Chipsee

Industrial PC

CS-A55-BOX

PN: CS-RK3568-BOX

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CS-A55-BOX

Front View

Rear View

Side View 1

Side View 2

Product Overview

The fanless embedded PC CS-A55-BOX (PN: CS-RK3568-BOX) is a Cortex®-A55 series high-quality industrial PC. Thanks to the fanless design, it is stable and reliable in client terminal, multimedia and other industry applications.

Key Applications

- Industrial Automation
- Process Control
- Smart Grid Management

- CNC Manufacturing
- Environmental Monitoring
- Predictive Maintenance

The offered CPU consumes very little power, around 4.35W (max). From the ground-up, the CPU is built for low power consumption. As such, it is best suited for mobile and power-constrained industrial or field applications. A specially designed aluminum alloy housing with fins for increased heat dissipation serves as a passive cooler, eliminating the need for built-in fans. The fanless design reduces noise, as well as the maintenance costs and efforts, leading to increased reliability at the same time.

The CS-A55-BOX Industrial PC is based around the powerful RK3568 System on Chip (SoC), powered by the Rockchip RK3568 low-power processor which integrates a quad-core Cortex®-A55 2.0GHz processor.

The RK3568 supports multi-format video decoders and has a high-performance 2GB LPDDR4 RAM 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 CS-A55-BOX 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
- Android 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

Optional Features

The CS-A55-BOX Industrial 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 CS-A55-BOX Industrial 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.

CS-A55-BOX	
CPU	Rockchip RK3568, Quad-core Cortex-A55 (2.0GHz)
RAM	2GB LPDDR4
eMMC	16GB
SSD	N/A
Storage	TF Card, Supports up to 128GB SDHC
Display	N/A
HDMI	1 x HDMI-D (Micro-HDMI) Out
Touch	N/A
USB	1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C
LAN	2 x RJ45, GbE
POE	Supported for 1 x **optional** POE RJ45
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 *(optional)*.
RS232	default 2 x RS232 (Optional 6 x RS232 at most, include 1 debug port)1
RS485	default 3 x RS485 at most1

CS-A55-BOX	
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 6V to 36V
Current	290mA (max) at 15V
Power Consumption	4.35W (max)
Working Temperature	From 0°C to +60°C
OS	Android 11, Debian11, Buildroot Linux Qt 5.15
Dimensions	CS-A55-BOX (PN: CS-RK3568-BOX): N/A
Weight	CS-A55-BOX (PN: CS-RK3568-BOX): null
Mounting	CS-A55-BOX (PN: CS-RK3568-BOX): Rear, VESA

