FEASYCOM

FSC-BT826x User Guide

Release 3.5.0

Table of contents

[中文版]

This guide applies to the **FSC-BT826x** series Bluetooth dual-mode data transmission application modules, include:

- FSC-BT826B
- FSC-BT826E
- FSC-BT826F
- FSC-BT826EN

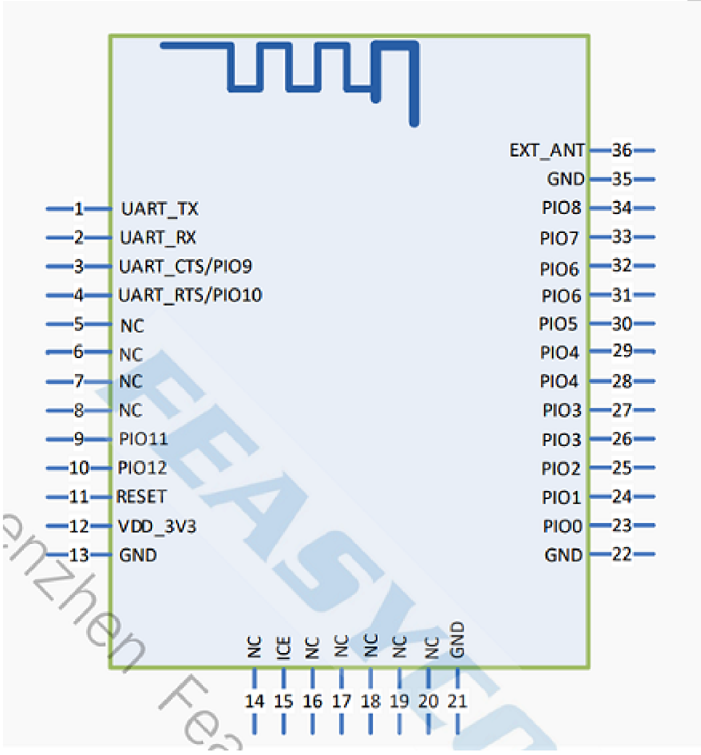
This guide consists of the following parts:

Chapter 1

Hardware Design

[中文版]

1.1 Module Pin Diagram



1.2 Pin Description

Pin	Pin Name	Type	Pin Descriptions
1	UART_TX	O	UART Data Pin (Transmit)
2	UART_RX	I	UART Data Pin (Receive)
3	UART_CT	I	UART Flow Control Pin (Clear To Send)
4	UART_RT	O	UART Flow Control Pin (Request To Send)
11	RESET	I	Reset Pin (Active-Low)
12	VDD	Power	Power Supply, 3.3V
13	GND	GND	GND
15	ICE	I/O	Programming Pin (In-Circuit Emulator)
29	I2C_CLK	I/O	I^{2}C Clock
30	I2C_DTA	I/O	I^{2}C Data
32	Work	O	Outputs square wave when BT not connected; Outputs high level when BT connected.
33	STATUS	O	Outputs low level when BT not connected; Outputs high level when BT connected.
36	EXT_ANT	ANT	Change the 0Ω resistor near the antenna to connect an external Bluetooth antenna.

1.3 Hardware Design Notes

- In simple test environment, the module can be used for basic testing and operation by simply connecting **VDD**, **GND**, **UART_RX**, and **UART_TX**.
- If the MCU needs to obtain the Bluetooth module’ s connection status, connect to the **STATUS** pin.
- Please submit the schematic diagram to Feasycom for review upon completion to ensure optimal Bluetooth range performance.

Chapter 2

Function Description

[中文版]

2.1 Default Configuration

Using **FSC-BT826F** as example：

Name	FSC-BT826F
LE-Name	FSC-BT826F-LE
Pin Code	0000
Secure Simple Pairing Mode	OFF
UART Baudrate	115200/8/N/1

2.2 GPIO Indications

2.2.1 Module Operation Status

Pin	Status	Description
Pin 32	1Hz square wave	Bluetooth Disconnected
Pin 32	High level	Bluetooth Connected

2.2.2 BT Connection Status

Pin	Status	Description
Pin 33	Low Level	Bluetooth Disconnected
Pin 33	High Level	Bluetooth Connected

2.3 Work Modes

2.3.1 Throughput Mode

- **Bluetooth Not Connected**: Data received via UART is parsed as AT commands.
- **Bluetooth Connected**: All data received via UART is sent as-is to the remote Bluetooth device.

2.3.2 Command Mode

- **Bluetooth Not Connected**: Data received via UART is parsed as AT commands.
- **Bluetooth Connected**: Data received via UART is still parsed as AT commands. Data must be sent to the remote device using AT commands, e.g., `AT+SPPSEND`.

2.4 GATT Service

Type	UUID	Permissions	Description
Service	0xFFF0		Throughput Transmission Service
Write	0xFFF2	Write,Write Without Response	APP to Module
Notify	0xFFF1	Notify	Module to APP

Chapter 3

Data Communication Technology

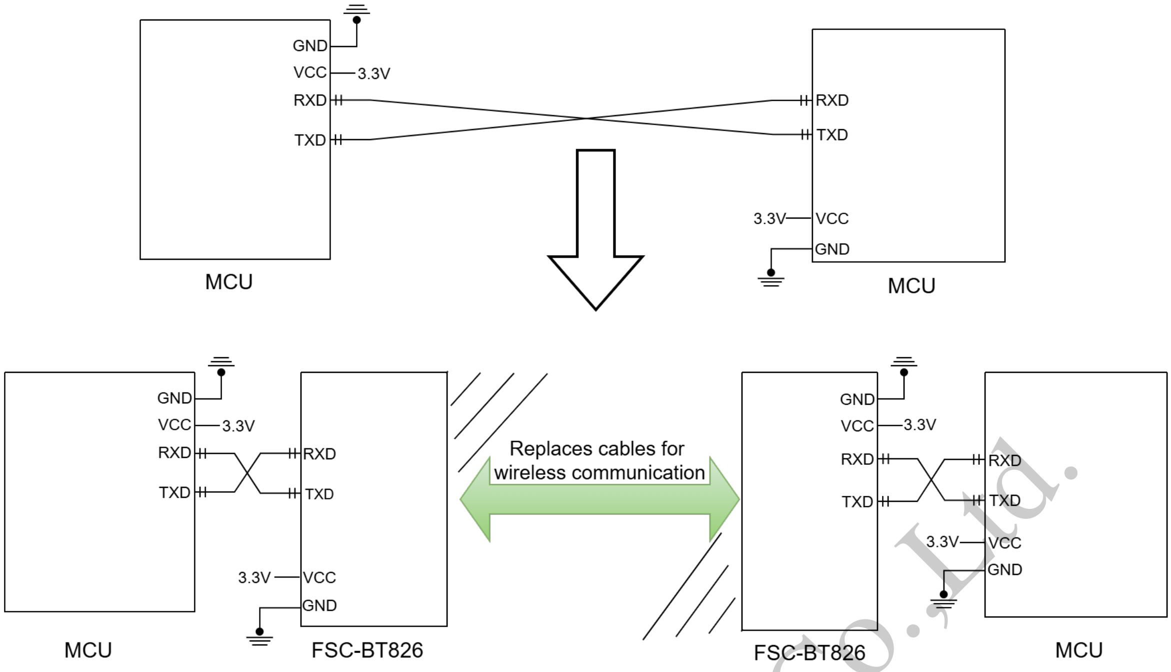
[中文版]

3.1 Communication Principle

The FSC-BT826x series Bluetooth dual-mode data modules enable wireless communication between devices based on the SPP (Serial Port Profile) and BLE (Bluetooth Low Energy) dual-mode protocols.

