



RaidoCore Series ESP32-C6

RCC6

Datasheet-Rev1.0.0



Document version

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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 **RCC6**, a model in this series, is equipped with the Espressif **ESP32-C6** 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 RCC6 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 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-S3C6 (Wi-Fi/BLE)
Compatible RF	HT-RA62A (LoRa)
Interface	USB-C; B2B; 2 x 10 Pin Headers
Peripherals	3 x SPI ^① , 2 x UART, 2 x I2C, 1xI2S, 7 x ADC1 ^②
Memory	16MB Flash, 16KB LP SRAM, 512KB HP SRAM, 320KB ROM
Temperature	-30~65℃ ^③
Power Supply	5V-1A(Recommended)
Shell Material	ABS
Dimensions	40.10 x 23.82 x 12.54 mm
Weight	7.2g ^④

① SPI0 and SPI1 are used to drive the Flash. When a LoRa module is installed, SPI2 is utilized for connecting the LoRa module.

② Total 7 ADC pins; only 5 are brought out to external connectors.

③ Plastic housing rated for -30℃ ~ 65℃ operating temperature.

④ RF module not included.

2.2 Power Consumption

Table3.2 Power consumption

Mode	Condition@3.7V-BAT	Typical	Unit
WiFi	TX @16dBm	265	mA
	RX	90	mA
BT	TX @16dBm	255	mA
	RX	80	mA
Sleep		19	μA
LoRa	Refer to the HT-RA62A datasheet for relevant information		

3. Pin Description

This section describes the functions of partial pins on the RC32 module. Refer to the [RCC6 Schematic](#) and the official [ESP32-S3 datasheet](#) for full details.

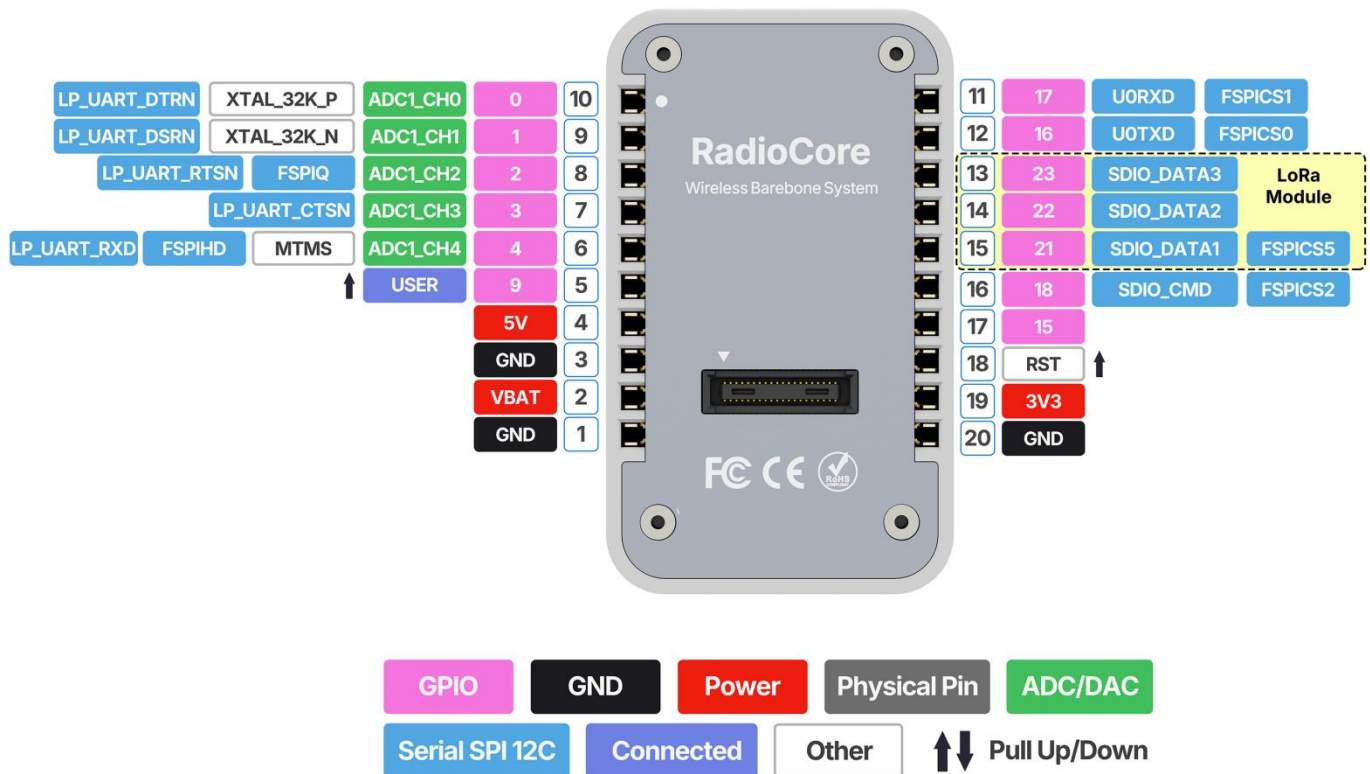
3.1 General Pins (Broken-out Pins)

