# ATK-DLRK3568

## Development Board Specification

## V1.5

**1. Shopping：**

TMALL：https://zhengdianyuanzi.tmall.com

TAOBAO：https://openedv.taobao.com

**2. Download**

Address：http://www.openedv.com/docs/index.html
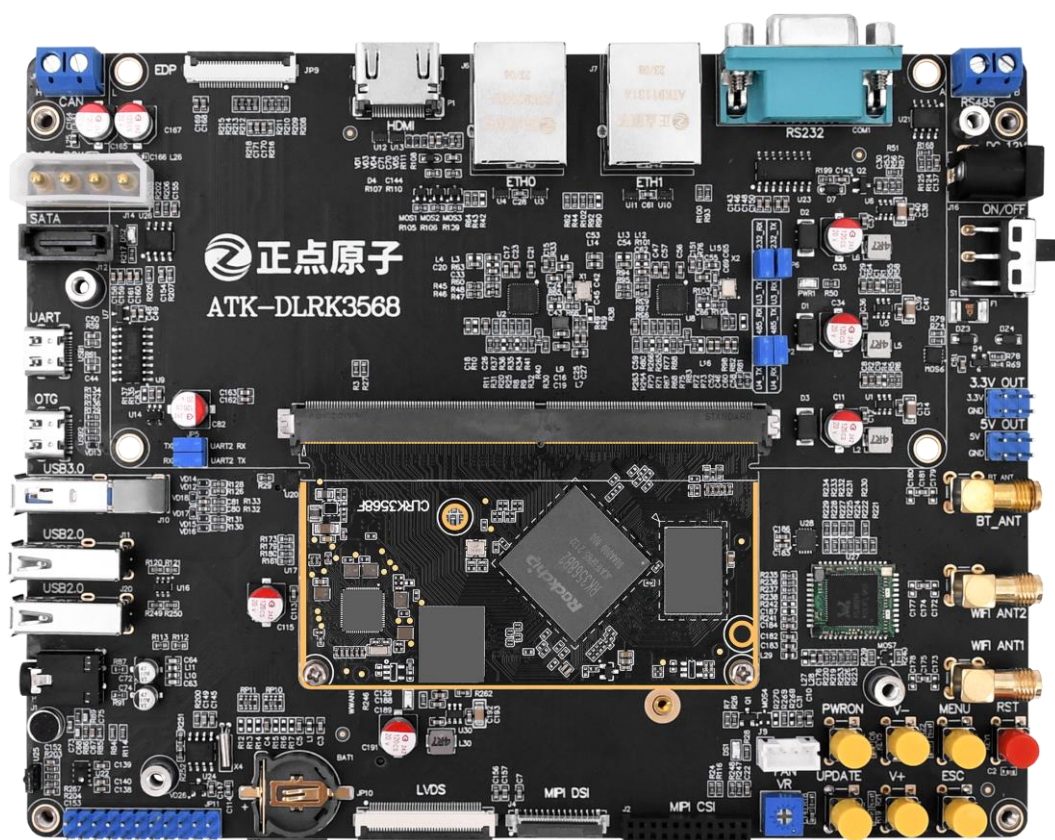
**3. FAE**

    Website   **：** www.alientek.com

    Forum    **：** http://www.openedv.com/forum.php

    Videos   **：** www.yuanzige.com

Fax     **：** +86 - 20 - 36773971

Phone  **：** +86 - 20 - 38271790

# Disclaimer

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In order to get the latest version of product information, please regularly visit the download center or contact the customer service of Taobao ALIENTEK flagship store. Thank you for your tolerance and support.

Revision History:

| Version | Version Update Notes | Responsible person | Proofreading | Date |
|---|---|---|---|---|
| V1.0 | release officially | ALIENTEK Linux Team | ALIENTEK Linux Team | 2023.07.20 |
| V1.1 | Add complementary products | ALIENTEK Linux Team | ALIENTEK Linux Team | 2023.08.05 |
| V1.2 | Correct error messages | ALIENTEK Linux Team | ALIENTEK Linux Team | 2023.08.15 |
| V1.3 | Add industrial-grade description for the core board Update the introduction of the documents in the data directory | ALIENTEK Linux Team | ALIENTEK Linux Team | 2023.10.01 |
| V1.4 | Correct error messages | ALIENTEK Linux Team | ALIENTEK Linux Team | 2024.01.31 |
| V1.5 | Delete the relevant descriptions about CAN. | ALIENTEK Linux Team | ALIENTEK Linux Team | 2025.04.10 |

# Catalogue

# Chapter 1.  Overview of Development Board

## 1.1 Introduction to the ATK-DLRK3568 development board

The ATK-DLK3568 development board is a mid-to-high-end development board launched by ALIENTEK. It is designed for Android, Linux and OpenHarmony operating systems, featuring powerful audio and video encoding and decoding capabilities, and integrating an independent NPU unit, enabling embedded AI development.