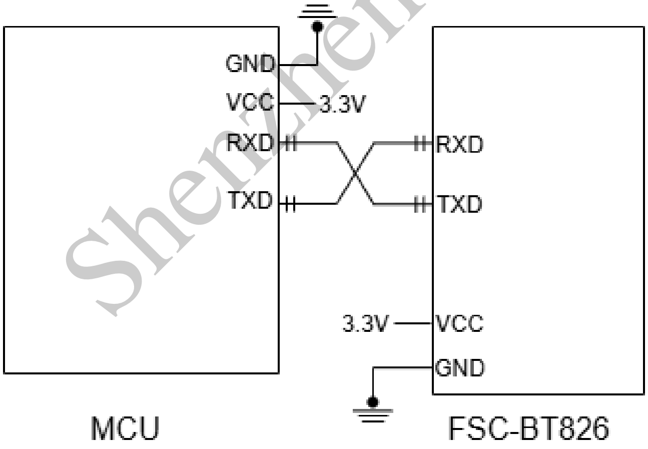
- **SPP Mode**: Emulates traditional serial port communication, establishing a virtual serial link through the RF layer. It supports continuous large data transfers (e.g., file transfer) and is suitable for scenarios like printers.
- **BLE Mode**: Utilizes an event-driven, low-power architecture, defining a “Service-Characteristic” model via the GATT protocol for intermittent small data interactions (e.g., sensor data), ideal for IoT devices.

Both modes share the underlying RF hardware and switch automatically via the protocol stack. The module communicates with the host device (phone/MCU) through the UART interface using AT commands or transparent data transmission to establish connections, exchange data, and manage status.



As shown in the figure, the Bluetooth module replaces the physical cable in full-duplex communication. A device like an MCU (left) sends data via its TXD pin to the Bluetooth module (left). The module’s RXD port receives the UART data and automatically transmits it via radio waves over the air to the remote Bluetooth module. The remote Bluetooth module (right) receives the airborne data and delivers it via its TXD pin to the local device, like an MCU (right).

3.2 MCU-to-Module Communication



This diagram illustrates the connection between a master MCU (Microcontroller Unit) and an FSC-BT826 Bluetooth module via cross-connected serial ports, enabling command interaction between the master and the Bluetooth module to support wireless communication functions. It is applicable to IoT devices, remote control, and other scenarios.

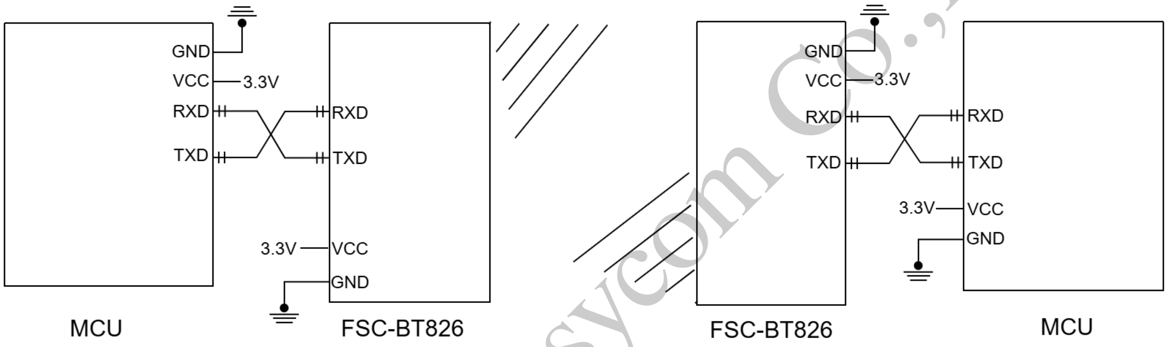
1. **Serial Communication Interface**: The master MCU’s transmit pin (MCU_TX) is

cross-connected to the Bluetooth module' s receive pin (UART_RX), and the master MCU' s receive pin (MCU_RX) is similarly connected to the Bluetooth module' s transmit pin (UART_TX), forming a bidirectional data transmission channel.

2. **Power and Grounding**: The Bluetooth module is powered by 3.3V through the VDD_3V3 pin and shares a common ground (GND) with the master MCU, ensuring level compatibility and signal stability.

3.3 Module-to-Module Communication

Two FSC-BT826 Bluetooth modules can establish a Bluetooth connection automatically upon power-up.



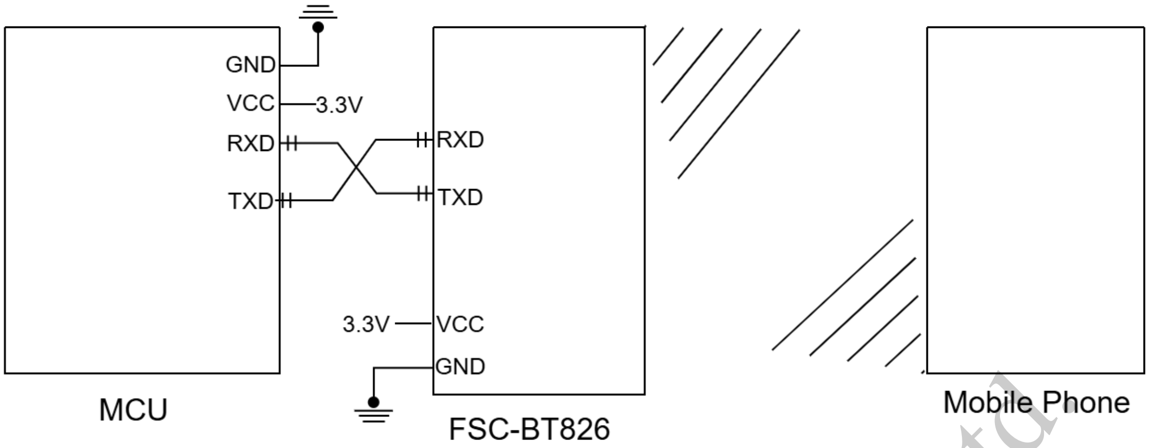
A module can act as a master device to connect to a slave device. The host can send commands to control the module for Bluetooth scanning, connection establishment, data transmission, and connection termination.

3.4 Module-to-Phone Communication

3.4.1 Why is a dedicated App needed for Bluetooth connection and communication on a phone?

Native phone Bluetooth functionality primarily supports common use cases like audio transfer and file sharing. Some Bluetooth peripheral devices can be connected via the phone's built-in settings (e.g., Bluetooth speakers, headphones, keyboards, mice). However, when a peripheral device, like a module only supporting SPP/GATT protocols, cannot be connected via native phone settings, a specific mobile application, such as the FeasyBlue app, is generally required for connection.

3.4.2 Communication Application



Bluetooth Module Side (FSC-BT826x): Continuously transmits broadcast data after power-up. **Phone Side**: Can discover the broadcast packets via scanning and initiate a connection request to the module (FSC-BT826). Upon successful connection, the Bluetooth module (FSC-BT826) will pull the connection status pin HIGH and respond to status indication commands (valid in Command Mode) to notify the host of the successful Bluetooth connection. **Host Side**: Can send data to the remote (phone side) Bluetooth via the UART through the Bluetooth module. Conversely, the remote (phone side) Bluetooth can also send data back to the host.

Chapter 4

Rapid Development Kit

[中文版]

4.1 Datasheet

- FSC-BT826F Datasheet

4.2 Evaluation Board

- FSC-DB005 : Feasycom USB to Serial Bluetooth Data Transmission Application Development Board.

4.3 AT Command Set

- FSC-BT826x General Dual-Mode Data AT Command Set

4.4 Serial Port Tool

- Feasycom Serial Port Tool : A serial port communication analysis tool based on Windows PC.

