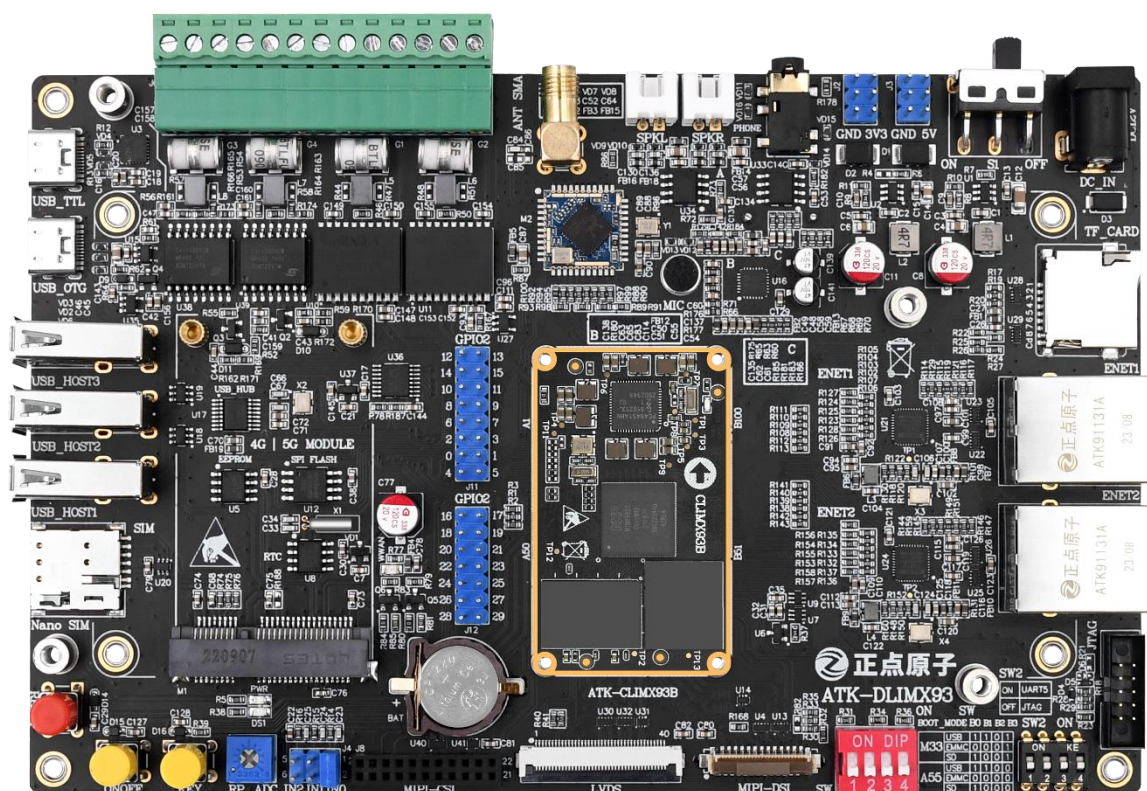


ATK-DLIMX93

Development Board Specification

V1.0



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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	ALIENTEK	2024.04.30

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Chapter 1. Product overview

1.1 Introduction of ATK-DLIMX93 development board

ATK-DLIMX93 development board is a high performance development board for embedded Linux based on NXP i.MX93 processor, which is suitable for embedded system development.

The ATK-DLIMX93 development board consists of an ATK-CLIMX93B core board and a base board with board-to-board connector (BTB interface). The ATK-CLIMX93B core board comes standard with 1GB of LPDDR4X running memory and 16GB of EMMC storage to meet most product development capacity requirements, and other storage capacities can be customized in bulk. The development board has rich peripheral resources, including 2 Gigabit Ethernet, 2 isolated RS485, 2 isolated CAN FD, 3 USB2.0 HOST, MIPI-DSI, MIPI-CSI, LVDS, WIFI&BT, audio and other functional interfaces. It is very suitable for embedded development evaluation, product application integration, etc.

The ATK-CLIMX93B core board uses the i.MX93 high-performance processor, dual-core 64-bit ARM Cortex-A55, clock up to 1.7GHz, and integrated 0.5 TOPS NPU to accelerate machine learning inference. At the same time, the processor integrates a single 250MHz Cortex-M33 core, which can be used for real-time and low-power processing. The i.MX93 processor supports I2C, I3C, SAI, SPI, UART, CAN-FD, Gigabit Ethernet, MIPI-DSI, MIPI-CSI, LVDS, USB, SDIO, JTAG, ADC and other rich peripheral interfaces. It is suitable for smart home, building control, HMI, IoT edge computing, industrial control, etc.

