A76-070

Front View



Rear View



Side View 1



Side View 2



PPC-A76-070 Product Overview

Product Overview

The Cortex[®]-A76 series PPC-A76-070 (PN: CS10600-RK3588-070P) is a high-quality IP65-compliant industrial panel PC. This single board computer features a 7" 5-point capacitive touch screen with a resolution of 1024 x 600 pixels and brightness of 400 cd/m².

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-A76-070 Industrial Panel PC is based around the powerful RK3588J System on Chip (SoC), powered by the Rockchip RK3588J low-power processor which integrates a Quad(4)-core Cortex[®]-A76 (2.0GHz) and Quad(4)-core Cortex[®]-A55 (1.8GHz) processor.

The RK3588J supports multi-format video decoders and has a high-performance 8GB LPDDR4 RAM capable of sustaining demanding memory bandwidths. It also provides a complete set of peripheral interfaces.

PPC-A76-070 Ordering Options

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 PPC-A76-070 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 also be obtained from the Software Documentation section, along with the detailed installation instructions.

- Debian 11
- Buildroot Linux Qt 5.15



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

PPC-A76-070 Optional Features

Optional Features

The PPC-A76-070 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.

PPC-A76-070 Hardware Features

Hardware Features

The PPC-A76-070 Industrial Panel PC offers a broad 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.

PPC-A76-070			
СРИ	Rockchip RK3588J, Quad(4)-core Cortex-A76 (2.0GHz) and Quad(4)-core Cortex-A55 (1.8GHz)		
GPU	ARM Mali-G610 MC4. Up to 8K60 FPS video decoding, up to 8K30 FPS video encoding.		
NPU	Neural network acceleration engine with 6Tops int8, support Int4/8/16/FP16/BF16/TF32.		
RAM	8GB LPDDR4		
еММС	64GB		
SSD	N/A		
Storage	TF Card, Supports up to 128GB SDHC		
Display	7" LCD, 1024 x 600, High Brightness: 400 cd/m ²		
HDMI	1 x HDMI-D (Micro-HDMI) Out		
Touch	5-point capacitive touch screen		
USB	2 x USB 3.0 HOST, 1 x USB Type-C1		
LAN	2 x RJ45, GbE		
POE	N/A		
Audio	3.5mm Audio In/Out Connector, 2W Internal Speaker		
Buzzer	Yes		
RTC	High accuracy RTC with farad capacitor, can work 1 week after power off (default) . High accuracy RTC with lithium coin battery, can work 3 years after power off <i>(optional)</i> .		
RS232	default 2 x RS232 (Optional 6 x RS232 at most, include 1 debug port) ²		
RS485	default 3 x RS485 at most2		
CAN	default 2 x CAN		
GPIO	8 Channels Isolated IO, 4 x Input and 4 x Output		
WiFi/BT	Integrated WiFi/BT Module		
4G/LTE	Supported, Optional		
Power Input	From 9V to 30V (supports optional 24V ignition signal)		
Current	533mA (max) at 15V		

PPC-A76-070 Hardware Features

PPC-A76-070		
Power Consumption	8W (max)	
Working Temperature	From -10°C to +60°C	
os	Debian11, Buildroot Linux Qt 5.15	
Dimensions	PPC-A76-070 (PN: CS10600-RK3588-070P): 188.05 x 123.11 x 33.20mm	
Weight	PPC-A76-070 (PN: CS10600-RK3588-070P): 700g	
Mounting	PPC-A76-070 (PN: CS10600-RK3588-070P): Panel, VESA	

Key Features

- 1 The USB-A host (near RJ45) and USB-C **can't be used** at the same time. Before boot into OS, USB-C is enabled for install OS image; after boot into OS, USB-A is enabled but USB-C is disabled. In Android, these can be configured; in Linux, these can't be configured.
- **2(1,2)**This product has 6 x UART channels in total. The default configuration is 2 x RS232 and 3 x RS485, including 1 debug port. CAN0 can be configured to RS232. UART can be swapped between RS232 and RS485 modes easily, if you need a different RS232/RS485 configuration, please get in touch with the Chipsee Technical Support at **support@chipsee.com**

PPC-A76-070 Power Input

Power Input

The PPC-A76-070 Industrial Panel PC can be powered by a wide range of input voltages: From 9V to 30V (supports **optional** 24V ignition signal) DC.

