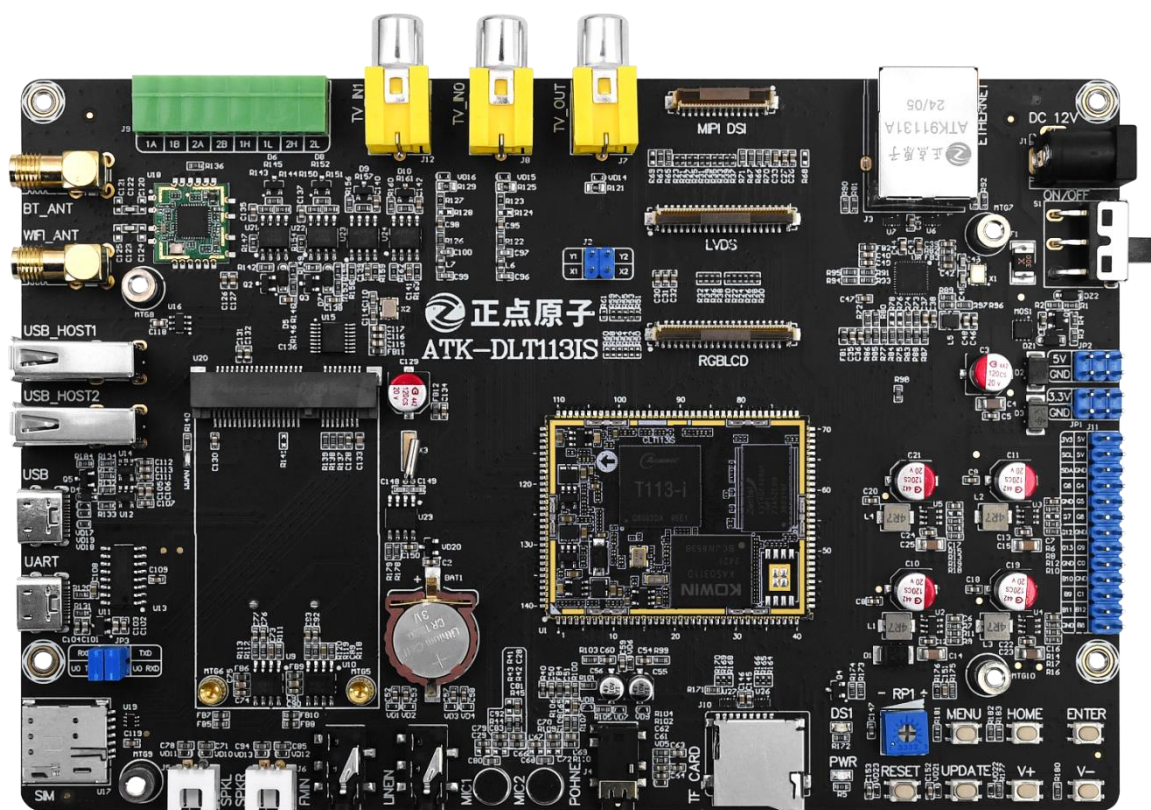


# ATK-DLT113IS

# Development Board Specification

**V1.0**



**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](http://www.alientek.com)Forum : <http://www.openedv.com/forum.php>Videos : [www.yuanzige.com](http://www.yuanzige.com)

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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	2025.03.01

## Catalogue

Chapter 1.	Overview of Development Board .....	1
1.1	Introduction to the development board .....	1
Chapter 2.	Development board hardware parameters.....	2
2.1	ATK-DLT113IS development board .....	2
2.2	ATK-CLT113IS core board hardware parameters .....	3
2.3	Hardware parameters of ATK-DLT113IS development board.....	4
2.4	Hardware parameters of ATK-DLT113IS development board.....	5
2.5	T113-i chip parameters .....	6
2.6	The core board leads to resources .....	8
Chapter 3.	Development board software resources .....	9
3.1	Factory system software resources.....	9
Chapter 4.	Development documents.....	10
4.1	Documents .....	10
4.2	T113 embedded Linux driver Development Guide directory .....	11
4.3	T113 Embedded C Application Programming Guide Directory .....	11
4.4	Other Software Information .....	12
Chapter 5.	Development board structure size .....	13
Chapter 6.	Development materials.....	14
Chapter 7.	Optional accessories.....	15
7.1	ATK-MD0700-1024*600 screen .....	15
7.2	ATK-MD1018R-1280*800 screen.....	15
7.3	ATK-MD0550-7201280 screen .....	16
Chapter 8.	Precautions and maintenance .....	18
Chapter 9.	After sales service .....	19
9.1	Terms of after-sales service .....	19
9.2	After-sales Support .....	19

