



# **LPA3588 Embedded Computer**

## **Datasheet**

### **V1.1**



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## Version History

| Version | Date      | Description     |
|---------|-----------|-----------------|
| V1.0    | 2022/8/23 | Initial version |
| V1.1    | 2024/11/5 | Data update     |

## Contents

|                                          |           |
|------------------------------------------|-----------|
| <b>1.Product Introduction .....</b>      | <b>3</b>  |
| <b>2.Function Overview .....</b>         | <b>4</b>  |
| <b>3.Technical Specifications .....</b>  | <b>7</b>  |
| <b>4.Appearance and Dimensions .....</b> | <b>9</b>  |
| <b>5.Interface Definition .....</b>      | <b>10</b> |
| <b>6.Application Scenarios .....</b>     | <b>13</b> |
| <b>7.Ordering Model .....</b>            | <b>14</b> |
| <b>8.About Neardi .....</b>              | <b>15</b> |

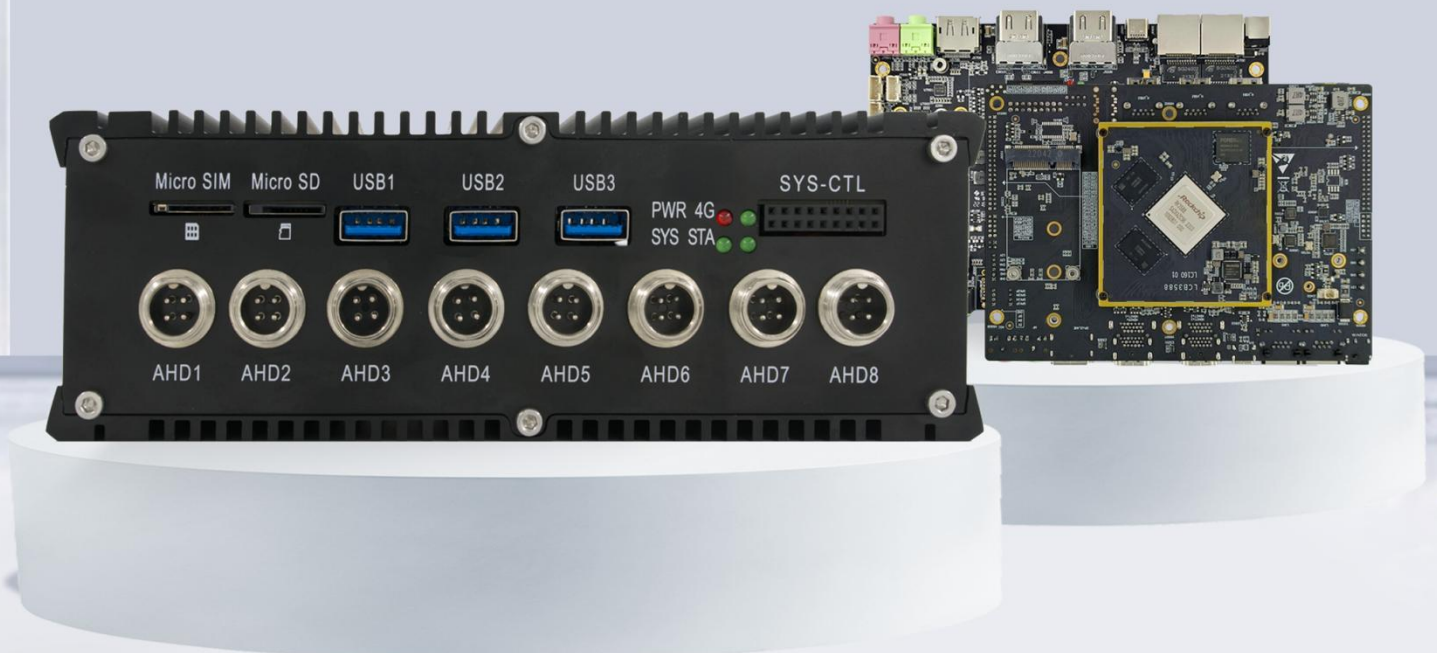
# 1.Product Introduction

The LPA3588 is an intelligent computer meticulously designed based on the Rockchip RK3588 chip. The body is made of full aluminum material with a fanless design and an innovative internal structural combination, allowing key heat-generating components such as the CPU and PMU to efficiently conduct heat to the external aluminum casing, using the entire body casing as a heat dissipation material. This design not only enables the LPA3588 to perform excellently in more severe working environments but also allows it to be widely applied in various industrial scenarios.

