

PDDAXLQUE DX-BT24-SET

PDDAXLQUE DX-BT24-SET Ultra-Low Power BLE 5.1 Bluetooth Module User Manual

1. INTRODUCTION

The PDDAXLQUE DX-BT24-SET is an ultra-low power Bluetooth Low Energy (BLE) 5.1 module designed for various applications requiring wireless communication. This module, based on the DA14531 chip, offers a long communication range of up to 90 meters and supports serial communication data transfer at speeds up to 10K Bytes/s. Its compact size and low power consumption make it suitable for battery-powered devices and embedded systems. This manual provides detailed instructions for setting up, operating, and troubleshooting your DX-BT24-SET module.

Key Features:

- Renesas DA14531 & BLE 5.1
- Communication Distance: 90m
- Serial communication data transfer
- Abundant AT commands for configuration
- Transmission rate: 10K Byte/s
- Power consumption as low as 2 μ A (hibernation)
- Optional on-board or external antenna
- Module Size: 37.5(L) x 15.7(W) x 4.0(H) mm
- Transmit Power: -19.5 ~ +2.5dBm
- Working temperature: -40 ~ +85°C
- Shield Protection: Antistatic & Dustproof
- Supports PC, iOS, Android transmission
- BQB, CE, FCC, IC, SRCC, ROHS certified

2. SAFETY INFORMATION

Please read and understand the following safety precautions before using the DX-BT24-SET module:

- Ensure proper voltage supply (3.3V) to prevent damage to the module.

- Handle the module with care to avoid electrostatic discharge (ESD) damage.
- Do not expose the module to extreme temperatures, humidity, or corrosive environments.
- Observe correct polarity when connecting power and data lines.
- This module is intended for integration into other devices. Ensure the final product complies with all relevant regulations.

3. PACKAGE CONTENTS

The DX-BT24-SET package typically includes the following components:

- 1x DX-BT24 Bluetooth Module
- 1x USB to TTL Adapter Board (for development kit)
- 1x USB Cable (for development kit)

BT24 Developer Package

Suggestion: For first-time use, it is recommended that you purchase a developer toolkit, which can help you quickly test and validate your product.

The product package contains:



BT24-A x1



USB to TTL
Adapter Board x1



USB Cable x1

▼ Example wiring diagram



Image 3.1: Contents of the DX-BT24-SET Developer Package, showing the BT24 module, a USB to TTL adapter board, and a USB cable.

4. PRODUCT OVERVIEW

The DX-BT24 module is a compact and efficient solution for integrating BLE 5.1 connectivity into your projects. It features a robust design with an RF shielding cover for strong anti-interference and EMC compatibility. The module supports both onboard and external antenna options.

