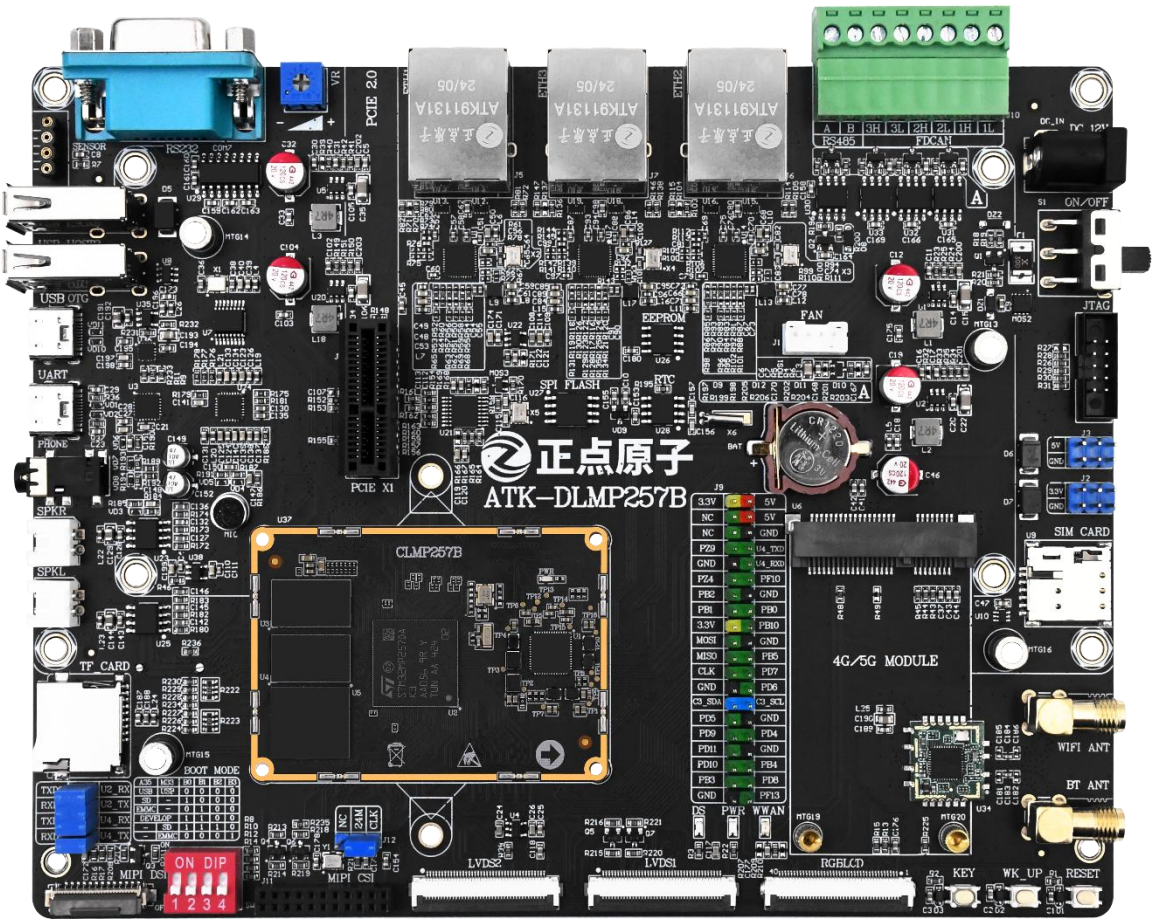
ATK-DLMP257B

Specification Document

V1.1



ALIENTEK

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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	ALIENTEK	2025.04.01
V1.1	1. Add "Notes for Attention" in Subsection 3.3; 2. Add the user manual list in Section 4.2.1; 3. Add the adaptation module picture in Section 3.4. 4. Modify Chapter II processor resource content description	ALIENTEK	ALIENTEK	2025.4.14

Catalogue

Introduction

This specification describes the hardware architecture, functional features and application scenarios of the ATK-DLMP257B development board in detail, aiming to help developers quickly understand the overall design and hardware resource configuration of the development board.

