



RaidoCore Series ESP32-S3R8

RC32

Datasheet-Rev1.0.0



Document version

Version	Time	Description	Remark
Rev. 1.0.0	2026-06-10	Dev-Preview Version	Richard

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1. Overview

The RadioCore series is a quasi-system-level development platform that enables flexible integration of various MCUs and RF modules within an ultra-compact form factor, making it well suited for a wide range of IoT applications.

The **RC32**, a model in this series, is equipped with the Espressif **ESP32-S3R8** and supports 2.4 GHz **Wi-Fi**, **Bluetooth 5.0**, and **BLE** connectivity. It also allows flexible integration of additional RF modules—such as **LoRa**, **Wi-Fi HaLow**, and others—based on specific application requirements.

The RC32 features a custom pin layout that supports **solder-free** plug-and-play operation, simplifying prototype assembly and module replacement, thereby accelerating development and iteration cycles.

It supports the official **Arduino** framework and is fully compatible with mainstream toolchains including Arduino, PlatformIO, and ESP-IDF, enabling developers to work in familiar environments and speed up project delivery.

Features

-  Equipped with the ESP32-S3R8 (with 8MB PPSRAM onboard), integrating 2.4GHz Wi-Fi, Bluetooth 5.0 / BLE.
-  Expandable modular RF interface, with optional **LoRa** and **Wi-Fi HaLow** RF modules, reserving room for future communication scheme expansion.
-  Provides **Arduino development framework**; compatible with mainstream toolchains including ESP-IDF, PlatformIO, and MicPython etc..
-  Compatible with various open-source projects, such as Meshtastic, MeshCore, Home Assistant, etc.
-  Compact form factor with solder-free pins for easy integration.

Application Scenario

- | | |
|---|---|
|  Outdoor mesh networking |  Smart agriculture sensing |
|  Smart home gateway |  Bluetooth indoor positioning |
|  Environmental monitoring node |  Wireless repeater / relay |
|  Wearable device prototyping |  Maker education & experiments |
|  Industrial data acquisition |  Edge computing node |
|  Remote meter reading terminal |  Multi-protocol converter |

2. Specifications

2.1 Generic Parameter

Table 3.1 General specification

Parameters	Description	
MCU	ESP32-S3R8 (Wi-Fi/BLE)	
Compatible RF	<u>HT-RA62A</u> (LoRa), <u>HT-HC01</u> (WiFi HaLow)	
Interface	USB-C; B2B; 2 x 10 Pin Headers	
Peripherals	4 x SPI ^① , 3 x UART, 2 x I2C, 2xI2S, 3 x ADC1, 2 x ADC2	
Memory	16MB Flash, 8MB PSRAM, 512KB SRAM, 384KB ROM	
Temperature	Storage	-35~80℃
	Recommended	-30~65℃ ^②
Power Supply	Recommended 5V-1A	
Shell Material	ABS	
Dimensions	40.10 x 23.82 x 12.54 mm	
Weight	8.3g	

2.2 Power Consumption

Table3.2 Power consumption

Mode	Condition@3.7V-BAT	Typical	Unit
WiFi	TX @16dBm	340	mA
	RX	115	mA
BT	TX @16dBm	340	mA
	RX	110	mA

① SPI0 and SPI1 are occupied by flash memory and internal PSRAM respectively.

② Plastic housing rated for -30℃ ~ 65℃ operating temperature.

Sleep		19	μA
LoRa	Refer to the HT-RA62A datasheet for relevant information		
WiFi HaLow	Refer to the HT-HC01 V2 datasheet for relevant information		