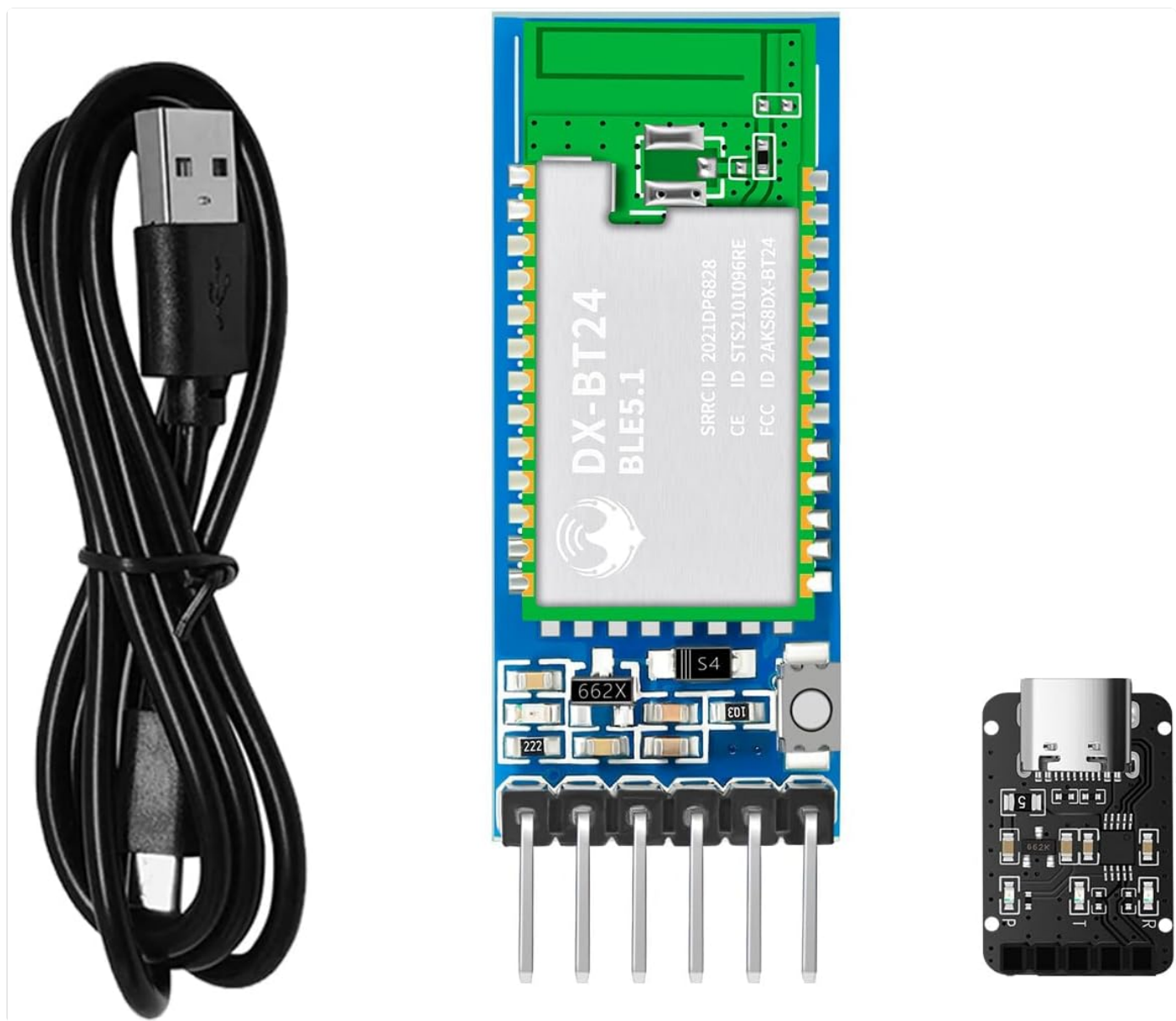


Image 4.1: The DX-BT24-SET Bluetooth module, shown alongside a USB cable and a USB to TTL adapter board, illustrating the complete set.

5. SETUP AND PINOUT

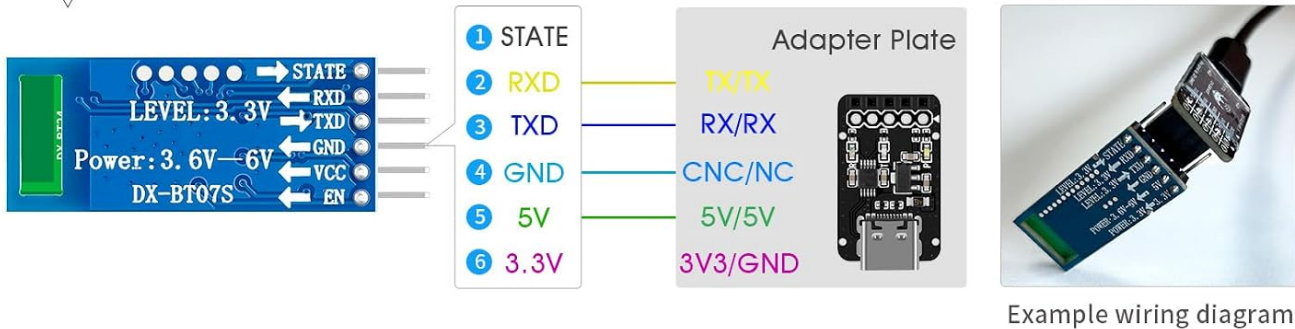
The DX-BT24 module communicates via a UART serial port. Understanding the pinout is crucial for correct integration.

