Evaluation Kit for
E-Paper Display

DESPI-L(C03)

GooDisplay

Product Specifications

Customer	Standard
Description	Evaluation Kit For E-paper Display
Model Name	DESPI-L(C0**3**)
Date	2022/06/**28**
Revision	**1.0**

	Design Engineering		
	Approval	**Check**	**Design**
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1.Overview

DESPI-L(C03) development kit is used to help users develop epaper 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 black-white e-paper display and three-color(black,white and red/Yellow)e paper display 0.97'',1.54'',2.13'',2.6'', 2.7'',2.9'',3.71'',4.2'',5.83''and 7.5''. It can driver touch screen for 1.54'', 2.7'', 4.2'', 4.3'' and 6.0'' e-paper and can support 3.3V front light;also support USB to serial port, LED indicator, reset key, user-defined button, font chip, FLash chip and other functions;support via PC software to control e-paper display.

DESPI-L（C03） evaluation kit consists of motherboard DESPI-M02L and connector board DESPI-C03.

2. Structure Specification

| Parameter	Specification
Model	DESPI-L（C03）
Platform	STM32
Dimension	Mother Board：90mm x 60mm (DESPI-M02L) Adapter　52mm x 36mm (DESPI-C03)
Power Interface	Type-C
Example Code	Available
Operating Temp.	-20 ℃ ~ 70 ℃
Main Function	Learn to drive E-paper display; Test and evaluate e-paper display; Support secondary development
Additional Function	Type-C, LED indicator, User-defined button, Reset button, Font chip, Flash chip, Current detection