The ATK-DLMP257B development board is based on the STM32MP257DAK3 processor. It adopts a heterogeneous multi-core architecture and integrates dual-core Cortex-A35 (1.5GHz), Cortex-M33 (400MHz) and Cortex-M0+ (200MHz). It is equipped with 1.35 TOPS NPU (neural network Processing Unit) and GPU (graphics processing unit) to provide strong support for edge AI reasoning and graphics rendering. The development board adopts the combination design of ATK-CLMP257B core board and bottom board, uses board to board (BTB) interface, and is equipped with DDR4 memory and eMMC storage, which provides sufficient storage and high-speed data processing capabilities for complex system development.

The development board has rich expansion interfaces, with 3 gigabit Ethernet, USB 2.0 HOST, MIPI DSI/CSI, LVDS, CAN-FD, RS232, RS485, I2C, SPI, UART and other interfaces, supporting audio, WiFi, Bluetooth, 4G module and other functions. It covers most embedded application scenarios. The development board can run Linux and RTOS dual systems, which is suitable for complex applications such as smart home, industrial automation, and Internet of things edge computing.

ALIENTEK provides a wealth of open source resources and development materials for the development board, including U-Boot source code, Linux kernel source code, peripheral driver source code, file system, Qt source code, AI sample program, etc., and a complete set of development tools and documentation tutorials, covering embedded driver development, application development, AI modeling and deployment, etc.

Through this specification, developers can fully understand the functions and configuration of the ATK-DLMP257B development board, combined with detailed configuration methods and debugging guidance, quickly complete system integration and product development, and accelerate product launch

Chapter 1. Product overview

1.1 Introduction of ATK-DLMP257B development board

ATK-DLMP257B development board is a high performance embedded development platform based on STM32MP257DAK3 processor, which is suitable for embedded system development. The development board is composed of ATK-CLMP257B core board and bottom board, which are connected by board-to-board connector (BTB interface). The core board is equipped with DDR4 high-speed memory and eMMC storage, which can meet the capacity requirements of most product development, and can also be customized according to batch requirements.

The development board has abundant peripheral resources, including 3 channels of Gigabit Ethernet, RS232, RS485, FDCAN, 2 channels of USB2.0 HOST, MIPI DSI, LVDS, WiFi & Bluetooth, audio and other functional interfaces, which are very suitable for embedded development evaluation and product application integration.

The ATK-CLMP257B core board uses STM32MP257DAK3 high-performance processor, combines ARM Cortex-A35 and Cortex-M33, Cortex-M0+ heterogeneous architecture, and provides a main frequency of up to 1.5GHz. The processor supports Linux and RTOS dual system to meet the needs of complex applications. At the same time, the processor integrates a wealth of peripheral interfaces, including I2C, SPI, UART, CAN-FD, Gigabit Ethernet, MIPI DSI, MIPI CSI, LVDS, USB, SDIO, JTAG, ADC, etc., which is suitable for smart home, building control, HMI, iot edge computing, industrial control and other fields.

The ATK-DLMP257B development board is provided with abundant free and open source materials by ALIENTEK. 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, and related development tools and development environments. The documentation material contains detailed tutorial documents and user manuals, covering embedded Linux driver development guide, embedded Linux C application programming guide, embedded AI development manual, etc. Hardware information includes core board specification, base board schematic diagram, core board interface data manual, base board component package library, mechanical size diagram, chip reference manual, etc.

ATK-DLMP257B development board is rich in detailed information, to help customers shorten the development cycle, accelerate the product market.

1.2 Some application fields

Figure 1 Part of the application area

Chapter 2. Processor Resources

The STM32MP257 series processor is a high-performance, low-power heterogeneous multi-core processor. It integrates Cortex-A35 + Cortex-M33 to provide powerful computing capabilities and rich connectivity interfaces (Ethernet, CAN, PCIe, USB, I²C, SPI, UART). It supports AI hardware acceleration, 3D GPU, multimedia video codec, ISP, and camera interface for image processing and embedded computing. Perfect security mechanisms (TrustZone, SHA, HMAC, tamper-proof) ensure data security, which is widely used in industrial control, AI computing, real-time control, motor drive and other application scenarios.