There are two DC input interfaces on this device: a **3-pin, 3.81mm terminal**, and a **2.1mm I.D x 5.5mm O.D x 9.5mm DC connector**.



Power Input

Note that the "+" sign represents the positive power input. The "-" terminal is shorted to the ground.

Default Connector

By default, the 3 pins are +, - and ground.

Power Input Definition			
Pin Number Definition Description		Description	
Pin 1	Positive Input	DC Power Positive Terminal	
Pin 2	Negative Input	DC Power Negative Terminal	

PPC-A76-070 DC Jack

Power Input Definition		
Pin 3	Ground	Power System Ground

Power Connector



The system ground " \mathbf{G} " is connected to power negative "-" on board.

DC Jack

For a proper 2.1mm x 5.5mm x 9.5mm DC power connector, refer to the figure below:.



PPC-A76-070 Ignition Signal

Ignition Signal

The product has a "ignition signal" **optional** feature. By default the ignition signal is not installed. If you need this feature you can contact us when placing an order. In this setup, Pin 3 is the ignition signal pin.

The DC jack doesn't support ignition signal.

To use this feature, apply a 24V DC input (relative to -) to Pin 3. If Pin 3 detects a low input voltage, the product will be shutdown. If Pin 3 detects a high input voltage, the product will be boot and running.



Power Input (with Ignition Signal)

PPC-A76-070 Touch Screen

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	Ignition	Ignition Signal	

Power Connector with Ignition Signal

Touch Screen

The PPC-A76-070 Industrial Panel PC uses a 5-point capacitive touch screen.



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-A76-070 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.

PPC-A76-070 Connectivity

Connectivity

There are many connectivity options available on the PPC-A76-070 industrial PC. It has 2 x USB 3.0 HOST, 1 x USB Type-C, 2 x RJ45, GbE (RJ45) Ethernet connector supporting up to 1 Gbps, and 5 x UART terminals (RS232/RS485), 2 x CAN.

RS232/RS485/CAN

The serial communication interfaces (RS485, RS232, and CAN) are routed to a **16-pin 3.81mm terminal**, as illustrated on the figure below.



RS232 RS485 CAN Pins

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

Pin Number	Definition	Description	OS Node
Pin 16	CAN1_H	CPU CAN2_M1, CAN H signal	
Pin 15	CAN1_L	CPU CAN2_M1, CAN L signal	CAN1
Pin 14	CAN0_H	CPU CAN1_M1, CAN H signal	
Pin 13	CAN0_L	CPU CAN1_M1, CAN L signal	CAN0
Pin 12	RS485_5-	CPU UART1, RS485 –(B) signal	
Pin 11	RS485_5+	CPU UART1, RS485 +(A) signal	/dev/ttyS1
Pin 10	RS485_4-	CPU UARTO, RS485 –(B) signal	
Pin 9	RS485_4+	CPU UARTO, RS485 +(A) signal	/dev/ttyS0
Pin 8	RS485_3-	CPU UART4, RS485 –(B) signal	
Pin 7	RS485_3+	CPU UART4, RS485 +(A) signal	/dev/ttyS4
Pin 6	RS232_0_RXD	CPU UART6, RS232 RXD signal	
Pin 5	RS232_0_TXD	CPU UART6, RS232 TXD signal	/dev/ttyS6
Pin 4	RS232_2_RXD	CPU UART2, RS232 RXD signal, Debug Port	
Pin 3	RS232_2_TXD	CPU UART2, RS232 TXD signal, Debug Port	/dev/ttyFlQ

