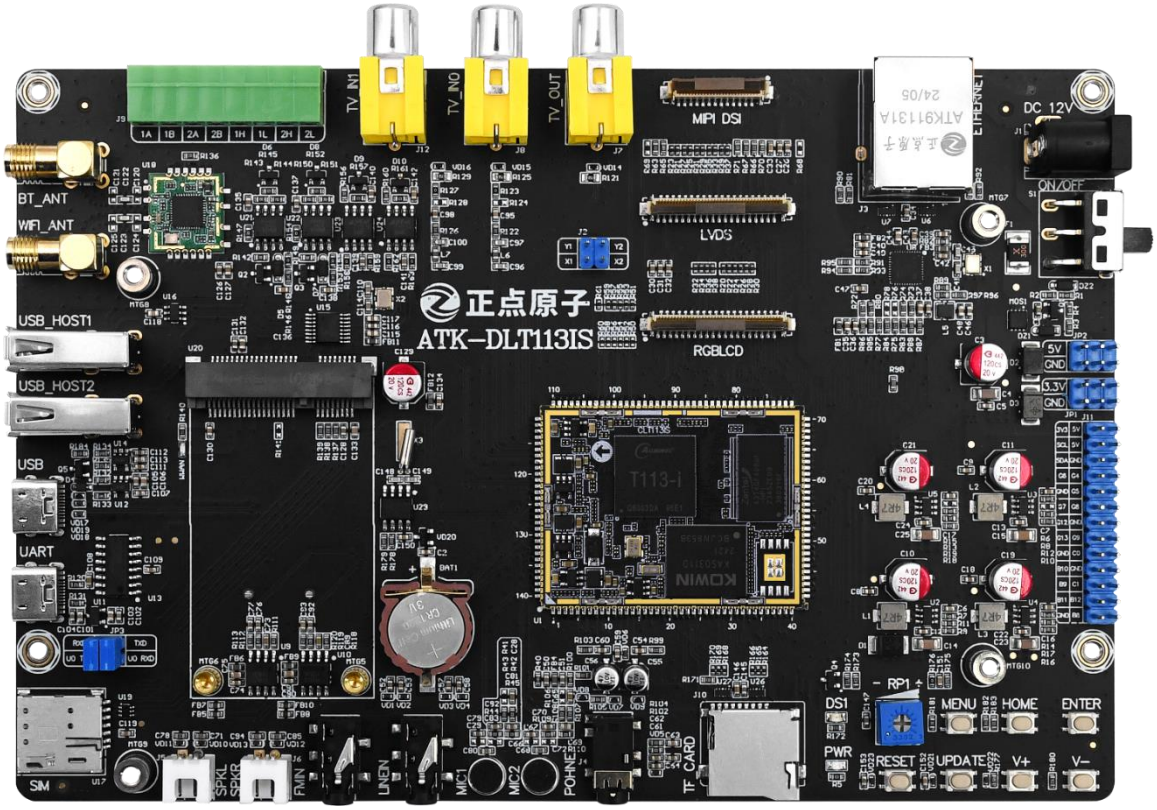
ATK-CLT113IS

Core Board Specification

V1.01



ALIENTEK

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

The product specifications and instructions mentioned in this document are for reference only and subject to update without prior notice; Unless otherwise agreed, this document is intended as a product guide only, and none of the representations made herein constitutes a warranty of any kind.

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
V1.01	1. Increase the core board size diagram	ALIENTEK Linux Team	ALIENTEK Linux Team	2025.3.27

Catalogue

Chapter 1. Core board overview

1.1 Core board introduction

ATK-CLT113IS core board is a high-performance industrial core board for embedded Linux developed by ALIENTEK based on Allwinner's T113-i processor. The core board has rich interfaces, supports a variety of communication and audio and video interfaces, meets the needs of diverse industrial applications, and has stable and reliable performance.

The T113-I chip integrates ARM Cortex-A7 dual-core, RISC-V and HiFi4 DSP heterogeneous multi-core processor. It uses 22nm process technology, 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 core plate and the bottom plate are connected by stamp holes. It has the characteristics of stable and reliable, high-density layout, excellent signal transmission and easy maintenance. There are abundant peripheral resources, supporting I2C, SPI, CAN, NET, UART, MIPI DSI, RGB, LVDS, USB and other interfaces. The core board provides a wealth of development documents and software resources. 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, involving schematic diagrams, base board design data, mechanical structure, component packaging, connector specifications, factory system image source code, compilers, software packages, etc., to facilitate the development of enterprise users.