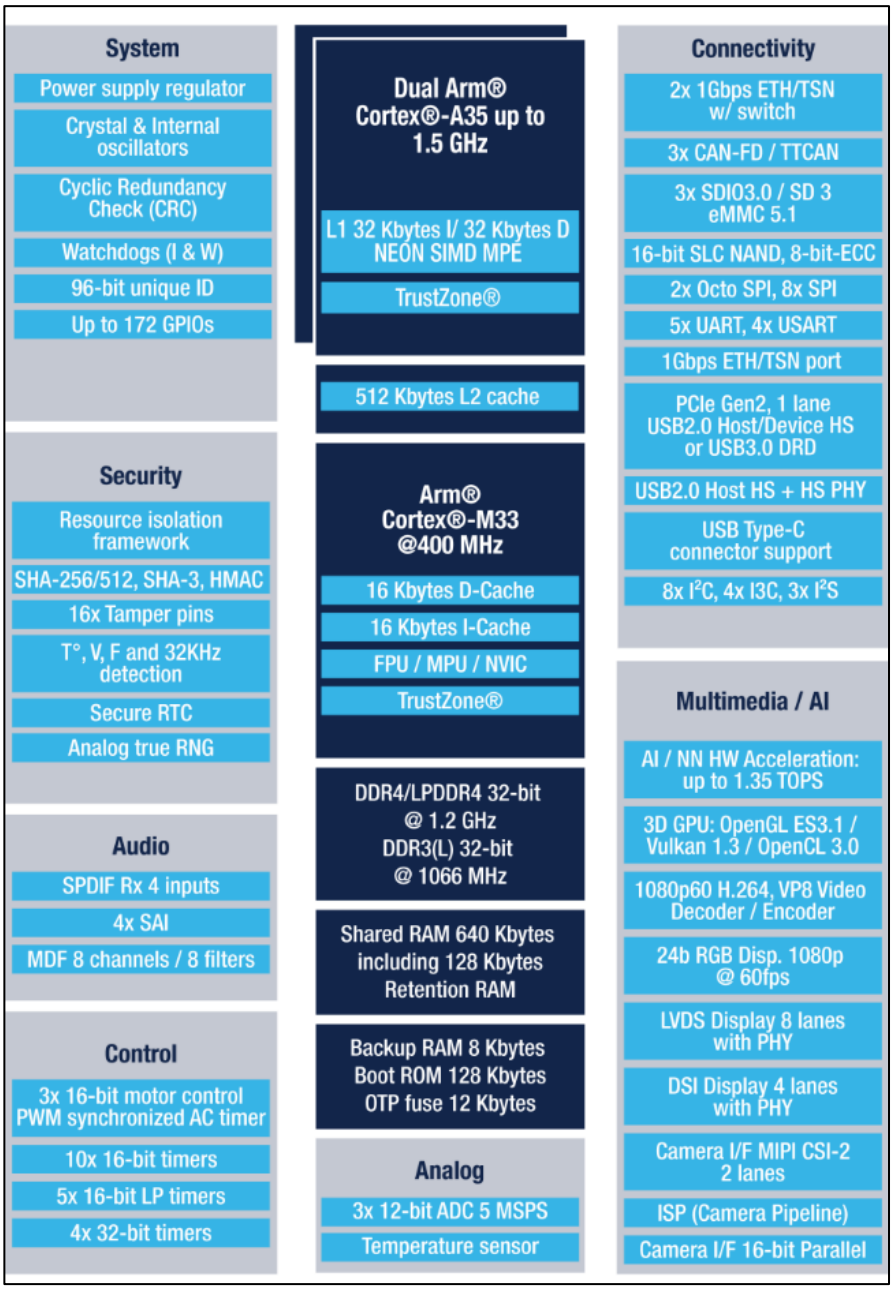

Figure 2 STM32MP257D processor resource block diagram

Some resources of STM32MP257DAK3 processor are summarized in the following table.

STM32MP257 processor resources			
Cortex-A35	x2，1.5GHz，64-bit ARMv8	**Cortex-M33**	x1, 400MHz
NPU	1.35 TOPS	**DRAM**	DDR4
I2C	Up to 8 ways	**I3C**	Up to 4 ways
SAI	Up to 4 ways	**SPI**	Up to 8 ways
UART/USART	Up to 9 ways	**CAN-FD**	Up to 3 ways
Gigabit Ethernet	Up to 3 Gigabit Ethernet channels	**USB**	Channel 2, HOST/OTG
MIPI-DSI	lane 1, lane 4	**MIPI-CSI**	lane 1, lane 2
RGB LCD	One, 24b, 1080p@60fps	**SDMMC**	Up to 3 ways
GPIO	Up to 144 ways, multiplexed with other IO	**ADC**	Three, 21 channels, 12 bits
TIMER/PWM	The Sixth Road	**JTAG**	1 way
WDOG	7 of them	**LPUART**	1 of them
PCIE 2.0/USB 3.0	1 of them	**LVDS**	2 of them