The LPA3588 has a variety of interfaces, including 3 USB 3.0 HOSTs, and 1 full-function Type-C interface that can connect multiple USB cameras. It has 2 onboard mini-PCIe interfaces that can be expanded to connect 4G/5G modules or NPU computing cards with mini-PCIe interfaces based on RK1808, combining with multiple cameras to form an artificial intelligence vision computer. In addition, the LPA3588 supports dual-band WIFI 6, BT5.0, 2 Gigabit Ethernet, CANBUS, RS485, and other communication module interfaces. It provides 3 HDMI outputs, 1 HDMI input, supports audio input and output, can be connected to a 10W@8Ω stereo sound box, 1 DP interface output, 1 dual-channel LVDS interface and backlight control and touch screen interface, and has a built-in M.2 NVMe 2280 solid-state drive interface that can be connected to various display interfaces and supports multi-screen independent display.

The LPA3588 intelligent computer supports the simultaneous connection of 8 AHD cameras, with each camera supporting up to 1920\*1080@30Hz image input; AHD cameras use the industry-standard GX12 aviation plug, which is reliable and has high stability. Multiple cameras can be connected at the same time, suitable for panoramic stitching, ADAS vehicle intelligent terminals, etc.

The LPA3588 supports multiple operating systems such as Android, buildroot, Debian, and Ubuntu, offering excellent high performance, high reliability, and high scalability. The system source code is open to users, providing open-source support for secondary development and customization. We are committed to providing developers and enterprise users with comprehensive technical services to assist users in efficiently completing research and development work and helping customers quickly bring products to market.



## 2. Function Overview



### High-Performance Processor

|             |                                                                                                                                         |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>CPU</b>  | 8nm advanced process technology with an 8-core 64-bit architecture (4A76 + 4A55), offering high performance with low power consumption. |
| <b>GPU</b>  | ARM Mali-G610 MC4 GPU, featuring a dedicated 2D graphics acceleration module.                                                           |
| <b>NPU</b>  | 6TOPS computing power for AI-related tasks.                                                                                             |
| <b>VPU</b>  | Capable of 8K video encoding and decoding, as well as 8K display output.                                                                |
| <b>DDR</b>  | LPDDR4 memory, with options for 4GB, 8GB, or 16GB capacities.                                                                           |
| <b>eMMC</b> | eMMC 5.1 storage, with options for 32GB, 64GB, or 128GB capacities.                                                                     |



### Rich Interfaces

3 HDMI outputs, 1 HDMI input, 1 DP interface output, 1 Type-C with DP1.4 display interface output, 1 dual 8-bit LVDS output, supporting up to 6 screens with independent display.

2 Gigabit Ethernet ports, dual-band WIFI 6; supports the expansion of 4G/5G modules.

3 Type-A USB 3.0 HOSTs.

8 AHD camera interfaces.

2 UARTs, 4 RS232s, 1 RS485, 2 CANBUS.



### Scalable NPU Computing Power

NPU computational power can be expanded up to 38 TOPS; capable of externally connecting 1

computational card with 26 TOPS of computational power and 2 computational cards with 3 TOPS each.

Demo programs are provided.

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## Operating System

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Android

Linux (Buildroot / Debian / Ubuntu)

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## Open Source Materials

WIKI Documentation      <http://www.neardi.com/cms/en/wiki.html>

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Quick Start

Firmware Upgrade

Android Development

Linux Development

Kernel Drivers

DEMO

System Customization

Accessories

Frequently Asked Questions (FAQ)

Release Notes

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## Hardware Materials

Product 2D/3D Drawings

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## Software Materials

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Firmware Tools and Drivers

Android Source Code and Images

U-Boot and Kernel Source Code

Debian/Ubuntu/Buildroot System Files

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### 3. Technical Specifications

#### Basic Parameters

|      |                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------|
| SOC  | RK3588 8nm; 8-core 64-bit processor architecture (4A76 + 4A55).                                                                            |
| GPU  | ARM Mali-G610 MC4; Supports OpenGL ES 1.1/2.0/3.1/3.2; Vulkan 1.1/1.2; OpenCL 1.1/1.23/2.0; High-performance 2D image acceleration module. |
| NPU  | 6TOPS computing power / 3-core architecture; Supports int4/int8/int16/FP16/BF16/TF32.                                                      |
| VPU  | Supports H.265/H.264/AV1/VP9/AVS2 video decoding, up to 8K60FPS;<br>Supports H.264/H.265 video encoding, up to 8K30FPS.                    |
| DDR  | LPDDR4, with options for 4GB/8GB/16GB.                                                                                                     |
| eMMC | eMMC 5.1, with options for 32GB/64GB/128GB.                                                                                                |
| PMU  | RK806                                                                                                                                      |
| OS   | Android / Ubuntu / Buildroot / Debian                                                                                                      |