4.5 APP&SDK

- FeasyBlue ： Feasycom App & SDK resource supporting Android and iOS, which enables functions such as Bluetooth BLE & SPP data communication test, Feasycom module firmware version reading, parameter configuration, OTA Upgrade and OTA AT commands etc.

4.6 Firmware Upgrade

4.6.1 OTA Upgrade

- Tool : FeasyBlue APP
- User Guide: Please refer to FSC-BT826x - OTA Upgrade .

4.6.2 UART Upgrade

- Tool : Feasycom UART Upgrde Tool (Based on Windows PC)
- User Guide: Please refer to FSC-BT826x - UART Upgrade .

Chapter 5

Quick Start

[中文版]

5.1 What you need

Taking the FSC-BT826F module as an example:

5.1.1 Required Hardware

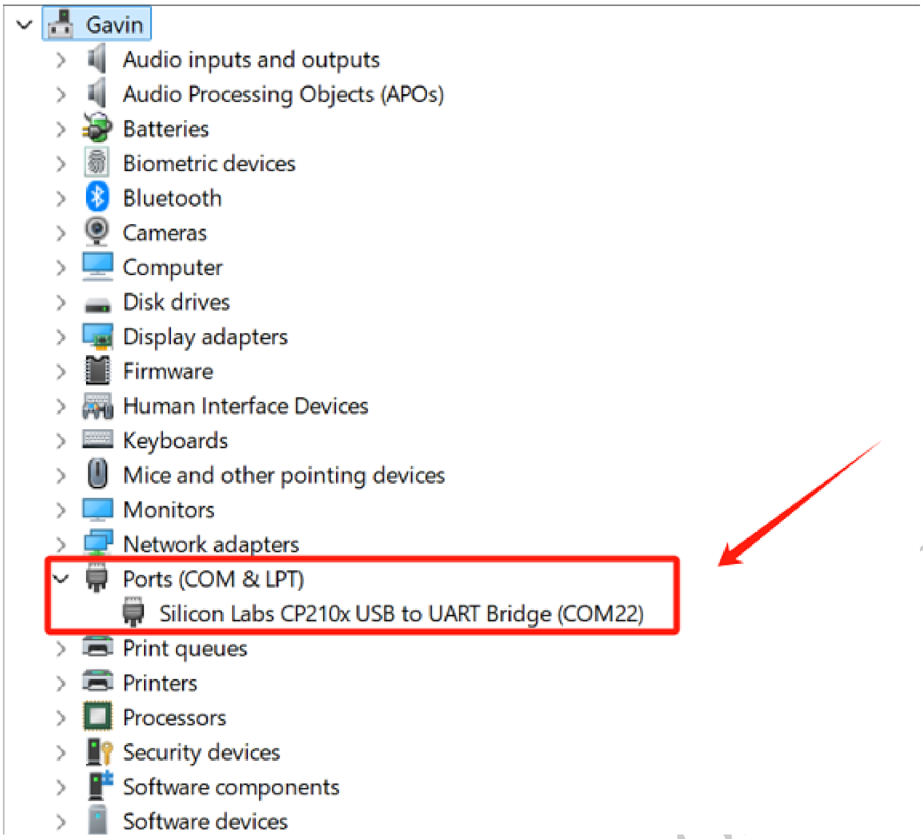
- 1 x FSC-DB005-BT826F Rapid Development Kit : FSC-DB005 USB-to-Serial Rapid Evaluation Board pre-integrated with FSC-BT826F module.
- 1 x PC (Windows / Mac)

5.1.2 Software and Setup

- Feasycom Serial Port Tool : A serial port communication analysis tool based on Windows PC.
- Communication Interface : UART
- UART Configuration： 115200/8/N/1

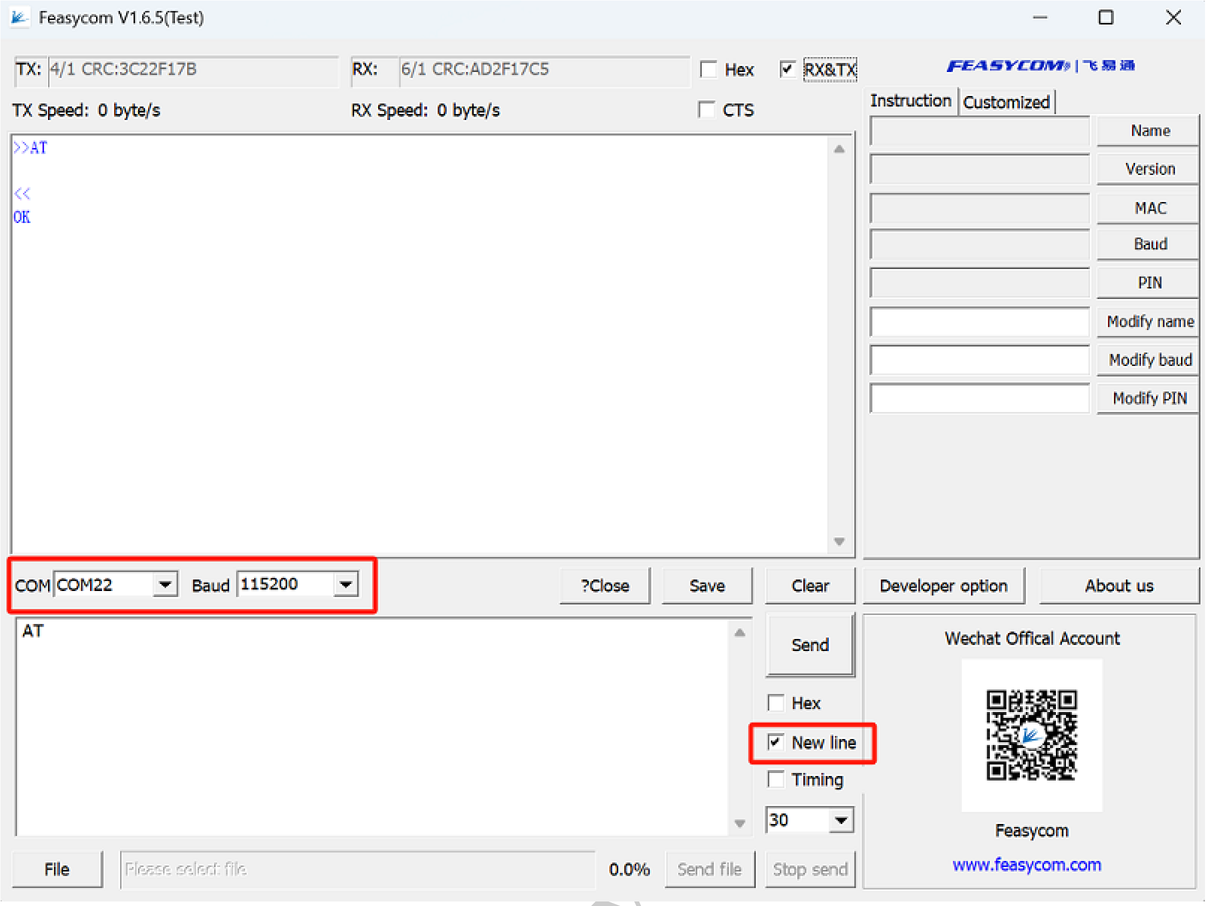
5.2 Hardware Access

1.Connect the FSC-DB005-BT826F to the PC via USB. The PC will automatically recognize the serial port and create a virtual COM port.



