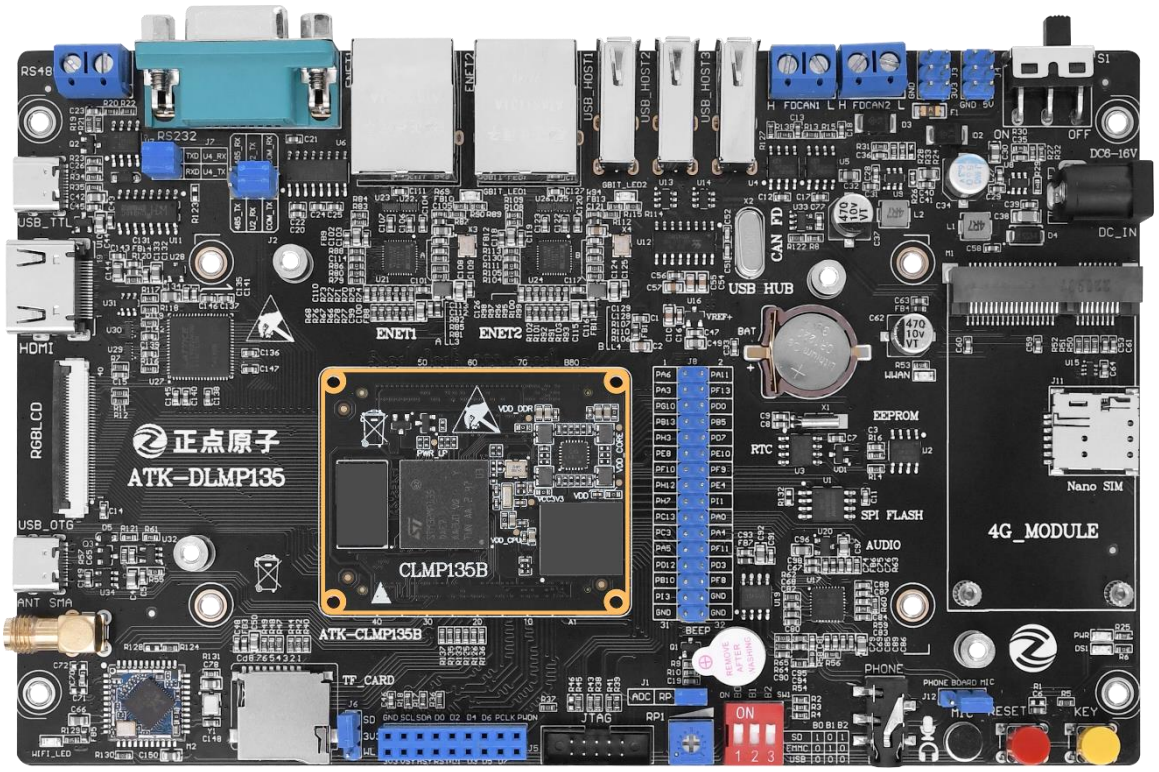
ATK-DLMP135

Development Board Specification

V1.0



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

Catalogue

Chapter 1. Overview of Development Board

1.1 Introduction to the ATK-DLMP135

The ATK-DLMP135 development board is a high-performance development board for the embedded Linux field, developed by ALIENTEK based on the STM32MP135DAE7 chip from ST Microelectronics. It is suitable for embedded system development.

The STM32MP135DAE7 processor features a single-core ARM cortex-A7 architecture with a maximum clock speed of 1GHz, supporting dual gigabit Ethernet ports, and offers high cost-effectiveness. In terms of RAM, the ATK-CLMP135 core board comes with a standard 512MB DDR; in ROM, the core board comes with an 8GB EMMC storage, meeting the needs of most development capacities. The processor supports I2C, SPI, CAN FD, GMAC, UART, ADC, LCD, USB, SDIO, and other peripheral interfaces.