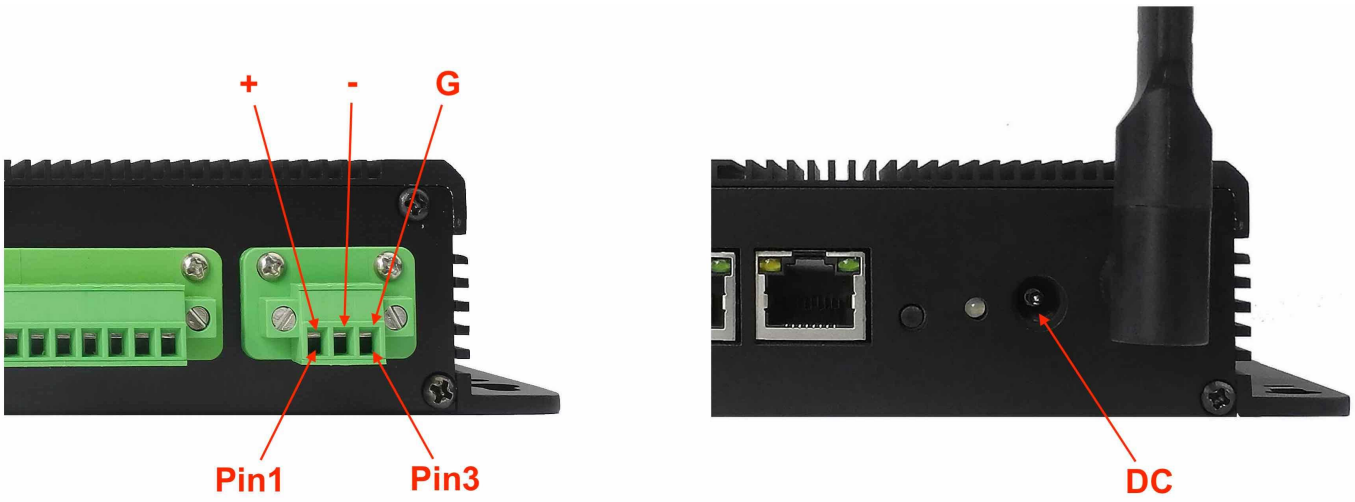
Table 164 Key Features

1(1,2) This product has 6 x UART channels in total. The default configuration is 2 x RS232 and 3 x RS485, include 1 debug port. 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**

Power Input

The CS-A55-BOX Industrial PC can be powered by a wide range of input voltages: From 6V to 36V 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, 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.

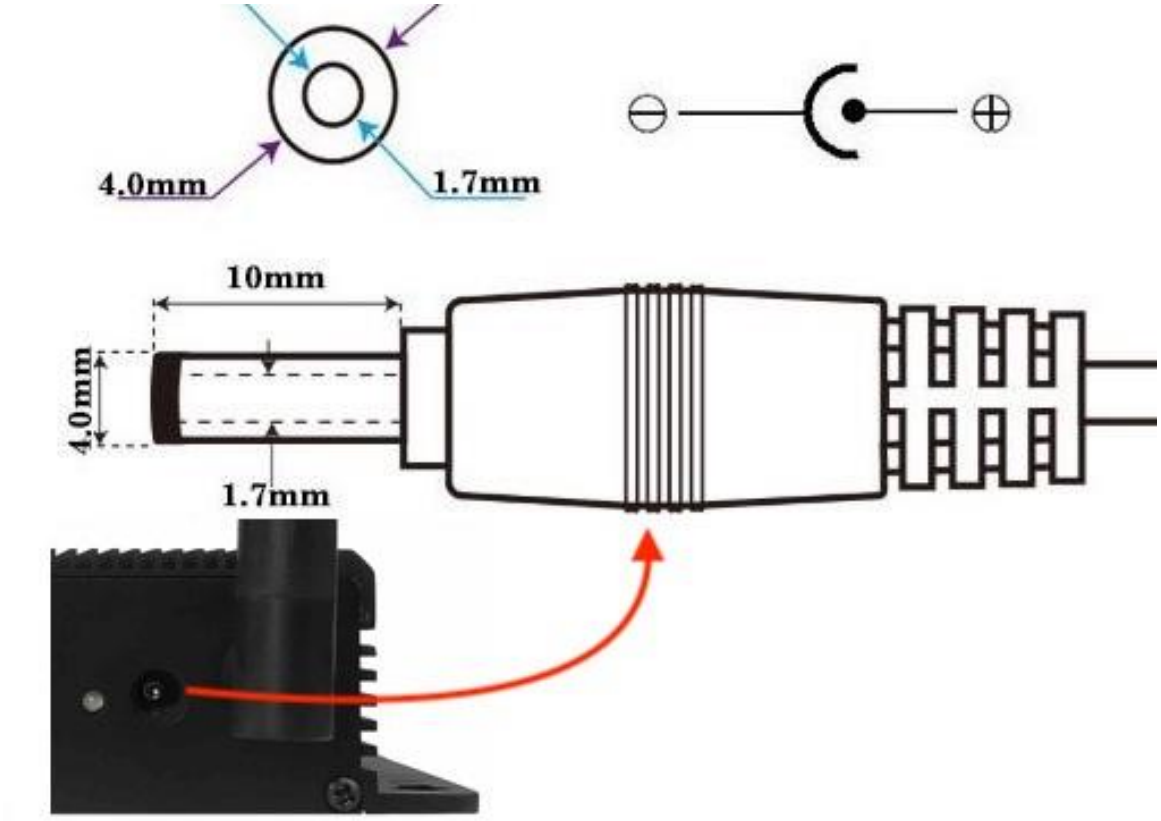
Power Input Definition		
Pin Number	**Definition**	**Description**
Pin 1	Positive Input	DC Power **Positive Terminal**
Pin 2	Negative Input	DC Power **Negative Terminal**
Pin 3	Ground	**Power System Ground**