#### Hardware Specifications

|                |                                                    |
|----------------|----------------------------------------------------|
| Power          | DC 9V - 36V, Default to 24V power supply input     |
| USB            | 3*Type-A USB3.0 HOST,<br>1*Type-c USB3.1 OTG       |
| Display output | 3*Type-A HDMI 2.0,<br>1*DP,<br>1*Duel channel LVDS |



|              |                                                             |
|--------------|-------------------------------------------------------------|
| Audio        | 1*φ3.5mm audio out,                                         |
|              | 1*φ3.5mm microphone,                                        |
|              | 2*Speaker output with 10W@8Ω                                |
| Video input  | 1*HDMI2.0 Input,                                            |
|              | 8*AHD input up to 1920*1080@30fps per channel               |
| PCIe         | 1*mini PCIe for 2G/3G/4G/5G LTE module,                     |
|              | 1*mini PCIe for AI cards (optional)                         |
| M.2          | M.2 NGFF ( M-KEY ) PCIE V2.1 *4 with NVMe SSD supported     |
| SATA         | 1*SATA3.0                                                   |
| SD card      | Compatible with SDIO 3.0 protocol, system boot up supported |
| SIM card     | Micro sim slot for Mini-PCIe 4G LTE module                  |
| RJ-45        | 2*10/100/1000 Ethernet                                      |
| Connectivity | 2*Uart, 2*CANBUS, 4*RS232, 1*RS485                          |

### Other Parameters

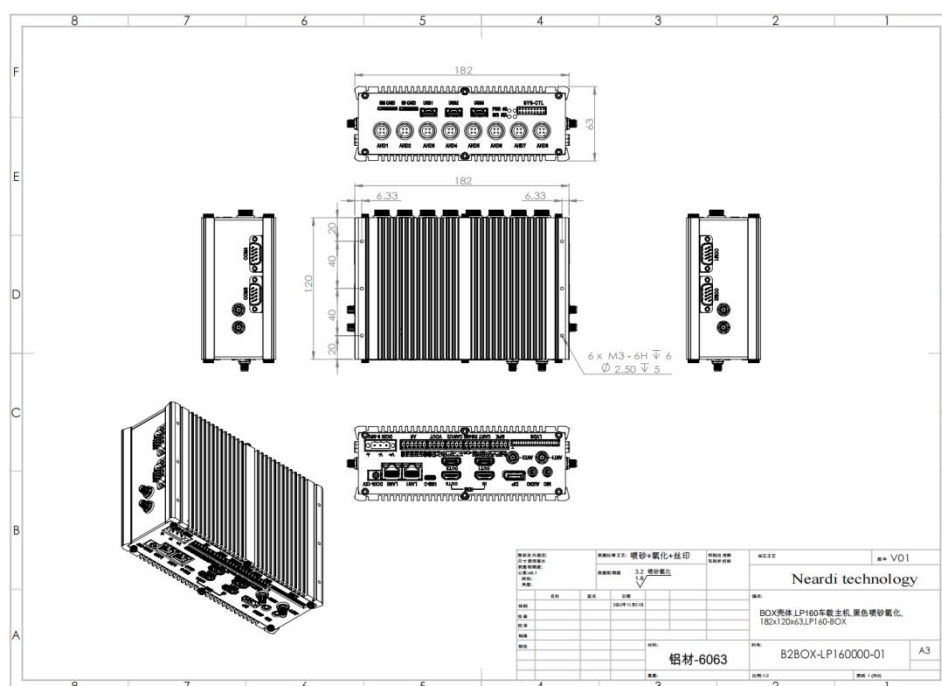
|                       |                                             |
|-----------------------|---------------------------------------------|
| Dimensions            | L*W*H(mm) 182*120*63                        |
| Operating Temperature | -10 ~ 70℃                                   |
| Weight                | Approximately 1138g (excluding peripherals) |