The ATK-DLMP135 development board consists of the ATK-CLMP135B core board and the baseboard. The core board and the baseboard are connected using a board-to-board connection method (BTB interface). The development board has abundant peripheral resources, including 2 gigabit Ethernet ports, 2 CAN FD ports, RS232, RS485, 3 USB 2.0 interfaces, RGB LCD interface, RGB to HDMI interface, WIFI&BT, audio interface, etc.

The ATK-DLMP135 development board has rich documentation and is freely open-source. The software documentation includes but is not limited to U-boot, Linux, peripheral driver source code, file system, Qt source code, C application source code, related development tools and development environments. The documentations include tutorial documents and user manuals: the tutorial documents include Linux embedded driver development guide, Linux C application programming guide, embedded Qt development guide, currently totaling over 2,300 pages; the user manuals include development board quick experience document, factory system source code usage guide, development board hardware reference manual, Qt cross-compilation environment setup manual, system logo modification manual, etc., currently totaling 12 user manual documents. The hardware documentation includes development board and core board schematic pdf documents, development board and core board AD packaging libraries, development board and core board mechanical size diagrams, chip reference manuals, etc.

1.2 Application Areas

Chapter 2. Chip Resource Parameters

2.1 Parameters of STM32MP135DAE7 Chip

The STM32MP135DAE7 features a single-core ARM cortex-A7 processor with a maximum clock speed of 1GHz. It supports dual gigabit Ethernet ports and interfaces such as I2C, SPI, CAN FD, GMAC, UART, ADC, LCD, USB, and SDIO.

The summary table of the main resources of the STM32MP135DAE7 main control chip is as follows:

STM32MP135DAE7 Main control chip resources			
Kernel architecture	32-bit ARM Cortex-A7	**Maximum clock frequency**	1 GHz
UART	Up to 8 channels	**GMAC**	Supports a maximum of 2 gigabit Ethernet channels
CAN FD	Up to 2 channels supported for CAN FD	**USB**	2 USB HOST/OTG
I2C	Up to 5 channels	**SPI**	Up to 5 channels
SAI	Up to 2 channels	**SD/MMC**	Up to 2 channels
DVP	Up to 1 channels	**LCD**	1
GPIO	Up to 135 channels	**ADC**	2 groups of ADC, with a maximum of 20 channels
PWM	Up to 37 channels	**JTAG**	1
32-bit timer	2	**16-bit advanced timer**	2
16-bit general-purpose timer	10	**16-bit low-power timer**	5
System timer	4	**RTC**	1
WDOG	2		

Note: These are the parameter values of the chip data manual resources, not the available resource parameter values for the development board.