- Gavin
  - Audio inputs and outputs
  - Audio Processing Objects (APOs)
  - Batteries
  - Biometric devices
  - Bluetooth
  - Cameras
  - Computer
  - Disk drives
  - Display adapters
  - Firmware
  - Human Interface Devices
  - Keyboards
  - Mice and other pointing devices
  - Monitors
  - Network adapters
  - Ports (COM & LPT)
    - Silicon Labs CP210x USB to UART Bridge (COM22)
  - Print queues
  - Printers
  - Processors
  - Security devices
  - Software components
  - Software devices

2.Run the Feasycom Serial Port Tool on the PC, set the correct **COM** and **Baud**, and check the **New Line**.



Feasycom V1.6.5(Test)

TX: 4/1 CRC:3C22F17B

RX: 6/1 CRC:AD2F17C5

□ Hex ☑ RX&TX

TX Speed: 0 byte/s

RX Speed: 0 byte/s

□ CTS

```
>>AT

<<
OK
```

COM COM22 Baud 115200

AT

□ Hex

☑ New line

□ Timing

30

Please select file

0.0%

5.3 Communication Test

The following are several basic general AT command test examples.

For more AT commands, please refer to FSC-BT826x General Dual-Mode Data AT Command Set .

5.3.1 AT - UART Communication Test

Command	AT
Response	**OK**
Description	Test the UART communication between HOST and Module after power on, baudrate changed, etc.

Example:

```
Send:     <<AT\r\n
Response: >>r\nOK\r\n                    //Successfully connected.
```

5.3.2 AT+NAME - Read/Write Local BR/EDR Name

Example: Read Local BR/EDR Bluetooth Name

```
Send:     <<AT+NAME\r\n
Response: >>\r\n+NAME=FSC-BT826F-xxxx\r\n   //Example, please refer␣
↪to the actual reading
Response: >>\r\nOK\r\n
```

5.3.3 AT+LENAME - Read/Write Local BLE Name

Example: Read Local BLE Name

```
Send:     <<AT+LENAME\r\n
Response: >>\r\n+NAME=FSC-BT826F-LE-xxxx\r\n   //Example, please␣
↪refer to the actual reading
Response: >>\r\nOK\r\n
```

5.3.4 AT+VER - Read Current Firmware Version

Example: Read Current Firmware Version

```
Send:     <<AT+VER\r\n
Response: >>\r\n+VER=1.0.0,FSC-BT826F\r\n    //Example, please refer␣
↪to the actual reading
Response: >>\r\nOK\r\n
```

Chapter 6

Development Examples

[中文版]

6.1 Data Throughput Mode Application

6.1.1 What is Throughput Mode?

FSC-BT826x series dual-mode Bluetooth data transmission modules have two data transmission modes: **Throughput Mode** and **Command Mode**.

The generic data throughput firmware for the FSC-BT826x series modules default to throughput mode. To switch modes, refer to the FSC-BT826x General Dual-Mode Data AT Command Set and use the **AT+TPMODE** command.

The operation and differences between the two modes are as follows:

- **Throughput Mode**:

  Bluetooth Not Connected: Data received via UART is parsed as AT commands.

  Bluetooth Connected: All data received via UART is sent as-is to the remote Bluetooth device. It does not contain any data headers or framing and does not require AT commands to send data.

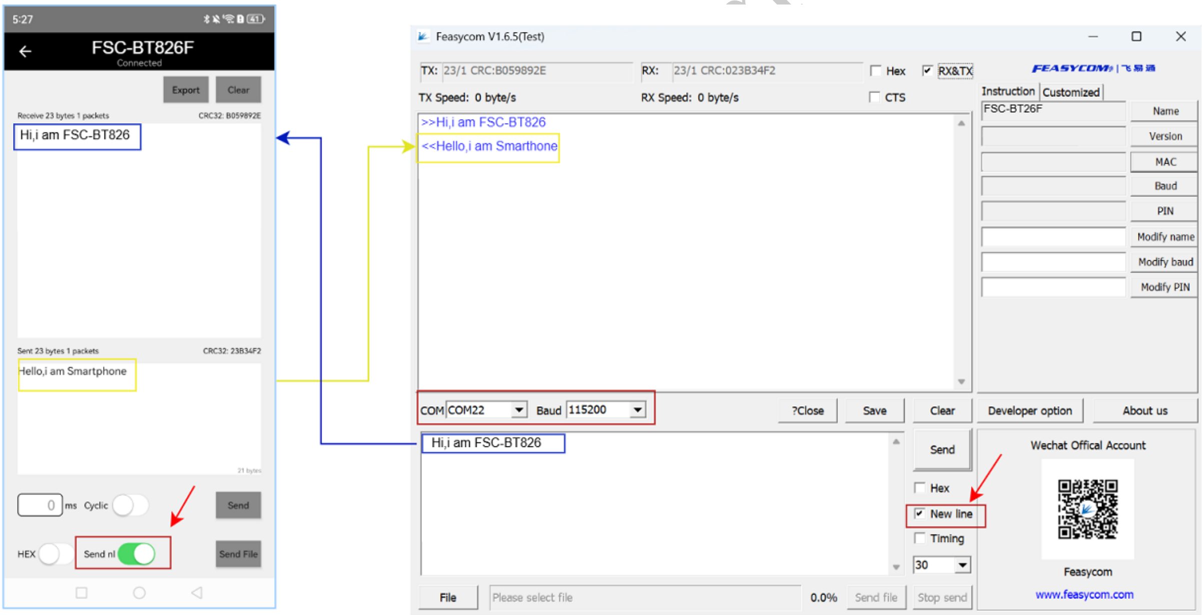
- **Command Mode**:

  Bluetooth Not Connected: Data received via UART is parsed as AT commands.

  Bluetooth Connected: Data received via UART is still parsed as AT commands. It will contain specific response indication headers and framing. Data must be sent to the remote device using AT commands, such as **AT+SPPSEND** or **AT+LESEND** .

6.1.2 Module to Phone Application

1. **Module** : After power-on, the module will continuously send broadcast packet data.
2. **Phone** : Open the FeasyBlue APP , scan for nearby Bluetooth device advertisements, find the target Bluetooth module, and establish a connection.
3. **Connection Success** : After successful connection, the status pin of the module will pull up the level, indicating that the connection has been established.
4. **Data Transmission** : After successful connection, in the througput mode, the module will automatically transmit the serial port data it receives to the remote end (mobile phone side) via air.



5:27

FSC-BT826F

Connected

Receive 23 bytes 1 packets CRC32: B059892E

Hi,i am FSC-BT826

Sent 23 bytes 1 packets CRC32: 23B34F2

Hello,i am Smartphone

0 ms Cyclic

HEX ○ Send nl ●

Feasycom V1.6.5(Test)

TX: 23/1 CRC:B059892E

RX: 23/1 CRC:023B34F2

□ Hex ☑ RX&TX

TX Speed: 0 byte/s

RX Speed: 0 byte/s

□ CTS

>>Hi,i am FSC-BT826

<<Hello,i am Smarthone

COM COM22 Baud 115200

Hi,i am FSC-BT826

□ Hex

☑ New line

□ Timing

30

Please select file

0.0%

FSC-BT26F

6.1.3 Module to Module Application

Demonstration of SPP communication and data throughput transmission between an FSC-BT826x and an FSC-BT9101 Bluetooth module, as follows:

1.Scan for nearby SPP devices

FSC-BT826x scans for nearby Bluetooth SPP devices, as follows:

```
Send:     <<AT+SCAN=1                    // Scan for nearby Bluetooth␣
 ↪SPP devices
Response: >>OK
Response: >>+SCAN={                       // Scan started
Response: >>+SCAN=1,2,70CD0D311A59,-48,13,FEASYCOM-WILL
Response: >>+SCAN=2,2,1063C8585846,-68,15,DESKTOP-BVPUURD
Response: >>+SCAN=3,2,DC0D3000012F,-45,10,FSC-BT9101
Response: >>+SCAN=4,2,1418C3B28AC1,-52,15,DESKTOP-U13VRNN
Response: >>+SCAN=5,2,C03E15D0166F,-82,2,K2
Response: >>+SCAN=6,2,DC0D3100015E,-73,10,FSC-BT986
Response: >>+SCAN=7,2,DC0D30001AF3,-51,14,FSC-BT955-1AF3
Response: >>+SCAN=8,2,C02E25D07080,-58,7,OPPO K3
Response: >>+SCAN=}                      // Scan ended
```

