

E-paper Display Demo Kit DESPI-L(T01)

Dalian Good Display Co., Ltd.





# **Product Specifications**



Customer	Standard
Description	E-paper Display Demo Kit
Model Name	DESPI-L(T01)
Date	2023/05/09
Revision	1.0

D	esign Engineerin	Ig
Approval	Check	Design
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### 1.0verview

DESPI-L(T01) can assist developers in the development of E-paper display projects. It is specially designed for SPI E-paper display and supports 0.97 inch, 1.54 inch, 2.13 inch, 2.6 inch, 2.7 inch, 2.9 inch, 3.71 inch, 4.2 inch, 5.83 inch and 7.5 inch E-paper in monochrome and three colors; it also supports 1.54-inch, 2.7-inch, and 2.9-inch E-paper display with touch screen and supports E-paper and touch working simultaneously so to provide with convenience for users in the early stage of development.

The main board has LED indicator, reset button, font chip, FLASH chip, etc. The DESPI-L(T01) development kit includes two parts: the main board DESPI-M02L and the adapter board STM32-T01. The DESPI-L(T01) development kit only provides programs to drive the electronic paper display and touch screen. The application of other functions such as WiFi and Bluetooth needs to be developed by the customer according to the project.

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Parameter	Specification
Model	DESPI-L(T01)
Platform	Keil4
Dimension	Mother board : 70mm x 54mm (DESPI-M02L) Adapter : 53mm x 51mm (STM32-T01)
Power Supply	Туре-С
Example Code	Available
Operating Temp.	-20 °C ~ 70 °C
Main Function	Learn to drive E-paper display; Test and evaluate E-paper displays; Secondary development based on this board
Additional Function	Type-C interface, LED indicator, reset button, current detection, font chip, flash chip, etc., touch screen port

## 2. Structure Specification



### 3. Functions





Figure 2 Adapter STM32-T01



#### **3.1 Power Supply**

The input voltage of this board is DC5V, which is powered by the USB port. Since the e-paper is 3.3V powered, it is necessary to connect VCC at P6 to 3.3V when using.

#### 3.2 USB to serial port transmission

This development board uses USB to serial port communication. Users should install CH340 driver on computer before downloading program.

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

P3 short-circuit jumper controls **STM32-T01**' s power supply, which is e-paper' s power supply. Be sure to short it when using.

#### **3.4 Current measurement**

The development kit supports current measurement of motherboard DESPI-M02L and STM32-T01.

1)Motherboard current measurement: Turn off the power switch and connect the ammeter to TEST1 in series.

2)Current measurement of the adapter board: Turn the power switch ON, remove the P3 short-circuit cap, connect the ammeter to TEST2 in series, and then connect the P3 short-circuit cap after the test.

#### 3.5 I/O port extension

This development board led out the digital I/O 0~13 and the analog I/O 0~5 for development.

#### 3.6 LED indicator light

There is a indicator light reserved for developing.

#### 3.7 Reset key

This development board contains a reset key for users operation.

#### 3.8 STM32-T01 Adapter

In addition to driving E-paper, the adapter also supports 1.54 inch, 2.7 inch, 2.9 inch E-paper touch screen.

#### **3.9 Expanded Functions**

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



## 4. Connection and RESE Switch

## 4.1. Connecting the adapter to the mother board

Connect the mother board and the adapter as shown in Figure 3, and connect the E-paper FPC to the adapter as shown in Figure 4 (note the connection of E-paper).



Figure 3 Connecting Mother Board and Adapter

## **4.2. Connecting E-paper display to the adapter**

1) Identify the front and back of the E-paper, and insert the E-paper into the adapter with the front facing up

Note: The mirror surface of E-paper display facing down, the display facing up.



Figure 4 Connecting Adapter and E-paper display







#### 4.3. RESE Resistance Selection

The switch P1 is a selection switch for the matching resistance (RESE resistance) of the current feedback part of the peripheral boost circuit of the E-paper. Different types of E-paper need to be matched with different RESE resistors. Choosing the wrong RESE resistor will cause the E-paper to fail to refresh.

Note: Users should strictly follow the circuit design in the E-paper specification when designing the actual product.

1) When RESE is set to 0.47 : Applicable to ULTRACHIP series driver ICs (starting with UC), fiti power 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

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



Figure 6 : Connection between JTAG and simulator

2) Open the "mdk.uvproj" in the program folder "Project" shown in Figure 7 with Keil4.

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1 最近访问的位置	JLinkArm_mdk	2011/7/21 16:16	配置设置	1 KB		
2345下载	JLinkLog	2018/9/6 9:47	文本文档	132 KB		
20401.30	JLinkSettings	2015/5/6 13:38	配置设置	1 KB		
+	mdk.opt.bak	2014/2/23 14:30	BAK 文件	5 KB		
	mdk.Uv2.bak	2013/9/25 12:58	BAK 文件	4 KB		
🛗 视频	mdk.uvgui.Administrator	2018/9/6 9:47	ADMINISTRATO	136 KB		
国 图片	mdk.uvgui_Administrator.bak	2018/9/6 9:18	BAK 文件	136 KB		
文档	mdk.uvopt	2018/9/6 9:47	UVOPT 文件	19 KB		
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Figure 7 : Open the mdk.uvproj

3) The Keil4 toolbar is shown in Figure 8. Please click at the first time using the simulator and a box like Figure 9 will pop up. Choose the simulator model of yours in the "Debug" bar, and click "OK" to confirm.



Figure 8 : Keil4 toolbar

Device   Target   Output   Listing	Vser   C/C++	Asm Linker	Debug   Utilities		
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Restore Debug Session Settings		Restore SiLab	s UDA Debugger		
Restore Debug Session Settings	xox	Restore SiLab ST-Lir Bre CMSI	s UDA Debugger nk Debugger S-DAP Debugger		
Restore Debug Session Settings     ✓     Breakpoints     ✓     Toolt     ✓     Watch Windows & Performance	oox e Analyzer	Restore SiLab: ST-Lir Bra CMSI: Fast M Watch vo	s UDA Debugger hk Debugger S-DAP Debugger Models Debugger Models Sebugger		
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Figure 9 : Choose the simulator model

4)Click Ap\_29demo.h in Figure 10 to change the image data that needs to be displayed (the image data needs to be achieved by image2lcd ).



Figure 1 0 : change the image data





#### 5.2 SWD

We need to use ST-link simulator and Keil4, the operation steps are as follows: 1) As shown in figure 11, 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 11 :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 12.



Figure 12 : 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 13.

FlyMcu V0.188MCU In System Programmerwww.mcuisp.com system Help Language EnumPort Port:COM2->COM3 bps	:115200 www.mcuisp.com,Programmer	X
ade File For Online ISP:		
C:\Users\Administrator\Desktop\Debug\obj\mdk.hex	📝 Auto Reload Before Program	
HandHeld eLoader STM ISP Free STM IAP NXP ISP EP968_RS232  Start ISP(P)  Verify Use RamIsp Continue Program		
Read ChipInfo(R) Erase Chip(Z) ReadFlash		
Option Bytes:		
Program OntionButton when TCD		
Program OptionBytes when ISP		
Setting(OptionBytes)		
Reset@DTR Low(<-3V),ISP@RTS High		
		-

Figure 13 : Configuration of FlyMcu

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.



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8) When download is complete, remove the short-circuit jumper of P12 and reenergize 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.