Chapter 3. Product Specifications

3.1 Development Board Appearance and Shipping List

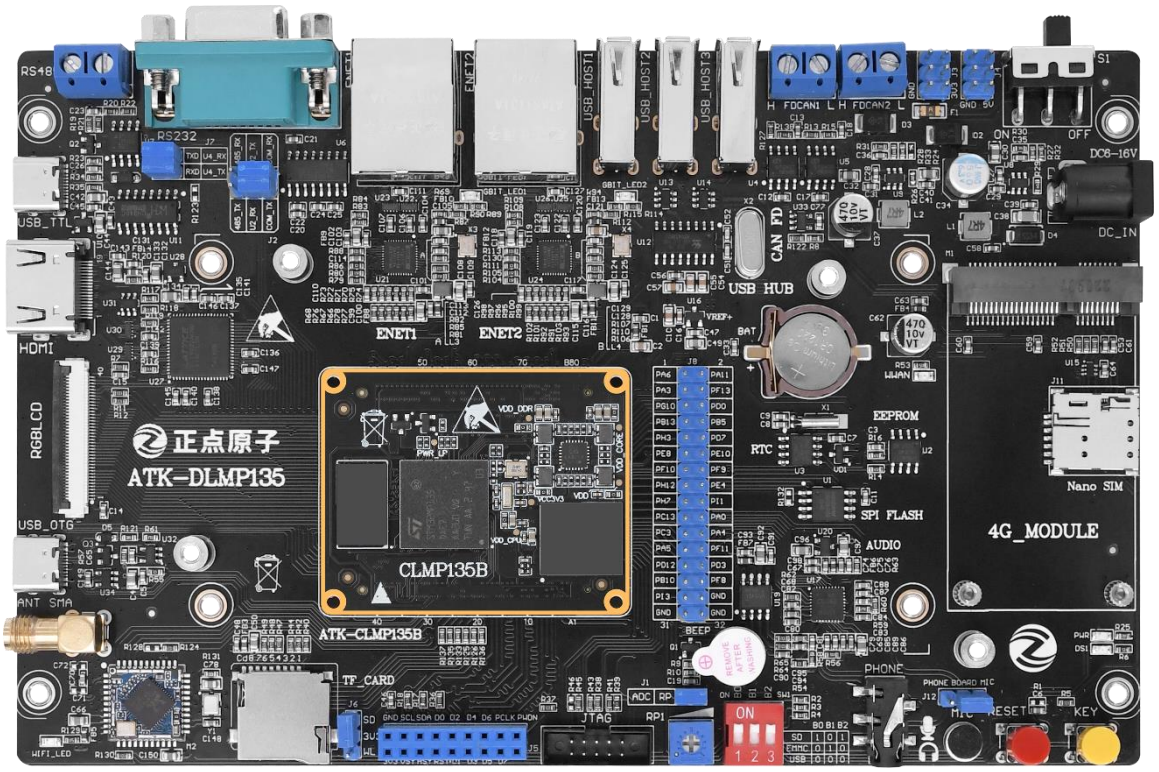


Figure 3.1-1 The front appearance of the development board

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

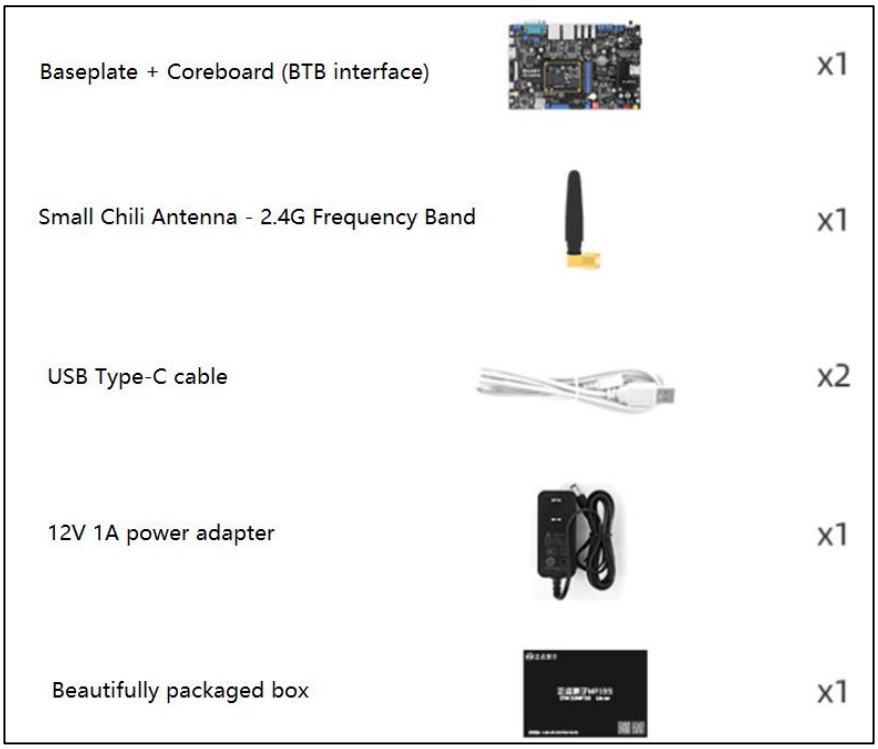


Figure 3.1-2 Default shipping list

3.2 Mechanical dimensions of the development board

The external dimensions of the development board are 180mm * 115mm. The design of the board fully considers humanized design, and in combination with the many years of development board design experience of ALIENTEK, it has been improved multiple times, and finally this design was determined.

