ESP32 LoRa V3 WIFI Bluetooth Development Board

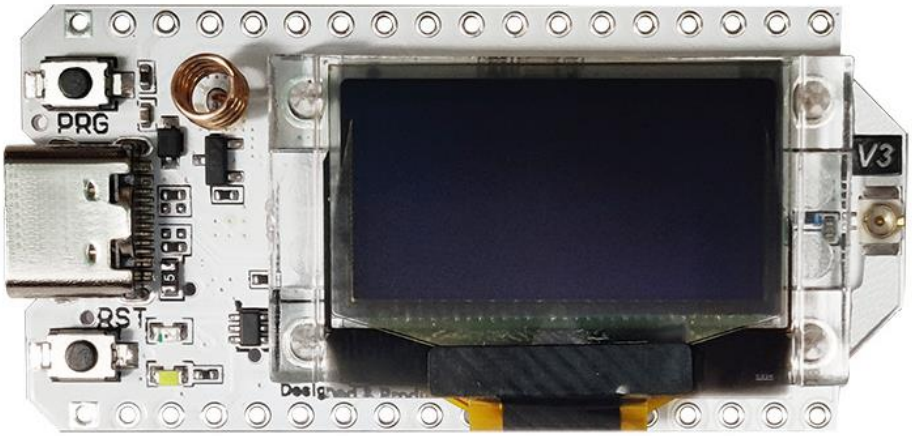


Table of contents

product description

ESP32 LoRa 32 WIFI development board is a classic IoT development board. Since its launch, it has been loved by developers and manufacturers. The newly launched V3 version retains functions such as Wi-Fi, BLE, LoRa, OLED display, etc. It has rich peripheral interfaces, good RF circuit design and low power consumption design , and has a variety of unique hardware security mechanisms . The perfect security mechanism enables the chip to meet strict security requirements. It is the best choice for smart city, farm, home, industrial control, house security, wireless meter reading and IoT developers.

Parameter Description :
Main frequency : 240MHz
FLASH : 8Mbyte
Processor : Xtensa 32-bit LX7 dual-core processor
Main control chip : ESP32-S3FN8
LoRa chip : SX1262
USB interface chip : C P 2102
Frequency: 470~510 MHz, 863~928 MHz
Deep sleep : < 10uA
Open communication distance : 2.8KM
Dual-mode Bluetooth : Traditional Bluetooth and BLE low-power Bluetooth
Working voltage : 3.3~7V
Operating temperature range : 20~70C
Receiver sensitivity : -139dbm (Sf12, 125KHz)
Support mode : WIFI Bluetooth LORA
Interface: Type-C USB; SH1.25-2 battery port ; LoRa ANT(IPEX1.0); 2*18*2.54 Header Pin

Power Description:
Only when the USB or 5V pin is connected separately , the lithium battery can be connected for charging. In other cases, only one power source can be connected .

Power supply mode description:

Power supply	Minimum	conventional	maximum	unit
Type-C USB (≥500mA)	4.7	5	6	V
Lithium battery (≥250mA)	3.3	3.7	4.2	V
5V pin (≥500mA	4.7	5	6	V
3V3 pin (≥150mA)	2.7	3.3	3.5	V

Power output:

Output Pins	Minimum	conventional	maximum	unit
3.3V Pin			500	mA
5V Pin (USB powered only)			500	mA
Vext Pin			500	mA

