Product Manual
ECB10-135A5M5M-I Single Board Computer



Chengdu Ebyte Electronic Technology Co.,Ltd.

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1.Product Overview

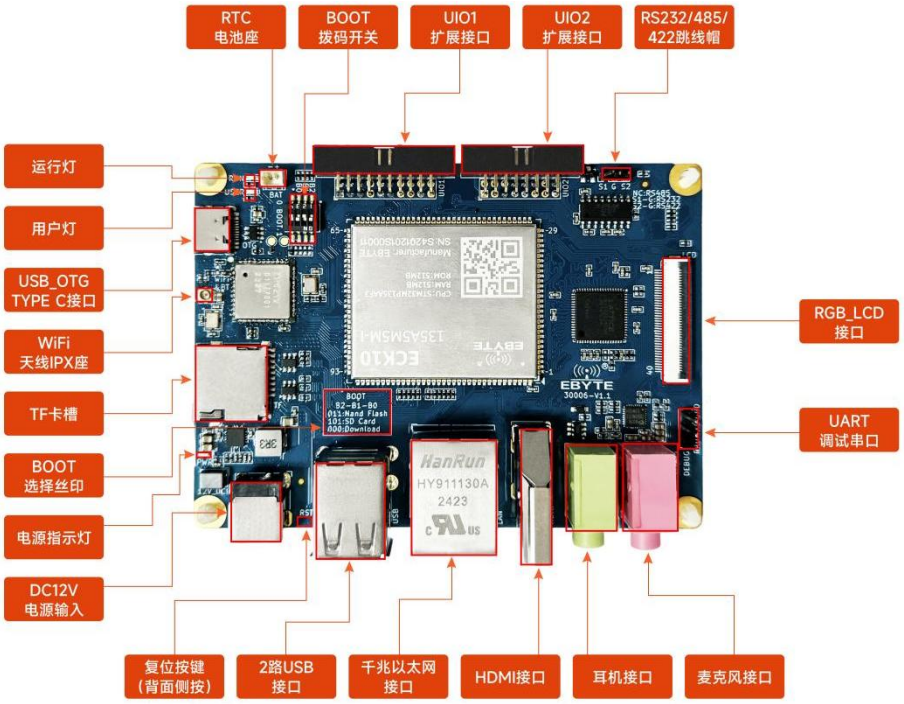
1.1.Product Introduction

Ebyte ECB10-135A5M5M-I is a cost-effective, highly reliable, compact 2.5-inch single board computer, carefully designed based on Ebyte's ECK10-135A5M5M-I core board. Provide rich peripheral interfaces and expansion capabilities such as 2 USB ports, 1 Gigabit Ethernet port, 1 HDMI port, and 1 audio port. Suitable for batch use in industrial automation, smart cities, display and control terminals, and other scenarios.

Accompanied by the single board computer, it provides abundant software resources and documentation materials. The software documentation includes but is not limited to U-boot, Linux, all peripheral driver source codes, and related development tools. The documentation includes product manuals, baseboard PDF schematics, software development notes, and other related materials.

The ECK10-135A5M5M-I core board processor adopts STMicroelectronics' STM32MP135 single core Cortex-A7, with a main frequency of 650MHz. The memory adopts 512MB DDR3L; The storage adopts 512MB NAND FLASH. The core board and the single board bottom plate are combined by stamp hole welding.

The functional diagram of the single board computer is as follows:



Single board computer function diagram

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1.2.Typical applications

- Smart home;
- Intelligent toy;
- Smart city;
- Tablet PC;
- IoT gateway;
- Advertising all-in-one machine;
- Industrial all-in-one machine;
- Industrial control motherboard;
- Robot.

2. Specification parameters

2.1.Functional parameters

Functional parameter table

Power input	12V 1A DC input	
Processor	STM32MP135AAF3； Single Arm Cortex-A7 core，650MHz；	
Storage	Memory	DDR3L SDRAM, 16 bits wide, 512MB;
	FLASH	512MB parallel NAND FLASH;
Display	1-channel 40Pin FPC parallel display interface, maximum resolution supporting WXGA (1366 × 1366) 768@60fps ）, RGB888 parallel display output, supporting touch screen; 1 HDMI 2.0 interface, maximum resolution supporting WXGA;	
USB HOST	4 USB2.0 HOSTs, with 2 UIO expansion ports leading out;	
USB OTG	1 USB OTG, Type-C interface type;	
Network port	1 channel 10/100/1000M adaptive RJ45 Ethernet port;	
WiFi&BT	1 2.4G WiFi, 1 Bluetooth, sharing 1 IPX interface;	
TF	1 TF card slot, supporting plug and unplug detection;	
Audio frequency	1 channel 3.5mm audio output (green), 1 channel 3.5mm microphone input (red);	
Debugging	1 UART TTL debugging serial port, 2.54mm pin;	
CAN	1 CAN-FD interface, with UIO expansion port output;	
GPIO	4-channel GPIO, UIO expansion port output;	
Serial port	1 RS485/422/232 multi protocol serial port, communication mode selected through jumper cap, RS485 communication rate 10Mbps, RS232 communication rate 250kbps; RS485, RS232 support flow control, UIO expansion port output; 1 UART communication serial port, supporting flow control and UIO expansion port output;	
I2C	2-channel I2C, UIO expansion port output;	
Key	1 reset button, side button, and UIO expansion port lead out at the same time; 1 power button, UIO expansion port lead out;	
Indicator light	1 power indicator light; 1 running indicator light; 1 user light;	
Watchdog	Support on-chip watchdog function	
RTC	1 channel 1.25mm RTC battery holder;	

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BOOT	1-channel startup selection dialing, supports booting from FLASH, OTG, TF card;
Power output	2-channel 5V 1A power output, led out from UIO expansion port; 2-channel 3.3V 1A power output, led out from UIO expansion port;

2.2.Environmental characteristics

Environmental Characteristics Table

Working temperature	Industrial grade: -40 ℃~85 ℃;
Storage temperature	-40℃ ~ 85℃；
Working humidity	5~95% humidity, non condensing;
Storage humidity	60 ℃ @ 95% humidity, non condensing;

