# Development Kit for E-paper Display

# DESPI-1248

GooDisplay®

# Product Specifications
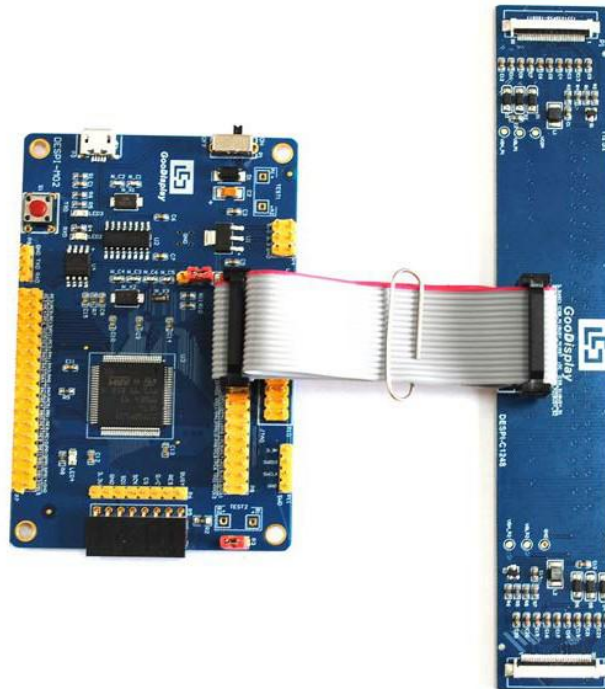


| Customer | Standard |
|---|---|
| Description | Development Kit for E-paper Display |
| Model Name | DESPI-1248 |
| Date | 2020/03/11 |
| Revision | 1.1 |

| | Design Engineering | | |
|---|---|---|---|
| | Approval | Check | Design |
| | | | |

No.17 Gonghua Street, Shahekou District, Dalian 116021 China

Tel: +86-411-84619565          Fax: +86-411-84619585-810

Email: info@good-display.com

Website: www.e-paper-display.com

# Contents

# 1.Overview

This development kit is used to help users develop e-paper display projects with provided source code to create more differentiated solutions. It is designed for SPI e-paper display. It supports driving Good Display's 12.48'' black-white e-paper and three-color (black, white and red/Yellow) e-paper. And it is added the functions of USB serial port and LED indicator light, etc. It also supports being updated by computer directly.

DESPI-1248 development kit consists of motherboard DESPI-M02 and connector board DESPI-C1248.

# 2.Mechanical Specifications

| Parameter | Specification |
|-----------|---------------|
| Model | DESPI-1248 |
| Platform | STM32 |
| Dimension | 90mm x 60mm (DESPI-M02)<br>150.2mm x 26mm (DESPI-C1248) |
| Power Interface | USB interface |
| Sample Code | Available (please contact sales) |
| Operating Temp. | -20°C ~+70°C |
| Main Function | Learn to drive e-paper display;<br>Test and evaluate e-paper display;<br>For secondary development. |
| Additional Function | USB to serial port;<br>Indicator light;<br>Key;<br>Current measurement. |