Table 165 Power Connector

Note

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

For a proper DC power connector, refer to the figure below.



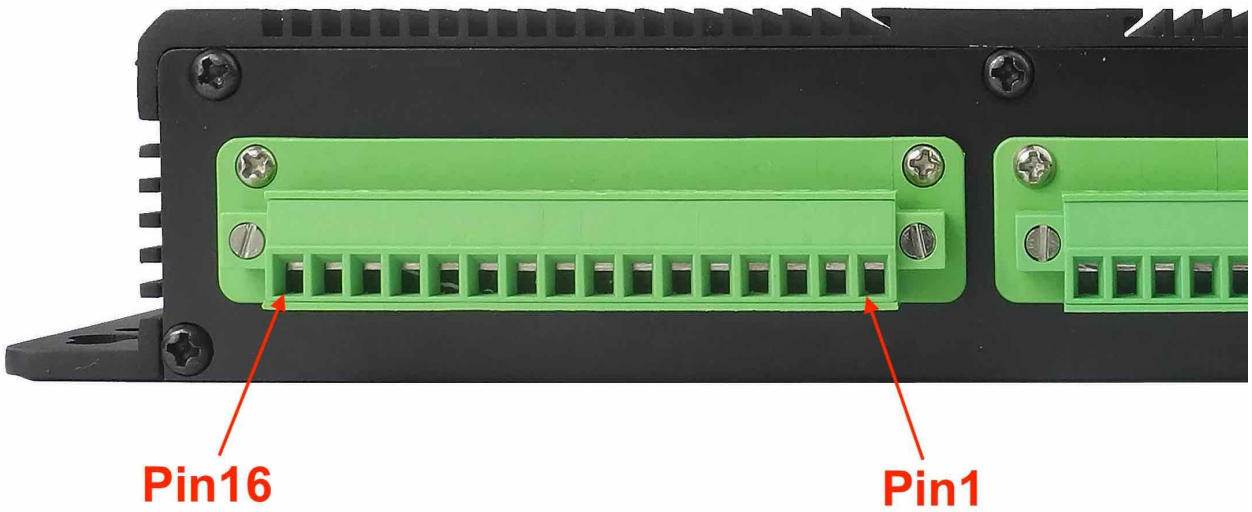
DC Jack

Connectivity

There are many connectivity options available on the CS-A55-BOX industrial PC. It has 1 x USB 2.0 HOST, 1 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/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:

RS232 / RS485 / CAN Pin Definition:		
Pin Number	**Definition**	**Description**
Pin 16	CAN1_H	CAN H signal
Pin 15	CAN1_L	CAN L signal
Pin 14	CAN0_H	CAN H signal
Pin 13	CAN0_L	CAN 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_0_RXD	CPU UART0, RS232 RXD signal
Pin 5	RS232_0_TXD	CPU UART0, RS232 TXD signal
Pin 4	RS232_2_RXD	CPU UART2, RS232 RXD signal, Debug Port
Pin 3	RS232_2_TXD	CPU UART2, RS232 TXD signal Debug Port
Pin 2	GND	System Ground
Pin 1	+5V	System +5V Power Output, No more than 1A Current output

