PB-04-Kit Specification

Version V1.0.0

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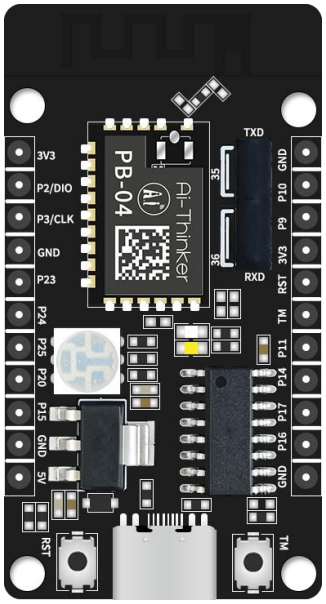

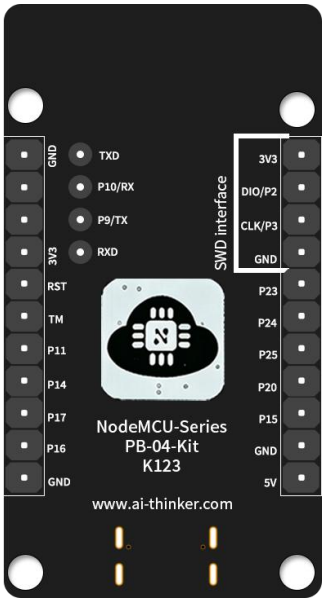

Document Revision History

Version	Date	Description of Changes	Authored by	Approved by
V1.0.0	2026-06-02	First edition	Wu Congcong	Xu Hong

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1 Product Overview

The PB-04-Kit is a development board designed for the PB-04 module. The module uses the PHY6222 chip as its core processor. The PHY6222 supports BLE 5.4 and is equipped with a high-performance, low-power 32-bit processor, featuring ultra-low power consumption, high performance, and multi-mode radio capability. In addition, the PHY6222 supports secure Bluetooth Low Energy (BLE), applications, and over-the-air (OTA) updates.

The PB-04-Kit provides a rich set of peripheral interfaces, including SPI, UART, I2C, PWM, ADC, Timer, DMIC/AMIC, GPIO, and others. It can be widely applied in fields such as the Internet of Things (IoT), mobile devices, wearable electronics, and smart home systems.

