neardi

LPA3588 Embedded Computer Datasheet

V1.1

Notes: All contengs only for explanatory and descriptive purposes. Please refer to the actual product. We strive to ensure consistency with the actual product. This document is provided for customers as a reference for product design and end application. It is better for you confirm the specifications and parameters carefully, provided in the document to ensure they meet the design or application requirements of the product. Whatsmore, it is strongly recommended that customers conduct detailed tests based on our actual products in the actual application scenario to ensure they meet the final usage requirements. Neardi Technology does not assume any responsibility for any damage suffered due to the use of the document, materials, and product functions.

Due to product version upgrades or other needs, our company may update the manual. If you need the latest version of the manual, please contact our company. We always adhere to the principle of customer first and provide customers with fast and efficient support services. If you have any needs, please feel free to contact our company at any time. Contact information is as follows:

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Version History

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

Contents

1.Product Introductioᴨ

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.
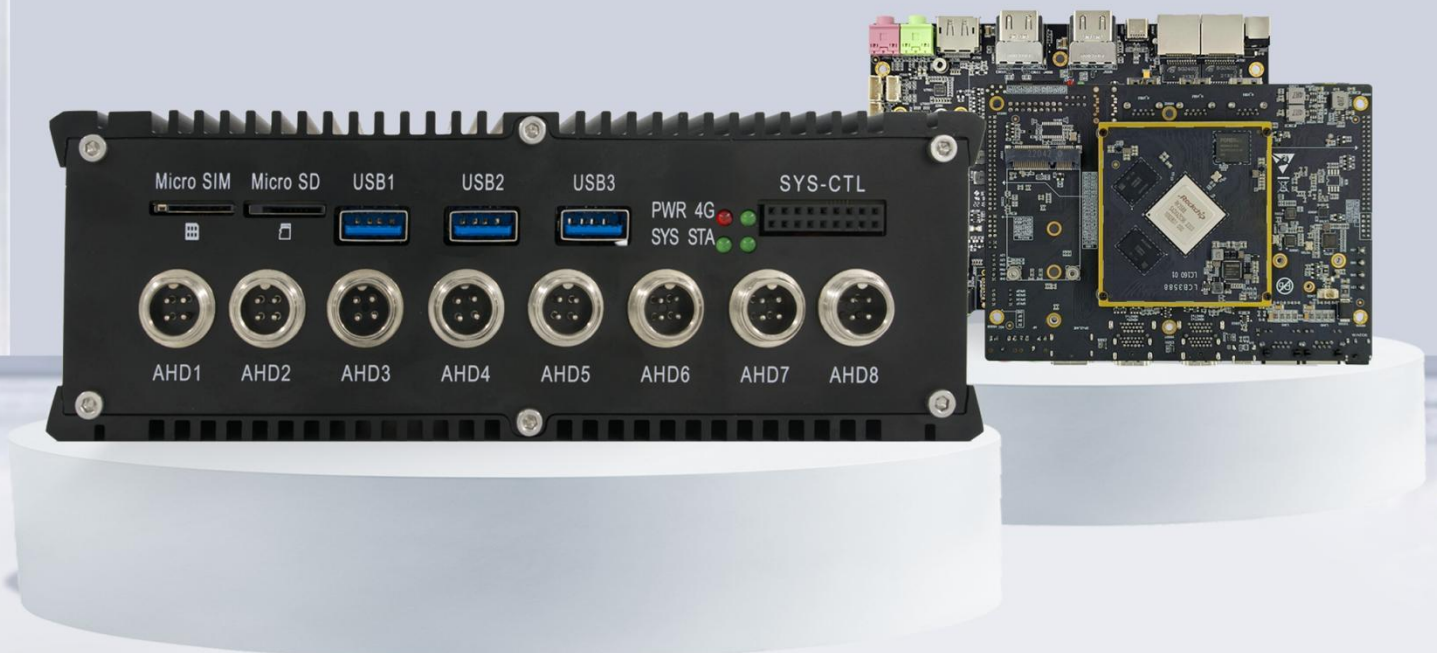
2. Function Overview

High-Performance Processor

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

Operating System

Android

Linux (Buildroot / Debian / Ubuntu)

Open Source Materials

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

Quick Start

Firmware Upgrade

Android Development

Linux Development

Kernel Drivers

DEMO

System Customization

Accessories

Frequently Asked Questions (FAQ)