5.1 Pin Description

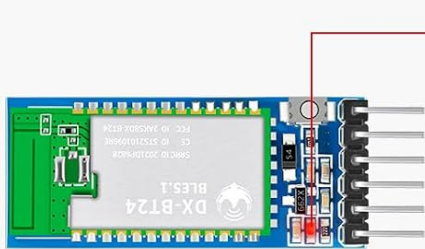
BT24 development kit demonstration

⚠ Note: It is recommended that you purchase the developer kit for the first time to facilitate quick product validation and testing.

BT24 Backplane Pinout



- 1 LINK-STATUS-Status Indicator Pin
High - Connected
Low - not connected
- 2 RXD
- 3 TXD
- 4 GND
- 5 Power supply 5V
- 6 Power supply 3.3V



* Please note

Button: Low Power Mode - Wake Up;
Normal Operating Mode - Disconnect

Lamp Status:
-Not connected: 1s high 1s low
-Connected: 3s high 50ms low
-Low Power/Hibernation Mode: Always Low

Image 5.1: Detailed pinout diagram for the DX-BT24 module and an example wiring diagram connecting it to an adapter plate. The module features the following pins:

- **STATE:** Link status indicator pin. High indicates connected, Low indicates not connected.
- **RXD:** Receive Data pin for UART communication.
- **TXD:** Transmit Data pin for UART communication.
- **GND:** Ground connection.
- **5V:** 5V power supply input (typically for adapter board, module itself uses 3.3V).
- **3.3V:** 3.3V power supply input for the module.

5.2 Wiring Example

When using the development kit, connect the DX-BT24 module to the USB to TTL adapter board as follows:

1. Connect the **RXD** pin of the DX-BT24 module to the **TXD** pin of the adapter board.
2. Connect the **TXD** pin of the DX-BT24 module to the **RXD** pin of the adapter board.

3. Connect the **GND** pin of the DX-BT24 module to the **GND** pin of the adapter board.
4. Connect the **3.3V** pin of the DX-BT24 module to the **3.3V** output of the adapter board.
5. Connect the USB cable from the adapter board to your computer.

Note on LED Status:

- **Not connected:** 1s high, 1s low.
- **Connected:** 3s high, 50ms low.
- **Low Power/Hibernation Mode:** Always Low.

6. OPERATING INSTRUCTIONS

The DX-BT24 module facilitates communication between devices via its UART serial port and the BLE protocol.

6.1 Serial Communication

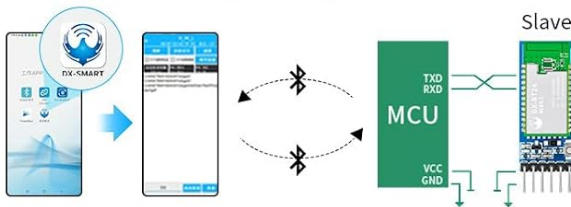
The module supports multiple serial port baud rates: 2400, 9600, 19200, 38400, 57200, 115200. The serial port transmission speed can reach up to 10K Bytes/s.

Application of direct serial communication

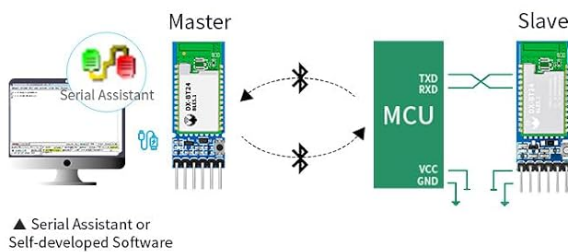
- BT24 module can be connected to communicate with phone, computers, devices.