Table 166 Connectivity Section

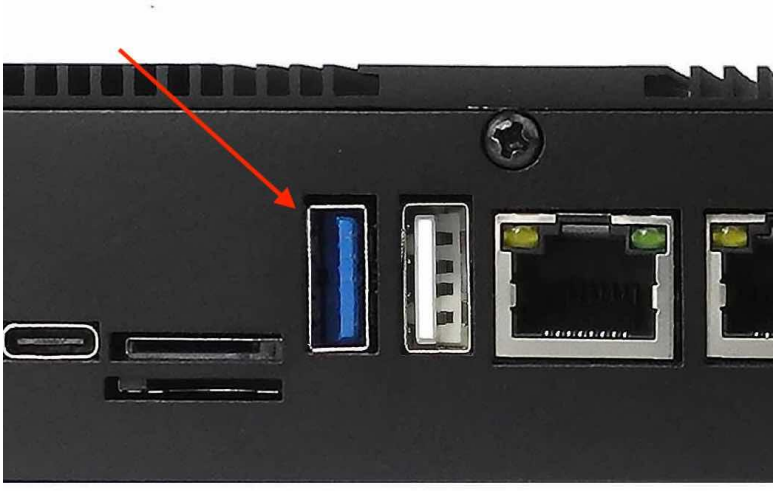
Attention

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.

USB Connectors

There are 2 x **USB HOST** and 1 x **USB DEVICE** (for flashing OS) ports onboard: 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C , as shown in the figures below.

USB 2.0 HOST Port (embedded / enclosed PC version)



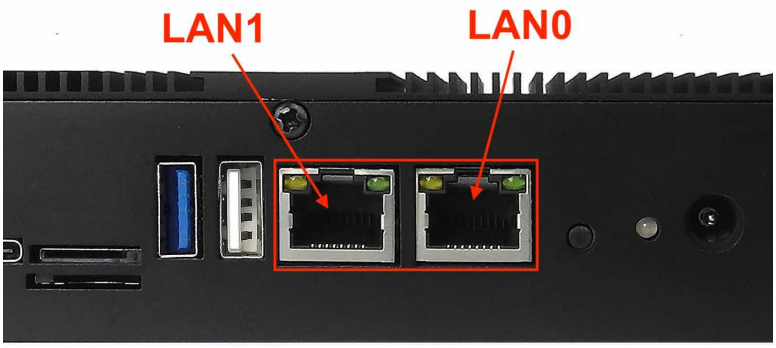
USB 3.0 HOST Port (embedded / enclosed PC version)

USB Type-C Port (embedded / enclosed PC version)

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

LAN Connectors

LAN (RJ45) connector provides 2 x RJ45 Ethernet (including 1 x **optional** POE port: LAN0) 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

> **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 CS-A55-BOX Industrial PC is equipped with the popular **Realtek RTL8821CS WiFi/BT module** which supports BT/BLE 2.1/3.0/4.2, as well as 802.11ac/abgn 433Mbps 2.4/5.8 GHz Wireless LAN (WLAN).

Figure 618: *RTL8821CS WiFi/BT Module*

The CS-A55-BOX includes an SMA connector for an external WiFi/BT antenna, as illustrated in the figure below.

