

PDDAXLQUE DX-BT24-T

PDDAXLQUE DX-BT24-T Bluetooth Module User Manual

Model: DX-BT24-T

1. INTRODUCTION

The PDDAXLQUE DX-BT24-T is an ultra-small, low-power Bluetooth module designed for various applications requiring wireless communication. It features the DA14531 BLE 5.1 chip, offering a communication range of up to 45 meters and a serial port transmission speed of up to 10K Bytes/s. This module supports UART serial communication and can be configured using AT commands, simplifying integration into your projects. Its ultra-low power consumption makes it suitable for battery-powered devices.

2. KEY FEATURES

- Ultra Mini Size
- Renesas DA14531 & BLE 5.1
- Communication Distance: 45m (open environment)
- Serial communication data transfer
- Abundant AT commands for configuration
- Transmission rate: Up to 10K Bytes/s
- Power consumption: As low as 2 μ A (hibernation), 19 μ A (working)
- Ceramic Antenna
- Module Size: 8.3(L) x 7.6(W) x 2.1(H) mm
- Transmit Power: -19.5 ~ +2.5dBm
- Working temperature: -40 ~ +85°C
- Complete developer profile
- Shield Protection: Antistatic & Dustproof
- Supports PC, iOS, Android transmission
- Certifications: CE, FCC, BQB, IC, SRCC, ROHS

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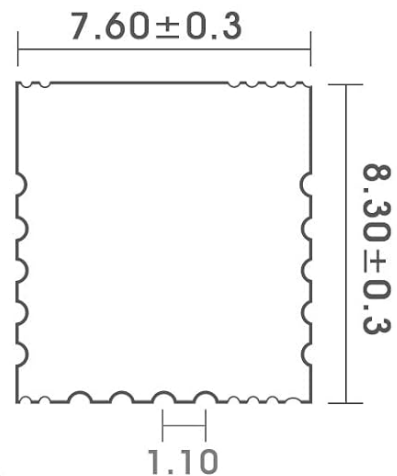


Figure 2.1: DX-BT24-T Key Features and Dimensions. This image highlights the module's compact size, BLE 5.1 capability, communication range, data transfer rate, and power efficiency, along with its physical dimensions.

3. PRODUCT OVERVIEW

The DX-BT24-T is the smallest module in the BT24 series, designed for applications where space is critical. It integrates a ceramic antenna and offers robust performance within its compact form factor.

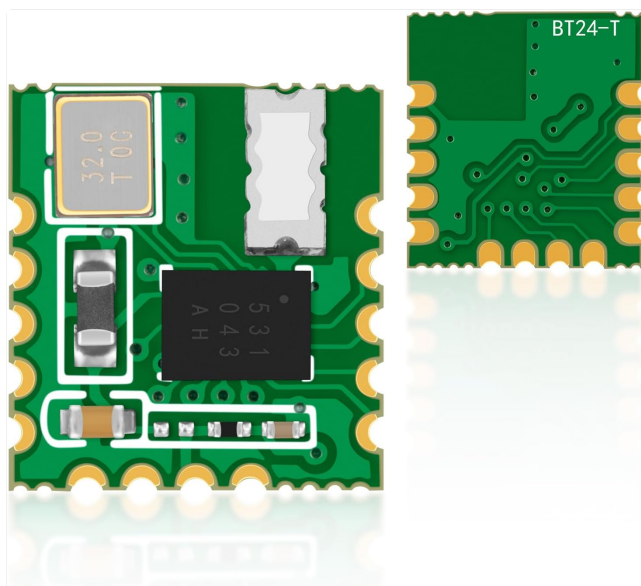


Figure 3.1: Top and bottom view of the DX-BT24-T module, showcasing its compact design and pin layout.

Ultra Mini Size

- Low-power BLE 5.1
- 10KB/s high-speed transparent transmission
- 45 meter stable transmission

Ultra small volume 7.6mm × 8.3mm

Figure 3.2: The DX-BT24-T module demonstrating its ultra-miniature size, highlighting its suitability for space-constrained designs.

3.1. BT24 Series Comparison

The DX-BT24 series offers various models with different form factors and communication ranges. The DX-BT24-T is the smallest, with a 45m communication distance.