1. The phone APP communicates with each other and the device through the Bluetooth module:

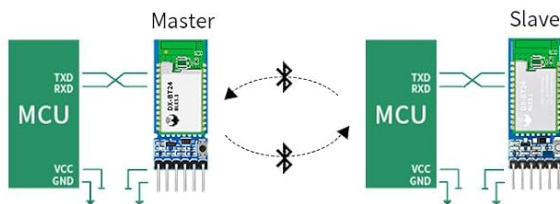
▼ DX-SMART APP or self-developed APP



2. The computer software communicates with the device through the Bluetooth module:



3. Devices communicate with each other via Bluetooth module:

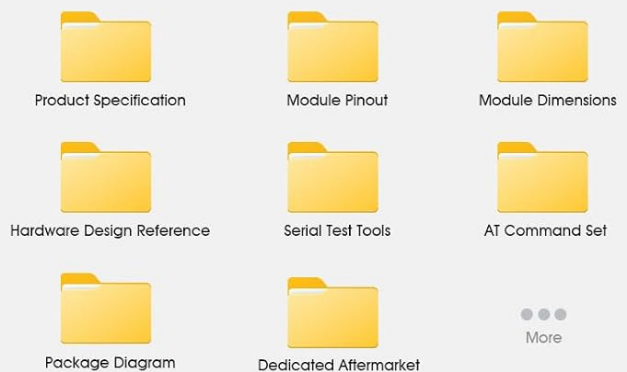


AT command set

AT command	Command description
AT+VERSION	Query version number
AT+LADDR	Query MAC Address
AT+NAME	Query Bluetooth Name
AT+NAME<name>	Setting Bluetooth Name
AT+NAMAC	Query Bluetooth Parameters
AT+NAMAC<param>	Setting Bluetooth Parameters
AT+STOP	Query Serial Stop Bit
AT+STOP<param>	Setting the Serial Stop Bit
AT+PARI	Query serial port parity bit
For more AT commands, please consult the product information packages.	

Professional technical documentation

Professional documentation can help you use the module more easily and conveniently.



💡 If you need more details, please feel free to contact us.

Image 6.1: Diagrams illustrating various serial communication applications: phone to module, computer to module, and module to module. **Communication Scenarios:**

1. **Phone APP to Bluetooth Module:** Use a dedicated mobile application (e.g., DX-SMART APP or a self-developed APP) to search for and connect to the DX-BT24 module. Data is then exchanged via the BLE connection.
2. **Computer Software to Bluetooth Module:** Connect the module to a computer via a USB to TTL adapter. Use serial port software (e.g., Serial Assistant or custom software) to communicate with the module.
3. **Module to Module Communication:** Two DX-BT24 modules can communicate directly with each other, with one configured as a master and the other as a slave.

Important Note: The DX-BT24 Bluetooth module supports the BLE protocol. It cannot be directly searched and connected by a phone's native Bluetooth settings or a computer's standard Bluetooth interface. You must use a specific application (either your own developed APP or a test APP provided by the manufacturer) to establish a connection. For computer connectivity, a master module or a CP11 adapter is required to interface with serial port software.

7. AT COMMANDS

The DX-BT24 module features a comprehensive set of AT commands for configuration and control. These commands allow you to query and set various parameters of the module without needing to develop complex Bluetooth firmware.

7.1 Common AT Commands

AT Command	Command Description
AT+VERSION	Query version number
AT+LADDR	Query MAC Address
AT+NAME	Query Bluetooth Name
AT+NAME<name>	Setting Bluetooth Name
AT+NAMAC	Query Bluetooth Parameters
AT+NAMAC <param>	Setting Bluetooth Parameters
AT+STOP	Query Serial Stop Bit
AT+STOP <param>	Setting the Serial Stop Bit
AT+PARI	Query serial port parity bit

For a complete list of AT commands and their detailed usage, please refer to the official product information packages and technical documentation provided by the manufacturer.

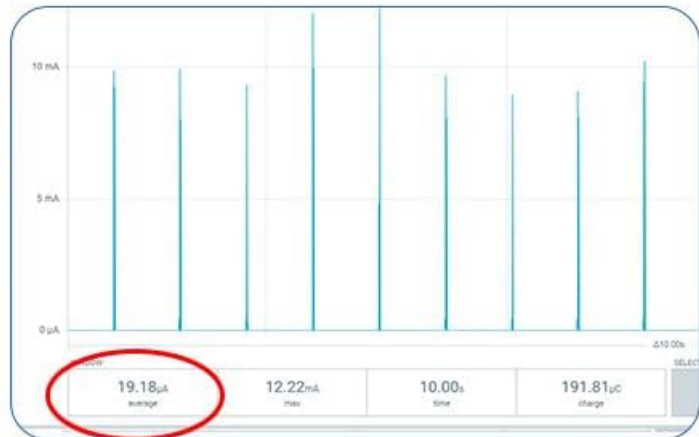
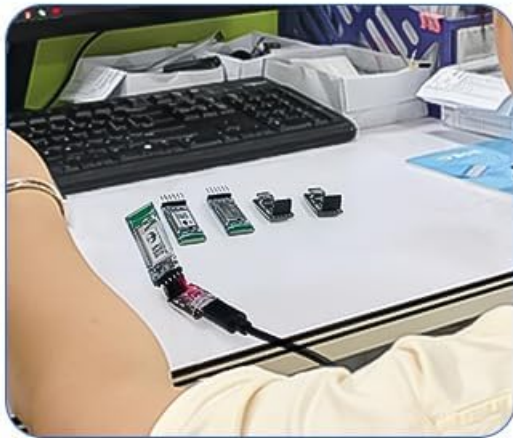
8. POWER CONSUMPTION

