E-paper Display Evaluation Kit for ESP32

ESP32-L(C03)

Product Specifications
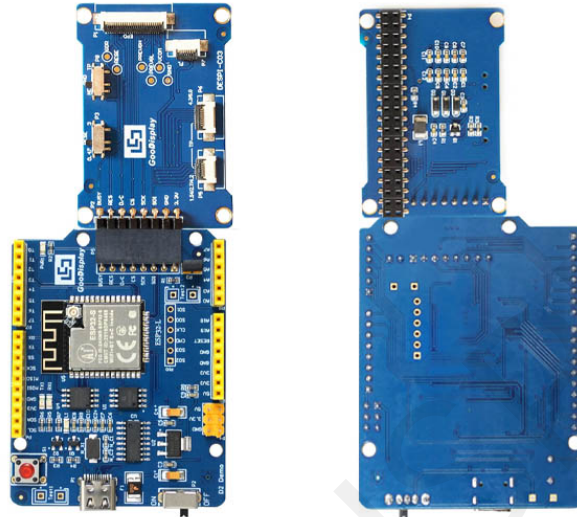
Customer	Standard
Description	Evaluation Kit For E-paper Display
Model Name	ESP32-L(C03)
Date	2022/08/19
Revision	1.0

	Design Engineering		
	Approval	Check	Design
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Contents

1.Overview

ESP32-L evaluation 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 black-white e-paper display and three-color (black, white and red/Yellow) e-paper display: 0.97'', 1.54'',2.13'', 2.66'', 2.7'', 2.9'', 3.71'', 4.2'', 5.83'' and 7.5''. And it is added the functions of USB serial port and LED indicator light, Reset button, font chip, Flash chip and etc.

ESP32-L（C03）development kit consists of motherboard ESP32-L for EPD and connector board DESPI-C03

ESP32-L(C03)development kit is only for driving the e-paper, WIFI, BLE and other functions need to be developed by users according to the project.

2. Structure Specification

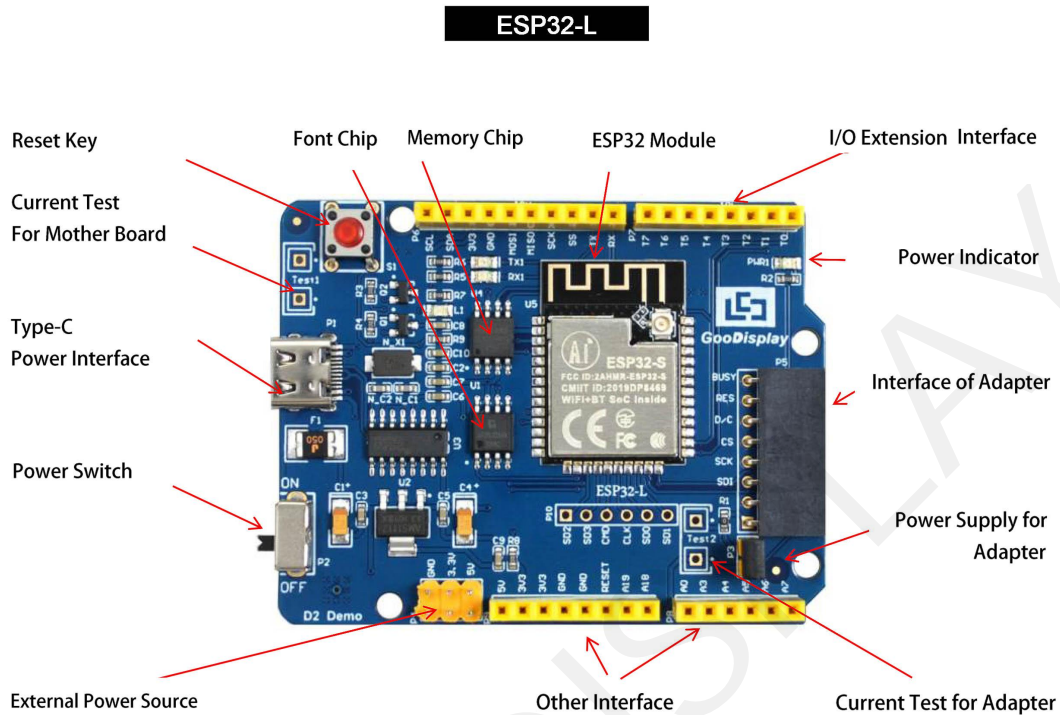| Parameter	Specification
Model	ESP32-L（C03）
Platform	Arduino
Dimension	Mother Board：70mm x 54mm (ESP32-L) Adapter：52mm x 36mm (DESPI-C03)
Power Interface	Type-C
Example Code	Available
Operating Temp.	-20 ℃ ~ 70 ℃
Main Function	Learn to drive E-paper display; Test and evaluate e-paper display; Support secondary development
Additional Function	Type-C,LED indicator, Reset button, Font chip, Flash chip, Current detection