The RK3568 chip is a mid-to-high-end general-purpose SoC, using a 22nm manufacturing process, integrating a 4-core Cortex-A55 processor with a maximum frequency of 2.0GHz. It includes H264/H265 hardware encoding and decoding capabilities, supporting 4K@60fps decoding, 1080P@60fps encoding, and high-quality JPEG encoding. It also includes a 3D GPU (Mali-G52), supporting OpenGL ES1.1/2.0/3.2, OpenCL2.0 and Vulkan 1.1. Additionally, it includes a 1.0TOPs NPU, supporting INT8 and INT16. It also includes an 8M ISP, supporting multi-screen heterogeneous display, with a significant performance improvement.

The ATK-DLRK3568 development board is composed of the ATK-CLRK3568 core board and the base board. The core board has industrial and commercial versions, with the main difference being the operating temperature. The commercial version ranges from 0°C to +70°C, while the industrial version ranges from -40°C to +85°C. There are two options for memory: 2G LPDDR4X + 32G EMMC, and 4G LPDDR4X + 64G EMMC, meeting most development capacity requirements. The core board and the base board use a 314P gold finger interface format, with a total of 127 GPIOs (which can be re-used for other functions). The development board has abundant peripheral resources, including 2 gigabit Ethernet ports, RS232, USB3.0 OTG, 2 USB2.0 interfaces, MIPI DSI, HDMI, LVDS, EDP, MIPI CSI interfaces, etc.

The ATK-DLRK3568 development board provides rich development documents and software resources, covering teaching areas such as Linux system development and Android system development. All software resources are freely available. Enterprise customers can directly purchase the core board for their own product development. ALIENTEK provides a comprehensive and complete SDK to assist enterprise customers in their product development. To improve the development efficiency and shorten the development cycle for enterprise users, ALIENTEK has specially compiled a series of materials that are used in development stages for core board users, including schematics, base board design materials, mechanical structure, component packaging, connector specifications, factory system image source code, compiler, software packages, etc., to facilitate enterprise users' development.

Download the materials:

Download center: http://www.openedv.com/docs/boards/arm-linux/index.html

## 1.2 Application Areas

The application scope of RK3568:

- Smart home devices, providing efficient computing and image processing capabilities, supporting decoding and encoding of various audio and video formats.
- Industrial automation control, manufacturing, etc., providing high-precision computing and control capabilities, supporting multiple communication protocols and interfaces.

- Smart recognition (car recorders, smart locks, smart gates, unmanned supermarkets, access control and attendance systems, etc.)
- Multimedia fields (smart offices, game interaction, digital campuses, live streaming, network cameras, etc.)
- Human-computer interaction (intelligent self-service terminals, multi-channel video, information collection, etc.)

# Chapter 2.  Chip Resource Parameters

## 2.1 Parameters of RK3568 Chip

The summary table of the main resources of the RK3568 main control chip is as follows:
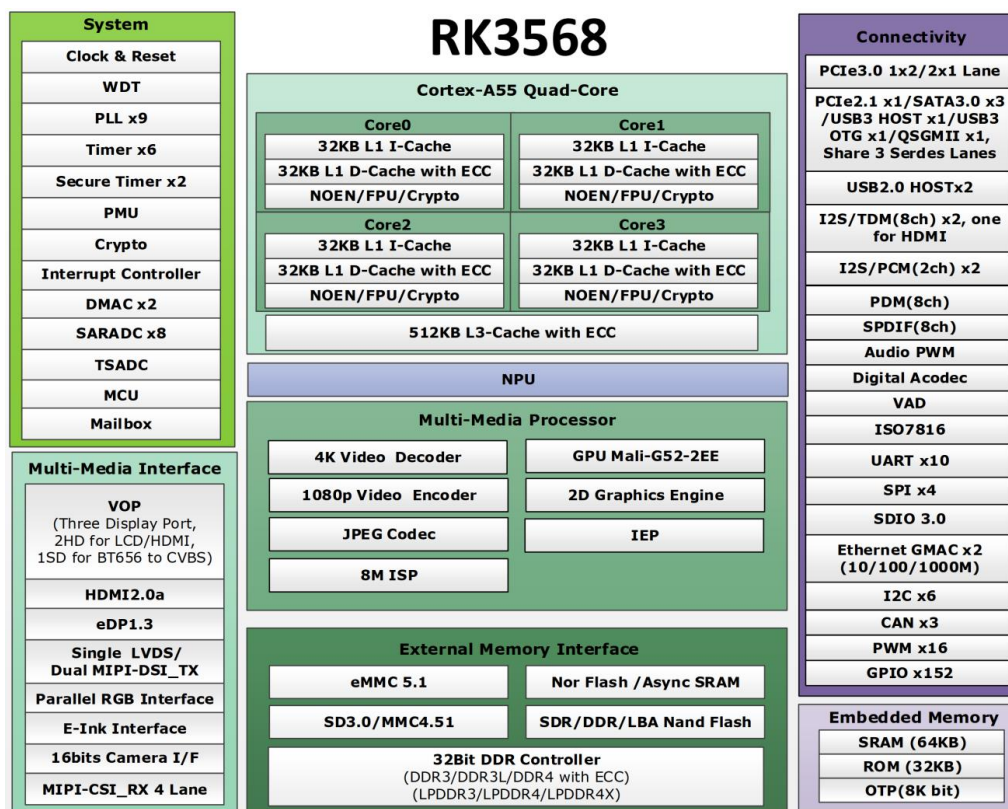


