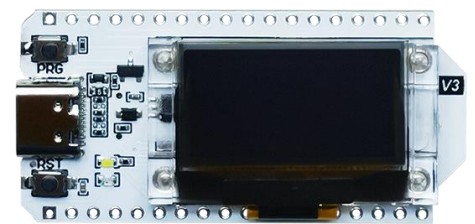




## HTIT-WB32\_V3

## ESP32 Development Kit





## Document version

Version	Time	Description	Remark
V1.0	2022-08-16	Documents creating	肖鸿
V1.1	2022-09-21	Document structure update	Aaron



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# 1. Description

## 1.1 Overview

WiFi Kit 32 is a classic IoT dev-board designed & produced by Heltec Automation (TM), it's a highly integrated product based on ESP32 (include Wi-Fi and BLE), Li-Po battery management system, 0.96" OLED are also included. It's the best choice for smart cities, smart farms, smart home, and IoT makers.

On this basis, the V3 version has been upgraded as follows:

Table 1.1: Version comparison

	WiFi Kit 32 (V2)	WiFi Kit 32 (V3)
<b>MCU</b>	ESP32-D0	ESP32-S3
<b>USB Socket</b>	Micro USB	Type C
<b>Low power features in deep sleep</b>	800uA	<10uA

## 1.2 Product features

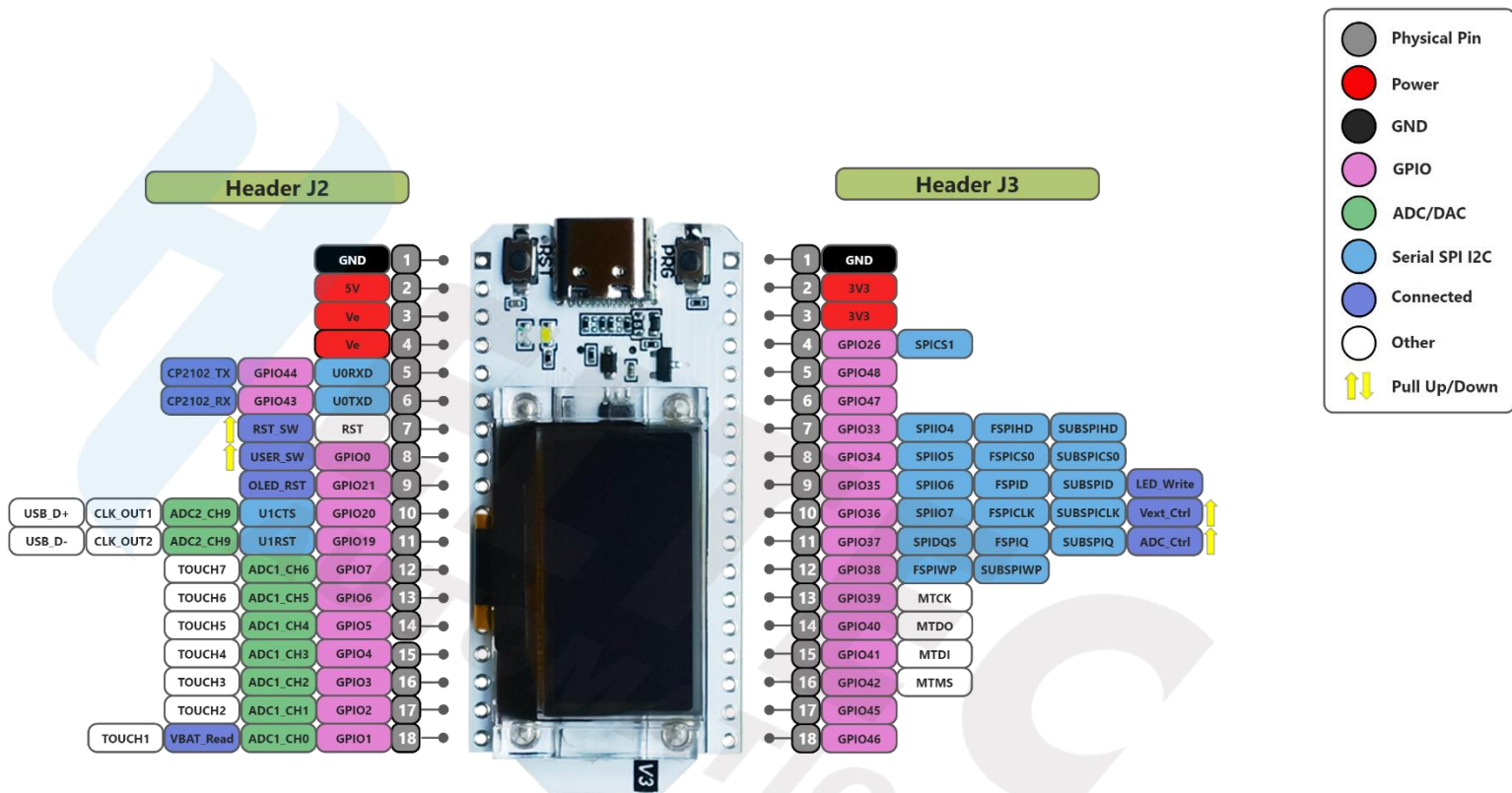
- Microprocessor: ESP32-S3FN8 (Xtensa<sup>®</sup> 32-bit LX7 dual core processor, five stage pipeline rack Structure, main frequency up to 240 MHz);
- Type-C USB interface with a complete voltage regulator, ESD protection, short circuit protection, RF shielding, and other protection measures;
- Onboard SH1.25-2 battery interface, integrated lithium battery management system (charge and discharge management, overcharge protection, battery power detection, USB / battery power automatic switching);