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. SPI0 and SPI1 are used to drive the Flash. When a LoRa module is installed, SPI2 is utilized for connecting the LoRa module.
- **ADC / DAC**: These pins are the chip's dedicated analog input and analog output channels.

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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

[®] A 10K pull-up resistor is fitted.

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 [®]	I				RST Button
19	3V3	P				3.3V Power Supply
20	GND	G				Ground

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: [RCC6-LoRa](#)

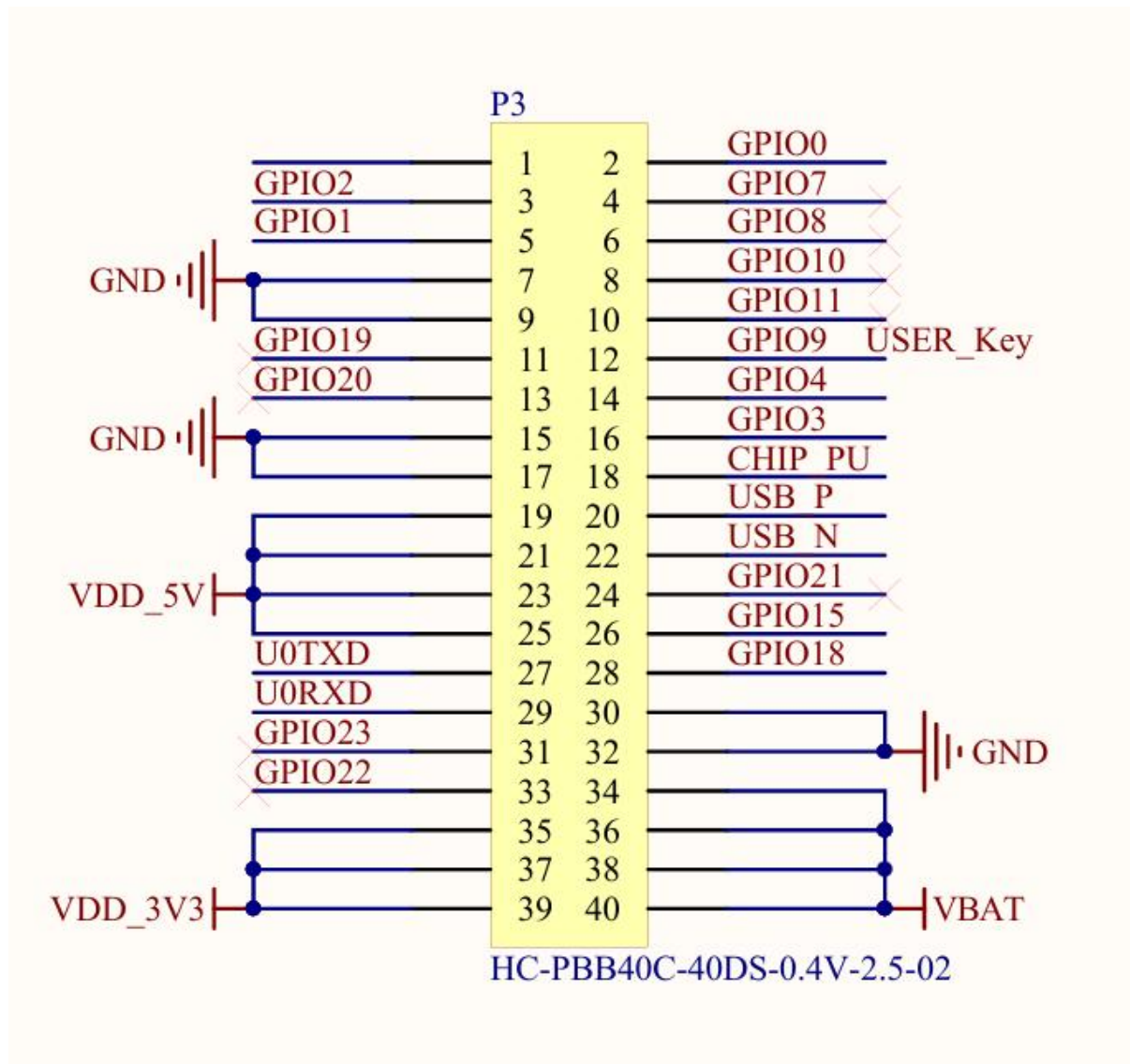
SCHEMATIC.