3. Functions
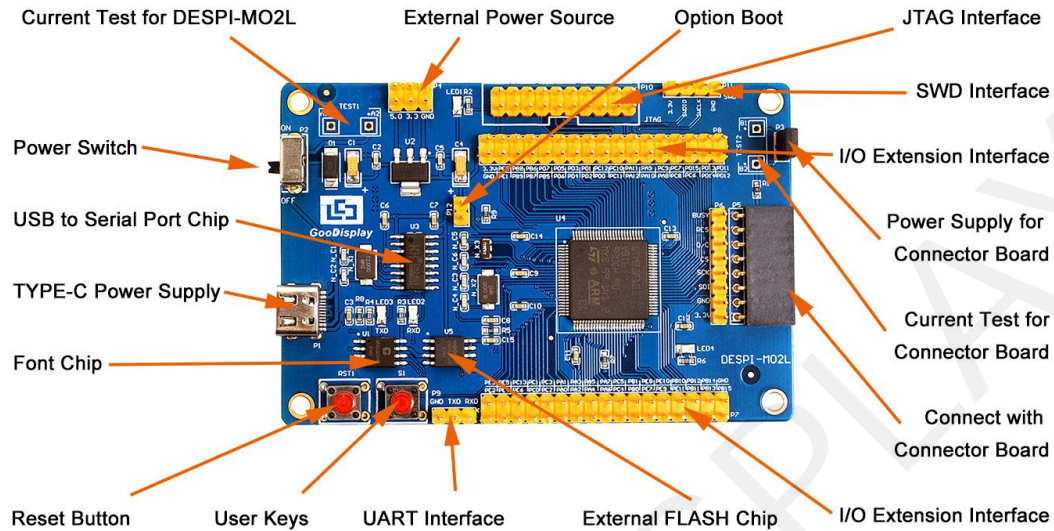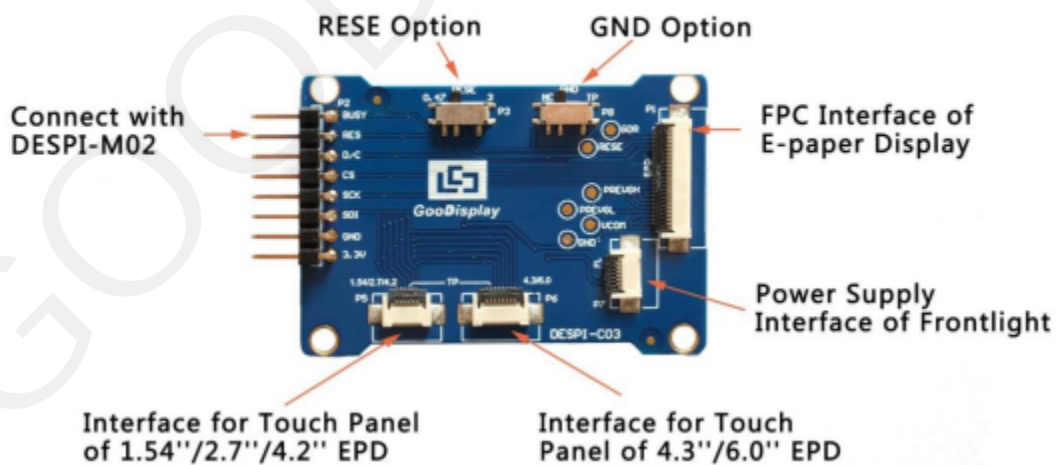

Figure 1: DESPI-M02L

Figure 2: DESPI-C03

3.1 Power Supply

The input voltage of this board is DC5V, which is powered by the Type-C 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-C03'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-C03.

1) DESPI-M02L: Power off and make series connection between ampere meter and TEST1.
2) DESPI-C03: 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 Touch panel and front light panel driving

DESPI-C03 supports 1.54'', 2.7'', 4.2'', 4.3'' and 6.0'' touch panel driving and 3.3V-powered front light panel driving.

3.9 Raspberry Pi interface

There is a Raspberry Pi interface in the back of DESPI-C03, which can connect Raspberry Pi motherboard to the e-paper.

Built-in Chinese font chip GT30L32S4W.
Built-in data storage chip W25Q16.

4. Connection Mode and RESE Selection

4.1 Connection between e-paper and development board

1) Connect DESPI-C03 to DESPI-M02L as shown in Figure 3.

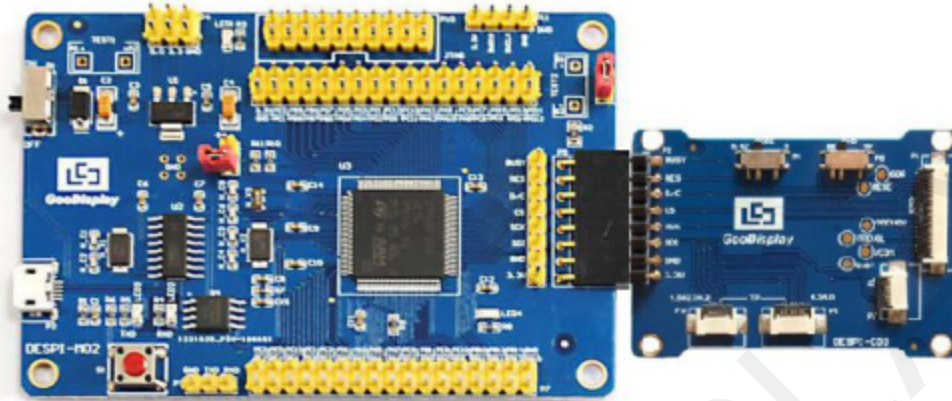
Figure 3：Connection between DESPI-M02L and DESPI-C03

2) Insert the e-paper display face up into the adapter board

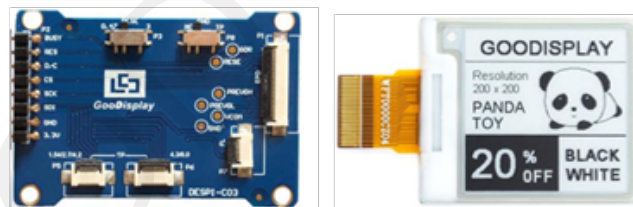Note: The mirror side of the e-paper is facing down and the display side is facing up.