3. Functions

ESP32-L

Reset Key

Current Test
For Mother Board

Font Chip   Memory Chip   ESP32 Module   I/O Extension Interface

Power Indicator

Type-C
Power Interface

Interface of Adapter

Power Switch

Power Supply for
Adapter

External Power Source

Other Interface   Current Test for Adapter

Figure 1：ESP32-L

DESPI-C03

RESE Option   GND Option

Connect with
DESPI-M02

FPC Interface of
E-paper Display

Power Supply
Interface of Frontlight

Interface for Touch Panel
of 1.54''/2.7''/4.2'' EPD

Interface for Touch
Panel of 4.3''/6.0'' EPD

Interface for Raspberry
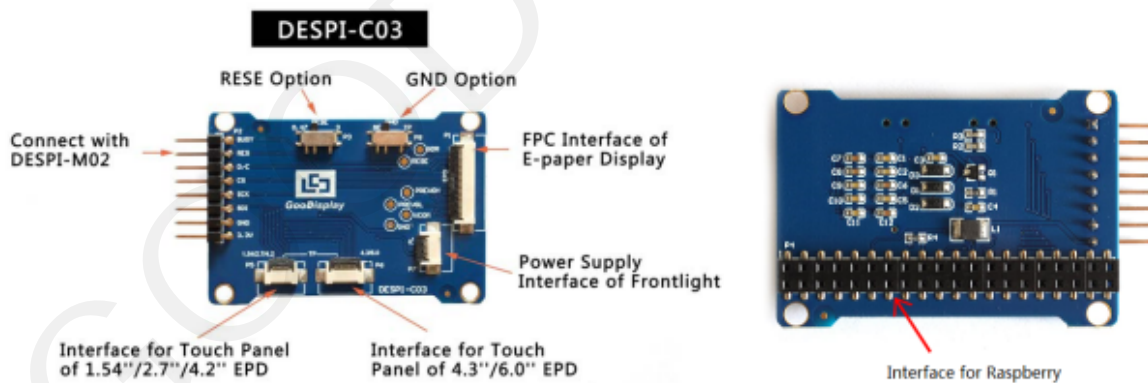
Figure 2：DESPI-C03

3.1 Power Supply

The input voltage is DC5V, which is powered by the Type-C interface.

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 DESPI-C03'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 ESP32-L and DESPI-C03.

1) motherboard ESP32-L: 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

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 DESPI-C03 Adapter

DESPI-C03 supports 1.54-inch, 2.7-inch, 4.2-inch, 4.3-inch and 6.0-inch touch panel driving and 3.3V-powered front light panel driving. Besides, There is a Raspberry Pi interface in the back of DESPI-C03, which can connect Raspberry Pi motherboard to the e-paper.

