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# WT9932C2 TINY User Guide

WT9932C2 Development Board User Manual

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## Revision History

Version	Date	Changed By	Change Item
V1.0	2025/11/21	Kirto	Initial Document Creation

## 1. Development Board Overview

### 1.1 Product Classification

### 1.2 Development Board Introduction

WT9932C2-TINY is a mini development board designed for lightweight IoT applications. It is powered by the Espressif ESP32-C2 chip and integrates the Wireless-tag WT08684-S5 module. With a compact size of only 23 × 38 mm, it achieves an excellent balance between performance and functionality.

The development board runs at up to 120 MHz and supports dual-mode wireless communication (Bluetooth + Wi-Fi), making it ideal for smart home devices, low-power IoT terminals, and similar scenarios. The hardware design exposes all GPIO pins for breadboard-friendly prototyping and includes an onboard USB-to-UART interface for simplified debugging. Additional features include an onboard RGB LED, EN and BOOT buttons, and a power indicator LED for basic functionality validation and status monitoring.

The power supply section uses an LDO design supporting up to 1 A output to ensure stable peripheral power. Furthermore, by shorting the EN pin to GND, the board can function as a USB-to-UART converter, enhancing versatility.

### 1.3 Product Features

- Ultra-compact size with high integration** At only 23 × 38 mm, the board is suitable for space-constrained applications such as compact smart devices and embedded modules. It integrates the module, USB-to-UART interface, onboard LED/buttons, enabling instant development without additional components.
- High performance with dual-mode wireless connectivity** Based on ESP32-C2 with a 120 MHz CPU frequency, it provides strong processing capability and supports both Wi-Fi and Bluetooth. Suitable for smart home, remote control, data transmission, and various IoT applications.
- Flexible development and easy compatibility** All pins are fully accessible and breadboard-friendly for rapid prototyping. Compatible with various sensors and actuators. The onboard USB-to-UART interface eliminates the need for additional serial modules. Micropython is pre-installed for easy scripting.
- Dual-purpose debugging capability** EN (reset/enable) and BOOT buttons support easy entry into download mode. By shorting EN to GND, the board can act as a USB-to-UART adapter for external devices.
- Stable power supply with visual indicators** LDO supports up to 1 A current output, ensuring stable power delivery. The power indicator and RGB LED provide intuitive status feedback for features such as connectivity or data transfer.

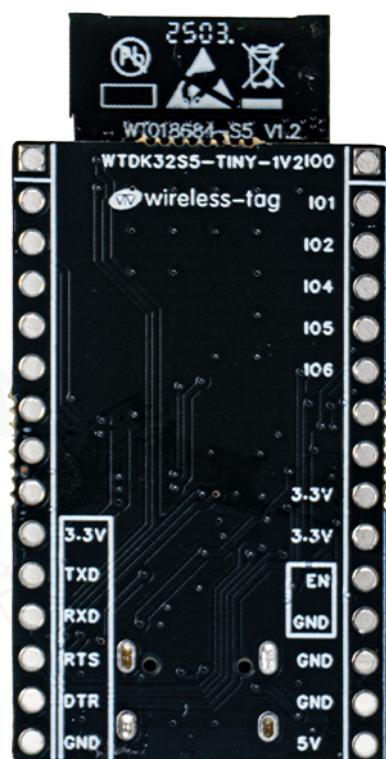
## 1.4 Development Board Images

Front view:



**Figure 1** – Front view

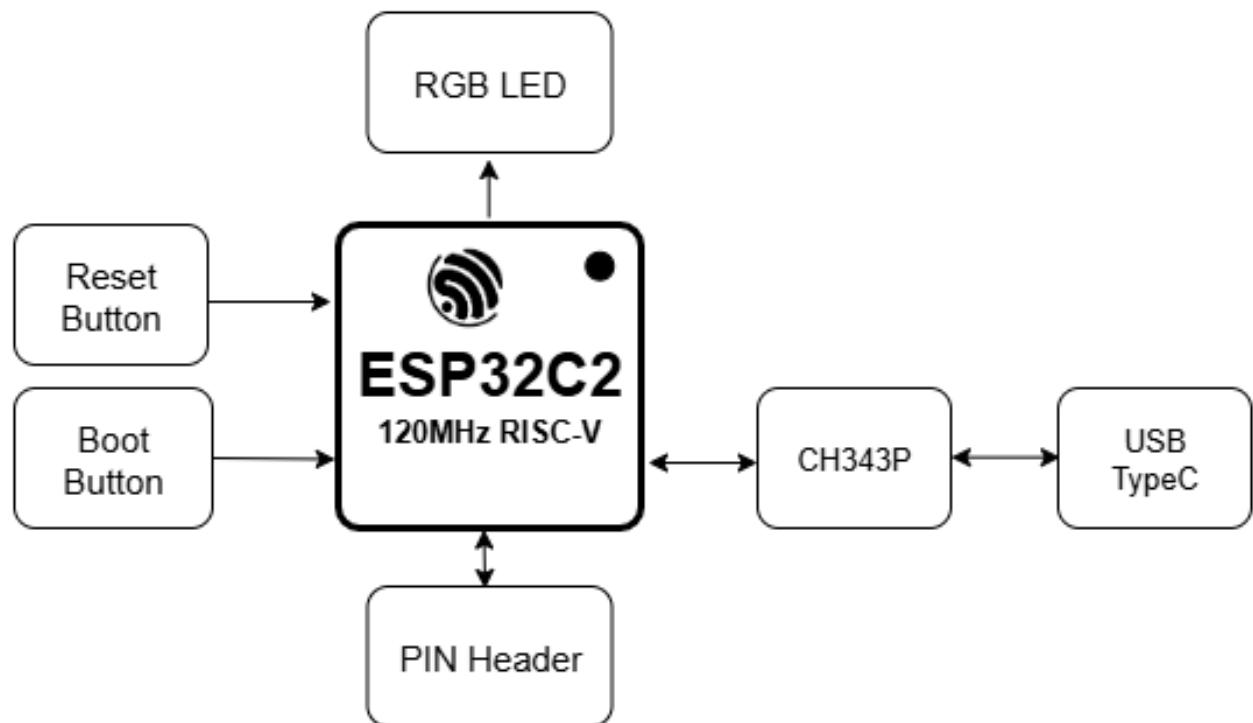
Back view:



**Figure 2 – Back view**

## 2. Hardware Reference

### 2.1 Functional Block Diagram

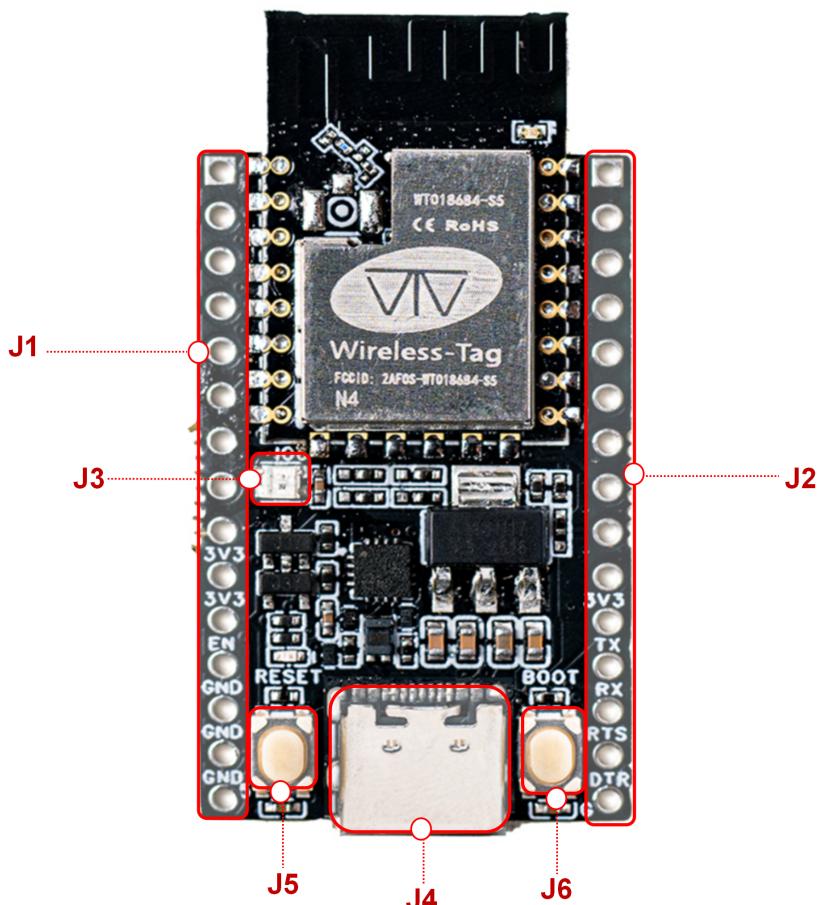


**Figure 3** – Functional Block Diagram

## 2.2 Hardware Peripherals

Peripheral	Description
WS2812	Single-bus RGB LED connected to IO6
RESET Key	Reset button
BOOT Key	BOOT/Download mode button, connected to IO9
USB	USB-to-UART interface for power and flashing
CH343P	USB-to-UART bridge chip

## 2.3 Component Description



**Figure 4** – Component Description

No.	Component Name	Description
J1/J2	Pin Headers	2.54 mm pin headers; short EN and GND to enter USB-to-UART mode
J3	RGB LED	SMD 2020 single-bus RGB LED on IO6
J4	USB Type-C Port	USB-to-UART debugging interface
J5/J6	Tactile Buttons	For RESET and manual BOOT mode entry

## 2.4 Connector Footprints

Interface	Footprint	Notes
Pin Headers ×2	HDR-TH_15P-P2.54-V-M	Breadboard compatible
Type-C USB	USB-C-SMD_TYPE-C	USB-to-UART debugging

## 2.5 Interface Description

### [J1] Pin Header

No.	Pin	Description	Voltage	Notes
1	IO0	General-purpose I/O 0	0/3.3V	
2	IO1	General-purpose I/O 1	0/3.3V	
3	IO2	General-purpose I/O 2	0/3.3V	
4	IO4	General-purpose I/O 4	0/3.3V	
5	IO5	General-purpose I/O 5	0/3.3V	
6	IO6	General-purpose I/O 6	0/3.3V	
7	IO18	General-purpose I/O 18	0/3.3V	
8	3.3V	Power Output	3.3V	
9	3.3V	Power Output	3.3V	
10	3.3V	Power Output	3.3V	
11	EN	Reset/Enable Pin	0V	
12-14	GND	Ground	0V	

No.	Pin	Description	Voltage	Notes
15	5V	Power Output	5V	

### [J2] Pin Header

No.	Pin	Description	Voltage	Notes
1	IO3	General-purpose I/O 3	0/3.3V	
2	IO10	General-purpose I/O 10	0/3.3V	
3	IO9	General-purpose I/O 9	0/3.3V	
4	IO8	General-purpose I/O 8	0/3.3V	
5	IO7	General-purpose I/O 7	0/3.3V	
6–9	GND	Ground	0V	
10	3.3V	Power Output	3.3V	
11	RXD	CH343P UART RX	0/3.3V	
12	TXD	CH343P UART TX	0/3.3V	
13	RTS	CH343P UART Flow Control	0/3.3V	
14	DTR	CH343P UART Flow Control	0/3.3V	
15	GND	Ground	0V	