Figure 4.1 Connection between DESPI-C03 and e-paper

3) Connect the e-paper FPC to DESPI-C03 as shown in Figure 5. (Pay attention to the direction of the e-paper.) And set P8 to NC.
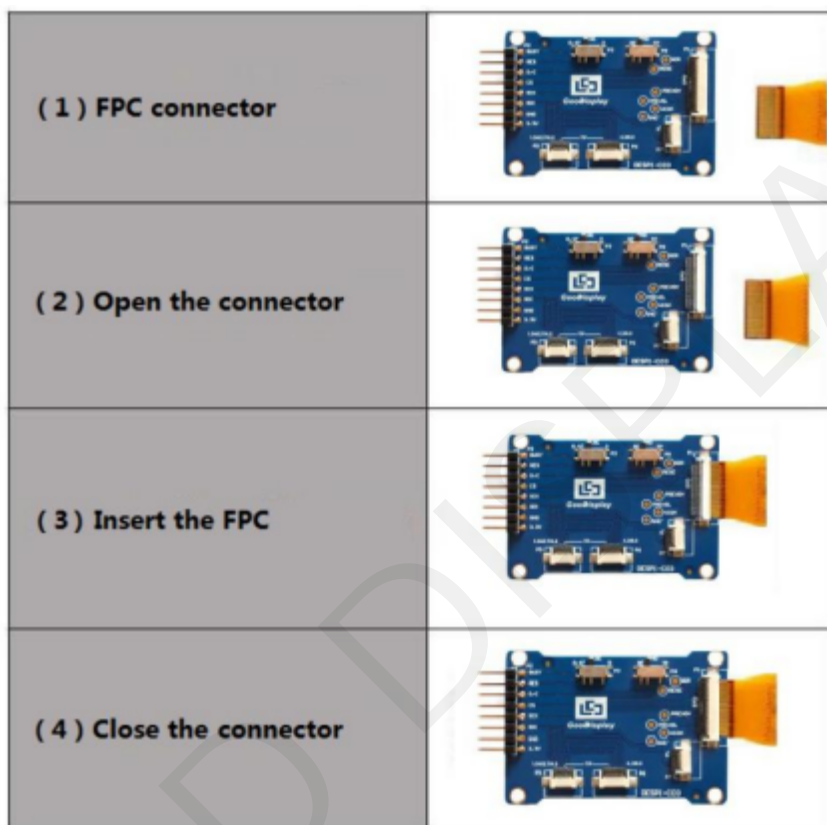

Figure 5 : Connection between DESPI-C03 and e-paper

4.3 Connection between DESPI-C03 and front light panel

DESPI-C03 supports 3.3 V powered front light panel driving, the corresponding interface is P7 as shown in Figure 5. The pin definitions are as follows: 3.3V (1,2), NC (3,4), GND (5,6). The power supply of front light panel must be divided from the power supply of e-paper, otherwise it may affect the display of e-paper.

Figure 6 : Connection between DESPI-C03 and front light panel

4.4 Connection between DESPI-C03 and touch panel

As shown in Figure 7, 1.54-inch, 2.7-inch, 4.2-inch touch panel use interface P5, and 4.3-inch, 6.0-inch touch panel use interface P6. Connect the touch panel to DESPI-C03 with the touch area upside. In addition, P8 needs to be set to TP when driving touch panels.
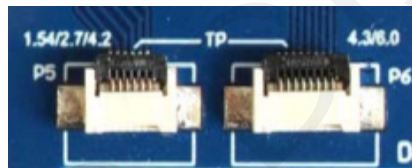

Figure 7 : Connection between DESPI-C03 and touch panel

4.5 Switch P8 on DESPI-C03

The switch P8 on DESPI-C03 is used to select GND. It needs to be set to NC when driving e-papers (default NC), and to TP when driving touch panels.

4.6 Switch P3 on DESPI-C03

The switch P3 on DESPI-C03 is used to select the RESE resistor, different e-papers need to match different RESE resistors, a wrong RESE resistor will cause the e-paper cannot be refreshed.
Note: when designing the actual product, users should strictly follow the circuit in the electronic paper product specification.

