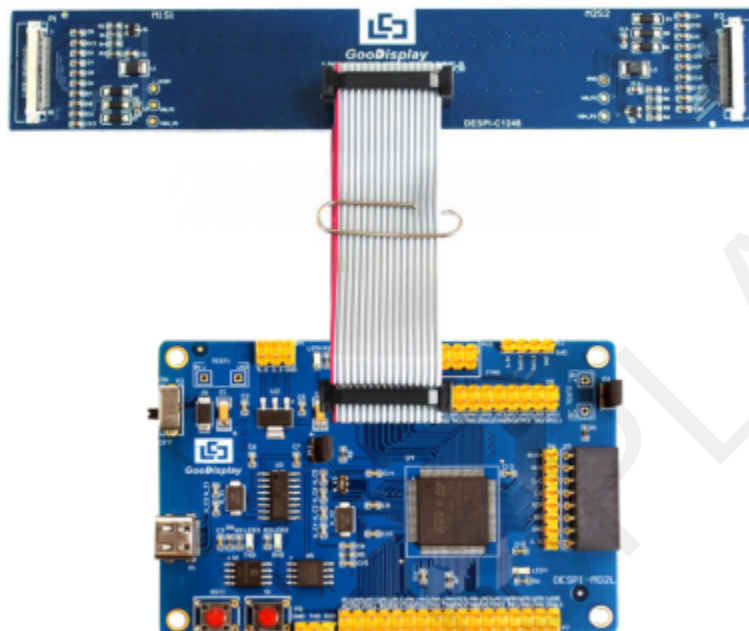




## **Evaluation Kit for E-Paper Display DESPI-C1248**

Dalian Good Display Co., Ltd.

# Product Specifications



<b>Customer</b>	<b>Standard</b>
<b>Description</b>	Evaluation Kit For E-paper Display
<b>Model Name</b>	DESPI -L(C1248)
<b>Date</b>	2022/10/14
<b>Revision</b>	<b>1.0</b>

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## Contents

1. Overview .....	4
2. Mechanical Specifications .....	4
3. Diagram .....	5
4. Connection Mode and RESE Selection.....	7
5. Program Downloading .....	9

## 1. Overview

DESPI-L (C1248) development kit can help developers develop e-paper display projects more quickly and smoothly. It is designed for e-paper display with SPI interface, and supports 12.48 inch e-paper B/W monochrome and B/W/R three color. In addition, it also has USB serial port and LED status indication functions, and supports upper computer control display.

The DESPI-L (C1248) development kit includes the main board DESPI-M02L and the adapter board DESPI-C1248.

## 2. Structure Specification

Parameter	Specification
Model	DESPI-L (C1248)
Platform	STM32
Dimension	Mother Board: 90mm x 60mm (DESPI-M02L) Adapter : 150.2mm x 26mm (DESPI-C1248)
Power Interface	USB Type
Example Code	Available
Operating Temp.	-20 ~70 (-4 ~158 )
Main Function	Learn to drive E-paper display; Test and evaluate E-paper display; Support secondary development
Additional Function	Type-C, LED indicator light, Reset button, Font chip, Flash chip, Current detection