## **Chapter 1. Overview of Development Board**

### **1.1 Introduction to the development board**

ATK-DLT113IS development board is a high performance development board for embedded Linux developed by ALIENTEK based on Allwinner's T113-i processor. The T113-i processor integrates ARM Cortex-A7 dual-core processor, RISC-V and HiFi DSP heterogeneous multi-core processor, which has the characteristics of high performance and high integration. The main frequency can reach 1.2GHz, supports rich communication and audio and video interfaces, and is suitable for a variety of industrial application scenarios.

The development board is composed of a core board and a bottom board, using a stamp hole connection. The development board has rich peripheral resources, supporting NET, CAN, RS485, RGB, LVDS, MIPI DSI, I2C, SPI, UART and USB interfaces. The supporting software is rich in information, providing the corresponding source code and detailed development documents. In order to improve the development efficiency of enterprise users and shorten the development cycle, we specially organize a series of materials used in the development stage for core board users, including schematic diagrams, base board design data, mechanical structure, component packaging, factory system image source code, compilers, software packages, etc., to facilitate the development of enterprise users.

Information Download Centre:

<http://www.openedv.com/docs/boards/arm-linux/T113.html>



## Chapter 2. Development board hardware parameters

### 2.1 ATK-DLT113IS development board

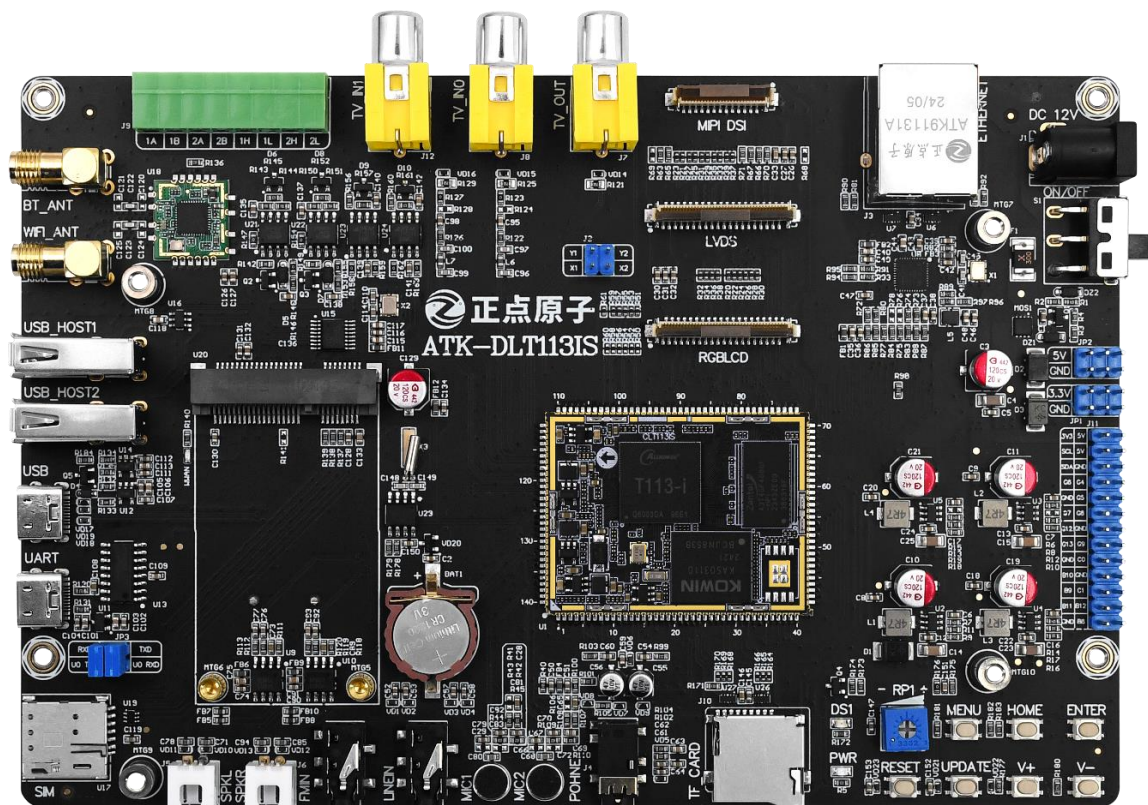


Figure 2.1-1ATK-DLT113IS development board