1）**When RESE is set to 0.47：** Applicable to ULTRACHIP series driver ICs (starting with UC), fitipower series driver ICs (starting with JD)

1.54 inch GDEW0154T8D、GDEW0154I9FD、GDEW0154M09、GDEW0154M10
2.13 inch：GDEW0213T5D、GDEW0213I5FD、GDEW0213M21
2.6 inch：GDEW026M01
2.7 inch：GDEW027W3
2.9 inch：GDEW029M06、GDEW029Z13
3.71 inch：GDEW0371W7、GDEY037T03、GDEY037Z03
4.2 inch：GDEW042T2、GDEQ042Z21
5.83 inch：GDEW0583T8、GDEW0583Z83
7.5 inch：GDEY075T7、GDEY075Z08

2）**When RESE is set to 3：** Applicable to Solomon series driver ICs (starting with SSD)

1.54 inch：GDEY0154D67、GDEY0154D90LT、GDEY0154Z90、GDEY0154T94
2.13 inch：GDEY213B74、GDEY213B75、GDEY0213D32LT
2.66 inch：GDEY0266T90、GDEY0266Z90
2.7 inch：GDEY027T91
2.9 inch：GDEY029T94
4.2 inch：GDEY042T91

4.7 Connection between DESPI-C03 and Raspberry Pi

Connect DESPI-C03 to Raspberry Pi motherboard in the direction shown below. The pins of DESPI-C03 should in the same direction with the USB interface of Raspberry Pi.
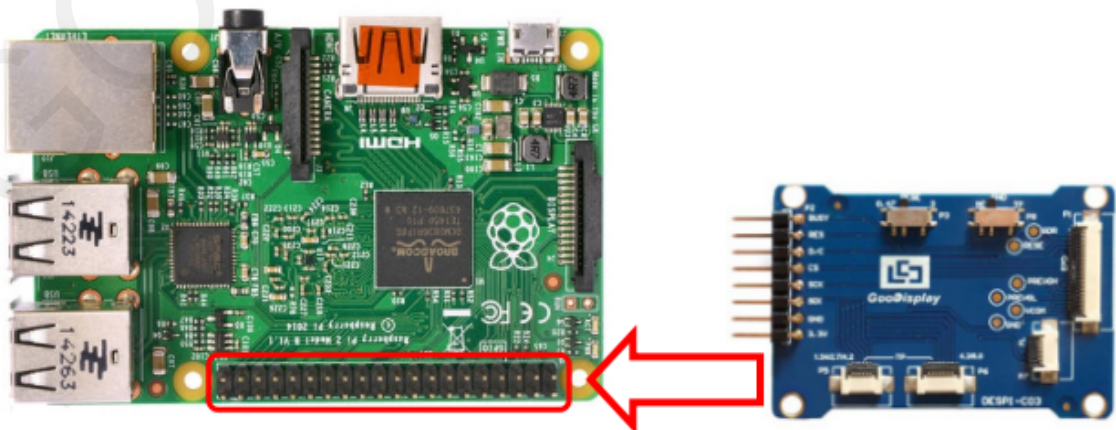

Figure 8：Connection between DESPI-C03 and Raspberry Pi

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 9 simulator interface to the notch direction of the JTAG interface) and connect the computer USB port at the other end.
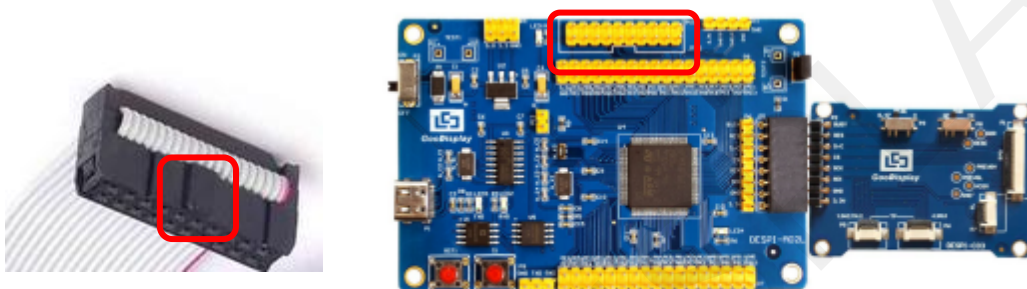
Figure 9：Connection between JTAG and simulator