WiFi+BT Antenna SMA

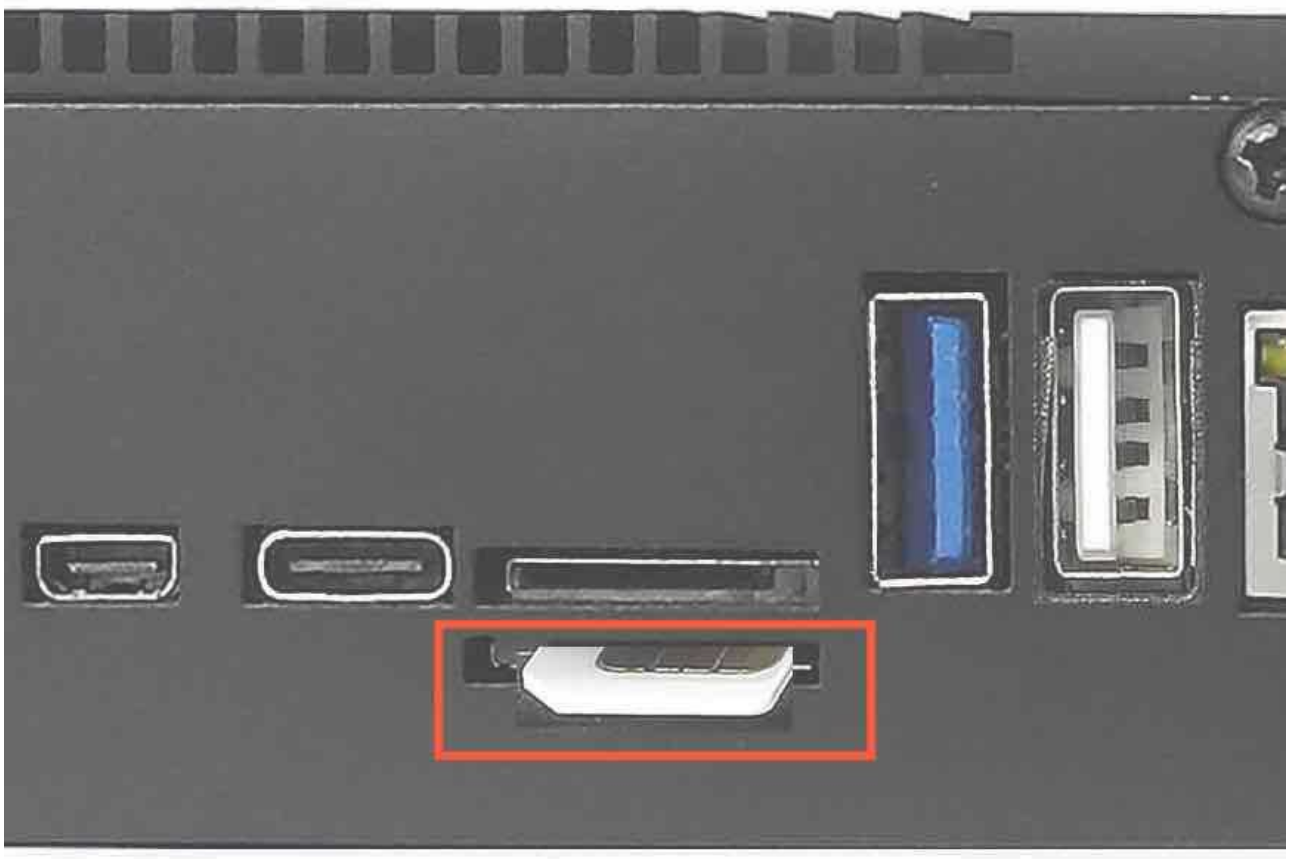
4G/LTE Module

The CS-A55-BOX Industrial PC is equipped with a **mini-PCIe connector** that can connect 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 CS-A55-BOX. SIM card does **NOT** support hot plug. **Power off** before inserting or removing SIM card.

Figure 619: *mini-PCIe Connector & 4G Module*

Figure 620: *SIM Card Holder & 4G Antenna*



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.

TF Card & SIM Card Slot

The CS-A55-BOX Industrial PC features 1 x **TF Card (micro SD) slot** and 1 x **SIM Card slot**. TF Card can address up to 128GB of storage.

TF (micro SD) Card & SIM Card Slot

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

Audio Connectors

The CS-A55-BOX Industrial 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.