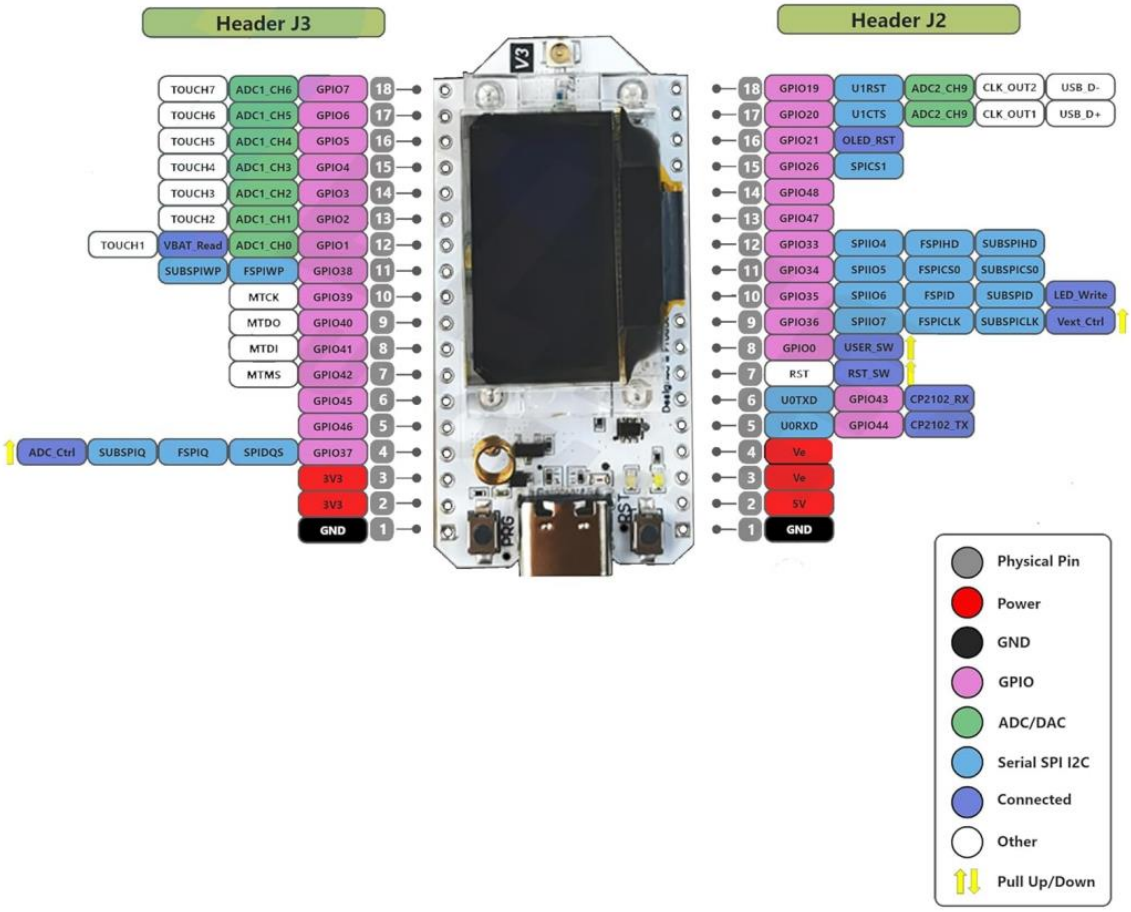
Power characteristics:

model	condition	Minimum	conventional	maximum	unit
WiFi Scan	USB powered		115		mA
WiFi AP	USB powered		150		mA
BT	USB powered		115		mA
TX	14dBm USB powered 868		200		mA
	17 dBm USB powered 868		210		mA
	22 dBm USB powered 868		230		mA
RX	TX disabled; RX enabled		90		mA
sleep	USB powered		2		mA
	VBAT/battery power supply		15		uA
	3.3V plug power supply		10		uA

Transmit power :

Working frequency	Maximum power value/[dBm]
470~510	21 ± 1
867~870	21 ± 1
902~928	21 ± 1