2) Open the "mdk.uvproj" in the program folder "Project" shown in Figure 10 with Keil4.
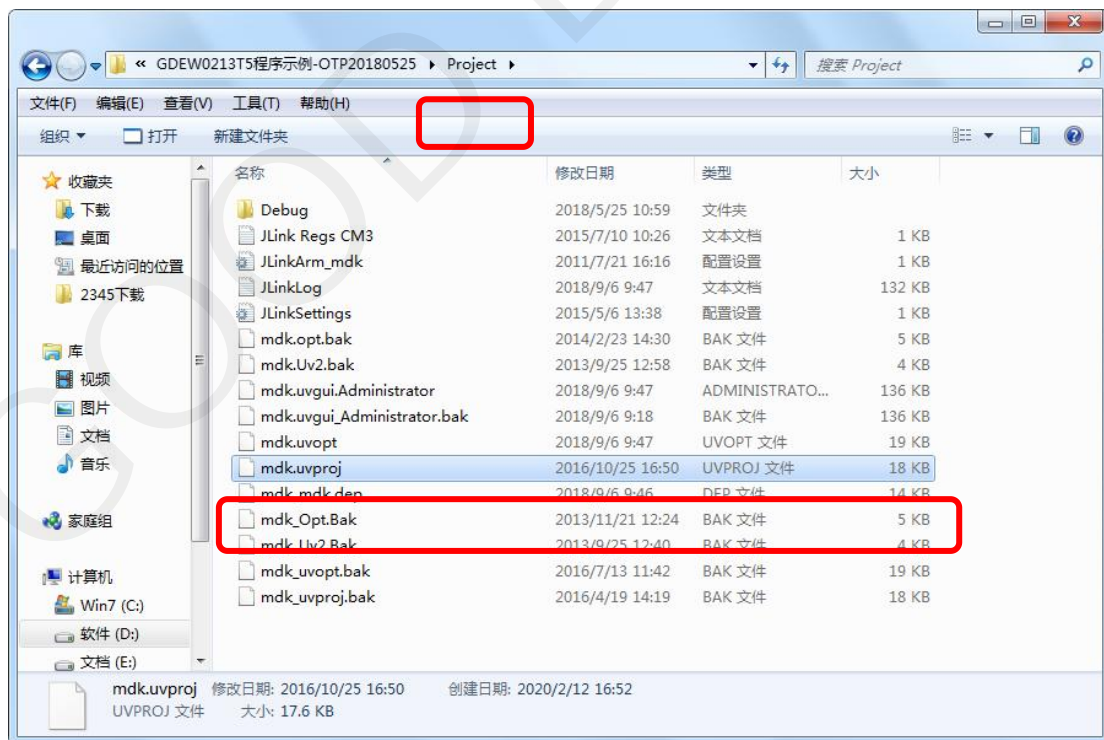
Figure 10：Open the mdk.uvproj

