



FSC-BT909C User Guide

Release 3.7.0

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This guide is applicable to

FSC-BT909C Bluetooth Audio Application Module

This guide consists of the following parts:

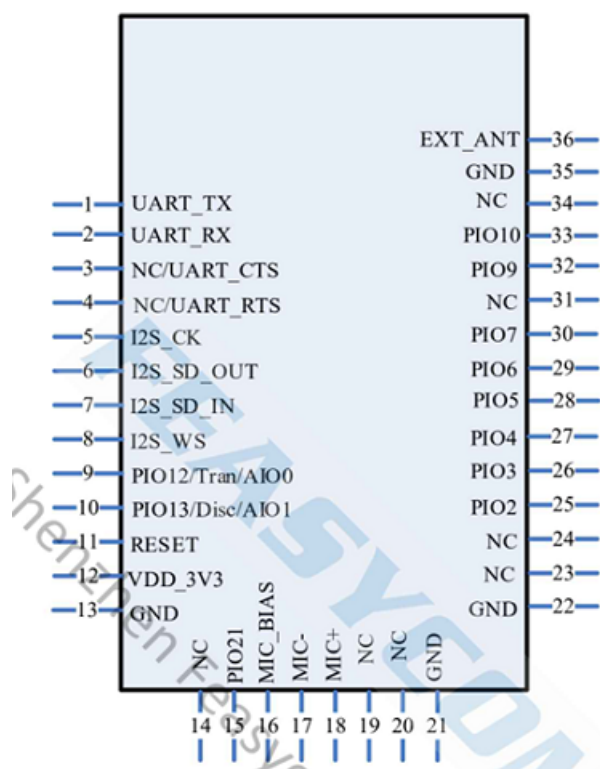
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Chapter 1

Hardware Design

[中文版]

1.1 Module Pin Diagram

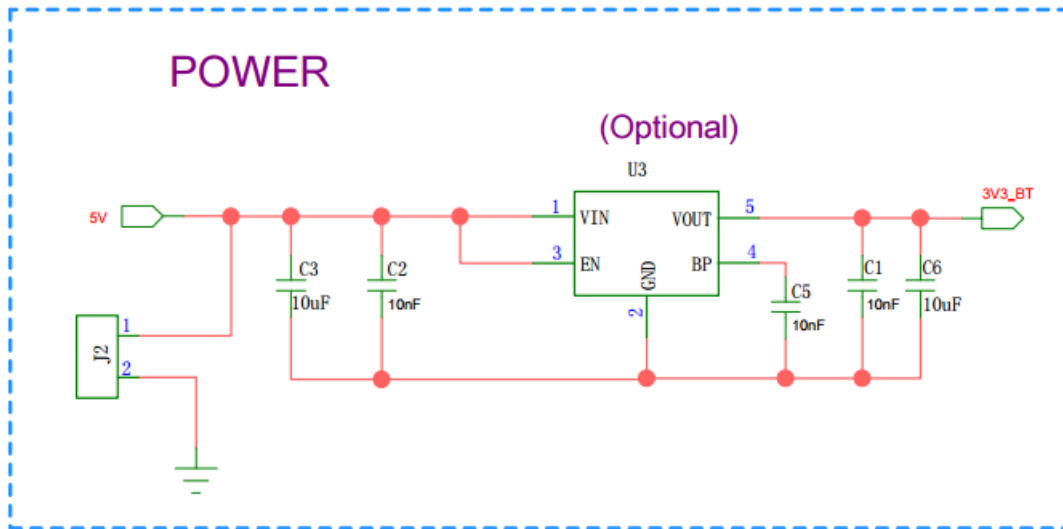


1.2 Module Pin Description

Pin	Pin Name	Type	Pin Descriptions
1	UART_TX	O	UART TX
2	UART_RX	I	UART RX
5	I2S_CLK	I/O	I2S bit clock
6	I2S_OUT	O	I2S data output
7	I2S-IN	I	I2S data input
8	I2S-WS	I/O	Frame Sync Clock
11	RESET	I	Active-low reset
12	VDD_3V3	VDD	3.3V power supply
13	GND	GND	GND
16	MIC_BIAS	O	Microphone bias voltage
17	MIC-	I	MIC negative
18	MIC+	I	MIC positive
32	PIO9 (LED)	I/O	Operating status indicator Pin
33	PIO10 (Status)	I/O	Connection indicator Pin
36	EXT_ANT	ANT	External antenna Pin

1.3 Power-on Circuit Design

- To ensure the stable operation of the Bluetooth module, the power supply for the VDD_3V3 pin must reserve a current of $\geq 300\text{mA}$ for the Bluetooth module.
- If the power supply is converted from 5V to 3.3V, you can refer to the following optional recommended schematic diagram for design:



1.4 Hardware Design Note

- For the module's simple test environment, you only need to connect **VDD / GND / UART_RX / UART_TX** to test and use it.
- After completing the PCB circuit schematic, please contact the staff of [Feasycom](#) for review to prevent the Bluetooth range from failing to reach the optimal performance.