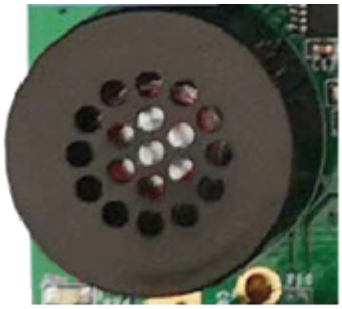


Figure 621: *2W Micro Speaker and Buzzer*

Attention

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

HDMI Connector

The CS-A55-BOX Industrial 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

PROG Button

The CS-A55-BOX Industrial 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 CS-A55-BOX 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 CS-A55-BOX will boot normally.

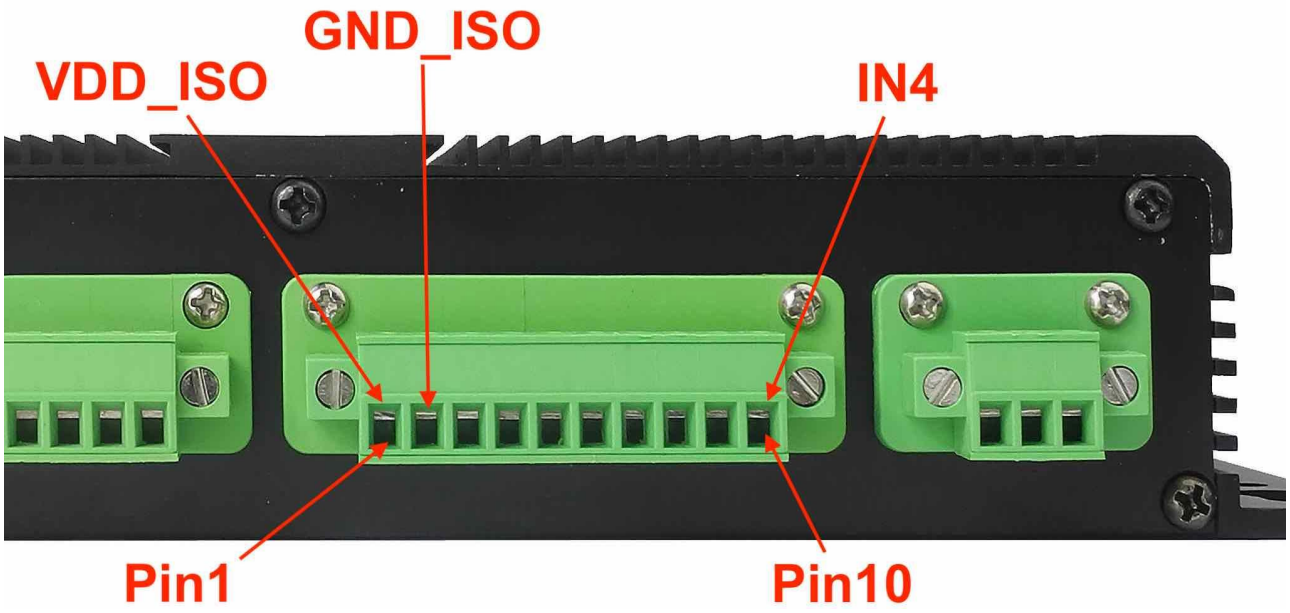
There is no need to press the button during regular operation. However, if you need to flash the OS in MASKROM mode, the button will be used. Please refer to the software documents for more information.