3) The Keil4 toolbar is shown in Figure 11. Please click ![icon] at the first time using the simulator and a box like Figure 1 2 will pop up. Choose the simulator model of yours in the "Debug" bar, and click "OK to confirm.
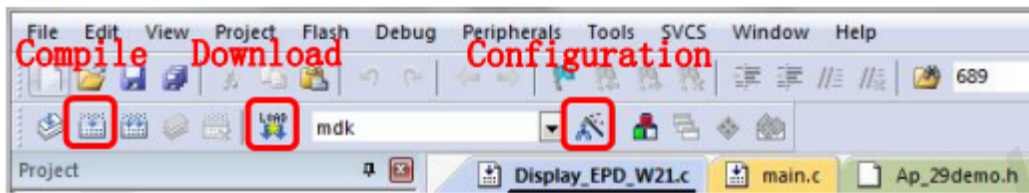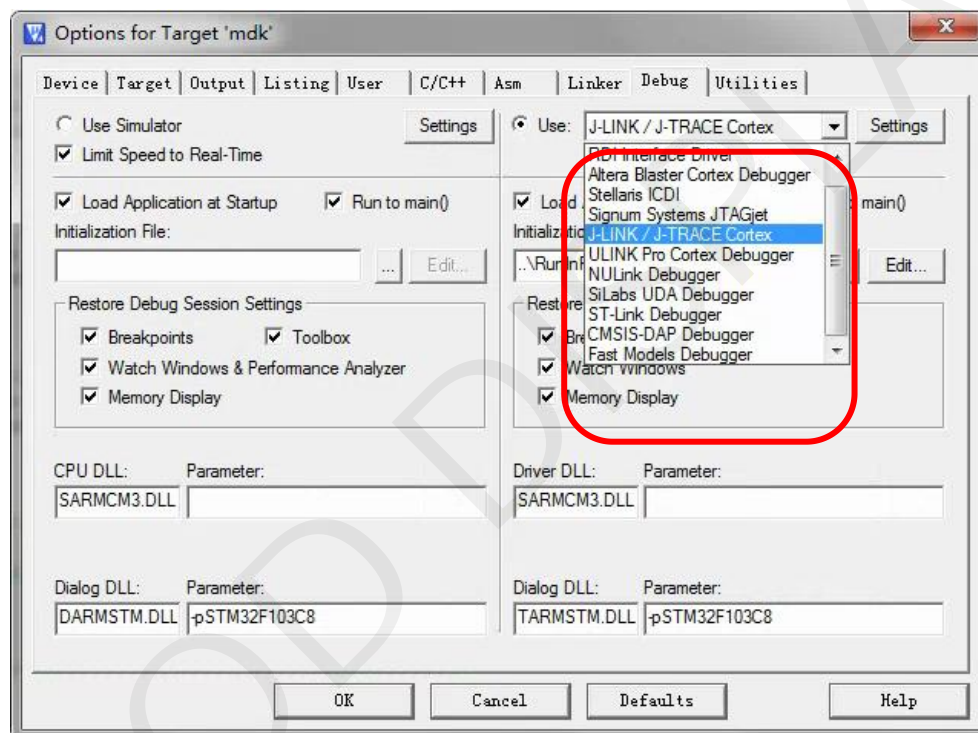

Figure 1 1：Keil4 tool bar

Figure 12：Choose the simulator model

4)Click Ap_29demo.h in Figure 13 to change the image data that needs to be displayed(the image data needs to be achieved by image2lcd).
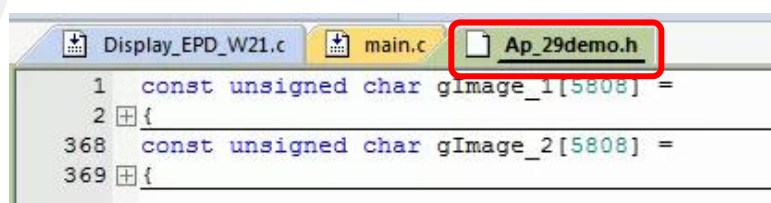

Figure 13：change the image data

5)Click ![icon] in the toolbar in Figure 1 1 to compile.

6)Click ![icon] in the toolbar in Figure 11 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 14, 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.
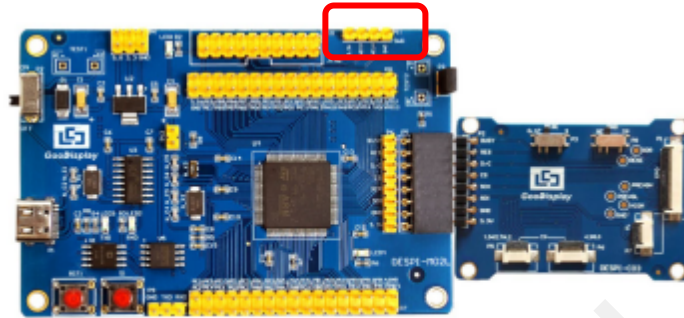

Figure 14:SWD interface

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.