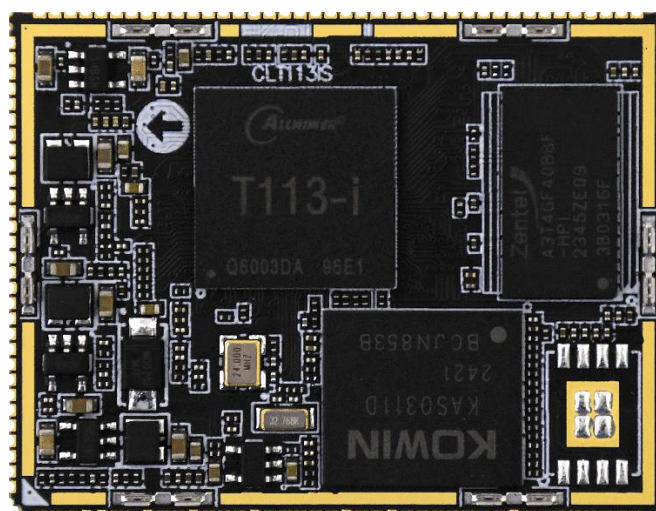


Figure 2.1-2ATK-CLT113IS core board

**2.2 ATK-CLT113IS core board hardware parameters**

Item	Parameter	Note
Dimensions and specifications	43mm*33mm	Length * width
CPU	T113-i	LFBGA package
Memory	256/512MByte	Patch encapsulation. Affected by chip supply, there may be a variety of different manufacturers of chips, all the actual patch model shall prevail.
Storage	4/5GByte EMMC(256MB NAND)	Patch encapsulation. Affected by chip supply, there may be a variety of different manufacturers of chips, all the actual patch model shall prevail.
Power management chip	Discrete power supply design	
Voltage of operation	3.3V	
Power consumption (1)	≤1.6W	Static power consumption, which depends on the peripherals
Operating temperature	industrial grade :-40℃~+85℃	
Pin spacing	1mm	
Core board connection mode	Stamp hole	
PCB process	8 layers, sinking gold process, independent grounding signal layer	Use lead-free process

Note: (1) The power consumption data of the core board is input by the environment 12V/1A, only connected to the serial port UART1, no other peripherals. The specific power consumption data depends on the peripherals connected to the development board.



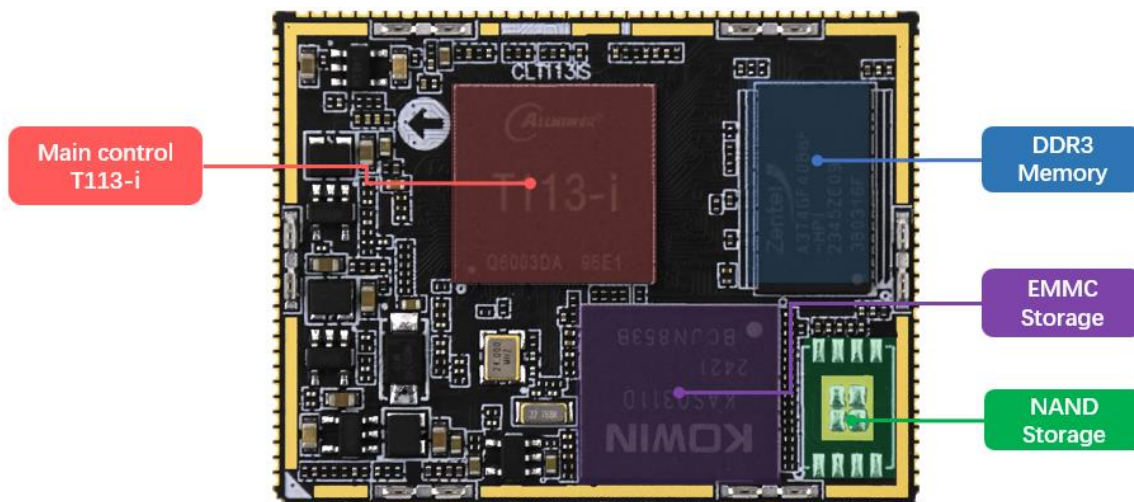


Figure 2.2-1 Core board resource diagram

### 2.3 Hardware parameters of ATK-DLT113IS development board

Item	Parameter	Note
Dimensions and specifications	180mm*120mm	Length * width
PCB process	4 layers, independent ground signal layer	Use lead-free process
Voltage of operation	12V	
Power consumption	$\geq 1.60W$	Static power consumption, which depends on the peripherals