### 3. Diagram

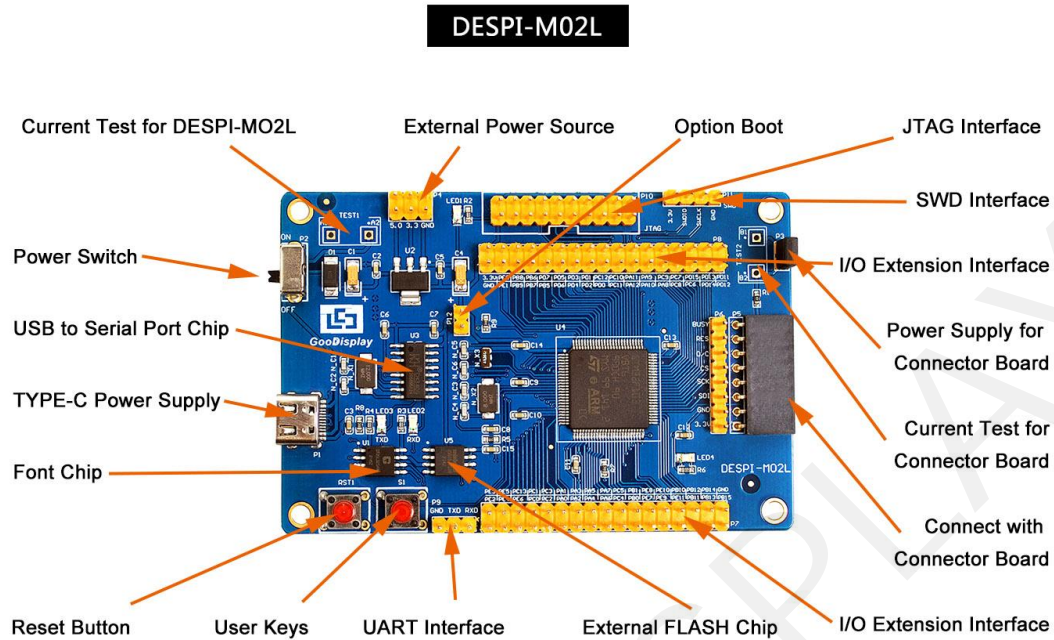


Figure 1: DESPI-M02L



Figure 2: DESPI-C1248

### **3.1 Power Supply**

The input voltage of this board is DC5V, which is powered by the USB port.

### **3.2 USB to serial port**

This board has USB to serial port transmission function. Please install the driver program CH340 to use it.

### **3.3 P3 and P12 short-circuit jumper**

- 1) P3: P3 short-circuit jumper controls DESPI-C1248's power supply, which is e-paper's power supply.
- 2) P12: P12 short-circuit jumper is used to select the download mode. You need to connect it when you download a program by UART mode, and remove it after you have downloaded it, otherwise the program will not run. If you connect it, you will not be able to download program by other ways.

### **3.4 Current measurement**

The development kit supports current measurement of DESPI-M02L and DESPI-C1248.

- 1) DESPI-M02L: Power off and make series connection between ampere meter and TEST1.
- 2) DESPI-C1248: Power on and take off the short-circuit jumper P3, then make series connection between ampere meter and TEST2. Put on the short-circuit jumper P3 after measurement.

### **3.5 I/O port extension**

The I/O port of STM32 has been led out for developing.

### **3.6 LED indicator light**

There is a indicator light reserved for developing.

### **3.7 Key**

This board has two buttons, a reset button and a user button for testing and development.

### **3.8 DESPI-C1248 adapter**

This adapter board contains the voltage boosting drive part of 12.48 inch electronic paper, and provides the measurement of VGH, VGL, VCOM and other voltage values of the voltage boosting part of the electronic paper. When designing the drive board by users, they need to pay attention to these parameters. The normal value of VGH is +20V, and the normal value of VGL is -20V.

### 3.9 Expanded Functions

Built-in Chinese font chip GT30L32S4W.

Built-in data storage chip W25Q16.

## 4. Connection Mode and RESE Selection

### 4.1 Connection between adapter and development board

The 16PIN connector is used to connect the motherboard and the adapter board. The connection method is shown in Figure 3. When connecting, it is necessary to connect the convex part of the connector shown in Figure 4 with the notch direction in Figure 5 and Figure 6 (the installation position of the main board connector in Figure 5 is the leftmost end of pin P8).



Figure 3 Connection of mother board and adapter



Figure 4 Connector Bulge



Figure 5 Installation Position of Mother Connector (Pin P8)



Figure 6. Mounting position of adapter board connector (pin P3)

## 4.2 Connection between e-paper and development board

The e-paper is connected with the development board through connectors P1 (left side) and P2 (right side) on the adapter board as shown in Figure 7.



Figure 7. Adapter Connectors

1) Connector P1 is connected to the electronic paper main FPC, and the silk screen is FPC -C008, as shown in Figure 8.



Figure 8. Main FPC silk screen



2) Connector P2 connects the e-paper from FPC, and the silk screen is FPC-009, as shown in Figure 9.