PPC-A76-070 RS232/RS485/CAN

Pin Number	Definition	Description	OS Node
Pin 2	GND	System Ground	
Pin 1	+5V	System +5V Power Output, No more than 1A Current output	

RS232 / RS485 / CAN Pin Definition



Attention

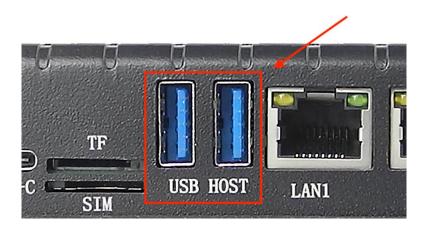
- 1. RS485_3,RS485_4 and RS485_5 can control the input and output direction automatically. There's no need to control it from within the software.
- 2. The 120Ω match resistor for the RS485 is mounted by default.
- 3. The 120Ω match resistor for the CAN bus is NOT mounted by default.

PPC-A76-070 USB Connectors

USB Connectors

There are $2 \times USB + OST$ and $1 \times USB DEVICE$ (for flashing OS) ports onboard: $2 \times USB 3.0$ HOST, $1 \times USB Type-C$, as shown in the figures below.

The USB-A host (near RJ45) and USB-C **can't be used** at the same time. Before boot into OS, USB-C is enabled for install OS image; after boot into OS, USB-A is enabled but USB-C is disabled. In Android, these can be configured; in Linux, these can't be configured.



USB 3.0 HOST Port



USB Type-C Port



Warning

Be careful not to touch surrounding electronic components accidentally while plugging USB devices into the embedded IPC version.

PPC-A76-070 LAN Connectors

LAN Connectors

LAN (RJ45) connector provides 2 x RJ45 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

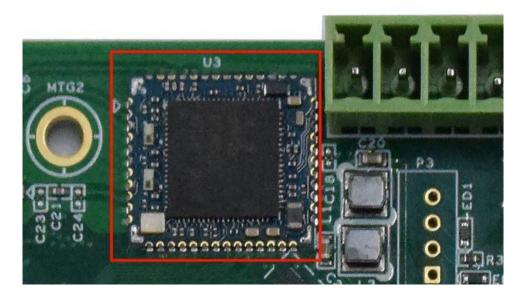


Use CAT5 or better cables to achieve full data throughput over maximum distance defined by the 1000BASE-T standard (100m).

PPC-A76-070 WiFi & BT Module

WiFi & BT Module

The PPC-A76-070 Industrial Panel PC is equipped with the WiFi-6 **Realtek RTL8852BE WiFi/BT** chip (through CPU PCIe lane) which supports Bluetooth V2.1+EDR/4.2/5.2, as well as IEEE802.11a/b/g/n/ac/ax 2.4/5 GHz Wireless LAN (WLAN).



Realtek RTL8852BE Chip

The PPC-A76-070 includes an SMA connector for an external WiFi/BT antenna, as illustrated in the figure below.



WiFi+BT Antenna SMA

PPC-A76-070 4G/LTE Module

4G/LTE Module

The PPC-A76-070 Industrial Panel PC is equipped with a **mini-PCle connector** (through USB CPU lane) that can connect an **optional** 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-A76-070. SIM card does **NOT** support hot plug. **Power off** before inserting or removing SIM card.



Mini PCI-e and 4G/LTE Module



4G/LTE Antenna

PPC-A76-070 4G/LTE Module



SIM Card Direction



Attention

The product does not come shipped with the 4G/LTE module by default. The customer can choose the 4G/LTE module option when placing an order, we will install all the necessary components.

PPC-A76-070 GPIO

GPIO

The PPC-A76-070 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 follow table.

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.



GPIO Terminal

PPC-A76-070 GPIO



Isolated GPIO reduced schematic

Pin Number	Definition	GPIOD Chip	GPIOD Line
Pin 1	Isolated Power Input3		
Pin 2	Isolated Ground Input	Isolated Ground Input	
Pin 3	OUT1	4	14
Pin 4	OUT2	4	13
Pin 5	OUT3	4	8
Pin 6	OUT4	4	7
Pin 7	IN1	4	6
Pin 8	IN2	1	9
Pin 9	IN3	1	8
Pin 10	IN4	1	6

GPIO Pinout

³ If the isolation is not a requirement, it is possible to use a non-isolated PSU instead.