ALIENTEK ATK-DLIMX93 development board is rich in information and free open source. Software materials include but are not limited to U-Boot source code, Linux source code, peripheral driver source code, file system, Qt interface source code, Linux C application source code, related development tools and development environment, etc. The documentation includes detailed tutorial documents and user manuals. The tutorial documents include embedded Linux driver development guide, embedded Linux C application programming guide, embedded AI development manual, etc. The user manual contains detailed documents such as the quick experience manual of the development board, the factory system source code use guide, the use guide of the different core communication routine, the hardware reference manual of the development board, the construction of the embedded Qt6 development environment, the factory system logo modification manual, the reference manual of the virtual machine use, the NFS/TFTP construction manual of the network environment, and the file transfer reference manual. Hardware information includes core board specification, base board schematic diagram document, core board interface data manual, base board component package library, mechanical size diagram, chip reference manual, etc.

ATK-DLIMX93 development board is rich in detailed information to help customers shorten the development cycle and accelerate the product launch.

1.2 Application Areas



Figure 1-1 Some Application Areas

Chapter 2. Processor Resources

The i.MX93 processor is a 1.7GHz 64-bit dual-core ARM Cortex-A55 and a 250MHz single-core ARM Cortex-M33 architecture with 0.5TOPS NPU. It supports I2C, I3C, SAI, SPI, UART, CAN-FD, Gigabit Ethernet, MIPI-DSI, MIPI-CSI, LVDS, USB, SDIO, JTAG, ADC and other rich peripheral interfaces.

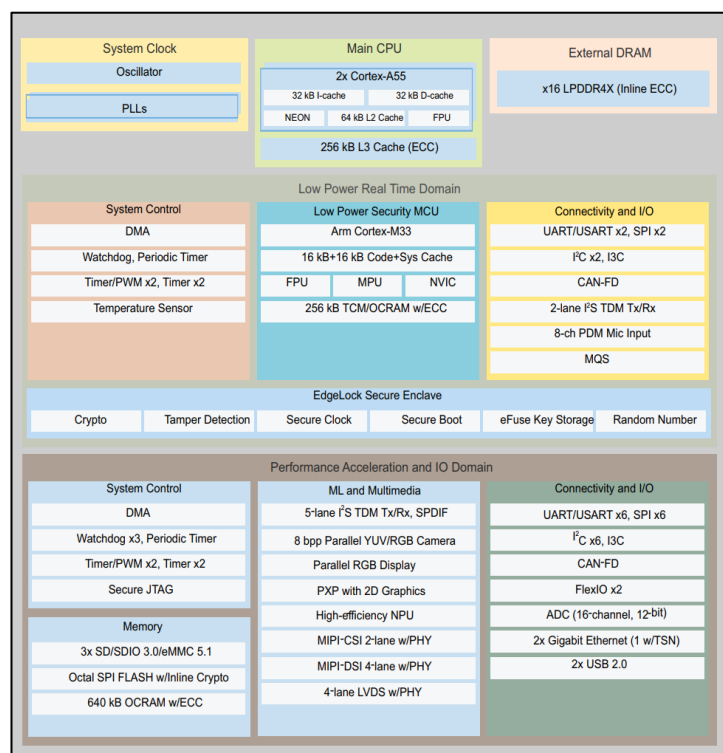


Figure 2-1 Block diagram of i.MX93 processor resources

Some of the i.MX93 processor resources are summarized in the following table.

i.MX93 Processor resources			
Cortex-A55	x2, 1.7GHz, 64bits Armv8	Cortex-M33	x1, 250MHz
NPU	0.5 TOPS	DRAM	LPDDR4/LPDDR4X
I2C	Up to 8 ways	I3C	Up to 2 ways
SAI	Up to 3 ways	SPI	Up to 8 ways
UART	Up to 8 ways	CAN-FD	Up to 2 ways
Gigabit Ethernet	Up to 2 Gigabit Ethernet channels	USB	2ways, HOST/OTG
MIPI-DSI	1 way, 4-lane	MIPI-CSI	1 way, 2-lane
LVDS	1 way, 4-lane	SDMMC	Up to 3 ways
GPIO	Up to 128 ways, multiplexed with other IO	ADC	4
TIMER/PWM	Up to 6 ways	JTAG	1
WDOG	5	RTC	1

Note: Here is the chip data sheet resource parameter values, non-development board available resource parameter values.