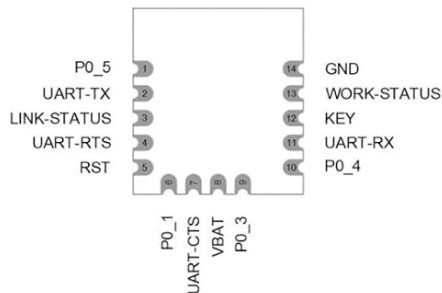
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Video 3.1: Overview of the DX-BT24 Low-power Bluetooth Module series, showcasing different sizes and their respective communication distances. This video provides a visual comparison of the DX-BT24-A, DX-BT24-SMD, DX-BT24-S, and DX-BT24-T models.

4. PIN DEFINITIONS

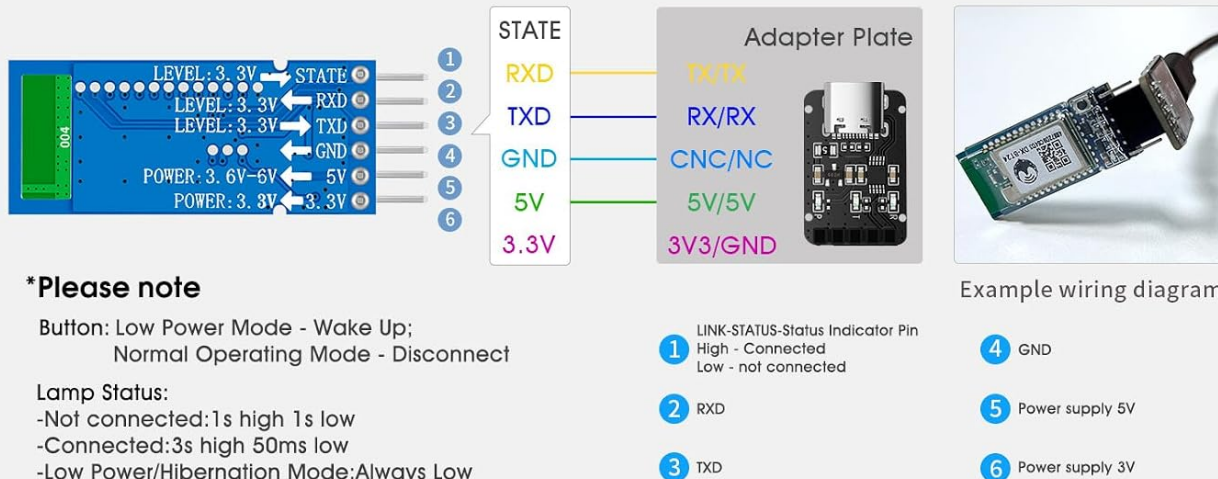
Understanding the pin definitions is crucial for proper integration and operation of the DX-BT24-T module. The table below outlines each pin's number, name, and function.

Module Pin Definitions



Pin number	Pin name	Pin function	illustrate
1	P0_5	Programmable input/output line	—
2	UART-TX	Serial data output	—
3	LINK-STATUS	Bluetooth connection status pin	Not connected: Output low level Connection Status: Output high level
4	UART-RTS	UART request to send, active low	—
5	RST	Reset	—
6	P0_1	Wake up from hibernation mode	Reference Technical Manual
7	UART-CTS	UART clear to send, active low	—
8	VBAT	Power input pin	3.3V(Typical value)
9	P0_3	Programmable input/output line	—
10	P0_4	Programmable input/output line	—
11	UART-RX	Serial data input	—
12	KEY	Disconnect pin Low power mode wake up Enter pairing mode	Reference Technical Manual
13	WORK-STATUS	Module working status pin	Not connected: 1s high 1s low Connection Status: 3s high 50ms low Always low in low power consumption & hibernation mode
14	GND	Power Ground	—

BT24 development kit demonstration



It is recommended that you purchase the developer kit for the first time to facilitate quick product validation & testing.

Figure 4.1: Module Pin Definitions and Development Kit Demonstration. This image details the function of each pin on the BT24 module and provides an example wiring diagram for a development kit, including power and communication lines.