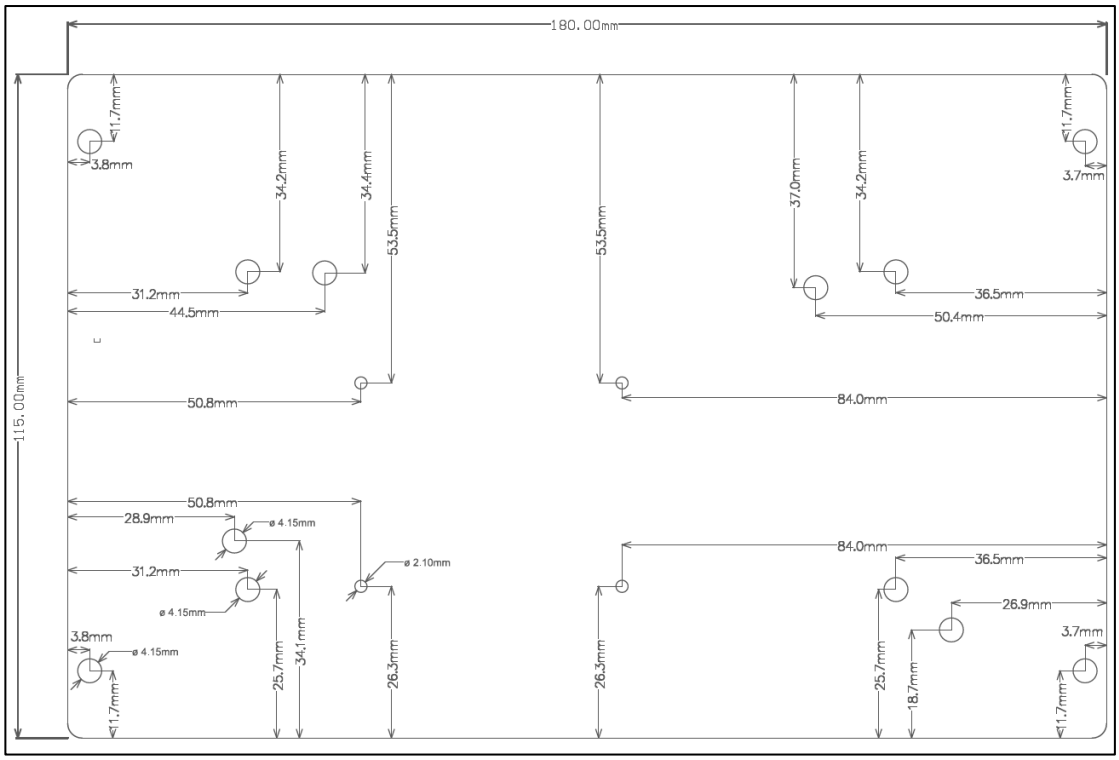


Figure 3.2-1 Mechanical dimensions of the development board

3.3 Peripheral resources of the development board

The base board of the ATK-DLMP135 development board is extremely resource-rich. It fully utilizes the internal resources of the STM32MP135DAE7. Most of the internal resources of the STM32MP135DAE7 can be verified on this development board. At the same time, it is expanded with rich interfaces and functional modules. The entire development board appears very grand.