# 3.Functions
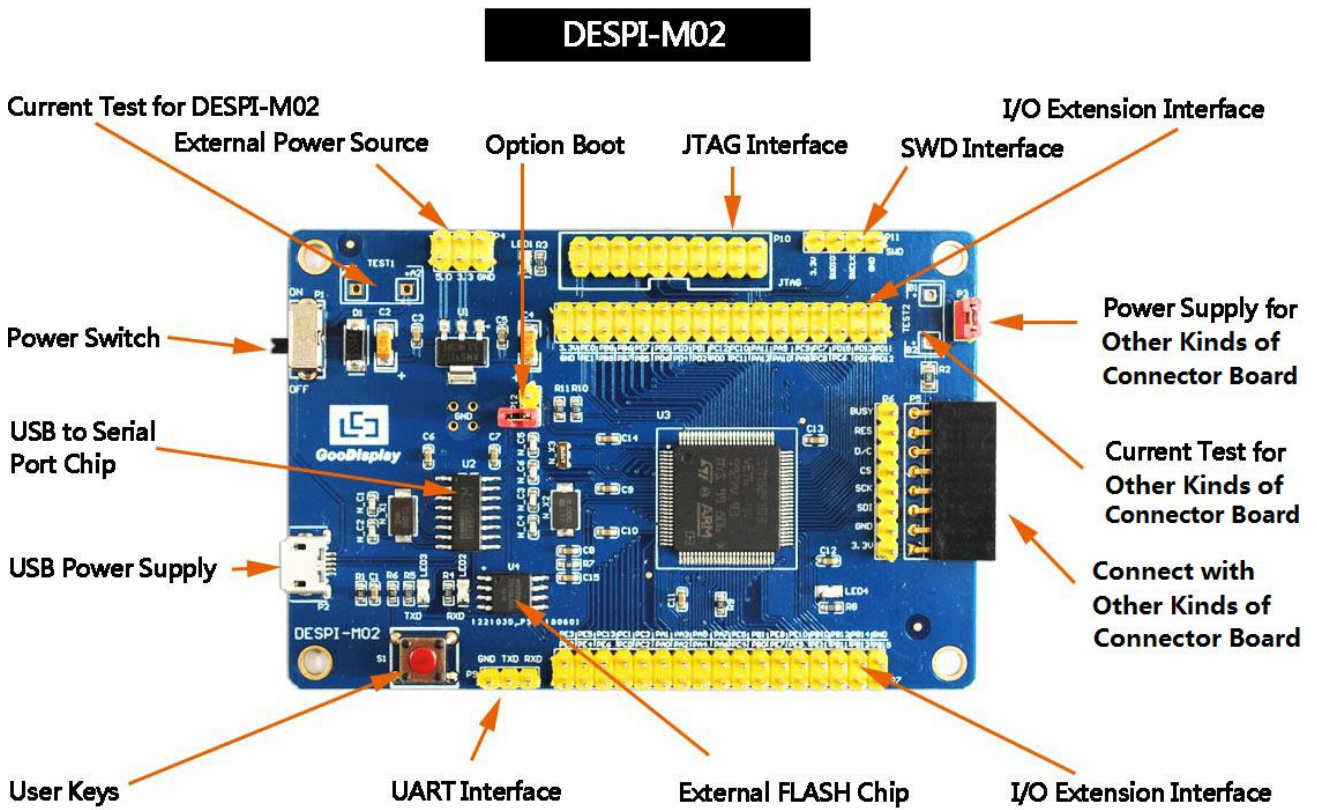


**Figure 1 : DESPI-M02**



**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 transmission

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-M02 and DESPI-C1248.

1) DESPI-M02: 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

There is a key reserved for developing.

### 3.8 DESPI-C1248

DESPI-C1248 contains a boost part for 12.48 inch e-paper and supports measurement of e-paper voltage values such as VGH, VGL and VCOM. Users should pay attention to these parameters when designing driving boards. The VGH normal value is 20V and the VGL normal value is -20V.