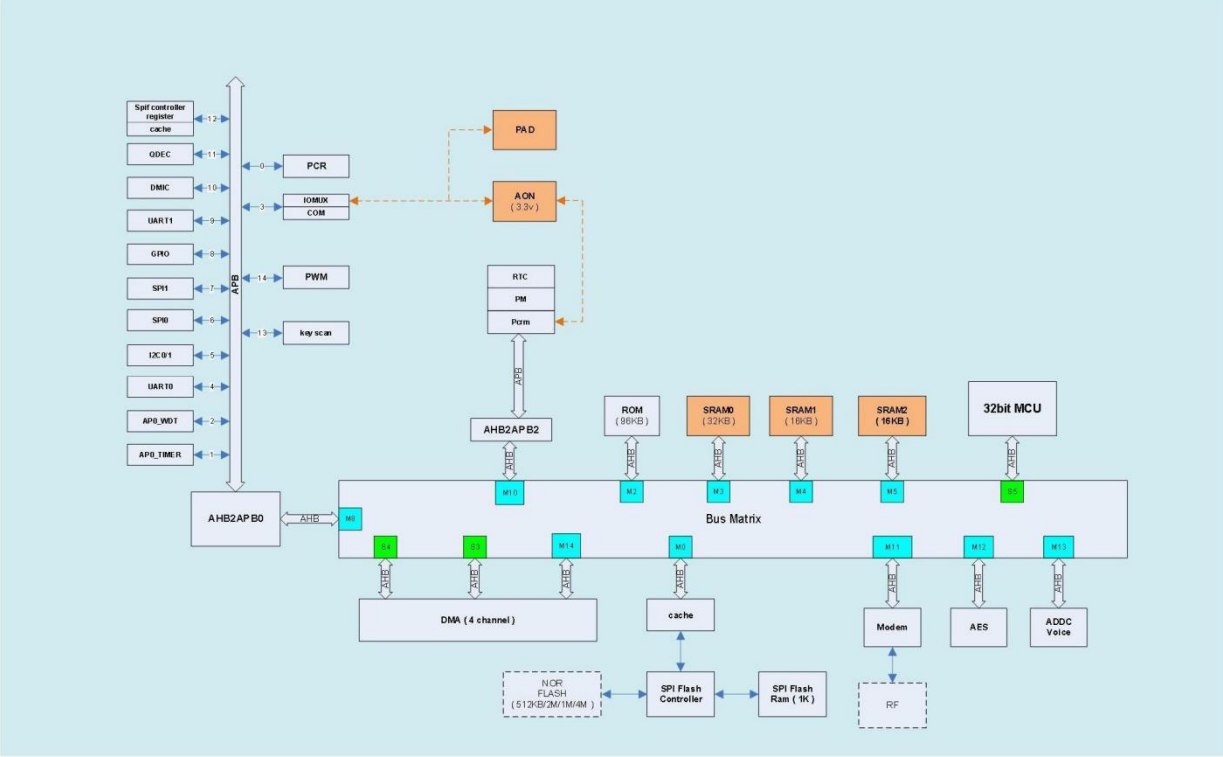

Figure 1 Main Chip Architecture Diagram

1.1 Features

Wireless

- Supports Bluetooth BLE5.4 link controller
- -95dBm sensitivity@1Mbps GFSK
- -92dBm sensitivity@2Mbps GFSK
- TX Power -20 to +5dBm
- RSSI (1dB Resolution)

Microcontroller Subsystem

- High-performance, low-power 32-bit processor
- SWD interface

Memory

- eFuse: 256-bit
- SRAM: 64KB
- Serial Flash: 128KB–8MB
- 96KB ROM

Clock

- 16MHz & 32.768kHz external crystal oscillators
- 32MHz & 32.768kHz internal RC oscillators

Security

- Supports AES-128 bit

Software

- Compatible with Bluetooth 5.4
- Supported data rates: 1Mbps and 2Mbps (BLE)
- Support SIG-Mesh multifunction features
- Supports OTA

Peripherals

- Supports SPI, UART, I2C, PWM, ADC, GPIO, Timer, DMIC/AMIC, etc.

Package Type

- Adopts DIP-22 package

Development Environment

- Supports secondary development; integrated Windows development environment

1.2 Applications

- Smart Home
- Industrial Equipment Interaction
- Wearable Electronic Devices
- Internet of Things (IoT)
- Mobile Devices

2 Main Parameters

Table 1 Main Parameter Specification

Model	PB-04-Kit
Applicable Module	PB-04
Package	DIP-22 (2.54mm pitch standard pin header)
Dimensions	48.0*25.4 (mm)
Antenna Type	On-board antenna
Frequency Range	2400–2483.5 MHz
Operating Temperature	-40–85℃
Storage Conditions	-40–125℃, <90% RH
Power Supply Range	Supply voltage: 3.3V or 5V; supply current ≥100mA
Supported Interfaces	SPI, UART, I2C, PWM, ADC, Timer, SWD, DMIC/AMIC, GPIO etc.
Available I/Os	13 (default)
UART Baud Rate	115200bps (default)
Security	AES-128 encryption hardware
Flash	512KB (default), up to 8MB

2.1 Power Supply Options

The PB-04-Kit supports three power supply options:

- Type-C interface (recommended)
- 5V and GND pin header
- 3V3 and GND pin header

3 Electrical Characteristics

3.1 Recommended Operating Conditions

Table 2 Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VDD	Supply Voltage	3.3	5	5.3	V
I	Supply Current	100	-	-	mA

3.2 I/O DC Electrical Characteristics

Table 3 I/O DC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
VIH	High-level Input Voltage	2.4	-	-	V
VIL	Low-level Input Voltage	-	-	0.5	V
VOH	High-level Output Voltage	2.5	-	-	V
VOL	Low-level Output Voltage	-	-	0.5	V
Imax	I/O Maximum Operating Current	-	-	10	mA

3.3 Electrostatic Discharge

The PB-04-Kit is an ESD-sensitive device and requires special precautions during handling.

Figure 2 ESD Protection Symbol

3.4 BLE RF Performance

Table 4 BLE RF Performance

Description	Typ			Unit
Frequency Range	2400–2483.5			MHz
Output Power				
Data Rate Mode	**Min**	**Typ**	**Max**	**Unit**
1Mbps	-	5	-	dBm
2Mbps	-	5	-	dBm
Receiver Sensitivity				
Data Rate Mode	**Min**	**Typ**	**Max**	**Unit**
1Mbps Sensitivity @ 30.8% PER	-	-95	-	dBm
2Mbps Sensitivity @ 30.8% PER	-	-92	-	dBm

3.5 Power Consumption

The following power consumption data are measured based on a 3.3V power supply and an ambient temperature of 25℃.