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

Chapter 3. Product Specifications

3.1 Appearance of development board and delivery list

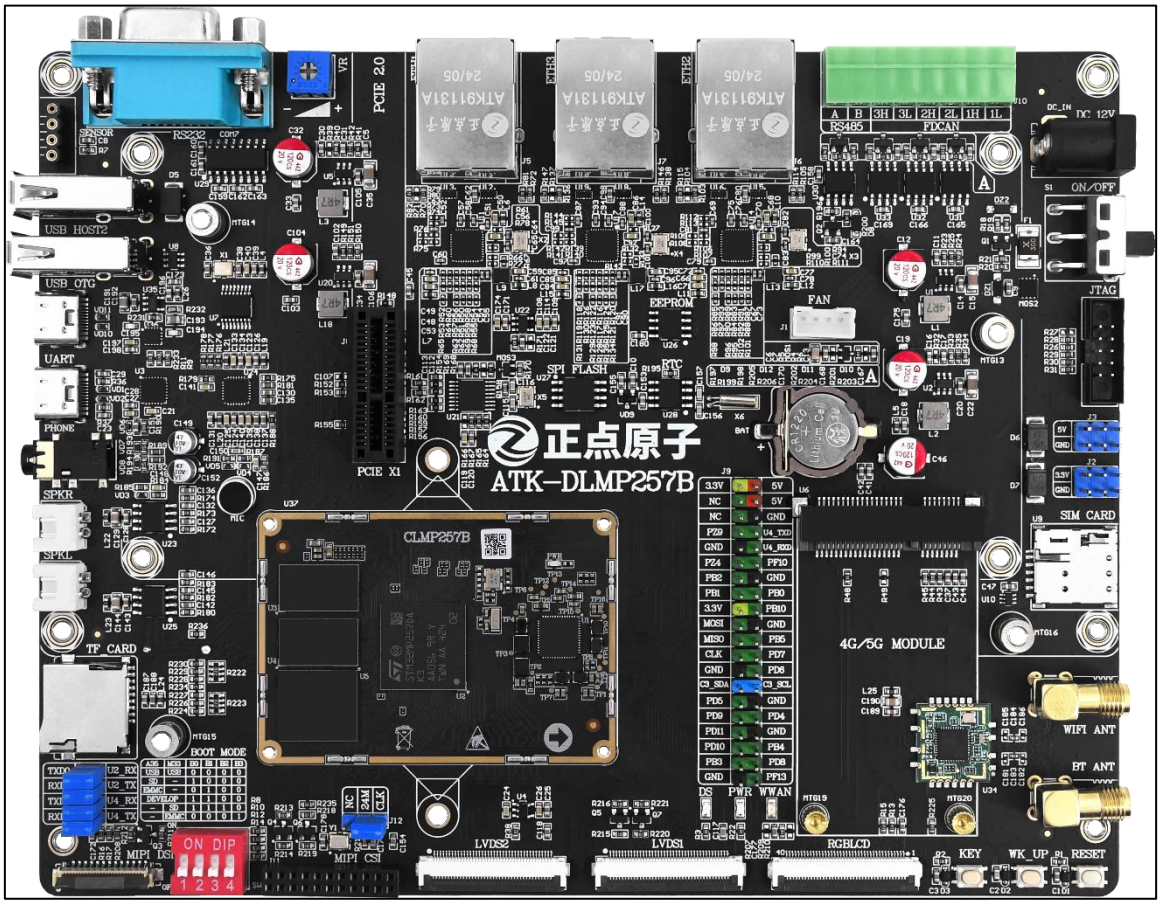

Figure 3 Front of the development board

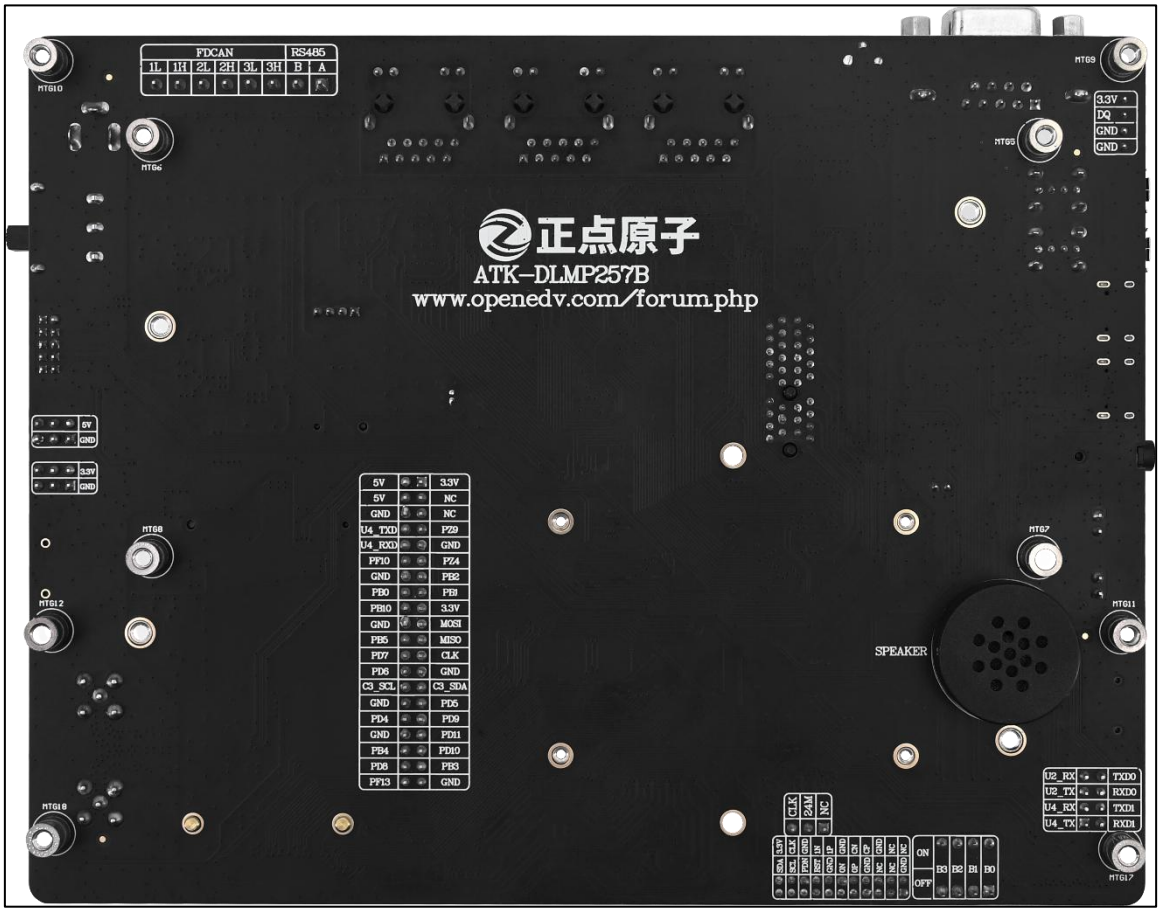

Figure 4 The back of the development board

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

	Name	Quantity	Description
1	STM32MP257 development board	1	Base plate + core plate
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 5 Default shipping list