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

[®] A 10K pull-up resistor is fitted.

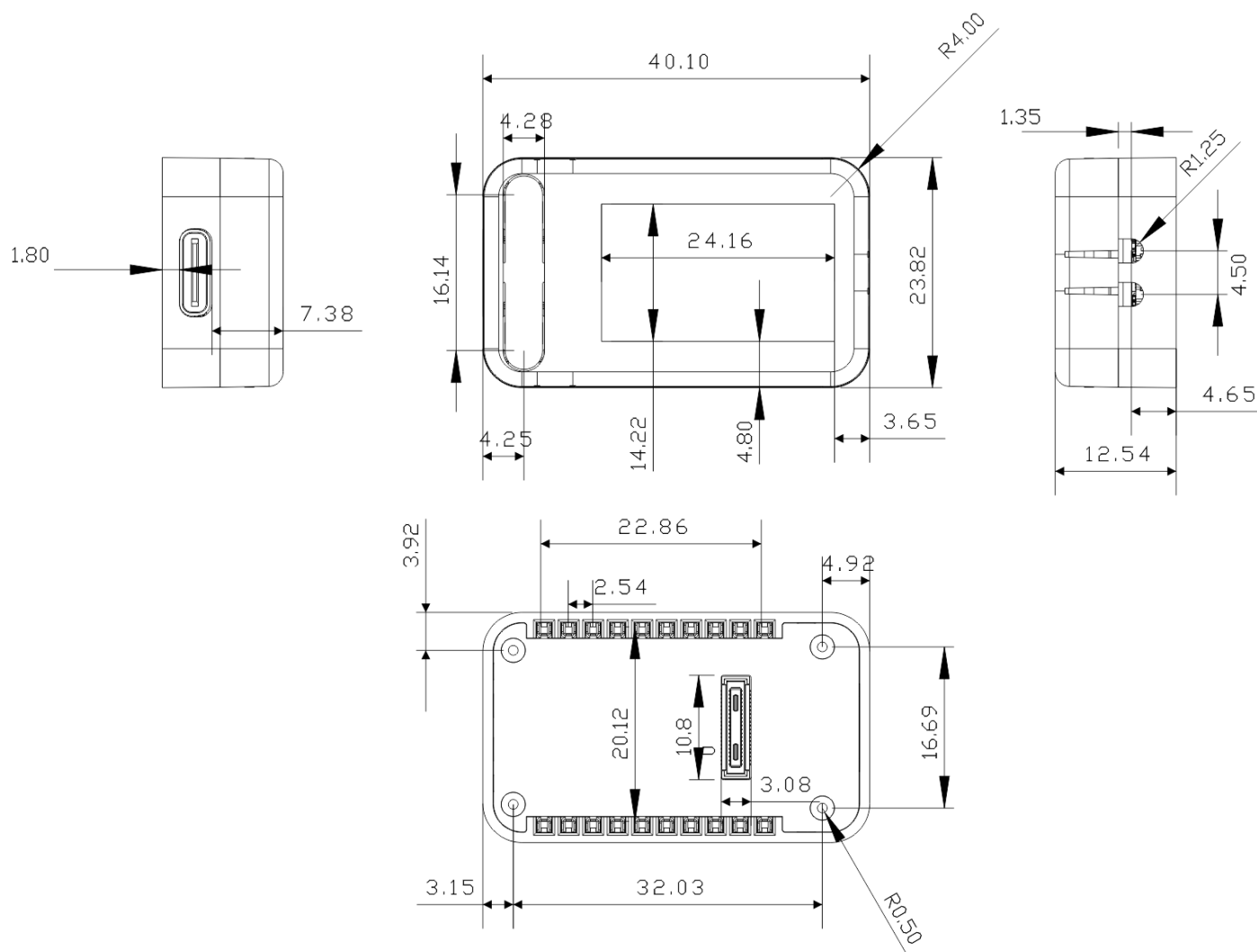
7	GPIO8	RESET_N
8	GPIO10	BUSY
9	GPIO11	VEXT_LDO_Ctrl

3.3 B2B Interface Pin Definition



4. Dimensions

Main device dimensions are listed below; see [outline drawing](#) for full data.



5. Schematic

➤ RCC6

5.1 RCC6-L62(LoRa Module HT-RA62A)

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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