PROG Button

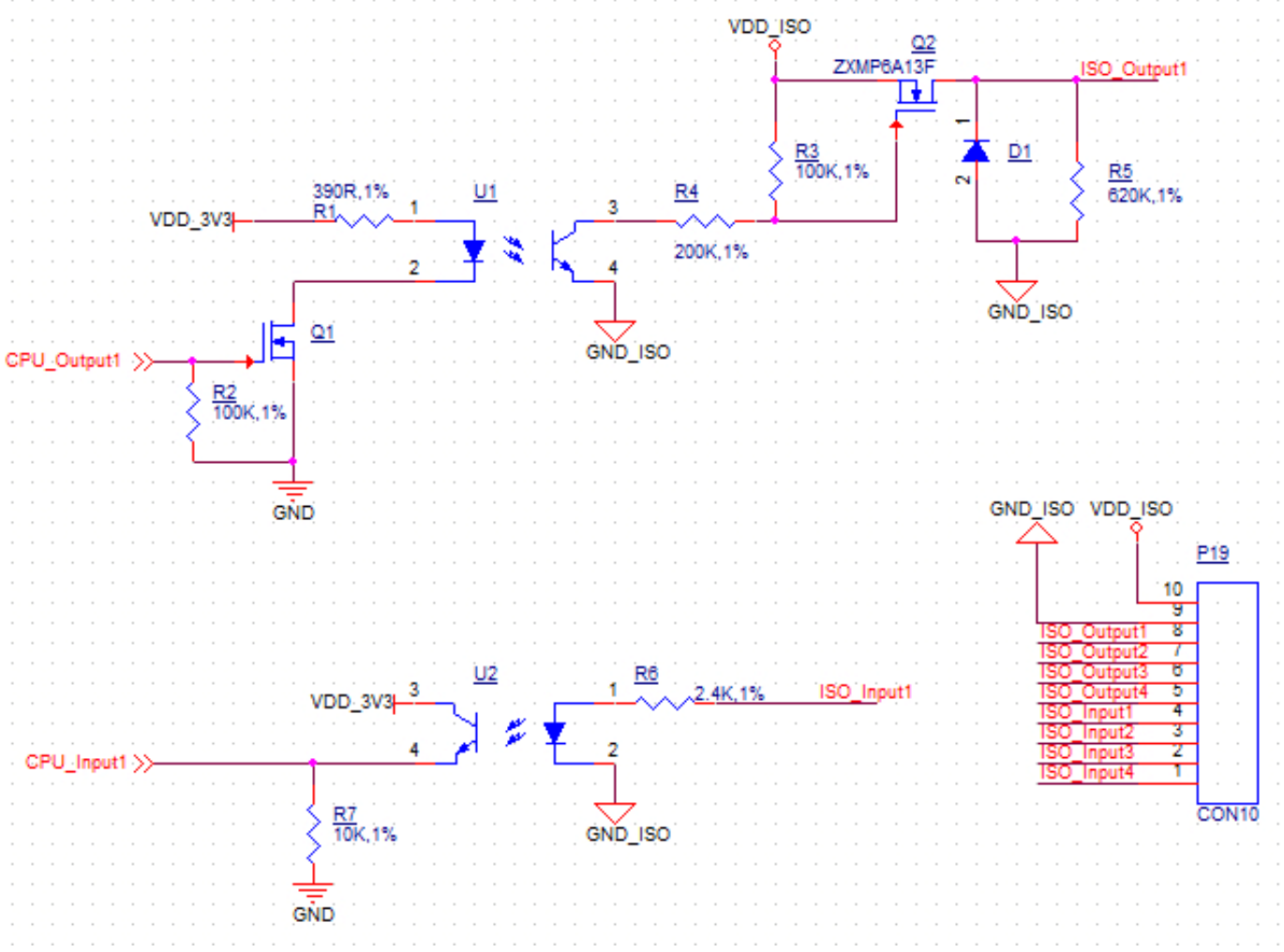
GPIO

The CS-A55-BOX Industrial 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 (enclosed PC version)



Isolated GPIO reduced schematic

GPIO Pin Definition:	
Pin Number	**Definition**
Pin 1	Isolated Power Input2
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 167 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 R251 and R247 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.

Mounting Procedure

You can mount CS-A55-BOX with VESA mounting (guide): **75 x 75** mm, 4 x **M4** (6mm) screws.

You can also mount CS-A55-BOX with rear mounting method (guide).

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

Mechanical Specifications

For CS-A55-BOX, the outer mechanical dimensions are N/A (W x L x H).

Disclaimer

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