Chapter 2

Functional Description

[中文版]

2.1 Default Configuration

Name	FSC-BT909C-XXXX
LE-Name	FSC-BT909C-LE-XXXX
Pin Code	0000
Secure Simple Pairing Mode	On
UART Baudrate	115200/8/N/1

2.2 Supported Profiles

- SPP (Serial Port Profile)
- GATTs (Generic Attribute Profile LE-Peripheral role)
- GATTC (Generic Attribute Profile LE-Central role)
- HFP-HF (Hands-Free Profile)
- HFP-AG (Hands-Free-AG Profile)
- A2DP-Sink (Advanced Audio Distribution Profile)
- A2DP-Source (Advanced Audio Distribution Profile)
- AVRCP-Controller (Audio/Video remote controller Profile)

- AVRCP-Target (Audio/Video remote controller Profile)
- HID-DEVICE (Human Interface Profile)
- PBAP (Phonebook Access Profile)
- The function protocol enable configuration can be performed via `AT+PROFILE`. It is not possible to enable GATT Server and Client, HFP AG and HF, A2DP Sink and Source, or AVRCP Controller and Target simultaneously.
- FSC-BT909C has two versions of general standard firmware:
 - General dual-mode data transmission application firmware
 - General Audio application firmware

2.3 GATT Service

Type	UUID	Permission	Description
Ser-vice	0xFFFF0		Throughput Transmission Service
Write	0xFFFF2	Write, Write Without Response	The APP sends (data/messages) to the module
Notify	0xFFFF1	Notify	The module sends (data/messages) to the APP

Chapter 3

Quick Development Kit

[中文版]

3.1 Datasheet

- FSC-BT909C Datasheet

3.2 Evaluation Board

- FSC-DB008 : Feasycom Bluetooth audio application development board, it is compatible with modules such as FSC-BT936B, FSC-BT1036B, and BT909C.

3.3 AT Command Set

- FSC-BT909C General Data AT Command Set : Applicable to the FSC-BT909C Universal Dual-Mode Data Transmission Application Program.
- FSC-BT909C General Audio AT Command Set : Applicable to the FSC-BT909C Universal Audio Sink & Audio Source Application Program.

3.4 Serial Port Tool

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

3.5 APP&SDK

- **FeasyBlue App** : 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.

3.6 Firmware Upgrade

3.6.1 OTA Upgrade

- **Tool** : FeasyBlue App
- **User Guide** : Please refer to **FSC-BT909C - OTA Update** .

Chapter 4

Quick Start

[中文版]

4.1 What you need

4.1.1 Required Hardware

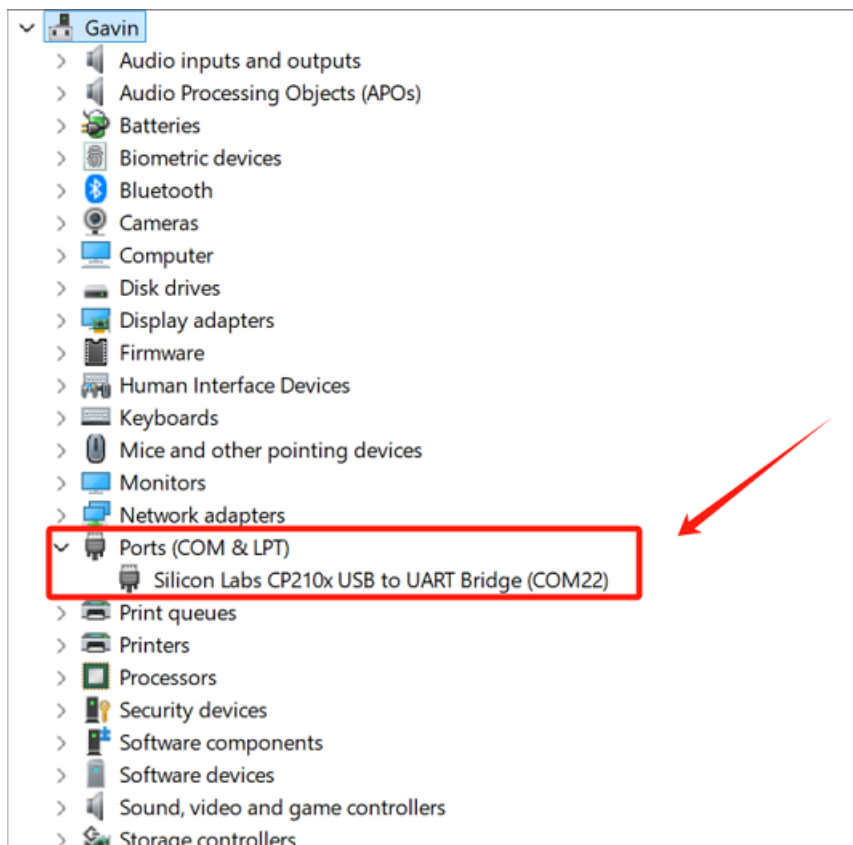
- 1 x FSC-DB008-BT909C Rapid Development Kit : FSC-DB008 Rapid Development Kit pre-integrated with the FSC-BT909C Bluetooth Audio Module
- 1 x Windows PC