The selection table of the ATK-CLT113IS core board is as follows:

CPU	Frequence	DDR3	NAND	EMMC	Temperature level
T113-i	1.2GHz	256MByte	256MByte	\	Industrial grade
T113-i	1.2GHz	256MByte	\	4GByte	Industrial grade
T113-i	1.2GHz	512MByte	\	8GByte	Industrial grade

Information Download Centre:

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

Chapter 2. Core board hardware parameters

2.1 Size diagram of core board

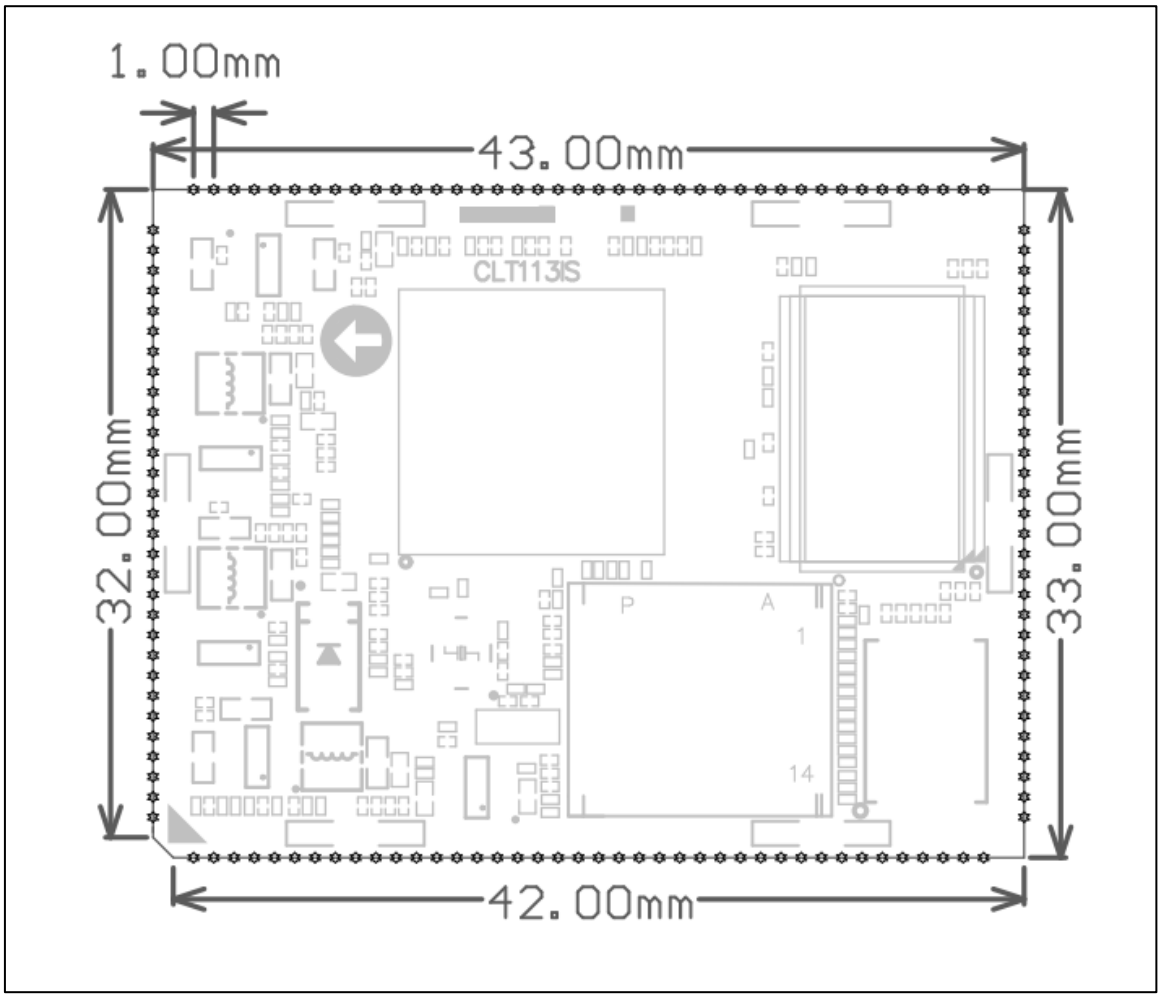


Figure 2.1-1 Core board size diagram

2.2 Hardware parameters

Parameter term	Parameter	Note
Size	43mm*33mm	length * width
CPU	T113-i	LFBGA
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	4/8GByte 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, gold-sinking process, independent grounding signal layer	Using 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.