Figure 2.1-1 Chip resources

For specific detailed parameters, please refer to the data sheet of the RK3568 chip.

| RK3568 main control chip resources | | | |
|---|---|---|---|
| Processor | Quad-core Cortex-A55, 2.0GHz | GPU | Mali G52 |
| NPU | 1.0 TOPS | RGA 2D Image Engine | 2D image cropping, format conversion, scaling, rotation, image overlay, etc. |
| Video encoder | 1080P@60fpsH.265/H.264 | Video Decoder | 4k@60fps H.265/H.264/VP9 |
| JPEG decoder | Maximum support: 8176x8176 76 million pixels per second | JPEG Encoder | Maximum support: 8192x8192 Up to 90 million pixels per second |
| MIPI CSI RX | 1x4-lane/2x2-lane @2.5Gbps/lane | DVP | 8/10/12/16 bits Maximum support: 150 MHz |
| ISP | Supports 3A, HDR, 3DLUT, BLC, etc. | VICAP | Support BT.656/601/1120, etc. |

| | | | |
|---|---|---|---|
| RGB/BT1120 | Supports 1080P at 60fps Supports RGB format (8-bit maximum); Up to 150MHz data rate | MIPI DSI TX | Supports 2 channels of DSI, with each channel supporting 4 data channels; the maximum support is 2.5 Gbps/lane. Single MIPI mode supports 1080P@60Hz display; Dual MIPI mode supports 1440P@60Hz display; Supports RGB format (up to 8 bits) |
| BT656 | Support PAL and NTSC | LVDS | Supports RGB888 and RGB666 input; Supports VESA/JEIDA data format input |
| HDMI TX | Up to 10-bit deep color mode 1080P@120Hz and 4K@60Hz, supports 3D video format, RGB/YUV (up to 10-bit) format, HDCP 1.4/2.2 | EDP | Up to 4 physical channels, up to 2.7 Gbps per lane; supports PSR, 2K@60Hz, RGB format (up to 10-bit) |
| EBC | Compatible with EPD, Supports 2200*1650, 16-bit data, 16-level grayscale, and a maximum of 256 frames per scan. | USB 2.0 HOST | × 2, supports high-speed (480Mbps), full-speed (12Mbps) and low-speed (1.5Mbps) modes |
| SD3.0/MMC4.5 | × 1, The data bus width is 4 bits. | SDIO3.0 | 4-bit data bus width |
| UART | × 10, 5/6/7/8 bits, the maximum baud rate supported is 4 Mbps | Ethernet | × 2, 10/100/1000M RGMII 10/100 RMII |
| PWM | × 16 Supports continuous mode or single-shot mode | Timer | × 6, 64 bits Non-secure application program |
| PDM | × 8 Sampling rate up to 192 KHz Supports PDM main receiving mode | I2S | × 8 Sampling rate up to 192 KHz Audio resolution 16 - 32 bits |
| SPI | × 4, 32 bits Supports one chip-select output, and supports two chip-select outputs | I2C | × 6, Supports 7-bit and 10-bit address modes Data transmission rate supports 100Kbit/s, 400Kbit/s, and 1Mbit/s |
| GPIO | × 127 has the function of reusability | Package | FCCSP636L |

# Chapter 3.  Product Specifications

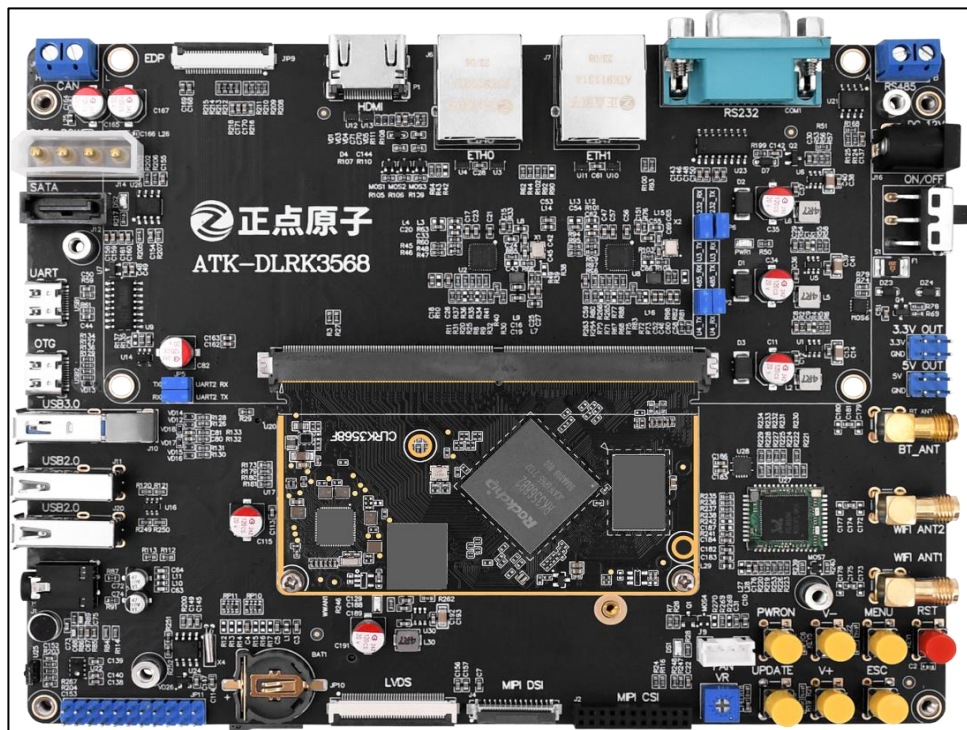## 3.1 Development Board Appearance and Shipping List