- The POUT power for all transmit modes is measured at the antenna interface.
- All transmission data are measured at 100% duty cycle in continuous transmit mode.

Table 5 Power Consumption

Mode	Min	Avg	Max	Unit
TX PHY=1M, PRBS9, Pout = 5dBm	-	9	-	mA
TX PHY=2M, PRBS9, Pout = 5dBm	-	6	-	mA
RX PHY= 1M, Packet Length 1024 bytes	-	6	-	mA
RX PHY= 2M, Packet Length 1024 bytes	-	6	-	mA

4 Mechanical Specifications

4.1 Development Board Dimensions

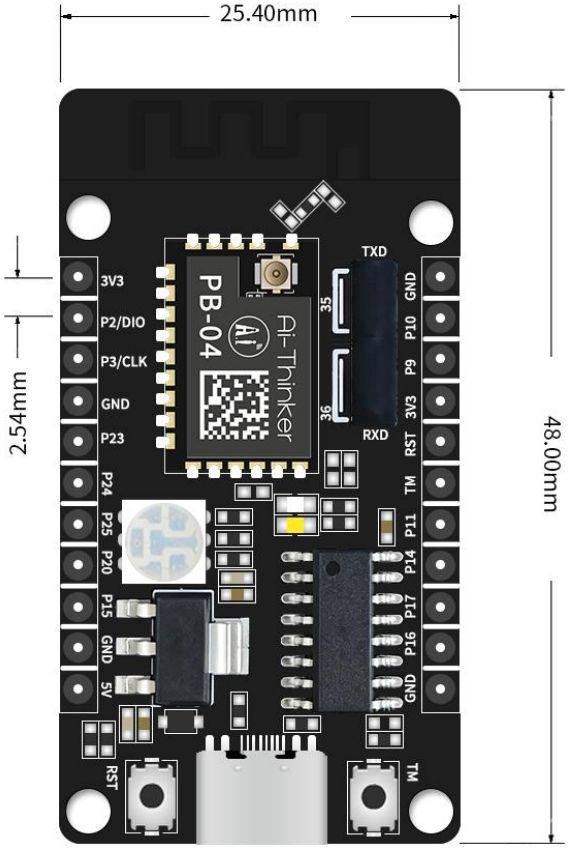

Figure 3 PB-04-Kit Dimension Diagram

5 LED Indicator and Button Description

The PB-04-Kit has three LED indicators, namely an RGB LED, a yellow LED, and a white LED. Two buttons are provided: the RST button, located on the left, and the TM button, located on the right, as shown in the figure below.

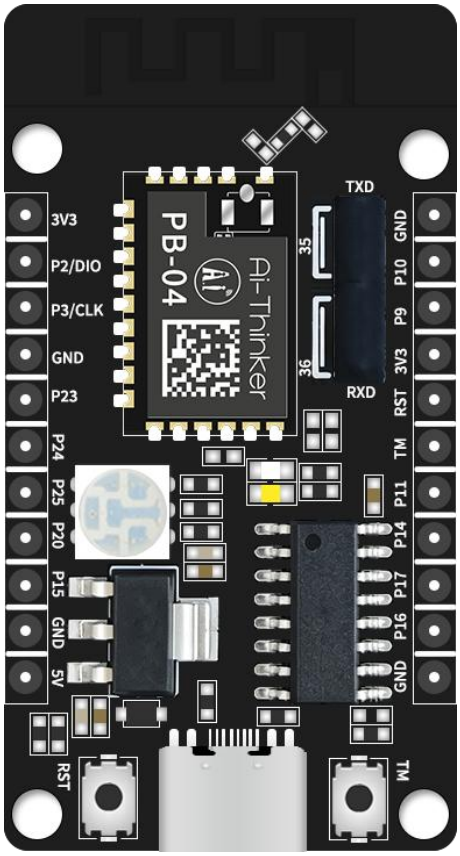

Figure 4 PB-04-Kit LED Indicator and Button Location

Table 6 LED Indicator Status and Button Functions

LED Indicator/ Button	LED Indicator Status / Button Function	Note
RGB LED	Red LED, P23 pin	/
	Green LED, P24 pin	/
	Blue LED, P25 pin	/
White LED	Cool white LED, P16 pin	/
Yellow LED	Warm yellow LED, P17 pin	/
TM Button	Flashing mode button	Hold down TM and then press RST to enter flashing mode. Release TM and press RST to enter program mode.
RST Button	Reset button	/

6 Pin Definition

The PB-04-Kit exposes a total of 22 pins, as shown in the pin diagram. The pin function definition table provides the detailed interface specifications.