# 4.Connection Mode

## 4.1 Connection between DESPI-M02 and DESPI-C1248

Connect DESPI-C1248 to DESPI-M02 with a 16 PIN connector as shown in Figure 3. When connecting, align the protruding portion of the connector shown in Figure 4 to the notch direction in Figure 5 and Figure 6 respectively. (The connector position is the left of P8 in Figure 5. )
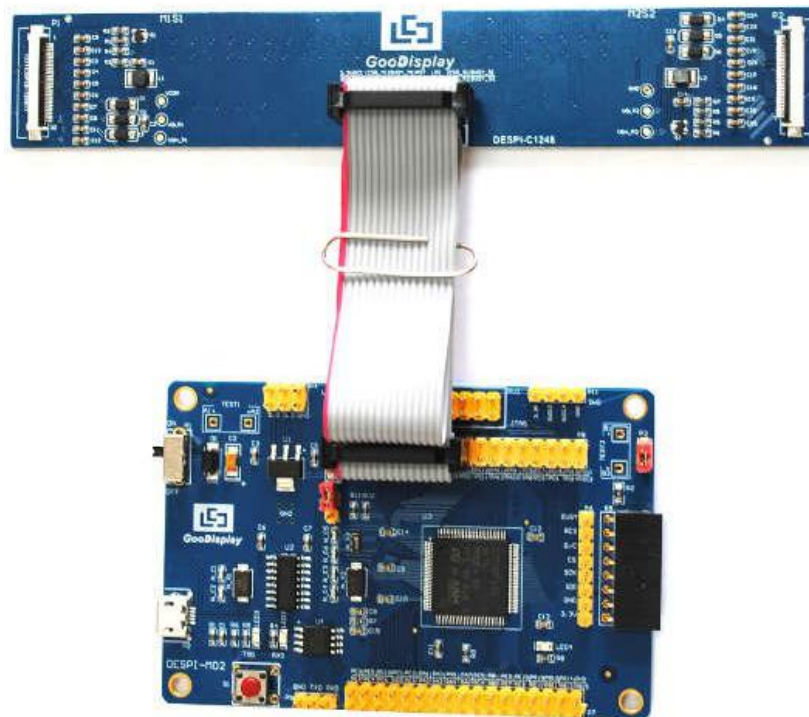


**Figure 3 : Connection between DESPI-M02 and DESPI-C1248**



**Figure 4 : Protruding portion of connector**

**Figure 5 : Position for connector on DESPI-M02（PIN P8）**



**Figure 6 : Position for connector on DESPI-C1248（PIN P3）**

## 4.2 Connection between DESPI-C1248 and e-paper

The e-paper should be connected to DESPI-C1248 by interface P1 (left) and interface P2 (right) in Figure 7.
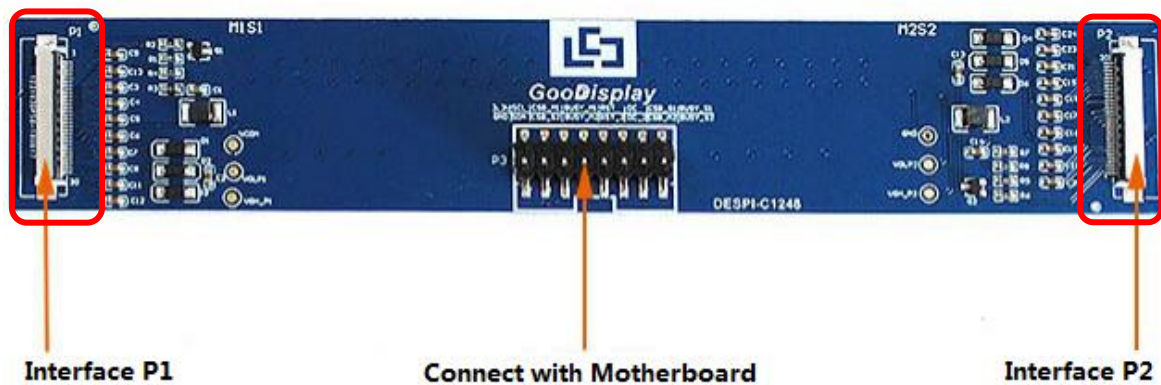


**Figure 7 : Interface P1 and interface P2**

1) The interface P1 should connect to the master FPC which the silk print is WFT1248BZ23 as shown in Figure 8.



**Figure 8 : Silk print of the master FPC**

2) The interface P2 should connect to the slave FPC which the silk print is WFT1248BZ24 as shown in Figure 9.