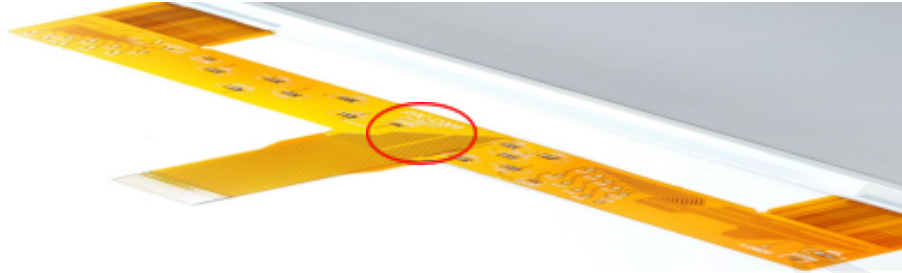


Figure 9. Screen printing from FPC

#### 4.3 Complete connection diagram

The complete connection diagram is shown in Figure 10. The master and slave FPCs cannot be connected reversely, otherwise the e-paper cannot be refreshed.

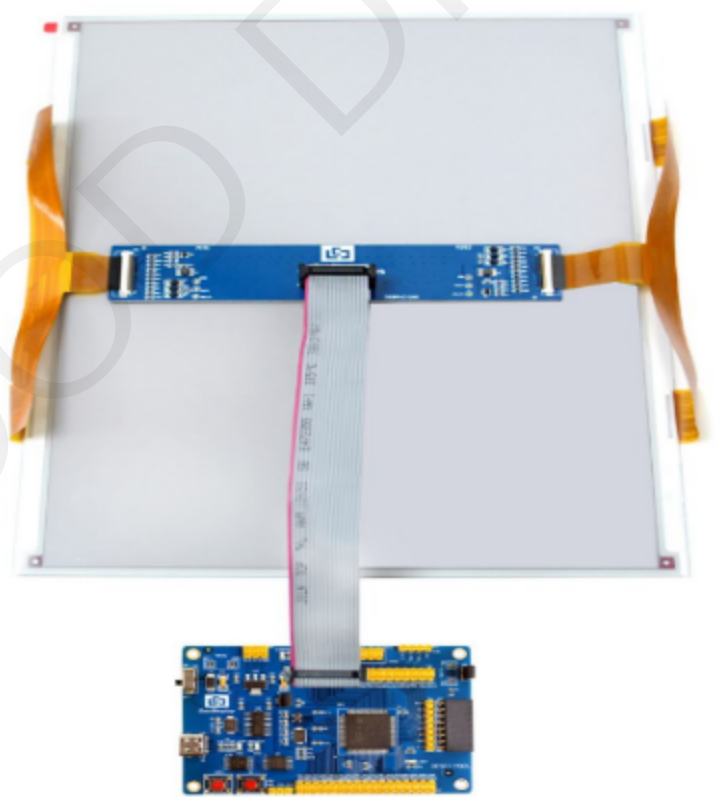


Figure 10. Complete connection diagram

## 5. Program Downloading

This development board supports three ways downloading program. They are JTAG, SWD and UART. JTAG and SWD is recommended, because these two can make online downloading available for debug.

### 5.1 JTAG

We need to use J-link simulator and Keil4, the operation steps are as follows:

- 1) Connect the simulator to DESPI-M02's JTAG interface ( align the raised part of the figure 1 1 simulator interface to the notch direction of the JTAG interface ) and connect the computer USB port at the other end.

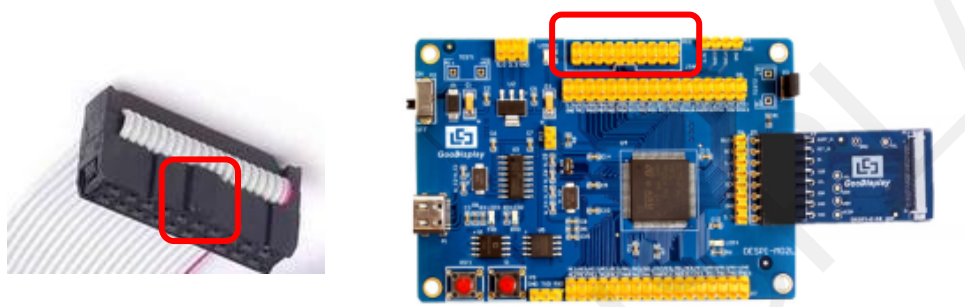


Figure 1 1 :Connection between JTAG and simulator

- 2) Open the "mdk.uvproj" in the program folder "Project" shown in Figure 12 with Keil4.