2.Establish SPP connection request

FSC-BT826x establishes an SPP connection with the FSC-BT9101 using the AT+SPPCONN command, as follows:

```
Send:     <<AT+SPPCONN=DC0D3000012F      // Initiate an SPP␣
 ↪connection request to the remote FSC-BT9101
Response: >>OK
```

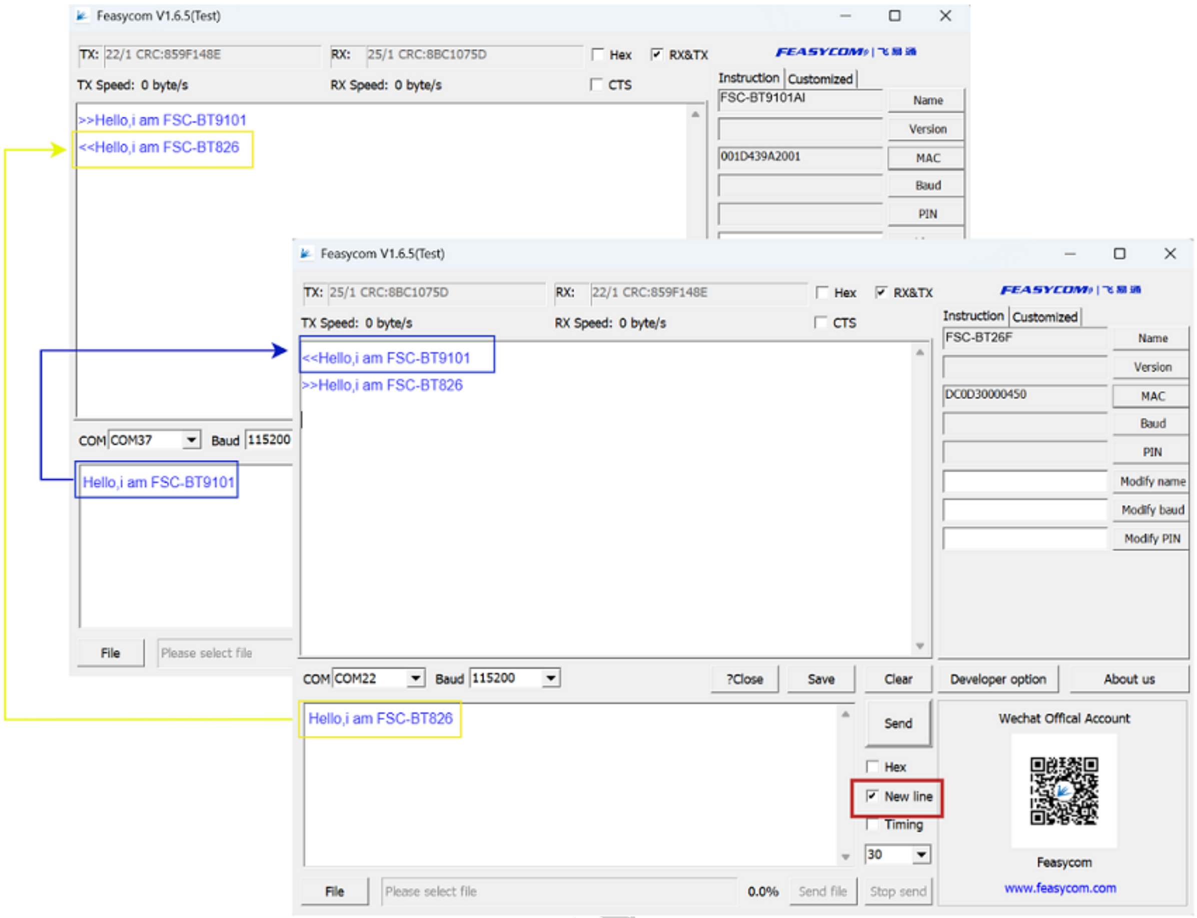
3.SPP Connected

In throughput mode, after a successful Bluetooth connection, the UART will not receive event response indicators. The connection status can be determined by the level state of the status pin (e.g., Pin 10) on the FSC-BT826x, as follows:

- **High Level (H):** Indicates Bluetooth is successfully connected.
- **Low Level (L):** Indicates Bluetooth is not connected or the connection has been disconnected.

4.Send data

Throughput mode is enabled by default in the generic data transmission firmware. After SPP connected, data can be sent directly without using AT commands, as follow:


Feasycom V1.6.5(Test)

TX: 22/1 CRC:859F148E RX: 25/1 CRC:8BC1075D ☐ Hex ☑ RX&TX

TX Speed: 0 byte/s RX Speed: 0 byte/s ☐ CTS

```
>>Hello,i am FSC-BT9101
<<Hello,i am FSC-BT826
```

FSC-BT9101AI

001D439A2001

COM COM37 Baud 115200

Hello,i am FSC-BT9101

Feasycom V1.6.5(Test)

TX: 25/1 CRC:8BC1075D RX: 22/1 CRC:859F148E ☐ Hex ☑ RX&TX

TX Speed: 0 byte/s RX Speed: 0 byte/s ☐ CTS

```
<<Hello,i am FSC-BT9101
>>Hello,i am FSC-BT826
```

FSC-BT26F

DC0D30000450

COM COM22 Baud 115200

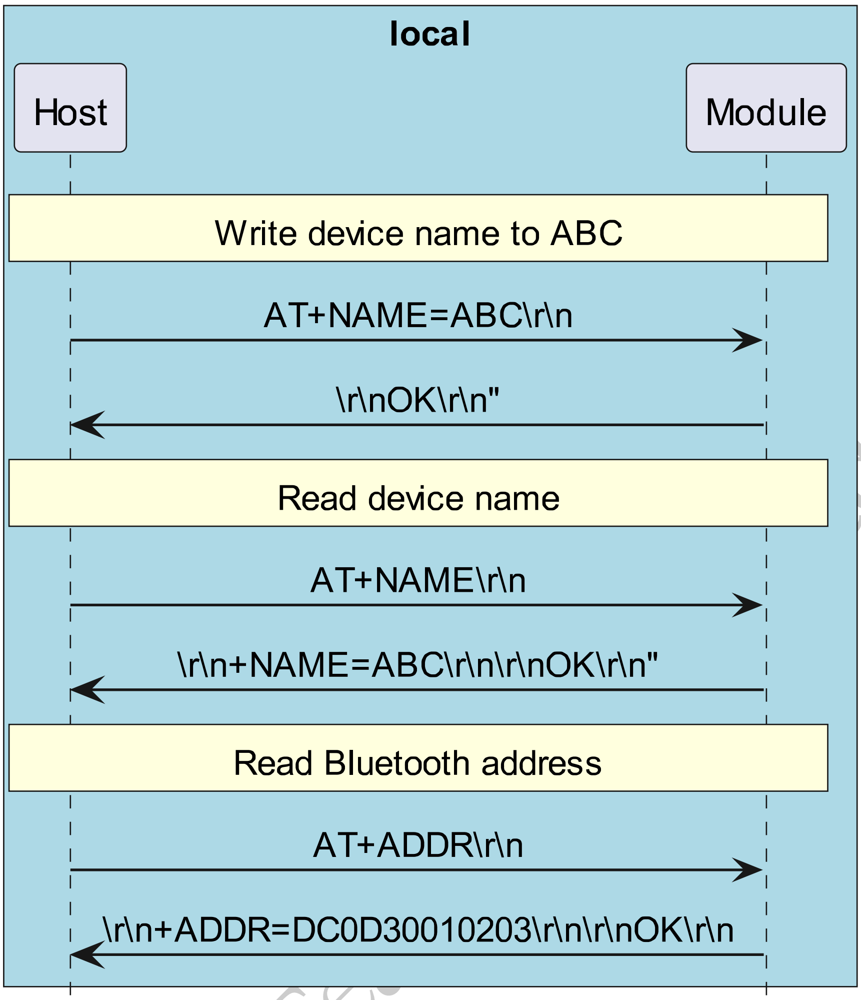
Hello,i am FSC-BT826

☐ Hex ☑ New line ☐ Timing 30

6.2 Read/Write Module Default Parameters

When Bluetooth is not connected, the module parses UART data as AT commands. The host can query and modify the module’ s default parameters. As follow:

1. Write the device name to ABC
2. Read the device name
3. Read the Bluetooth address

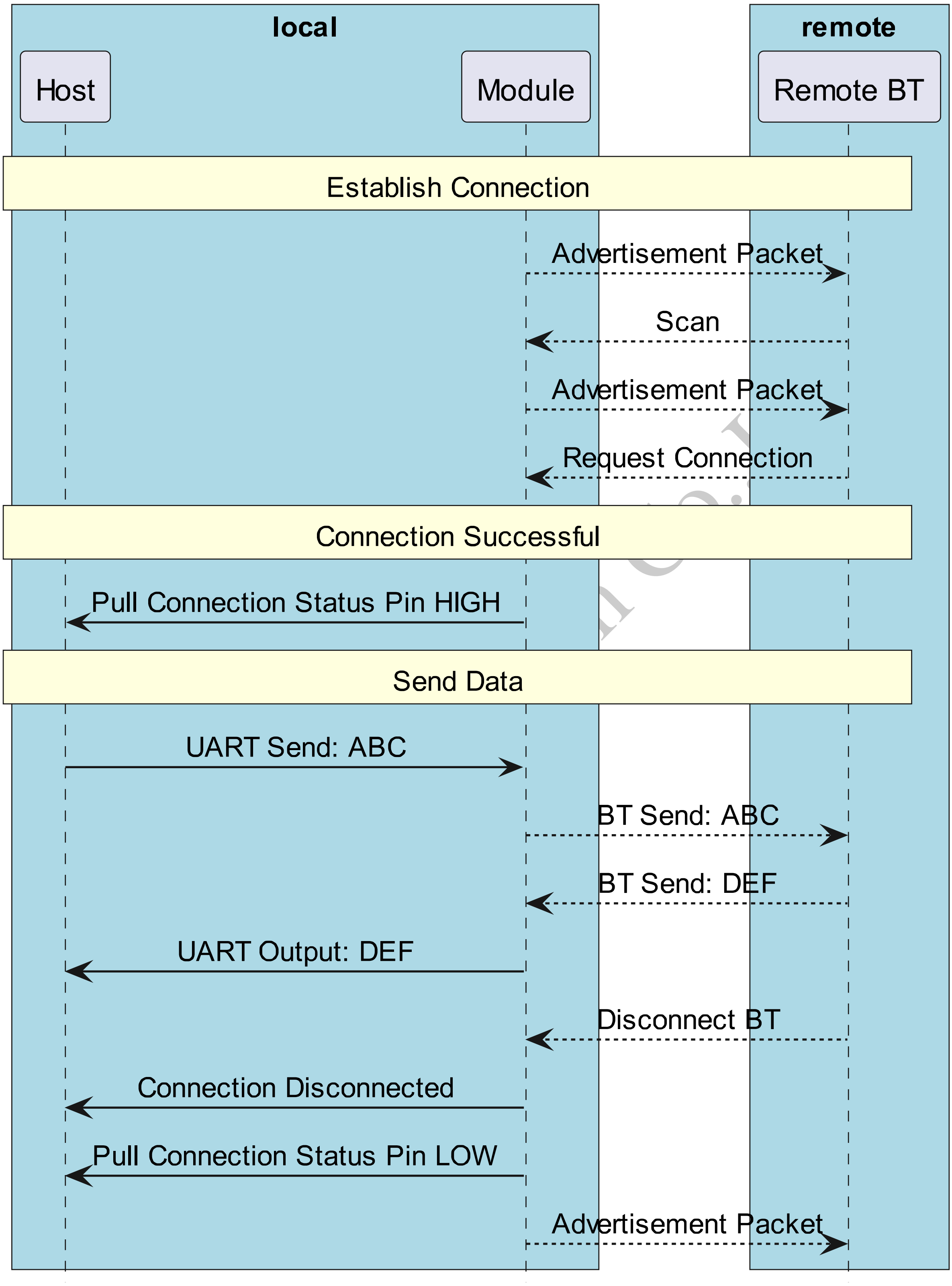


6.3 Data Transmission Flow

Upon power-up, the module continuously transmits advertisement data. A remote Bluetooth device (e.g., phone) can discover these advertisement packets via scanning and initiate a connection request to the module.

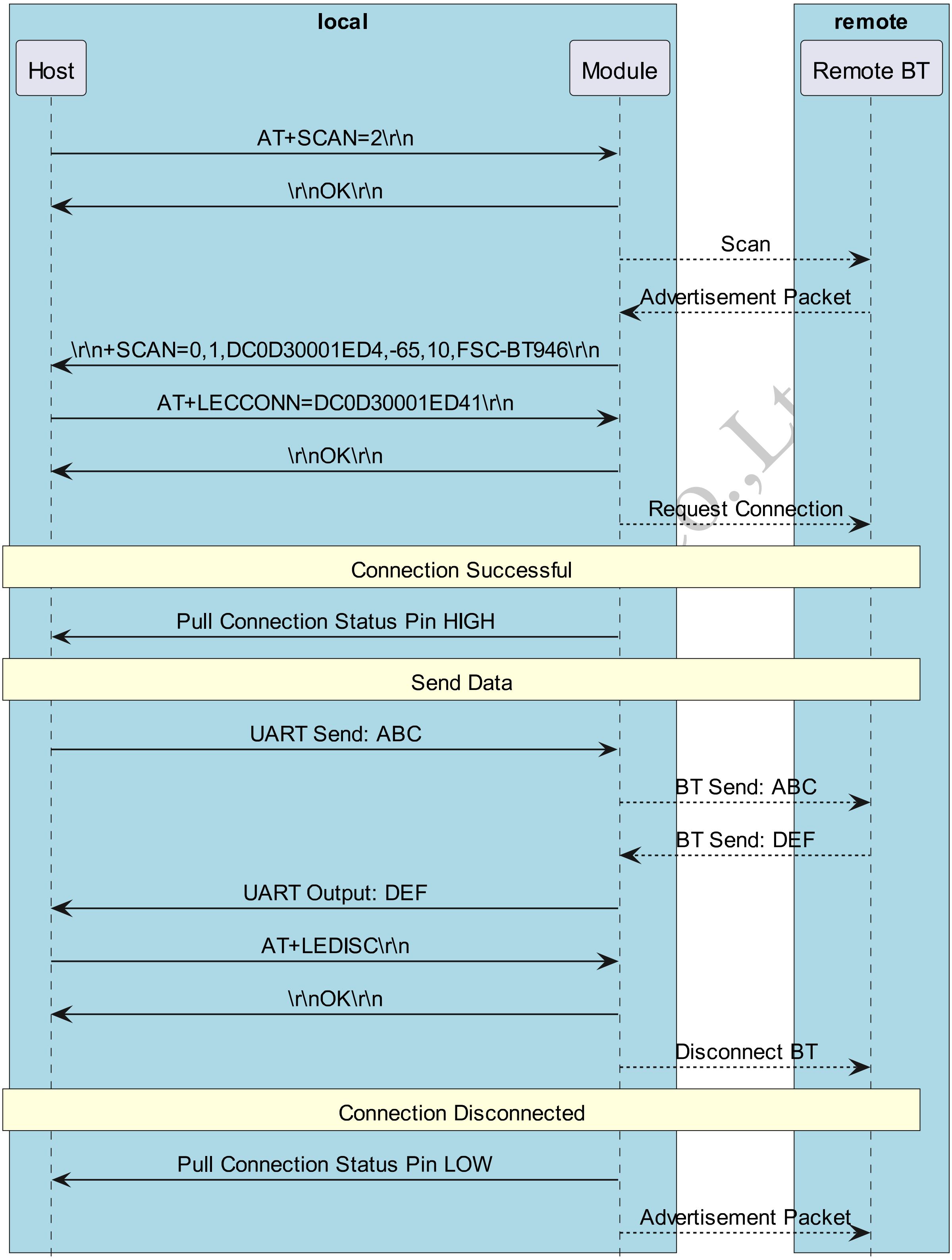
Upon successful connection, the module pulls its connection status pin HIGH to notify the host of the successful Bluetooth connection.