Release Notes

Hardware Materials

Product 2D/3D Drawings

Software Materials

Firmware Tools and Drivers

Android Source Code and Images

U-Boot and Kernel Source Code

Debian/Ubuntu/Buildroot System Files

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; 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,
	1*Type-c USB3.1 OTG
Display output	3*Type-A HDMI 2.0,
	1*DP,
	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
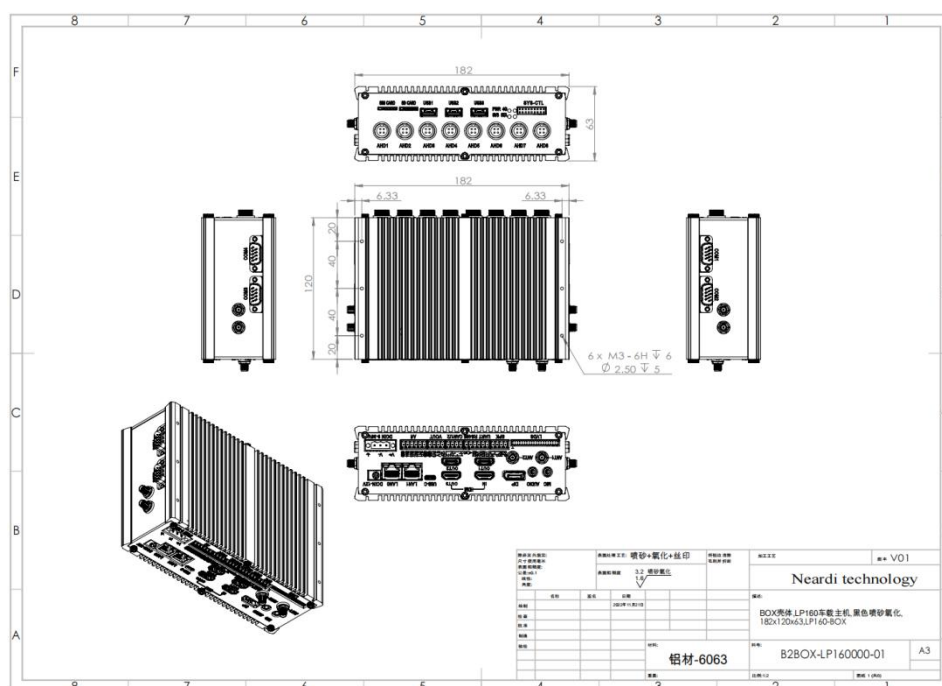
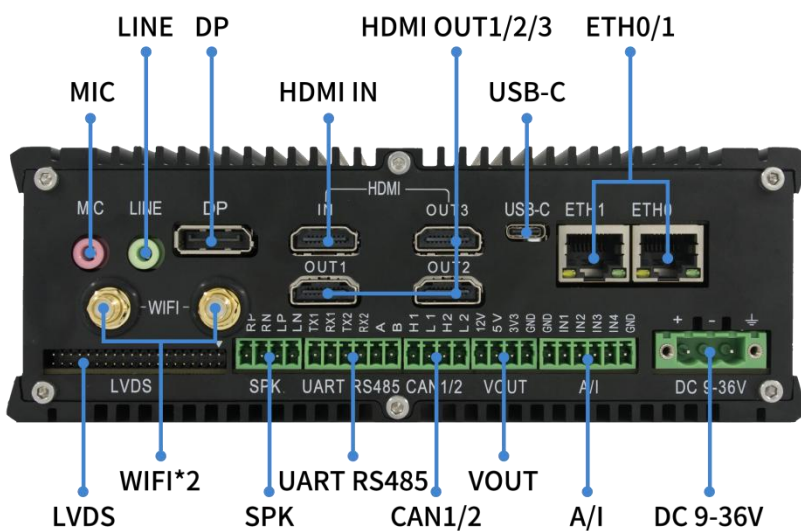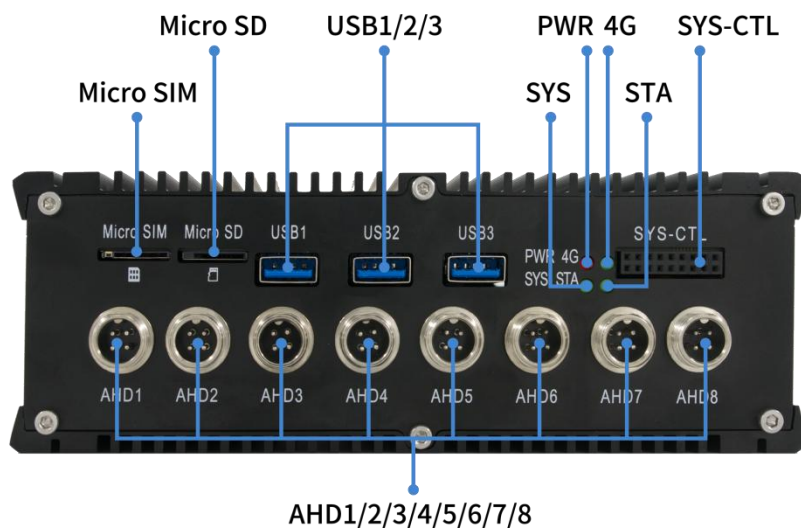|	
Dimensions	L*W*H(mm) 182*120*63
Operating Temperature	-10 ~ 70℃
Weight	Approximately 1138g (excluding peripherals)