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- Onboard Wi-Fi, Bluetooth 2.4GHz PCB antenna;
- Onboard 0.96-inch 128\*64 dot matrix OLED display, which can be used to display debugging information, battery power, and other information;
- Integrated CP2102 USB to serial port chip, convenient for program downloading, debugging information printing;
- Compatible with the [Arduino development environment](#).

## 2. Pin Definition

### 2.1 Pin assignment



HT-WB32\_V3 Pin map





## 2.2 Pin description

- Header J2

Table 2.2-1: Pin description

No.	Name	Type	Function
1	GND	P	Ground.
2	5V	P	5V Power Supply.
3	Ve	P	Output 3.3V, power supply for external sensor.
4	Ve	P	Output 3.3V, power supply for external sensor.
5	RX	I/O	GPIO44, U0RXD, connected to CP2102 TXD.
6	TX	I/O	GPIO43, U0RXD, connected to CP2102 RXD.
7	RST	I	CHIP_PU. Connect to RST switch.
8	0	I/O	GPIO0, connect to PRG switch.
9	21	I/O	GPIO21, OLED RST.
10	20	I/O	GPIO20, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+ <sup>1</sup>
11	19	I/O	GPIO19, U1RTS, ADC2_CH8, CLK_OUT2, USB_D- <sup>2</sup>
12	7	I/O	GPIO7, ADC1_CH6, TOUCH7.
13	6	I/O	GPIO6, ADC1_CH5, TOUCH6
14	5	I/O	GPIO5, ADC1_CH4, TOUCH5.
15	4	I/O	GPIO4, ADC1_CH3, TOUCH4.
16	3	I/O	GPIO3, ADC1_CH2, TOUCH3.
17	2	I/O	GPIO2, ADC1_CH1, TOUCH2.