The DX-BT24 module is designed for ultra-low power operation, making it ideal for battery-powered applications. It features different power modes to optimize energy usage.

LOW POWER

Hibernation mode:2uA

Low power mode:19uA



Paradigm	Statuses	Voltage	Unit
Hibernation mode	-	2	uA
Low power mode	Unconnected	19	uA
	Connected	341	uA
Normal Operating Mode	Unconnected	299	uA
	Connected	347	uA
Transmission of data	Connected	MIN:341uA MAX:606uA	MIN is the power consumption when no data is sent MAX is the power consumption when the module sends 10626bytes/s

The results of testing using a professional low-power Bluetooth device

Note: The test results are derived from laboratory data, the specific values are subject to actual measurement.

Image 8.1: Graph and table detailing the power consumption of the DX-BT24 module in various operating modes, including hibernation and data transmission.

Power Consumption Overview:

- **Hibernation mode:** As low as 2 μ A.
- **Low power mode (unconnected):** Approximately 19 μ A.
- **Normal Operating Mode (connected, idle):** Around 341 μ A.
- **Data Transmission (connected):** Minimum 341 μ A, Maximum 606 μ A (at 10626 bytes/s).

These figures are derived from laboratory data and are subject to actual measurement conditions.

9. SPECIFICATIONS

Feature	Specification
Model Number	DX-BT24-SET
Bluetooth Version	BLE 5.1

Feature	Specification
Chipset	DA14531
Communication Range	Up to 90 meters
Data Transfer Rate	Up to 10K Bytes/s (serial port)
Operating Voltage	3.3V
Power Consumption (Hibernation)	As low as 2 μ A
Power Consumption (Working)	As low as 19 μ A (unconnected)
Module Dimensions (L x W x H)	37.5 x 15.7 x 4.0 mm
Transmit Power	-19.5 ~ +2.5dBm
Operating Temperature	-40°C to +85°C
Hardware Interface	Bluetooth, UART
Compatible Devices	Laptop, Smartphone (via APP)
Certifications	BQB, CE, FCC, IC, SRCC, ROHS

10. TROUBLESHOOTING

If you encounter issues with your DX-BT24-SET module, consider the following common troubleshooting steps:

- **Module not powering on:** Verify power supply connections and ensure the correct 3.3V voltage is applied.
- **Cannot connect via phone/computer:** Remember that the DX-BT24 uses BLE and requires a specific application (not native Bluetooth settings) for connection. For computers, a master module or CP11 adapter is needed.
- **No data transmission:** Check UART wiring (RXD to TXD, TXD to RXD), baud rate settings, and ensure the module is in a connected state (STATE LED indicator).
- **AT commands not responding:** Ensure the module is in command mode (if applicable, refer to full AT command documentation) and that serial communication settings (baud rate, parity, stop bits) are correct.
- **Short communication range:** Check for environmental interference or obstructions. Ensure the antenna is properly connected (if using an external antenna).

11. WARRANTY AND SUPPORT

PDDAXLQUE provides comprehensive technical support for the DX-BT24-SET module. As a manufacturer, we support OEM and ODM services.

If you encounter any problems or require assistance, please contact our service support team. You can typically find contact information through the User Guide or Product Information sections on our official channels.

We recommend consulting the complete technical documentation, AT command sets, module footprints, reference design schematics, and development/test tools available to facilitate quick product development and verification.

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question