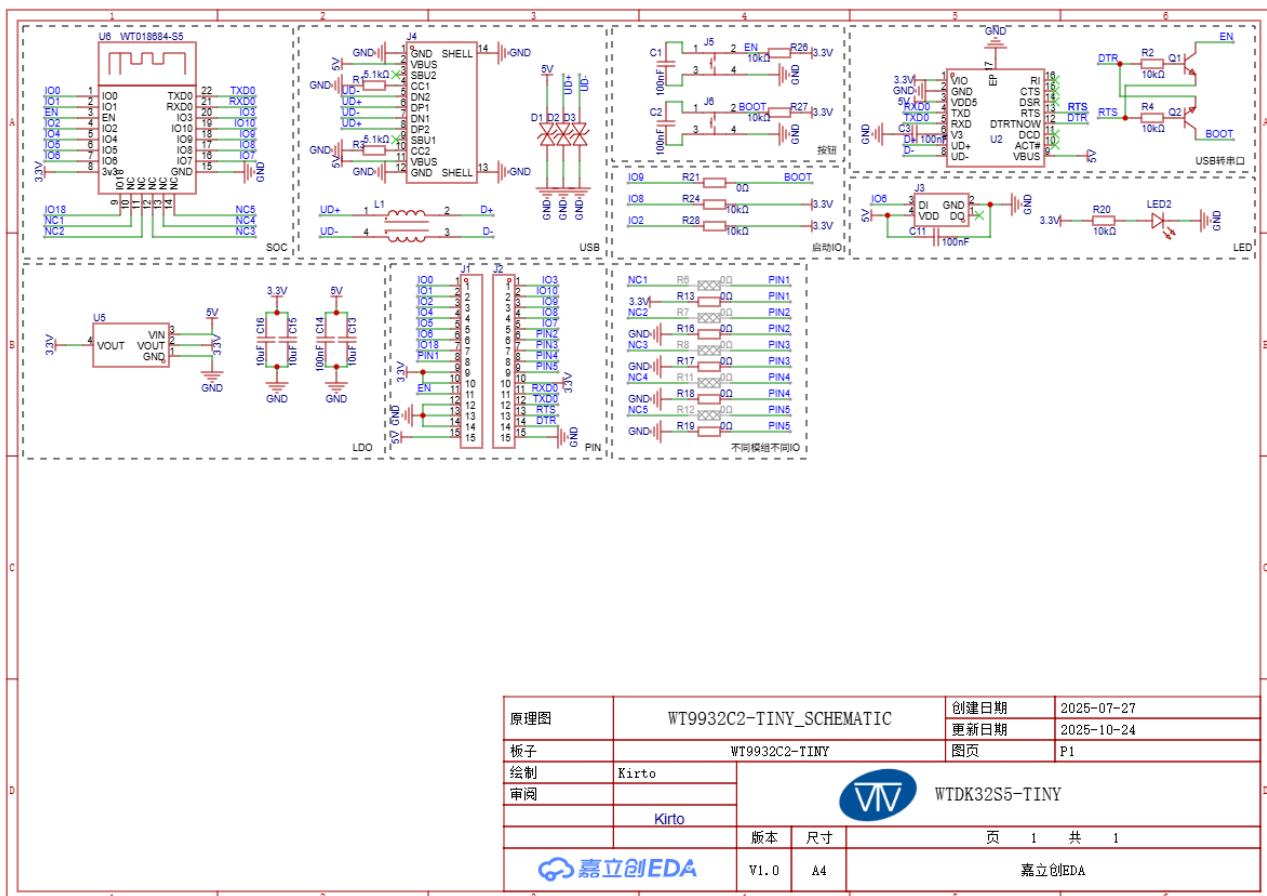
### [J3] RGB LED

A [WS2812](#) single-bus RGB LED is connected to IO6.