2.3.Core board I/O function allocation

The ECK10-135A5M5M-I core board installed on the single board computer is configured with I/O function through STM32CubeMX official software. In order to meet the diverse interface requirements, we provide as many configuration application solutions as possible, while also offering STM32CubeMX configuration files. The definition of I/O allocation pins for the core board is as follows:

Core board pin definition table

Pin	Pin name	function	level	type
1	DGND	—		PWR
2	GPIO_PF2	LTDC_B3	3.3V	I/O
3	GPIO_PH13	LTDC_G2	3.3V	I/O
4	GPIO_PB5	LTDC_DE	3.3V	I/O
5	GPIO_PB9	LTDC_B1	3.3V	I/O
6	GPIO_PC7	LTDC_G6	3.3V	I/O
7	GPIO_PF3	LTDC_G3	3.3V	I/O
8	GPIO_PH9	LCD_PWM	3.3V	I/O
9	GPIO_PF1	LTDC_G1	3.3V	I/O
10	DGND	—		PWR
11	GPIO_PE1	LTDC_R4	3.3V	I/O
12	GPIO_PD10	LTDC_B2	3.3V	I/O
13	GPIO_PD9	LTDC_B0	3.3V	I/O
14	GPIO_PH14	LTDC_B4	3.3V	I/O
15	GPIO_PG0	LTDC_G5	3.3V	I/O
16	GPIO_PA15	LTDC_G7	3.3V	I/O
17	GPIO_PB8	I2C1_SCL	3.3V	I/O
18	GPIO_PH12	I2C3_SCL	3.3V	I/O

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19	GPIO_PA12	HDMI_INT	3.3V	I/O
20	DGND	—		PWR
21	GPIO_PB12	LTDC_R3	3.3V	I/O
22	GPIO_PG7	LTDC_R1	3.3V	I/O
23	GPIO_PG4	USART3_RX	3.3V	I/O
24	GPIO_PE15	LTDC_B7	3.3V	I/O
25	GPIO_PG15	HDMI_NRST	3.3V	I/O
26	GPIO_PG8	USART3_RTS	3.3V	I/O
27	GPIO_PH8	LTDC_R2	3.3V	I/O
28	GPIO_PF6	LTDC_R7	3.3V	I/O
29	DGND	—		PWR
30	DGND	—		PWR
31	GPIO_PH11	(LCD)Power_EN	3.3V	I/O
32	GPIO_PD13	LTDC_G4	3.3V	I/O
33	GPIO_PE12	LTDC_VSYNC	3.3V	I/O
34	GPIO_PE11	LTDC_R0	3.3V	I/O
35	GPIO_PE13	LTDC_R6	3.3V	I/O
36	GPIO_PF5	LTDC_R5	3.3V	I/O
37	GPIO_PD3	I2C1_SDA	3.3V	I/O
38	GPIO_PD6	UART4_TX	3.3V	I/O
39	DGND	—		PWR
40	GPIO_PB6	LTDC_B6	3.3V	I/O
41	GPIO_PE0	LTDC_B5	3.3V	I/O
42	GPIO_PD8	UART4_RX	3.3V	I/O
43	VBAT_EXT	VBAT_EXT	3.3V	PWR-I
44	QSPI_CLK_PF10_R	LCD_DISP	3.3V	I/O
45	QSPI_BK2_IO0_PH2	TP_INT	3.3V	I/O
46	QSPI_BK2_IO1_PG10	UART8_CTS	3.3V	I/O
47	DGND	—		PWR
48	QSPI_BK2_IO2_PE14	UART8_RTS	3.3V	I/O
49	QSPI_BK2_NCS_PE4	UART8_TX	3.3V	I/O
50	QSPI_BK2_IO3_PH7	I2C3_SDA	3.3V	I/O
51	GPIO_PG3	FDCAN2_RX	3.3V	I/O
52	GPIO_PA11	GPIO	3.3V	I/O
53	GPIO_PA0	UART5_TX	3.3V	I/O
54	GPIO_PF13	UART5_RX	3.3V	I/O
55	DGND	—		PWR
56	GPIO_PA1	GPIO	3.3V	I/O
57	GPIO_PG11	USART3_TX	3.3V	I/O
58	GPIO_PG1	FDCAN2_TX	3.3V	I/O
59	GPIO_PA8	GPIO	3.3V	I/O
60	GPIO_PE6	GPIO	3.3V	I/O
61	GPIO_PH3	LED_1	3.3V	I/O
62	GPIO_PF9	UART8_RX	3.3V	I/O
63	GPIO_PA13	LED_RUN	3.3V	I/O
64	GPIO_PC0	I2S1_MCK	3.3V	I/O
65	JTCK_SWCLK_PF14	HEADSET_INTERRUPT	3.3V	I/O
66	GPIO_PA4	WL_HOST_WAKE	3.3V	I/O
67	GPIO_PC3	I2S1_CK	3.3V	I/O