<sup>1</sup> DP pin connectable to USB socket, solder R29

<sup>2</sup> DN pin connectable to USB socket, solder R3



18	1	I/O	GPIO1, ADC1_CH0, TOUCH1, Read VBAT Voltage <sup>3</sup>
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### Header J3

Table 2.2-2: Pin description

No.	Name	Type	Function
1	GND	P	Ground.
2	3V3	P	3.3V Power Supply.
3	3V3	P	3.3V Power Supply.
4	26	I/O	GPIO26, SPICS1.
5	48	I/O	GPIO48, SPICLK_N_DIFF, SUBSPICLK_N_DIFF.
6	47	I/O	GPIO47, SPICLK_P_DIFF, SUBSPICLK_P_DIFF.
7	33	I/O	GPIO33, SPIIO4, FSPIHD, SUBSPIHD.
8	34	I/O	GPIO34, SPIIO5, FSPICS0, SUBSPICS0.
9	35	I/O	GPIO35, SPIIO6, FSPID, SUBSPID, LED Write Ctrl.
10	36	I/O	GPIO36, SPIIO7, FSPICLK, SUBSPICLK, Vext Ctrl.
11	37	I/O	GPIO37, SPIDQS, FSPIQ, SUBSPIQ, ADC_Ctrl.
12	38	I/O	GPIO38, FSPIWP, SUBSPIWP.
13	39	I/O	GPIO39, MTCK.
14	40	I/O	GPIO40, MTDO.
15	41	I/O	GPIO41, MTDI.
16	42	I/O	GPIO42, MTMS.

<sup>3</sup> ADC1\_CH0 is used to read the lithium battery voltage, the voltage of the lithium battery is:

$$V_{BAT} = 100 / (100+390) * V_{ADC\_IN1}$$





17	45	I/O	GPIO45.
18	46	I/O	GPIO46.

### 3. Specifications

#### 3.1 General specifications

Table 3.1: General specifications

Parameters	Description
Master Chip	ESP32-S3FN8(Xtensa®32-bit lx7 dual core processor)
USB to Serial Chip	CP2102
WiFi	802.11 b/g/n, up to 150Mbps
Bluetooth	Bluetooth LE: Bluetooth 5, Bluetooth mesh
Hardware Resource	7*ADC1+2*ADC2; 7*Touch; 3*UART; 2*I2C; 2*SPI, etc.
Memory	384KB ROM; 512KB SRAM; 16KB RTC SRAM; 8MB SiP Flash
Interface	Type-C USB; 2*1.25 lithium battery interface; 2*18*2.54 Header Pin
Battery	3.7V lithium battery power supply and charging
Power consumption	Deep sleep 10 uA
Operating temperature	-20~70°C
Dimensions	50.2 * 25.5* 10.2 mm



### 3.2 Power supply

Except when USB or 5V Pin is connected separately, lithium battery can be connected to charge it. In other cases, only a single power supply can be connected.

Table 3.2: Power supply

Power supply mode	Minimum	Typical	Maximum	Company
Type-C USB( $\geq 500\text{mA}$ )	4.7	5	6	V
Lithium battery( $\geq 250\text{mA}$ )	3.3	3.7	4.2	V
5V pin( $\geq 500\text{mA}$ )	4.7	5	6	V
3V3 pin( $\geq 150\text{mA}$ )	2.7	3.3	3.5	V

### 3.3 Power output

Table 3.3: Power output

Output Pin	Minimum	Typical	Maximum	Company
3.3V Pin			500	mA
5V Pin (USB Powered only)			500	mA
Vext Pin			350	mA