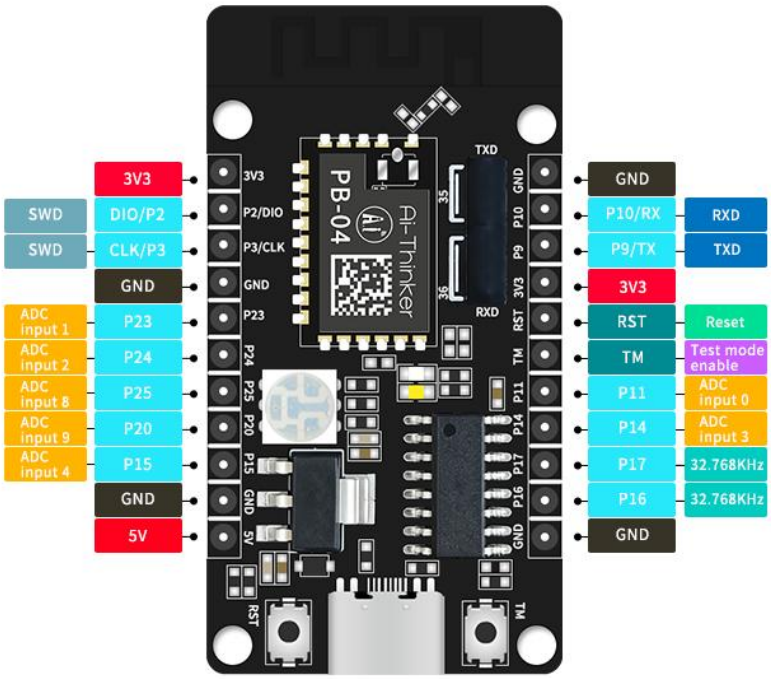

Figure 5 PB-04-Kit Pin Diagram (Top View)

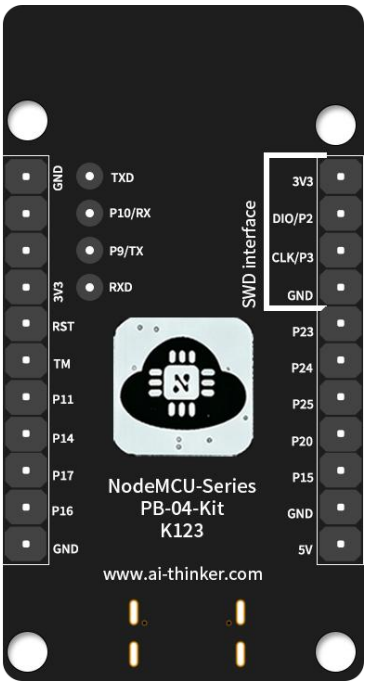

Figure 6 PB-04-Kit Pin Diagram (Bottom View)

Table 7 Pin Function Definition

No.	Name	Function
1	3V3	3.3V power supply
2	DIO / P2	GPIO 2 / SWD debug data input/output port
3	CLK / P3	GPIO 3 / SWD debug clock port
4	GND	Ground
5	P23	GPIO 23 / ADC input 1 / Micbias output reference
6	P24	GPIO 24 / ADC input 2
7	P25	GPIO 25 / ADC Input 8
8	P20	GPIO 20 / ADC input 9 / PGA positive input
9	P15	GPIO 15 / ADC input 4 / Micbias output
10	GND	Ground
11	5V	5V power supply
12	GND	Ground
13	P16	GPIO16 / 32.768kHz crystal input
14	P17	GPIO17 / 32.768kHz crystal output
15	P14	GPIO 14 / ADC input 3
16	P11	GPIO 11 / ADC input 0
17	TM	Test mode enable
18	RST	Reset, active low
19	3V3	3.3V power supply
20	P9 / TX	TXD / GPIO 9
21	P10 / RX	RXD / GPIO 10
22	GND	Ground

Note: 1. The bottom test point is the TM pin, which functions as the Test Mode Enable pin. When TM is pulled high and RST is reset, the module enters download mode. If the pin is high at the moment of power-on, the module enters flashing mode. If the pin is low at the moment of power-on, the module boots normally.