4.1. Pin Function Table

Pin Number	Pin Name	Pin Function
1	P0_5	Programmable input/output line
2	UART-TX	Serial data output
3	LINK-STATUS	Bluetooth connection status pin (Not connected: Output low level; Connection Status: 3s high 50ms low)
4	UART-RTS	UART request to send, active low
5	RST	Reset

Pin Number	Pin Name	Pin Function
6	WORK-STATUS	Module working status pin (Not connected: 1s high 1s low; Connected: 3s high 50ms low; Low Power/Hibernation Mode: Always Low)
7	UART-CTS	UART clear to send, active low
8	VBAT	Power input pin (3.3V typical)
9	P0_3	Programmable input/output line
10	UART-RX	Serial data input
11	P0_4	Programmable input/output line
12	KEY	Low power mode wake up / Enter pairing mode
13	GND	Power Ground

Note: For detailed information on specific pin functions and advanced usage, refer to the complete technical documentation.

5. SETUP AND OPERATION

5.1. Serial Communication

The DX-BT24-T module communicates via UART serial port. This allows for data exchange with microcontrollers, computers, or other Bluetooth-enabled devices.

- Phone APP Communication:** The module can communicate with a mobile phone using a dedicated APP (e.g., DX-SMART APP or a self-developed application). This enables control and monitoring of your device via Bluetooth.
- Computer Software Communication:** For communication with a computer, a master module or CP11 adapter is required to connect the DX-BT24-T to the computer's serial port software. Direct connection to a computer's built-in Bluetooth is not supported for BLE protocol.
- Device-to-Device Communication:** Two DX-BT24 modules can communicate with each other, typically with one configured as a master and the other as a slave.

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.

5.2. AT Command Set

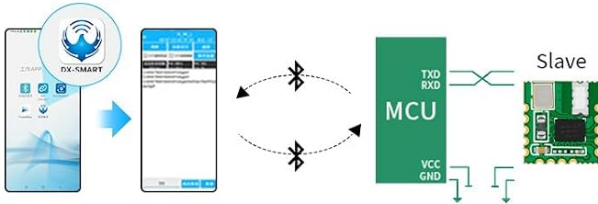
The DX-BT24-T module is configured using AT commands. These commands allow you to query and set various parameters of the module without needing to develop a Bluetooth program from scratch.

Application of direct serial communication

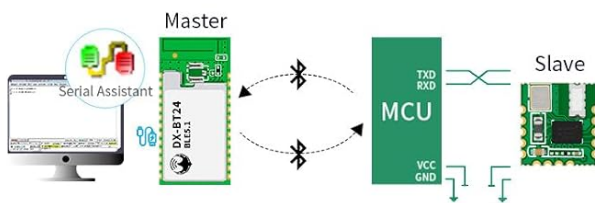
- BT24-T module can be connected to communicate with phone, computers, devices.

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

▼ DX-SMART APP or self-developed APP

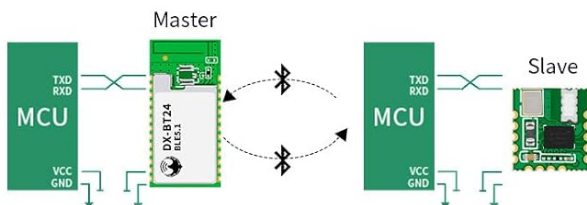


2. The computer software communicates with the device through the Bluetooth module:



▲ Serial Assistant or Self-developed Software

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.



Product Specification



Module Pinout



Module Dimensions



Hardware Design Reference



Serial Test Tools



AT Command Set



Package Diagram



Dedicated Aftermarket



More



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

Figure 5.1: Application of Direct Serial Communication and AT Command Set. This image shows how the module communicates with phones, computers, and other devices, alongside a table listing common AT commands and their descriptions.

Common AT Commands:

- **AT+VERSION:** Query version number.
- **AT+LADDR:** Query MAC Address.
- **AT+NAME:** Query Bluetooth Name.
- **AT+NAME<param>:** Set Bluetooth Name.
- **AT+NAMAC:** Query Bluetooth Parameters.
- **AT+NAMAC<param>:** Set Bluetooth Parameters.
- **AT+STOP:** Query Serial Stop Bit.
- **AT+STOP<param>:** Set the Serial Stop Bit.
- **AT+PARI:** Query serial port parity bit.
- Other commands include setting baud rate, UUID, transmission power, broadcast time, command disconnection, and restart.

Important: For a complete list of AT commands and their detailed usage, please refer to the comprehensive technical documentation

provided by the manufacturer.