3.2 Mechanical dimensions of the development board

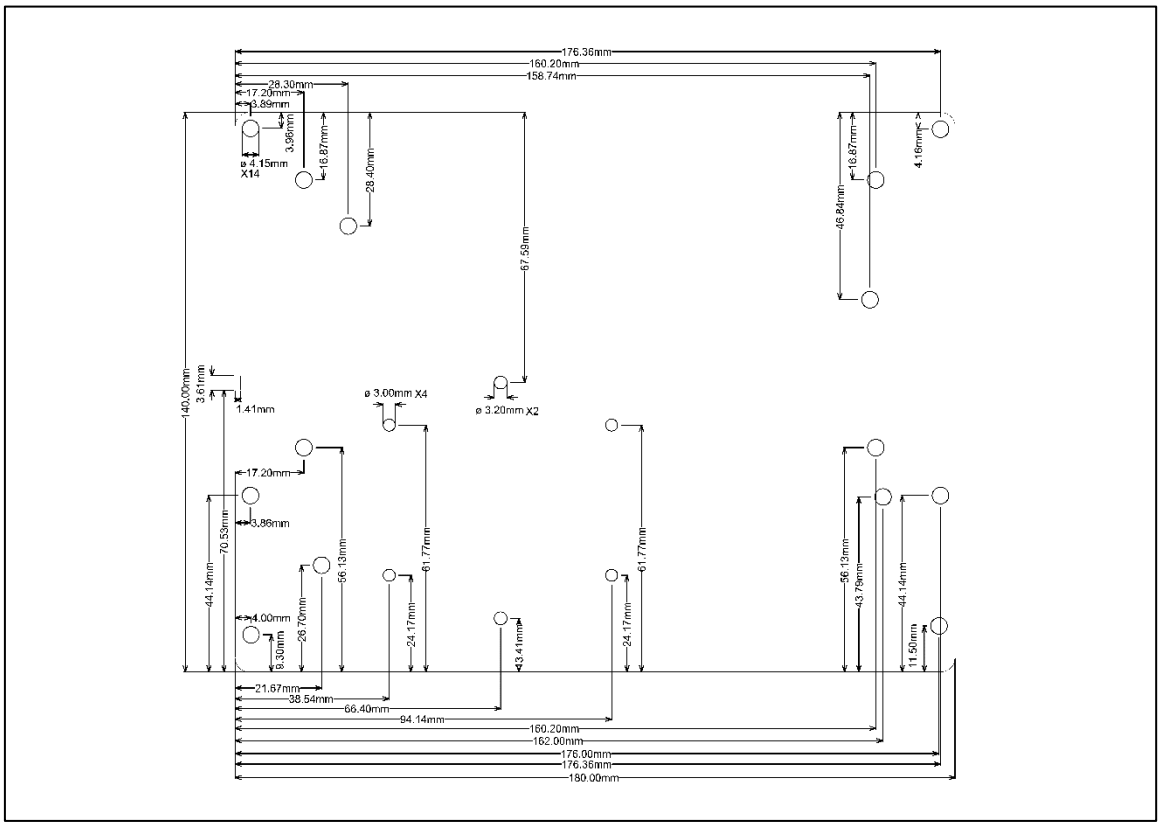

Figure 6 Development board mechanical dimension drawing

3.3 Development board peripheral resources

The ATK-DLMP257B development board is very rich in resources, which takes the internal resources of STM32MP257 processor to the extreme. Almost all the internal resources of STM32MP257 processor can be verified on this development board, and the rich interfaces and functional modules are extended, which is very suitable for user evaluation.