Figure 3.1-1 The front appearance of the development board
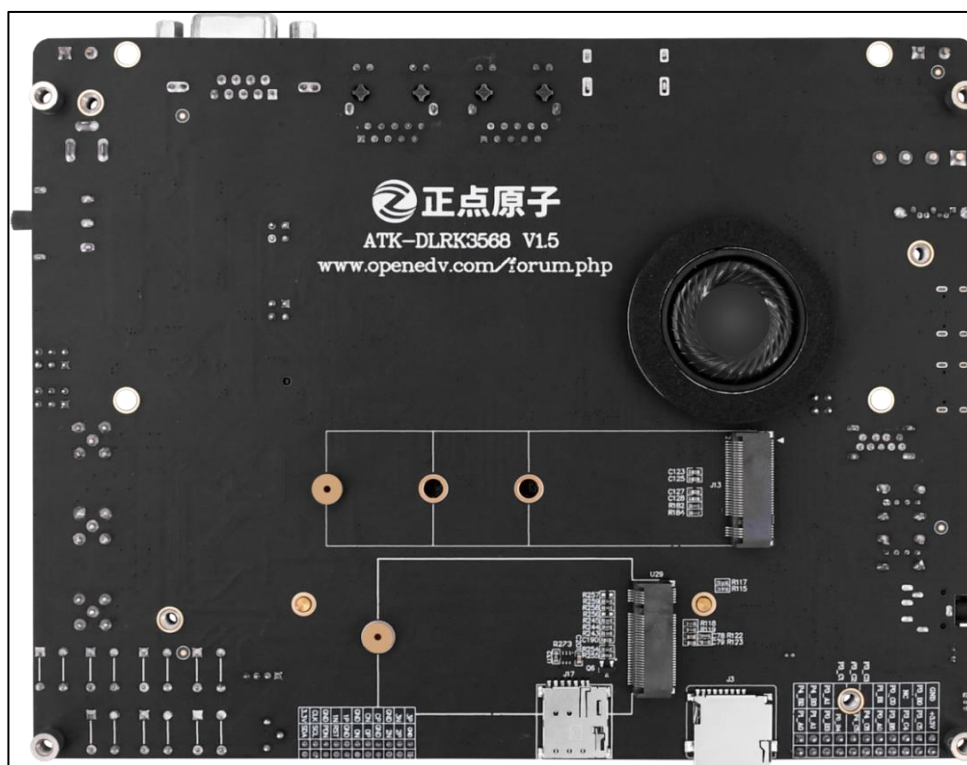


Figure 3.1-2 Backside appearance of the development board

## 3.2 Mechanical dimensions of the development board

The external dimensions of the development board are 180mm * 140mm. The image below is from the "ATK-DLRK3568 Mechanical Dimensions Chart.pdf" on the data disk. The design of the board fully considers humanized design and combines the years of development board design experience of ALIENTEK. After multiple improvements, this design was finally determined.