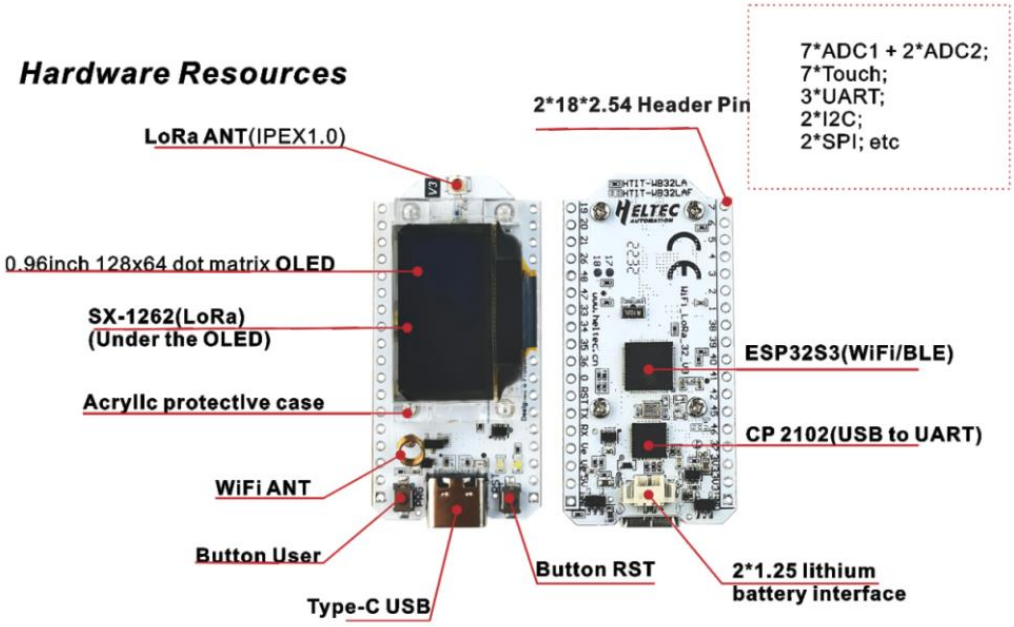
Product Pin Description



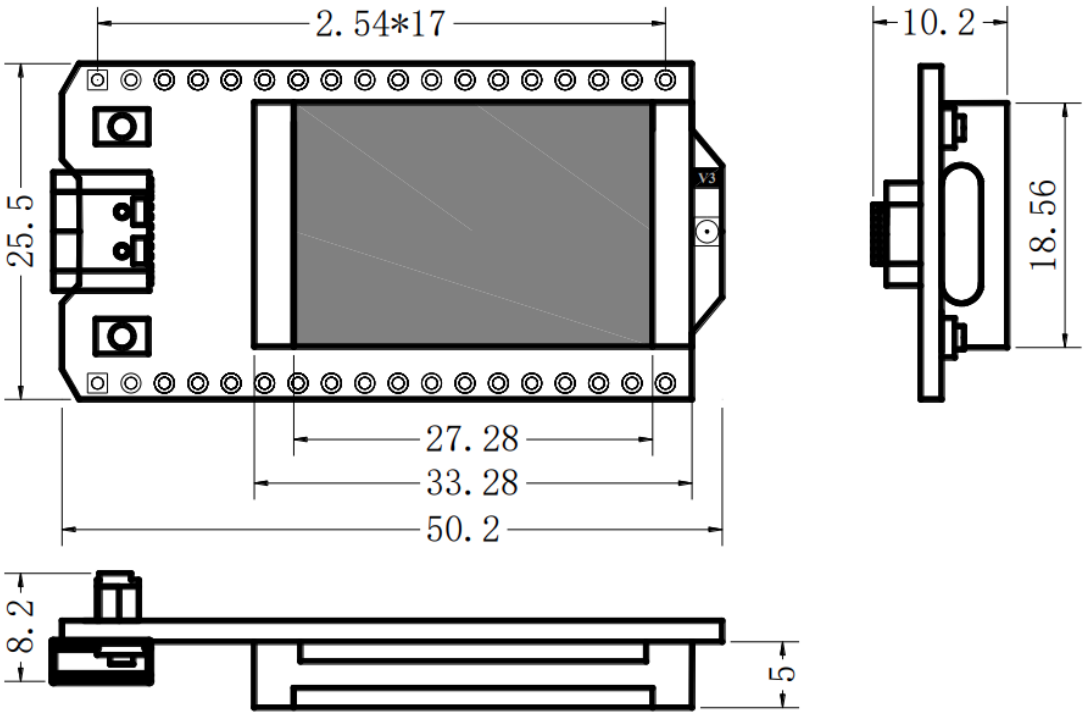
Header J2			
No.	Name	Type	Function
1	GND	P	Ground.
2	5V	P	5V Power Supply.
3	Ve	P	Output 3.3V, power supply for external sensor.
4	Ve	P	Output 3.3V, power supply for external sensor.
5	RX	I/O	GPIO44, U0RXD, connected to CP2102 TXD
6	TX	I/O	GPIO43, U0RXD, connected to CP2102 RXD
7	RST	I	CHIP_PU, connected to RST switch
8	0	I/O	GPIO0, connect to PRG switch
9	36	I/O	GPIO36, SPII07, FSPICLK, SUBSPICLK, Vext Ctrl
10	35	I/O	GPIO35, SPII06, FSPID, SUBSPID, LED Write Ctrl
11	34	I/O	GPIO34, SPII05, FSPICS0, SUBSPICS0.
12	33	I/O	GPIO33, SPII04, FSPIHD, SUBSPIHD.
13	47	I/O	GPIO47, SPICLK_P_DIFF, SUBSPICLK_P_DIFF.
14	48	I/O	GPIO48, SPICLK_N_DIFF, SUBSPICLK_N_DIFF.
15	26	I/O	GPIO26, SPICS1.
16	21	I/O	GPIO21, OLED RST
17	20	I/O	GPIO20, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+1.
18	19	I/O	GPIO19, U1RTS, ADC2_CH8, CLK_OUT2, USB_D2 .
Header J3			
No.	Name	Type	Function
1	GND	P	Ground.
2	3V3	P	3.3V Power Supply.
3	3V3	P	3.3V Power Supply.
4	37	I/O	GPIO37, SPIDQS, FSPIQ, SUBSPIQ.
5	46	I/O	GPIO46.
6	45	I/O	GPIO45.
7	42	I/O	GPIO42, MTMS.
8	41	I/O	GPIO41, MTDI.
9	40	I/O	GPIO40, MTDO.
10	39	I/O	GPIO39, MTCK.
11	38	I/O	GPIO38, FSPIWP, SUBSPIWP.
12	1	I/O	GPIO1, ADC1_CH03, TOUCH1, Read VBAT Voltage
13	2	I/O	GPIO2, ADC1_CH1, TOUCH2
14	3	I/O	GPIO3, ADC1_CH2, TOUCH3.
15	4	I/O	GPIO4, ADC1_CH3, TOUCH4.
16	5	I/O	GPIO5, ADC1_CH4, TOUCH5.
17	6	I/O	GPIO6, ADC1_CH5, TOUCH6.
18	7	I/O	GPIO7, ADC1_CH6, TOUCH7.