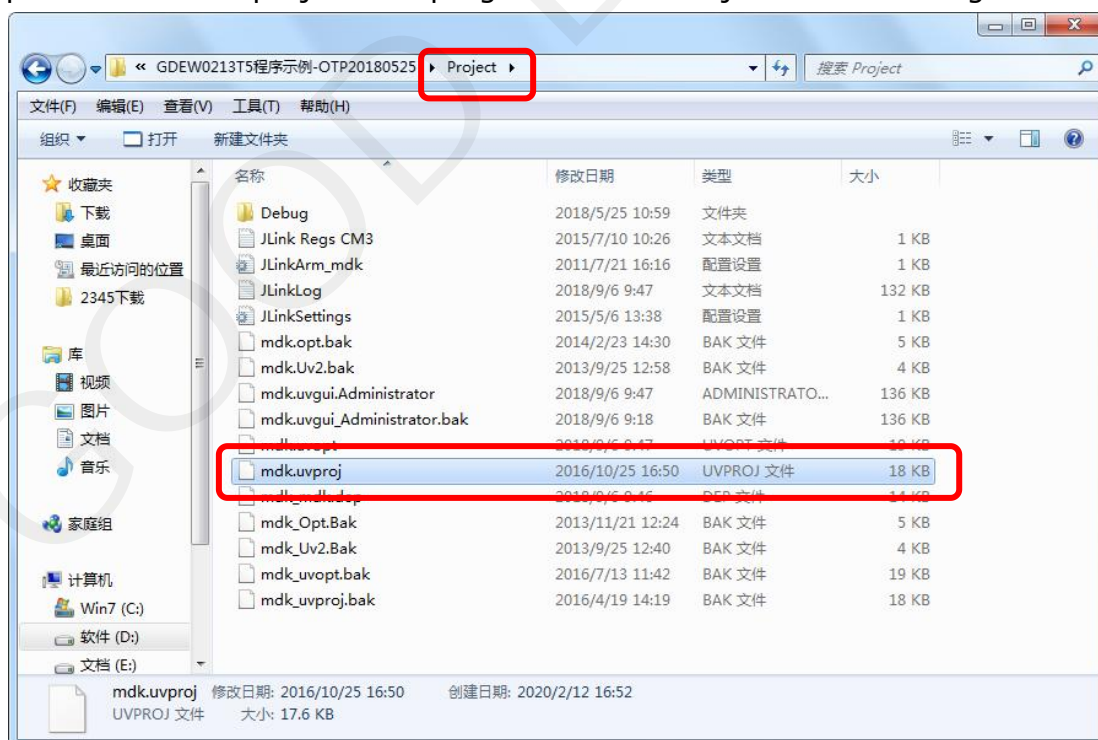



Figure 1 2 : Open the mdk.uvproj

3) The Keil4 toolbar is shown in Figure 13. Please click  at the first time using the simulator and a box like Figure 14 will pop up. Choose the simulator model of yours in the "Debug" bar, and click "OK" to confirm.