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68	GPIO_PA5	I2S1_WS	3.3V	I/O
69	GPIO_PA3	I2S1_SDO	3.3V	I/O
70	ETH1_LEDG	ETH1_LEDG	3.3V	O
71	ETH1_LEDY	ETH1_LEDY	3.3V	O
72	JTRST_NJTRST	—	3.3V	I
73	GPIO_PA6	I2S1_SDI	3.3V	I/O
74	GPIO_PI6-BOOT2	BOOT2	3.3V	I/O
75	DGND	—		PWR
76	USBH_HS1_DM	USBH_HS1_DN	USB	I/O
77	USBH_HS1_DP	USBH_HS1_DP	USB	I/O
78	DGND	—		PWR
79	USB_OTG_HS_DM	USB_OTG_HS_DN	USB	I/O
80	USB_OTG_HS_DP	USB_OTG_HS_DP	USB	I/O
81	DGND	—		PWR
82	ETH1_MDIN2	ETH1_MDIN2	ETH	I/O
83	ETH1_MDIP2	ETH1_MDIP2	ETH	I/O
84	DGND	—		PWR
85	ETH1_MDIN0	ETH1_MDIN0	ETH	I/O
86	ETH1_MDIP0	ETH1_MDIP0	ETH	I/O
87	DGND	—		PWR
88	ETH1_MDIN1	ETH1_MDIN1	ETH	I/O
89	ETH1_MDIP1	ETH1_MDIP1	ETH	I/O
90	DGND	—		PWR
91	ETH1_MDIN3	ETH1_MDIN3	ETH	I/O
92	ETH1_MDIP3	ETH1_MDIP3	ETH	I/O
93	DGND	—		PWR
94	JTDO_SWO_PH5	WL_REG_ON	3.3V	I/O
95	JTDI_PH4	BT_nRST	3.3V	I/O
96	GPIO_PI4-BOOT0	BOOT0	3.3V	I/O
97	OTG_VBUS_PI7	OTG_VBUS	3.3V	I/O
98	JTMS_SWDIO_PF15	BT_WAKE_R	3.3V	I/O
99	GPIO_PA14	BT_HOST_WAKE_R	3.3V	I/O
100	GPIO_PI5-BOOT1	BOOT1	3.3V	I/O
101	DGND	—		PWR
102	SDMMC2_CMD_PG6	SDMMC2_CMD	3.3V	I/O
103	SDMMC2_CK_PE3_R	SDMMC2_CK	3.3V	I/O
104	SDMMC2_D3_PB4	SDMMC2_D3	3.3V	I/O
105	SDMMC2_D0_PB14	SDMMC2_D0	3.3V	I/O
106	SDMMC2_D2_PB3	SDMMC2_D2	3.3V	I/O
107	DGND	—		PWR
108	SDMMC2_D1_PB15	SDMMC2_D1	3.3V	I/O
109	SDMMC1_CMD_PD2	DMMC1_CMD	3.3V	I/O
110	SDMMC1_D3_PC11	SDMMC1_D3	3.3V	I/O
111	SDMMC1_D1_PC9	SDMMC1_D1	3.3V	I/O
112	SDMMC1_D0_PC8	SDMMC1_D0	3.3V	I/O
113	SDMMC1_D2_PC10	SDMMC1_D2	3.3V	I/O
114	DGND	—		PWR
115	SDMMC1_CK_PC12_R	SDMMC1_CK	3.3V	I/O
116	GPIO_PH10	USART3_CTS	3.3V	I/O

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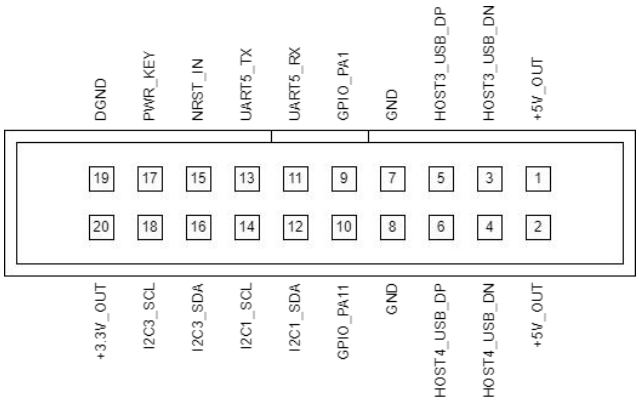
117	GPIO_PB10	SDMMC1_CD	3.3V	I/O
118	GPIO_PB13	LTDC_CLK	3.3V	I/O
119	GPIO_PC6	LTDC_HSYNC	3.3V	I/O
120	GPIO_PF0	LTDC_G0	3.3V	I/O
121	P_LDO1_R0	LDO1_OUT	3.3V	PWR-O
122	P_LDO2_R0	LDO2_OUT	3.3V	PWR-O
123	NRST_CPU	NRST	3.3V	I
124	P3V3_OUT_R2	3V3_OUT	3.3V	PWR-O
125	P3V3_OUT_R2	3V3_OUT	3.3V	PWR-O
126	PMIC_PONKEY	PWR_KEY	5.0V	I
127	VIN_5V	5V_IN	5.0V	PWR-I
128	VIN_5V	5V_IN	5.0V	PWR-I

3. Resource Description

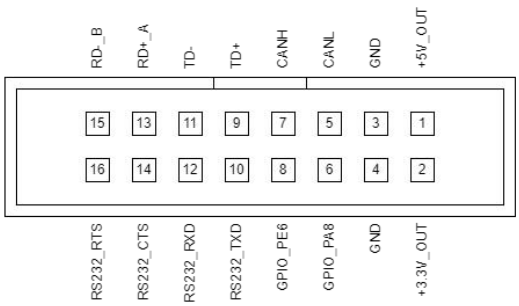
3.1.Hardware resources

3.1.1. Introduction to UIO extension pins

UIO1 and UOI2 are two extension function pins that are introduced from the board. UIO1 has a 2.0mm spacing of 2 * 10 simple bull seats, while UIO2 has a 2.0mm spacing of 2 * 8 simple bull seats. The pin definitions of the two extended function pins are shown in the following figure:



Definition of UIO1 pin



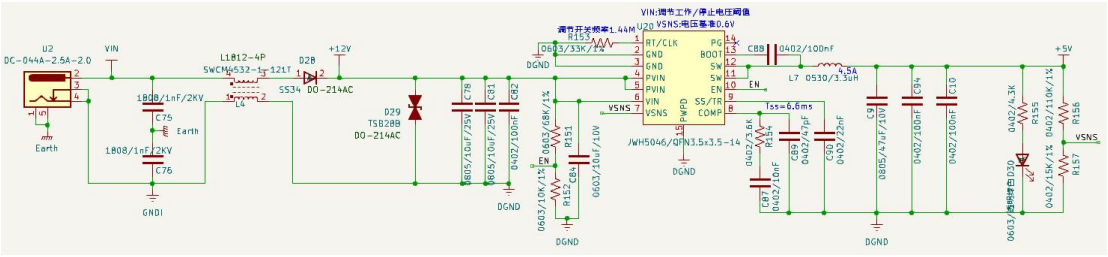
Definition of UIO2 pins

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3.1.2. DC12V power input

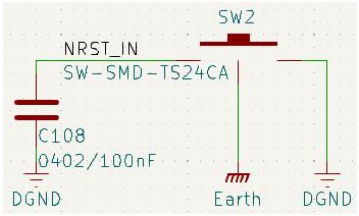
This is the external power input port (DC-IN), which uses a standard DC power socket. The single board computer is equipped with a DC-DC chip, which is used to provide efficient and stable 5V power to the single board computer. Simultaneously designed with a+5V power indicator light (PWR). In situations where power consumption is high, such as when using 7-inch screens, USB, HDMI, and other peripherals simultaneously, it is recommended to use a 12V 2A adapter to power the single board computer, which can provide sufficient current for its use. The schematic diagram is as follows:



Schematic diagram of 5V power supply DCDC

3.1.3. Power button reset button

The power button signal is led out by UIO1, making it convenient for users to connect the switch. Press and hold the power button in sleep mode to enter normal mode, and the RUN indicator light will flash accordingly. The reset button is designed with a side button, which is also led out by UIO1. Press the button to reset the single board computer. Due to the fact that both signals have pull-up resistors inside the single board computer and the pull-up power rails are different, there is no need to connect pull-up resistors when using the motherboard. They can be directly connected to buttons or driven through OD doors. The schematic diagram is as follows:



Reset button schematic

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3.1.4. 5V power output

This is a set of 5V power output pins on the single board computer, located at pins 1 and 2 of UIO1 and pin 1 of UIO2. This pin is used to provide 5V power to the external environment.

3.1.5. 3.3V power output

This is a set of 3.3V power output pins on the single board computer, located at pin 20 of UIO1 and pin 2 of UIO2. This pin is used to provide external 3.3V power supply.

3.1.6. RGB LCD module interface

This interface adopts RGB888 data format and supports touch screens (capacitive screens). Only supports LCD with RGB interface (LCD without MCU interface). Compatible with Ebyte's 7-inch RGB interface touch screen module: ECA10-7LCD24R1006CT-C.

I2C1_SCL and I2C1_SDA in the figure are two data lines for touch signals, connected to PB8 and PD3 IO respectively. LCD_PWM is the backlight control IO of LCD, connected to PH9, used to control the backlight of LCD. The three signals of LCD reset, HDMI chip reset, and touch reset share a reset circuit and are connected to PG15.

The definition of RGB LCD interface is shown in the following table:

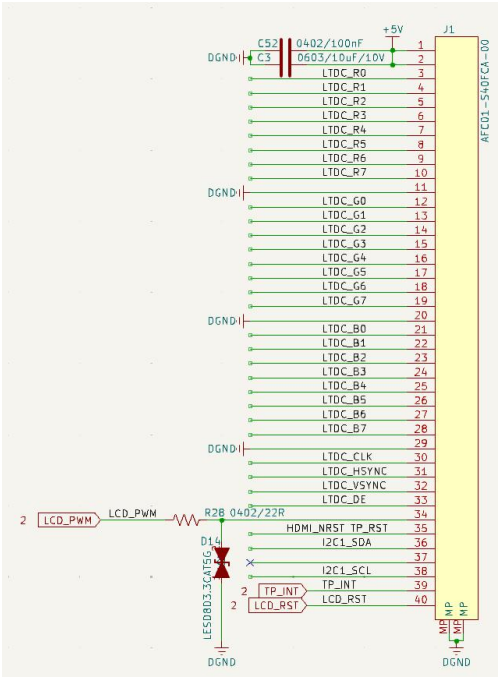
RGB LCD Interface Definition Table

Pin number	Pin Name	Description
1~2	+5V	5V power supply input
3~10	LCD_R0~LCD_R7	8 sets of red signal lines
11	GND	Power Ground
12~19	LCD_G0~LCD_G7	8 sets of green signal lines
20	GND	Power Ground
21~28	LCD_B0~LCD_B7	8 sets of blue signal lines
29	GND	Power Ground
30	LCD_CLK	Pixel clock signal
31	LCD_HSYNC	Horizontal synchronization signal
32	LCD_VSYNC	Frame synchronization signal
33	LCD_DE	Data enable signal
34	LCD_PWM	Screen backlight adjustment
35	TP_RST	Touch reset
36	I2C_SDA	Touch I2C signal
37	NC	Not answering
38	I2C_SCL	Touch I2C signal
39	TP_INT	Touch interruption
40	LCD_RST	Screen display reset

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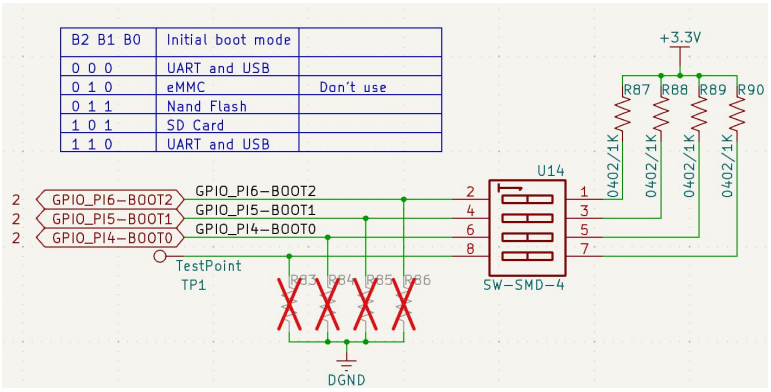
The schematic diagram of the RGB LCD interface is shown in the following figure:



Schematic diagram of LCD interface

3.1.7. Startup mode setting interface

The Ebyte ECB10-135A5M5M-I single board computer supports USB (Download), SD card, and Nand Flash boot modes. Configure through a four digit dip switch. The schematic diagram is shown in the following figure:



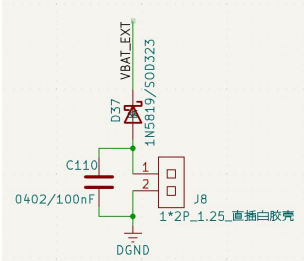
Schematic diagram of BOOT dip switch

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3.1.8. VBAT battery interface

The VBAT pin is used by connecting an external 1.25mm CR1220 or CR2032 plug-in battery. Adopting a hybrid power supply of VBAT and VDD, when there is an external power source (VDD), the battery does not provide power to VBAT, but when the external power source is disconnected, it is powered by CR1220. In this way, VBAT always has power to ensure the timing of RTC. The battery on the bottom board supplies power to the VBAT of STM32MP135 through 1N5819, and the VDD on the core board also supplies power to the VBAT of STM32MP135 through another 1N5819. The schematic diagram is shown in the following figure:



Schematic diagram of VBAT battery interface

3.1.9. RS232/485/422 serial port

ECB10-135A5M5M-I single board computer UIO2 has one RS232 interface, one RS485 interface, and one RS422 interface respectively. Choose one of the options to use by pairing a 1 * 3P 2.0mm pin with a jumper cap. The three pins of the pin are silk screened as S1, G, and S2. The selection method is shown in the following table:

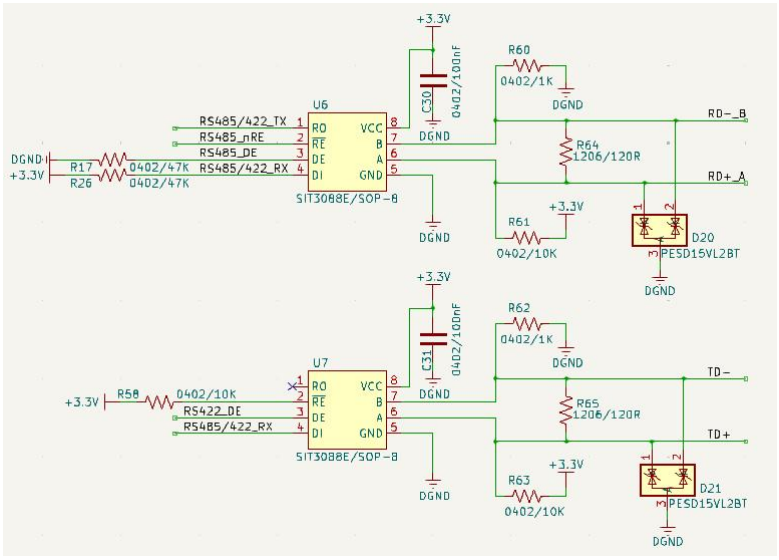
Serial port selection method table

Jumper cap short circuiting method	Selected interface type
Do not connect the jumper cap	RS485
Short circuit S1-G	RS232
Short circuit S2-G	RS422

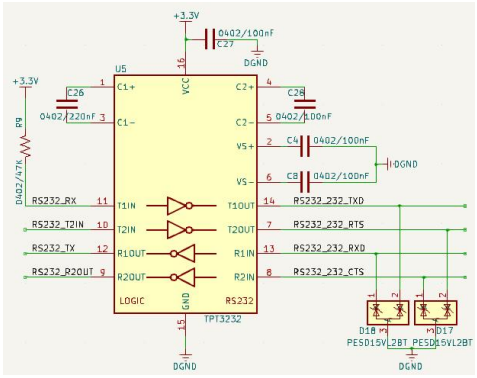
The level conversion chip used for RS485/422 is SIT3088E, and the level conversion chip used for RS232 is TPT3232. RS232 supports flow control. The schematic diagram of RS232/485/422 serial port is shown in the following figure:

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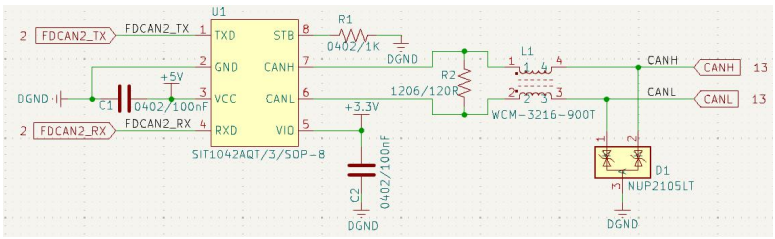
RS485/422 schematic diagram



RS232 schematic diagram

3.1.10. FDCAN interface

The ECB10-135A5M5M-I single board computer UIO2 has one FDCAN interface, and the level conversion chip used is SIT1042AQT/3, which supports CAN and CAN FD protocols. The schematic diagram is shown in the following figure:



FDCAN interface schematic diagram

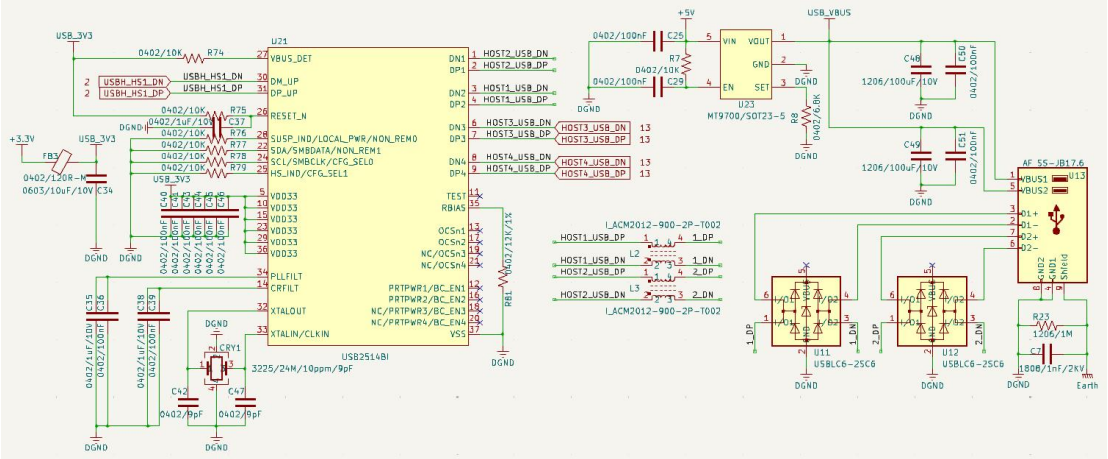
3.1.11. USB HUB interface

The ECB10-135A5M5M-I single board computer has expanded the USB1 of

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STM32MP135 to four USB HOST interfaces through a USB HUB chip. Two of them are USB-A interfaces, while the other two are led out by UIO1 and require user wiring to convert them into USB interfaces for use. The schematic diagram is shown in the following figure:

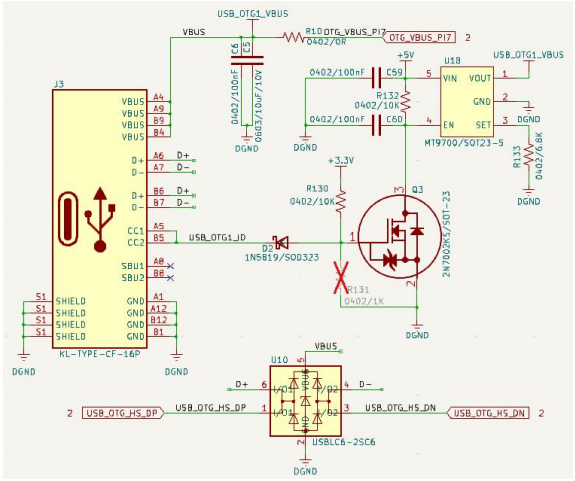


Schematic diagram of USB HUB interface

3.1.12. USB OTG (Type-C) interface

The ECB10-135A5M5M-I single board computer uses STM32MP135 USB2 as the USB OTG interface, with the interface type being USB Type-C.