Chapter 3. Product Specifications

3.1 Development board appearance and delivery list

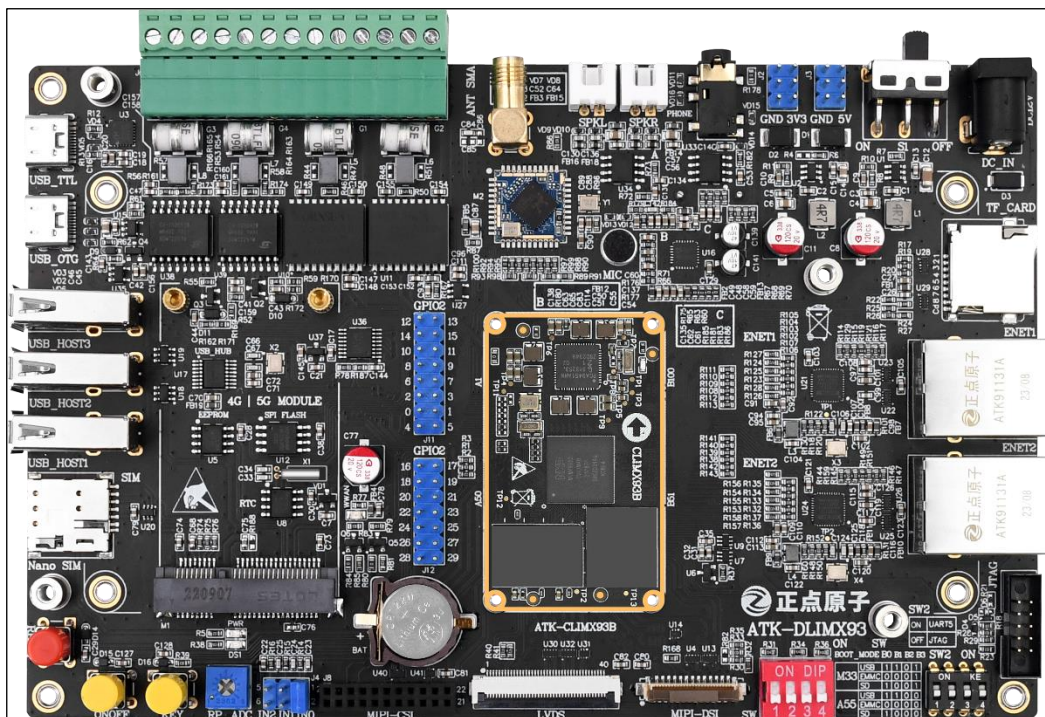


Figure 3-1 Development board front

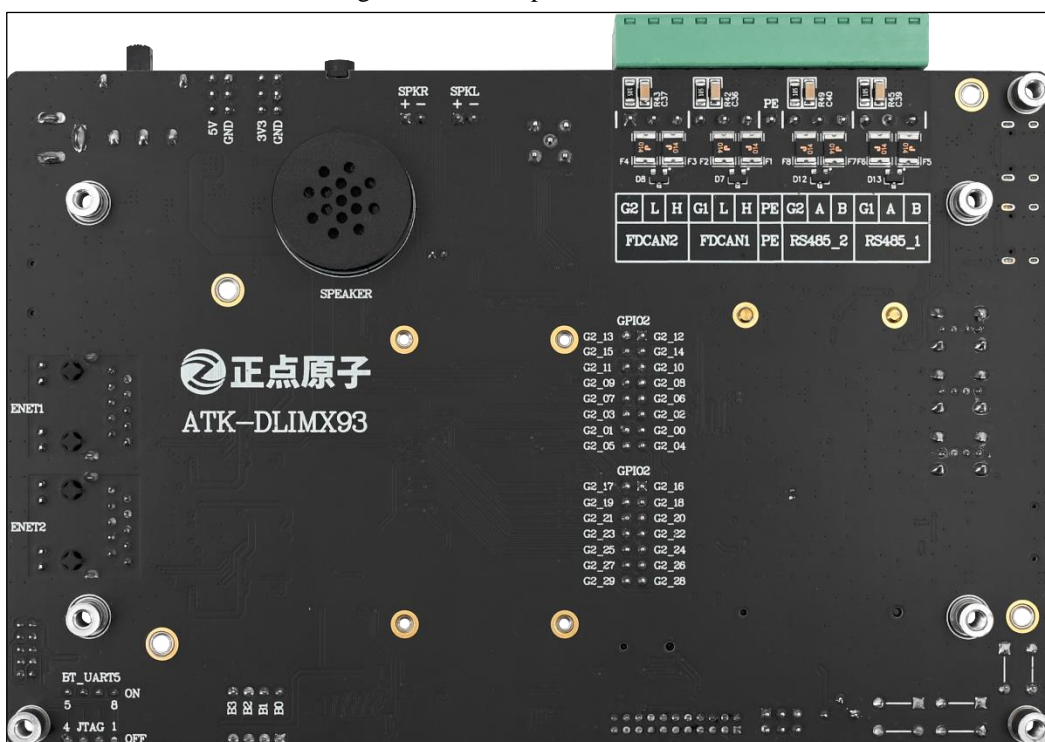


Figure 3-2 The underside of the development board

Default shipping list (development board comes with acrylic board by default):

	Name	Quantity	Note
1	i.MX93 development board	1	Baseboard + core board
2	12V 1A power adapter	1	
3	USB cable Type-C	2	
4	Small pepper antenna	1	BT&WIFI usage
5	4G module set screw	2	

Figure 3-3 Default shipping list

3.2 Mechanical dimensions of the development board

The external size of the development board is 170mm*110mm. The following picture shows the outline size of the bottom plate of the development board and the position of the fixed hole. (If the user needs more interface position size, please contact after-sales technical support)