PPC-A76-070 GPIO

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

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

PPC-A76-070 TF Card Slot

TF Card Slot

The PPC-A76-070 Industrial Panel PC features 1 x **TF Card (micro SD) slot**. TF Card can address up to 128GB of storage.



TF (micro SD) Card Slot



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

PPC-A76-070 Audio Connectors

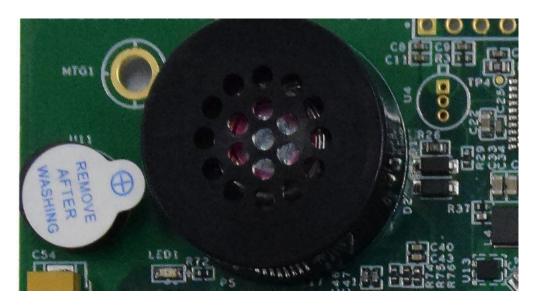
Audio Connectors

The PPC-A76-070 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)

The miniature 2W embedded speaker is handy for audio reproduction, the small buzzer can play alarm/notification sounds.



2W Micro Speaker and Buzzer



Attention

By plugging in the headphone cable, the internal speaker will be disabled automatically.

PPC-A76-070 HDMI Connector

HDMI Connector

The PPC-A76-070 Industrial Panel PC is equipped with 1 x HDMI-D (Micro-HDMI) Out port. The HDMI connector allows connecting an additional (external) monitor. HDMI output resolution can be configured by the software.



HDMI Connector

PPC-A76-070 PROG Button

PROG Button

The PPC-A76-070 Industrial Panel PC has one button on the board marked as PROG, as shown in the figure below.

When the button is pressed before powering up, the PPC-A76-070 will enter MASKROM mode. In this mode you can use a USB Type-C cable to upgrade its operating system. You can use this feature to flash another OS to the internal eMMC.

When the button is not pressed before and during power up, the PPC-A76-070 will boot normally.

There is no need to press the button during regular operation. However, if you need to flash the OS in MASKROM mode, the button will be used. Please refer to the software documents for more information.



PROG Button

PPC-A76-070 **Mounting Procedure**

Mounting Procedure

You can mount PPC-A76-070 with VESA mounting (guide): **75 x 75** mm, 4 x **M4** (6mm) screws.

You can also mount PPC-A76-070 with panel mounting method (guide).



Attention

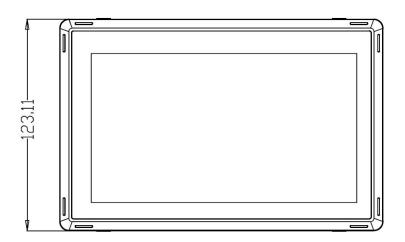
Please make sure the display is not exposed to high pressure when mounting into an enclosure.

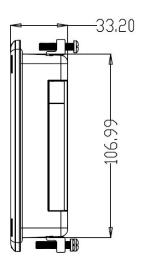
PPC-A76-070 Mechanical Specifications

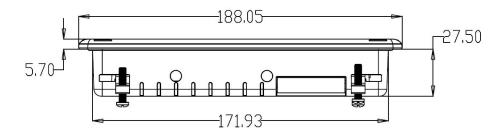
Mechanical Specifications

For PPC-A76-070, the outer mechanical dimensions are $188.05 \times 123.11 \times 33.20 \text{mm}$ (W x L x H).

Please refer to the technical drawing in the figure below for details related to the specific product measurements.







PPC-A76-070 Technical Drawing

PPC-A76-070 3D Model

3D Model

PPC-A76-070 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 PPC-A76-070, select hardware documentation, drag the navigation bar to the 3D Model section.

PPC-A76-070 Disclaimer

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