## 2.4 Hardware parameters of ATK-DLT113IS development board

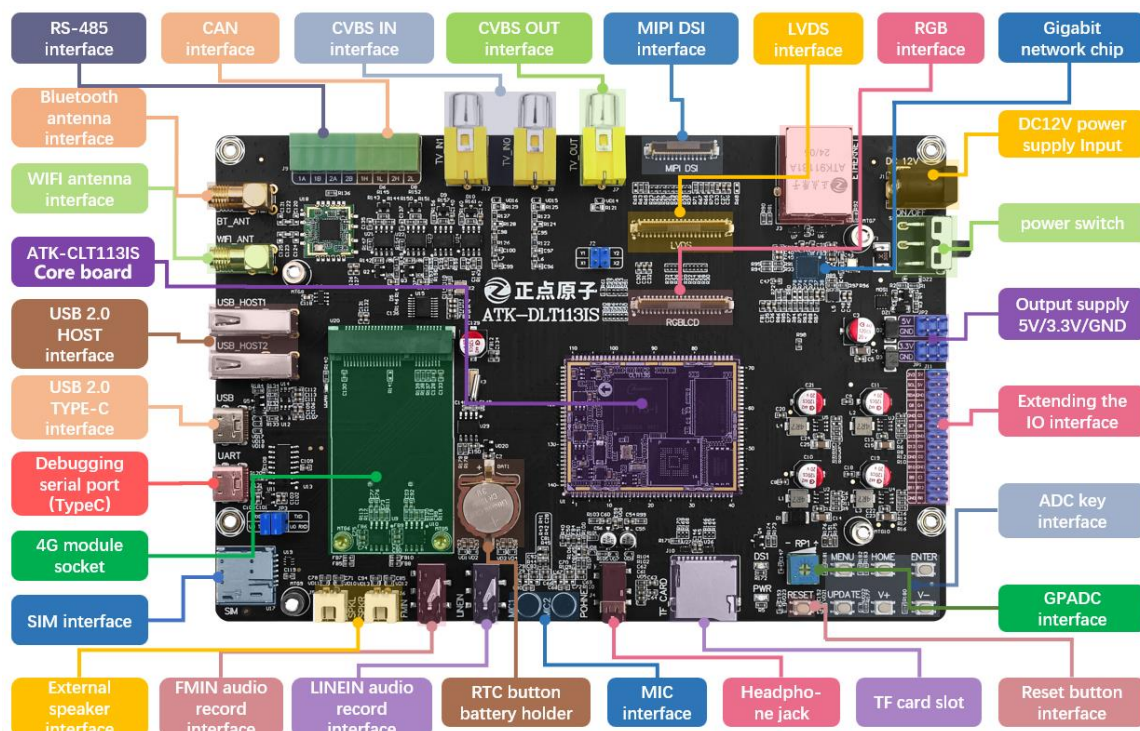


Figure 2.4-1 Development board resource diagram

- ◆ 1 core board interface
- ◆ 1 DC power input interface (DC 12V)
- ◆ 1 power indicator (blue)
- ◆ 1 status indicator (yellow-green)
- ◆ 1 channel 10M/100M/1000M Ethernet interface
- ◆ 1 way RGB interface
- ◆ 1 way LVDS interface
- ◆ 1 way MIPI DSI interface
- ◆ 2 way CVBS IN interface
- ◆ 1 way CVBS OUT interface
- ◆ 2 way CAN interface
- ◆ 2 way RS-485 interface
- ◆ 1 way WIFI&BT module, RTL8733BU
- ◆ 1 way Mini PCIE 4G module interface
- ◆ 1 way Nano SIM card interface
- ◆ 2 way USB HOST interface
- ◆ 1 USB OTF interface
- ◆ 1 USB TTL interface
- ◆ 1 RTC chip
- ◆ 1 way LINE IN audio input interface
- ◆ 1 way FMIN audio input interface
- ◆ 2 way LINE OUT audio output interface

- ◆ 2 way MIC recording interface
- ◆ 1 headphone port
- ◆ 1 small speaker
- ◆ 1 way TF card interface
- ◆ 1 way GPADC interface
- ◆ 1 reset button
- ◆ 1 burn button
- ◆ 5 user keystrokes
- ◆ 1 5V power output interface
- ◆ 1 3.3V power output interface