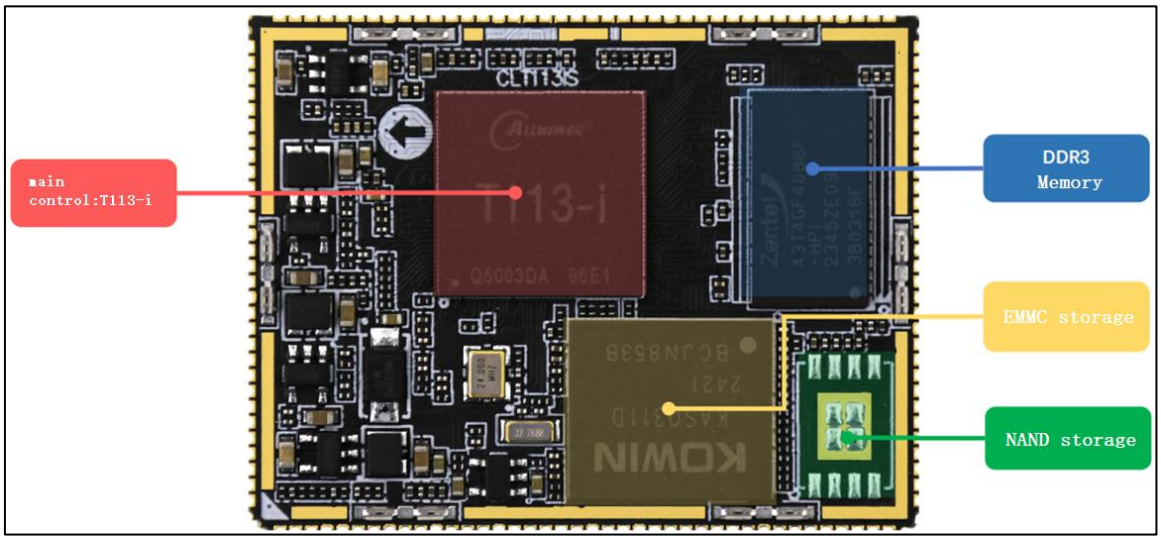


Figure 2.2-1 Core board resource diagram

2.3 T113-i chip parameters

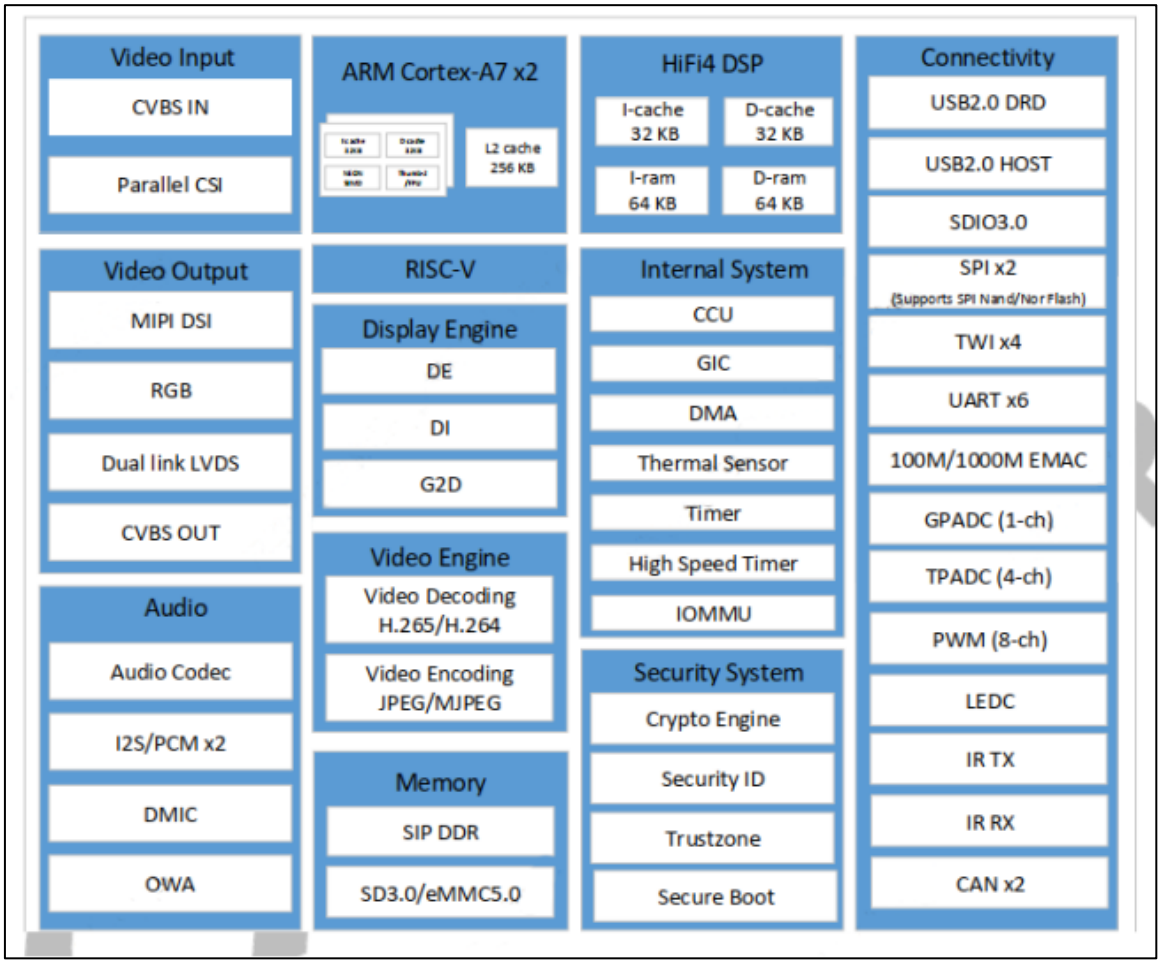


Figure 2.3-1 Block diagram of chip

Please refer to the data sheet of the T113-i chip for details of the function.

T113-I Main control chip resources			
Processor	2x Cortex-A7，1.2GHz 1x RISC-V， 1x HiFi4 DSP	Decoder	×1， MPEG-/2/4/65/H.264/H.263/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 4lanes MIPI DSI， Highest support 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 Support master-slave mode; Note: All the way used for spi NAND is not led to the core board	PWM	×8， Support 0~24MHz or 100MHz; 0~100% adjustable duty cycle; Support PWM output and input capture;
CVBS OUT	×1， Support NTSC and PAL format	CVBS IN	×2， Support NTSC and PAL format
USB 2.0	×2， One USB OTG, one USB HOST	SMHC	×3， Supports eMMC 5.1, SD 3.0, and SDIO 3.0 specifications. Note: One way used for EMMC does not lead to the core board
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

2.4 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 Note: The measured speed ranges from 710 Mb/s to 750Mb/s
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 interface screen
LVDS	1	Support ALIENTEK LVDS interface 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

2.5 Reusable resources of core board

The core board brings out most of the IO on the processor. Users can design their own backboard to use the IO resources on the core board and reuse the IO into their own functions. The default factory firmware functions of the core board only support the functions described in Subsection 2.3, and cannot be directly used for other reuse functions, and the reuse function firmware requires additional development.