### 3.4 Power characteristics

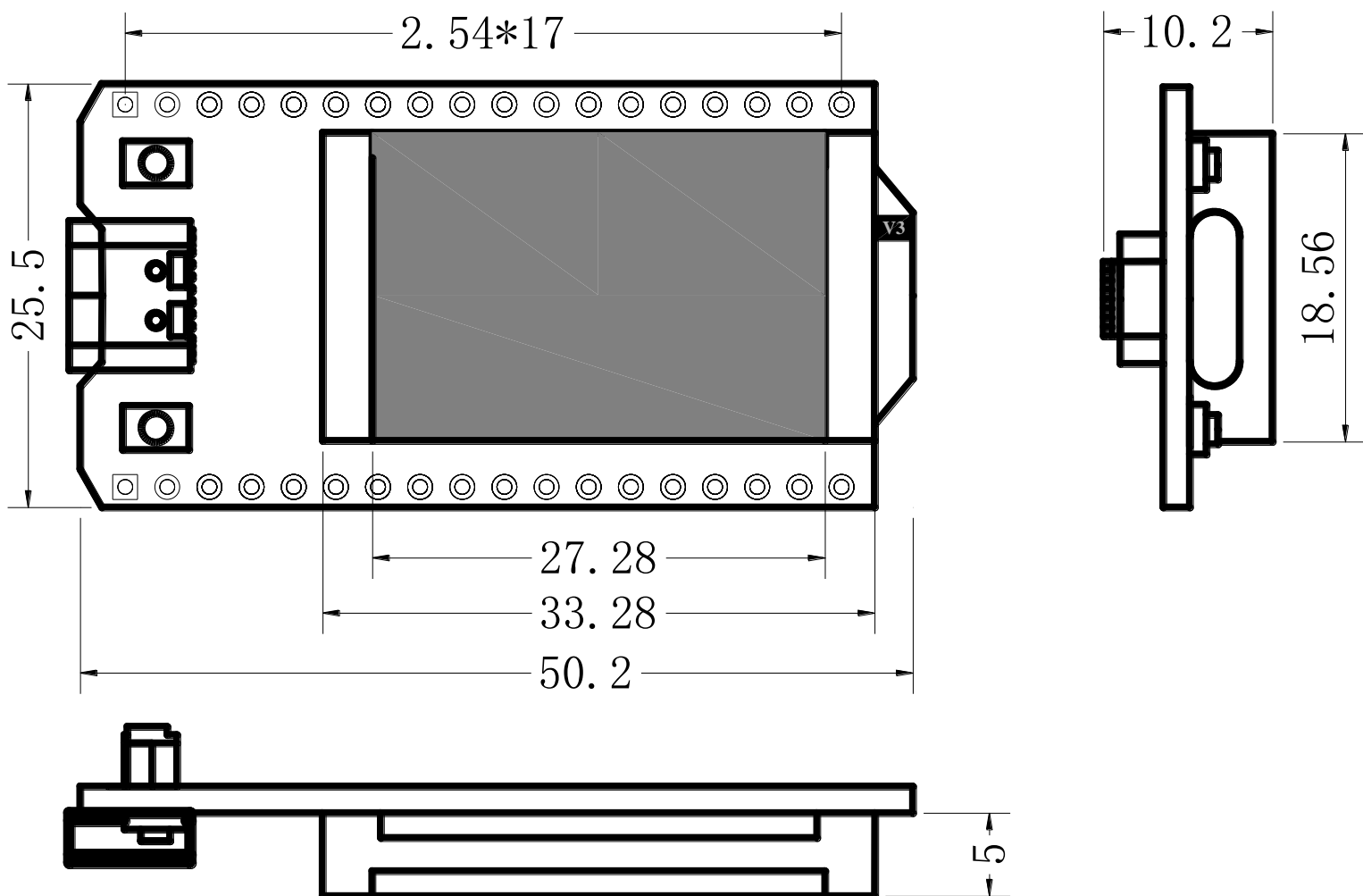
Table 3.4: Power characteristics

Mode	Condition	Min.	Typical	Max.	Company
WiFi Scan	USB powered		115		mA
WiFi AP	USB powered		150		mA
BT	USB powered		115		mA

sleep	USB powered		2		mA
	VBAT/battery powered		15		uA
	3.3V header powered		10		uA

## 4. Hardware resource

### 4.1 Physical dimensions





## 5. Resource

### 5.1 Relevant Resource

- Source Code
  - [Heltec ESP \(ESP32 & ESP8266\) framework](#) (Already included Heltec ESP32 LoRaWAN library)
  - [Heltec ESP32 library](#)
- [Schematic diagram](#)
- [Pin map](#)
- [Downloadable resource](#)

### 5.2 Contact Information

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