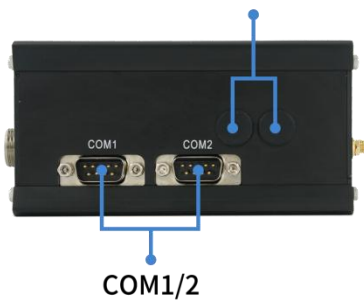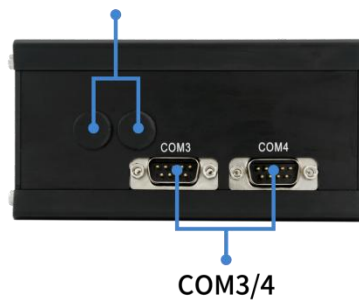# 4. Appearance and Dimensions

4.1 Appearance

4.2 Dimensions

5.Interface Definition

Micro SD   USB1/2/3   PWR 4G   SYS-CTL

Micro SIM   SYS   STA

AHD1/2/3/4/5/6/7/8

LINE   DP   HDMI OUT1/2/3   ETH0/1

MIC   HDMI IN   USB-C

WIFI*2   UART RS485   VOUT

LVDS   SPK   CAN1/2   A/I   DC 9-36V

Reserved Antenna Interface*2   Reserved Antenna Interface*2

COM1/2   COM3/4

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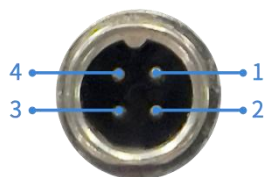
Pin Number	Pin Name	Pin Description
1	VCC12V_AHD	AHD Camera Power Supply Output Positive Pole, 12V 0.5A
2	GND	GND
3	NC	NC
4	AHD_Video	Video Input

6.Application Scenarios

AI

Machine Vision

Industrial Control

Energy and Power

Smart Tablet
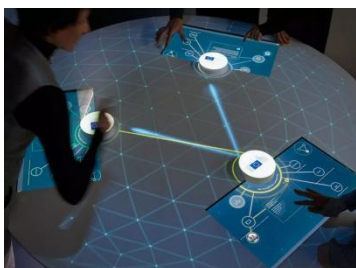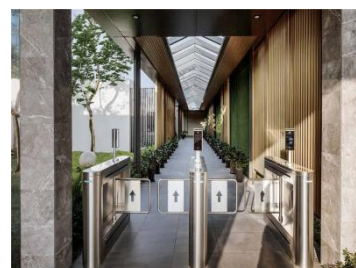

VR

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℃ - 70℃
LP16086400	ACTIVE	RK3588	8GB	64GB	-10℃ - 70℃
LP1609A800	ACTIVE	RK3588	16GB	128GB	-10℃ - 70℃

*For customized non-standard orders, please contact us via email at sales@neardi.com.

8.About Neardi

Shanghai Neardi 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 Neardi 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
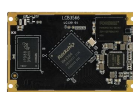
Products

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 Development kit |

Vehicle Terminal

| LPA3588 | LPA3568 | LPA3399Pro | LPS3399Pro |

WIFI Module

| FD7352S | FD7352P | FD7352M | FD7155U | FD7256S |