3.8 Expanded Functions

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

Connect DESPI-C03 to ESP32-L for EPD as shown in Figure 3. Connect e-paper FPC to DESPI-C03 as shown in Figure 4. (Please note the direction of the e-paper.)
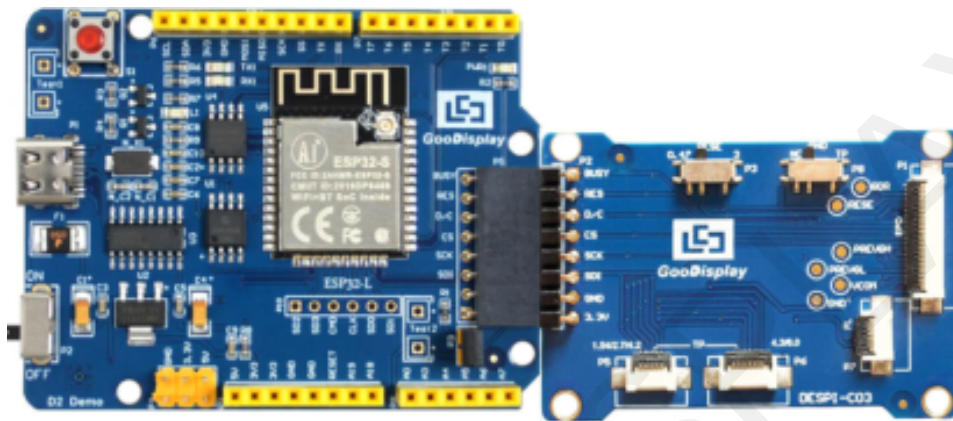

Figure 3 : Connection between ESP32-L for EPD and DESPI-C03

4.2 Connection between e-paper and adapter board

1) Identify the front and back sides of the e-paper, and insert the e-paper into the adapter plate with the front side facing up

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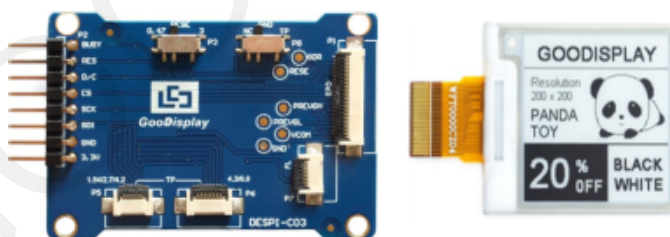

Figure 4 Schematic diagram of e-paper and adapter board plugging

2) Insert the e-paper FPC gold finger upward into the P1 connector of the adapter board as shown in Figure 4.

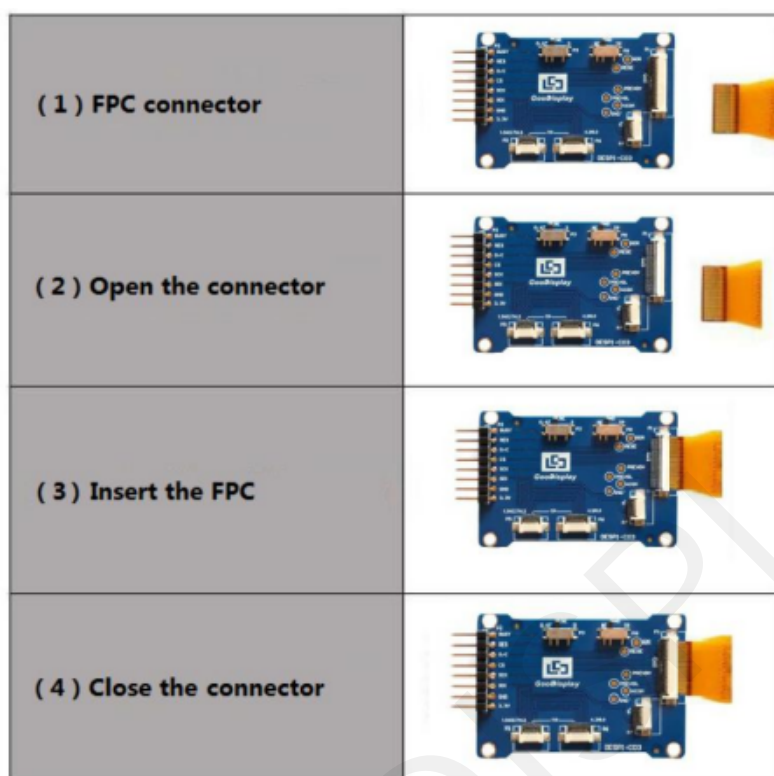|	
(1) FPC connector	
(2) Open the connector	
(3) Insert the FPC	
(4) Close the connector	

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

4.2 RESE resistor selection of DESPI-C03

The switch 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

5. Program Downloading

This development board adopts serial port to download programs, which requires Arduino programming software, type-C cable, CH340 driver and esp32_ package_ v1_ 0_ 2 firmware package and python-2.7.17 plug-in. The operation steps are as follows:

For the first download, install CH340 driver and ESP32 on the computer_ package_ v1_ 0_ 2 firmware package, python-2.7.17 plug-in.