3. Pin Description

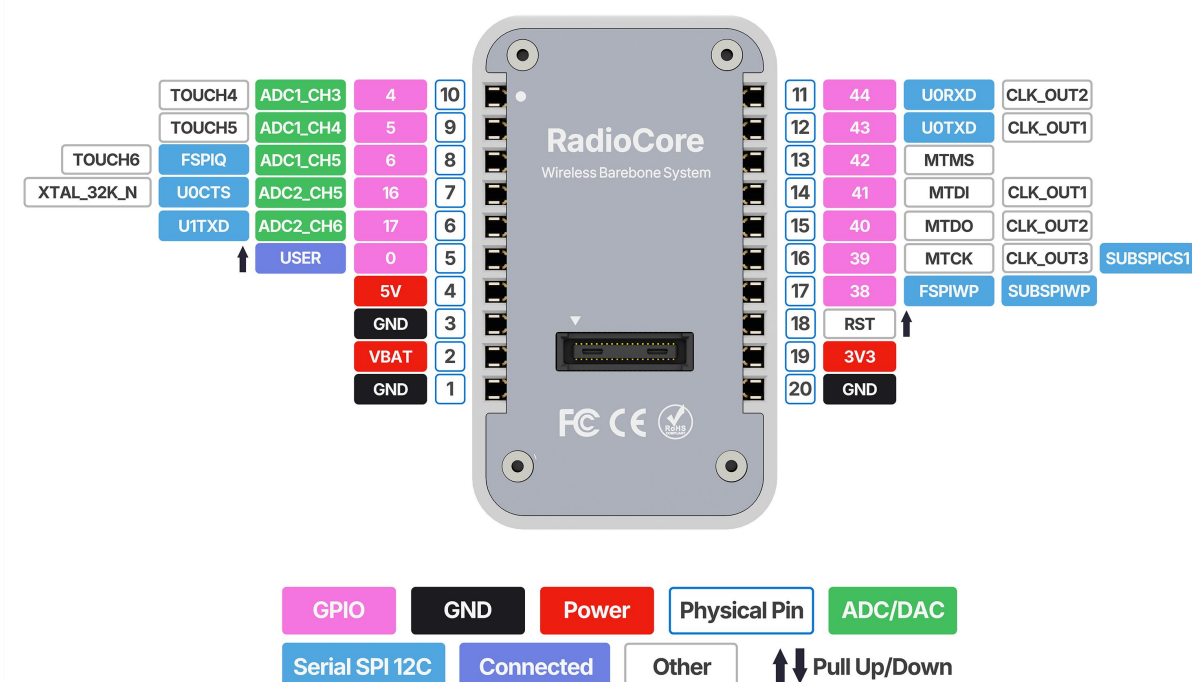
This section describes the functions of partial pins on the RC32 module. Refer to the [RC32 Schematic](#) and the official [ESP32-S3 datasheet](#) for full details

3.1 General Pins (Broken-out Pins)

3.1.1 General Pins Layout

These pins are routed to the external pin headers of RadioCore. Their functions remain intact regardless of whether an external RF expansion module is soldered onto the board.

- **GPIO:** All pins marked GPIO are usable as general-purpose input/output pins.
- **Serial / SPI / I2C & Other Peripherals:** These peripherals follow the chip's default pin assignments. You may remap these functions to any available GPIO pins via software configuration in your code.
- **ADC / DAC:** These pins are the chip's dedicated analog input and analog output channels.



3.1.2 General Pins Description

Table2.1.2: General Pins Description

NO.	Name	Type				Function
1	GND	G				Ground
2	VBAT	P				Lithium Battery Power Supply
3	GND	G				Ground
4	5V	P				5V Power Supply
5	0[®]	I/O/T		RTC	IO_MUX	GPIO0, USER Button
6	17	I/O/T	Analog	RTC	IO_MUX	GPIO17, U1TXD, ADC2_CH6
7	16	I/O/T	Analog	RTC	IO_MUX	GPIO16, U0CTS, ADC2_CH5, XTAL_32K_N
8	6	I/O/T	Analog	RTC	IO_MUX	GPIO6, TOUCH6, ADC1_CH5
9	5	I/O/T	Analog	RTC	IO_MUX	GPIO5, TOUCH5, ADC1_CH4
10	4	I/O/T	Analog	RTC	IO_MUX	GPIO4, TOUCH4, ADC1_CH3
11	44	I/O/T			IO_MUX	U0RXD, GPIO44, CLK_OUT2
12	43	I/O/T			IO_MUX	U0TXD, GPIO43, CLK_OUT1
13	42	I/O/T			IO_MUX	MTMS, GPIO42
14	41	I/O/T			IO_MUX	MTDI, GPIO41, CLK_OUT1
15	40	I/O/T			IO_MUX	MTDO, GPIO40, CLK_OUT2
16	39	I/O/T			IO_MUX	MTCK, GPIO39, CLK_OUT3, SUBSPICS1
17	38	I/O/T			IO_MUX	GPIO38, FSPIWP, SUBSPIWP
18	RST^④	I				RST Button
19	3V3	P				3.3V Power Supply
20	GND	G				Ground

[®] A 10K pull-up resistor is fitted.

^④ A 10K pull-up resistor is fitted.

3.2 RF Module Pin Descriptions

This section specifies which RC32 pins are used for various RF module configurations.

3.2.1 HT-RA62A (LoRa)

RC32-L62 is equipped with the HT-RA62A LoRa module. Refer to the schematic for full details: [RC32-L62](#)

SCHEMATIC.

