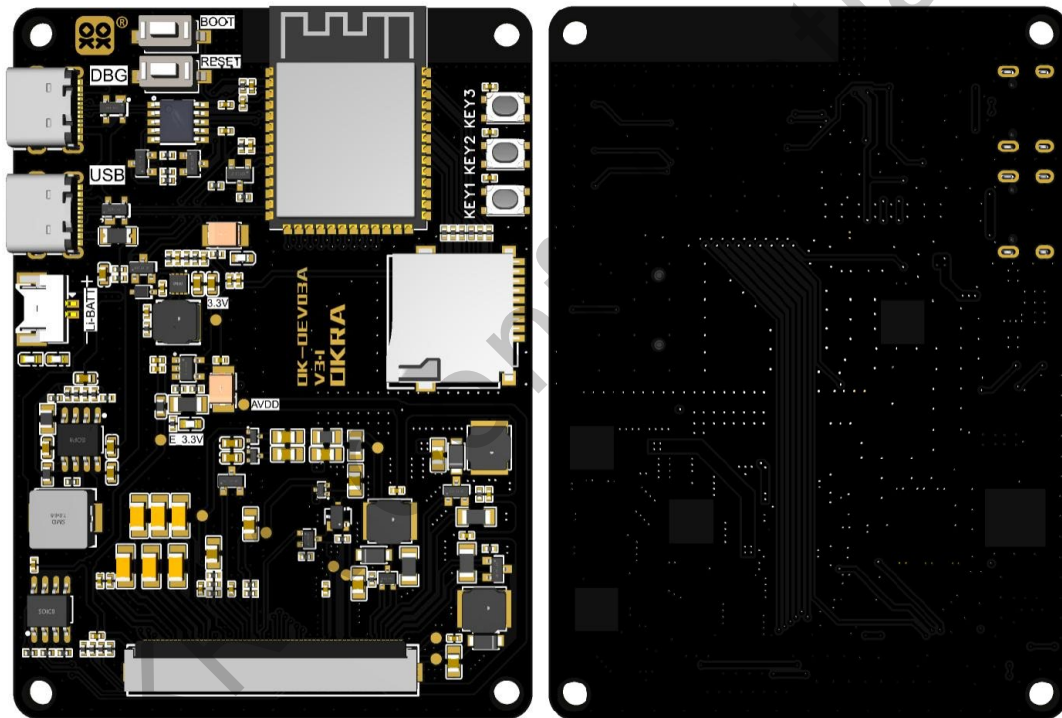


# OK-DEV03A V3.1 Specifications/ User Manual

## Foreword

- OK-DEV03A is a development board designed and developed by [Shanghai OKRA Technologies CO., LTD.] (<https://www.okratechnologies.com/cn/>) specifically for the E Ink 13.3-inch Spectra 6 E-paper display. It can be used as a motherboard, or connected to a host computer via USB. Basic source code is provided, so users can easily carry out secondary development without having to have a deep understanding of the E-paper display



## Product Features

- Equipped with ESP32S3-WROOM-1-N16R8 module.
- External TF card, directly load pictures (jpg format) through TF card for display.
- Support high-precision dithering algorithm.
- Onboard Type-C to serial port debugging interface, allows easy firmware burning and debugging.
- Provides basic reference code based on the Arduino environment to fully implement the screen drive and PMIC control functions.

- It also supports ESPRESSIF's official ESP-IDF and ESPRESSIF-IDE.

## ESP32S3-WROOM-1-N16R8

- WIFI+BLE5.0
- Built-in ESP32-S3 series chip, Xtensa dual-core 32-bit LX7 processor, supports single-precision floating-point unit, and clock frequency up to 240MHz.
- Built-in 384KB ROM
- Built-in 512KB SRAM
- Built-in 16KB RTC SRAM
- 8MB PSRAM in package
- External 16MB SPI FLASH

Get the full ESP32S3-WROOM-1-N16R8 datasheet.