## 4. Appearance and Dimensions

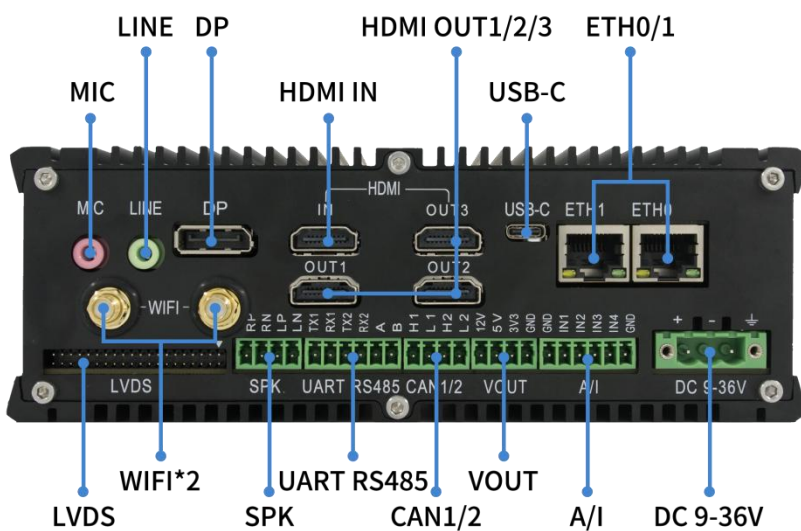
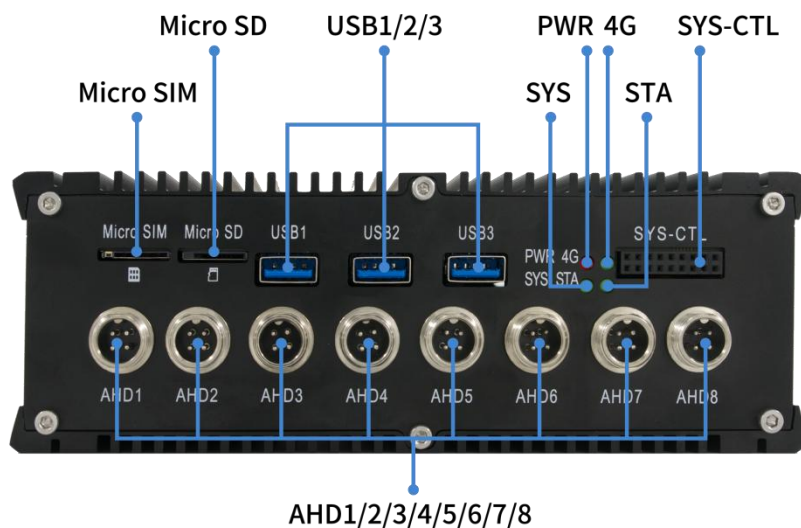
### 4.1 Appearance



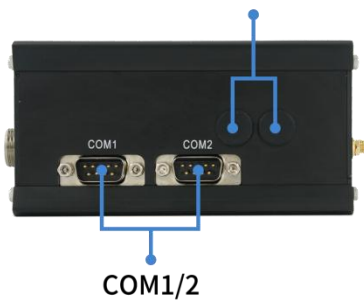
### 4.2 Dimensions



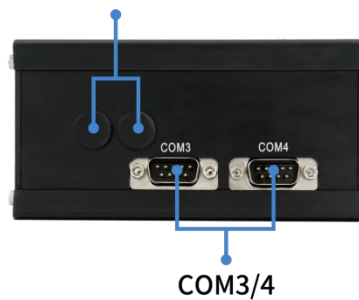
## 5.Interface Definition



Reserved Antenna Interface\*2



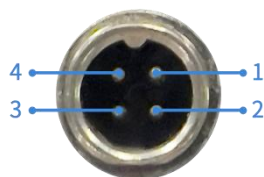
Reserved Antenna Interface\*2



| Name       | Function                | Notes                                                                |
|------------|-------------------------|----------------------------------------------------------------------|
| DCIN 9-36V | 9V-36Vpower input       | Default to 24V power supply input                                    |
| MIC        | φ3.5mm 3-L Jack         | Micphone In                                                          |
| LINK       | φ3.5mm 3-L Jack         | L/R audio out                                                        |
| HDMI IN    | HDMI2.0 input           | HDMI 2.0 input up to 4K@30HZ                                         |
| HDMI OUT1  | HDMI output             | HDMI 2.0 output up to 4K@60HZ                                        |
| HDMI OUT2  | HDMI output             | HDMI 2.0 output up to 4K@60HZ                                        |
| HDMI OUT3  | HDMI output             | HDMI 2.0 output up to 4K@30HZ                                        |
| DP         | DP output               | DP Output up to 1920*1080@60HZ                                       |
| AHD1~AHD8  | AHD signal input        | AHD input up to 1920*1080@30HZ per channel                           |
| LAN1       | RJ45                    | 10/100/1000-Mbps data transfer rates                                 |
| LAN2       | RJ45                    | 10/100/1000-Mbps data transfer rates                                 |
| LVDS       | Lvds LCM                | Dual channel 24bit LVDS output with backlight control and TP signals |
| ANT1/ANT2  | WIFI/BT antenna         | 2.4G/5.8G frequency                                                  |
| USB1       | USB2.0 HOST             | The first USB3.0 host for external devices                           |
| USB2       | USB2.0 HOST             | The second USB3.0 host for external devices                          |
| USB3       | USB3.0 HOST             | The third USB3.0 host for external devices                           |
| USB-C      | Type-C usb              | Full function type-C USB3.1 with DP output                           |
| SIM CARD   | Micro Sim card slot     | Micro Sim card slot                                                  |
| SD CARD    | T-flash card            | SDIO3.0                                                              |
| SYS-CTL    | System control or debug | 2.54MMpitch,2*9PIN,A2541HWR-2x9P                                     |