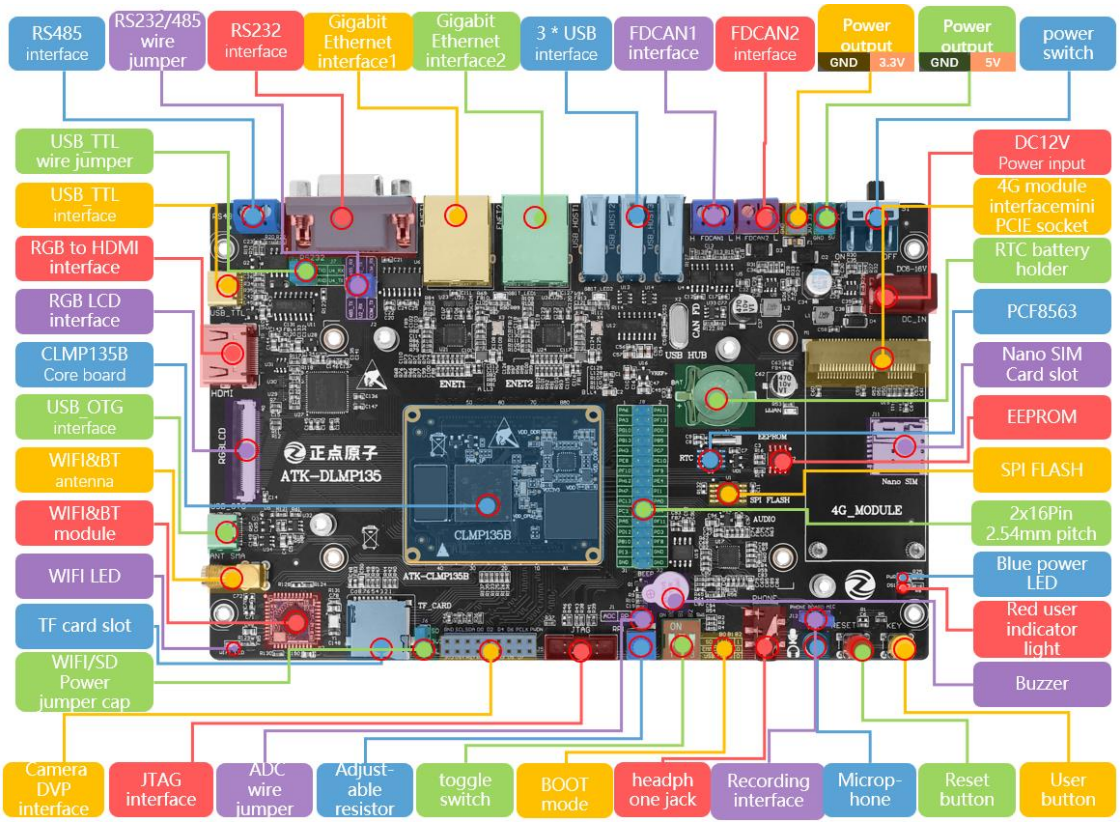


Figure 3.3-1 Front resource diagram of the ATK-DLMP135 development board

Classification	Description		
BTB interface	ATK-CLMP135B coreboard, a pair of 2x40P sockets		Bottom plate: One pair of 2x40P male sockets
Memory storage	RAM：512MB DDR	ROM：8GB EMMC	TF card slot: 1
Human-computer interaction	Power indicator light x1	System user indicator x1	WIFI LED: 1
	Reset button x1	User button x1	ADC connection interface: 1
	Adjustable resistor x1	Buzzer x1	BOOT toggle switch: 1
Display interface	RGB LCD interface x1	RGB to HDMI interface	SiI9022A chip: 1
Download debugging	USB_TTL serial port x1 (Type-C)	USB OTG interface x1 (Type-C)	Reserved JTAG interface: 1
Wired communication	Gigabit Ethernet interface x2	USB HOST interface x3	CAN FD interface: 2
	Female RS232 interface x1	RS485 interface x1	RS232/485 selection port: 1

Wireless communication	WIFI&BT module x1	WIFI & BT antenna interface	WIFI/SD power supply option x1
	4G module interface (Mini PCIE interface) x1		Nano SIM card slot x1
Module interface	Camera DVP interface x1	2x16-pin connector interface, with a pitch of 2.54mm	
Audio function	CS42L51 chip x1	Mouthpiece x1	Speaker (built-in on the back panel) x1
	Recording interface jumper cap x1	Headphone jack x1, supporting 4-pin headphones	
On-board chip	W25Q128 chip x1	AT24C64 chip x1	PCF8563 chip x1
Power-related	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 base board of the ATK-DLMP135 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 121 general GPIO pins, as well as 9 other functional pins (USB, NJTRST, VBAT, etc.), 3 VCC_5V pins and 27 GND pins, totaling 160 pins, which greatly facilitates expansion and usage.

3) Abundant resources. The board is equipped with high-performance audio codec chips, gigabit network cards, EEPROM storage chips and various interface chips, meeting various application needs.