## IO and buttons

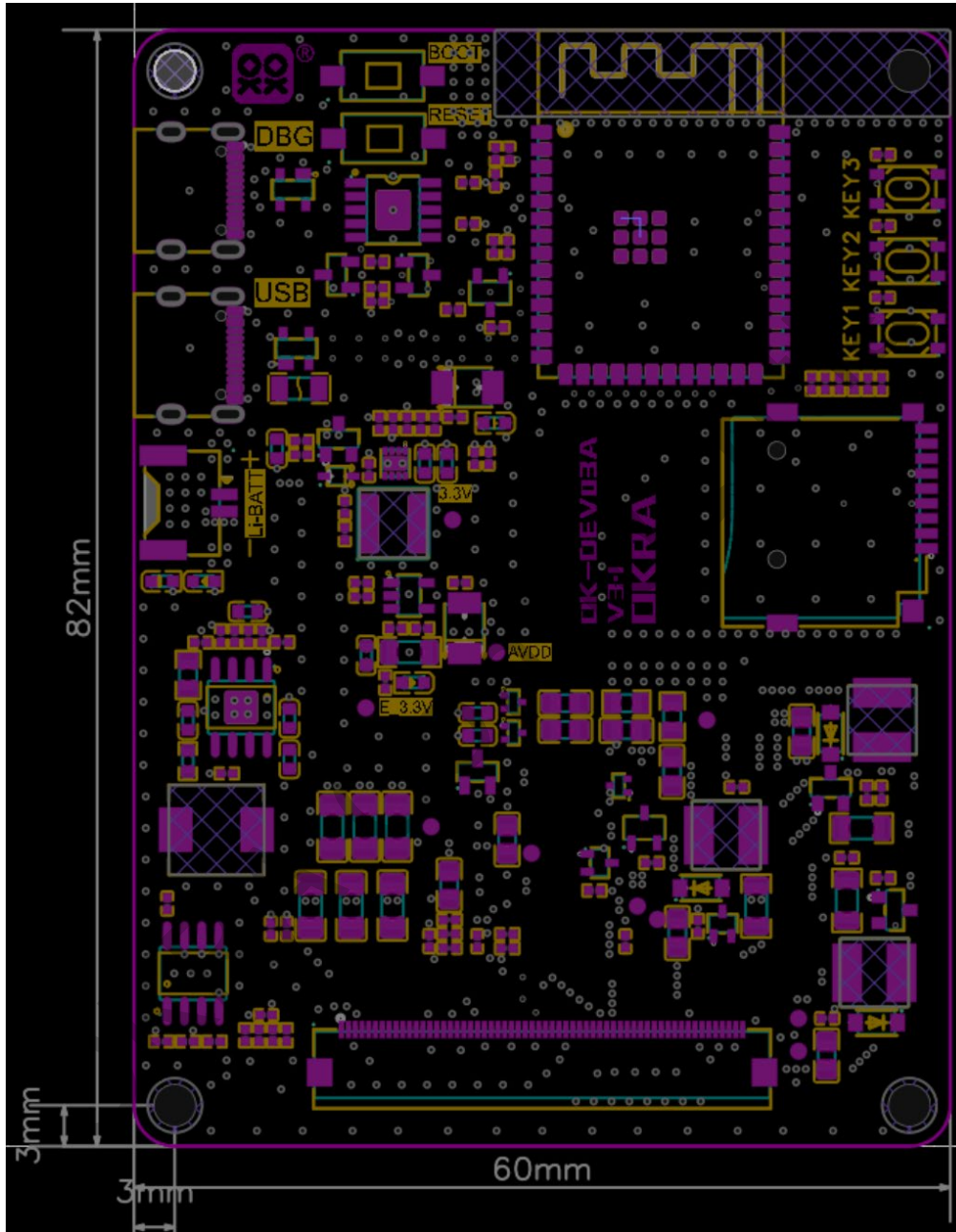
- OK-DEV03A has onboard Boot and Reset buttons. Press and hold the Boot button and then press the Reset button to manually enter the firmware burning mode.
- Lead out the TF card interface. \*\*\*This interface is internal and cannot be hot-swapped. \*\*\*It is used to load Slide Show images.
- Key1~Key3 user buttons

## Power supply and charging

- The battery port and any USB port can power OK-DEV03A, and the power supply circuit will be automatically switched, with the USB port taking priority.
- The recommended lithium battery is 1000~10000mAH. (Charging current 1.5A, too small capacity is unsafe, too large capacity will slow down charging)

## Outline dimension

The dimensions of OK-DEV03A V3.1 are 82x60mm, the board thickness is 1.6mm, and the fixing hole specification is M3.



## Design and quality

- Plug hole, immersion gold process
- All black PCB

## Shipping list

- OK-DEV03A motherboard (with Demo firmware burned)
- 8GB TF card (Demo image has been copied)
- USB A-C cable 1

## Firmware Support

### SlideShow firmware — Functional Demonstration

- Default factory firmware, with TF card to achieve screen carousel function.
- **The image file has to be in baseline-encoded jpg format (Windows Paint saves the image in jpg format with baseline encoding. If using Photoshop, you need to manually select baseline encoding)**
- **Image resolution has to be 1200x1600.**
- The default refresh interval is 30 seconds.
- **TF card is not hot-swappable .**
- Provide binary files ready for flashing.

### Basic firmware — Secondary Development

- Provide reference code.
- Complete power-on and power-off timing control of the EPD.
- Simple and clear driver architecture, convenient for secondary development.

### MQTT firmware (To be completed) — Project Cooperation

- Bluetooth network configuration.
- WIFI access to the Internet.
- MQTT Broker and username and password are configurable, and the communication protocol is simple and secure.

### USB-CDC firmware — Project Cooperation

- Need to be used with a host compute.

- Supports image transmission and corresponding control functions via USB virtual serial port.
- Image interface, Dither, and data packaging are all completed on the host computer.
- Supports partial refresh. (To be completed)
- This firmware supports direct display of images after transmission, or storage in the built-in Flash of the ESP32S3 module. After unplugging the USB cable, the images stored in the Flash will be automatically rotated.
- \*Provide host computer executable files for debugging and testing.
- \*Provide communication protocol.