This interface allows for system flashing and USB OTG testing. The single board computer defaults to slave mode. To enter host mode, you need to change the USB OTG device tree to host mode. The schematic diagram is shown in the following figure:



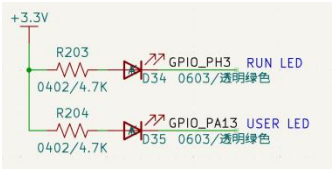
Schematic diagram of USB OTG interface

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3.1.13. LED

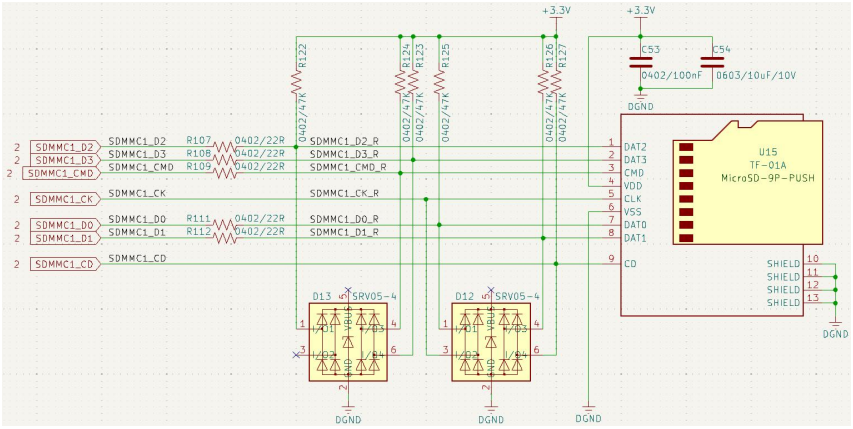
The three indicator lights on the ECB10-135A5M5M-I single board computer board are:+5V power indicator light (PWR), running light (RUN), and user light (USER). The user light is for user control and will flash before entering the system stage. The schematic diagram of the running light and user light is shown in the following figure:



LED schematic diagram

3.1.14. TF card holder

The ECB10-135A5M5M-I single board computer is equipped with a TF card (small card) interface and is driven by a 4-bit SDMMC, which is very suitable for situations that require high-speed storage. The TF card is connected to STM32MP135 through the SDIO1 interface. The schematic diagram of TF card is shown in the following figure:



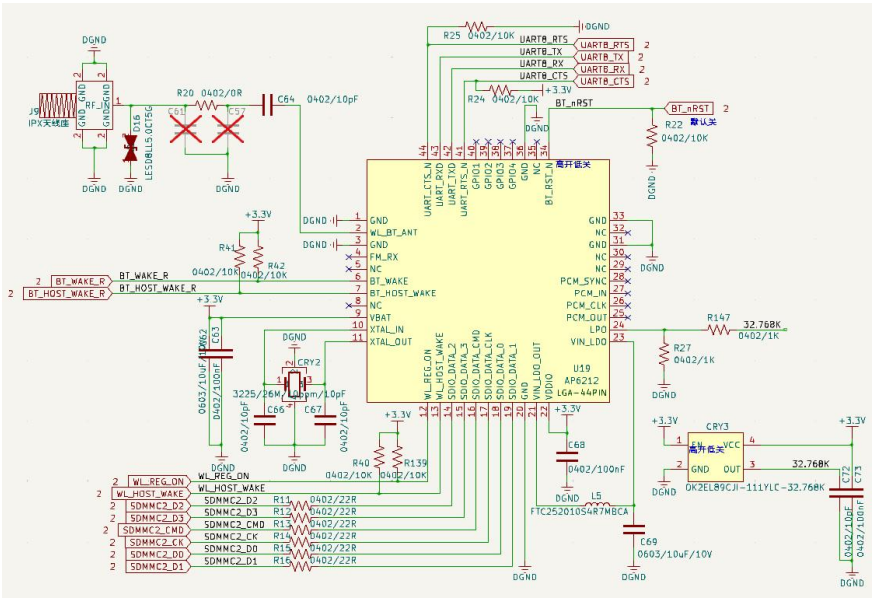
TF card holder schematic

3.1.15. SDIO WiFi&BT module

The ECB10-135A5M5M-I single board computer is equipped with a WiFi&BT module using AP6212. The WiFi part is connected to STM32MP135 through SDIO2 interface, and the BT Bluetooth part is connected to STM32MP135 through UART8 interface.

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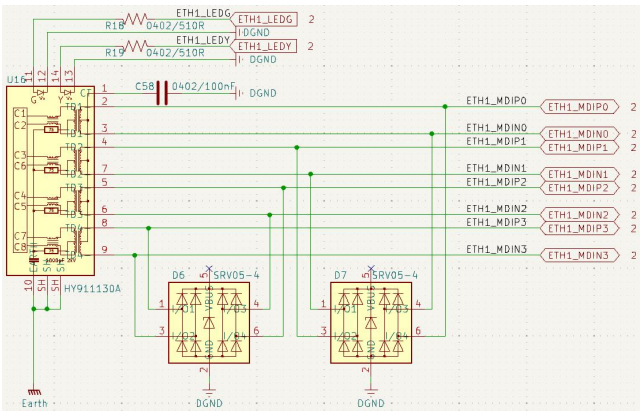
WiFi&BT module schematic