According to the peripheral function, the maximum number of single peripheral resources that can be reused on the ATK-CLT113IS core board is listed here. The specific selection can be combined with the chip data sheet. The following reference is from the T113-i Data sheet (Maximum number of

peripherals per item: the maximum number of peripherals a core board can use without using other peripherals)

Pin peripheral function	Maximum	Note
EMAC	1	Support RGMII and RMII interface (10/100/1000Mbps) Note: The measured speed ranges from 710 Mb/s to 750Mb/s
UART	6	Support 4Mbps baud rate (64MHz APB clock)
FMIN	1	
LINEIN	1	
MICIN	3	The sampling rate is from 8KHz to 48KHz
LINEOUT	2	The sampling rate is from 8KHz to 192KHz
HPOUT	1	
CAN	2	
CSI	1	Support 8 bit parallel data bus (RAW8/YUV422/YUV420), Supports 2*1080p@30fps
RGB	1	Support DE/SYNC mode, up to 1920x1080@60fps
LVDS	2	Highest support 1920x1080@60fps
MIPI DSI	1	Four-wire MIPI interface, up to 1920x1200@60fps
TWI(I2C)	4	Support standard mode (100Kbps) and high speed mode (400Kbps)
SPI	1	Support full-duplex mode; Support Master Mode, Slave Mode; Up to 100MHz operating frequency is supported
CVBS IN	2	Support NTSC and PAL format
CVBS OUT	1	Support NTSC and PAL format
USB OTG	1	
USB HOST	1	USB 2.0 (up to 480 Mbps)
SMHC	2	Supports eMMC 5.1, SD 3.0, and SDIO 3.0 specifications. SDC0: Development board as TF-CARD interface; SDC1: Core board leads to 4-bit data bus interface; SDC2: Connected to emmc, core board is not led out;
PWM	8	Support 0~24MHz or 100MHz; 0~100% adjustable duty cycle; Support PWM output and input capture;
GPADC	2	12-bit SAR A/D converter, sampling frequency up to 1MHz;
TPADC	1	12-bit SAR type A/D converter, sampling frequency up to 1MHz., support 4-wire resistive touch