**Figure 9 : Silk print of the slave FPC**

## 4.3 Completed connection mode

Completed connection mode is as Figure 10. The master FPC and the slave FPC should not be reversed, otherwise the e-paper will not be refreshed.
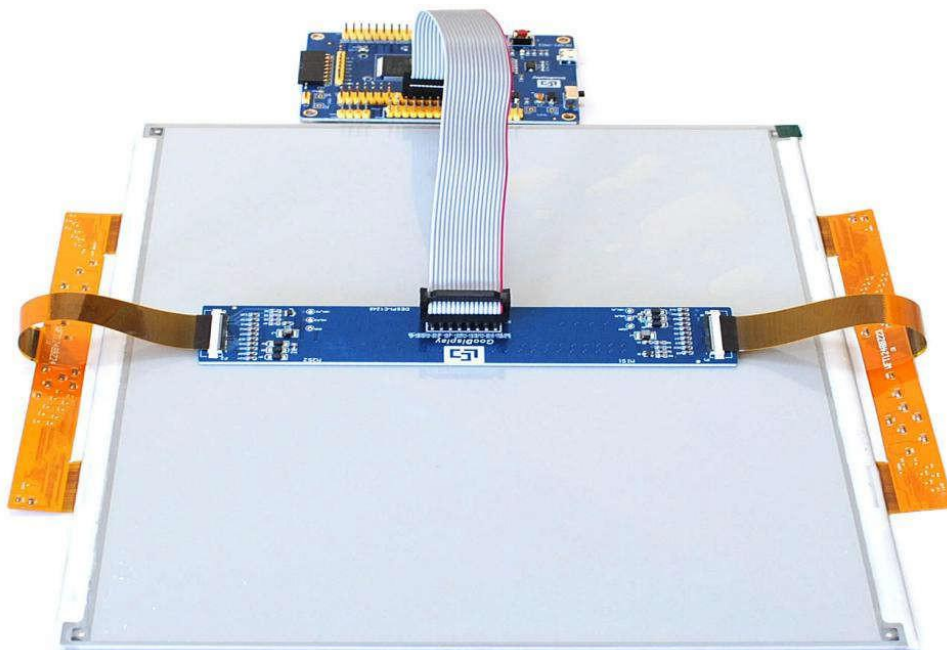


**Figure 10 : Completed connection mode**

# 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 11 simulator interface to the notch direction of the JTAG interface ) and connect the computer USB port at the other end.
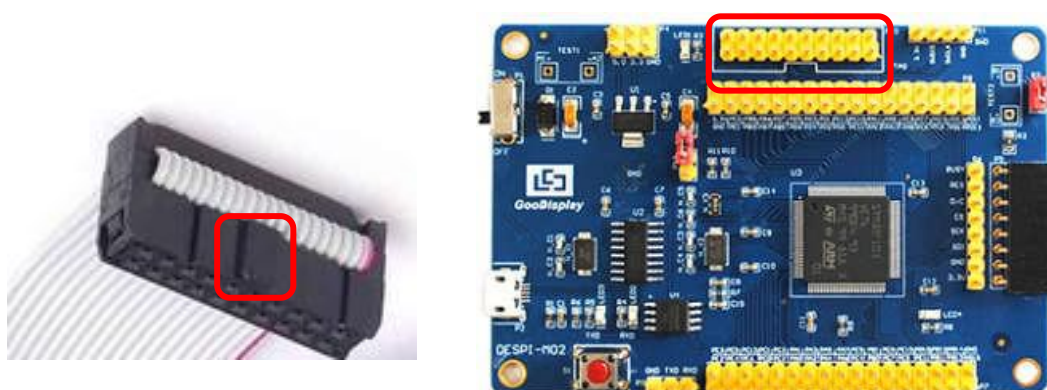