## 2.5 T113-i chip parameters

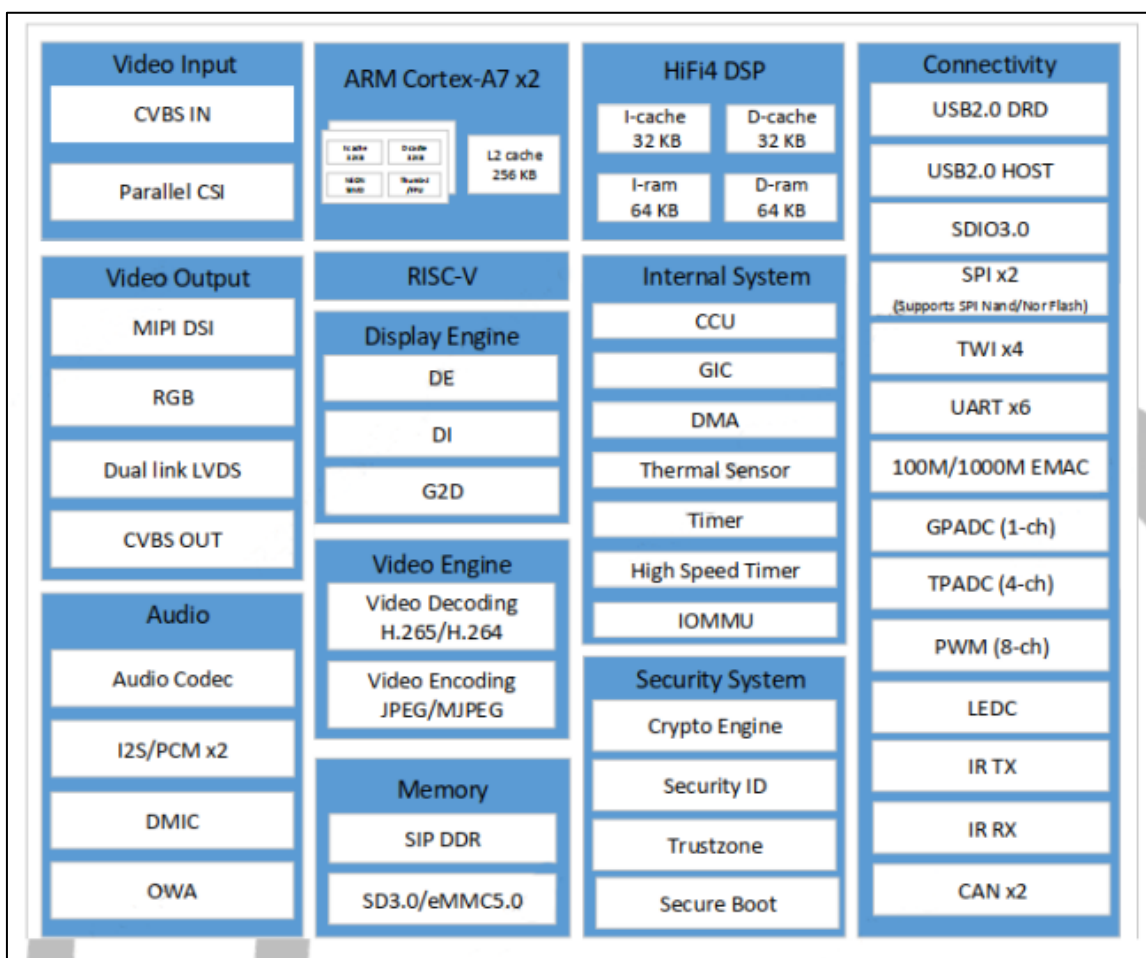


Figure 2.5-1 T113 chip function block diagram

For detailed parameters, please refer to the T113 chip manual.