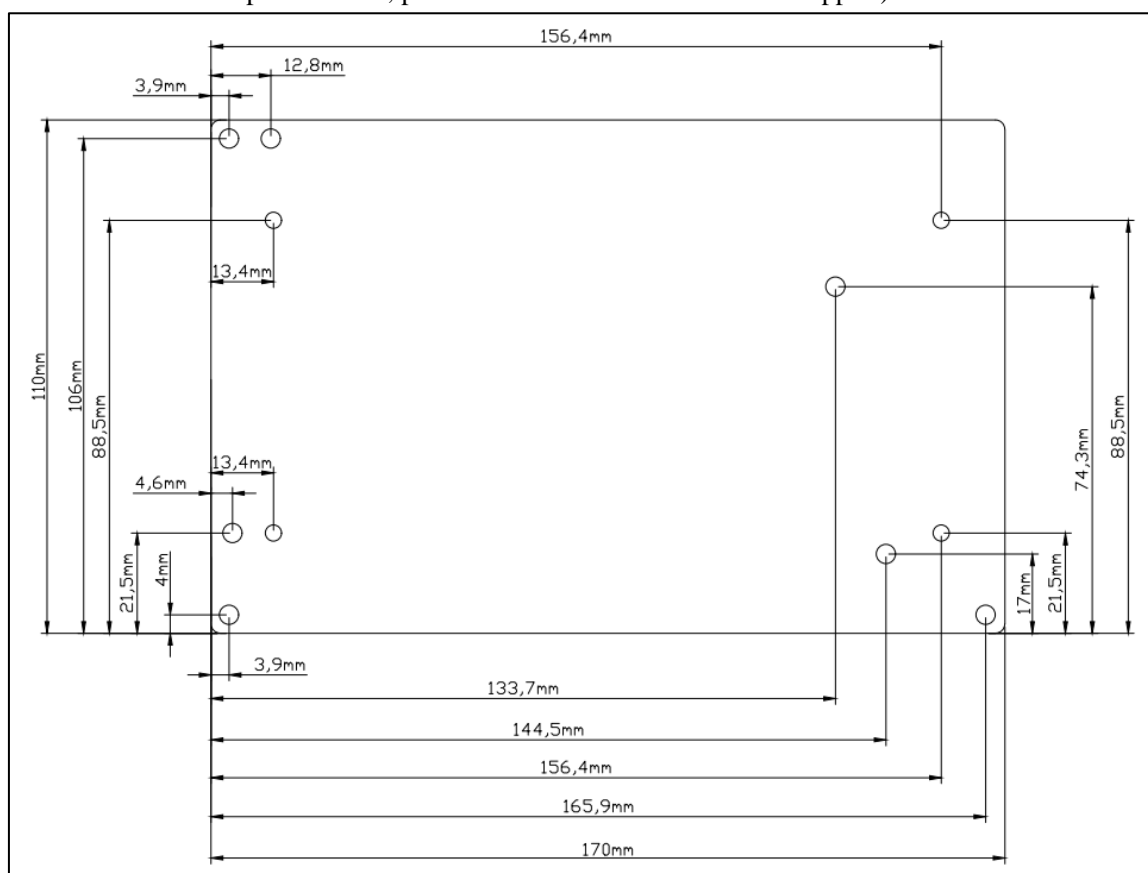


Figure 3-4 Mechanical dimensions of development board (fixed hole position)

3.3 Development board peripheral resources

ATK-DLIMX93 development board is very rich in resources, i.MX93 processor internal resources play to the extreme, almost all the internal resources of i.MX93 processor can be