6. APP APPLICATION OPERATION

The DX-BT24-T module supports communication with mobile applications for configuration and data transfer. The DX-SMART APP or other self-developed applications can be used.

APP Application Operation

- ✓ The DX-SMART app supports searching and connecting modules.
The APP supports changing parameters, searching BLE, sending and receiving data, helping you use and verify products faster.

- ✓ **Note:**
DX-BT24-T is a BLE protocol & cannot be searched & connected through the phone's built-in Bluetooth. It requires the use of self-developed applications or DX-SMART applications.
You cannot search and connect through the built-in Bluetooth of your PC or laptop.
You need to use our master module or CP11 adapter to communicate with the module.

- ✓ Free Android and iOS SDK provide,
Supporting Customization and development services.



Home page



Set parameters



SEARCH BLE



Transparent transmission

WE ARE FACTORY



[Technical Support & Customized Service]

We are a manufacturer, Not a trader. This is a product we developed and designed ourselves. Please believe in our ability and technology.

We can help you solve the problems you meet, and also support OEM and ODM services (Including customized logo, customized program, customized appearance, etc.).

Figure 6.1: DX-SMART APP Application Operation. This image displays various screens of the DX-SMART application, demonstrating its functionality for managing and communicating with the Bluetooth module, including setting parameters and transparent data transmission.

Note: The DX-BT24-T module uses the BLE protocol. It cannot be searched and connected directly through your phone's built-in Bluetooth settings. You must use a compatible application (e.g., DX-SMART APP or a custom-developed APP) to establish a connection. Similarly, direct connection via a computer's or notebook's built-in Bluetooth is not supported. For computer connectivity, a master module or CP11 adapter is required to use serial port software.

Android and iOS SDKs are available to support customization and development services for your own applications.

7. SPECIFICATIONS

Feature	Detail
Model Number	DX-BT24-T
Brand	PDDAXLQUE
Manufacturer	DX-SMART
Hardware Interface	Bluetooth
Data Link Protocol	Bluetooth (BLE 5.1)
Compatible Devices	Laptop, Smartphone (via specific APP/adapter)
Communication Distance	45m (open environment)
Transmission Rate	Up to 10K Bytes/s
Power Consumption	As low as 2 μ A (hibernation), 19 μ A (working)
Operating Temperature	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Certifications	BQB, CE, FCC, IC, SRCC, ROHS

8. TROUBLESHOOTING

- **Module Not Discoverable by Phone/PC:** Ensure you are using a compatible application (e.g., DX-SMART APP) for discovery and connection, as the module uses BLE protocol and cannot be directly paired via standard Bluetooth settings. For PC, a master module or CP11 adapter is required.
- **Communication Issues:**
 - Verify correct wiring of UART TX/RX, GND, and power pins.
 - Check that the baud rate settings on both the module (configured via AT commands) and the communicating device (e.g., microcontroller, serial terminal) match.
 - Ensure the power supply voltage is stable at 3.3V.
 - Confirm the communication distance is within the specified 45m range, especially in environments with obstacles.
- **Module Not Responding to AT Commands:**
 - Ensure the module is in the correct mode for AT command input (refer to technical documentation).
 - Verify the serial terminal settings (baud rate, data bits, parity, stop bits) match the module's configuration.
 - Check for proper command syntax, including carriage return/line feed requirements.
- **Unexpected Power Consumption:** Review the module's operating mode. Ensure it enters hibernation mode (2 μ A) when intended, or low power working mode (19 μ A) if active but not transmitting. Check for any continuous activity that might prevent low-power states.

9. WARRANTY AND SUPPORT

PDDAXLQUE, as the manufacturer, provides comprehensive technical support for the DX-BT24-T module. We offer OEM and ODM services and are committed to assisting users with any issues.

- **Technical Documentation:** Access to technical documentation, AT command sets, module footprints, reference design schematics, and development/test tools is available.
- **Development Kits:** For initial verification and accelerated product development, purchasing a development kit is recommended.

- **Contact Support:** If you encounter any problems or require assistance, please contact us through the provided service support channels. Refer to the "User Guide → Product Information → Service Support" section for contact details.

The module has passed BQB, CE, FCC, IC, SRCC, and ROHS certifications, ensuring product safety and reliability.

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