3.1.16. Gigabit Ethernet interface (RJ45)

The ECB10-135A5M5M-I single board computer is equipped with an Ethernet port (RJ45), and the PHY has been integrated into the core board, with the model being Lianyun MAE0621A-Q3i. There are yellow and green dual color indicator lights on the RJ45 Ethernet port socket, and the logic of the indicator lights is shown in the following table:

indicator light	100Mbps connection	100Mbps communication	Gigabit connection	Gigabit communication	The network cable is not connected
Green	Chang Liang	Twinkle	Not lit up	Not lit up	Not lit up
Yellow	Not lit up	Not lit up	Chang Liang	Twinkle	Not lit up

The RJ45 schematic is shown in the following figure:



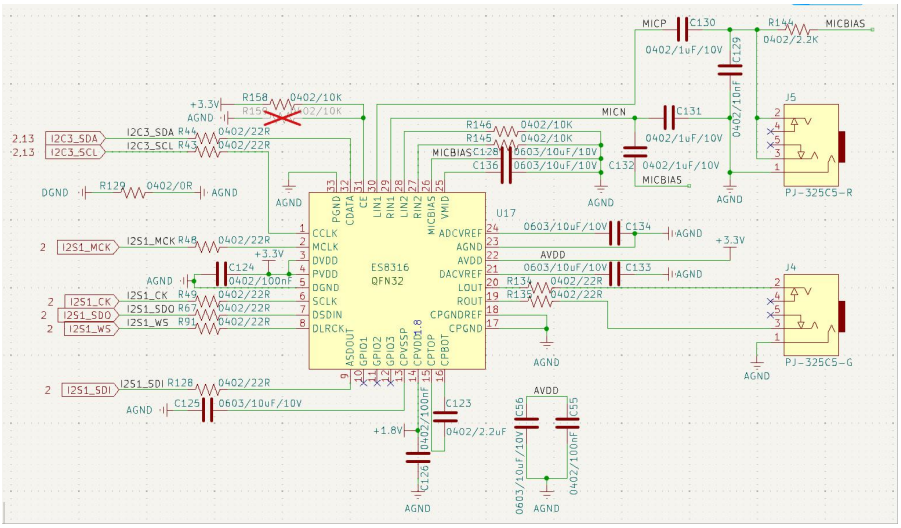
Schematic diagram of Gigabit Ethernet port

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3.1.17. Audio interface

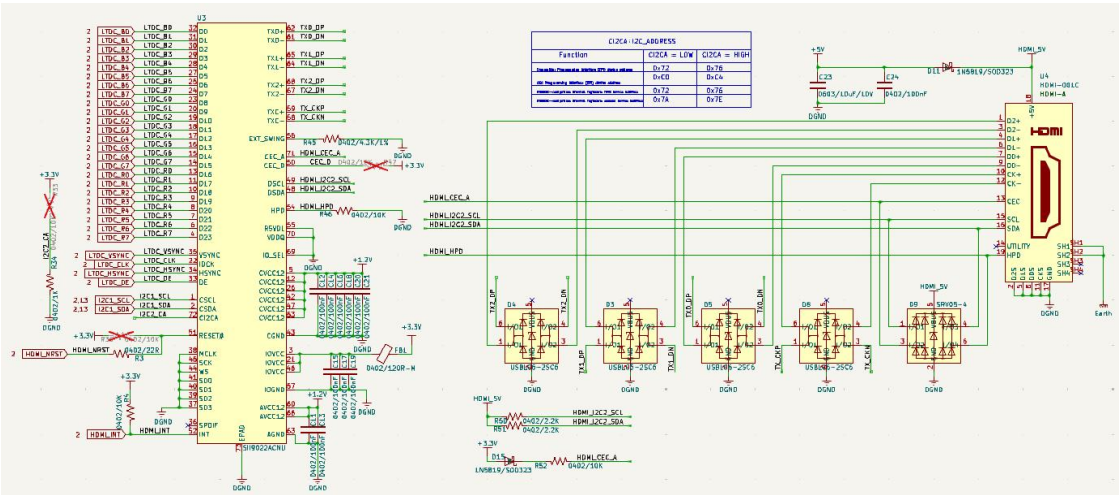
ECB10-135A5M5M-I single board computer is equipped with a three segment green 3.5mm headphone jack and a three segment red 3.5mm microphone jack. Adopting ES8316 high-performance audio codec chip. The schematic diagram is shown in the following figure:



Schematic diagram of audio interface

3.1.18. HDMI interface

ECB10-135A5M5M-I single board computer is equipped with an HDMI interface onboard. This is an RGB to HDMI interface that uses the Sil9022A chip. The chip shares a set of RGB888 signals with the RGB LCD module interface, so the RGB LCD module and HDMI cannot work simultaneously and can only choose one. The schematic diagram is shown in the following figure:



HDMI interface schematic

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3.1.19. I2C interface

ECB10-135A5M5M-I single board computer leads out two I2C interfaces through UIO1. They are I2C1 and I2C3 respectively. The touch signal and HDMI chip of I2C1 are shared with the RGB LCD module.

3.1.20. UART serial port

ECB10-135A5M5M-I single board computer leads out two serial ports. One is the UART5 extended serial port, which is exported through UIO1. The other is UART1 debugging serial port, which is led out through pin 2.54.

3.1.21. GPIO Interface

The ECB10-135A5M5M-I single board computer has four GPIO interfaces via UIO1 and UIO2, making it convenient for users to connect and use. The GPIO interface parameters and multiplexing functions are shown in the following table:

Table 3.2.2 GPIO Parameters and Reuse Function

Pin Name	level	Reuse function
GPIO_PA1	3.3V	ADC1_INP3, TIM2-CH2, TIM5_C2, LPTIM3-OUT, TIM15_C1N, DFSDM1_CKIN0, USART2dE/USART2RTS, ETH1_REF_CLK /ETH1_RX_CLK
GPIO_PA11	3.3V	ETH1_CLK, TIM1_CH4, I2C5_SCL, I2S2_SS/SPI2-NSS, USART1_CTS/USART1_NSS, ETH2RXD1, ETH1_CLK, ETH2.CLK
GPIO_PA8	3.3V	RCC_MCO1, SAI_2MCLK_SA, TIM8_SKIN2, I2C4_SDA, SPI5_SISO, SAI_2CK1, USART1_CK, I2S2_SDO/SPI_2-MOSI, USB_STG_SSOF, ETH2_SXD3, LTDC-B7
GPIO_PE6	3.3V	SAI1_SCK_B, RCC_MCO2, TIM1_BKIN2, SAI_2SCK_B, TIM15_CH2, I2C3_SMBA, SAI1_SCK_B, UART4_de/UART4-RTS, ETH2_TXD3, DCMIPP_D7, LTDC_G3

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3.2.Software Resources

The ECB10-135A5M5M-I single board computer is equipped with an operating system based on Linux version 6.1.28 kernel. The single board computer comes with a cross compilation toolchain, TF-A source code, Optee os source code, U-boot source code, Linux kernel and driver module source code required for embedded Linux system development, as well as various development and debugging tools suitable for Windows desktop environment and Linux desktop environment.