## T113-i Main control chip resources

Processor	2x Cortex-A7, 1.2GHz 1x RISC-V, 1x HiFi4 DSP	Decoder	H.265/H.264/H.263/MPEG- 1/2/4/JPEG/Xvid/Sorenson Spark decoding
Encoder	JPEG/MJPEG encoding, up to 1080p@60fps	EMAC	×1, 10/100/1000 Mbit/s Ethernet port with RGMII and RMII interfaces
RGB	×1, Highest support 1920x1080@60fps	MIPI DSI	×1, Supports 4-wire MIPI DSI, Support up to 1920 x 1200@60fps
LVDS	×2, Supports 2 4lane LVDS; Highest support 1920x1080@60fps;	AUDIO CODE	×2, DAC channel, sampling rate 8KHz~192KHz; ×3, ADC channel, sampling rate 8KHz~48KHz; One way stereo LINE IN, one way stereo FM IN;
UART	×6, Support 4Mbps baud rate (64MHz APB clock)	CAN	×2, CAN 2.0A and CAN 2.0B protocols are supported
CSI	×1, Support 8-bit DVP parallel interface. Support 2*1080p@30fps;	TWI(IIC)	×4, Support standard mode 100Kbit/s, high-speed mode 400Kbit/s
SPI	×2, Support full-duplex mode master-slave mode; <small>Note: All the way used for spi NAND is not led to the core board</small>	PWM	×8, Support 0~24MHz or 100MHz; 0~100% adjustable duty cycle; Support PWM output and input capture;
CVBS OUT	×1, Support NTSC, PAL standard	CVBS IN	×2, Support NTSC, PAL standard
USB 2.0	×2, One USB OTG, one USB HOST	SMHC	×3, Supports eMMC 5.1, SD 3.0, and SDIO 3.0 specifications. <small>Note: All the way used for EMMC does not lead to the core board</small>
GPADC	×2, 12-bit SAR type A/D converter with sampling frequency up to 1MHz	TPADC	×1, 12-bit SAR A/D converter, sampling frequency up to 1MHz, support 4-wire resistive touch;
LRADC	×1, For ADC keys	I2S	×2, The sampling rate from 8KHz to 384KHz is supported

DMIC	×1, The sampling rate from 8KHz to 48KHz is supported	OWA	×1, One Wire Audio
CIR	×1, One CIR_RX interface	JTAG	×1 JTAG debug interface

## 2.6 The core board leads to resources

Factory system default configuration signal: Factory system refers to the factory kernel firmware based on the development board that comes with the core board by default, and the specific configuration can refer to the factory system device tree file.

Peripheral function	Quantity	Note
Network port	1	10/100/1000M Ethernet <b>Note: The measured speed ranges from 710 Mb/s to 750Mb/s</b>
Serial port	6	UART0 is the debugging serial port
SPI	1	It is induced by 2.54 spacing needle row
I2C	4	
FMIN	1	
LINEIN	1	
MICIN	3	Two on-board mic recordings and one headphone recording
LINEOUT	2	
HPOUT	1	
CAN	2	
USB OTG	1	type-c interface usb master/slave interface
USB	1	Use USB HUB chip to convert to 4-way USB
MIPI DSI	1	Support ALIENTEK MIPI screen
RGB	1	Support ALIENTEK RGB screen
LVDS	1	Support ALIENTEK LVDS screen
PWM	2	One of them is used for CPU frequency modulation, and the bottom board is not elicited
SMHC	1	Connect the TF-CARD interface
GPADC	2	
LRADC	1	
RTP	1	Resistive touch interface
TV-IN	2	CVBS camera interface
TV-OUT	1	CVBS output interface
RTC	1	PCF8563 on board
4G	1	USB communication
WIFI&BT	1	USB communication

## Chapter 3. Development board software resources

### 3.1 Factory system software resources

The factory Linux system software resources are shown in the following table:

Types	Description	Note
U-Boot	The version is 2018.07	Provide source code
Linux Kernel	The version is 5.4.61	Provide source code
Qt5	The version is 5.12	Provide source code
Cross compiler	arm-linux-gnueabi-gcc	Used to compile the SDK
System burn method	SD card burning, PC burning	Provide tutorials
RGB LCD	RGB driver	Provide source code
LVDS	LVDS driver	Provide source code
MIPI DSI	MIPI DSI driver	Provide source code
Touch	GT9xx capacitive screen touch screen (only available at ALIENTEK)	Provide source code
Network	The Gigabit Ethernet PHY is YT8531	Provide source code
USB HOST	USB HOST 2.0	Provide source code
USB OTG	USB slave and host	Provide source code
4G module	GOSUNCN ME3630/ QUECTEL EC20	Provide source code
Function button	Five function buttons	Provide source code
RESET button	Reset function	Provide source code
External RTC	PCF8563 RTC chip	Provide source code
TF card /EMMC	SDMMC driver	Provide source code
LED	GPIO	Provide source code
Audio	On-chip audio	Provide source code
USB WIFI&BT	RTL8733BU	Provide source code
Serial port	USB debugging serial port, RS-485	Provide source code
PWM	LCD PWM backlight	Provide source code
CAN	Two CAN interface	Provide source code
CVBS OUT	One CVBS output interface	Provide source code
CVBS IN	Two CVBS input interfaces	Provide source code