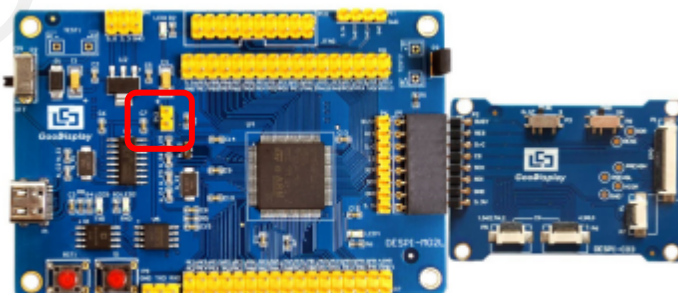3) Connect P12 with a short-circuit jumper, the position of P12 is shown in Figure 15.

Figure 1 5 :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 16.
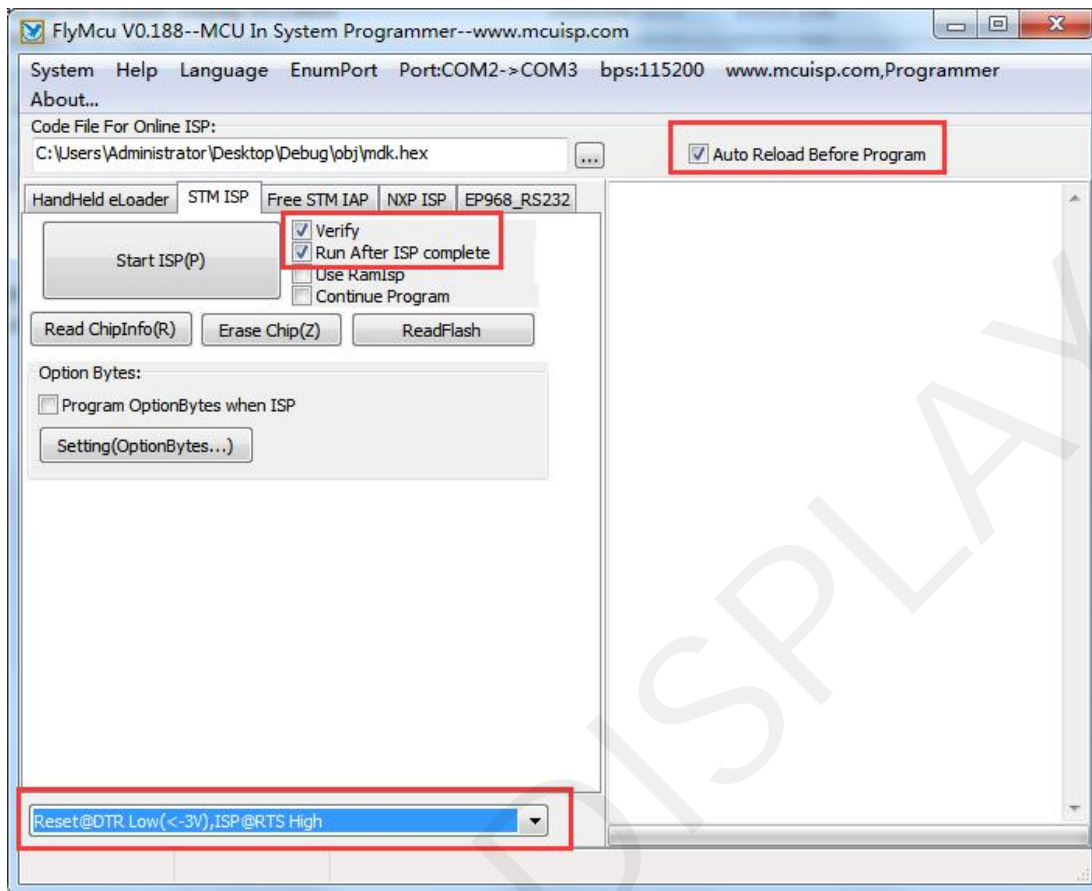