NO.	Name	LoRa Function
1	GPIO23	SPI_CS
2	GPIO22	SPI_MOSI
3	GPIO21	SPI_CLK
4	GPIO20	SPI_MISO
5	GPIO19	DIO1
6	GPIO7	SELECT
7	GPIO8	RESET_N
8	GPIO10	BUSY
9	GPIO11	VEXT_LDO_Ctrl

3.2.2 HT-HC01_V2 (Wi-Fi HaLow)

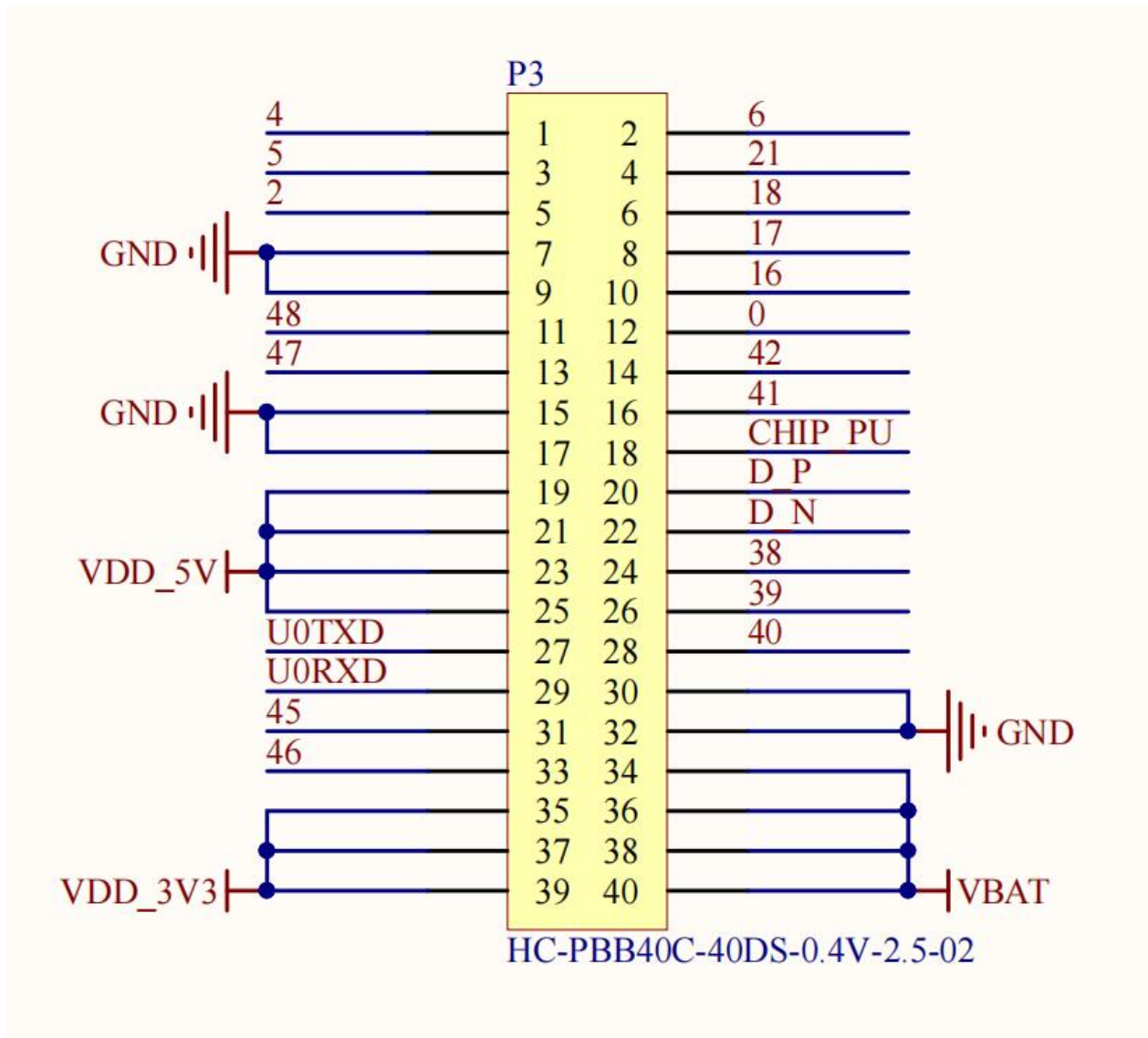
RC32-68 is equipped with the HT-HC02_V2 Wi-Fi HaLow module. Refer to the schematic for full details: [RC32-68](#)

SCHEMATIC.