The host can send data to the remote Bluetooth device via the Bluetooth module, and the remote Bluetooth device can also send data to the host.



6.4 Module Acts as Master to Connect to Remote Device

The module can act as a master device to connect to a slave device. The host can send commands to control the module to perform scanning, connection, and disconnection.


local
remote
Host
Module
Remote BT
AT+SCAN=2\r\n
\r\nOK\r\n
Scan
Advertisement Packet
\r\n+SCAN=0,1,DC0D30001ED4,-65,10,FSC-BT946\r\n
AT+LECCONN=DC0D30001ED41\r\n
\r\nOK\r\n
Request Connection
Connection Successful
Pull Connection Status Pin HIGH
Send Data
UART Send: ABC
BT Send: ABC
BT Send: DEF
UART Output: DEF
AT+LEDISC\r\n
\r\nOK\r\n
Disconnect BT
Connection Disconnected
Pull Connection Status Pin LOW
Advertisement Packet

Chapter 7

Firmware Upgrade

[中文版]

7.1 OTA Upgrade

7.1.1 Tool

- FeasyBlue App (Based on Android & iOS)

7.1.2 User Guide

1.Run the FeasyBlue App, select **Settings - OTA Upgrade** to enter the OTA Upgrade function section. After entering, you will navigate to the device search interface to select the Bluetooth device to be upgraded.

2.Search for and select the Bluetooth device that needs upgrading. After selecting the device, you will enter the **Load Firmware** function interface to load the firmware upgrade file.

3.There are two ways to load the firmware upgrade file:

- **Select Firmware**: Choose to load the firmware upgrade file stored in the mobile phone' s local storage (the firmware upgrade file is provided by Feasycom).
- **Get Firmware**: Enter the DFU name to download and import the corresponding firmware upgrade file from the cloud server via the network (the DFU name is provided by Feasycom).

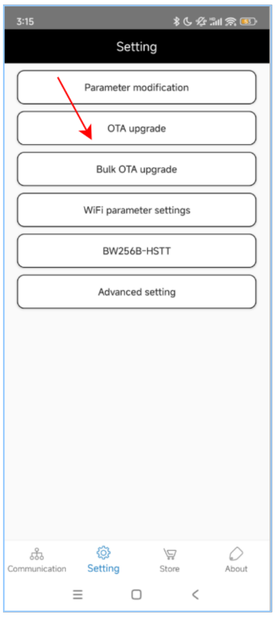
4.After the firmware file is loaded successfully, click the **Start Upgrade** button. The interface will display "Upgrading" and the upgrade progress, indicating that the upgrade mode is activated and the upgrade is in progress.

5.Wait for the upgrade progress bar to complete and the interface to display “Upgrade Completed”—the upgrade is then finished.

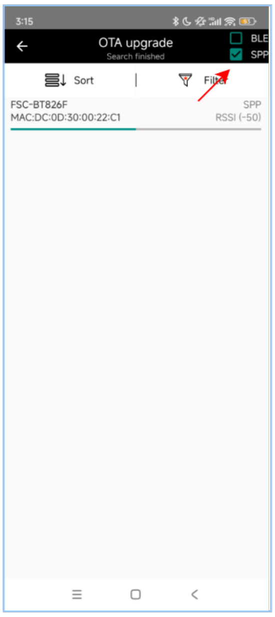
Warning :

1. When installing and running the FeasyBlue App, please allow the App to access the permissions for **nearby devices**, **location information**, and **media and file access**. Otherwise, you may fail to search for nearby Bluetooth devices and load the firmware upgrade file.
2. If you use the “Obtain Firmware” method (importing the firmware upgrade file by entering the DFU name), note that the mobile phone must be connected to the Internet, and ensure the DFU name is entered correctly (case-sensitive). Otherwise, an error of “network or file error” may occur.
3. Do not disconnect the power during the upgrade process.

7.1.3 Example

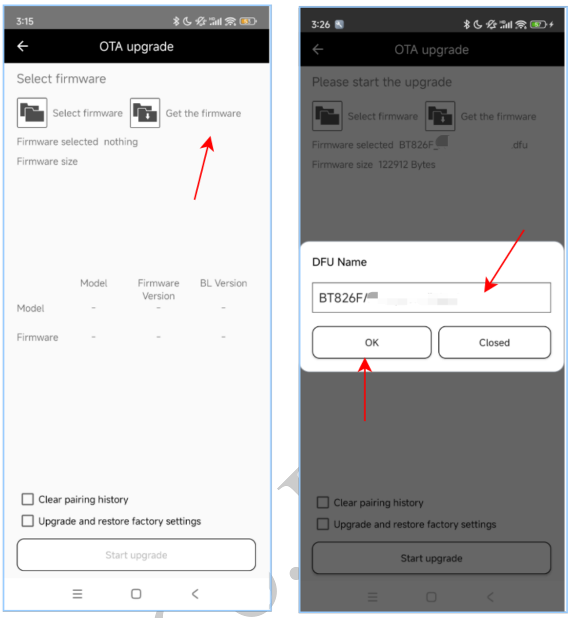


(1)



FSC-BT826F SPP
MAC:DC:0D:30:00:22:C1 RSSI (-50)

(2)



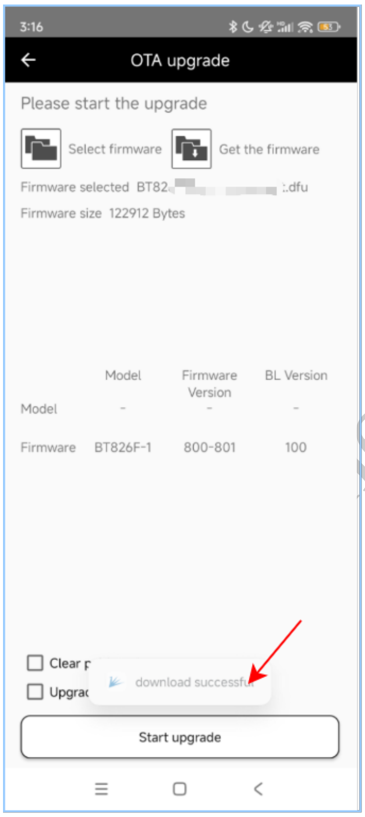
Firmware selected nothing
Firmware size

	Model	Firmware Version	BL Version
Model	-	-	-
Firmware	-	-	-

Firmware selected BT826F_ .dfu
Firmware size 122912 Bytes

DFU Name: BT826F/

(3)