Figure 3.2-1 Mechanical dimensions of the development board

## 3.3 Peripheral Resources of the Development Board

The base board of the ATK-DLRK3568 development board is rich in resources. Most of the internal resources can be verified on this development board. At the same time, it is equipped with a variety of expanded interfaces and functional modules, making the entire development board look very grand.
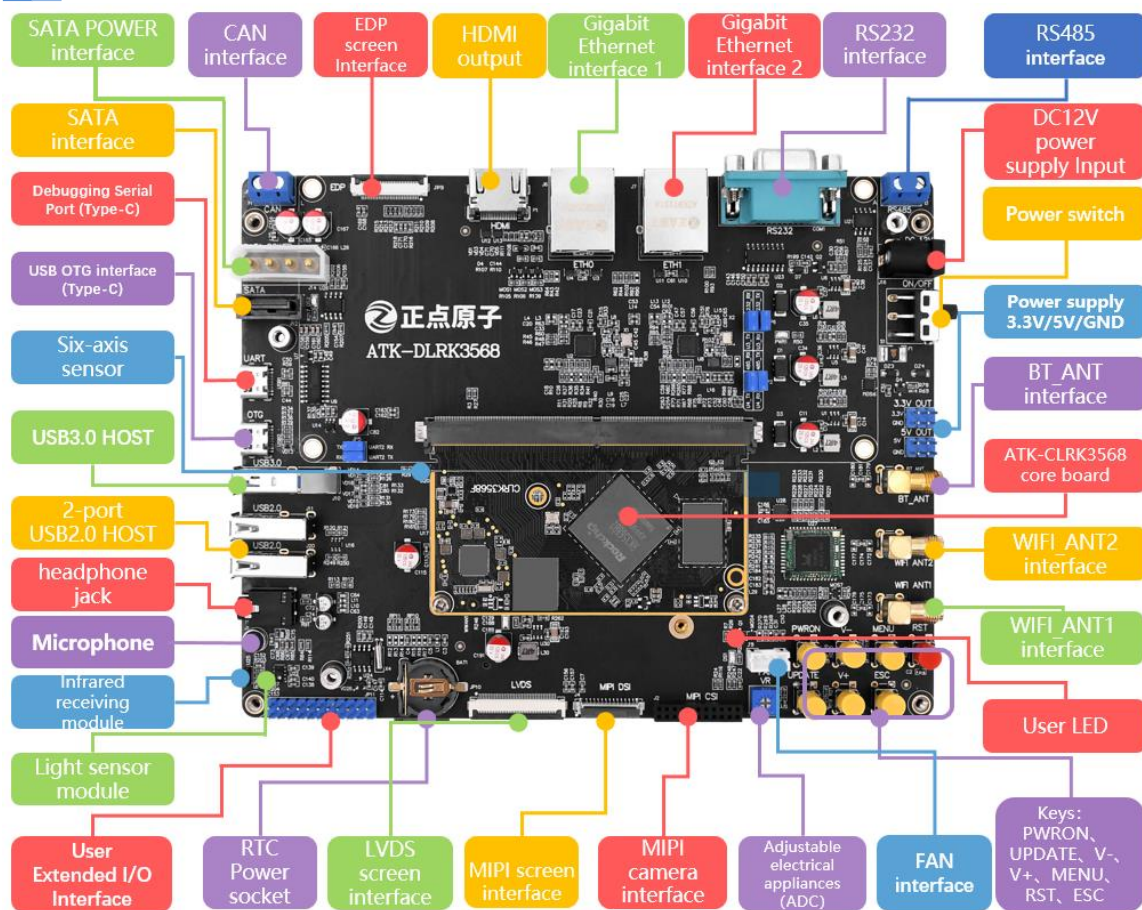
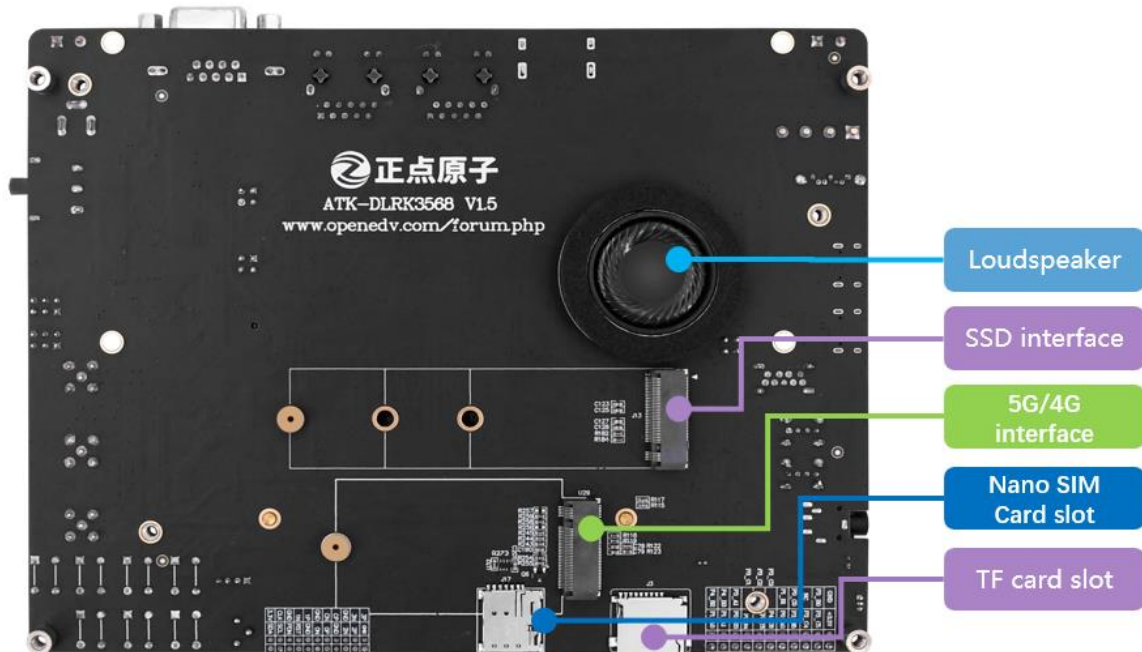Figure 3.3-1 Front resource diagram of the ATK-DLRK3568 development board