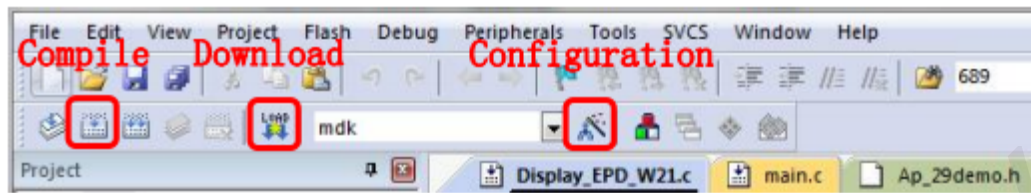


Figure 13 :Keil4 tool bar

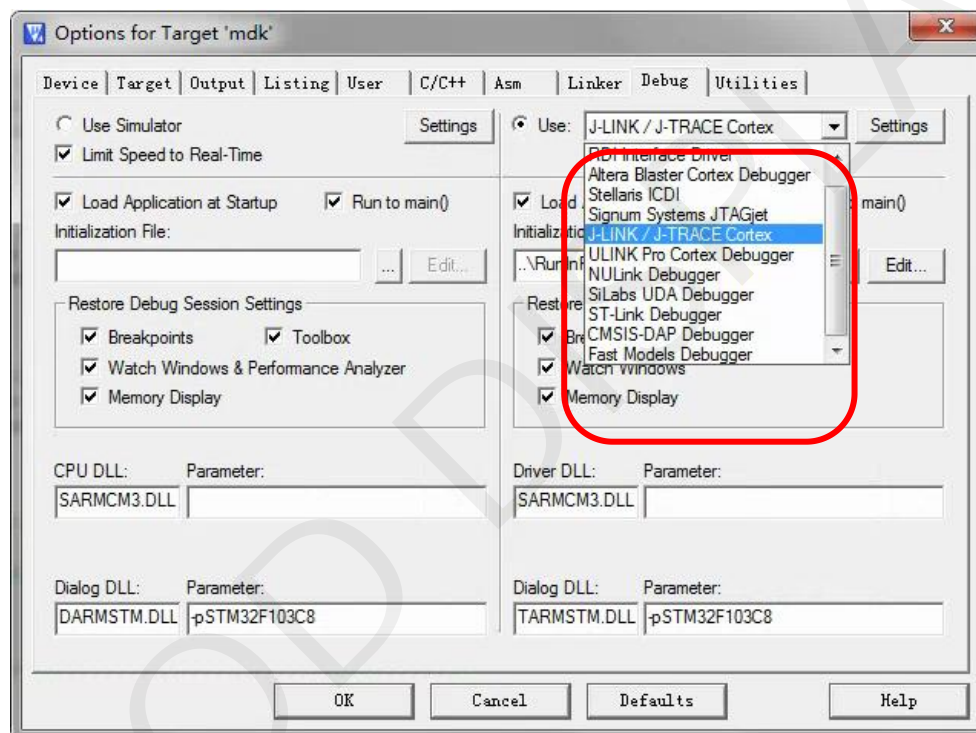



Figure 14: Choose the simulator model

4)Click Ap\_29demo.h in Figure 15 to change the image data that needs to be displayed(the image data needs to be achieved by image2lcd ).



Figure 15 :change the image data

5)Click  in the toolbar in Figure 13 to compile.

6)Click  in the toolbar in Figure 13 to download.

## 5.2 SWD

We need to use ST-link simulator and Keil4, the operation steps are as follows:

1) As shown in figure 16, DESPI-M02L has a 4-wire SWD interface, which can be connected to the simulator interface by 4 wires and then connect the simulator to the computer.

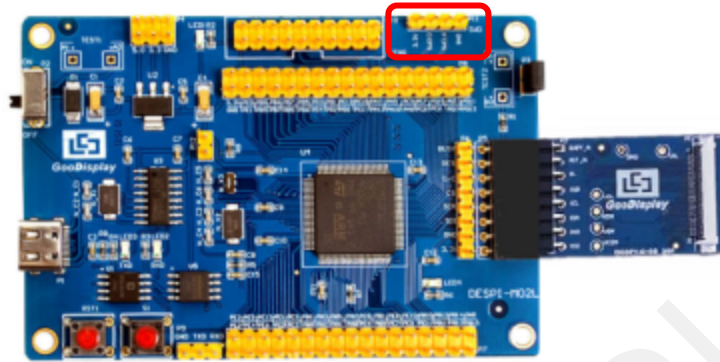


Figure 16:SWD interface

2) Download program with Keil4 by the same steps with JTAG.

## 5.3 UART

This development board supports USB to serial port download, which need to use Micro USB data cable, CH340 driver and FlyMcu download tool, the operation steps are as follows:

- 1) We need to install the CH340 driver on the computer before downloading for the first time.
- 2) Connect the USB port of DESPI-M02L to the computer with USB data cable.
- 3) Connect P12 with a short-circuit jumper, the position of P12 is shown in Figure 17.

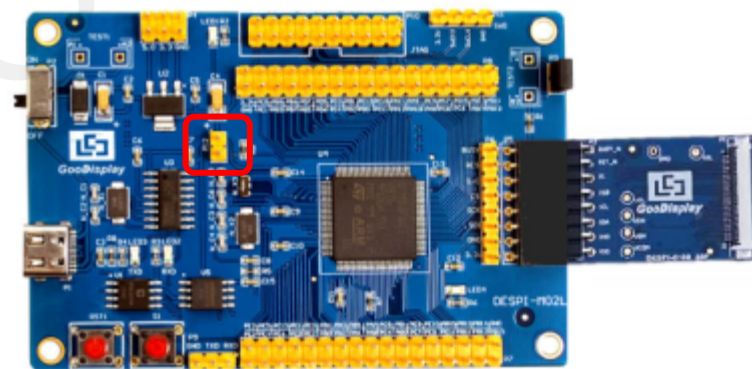


Figure 17 : The position of P12

Tips: When downloading a program with UART, P12 must be shorted. And the short-circuit jumper must be removed after downloading, otherwise the program cannot run.