## Chapter 4. Development documents

### 4.1 Documents

Development materials	
Document list (PDF format)	Description
ATK-DLT113IS Embedded Linux Driver Development Guide	Learning-driven based on factory system
ATK-DLT113IS Embedded Linux C Application Programming Guide	Learn application programming based on factory system
Embedded Qt development foundation	Learn basic Qt programming based on the factory system

User manual	
Document list (PDF format)	Description
ATK-DLT113IS Quick Test Manual	1.System burning 2.Use and test the development board
ATK-DLT113IS Factory system SDK user manual	1. install the cross compiler 2. compile the factory source code
ATK-DLT113IS Hardware Reference Manual	1.Development board resources description 2.Schematic diagram description
ATK-DLT113IS Buildroot User Manual	Guide to using the Buildroot file system
ATK-DLT113IS C906 Heteronuclear use documentation	Guide to use heteronuclear configuration
ATK-DLT113IS Construction of embedded Qt5 development environment	Install and configure environments such as Qt Creator
ATK-DLT113IS Multimedia Usage Documentation	Development board to play video instructions
ATK-DLT113IS Logo Replacement Manual	Replace the factory system display logo of the development board
ATK-DLT113IS Functional reuse manual	Description of core board interface function reuse
ATK-DLT113IS Debugging serial port modification manual	Change the default debugging serial port instructions
Ubuntu environment setup &VSCode installation and use	Development board environment construction instructions
ATK-DLT113IS Allwinner documentation manual	Check out the official documentation
Linux Network Environment Setup Manual	Development environment network building manual



**Official information of Allwinner**

Document list (PDF format)	Description
Reference manual	T113 processor reference manual
Data sheet	T113 processor datasheet

## 4.2 T113 embedded Linux driver Development Guide directory

### ATK-DLT113IS embedded driver development guide

Chapter 1 Introduction of ATK-DLT113IS development board	Chapter 13 SPI Subsystem
Chapter 2 Development environment setup	Chapter 14 UART Subsystem
Chapter 3 Basic Usage of SDK	Chapter 15 RS485 Subsystem
Chapter 4 Explains basic usage of the kernel sources	Chapter 16 CAN Subsystem
Chapter 5 Embedded Linux kernel driver basics	Chapter 17 MMC Subsystem
Chapter 6 The GPIO Subsystem	Chapter 18 Display Subsystem
Chapter 7 Pinctrl Subsystem	Chapter 19 Ethernet Subsystem
Chapter 8 PWM Subsystem	Chapter 20 Audio Subsystem
Chapter 9 LED Subsystem	Chapter 21 WiFi Subsystem
Chapter 10 Input Subsystem	Chapter 22 Bluetooth Subsystem
Chapter 11 ADC Subsystem	Chapter 23 4G Subsystem
Chapter 12 I2C Subsystem	

## 4.3 T113 Embedded C Application Programming Guide Directory

### ATK-DLT113IS Embedded Linux C Application Programming Guide

Part 1 Getting Started	
Chapter 1 Applies programming concepts	Chapter 8 Signals:The basics
Chapter 2 File I/O basics	Chapter 9 Processes
Chapter 3 Dives deeper into file I/O	Chapter 10 Introduces interprocess communication
Chapter 4 Standard I/O Libraries	Chapter 11 Threads
Chapter 5 File properties and directories	Chapter 12 Thread Synchronization
Chapter 6 String processing	Chapter 13 Advanced I/O
Chapter 7 System information and system resources	Chapter 14 Summary
Part 2 Improvement	
Chapter 15 Light up the LED	Chapter 24 PWM Application Programming
Chapter 16 Programming GPIO Applications	Chapter 25 Serial port application programming
Chapter 17 Input device application programming	Chapter 26 Watchdog Application Programming
Chapter 18 Use the tslib library	Chapter 27 Audio Application Programming
Chapter 19 Programming with FrameBuffer Applications	Chapter 28 Network Basics