Figure 3.3-2 Backside resource diagram of the ATK-DLRK3568 development board

Default shipping list (The development board is equipped with acrylic sheet by default)

| | Default shipping list | | |
|---|---|---|---|
| | Name | Quantity | Note |
| 1 | RK3568 development board | 1 | Base plate + Core board |
| 2 | 12V 2.5A power adapter | 1 | |
| 3 | USB Type-C cable | 2 | |
| 4 | 5G/2.4G dual-band chili antenna | 3 | |
| 5 | 5G module fixed screws | 1 | |
| 6 | SSD solid-state drive M2 fixing screw | 1 | |

Figure 3.3-3 Default shipping list

The summary table of the main resources of the RK3568 main control chip is as follows:

| ATK-DLRK3568 board peripheral resources | | |
|---|---|---|
| Size | 180mm*140mm | |
| Operating system | Linux/android | |
| Main chip | CPU | Rockchip RK3568 Quad-core Cortex-A55，2.0GHz |
| Storage | ROM | × 1，32/64GB EMMC |
| | RAM | × 1，2/4GB DDR4 |
| | TF card slot | × 1 |
| Human-computer interaction | Power indicator light (blue) | × 1 |
| | Status indicator light (green) | × 1 |
| | Function buttons | × 6 |
| | Reset button | × 1 |
| | Adjustable potentiometer | × 1 |
| | MIPI-DSI interface | × 1 |
| | LVDS interface | × 1 |
| | HDMI interface | × 1 |
| | EDP interface | × 1 |
| | STAT interfave | × 1 |
| | SATA POWER interface | × 1 |
| Download/Debug | Debugging the serial port （Type-C） | × 1 |
| | USB OTG(Type-C) | × 1 |
| Wired communication | USB3.0 HOST | × 1 |
| | USB2.0 HOST | × 2 |
| | Serial port selection interface (Connector + jumper) | × 3 |

| | | |
|---|---|---|
| | FAN interface | × 1 |
| | RS232 | × 1 |
| | RS485 | × 1 |
| | Ethernet interface（RJ45） | × 2，10/100/1000M RGMII |
| Wireless communication | 4G/5G interface | × 1 |
| | Nano SIM card interface | × 1 |
| | SSD interface | × 1 |
| | WIFI_ANT interface | × 2 |
| | BT_ANT interface | × 1 |
| | Light sensor module | × 1 |
| | Infrared receiving module | × 1 |
| | Six-axis sensor | × 1 |
| Module interface | MIPI-CSI camera interface | × 1 |
| | Built-in connector pinout | × 1，2×11P |
| | Microphone (MIC) | × 1 |
| | Audio output interface | × 1 |
| | Audio input interface | × 1 |
| | Small speaker (speaker) | × 1 |
| Power supply | 5V output interface | × 3 |
| | 3.3V output interface | × 3 |
| | DC power input interface (DC6~24V) | × 1 |
| | RTC backup battery holder (Connectable to battery CR1220) | × 1，PCF8563 |
| | Power switch | × 1 |

The features of the base board of the ATK-DLRK3568 development board are as follows:

1. Rich interfaces. The board provides about ten standard interfaces, which makes it convenient for conducting experiments and development of various peripherals.

2. Flexible design. It adopts the form of core board + base board, and many resources on the board can be flexibly configured to meet the usage requirements under different conditions. We have introduced 127 GPIOs (which can be reconfigured for other functions), greatly facilitating expansion and usage.

3. Abundant resources. The board is equipped with high-performance audio codec chips, six-axis sensors, infrared receiving module, light sensor module, gigabit network card, EEPROM storage chip, and various interface chips, meeting various application needs.

4. Humanized design. Each interface is marked with silk-screen printing, making it clear to use; some commonly used peripherals are marked with large silk-screen printing for easy search; the interface position is designed reasonably, making it convenient to use.

## 3.4 Software Resources of the Development Board

The pre-packaged Linux system software resources are as shown in Table 3.4.1 (the version description mainly refers to the data disk):