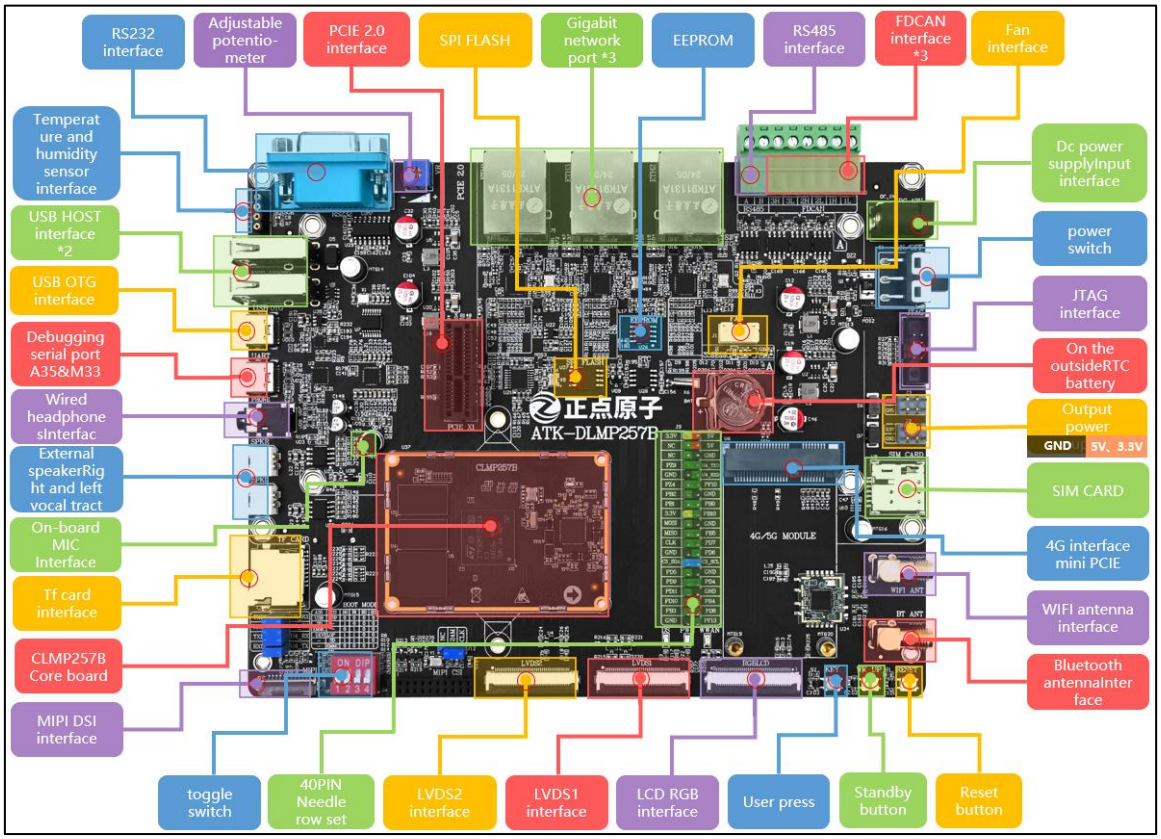

Figure 7 Development board front resource diagram

All functions and peripheral interface resources of ATK-DLMP257B development board are summarized in the following table.

Classification	Resource summary		
BTB interface	ATK-DLMP257B core plate, four pairs of 2x40P male base plate		four pairs of 2x40P female base
Memory storage	RAM：1GB/2GB DDR4	ROM ： 8GB/16GB EMMC	TF card slot x1
Human-computer interaction	Power indicator x1	System user lamp x1	Wake up button x1
	Reset button x1	User press x1	Adjustable potentiometer x1
	BOOT dial switch x1		
Download debugging	UART debug interface x1 (type-C)	USB OTG interface x1 (Type-C)	JTAG interface x1
Display interface	MIPI-DSI interface x1	LCD RGB interface x1	LVDS interface x2
Wire communication	Gigabit Ethernet interface x3	Mini PCIE interface x1	PCIE 2.0 interface x1
	RS485 interface x1	CAN FD interface x3	USB HOST interface x2
	Temperature and humidity sensor interface x1	Fan interface x1	TF card interface x1

Wireless communication	WIFI antenna interface x1	BT antenna interface x1	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	2x20P IO row pin interface x1, 2.54mm pitch		
On-board chip	W25Q128 chip x1	AT24C64 chip x1	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)	

Note: Two gigabit Ethernet GMAC interfaces are provided: one of them has an optional PHY interface; The other one is connected to the external PHY interface and can be optionally connected through the internal embedded Ethernet switch, which supports two external PHY interfaces.

3.4 Adaptation module

The ATK-DLMP257B development board can be used with the ATK-MCIMX335 module of the positive dot atom to provide good performance and effect. At present, the development board has been adapted to some modules. If you need more adaptation modules of ATK-DLMP257B development board, you can contact the technical support of Zhengdian Atomic official flagship store for consultation.

Chapter 4. Product Information

4.1 Data Download

ATK-DLMP257B Development Board Data Download Center:
http://www.openedv.com/docs/boards/arm-linux/mp257.html

4.2 Information Description

Description of Development board Catalog:

Catalogue	Description
1_codes	Factory system source code, tutorial routines source code, Qt interface source code, heteronuclear routines source code, AI routines source code, etc
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_STM32MP2_reference	STM32MP257 reference manual, data sheet, etc
8_system_image	Factory system image burn firmware package
9_tutorials	Linux driver development, Linux C application programming guide, AI development and other detailed documents
10_user_manual	Fast experience, Qt5 environment construction, heteronucleo communication and other documents to help users develop quickly

4.2.1 User manual

Material	Description
ATK-DLMP257B Quick Test Manual	Development of board burning system, preparation for use, functional test
ATK-DLMP257B Hardware Reference Manual	Development board hardware resources description, use precautions
ATK-DLMP257B Development Board Specification	Development board specification, pre-project selection reference
ATK-DLMP257B Virtual Machine Usage Reference Manual	Built virtual machine, installation and basic instructions to use
ATK-DLMP257B Factory System NFS Setup Manual	Development board factory system NFS configuration and testing
ATK-DLMP257B Factory System TFTP Setup Manual	Development board factory system TFTP configuration and testing