Product panel description

Microprocessor: ESP32-S3FN8 (Xtensa® 32-bit LX7 dual-core processor, five-stage pipeline rack structure, frequency up to 240 MHz).
SX1262 LoRa node chip.
Type-C USB interface, with complete protection measures such as voltage regulator, ESD protection, short circuit protection, and RF shielding.
On-board SH1.25-2 battery interface, integrated lithium battery management system (charge and discharge management, overcharge protection, battery power detection, USB/battery power automatic switching).
The onboard 0.96-inch 128*64 dot matrix OLED display can be used to display debugging information, battery power and other information.
Integrated WiFi, LoRa, and Bluetooth triple-network connections, onboard Wi-Fi, Bluetooth-specific 2.4GHz metal spring antenna, and reserved IPEX (U.FL) interface for LoRa use.
Integrated CP2102 USB to serial port chip for easy program downloading and debugging information printing.
It has good RF circuit design and low power consumption design.



Product Size



Instructions for use

This project is completely cloned from the ESP32 project. On this basis, we modified the contents of the "variants" folder and "boards.txt" (added the definition and information of the development board), which makes it easier for users (especially beginners) to use the ESP32 series development boards produced by our company.

1. Hardware Preparation

- ESP32: This is the main controller, responsible for coordinating the work of all other components.
- SX1262: LoRa module for long-distance wireless communication.
- OLED display: used to display node status or data.
- Wi-Fi module: Built-in ESP32 or additional Wi-Fi module for connecting to the Internet.

2. Hardware Connection

- Connect the SX1262 LoRa module to the specified pins of ESP32 according to the datasheet.
- The OLED display is connected to ESP32, generally using the SPI or I2C interface.
- If ESP32 itself does not have Wi-Fi function, you need to connect an additional Wi-Fi module.

3. Software Configuration • Firmware Writing

- Use an IDE that supports ESP32 for programming.
- Configure LoRa module parameters, such as frequency, signal bandwidth, coding rate, etc.
- Write code to read sensor data and send it via LoRa.
- Set the OLED display to display content, such as sensor data, LoRa signal strength, etc.
- Configure the Wi-Fi connection, including SSID and password, and possible cloud connection code.

4. Compile and upload

- Compile the code and make sure there are no syntax errors.
- Upload the code to ESP32.

5. Testing and debugging

- Test whether the LoRa module can send and receive data successfully.
- Make sure the OLED display shows information correctly.
- Verify that Wi-Fi connectivity and Internet data transfer are working properly.

6. Deployment and Monitoring

- Deploy nodes to actual application scenarios.
- Monitor the running status and data transmission of nodes.

Precautions

- Make sure all components are compatible and properly connected.
- When writing code, check and follow each component’s datasheet and library usage guidelines.
- For long distance transmission, it may be necessary to adjust the parameters of the LoRa module to optimize performance.
- If used indoors, the Wi-Fi connection may require additional configuration or enhancement.

Please keep in mind that the above steps are a general guide and the exact details may vary, especially when it comes to specific hardware and software libraries. Be sure to review and follow all relevant documentation and safety guidelines. If you encounter any problems during configuration or use, it is always best to consult the official documentation or contact the manufacturer's technical support.