4) Humanized design. Each interface has silk-screen labels, making it clear to use; some commonly used peripherals have large silk-screen labels for easy search; the interface position is designed reasonably, making it convenient to use.

3.4 Adaptation Module

The ATK-DLMP135 development board can utilize the OV5640 camera and screen module provided by ALIENTEK to achieve enhanced performance. The currently adapted modules for the development board are as follows (with purchase links attached in the pictures):

正点原子旗舰店

4.3-inch RGB LCD touch screen module

RGB screen | Capacitive screen | 800*480

Support simultaneous touch of 5 points | Provide ST drive

正点原子旗舰店

7-inch RGB LCD touch screen module800

RGB screen | Capacitive screen | 800*480

Support simultaneous touch of 5 points | Provide ST drive

正点原子旗舰店

7-inch RGB LCD touch screen module

RGB screen | Capacitive screen |1024*600

Support simultaneous touch of 5 points | Provide ST drive

正点原子旗舰店

10.1-inch RGB LCD touch screen module

RGB screen | Capacitive screen |1280*800

Support simultaneous touch of 10 points | RGB/LVDS

正点原子旗舰店

OV5640 camera module

500W pixels | 2592*1944 resolution

Supply FPC lines + adapter boards | Provide ST drive

正点原子旗舰店

4G module communication ME3630

Optional GPS positioning function

C3B/C3C optional | Support multiple protocols | Linux accessories

Chapter 4. Development materials

The ALIENTEK has provided the ATK-DLMP135 development board with a wealth of development documents and software resources, covering areas such as Linux driver development, Qt GUI development, and C application development. All the software resources are freely available for download through Baidu Netdisk.

4.1 Downloading of Materials

Development Board Materials Download Center:
http://www.openedv.com/docs/boards/arm-linux/zdyz-STM32MP135.html

4.2 Data Description

First-level directory of the cloud storage data:

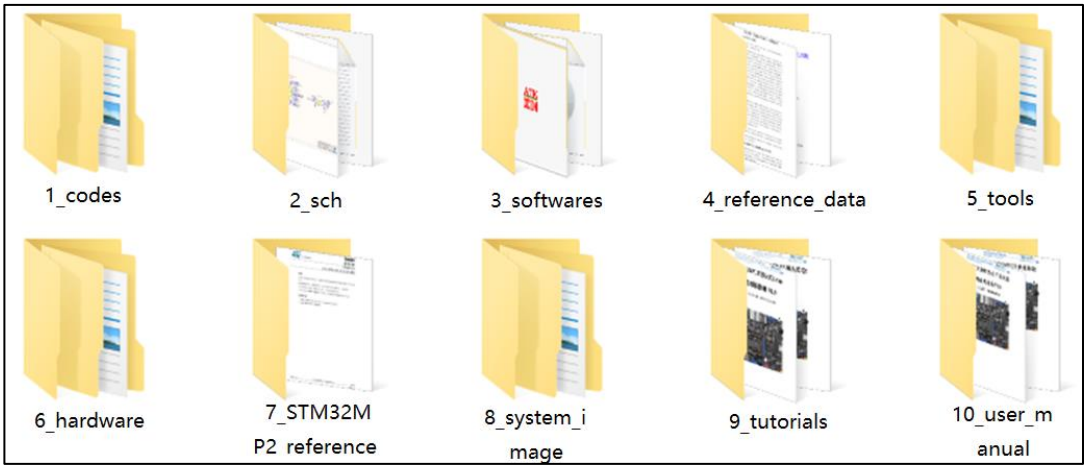


Figure 4.2-1 Primary directory of the cloud storage files

Directory description:

Directory	Description
1_codes	Source code collection, including factory system source code, tutorial routine source code, etc.
2_sch	Schematic collection, including development board, core board, screen, camera, etc. schematics
3_softwares	Software tools collection, including serial port terminal, file transfer, source code reading, virtual machine, etc.
4_reference_data	Reference materials collection, including protocol manuals, ARM manuals, etc. documents
5_tools	Development tools collection, including cross compiler, ST official development tools, etc.
6_hardware	Hardware-related materials collection, including onboard chip materials, development board packaging libraries, etc.
7_STM32MP2_reference	ST official reference materials collection