**Figure 11 : Connection between JTAG and simulator**

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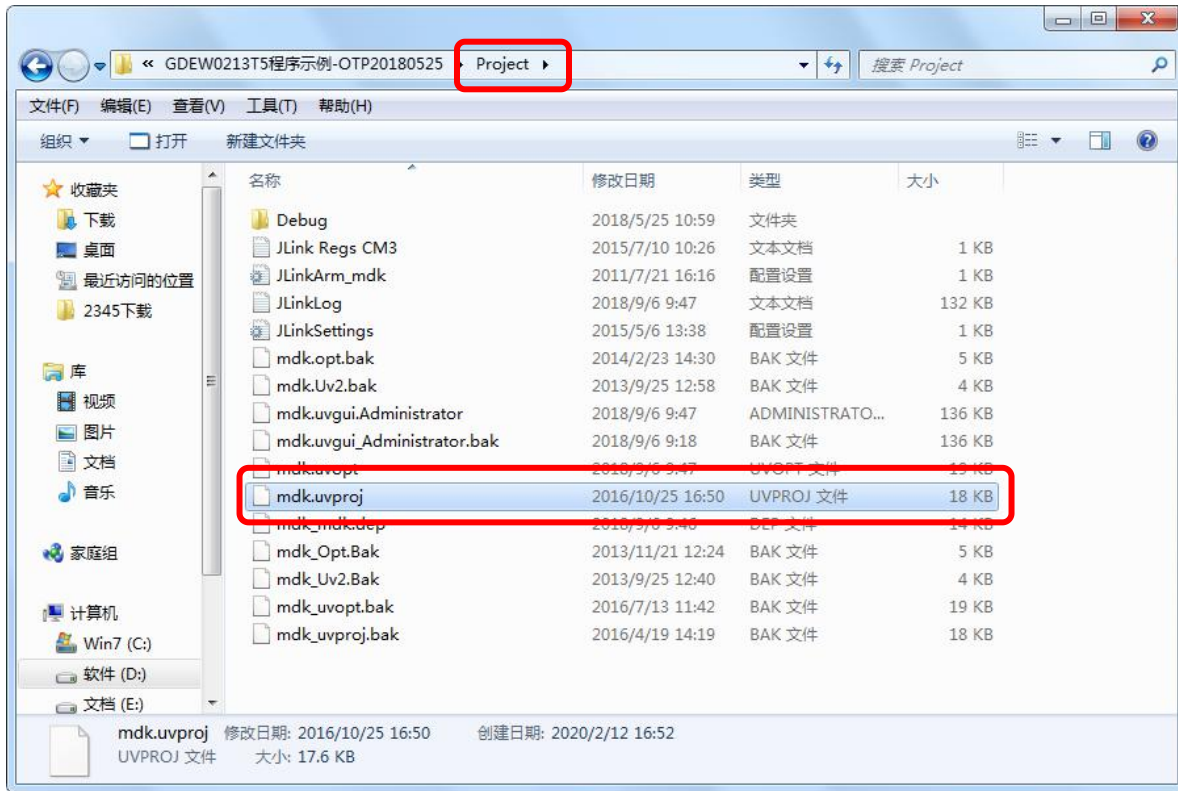
**Figure 12 : Open the mdk.uvproj**