verified on this development board, while expanding a wealth of interfaces and functional modules, very suitable for user evaluation.

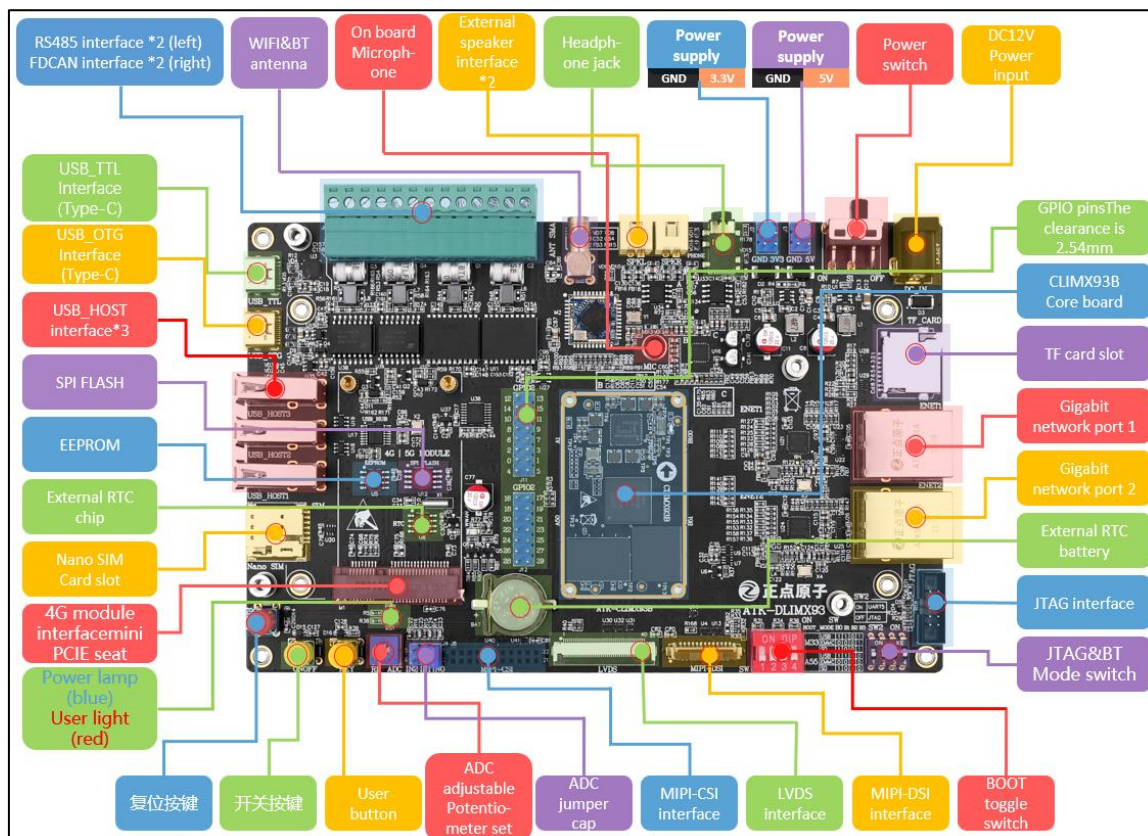


Figure 3-5 Development board front resource diagram

ATK-DLIMX93 development board all functions, peripheral interface resources are summarized in the following table.