LRADC	1	
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	

Chapter 3. Core board software resources

3.1 Factory system software resources

The factory Linux system software resources are shown in Table 3.1 below:

Table 3.1 Development board factory Linux system software resources

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. Core board certification instructions

4.1 FCC certification

ATTESTATION OF CONFORMITY

GTG Global Testing Group

No. 25AE010254F002

The device bearing the trade name and model specified below has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified.

Report No.	:	E04A25010254F00201
Applicant	:	Guangzhou Xingyi Electronic Technology Co., Ltd
Address	:	Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City
Manufacturer	:	Guangzhou Xingyi Electronic Technology Co., Ltd
Address	:	Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City
Description of Product	:	ATK-CLT113IS
Model No.	:	ATK-CLT113IS(EMMC)
Trade Mark	:	ALIENTEK
Rating	:	INPUT:DC12V 1A
Test Standards	:	FCC 47 CFR Part 15 Subpart B

Guangdong Global Testing Technology Co.,Ltd. CERTIFICATE

Test Laboratory:

Shawn Wen
Laboratory Manager
Date of Issue: January 9, 2025

This attestation of conformity is based on a single evaluation of the submitted sample(s) of the above mentioned product. It does not imply an assessment of the production of the products.

Guangdong Global Testing Technology Co., Ltd.
Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People's Republic of China, 523808
Web: www.gtggroup.com E-mail: info@gtggroup.com Tel.: 86-4007558988

1

Figure 4.1-1 FCC Certification

4.2 CE certification

GTG
Global Testing Group

ATTESTATION OF CONFORMITY

No. 25AE010254E001

The submitted sample of below equipment has been tested in according to Electromagnetic Compatibility Directive 2014/30/EU with the following standards. The test report(s) show that the product complies with standard(s) recognized as giving presumption of compliance with the principal protection requirement of the EC Council Directive of 2014/30/EU.

Report No.	:	E04A25010254E00101
Applicant	:	Guangzhou Xingyi Electronic Technology Co., Ltd
Address	:	Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City
Manufacturer	:	Guangzhou Xingyi Electronic Technology Co., Ltd
Address	:	Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City
Description of Product	:	ATK-CLT113IS
Model No.	:	ATK-CLT113IS(EMMC)
Trade Mark	:	ALIENTEK
Rating	:	INPUT:DC12V 1A
Test Standards	:	EN 55032:2015/A1:2020 EN 55035:2017/A11:2020

After preparation of the necessary technical documentation as well as the EU declaration of conformity, the CE marking as below can be affixed on the product if all relevant effective EU-directives or regulations related to CE marking have been complied with. The EU declaration of conformity is issued under the sole responsibility of the applicant or manufacturer.

CE

Test Laboratory GTG

Shawn Wan
Laboratory Manager
Date of Issue: January 9, 2025

This attestation of conformity is based on a single evaluation of the submitted sample(s) of the above mentioned product. It does not imply an assessment of the production of the products.

Guangdong Global Testing Technology Co., Ltd.
Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People's Republic of China, 523808
Web: www.gtggroup.com E-mail: info@gtggroup.com Tel.: 86-4007558988

1

Figure 4.2-1CE Certification

4.3 Reliability test report

Test Report Summary

Product information	Product name	ATK-DLT113IS base board ATK-CLT113IS Core Board (Industrial grade)		
	Product model number	ATK-DLT113IS V1.0 ATK-CLT113IS V1.0		
	Rated parameter	Input voltage: DC12V; Input current: 240mA(with screen); EMMC 8GB + DDR 512MB		
	Product number	——		
	Manufacturing unit	Guangzhou Xingyi Electronic Technology Co., Ltd.		
	Product description before inspection	In good condition	Sample quantity	3PCS
Information of testing	Date of trial	2025/01/14		
	Test items	Electrostatic discharge immunity test, electric fast transient pulse group immunity test		
	Basis of inspection	1. GB/T 17626.2-2018, Electromagnetic compatibility test and measurement technology electrostatic discharge immunity test 2. GB/T 17626.4-2018, Electromagnetic compatibility test and test technology Electrical fast transient pulse group immunity test		
	Test environment condition	Temperature :24℃; Humidity :23%RH		
	Test site	Guangzhou Star Wing Electronic Technology Co., LTD. Testing Laboratory		
Conclusion	According to the standards and requirements listed in the inspection basis, all items tested by the examined samples meet the requirements.			
Remarks				