8_system_image	Factory system image firmware burning package, including bootfs.ext4, rootfs.ext4, etc.
9_tutorials	Tutorial document collection, including driver development, application development, Qt development, etc. detailed documents
10_user_manual	Auxiliary document collection, including quick experience documents, etc., to help users quickly develop

4.2.1 User manual

Materials	Description
ATK-DLMP135 Quick Test Manual.pdf	1. System flashing 2. Development board usage and testing
ATK-DLMP135 Factory System Source Code Use Guide.pdf	1. Install cross-compiler 2. Compile the factory source code
ATK-DLMP135 Hardware Reference Manual.pdf	1. Development board resource description 2. Schematic diagram explanation
ATK-DLMP135 Network Environment Setup Manual.pdf	1. Configuration of development board and computer network environment
ATK-DLMP135 Factory System Qt Cross-compilation Environment Setup.pdf	1. Install and configure Qt Creator environment
ATK-DLMP135 File Transfer manual.pdf	1. File transfer between development board and computer 2. Network transmission
ATK-DLMP135 Factory System LOGO Modification Manual.pdf	1. Replace the factory system display logo of the development board
ATK-DLMP135 Factory System TFTP Setup Manual.pdf	1. Set up virtual machine TFTP environment
ATK-DLMP135 Factory System NFS Setup Manual.pdf	1. Set up virtual machine NFS environment
ATK-DLMP135 Porting Debian Reference Manual.pdf	1. Transplant the minimum Debian system onto the development board
ATK-DLMP135 Firmware Single-step Update Reference Manual.pdf	1. Guide users to update individual system firmware and test

4.2.2 Linux Driver Development Materials

Materials	Description
ATK-DLMP135 Embedded Linux Driver Development Guide.pdf	1. Based on factory system learning drive, 790+ pages
ALIENTEK factory-installed Linux system source code	1. Factory system tf-a\optee\uboot\kernel source code
Linux Driver code	1. Driver development guide example source code
Cross-compiler tool	1. For compiling source code

4.2.3 Qt GUI Development Materials

Materials	Description
Embedded Qt development Guide.pdf	1. Based on the factory system for learning Qt programming, 580 pages
ATK-DLMP135 Factory system Qt cross-compiler environment setup.pdf	1. Installation and configuration of the Qt Creator environment
Qt comprehensive example code	1. Comprehensive source code of the Qt interface in the factory system
Qt development code	1. Sample source code of the Qt development guide documentation

4.2.4 C Application Development Materials

Materials	Description
ATK-DLMP135 Embedded Linux C Application Programming Guide.pdf	1. Based on the factory system learning application programming, 1000 pages
Source code of Linux C application programming routines	1. Sample source code of the Linux C application programming documentation section
Visual Studio Code	1. Application development software

4.2.5 Core Board Usage Information

Materials	Description
ATK-CLMP135B Core Board Pinout Allocation Reference Manual.pdf	1. Familiarize with the pin configuration of the core board 2. Definition of pin multiplexing
ATK-CLMP135B Core board schematic diagram.pdf	1. Core board schematic diagram, used as a design reference
ATK-DLMP135 Base board schematic diagram.pdf	1. Development board schematic diagram, used as a design reference
Development board base board encapsulation library	1. Development board AD integration library, used for board fabrication
Board-mounted chip data manual collection	1. For referring to the data description of the chip
Development board/core board mechanical structure diagram	1. For structural design reference

The information is very abundant. Due to the limitations of this document's length, we cannot list all of them. Please download the documents from the cloud drive for further reference.

The document materials are constantly updated. Please use the latest cloud drive 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 MP135 Communication group

ALIENTEK MP135 User Group (order number required)

Taobao shop: ALIENTEK flagship store

Forum: http://www.openedv.com/forum.php?mod=forumdisplay&fid=269