NO.	Name	LoRa Function
1	GPIO10	SPI_CS
2	GPIO12	SPI_MOSI
3	GPIO13	SPI_CLK
4	GPIO14	SPI_MISO
5	GPIO1	SPI_INT
6	GPIO9	MM_BUSY

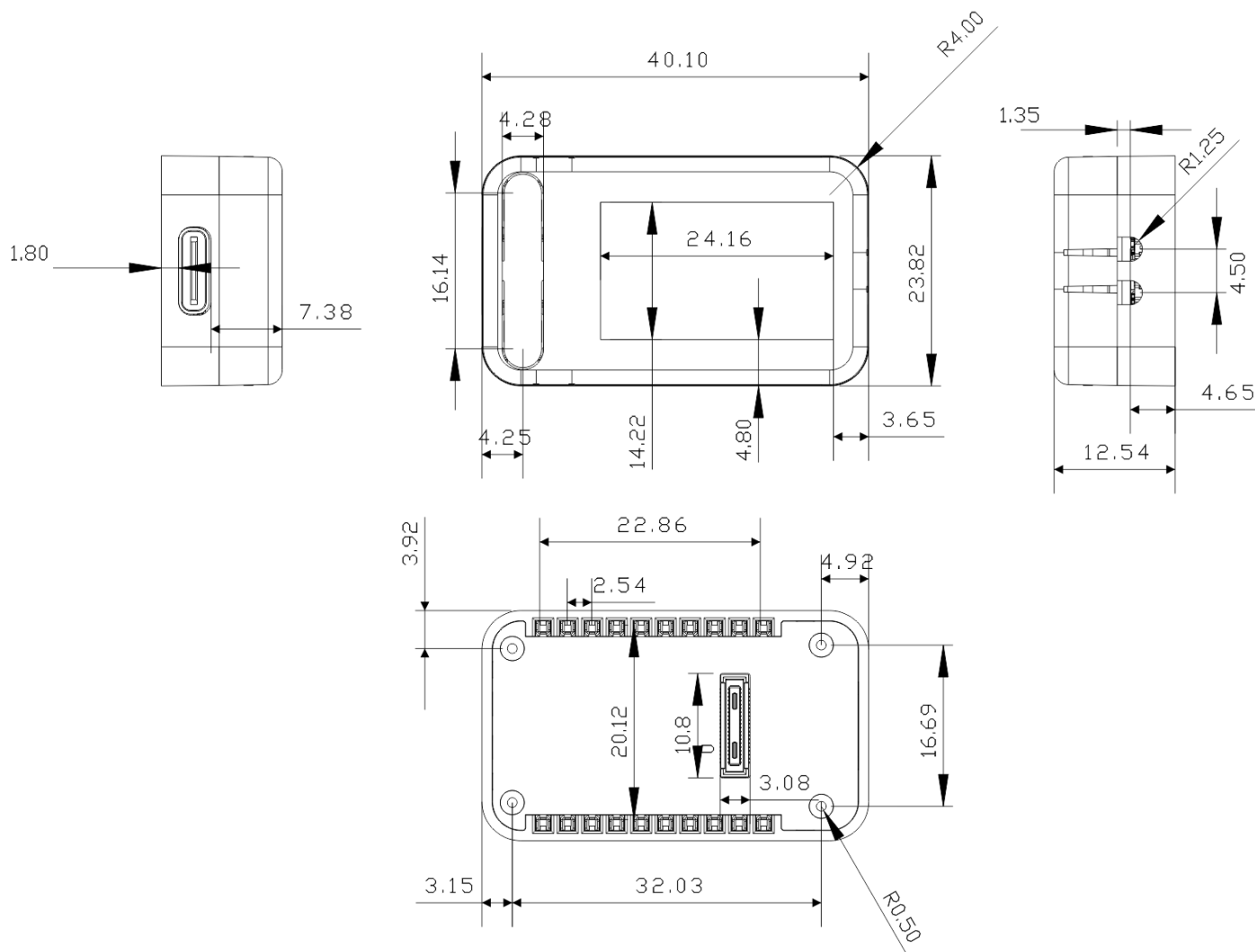
7	GPIO8	MM_RST
8	GPIO3	MM_WAKE
9	GPIO11	HaLow_LDO_Ctrl

3.3 B2B Interface Pin Definition



4. Dimensions

Main device dimensions are listed below; see **outline drawing** for full data.



5. Schematic

- **RC32**
- **RC32-L62(LoRa Module HT-RA62A)**
- **RC32-68(WiFi HaLow Module HT-HC01_V2)**

6. SDK

The device supports all development frameworks built around the ESP32-S3 chip, including ESP-IDF, PlatformIO, Arduino and more. At present, Arduino is the primary officially supported development framework.

6.1 Development Environment (Core Libraries & Board Manager)

- Espressif official ESP32 Arduino core framework
- Heltec ESP32 series boards

6.2 LoRa Library

- Heltec ESP32 expansion library (covering LoRa, sensors, display screens, GPS and other peripherals). *This library relies on either the official Espressif Arduino core or Heltec customized ESP32 development environment.*

6.3 WiFi HaLow Framework and Library

- Heltec ESP32 WiFi HaLow development framework

7. Docs and Resource

- USER Manual(Wiki)
- Resource Download Center
- Official Product Link

8. Heltec Contact Information

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