<a href="http://www.alientek.com">http://www.alientek.com</a> Forum: <a href="http://www.openedv.com/forum.php">http://www.openedv.com/forum.php</a>	
Chapter 20 Displaying jpeg images on LCD	Chapter 29 socket Programming Basics
Chapter 21 Displaying png images on LCD	Chapter 30 CAN Application Programming Basics
Chapter 22 Switch LCD landscape screen to portrait screen	Chapter 31 Introduction and Advanced Cmake
Chapter 23 Displaying characters on LCD	

4.4 Other Software Information

名称	修改日期	类型	大小
01、程序源码	2025/2/7 16:21	文件夹	
02、底板原理图	2025/2/7 15:34	文件夹	
03、软件	2025/2/7 15:28	文件夹	
04、参考资料	2024/12/6 14:28	文件夹	
05、开发工具	2025/2/7 15:33	文件夹	
06、硬件资料	2025/2/17 14:57	文件夹	
07、全志参考资料	2025/1/10 9:43	文件夹	
08、系统镜像	2024/12/6 15:37	文件夹	
09、用户手册	2025/2/7 15:34	文件夹	
资料更新记录.txt	2025/1/10 9:43	文本文档	0 KB

Figure 4.4-1 Other Software Information



## Chapter 6. Development materials

### Download development materials:

Development materials are written based on ATK-CLT113IS development board, please use the development board for project research and testing.

Development board Catalog:

名称	修改日期	类型	大小
01、程序源码	2025/2/7 16:21	文件夹	
02、底板原理图	2025/2/7 15:34	文件夹	
03、软件	2025/2/7 15:28	文件夹	
04、参考资料	2024/12/6 14:28	文件夹	
05、开发工具	2025/2/7 15:33	文件夹	
06、硬件资料	2024/12/6 14:29	文件夹	
07、全志参考资料	2025/1/10 9:43	文件夹	
08、系统镜像	2024/12/6 15:37	文件夹	
09、用户手册	2025/2/7 15:34	文件夹	
资料更新记录.txt	2025/1/10 9:43	文本文档	0 KB

Figure 4.4-1 Development board catalog

### Core board information Download:

The core board information is based on the ATK-CLT113IS core board, extracted from the ATK-DLT113IS development board information, convenient for users to download and use separately.

Core board data directory:

名称	修改日期	类型	大小
01、核心板管脚定义	2025/2/17 14:58	文件夹	
02、核心板板载芯片资料	2025/2/17 14:58	文件夹	
03、核心板使用参考手册	2025/2/17 14:58	文件夹	
04、核心板规格书	2025/2/17 14:59	文件夹	
05、核心板认证证书	2025/2/17 14:59	文件夹	

Figure 4.4-2 Core board data directory

## Chapter 7. Optional accessories

### 7.1 ATK-MD0700-1024\*600 screen

[RGB screen] ALIENTEK 7.0 inch RGB LCD module capacitive touch LCD display 1027\*600

Purchase link:

<https://detail.tmall.com/item.htm?abbucket=12&id=609758563397&rn=2bc286587344e22f9d93b3dfb05610f6&spm=a1z10.5-b-s.w4011-24686329149.89.1c3a48f5PH3kc9&skuId=4882572749742>



Figure 7.1-1 ATK-MD0700-1027\*600 screen

### 7.2 ATK-MD1018R-1280\*800 screen

[LVDS screen] 10.1-inch LVDS LCD module capacitor touch LCD display 1280\*800

Purchase link:

<https://detail.tmall.com/item.htm?abbucket=12&id=609034096308&rn=1a8459d219e6a69db3c297428c5fe026&spm=a1z10.3-b-s.w4011-24686329152.15.54d874679pwNCY>



Figure 7.2-1 ATK-MD1018R-1280\*800 screen

### 7.3 ATK-MD0550-7201280 screen

5.5 inch MIPI capacitive touch screen module 720\*1280

Purchase link:

<https://detail.tmall.com/item.htm?abbucket=12&id=691859000787&rn=0c60696d5f6381f7af67450da293e9fa&spm=a1z10.5-b-s.w4011-24686329149.129.3c74478c2YVEvx>



Figure 7.3-1 ATK-MD0550-7201280 screen



## **Chapter 8. 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 9. After sales service**

### **9.1 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.

### **9.2 After-sales Support**

Technical support:

QQ group: ALIENTEK **T113-i** Communication group: 1032186104

ALIENTEK **T113-i** User Group: 2152038686 (order number required)

Taobao shop: ALIENTEK flagship store