| Type | Description | Note |
|---|---|---|
| U-Boot | Version: 2017.09 | Provide the source code |
| Linux Kernel | Version: 4.19.232/5.10.160 | Provide the source code |
| Buildroot | Version: 2018.02 | Provide the source code |
| Qt5 | Version: 5.15.2 | Provide the source code |
| Cross compiler | aarch64-buildroot-linux-gnu | Used for compiling the root file system and upper-layer applications |
| | gcc-linaro-6.3.1-2017.05-x86_64_aarch64-linux-gnu | Used for compiling U-Boot and Linux Kernel |
| System burn-in method | Upper computer programming | Provides usage tutorials |
| MIPI LCD driver | MIPI DSI driver | Provide the source code |
| Touch | GT911 capacitive touchscreen (available only from ALIENTEK) | Provide the source code |
| Network | The Gigabit Ethernet PHY is YT8531 | Provide the source code |
| USB HOST | One USB HOST 3.0 port, two USB HOST 2.0 ports | Provide the source code |
| USB OTG | USB slave and host | Provide the source code |
| 4G/5G module | Supports Quectel 5G module RM500U, Quectel 4G module EM05 | Provide the source code |
| PMIC | RK809 power management chip | Provide the source code |
| Function keys | ADC implements 4 function buttons | Provide the source code |
| UPDATE button | Upgrade function | Provide the source code |
| RESET button | Reset function | Provide the source code |
| PWRON button | Sleep function | Provide the source code |
| External RTC | PCF8563 RTC chip | Provide the source code |
| Six-axis sensor (I2C) | SH3001，I2C interface | Provide the source code |
| TF card/EMMC | SDMMC drive | Provide the source code |
| LED | GPIO | Provide the source code |
| Audio | Power chip RK809 has built-in audio | Provide the source code |
| SDIO WIFI&BT | RTL8852BS，supports WIFI6 | Provide the source code |
| Serial port | USB debugging serial port, 232, 485 | Provide the source code |
| ADC | ADC driver | Provide the source code |
| MIPI CSI | Supports IMX415, IMX335 and OV13850 | Provide the source code |
| PWM | LCD PWM backlight | Provide the source code |
| Light sensor (I2C) | Supports AP3216C light sensor | Provide the source code |
| IR | Supports infrared receiving function | Provide the source code |

| HDMI | HDMI output, HDMI audio, 4K@60fps | Provide the source code |
|------|-----------------------------------|-------------------------|
| PCIE M.2 | Supports M.2 interface hard drive | Provide the source code |
| SATA | Supports SATA hard drive | Provide the source code |
| LVDS | Supports LVDS screen | Provide the source code |
| eDP | Supports eDP screen | Provide the source code |

Table 3.4.1 Resources of the factory Linux system software for the development board

The resources of the factory-prepared Android system software are as shown in Table 3.4.2:

| Type | Description | Note |
|------|-------------|------|
| U-Boot | Version: 2017.09 | Provide the source code |
| Linux Kernel | Version: 4.19.232 | Provide the source code |
| Android | Provide Android 11 and Android 12 source codes | Provide the source code |
| System burn-in method | Upper computer burning | Provide usage instructions |
| MIPI LCD driver Touch | MIPI DSI driver | Provide the source code |
| | GT911 capacitive touchscreen (only available from ALIENTEK) | Provide the source code |
| Network | Gigabit Ethernet PHY is YT8531 | Provide the source code |
| USB HOST | One USB HOST 3.0 and two USB HOST 2.0 | Provide the source code |
| USB OTG | USB slave and host | Provide the source code |
| 4G/5G module | Supports Quectel 5G module RM500U, Quectel 4G module EM05 | Provide the source code |
| PMIC | RK809 power management chip | Provide the source code |
| Function keys | ADC implements 4 function buttons | Provide the source code |
| UPDATE button | Upgrade function | Provide the source code |
| RESET button | Reset function | Provide the source code |
| PWRON button | Sleep screen function | Provide the source code |
| External RTC | PCF8563 RTC chip | Provide the source code |
| Six-axis sensor (I2C) | SH3001, I2C interface | Provide the source code |
| TF card/EMMC | SDMMC driver | Provide the source code |
| LED | GPIO | Provide the source code |
| Audio | Power chip RK809 has built-in audio function. | Provide the source code |
| SDIO WIFI&BT | RTL8852BS, supports WIFI6 | Provide the source code |
| Serial port | USB debugging serial port, 232, 485 | Provide the source code |
| ADC | ADC driver | Provide the source code |
| MIPI CSI | Supports IMX415, IMX335 and OV13850 | Provide the source code |
| PWM | LCD PWM backlight | Provide the source code |
| Light sensor (I2C) | Supports AP3216C light sensor | Provide the source code |
| IR | Supports infrared receiving function | Provide the source code |
| HDMI | HDMI output, HDMI audio, 4K@60fps | Provide the source code |

| PCIE M.2 | Supports M.2 interface hard drive | Provide the source code |
|----------|-----------------------------------|-------------------------|
| SATA | Supports SATA hard drives | Provide the source code |
| LVDS | Supports LVDS display | Provide the source code |
| eDP | Supports eDP display | Provide the source code |

Table 3.4.2 Software Resources of the Factory-Prepared Android System for the Development Board

This is the end of the explanation about the software resources for the ALIENTEK ATK-DLRK3568 development board. We will continue to update the software resources.