7 Schematic Diagram

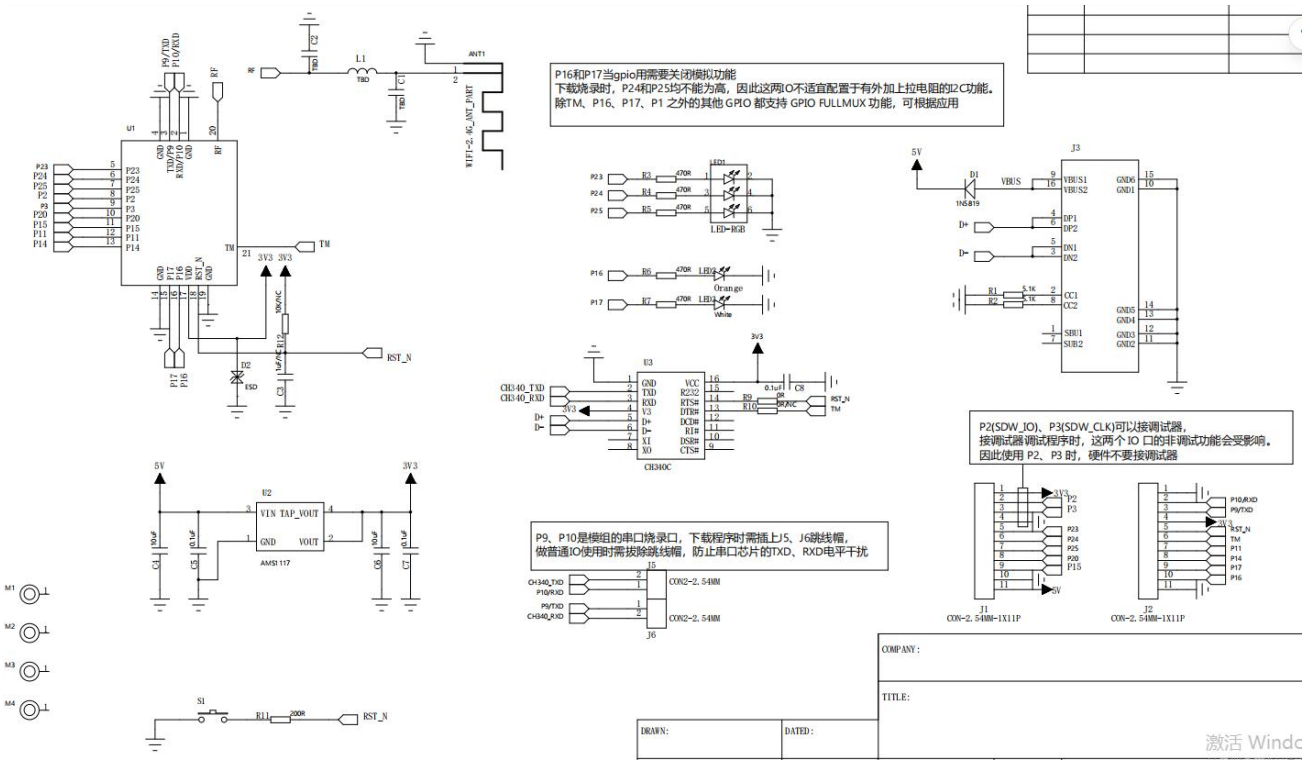

Figure 7 Schematic Diagram

8 Packaging Information

Table 8 Packaging Information

Packing List	Packaging Method	Quantity per Bag (ESD Bag)	Quantity per Bag (Sealed Bag)
PB-04-Kit	Foam + ESD bag	1pcs	20pcs

9 Contact Information

Official Website Official Forum Development DOCS LinkedIn

Tmall Store Taobao Store Alibaba Store

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Domestic Business Cooperation: sales@aithinker.com

Oversea Business Cooperation: overseas@aithinker.com

Company Address: Room 403–405, 408–410, Building C, Huafeng Smart Innovation Port, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China

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