Figure 4.3-1 Reliability test report

4.4 RoHS certification

UONE

CERTIFICATE OF CONFORMITY

No.:U112042501136O3E

Applicant	:	Guangzhou Xingyi Electronic Technology Co., Ltd
Address	:	Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City
Manufacturer	:	Guangzhou Xingyi Electronic Technology Co., Ltd
Address	:	Room 805-808, Room 801, Building 4, No. 1, 3, and 5, Kesheng Road, Guangzhou Private Science and Technology Park, No. 1633 Beitai Road, Baiyun District, Guangzhou City
Trade Mark	:	正点原子
Sample Name	:	T113-i Core Board
Model No.	:	ATK-CLT113IS

The submitted sample of the above mentioned product has been tested and found to comply with the following European Directive:

RoHS Directive 2011/65/EU & (EU) 2015/863

The standard(s) used for showing compliance with the essential requirements:

Applicable Standard(s)	Test Report(s) Number
IEC 62321-1:2013, IEC 62321-2:2021 IEC 62321-3-1:2013 IEC62321-4: 2013+A1:2017, IEC 62321-5:2013 IEC 62321-6:2015, IEC 62321-7-1: 2015 IEC 62321-7-2: 2017, IEC 62321-8: 2017	U112042501136O3E

The submitted samples have been tested by UONE with the listed standards and found in conformity with the Directive 2011/65/EU & (EU) 2015/863 of the European Parliament and of the Council with regard to the restriction of the use of certain hazardous substances in electrical and electronic equipment. It is possible to use CE marking to demonstrate the conformity with this Directive.

This certification is part of the full test report(s) and should be read in conjunction with it. The certificate is based on a single evaluation of one sample of above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. Other CE marking directives may apply have not been considered during the RoHS assessment.

The CE mark as shown below can be used under the responsibility of the relevant finished-product manufacturer, after completion of an EU Declaration of Conformity and compliances with all relevant EU Directives.

CE RoHS

UONE

Jan. 16, 2025

Shen Zhen UONE Test Co., LTD.
1101, Building D, Pengzhou Industrial Park, Fuqilen, No. 78, Yanmu Road, Yanchuan Community, Yanluo Street, Baoan District, Shenzhen
Tel: 0755-23695858 Fax: 0755-23699878 Email: Service@uonetest.com http://www.uonetest.com

Figure 4.4-1 RoHS Certification

Chapter 5. Development materials

5.1 Materials

Download development materials:

Development materials are written based on ATK-DLT113IS development board, please use the development board for project research and testing.

Development board Catalog:

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

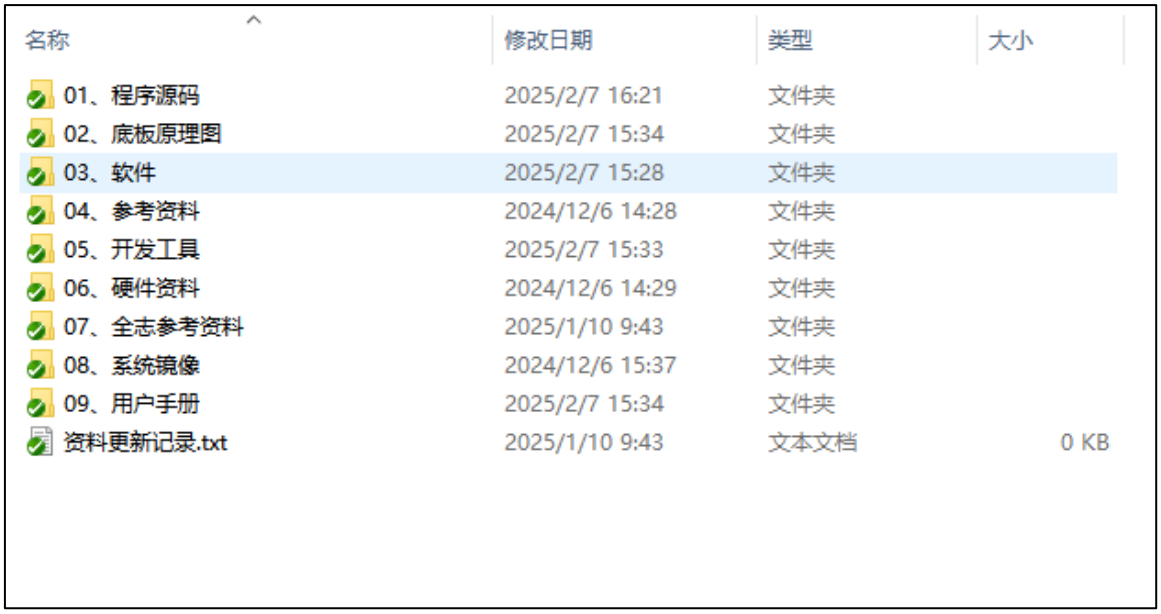


Figure 5.1-1 Development board catalog

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:

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

Figure 5.1-2 Core board catalog

Chapter 6. Optional accessories

6.1 ATK-DLT113IS development board

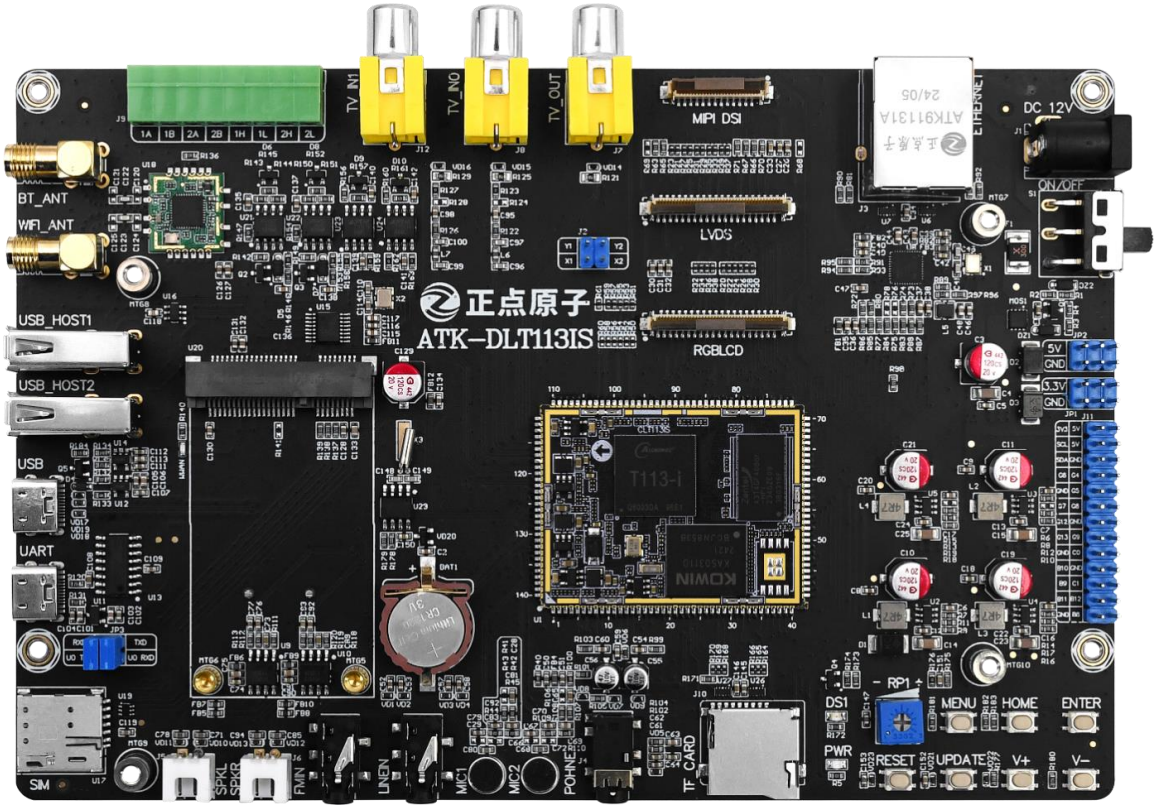


Figure 6.1-1 ATK-DLT113IS development board

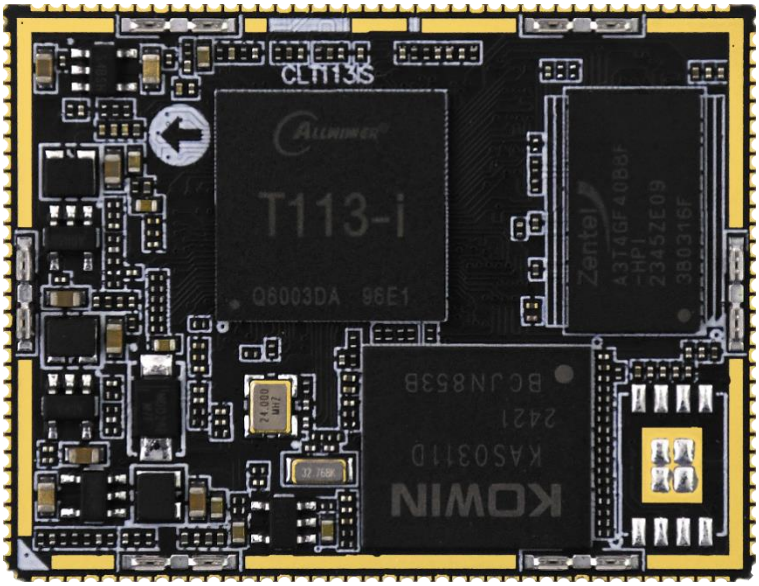


Figure 6.1-2 ATK-CLT113IS core board

6.2 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 6.2-17 inch RGB screen

6.3 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 6.3-1 10.1 inch RGB screen

6.4 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

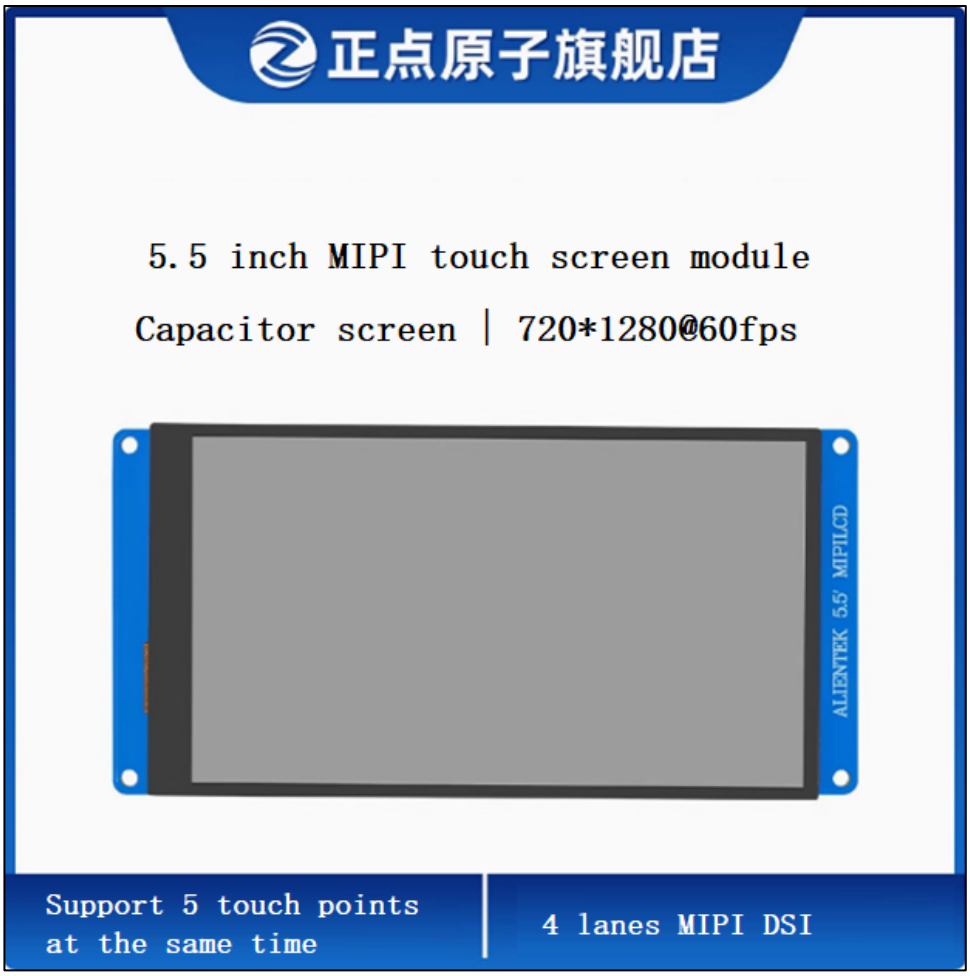


Figure 6.4-1 5.5-inch MIPI screen

Chapter 7. 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 8. After sales service

8.1 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.

8.2 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