Classification	Resource summary		
BTB interface	ATK-CLIMX93B core board, pair of 2x50P male seats		Bottom plate pair of 2x50P female base
Memory storage	RAM: 1GB LPDDR4X	ROM: 16GB EMMC	TF card slot x1
Human-computer interaction	Power indicator x1	System user lamp x1	ON/OFF press x1
	Reset button x1	User press x1	ADC connect interface x3
	Adjustable potentiometer x1	JTAG dial switch x1	BOOT dial switch x1
Download debugging	USB_TTL Serial x1 (Type-C)	USB OTG interface x1 (Type-C)	JTAG interface x1

Display interface	MIPI-DSI interface x1		LVDS interface x1
Wire communication	Gigabit Ethernet interface x2		USB HOST interface x3
	Isolate RS485 interface x2		Isolate CAN FD interface x2
Wireless communication	WIFI&BT antenna interface		WIFI&BT module x1
	4G module interface (Mini PCIE) x1		Nano SIM card slot x1
Audio function	Headphone interface x1, supports 4-segment headphone		ES8388 chip x1
	Electret microphone x1		Speaker (on board back) x1
Image acquisition	The camera MIPI-CSI interface x1		
IO row needle group	2x7P IO row pin interface x1, 2.54mm pitch		
	2x8P IO row pin interface x1, 2.54mm pitch		
On-board chip	W25Q128 chip x1	AT24C64 chip x1	RTC AT8563 chip x1
Power supply dependent	DC 12V input interface x1	5V output interface x3	3.3V output interface x3
	Power switch x1	RTC backup battery holder x1 (with CR1220 battery)	

The features of the ATK-DLIMX93 development board include:

- (1) Rich interfaces. The board provides more than ten standard interfaces, which can conveniently carry out the experiment and development of various peripherals.
- (2) Flexible design. It adopts the form of core board + bottom board, and all processor resources on the core board can be flexibly configured to meet the use of different conditions.
- (3) Abundant resources. Onboard high-performance audio codec chip, Gigabit Ethernet, WIFI&Bluetooth module, integrated isolation RS485&CANFD interface and other functional peripherals, as well as EEPROM, SPI FLASH and other memory chips, meet the needs of a variety of application scenarios.
- (4) Humanized design. Each interface is marked with screen printing, which is clear at a glance; Commonly used peripheral large screen marking, easy to find; The interface position is designed reasonably and easy to use.

3.4 Adaptation module

ATK-DLIMX93 development board can use ALIENTEK OV5645 camera and screen module, etc., to show stronger performance effects. At present, the development board has been adapted to the following modules:

<p>正点原子</p> <p>5.5-inch MIPI touch screen module Capacitive screen 720*1280@60fps</p>  <p>Support simultaneous touch of 5 points 4 lanes MIPI DSI</p>	<p>正点原子</p> <p>5.5-inch MIPI touch screen module Capacitive screen 1080*1920</p>  <p>Support simultaneous touch of 5 points 4 lanes MIPI DSI</p>	<p>正点原子</p> <p>10.1-inch MIPI LCD module Capacitive screen / 800*1280 @ 60 fps</p>  <p>Support simultaneous touch of 5 points 4lanes MIPI DSI</p>
<p>正点原子</p> <p>MIPI camera module OV5645 2 Lanes MIPI Interface</p>  <p>500W Pixel 2K resolution High dynamic range HDR</p>	<p>正点原子旗舰店</p> <p>4G module communication ME3630 Optional GPS positioning function</p>  <p>C3B/C3C optional Support multiple protocols Linux accessories</p>	

All the above modules can be purchased from ALIENTEK flagship store.

In addition, the development board is also adapted to ALIENTEK 10.1 inch 1280x800 LVDS screen, Fibocom 5G RedCap FG132 module, Quectel 4G EC20 module, etc. Users can develop and use according to project requirements.

Chapter 4. Product Information

ATK-DLIMX93 development board provides a wealth of development documents and software resources, involving Linux driver development, Linux C application programming, embedded AI development and other fields, all software resources are free to download.

Software materials include but are not limited to U-Boot source code, Linux source code, peripheral driver source code, file system, Qt interface source code, Linux C application source code, M33 core routine source code, related development tools and development environment, etc.