3) The Keil4 toolbar is shown in Figure 13. Please click ![icon] 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.
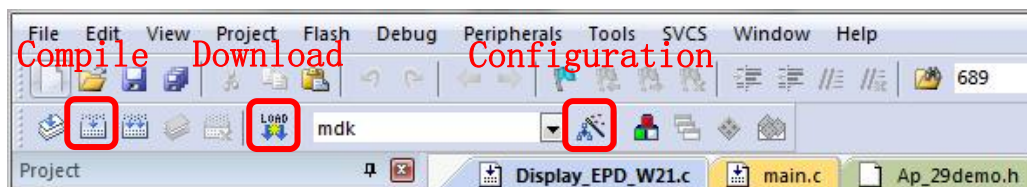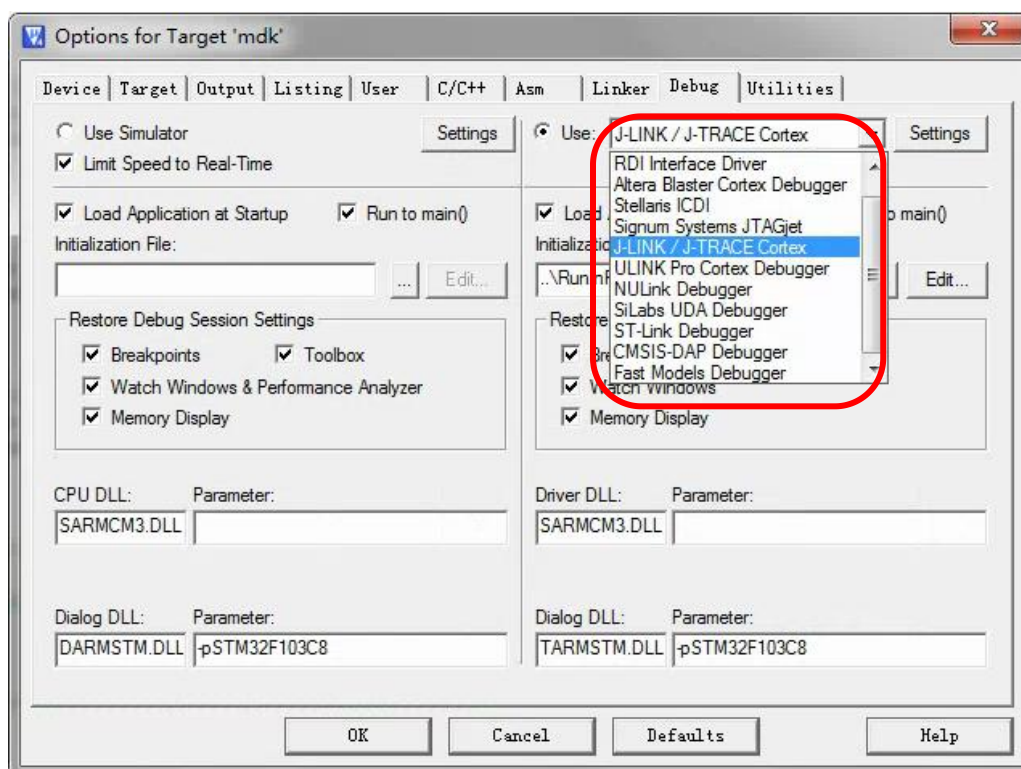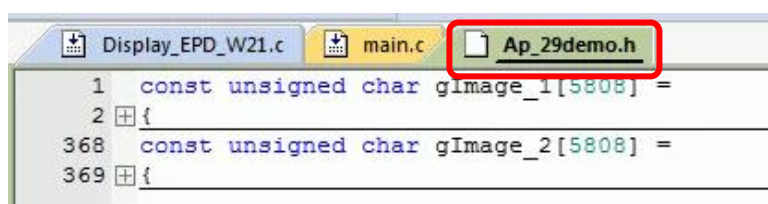


**Figure 13 : Keil4 toolbar**

**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-M02 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.
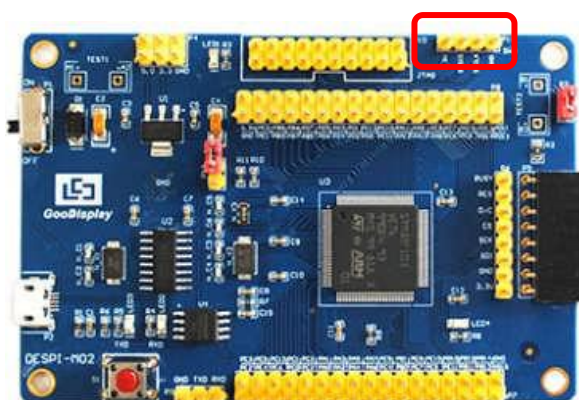


**Figure 16 :  SWD interface**

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-M02 to the computer with USB data cable.

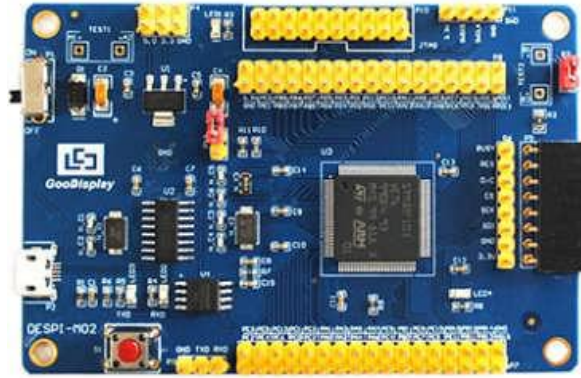3) Connect P12 with a short-circuit jumper, the position of P12 is shown in Figure 17.