4) Open the FlyMcu downloading tool and configure it as shown in Figure 18.

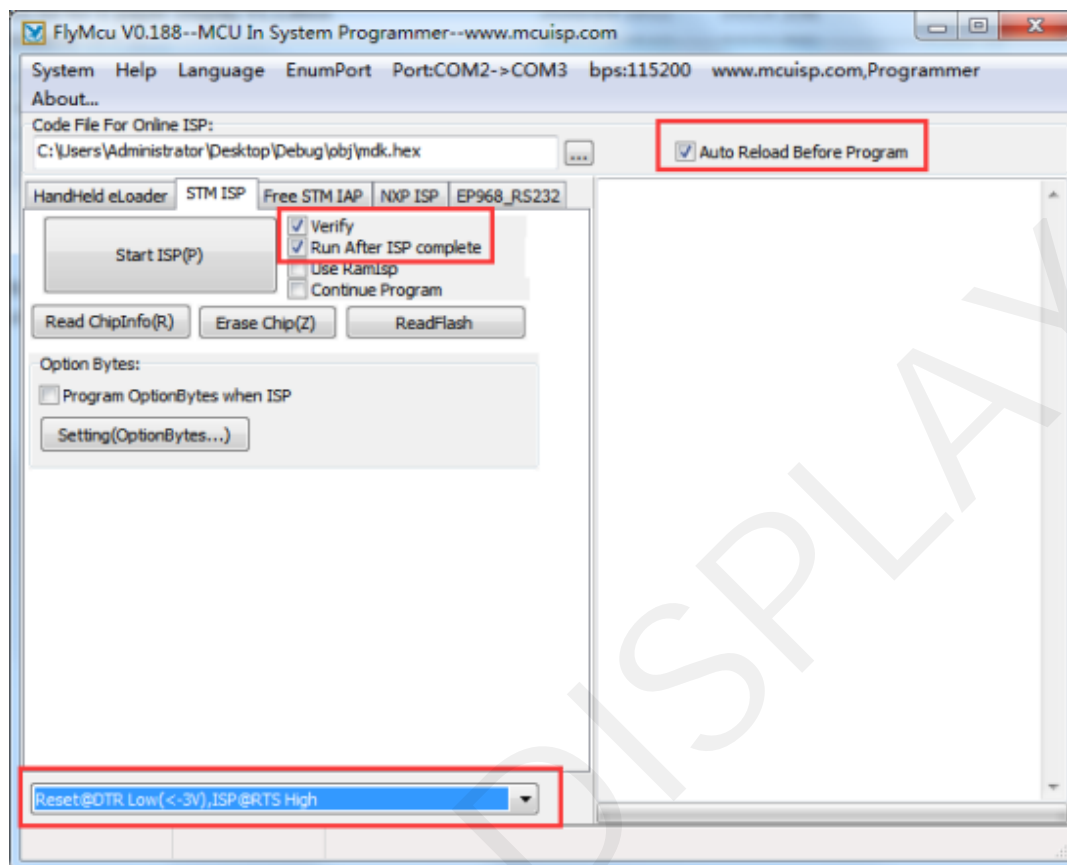


Figure 18: Configuration of Fly Mcu

- 5) Click "Search Serial Port", choose the COM port corresponding to the board, "bps" choose "115200".
- 6) Choose the program file with the file path: Project > Debug > obj > mdk.hex.
- 7) Click "Start ISP" to download.
- 8) When download is complete, remove the short-circuit jumper of P12 and re-energize the board, then the program will run.
- 9) If you want to change a image, you need to use Keil4 to change the image data (Figure 15), compile it (Figure 13) to generate a new mdk.hex file, and then re-select the file to download it.

**Tips:** When downloading a program with UART, P12 must be shorted. And the short-circuit jumper must be removed after downloading, otherwise the program cannot run.