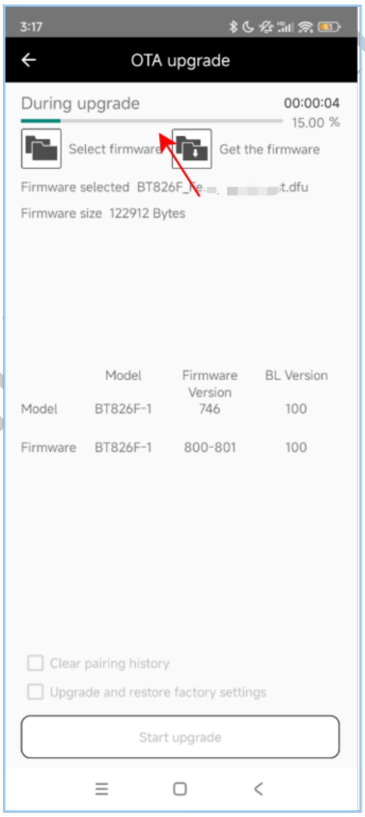


Firmware selected BT82 .dfu
Firmware size 122912 Bytes

	Model	Firmware Version	BL Version
Model	-	-	-
Firmware	BT826F-1	800-801	100

download successful

(4)

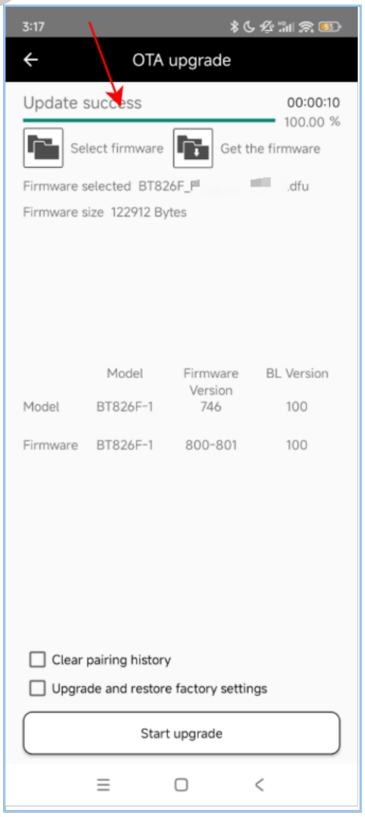


During upgrade 00:00:04
15.00 %

Firmware selected BT826F_ .dfu
Firmware size 122912 Bytes

	Model	Firmware Version	BL Version
Model	BT826F-1	746	100
Firmware	BT826F-1	800-801	100

(5)



Update success 00:00:10
100.00 %

Firmware selected BT826F_ .dfu
Firmware size 122912 Bytes

	Model	Firmware Version	BL Version
Model	BT826F-1	746	100
Firmware	BT826F-1	800-801	100

(6)

7.2 UART Upgrade

7.2.1 Tool

- Feasycom UART Upgrde Tool : Based on Windows PC

7.2.2 User Guide

1.Run the Feasycom UART Upgrde Tool .

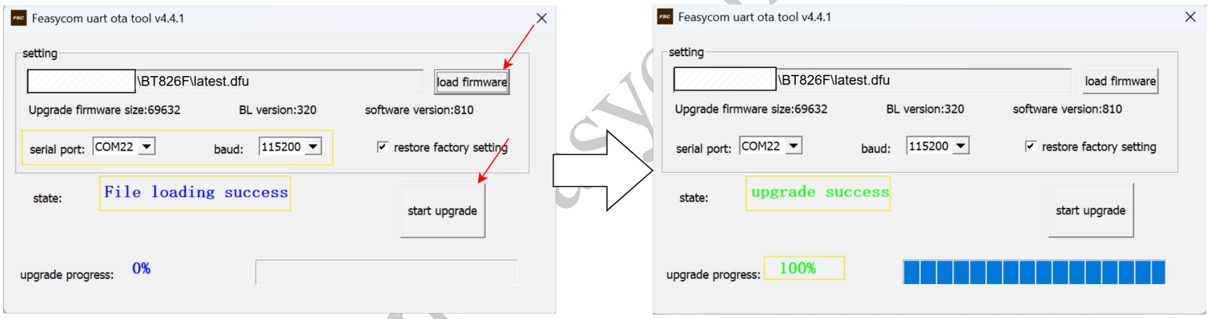
2.Enter the correct parameter configuration: **serial port**, **baud** .

3.Click **load firmware** and select the **.dfu firmware upgade file** stored locally on the PC.

4.Click **start upgrade** and will display **connection Successful** and simultaneously show the **upgrade progress**, indicating entry into upgrade mode.

5.When the progress bar displays **100%** and the status shows **upgrade success**, the serial port upgrade is complete.

7.2.3 Example



Feasycom uart ota tool v4.4.1

setting

\BT826F\latest.dfu

Upgrade firmware size:69632 BL version:320 software version:810

serial port: COM22 baud: 115200 ☑ restore factory setting

state: File loading success

upgrade progress: 0%

Feasycom uart ota tool v4.4.1

setting

\BT826F\latest.dfu

Upgrade firmware size:69632 BL version:320 software version:810

serial port: COM22 baud: 115200 ☑ restore factory setting

state: upgrade success

upgrade progress: 100%

Chapter 8

FAQs

[中文版]

8.1 Why is a dedicated App needed for Bluetooth connection and communication on a phone?

Native phone Bluetooth functionality primarily supports common use cases like audio transfer and file sharing. Some Bluetooth peripheral devices can be connected via the phone's built-in settings (e.g., Bluetooth speakers, headphones, keyboards, mice). However, when a peripheral device, like a module only supporting SPP/GATT protocols, cannot be connected via native phone settings, a specific mobile application, such as the FeasyBlue app, is generally required for connection.

8.2 How to get the Bluetooth MAC address on an iOS phone?

Due to security considerations, the iOS system converts the Bluetooth MAC address into a UUID at the underlying level before presenting it to upper-layer applications. Therefore, apps cannot directly obtain the device’s actual MAC address.

The FSC-BT826x series Bluetooth modules include the MAC address in their broadcasts by default. Apps can retrieve the MAC address from the advertisement packet using the following method.

```
- (void)centralManager:(CBCentralManager *)central␣
↪didDiscoverPeripheral:(CBPeripheral *)peripheral␣
↪advertisementData:(NSDictionary *)advertisementData RSSI:(NSNumber␣
↪*)RSSI
{
    if(![self describeDictonary:advertisementData])
    {
        NSLog(@"is not fsc module");
        return;
    }
}

- (Boolean)describeDictonary: (NSDictionary *) dict
{
    NSArray *keys;
    id key;
    keys = [dict allKeys];
    for(int i = 0; i < [keys count]; i++)
    {
        key = [keys objectAtIndex:i];
        if([key isEqualToString:@"kCBAdvDataManufacturerData"])
        {
            NSData *tempValue = [dict objectForKey:key];
            const Byte *tempByte = [tempValue bytes];
            if([tempValue length] == 6)
            {
                // tempByte Subsequent parameters are the Bluetooth␣
↪address
                return true
            }
        }else if([key isEqualToString:@"kCBAdvDataLocalName"])
        {
            //there is name
            //NSString *szName = [dict objectForKey: key];
        }
    }
```

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```
    return false;
}
```

Chapter 9

Contact Information

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Chapter 10

Appendix

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