## Tips for E Ink Spectra 6 Series E-paper display

- The Spectra 6 series E-paper display continues the color performance of E Ink Gallery and has improved the contrast and saturation. However, if you want the picture to have more realistic color performance on the Spectra 6 EPD, you need to enhance the original image.
- The control of power-on and power-off timing is very important for the EPD. Wrong power-on and power-off timing can easily lead to abnormal image or even display damage. Therefore, when using the source code of our basic firmware for secondary development, please do not modify the Pmic and interface driver code at will unless necessary to prevent abnormal power-on and power-off timing.
- **Please do not disconnect the power supply at will during the screen refresh process** (When the PMIC indicator light is on), otherwise it is very easy to cause damage to the EPD. When the power is off, please make sure that only 2 lights on the board are on (main power indicator light, 3.3V power indicator light).

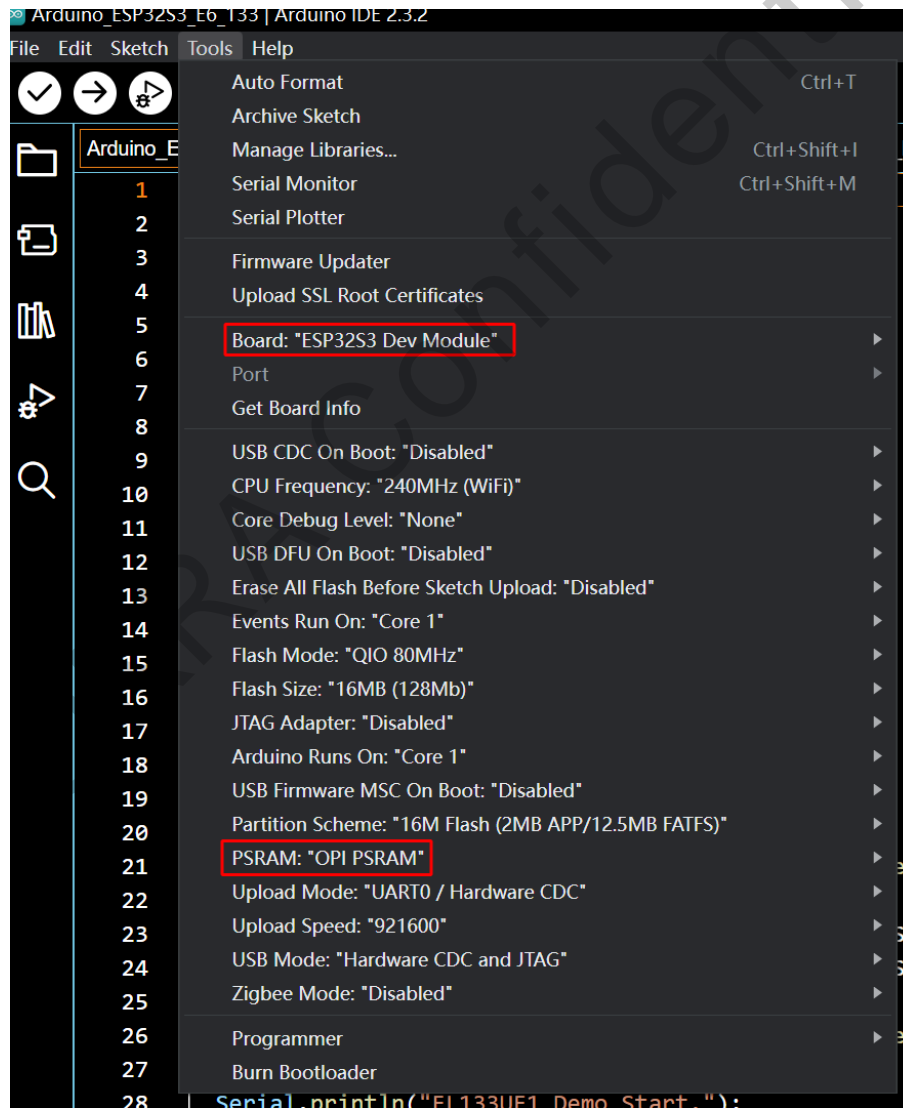
## Development environment construction

- Install the latest version of [Arduino](#).
- In the Arduino File->Preferences tab, in the Additional boards manager URLs field, fill in:

[https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package\\_esp32\\_index.json](https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json)

Click the OK button and wait for the update to complete.

- Download the source code of the basic firmware, unzip it, double-click the Arduino\_ESP32S3\_E6\_133.ino file, and then configure the development board.
- Tools->Boards->ESP32S3 Dev Module
- Tools->PSRAM->"OPI PSRAM"



## **Project Creation**

- Please refer to the Arduino related documentation.

## **Project compilation**

- Please refer to the Arduino related documentation.

## **Firmware burning**

- Please refer to the Arduino related documentation.

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