Operating System:

Equipped with XFCE desktop Ubuntu 18.04 system

System source code:

TF-A 2.8.6

Op-tee 3.19

U-boot 2022.10

Kernel 6.1.28

BuildRoot 2020.02.6

Development environment and IDE:

Burning tool: STM32CubeProgrammer

Development tool: STM32CubeMX

The system software resources are shown in the following table:

Table 3.2.1 System Software Resource Table

category	name	Describe information	Source code
FSBL	TF-A 2.8.6	First level bootloader	/source/tf-a.tar.xz
SSBL	Op-tee 3.19	Second level bootloader	/source/optee-os.tar.xz
SSBL	U-boot 2022.10	Second level bootloader	/source/u-boot.tar.xz
Linux kernel	Kernel 6.1.28	Linux kernel	/source/linux-6.1.28.tar.gz
Device Driver	USB Host	USB Host	kernel/
	USB OTG	USB OTG	kernel/
	I2C	I2C bus driver	kernel/
	SPI	SPI bus driver	kernel
	TTY	TTY serial port driver	kernel
	RS232	TTY serial port driver	kernel
	RS485	TTY serial port driver	kernel
	CAN	CAN bus driver	kernel
	Ethernet	10M/100M/1000M driver	kernel
	MMC	EMMC/TF card storage driver	kernel
	NAND	NandFlash storage driver	kernel
	LCD	RGB, HDMI display driver	kernel
	PWM	PWM control drive	kernel
	ADC	ADC driver	kernel
	RTC	Real time clock driven	kernel

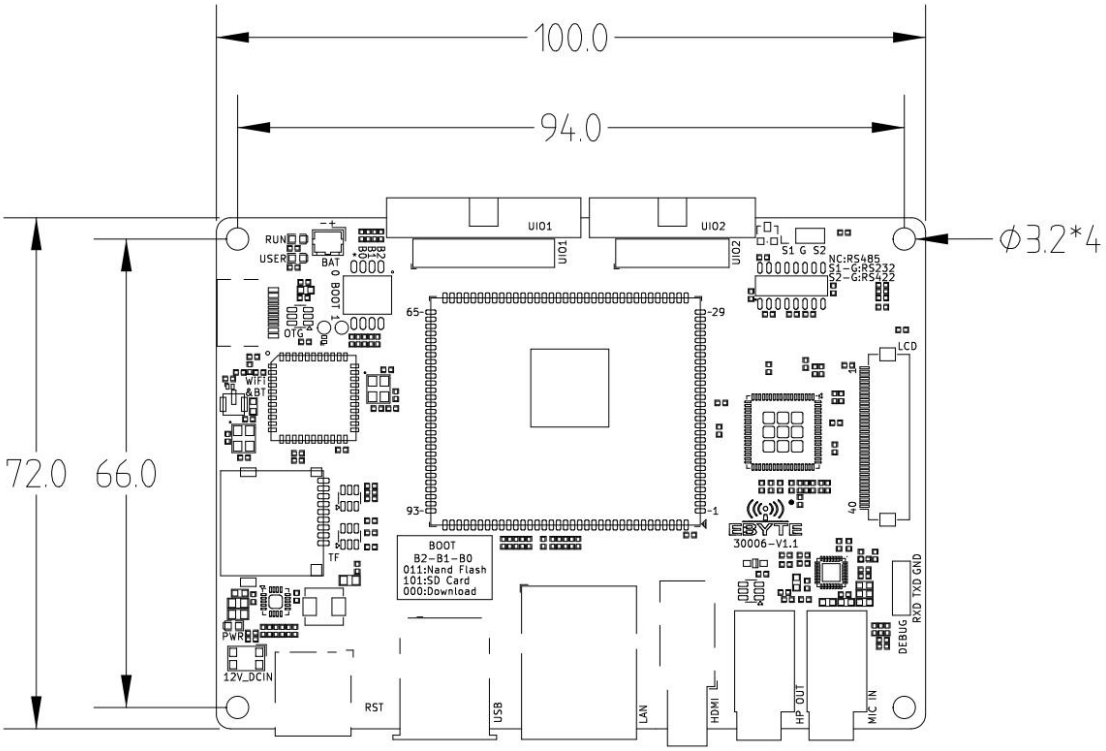
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	GPIO	GPIO driver	kernel
	Touch	Capacitive touch drive	kernel
	Watchdog	Watchdog driver	kernel
Operating system	Rootfs	Equipped with XFCE desktop Ubuntu 18.04 system	/images/ ubuntu18.ext4
Development tool	BuildRoot2020.02.6	Operating System Construction	/tools/buildroot-2020.02.6.tar.bz2
	SDK	arm-none-linux-gnueabihf 10.3	/tools/gcc-arm-10.3-2021.07-x86_64-arm-none-linux-gnueabihf.tar.xz
	STM32CubeProgrammer	Burning tool	/tools/ SetupSTM32CubeProgrammer-2.5.0.exe
	STM32CubeMX	Resource allocation tool	/tools/ en.stm32cubemx_v6-0-1.zip
	Win32DiskImager	Create SD card bootable tool	/tools/ Win32DiskImager-1.0.0-binary

4. Structural dimensions

Unit mm; Error ± 0.1mm.



Front structural dimension diagram of single board computer

5. Reference Documents

- STM32MP135 Data Manual
- ECK10-13xA Core Board Product Manual

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6. Revision Explanation

Revision Explanation Table

Edition	Modify content	Change time	Organization	Proofreading	Approval
V1.0	First draft	24-09-27	LJQ	WFX	WFX

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Technical support: service@cdebyte.com
Documents and RF Setting download link: www.cdebyte.com
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Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

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