The documentation includes detailed tutorial documents and user manuals. The tutorial documents include embedded Linux driver development guide, embedded Linux C application programming guide, heteronuclear communication routine use guide, embedded AI development manual, etc. The user manual contains detailed documents such as development board quick experience manual, virtual machine use reference manual, factory system source code use guide, hardware reference manual, embedded Qt6 development environment construction, factory system LOGO modification manual, virtual machine use reference manual, network environment NFS/TFTP construction manual, file transfer reference manual and so on.

Hardware information includes core board specification, base board schematic diagram document, core board interface data manual, base board component integrated package library, mechanical size diagram, chip reference manual, etc.

4.1 Data Download

ATK-DLIMX93 Development Board Data Download Center:

<http://www.openedv.com/docs/boards/arm-linux/iMX93.html>

Or: <https://github.com/openedv>

4.2 Information Description

ATK-DLIMX93 Development board data Level 1 Directory:

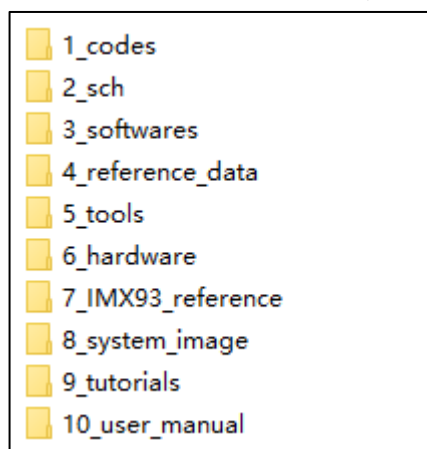


Figure 4-1 Development board information level 1 directory

Description of Development board Catalog:

Directory	Note
1_codes	Factory system source code
2_sch	Development board, screen, camera and other schematics
3_softwares	Serial port terminal, file transfer, source code reading, virtual machine and other software-aided development tools
4_reference_data	Protocol manual, ARM manual and other reference documents
5_tools	Cross-compilers, etc
6_hardware	Development board on-board chip data, development board package library, core board data, etc
7_IMX93_reference	i.MX93 Reference manual, data sheet, etc
8_system_image	Factory system image burn firmware package
9_tutorials	-
10_user_manual	Quick test, and other documents to help users develop quickly

4.2.1 User manual

Manual	Description
ATK-DLIMX93 Quick Test Manual	Development board burning system, preparation for use, functional test
ATK-DLIMX93 Factory System Source Code Use Guide	Cross compilation tool chain installation, development board source code use
ATK-DLIMX93 Hardware Reference Manual	Development board hardware resources description, use precautions
ATK-DLIMX93 Development Board Specification	Development board specification, pre-project selection reference

4.2.2 Linux C Application Programming Materials

Manual	Note
ATK-DLIMX93 Embedded Linux C Application Programming Guide	Learn C application programming based on factory system
Linux C application programming source code	Linux C application programming document part of the routine source code
Visual Studio Code	Application development software

4.2.3 Core board usage data

Manual	Note
ATK- CLIMX93B Core Board Specification Document	Core board specification for pre-project selection
ATK- DLIMX93 Core Board Interface Data Sheet	Core board interface pin function description

ATK- DLIMX93 Factory System Pin Reuse Modification Manual	Development board \ core board interface peripheral function modification
ATK- DLIMX93 Schematic diagram of the baseboard	Development board base board schematic diagram
ATK- DLIMX93_V1.3 Mechanical dimension drawing (fixed hole)	Develop board mechanical dimension data and screen positioning holes
Development board base board encapsulation library (see Figure 0.1 file logo)	Development board integrated encapsulation library
Onboard Chip Data Sheet Set (folder)	Chip data description

4.2.4 Virtual machine usage information

Manual	Note
ATK-DLIMX93 Virtual machine usage reference manual	Virtual machine installation and basic usage instructions
Ubuntu20_ATK_IMX93.zip	Build the ATK-DLIMX93 development environment system

The information is very rich, this document is limited by space, not a list, please download the online disk information for reference.

The documents are constantly updated, please use the latest web address to download the materials.

Chapter 5. Precautions for product use

- 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 positive dot atom 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 i.MX93 ac group

ALIENTEK i.MX93 After-sales Group (order number required)

Taobao shop: ALIENTEK flagship store, transfer Linux technical support

Business docking: ALIENTEK flagship store, transfer business customer service

Forum: <http://www.openedv.com/forum-279-1.html>

Tel: 020-38271790 (transfer from the front desk to Linux technical support)