4.1.2 Software and Setup

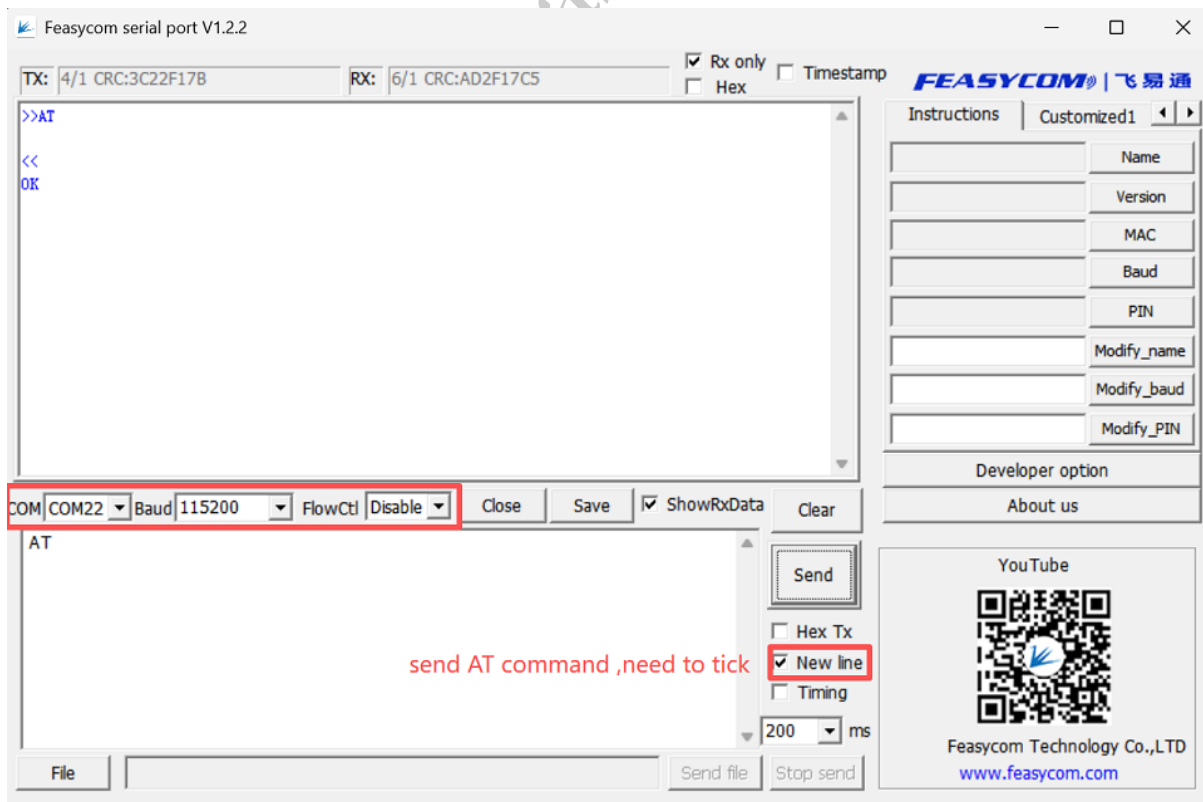
- Feasycom Serial Port Tool : A serial port communication analysis tool based on Windows PC.
- Communication Interface : UART
- UART Configuration : 115200/8/N/1

4.2 Hardware Access

1.Connect the FSC-DB008-BT909C to the PC via a USB-to-Type-C data cable. The PC will automatically recognize the serial port and generate a virtual COMx port.



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



4.3 Communication Test

The following are several basic general AT command test examples.

For more AT commands, please refer to [FSC-BT909C General Audio AT Command Set](#).

4.3.1 AT - UART Communication Test

Com- mand	AT\r\n
Response	\r\nOK\r\n
Descrip- tion	Test the UART communication between HOST and Module after power on, baudrate changed, etc.