ATK-DLMP257B Porting Debian Reference Manual	The development board builds the Debian minimal root filesystem
ATK-DLMP257B Factory System Source Code Use Guide	Factory system source code compilation and image construction method
ATK-DLMP257B Firmware Update Reference Documentation	System firmware partition description, update firmware method introduction
ATK-DLMP257B Build Qt Environment Based on the factory system	Introduction to the method of building Qt development environment in Ubuntu system
ATK-DLMP257B Factory QtUI Compilation Manual	Factory Qt UI source code compilation and use method introduction
ATK-DLMP257B U-Boot Command Reference Manual	Introduction to the use of common U-Boot commands
ATK-DLMP257B Factory System Screen ID Identification Function Introduction	Factory system screen ID recognition function
ATK-DLMP257B Factory System Peripheral Reuse Manual	Description of different peripheral device reuse methods in factory system
ATK-DLMP257B Ethernet Switch Development Guide	Factory system Ethernet switch software configuration
ATK-DLMP257B Factory System LOGO Modification Manual	Factory system kernel stage Logo modification method
ATK-DLMP257B Setup Self - Start Program Reference Document	Factory system self - start program setting method
ATK-DLMP257B Static IP Address Modification Document	Factory system set static IP address method

For more documents, please download the materials and consult them

4.2.2 Documentation Tutorials

Material	Description
ATK-DLMP257B Embedded Linux Driver Development Guide	Kernel subsystem learning, development board configuration description
ATK-DLMP257B Embedded Linux C Applications Programming Guide	Application programming learning based on factory system
ATK-DLMP257B Embedded Qt Development Foundation	Embedded Qt development case study
ATK-DLMP257B Rapid Development Manual For Heteronuclear Communication	Heteronuclear communication learning between A35 and M33
ATK-DLMP257B Embedded AI Development Manual	Embedded AI Model Development and Optimized Deployment Learning

For more documents, please download the materials and consult them

4.2.3 Core board information

Material	Description

ATK-CLMP257B Core Board Specification Document	Core board specification for pre-project selection
ATK-CLMP257B Core Board Interface Data Sheet	Core board interface pin function description
ATK-CLMP257B Core Board Use Precautions	Core board use precautions, small system board design instructions
ATK-DLMP257B Factory System Peripheral Reuse Manual	Core board interface peripheral function modification
ATK-CLMP257B Mechanical Dimension Drawing Of Core Board	Core board mechanical dimension data
Schematic diagram of ATK-DLMP257B Base Board	Schematic diagram of the development board
ATK-DLMP257B Base Board package library	Development board integrated encapsulation library

For more documents, please download the materials and consult them

Chapter 5. Product Usage Precautions

- Do not plug or unplug peripheral modules while powered on!
- Before using the product, please carefully read this manual and related development manuals, and pay attention to the applicable matters of the platform.
- Please follow all the guidelines and warning information marked on the product.
- Use this product in a cool, dry, and clean place.
- Keep this product dry. If any liquid is splashed or soaked onto it by accident, please immediately cut off the power supply and fully dry it.
- Do not use organic solvents or corrosive liquids to clean this product.
- Do not use this product in dusty or messy environments.
- If not used for a long time, please package this product well and pay attention to moisture-proof and dust-proof.
- Pay attention to the ventilation and heat dissipation of this product during use. Avoid overheating during operation to prevent damage to components.
- Do not use this product in alternating cold and hot environments to avoid condensation damage to components.
- Do not handle this product roughly. Dropping, knocking, or vigorous shaking may damage the circuit and components.
- Pay attention to preventing static electricity during use of this product.
- The FPC soft flexible cable is relatively fragile. When plugging or unplugging the cable, pay attention to checking whether the metal tabs at both ends of the cable are misaligned or fallen off.
- All products are tested before shipment. For the first use, please power on test with the development board corresponding to Point Atom.
- Do not repair or disassemble our products without authorization. If the product malfunctions, please contact us for repair in time.
- Unauthorized modification or use of unauthorized accessories may damage this product. Damages caused thereby will not be repaired.

Chapter 6. After-sales Service

6.1 After-sales service Terms

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 docking mode

QQ group: ALIENTEK STM32MP257 exchange group

ALIENTEK STM32MP257 After Sales Group (order number required)

Taobao shop: ALIENTEK flagship store

Business docking: ALIENTEK flagship store, transfer business customer service

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

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