## 3.5 Adapter Modules

The currently available adapter modules for the ATK-DLRK3568 development board are as follows:

正点原子旗舰店

**Three-in-One USB Serial Converter**

Support USB to TTL/RS232/RS485 conversion

| ESD/Overcurrent/ Lightning Strike Protection | Surge protection | Magnetic coupling isolation |



正点原子旗舰店

**USB to RS232 Serial Cable**

Length is approximately 150 cm.

| DB9 connector | CH340 Plan | Support Windows 7 |



正点原子

**RK3568 Development Board Cooling Kit**

| 4P interface | PWM speed control | Easy to assemble and disassemble |



正点原子

**RK3568 core board soldering and fixing kit**

| 0.5mm spacing | 50V | 250M |

# Chapter 4. Development documents

ALIENTEK has provided a wealth of development documents and software resources for the ATK-DLRK3568 development board, covering areas such as Linux system development manual, Linux driver development guide, QT development experiments, Android system development manual, and Android application development documentation. The software resources can be downloaded through Baidu Netdisk.

## 4.1 Downloading of Materials

Development Board Materials Download Center:
http://www.openedv.com/docs/boards/arm-linux/index.html

## 4.2 Data Description

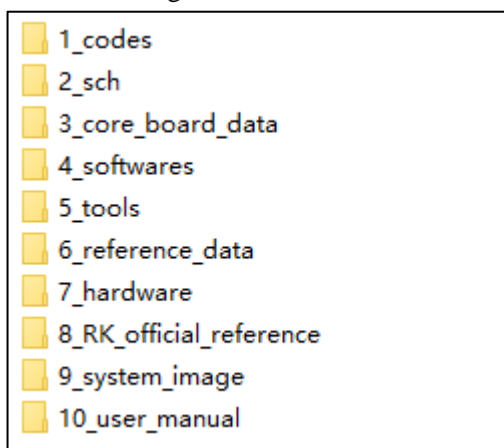First-level directory of the cloud storage data:



Figure 4.2-1 Cloud storage data main directory
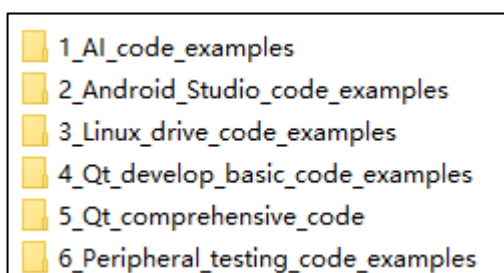
Below are some key directory sections:



Figure 4.2-2

The materials are very rich. Due to the length limitation of this document, they are not listed one by one. Please download the materials from the network disk for reference.

The document materials are constantly updated. Please use the latest network disk address to download the materials.

# Chapter 5. Precautions and maintenance

**Notes**

- Do not plug and unplug peripheral modules with power!

- Before using the product, please carefully read this manual and related development manuals, and pay attention to the applicable matters of the platform.

- Follow all instructions and warnings on the product.

- Please use this product in a cool, dry and clean place.

- Please keep the product dry. If any liquid splashes or soaks, power off immediately and let dry thoroughly.

- Do not use organic solvents or corrosive liquids to clean the product.

- Do not use or store this product in dusty, dirty and messy environment.

- If not used for a long time, please package this product, pay attention to moisture-proof and dust-proof.

- Pay attention to the ventilation and heat dissipation of the product during use to avoid component damage caused by excessive temperature during operation.

- Do not use this product in alternating hot and cold environment to avoid dew damage to components.

- Do not treat this product roughly, drop, knock or shake violently may damage the line and components.

- Pay attention to anti-static when using this product.

- FPC flexible cable is fragile, when plugging cable, pay attention to check whether the metal at both ends of the cable is misplaced and falling off.

- All products have passed the product test before shipment. Please use the development board corresponding to the ALIENTEK for power on test for the first time.

- Do not repair or disassemble the company's products by yourself. If the product fails, please contact the company in time for maintenance.

- Unauthorized modification or use of unauthorized parts may damage the product, the resulting damage will not be repaired.

# Chapter 6.  After sales service

## 6.1 Terms of after-sales service

1). After receiving the goods, please open them in front of the express, and sign after acceptance. If you find that the goods are less after signing, take photos in time and contact the seller's customer service to explain the situation within 15 days. If the feedback is lack of goods after 15 days, we will not reissue the goods. Other reasons notwithstanding).

2). 15 days -1 month: we are responsible for the return freight repair of product problems. Human factors damage expensive main chip or LCD screen, touch screen. The buyer needs to pay the cost and one time shipping fee, no maintenance fee.

3). 1-3 months: the problem of the product itself (non-human factors), we are responsible for the delivery of the past freight maintenance. If the main chip is burned out and the LCD screen and touch screen are damaged, the buyer needs to pay the cost, and the maintenance fee is not charged.

4) After 3 months: the buyer shall bear the return freight and the cost of chip, LCD screen and touch screen. No service charge.

## 6.2 After-sales Support

Technical support:

QQ group:    ALIENTEK Rockchip Communication group

ALIENTEK RK3568 Technical Support Group (order number required)

Taobao shop: ALIENTEK flagship store

Forum：http://www.openedv.com/forum.php