### [J4] Type-C Port

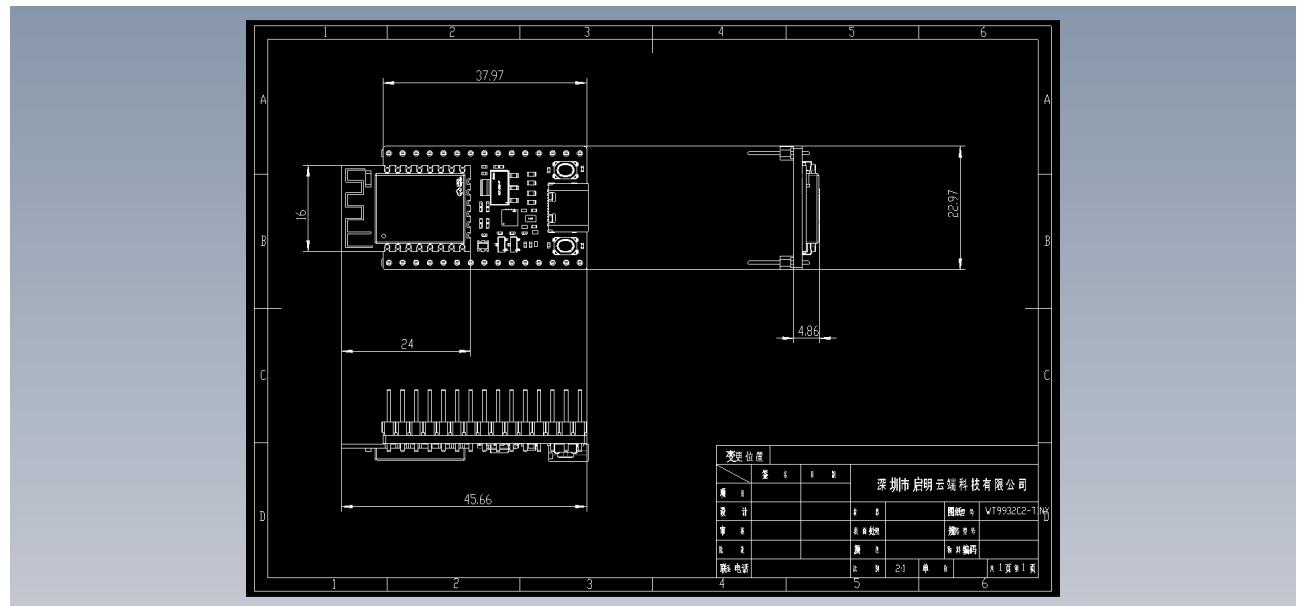
The USB-to-UART chip is [CH343P](#). Short EN and GND to turn the board into a USB-to-UART module.

### 3. Schematic



## 4. Mechanical Information

### 4.1 PCBA Dimensions



**Figure 5 – PCBA Dimensions**

## 5. User Guide

### 5.1 Preparation

Before using the board, prepare the following:

1. **USB-C Cable** ×1 Provides power or connects the board to a PC.
2. **WT9932C2-TINY Development Board** ×1
3. Serial Debug Tool For logging and debugging.

### 5.2 Hardware Setup

#### 1. Power On

- Connect the board to a PC or USB power adapter using the USB-C cable.
- The indicator LED will turn on once power is supplied.

### 5.3 Usage Guide

1. **Connect the board to your PC** Some systems may require the CH343 driver installation. > Note: Some computers may require installing the [driver](#)
2. **Open a Serial Terminal** Select the correct COM port and set the baud rate to 115200. [micropython](#) is pre-installed and can be interacted with via the terminal.

Note: This module uses a 26 MHz crystal oscillator. In ESP-IDF, set: Component config → Hardware Settings → Main XTAL Config → 26 MHz, otherwise garbled serial output may occur.

## 6. Related Documents

Document Name	Link	Description
WT9932C2-TINY Device User Guide	WT9932C2-TINY - Device User Guide	
ESP32-C2 IDF Online Documentation	<a href="https://docs.espressif.com/projects/esp-idf/zh_CN/v5.4.2/esp32c2/get-started/index.html">https://docs.espressif.com/projects/esp-idf/zh_CN/v5.4.2/esp32c2/get-started/index.html</a>	ESP-IDF programming guide and API docs
ESP32-C2 Technical Reference Manual	<a href="https://www.espressif.com/sites/default/files/documentation/esp8684_datasheet_cn.pdf">https://www.espressif.com/sites/default/files/documentation/esp8684_datasheet_cn.pdf</a>	ESP32-C2 chip specifications
Micropython Online Documentation	<a href="https://docs.micropython.org/en/latest/">https://docs.micropython.org/en/latest/</a>	Micropython documentation

### 7. Contact Us

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**Figure 6** – Wireless-Tag\_qrcode