**Figure 17 ： The position of P12**

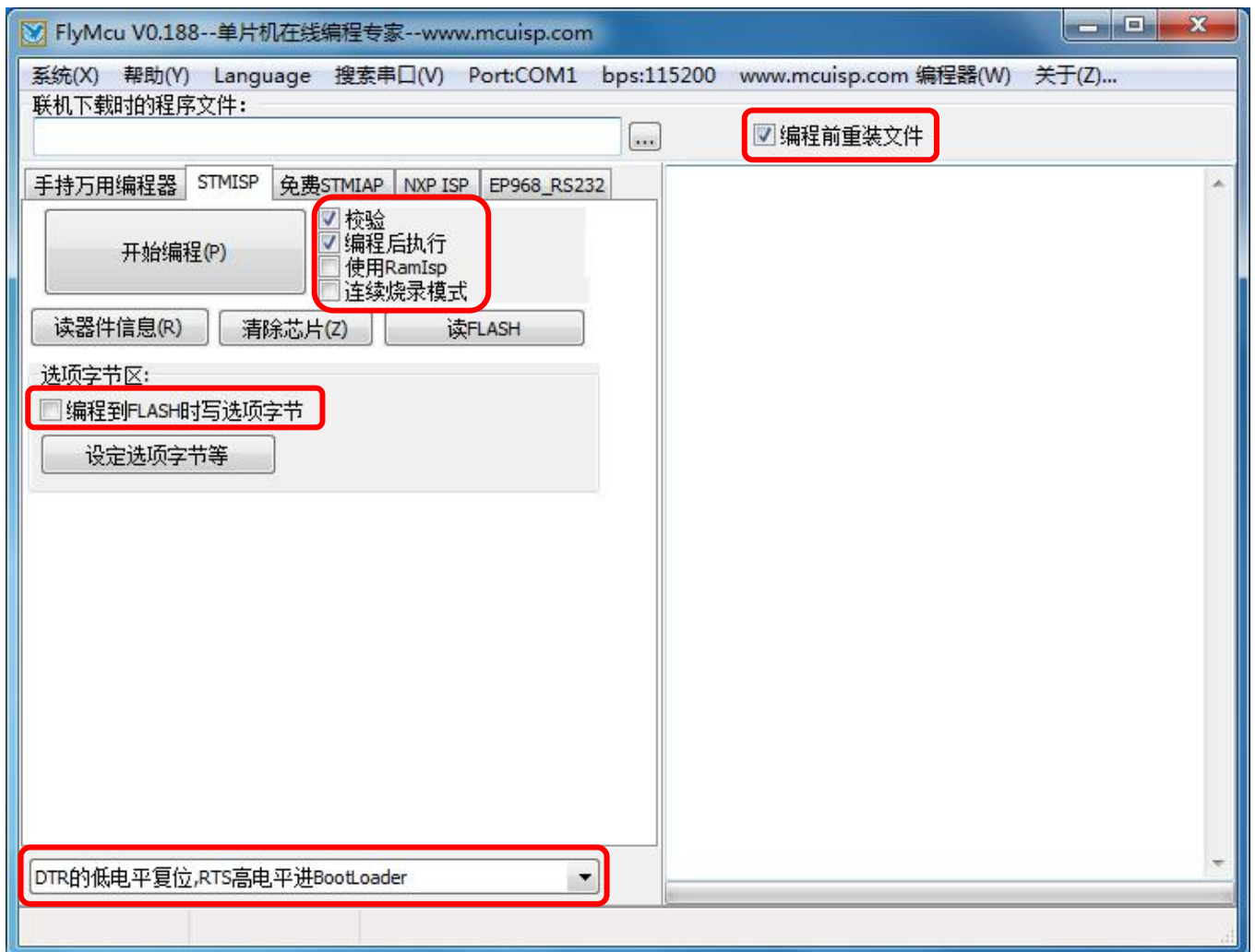4) Open the FlyMcu downloading tool and configure it as shown
   in Figure 18.



**Figure 18 ： Configuration of FlyMcu**

5) Click "搜索串口", 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 "开始编程" 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.