Firmware package: esp32_ package_ v1_ 0_ 2. The unzipped file name is espressif. Unzip the espressif folder and put it in the arduino/hardware directory. During installation, the Arduino programming software must be closed, and the firmware package can also be searched directly in the Arduino library manager.

Use the default installation path for CH340 driver and python-2.7.17 plug-in.

Run the program file get.exe in esp32/tools(you must have installed the python plug-in), as shown in Figure 6.
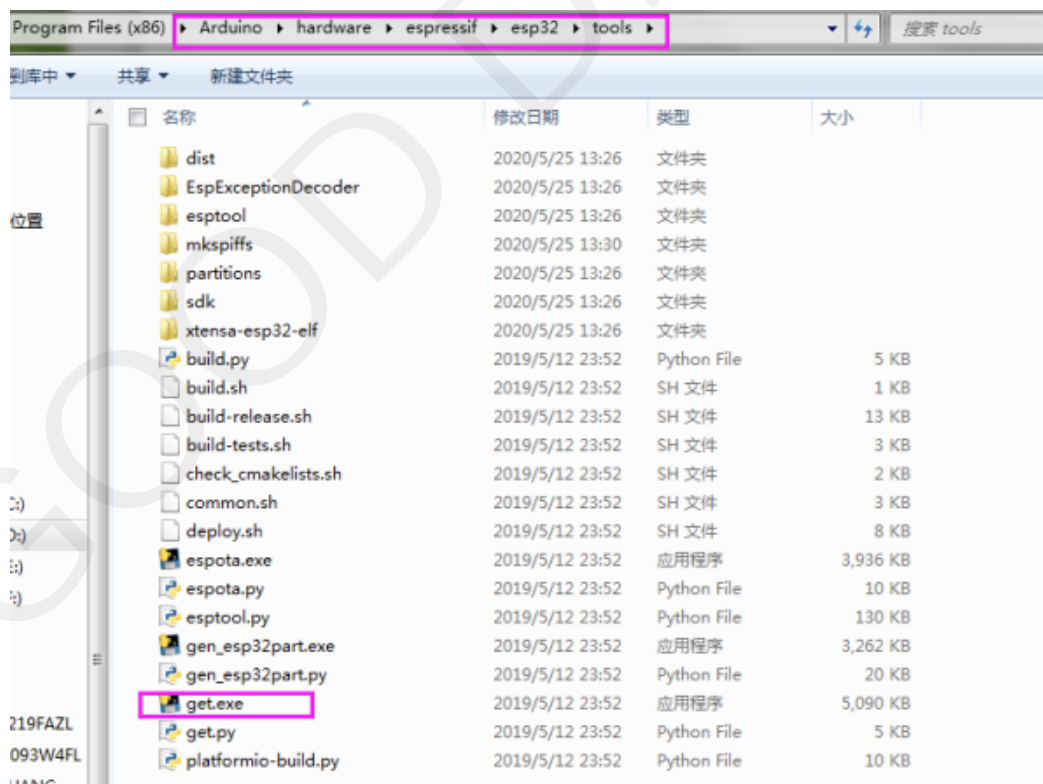