|            |                    |                                               |
|------------|--------------------|-----------------------------------------------|
| RS485 UART | RS485 and UART bus | RS485 signal, UART 3.3V TTL signal            |
| CAN1/2     | CAN bus            | CAN bus signal                                |
| VOUT       | Voltage output     | 12V/5V/3.3V output can be on/off by software  |
| A/I        | Analog input       | 0-16V voltage detect or 4-20mA current detect |
| COM1       | Serial COM port    | RS232 signal                                  |
| COM2       | Serial COM port    | RS232 signal                                  |
| COM3       | Serial COM port    | RS232 signal                                  |
| COM4       | Serial COM port    | RS232 signal                                  |

### AHD Pin Definition



| Pin Number | Pin Name   | Pin Description                                           |
|------------|------------|-----------------------------------------------------------|
| 1          | VCC12V_AHD | AHD Camera Power Supply Output<br>Positive Pole, 12V 0.5A |
| 2          | GND        | GND                                                       |
| 3          | NC         | NC                                                        |
| 4          | AHD_Video  | Video Input                                               |

## 6.Application Scenarios



**AI**



**Machine Vision**



**Industrial Control**



**Energy and Power**



**Smart Tablet**



**VR**



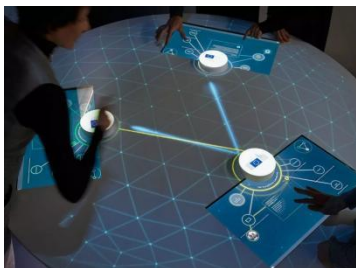
**Smart Logistics**



**New**



**Smart Commercial**



**Object Recognition**



**Vehicle terminal**



**Security Surveillance**

## 7.Ordering Model

| Product Model | Status | CPU    | DDR  | eMMC  | Operating Temperature |
|---------------|--------|--------|------|-------|-----------------------|
| LP16043200    | ACTIVE | RK3588 | 4GB  | 32GB  | -10°C - 70°C          |
| LP16086400    | ACTIVE | RK3588 | 8GB  | 64GB  | -10°C - 70°C          |
| LP1609A800    | ACTIVE | RK3588 | 16GB | 128GB | -10°C - 70°C          |

\*For customized non-standard orders, please contact us via email at [sales@neardi.com](mailto:sales@neardi.com).



## 8.About Nearidi

Shanghai Nearidi Technology Co., Ltd., established in 2014, is a national-level high-tech enterprise, a strategic partner of Rockchip, and an authorized agent for Black Sesame Technologies. We focus on the research and development and production of enterprise-level open-source hardware platforms, offering customers core modules, industry-specific boards, development boards, touch panels, and industrial control hosts. Adhering to the core philosophy of technological innovation and professional service, leveraging Nearidi Technology's technical strengths and industry experience, we assist our partners in achieving rapid mass production of their products.

## Company Advantages

Software Design / Custom OS / Product ODM / Bulk Delivery

## Products

### Rockchip

#### System On Module



LCB3588/J



LCB3568/J



LCB3566



LCB3399Pro



LCB3399

#### Development Board



LKD3588/J



LKD3568/J



LKD3566



LKD3399Pro



LKD3399

#### Embedded Computer



LPB3588



LPM3588



LPC3588



LPB3568



LPB3399Pro

### Black Sesame Technologies



SOM-A-A1000



SOM-π-A1000



SOM-B-A1000



SOM-A1000 开发者套件

### Vehicle Terminal



LPA3588



LPA3568



LPA3399Pro



LPS3399Pro

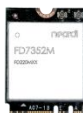
### WIFI Module



FD7352S



FD7352P



FD7352M



FD7155U



FD7256S