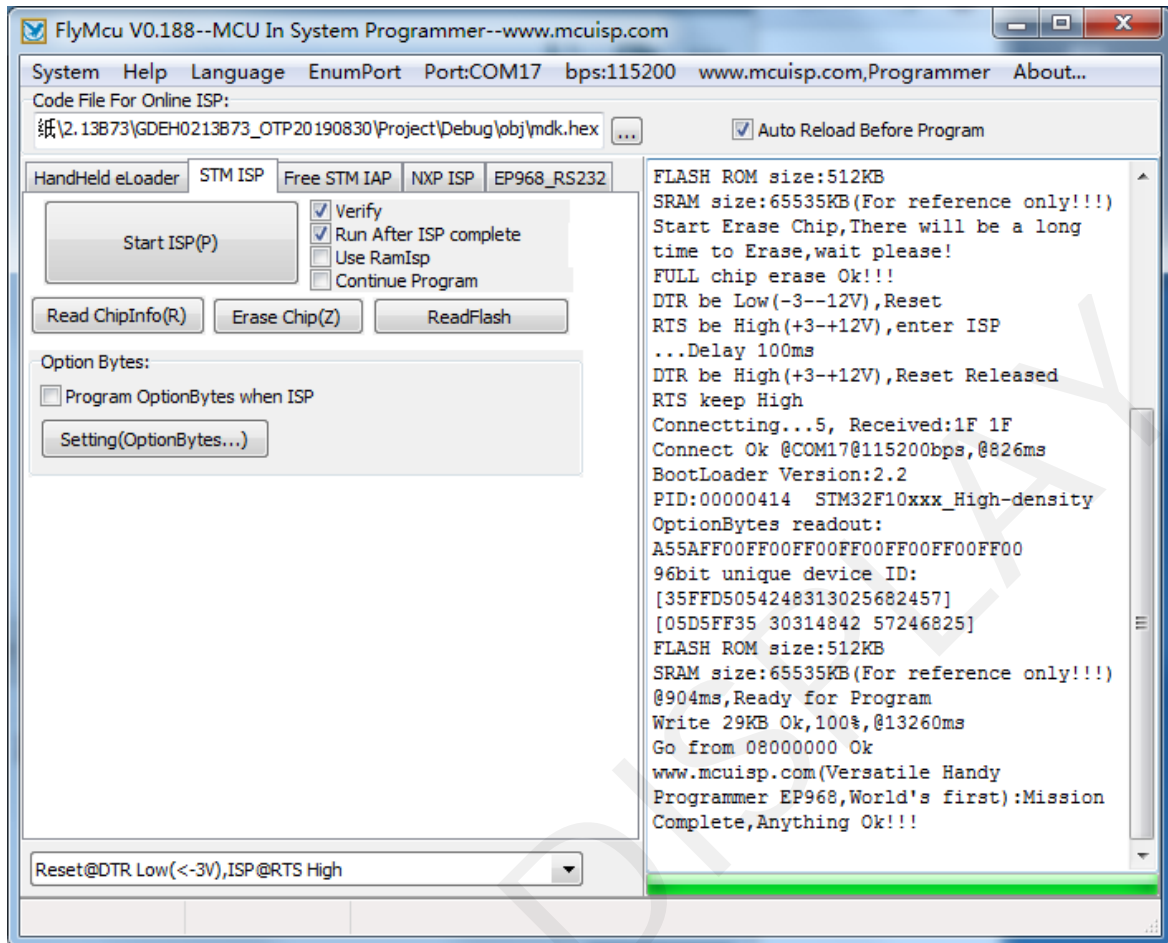

Figure 16: Configuration of Fly Mcu

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 10), compile it (Figure 8) to generate a new mdk.hex file, and then re-select the file to download it.