Figure 6 Run get.exe

1. Connect the Type-C interface of the development board to the computer with USB cable.

2. Open Arduino in the driver folder shown in Figure 7 with Arduino 1.8.6 ino engineering document.
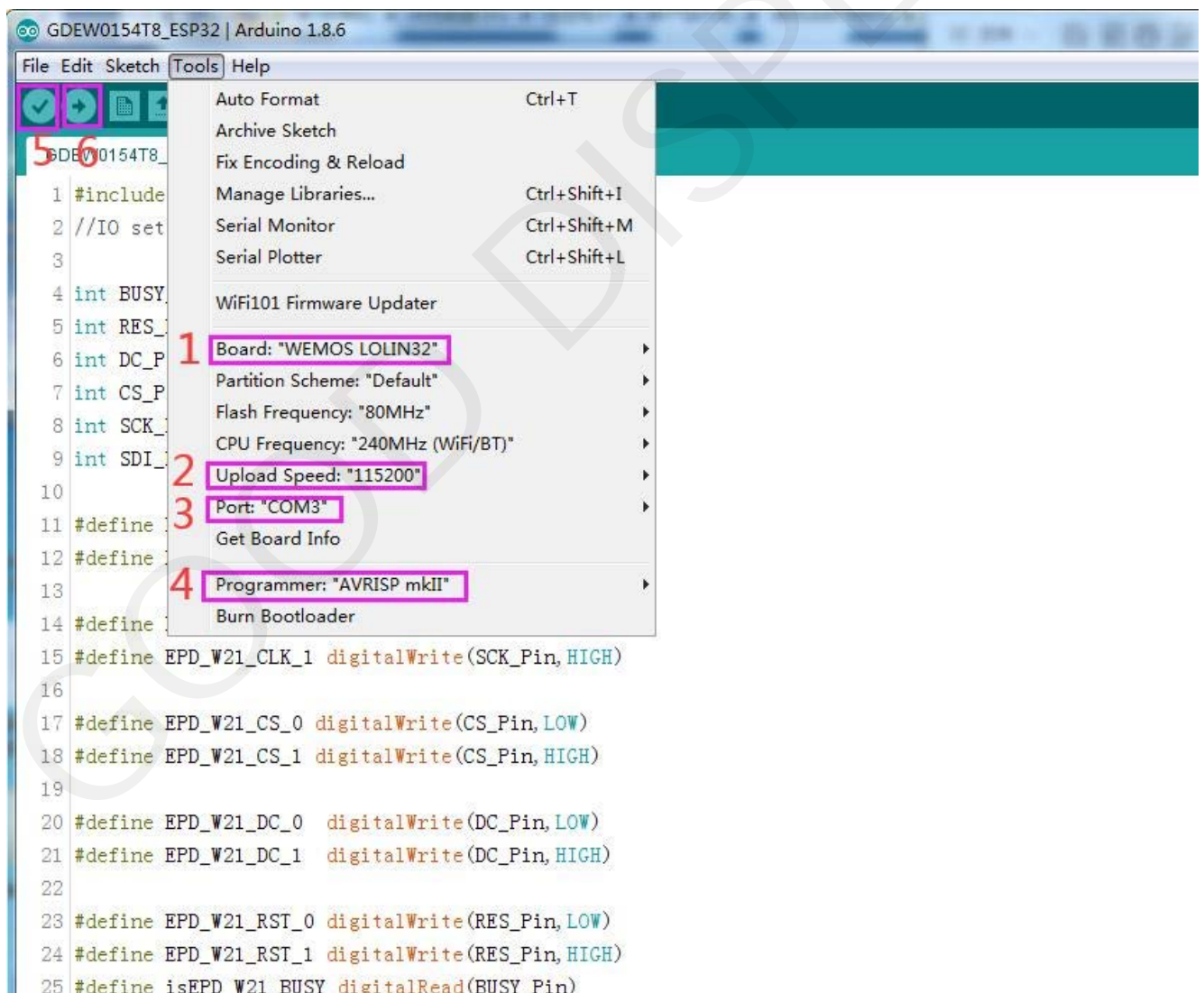

Figure 7 : Open Arduino.ino

Figure 8 : Steps of downloading program

4. Set in "tools".

5. Click position 1 to select the development board model "WEMOS LOLIN32".

6. Click position 2 to select serial port baud rate "115200".

7. Click position 3 to select COM port.

8. Click position 4 to select the programmer model, and here select "AVRISP mkII".

9. Click position 5 to compile the program.

10.Click position 6 to download the program to the development board.

11. After the downloading, first power off the development board, connect the electronic paper display screen to the adapter board, and then power on again so that E-paper can display normally.

Note: if the compiler prompts "invalid library found" during program compilation, please ignore this prompt, which will not affect the actual program download.