Example:

```
Send:      >>AT\r\n
Response:<<\r\nOK\r\n
```

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

Example:

```
Send:      <<AT+NAME\r\n
Response: >>\r\n+NAME=FSC-BT909C-0BB5\r\n    //Example, please refer_
↳to the actual reading
Response: >>\r\nOK\r\n
```

4.3.3 AT+LENAM - Read/Write Local BLE Name

Example:

```
Send:      <<AT+LENAM\r\n
Response: >>\r\n+LENAM=FSC-BT909C-LE-0BB5\r\n    //Example, please_
↳refer to the actual reading
Response: >>\r\nOK\r\n
```

4.3.4 AT+VER - Read the Current Firmware Version

Example:

```
Send: <<AT+VER\r\n
Response: >>\r\n+VER=BT909C,V2.2.1,20230103\r\n //Example, please
↳refer to the actual reading
Response: >>\r\nOK\r\n
```

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Chapter 5

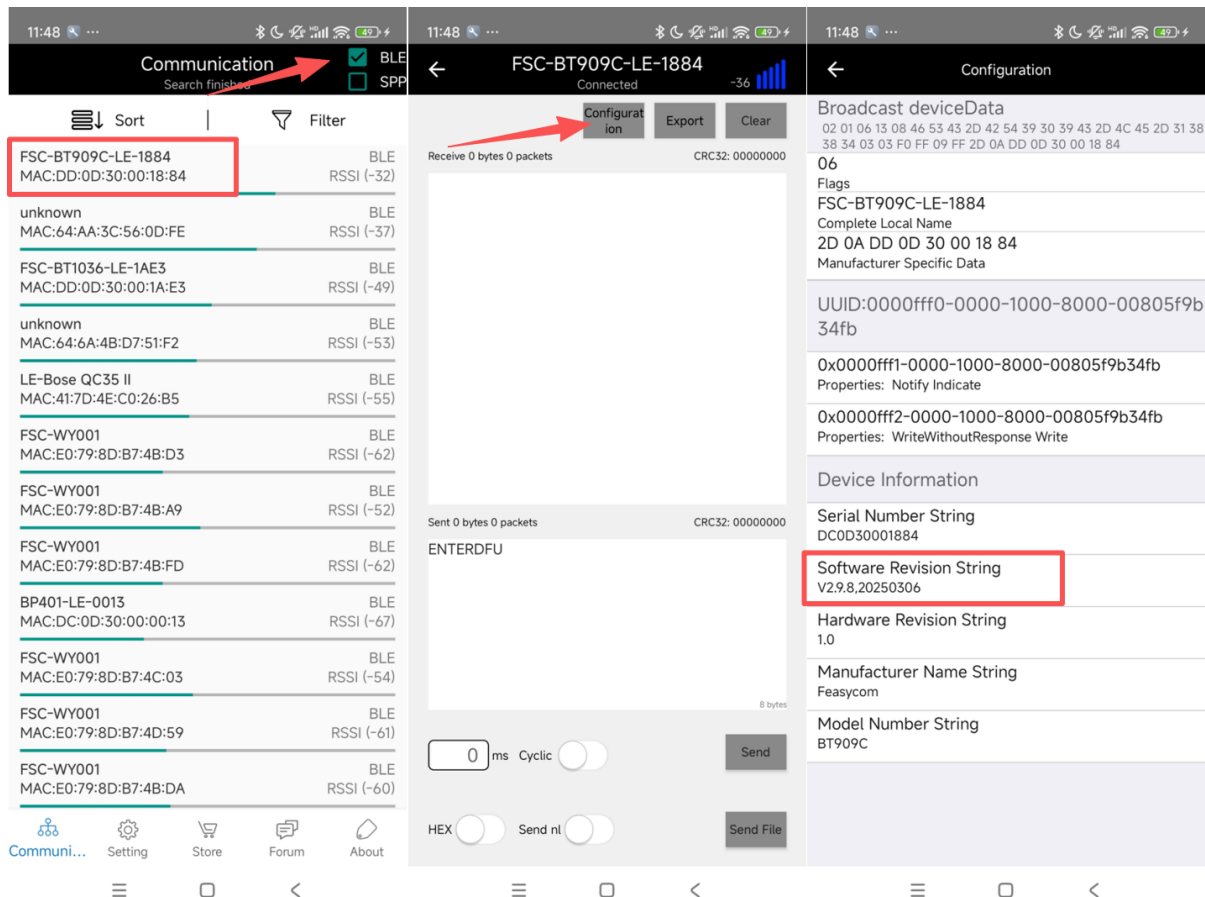
Obtain Firmware Version

5.1 FeasyBlue App

After establishing BLE connection between the FeasyBlue App and the FSC-BT909C , check the firmware version information on the **Configuration** page.

The profile of the Bluetooth module needs to enable the BLE (GATT) profile.

Example:



5.2 AT Command

Send the **AT+VER** command via UART to check the firmware version information of the module.

Example:

Send: >>AT+VER

Response: <<+VER=BT909C,V2.2.1,20230103 //Example, please refer to the actual reading

Response: <<OK

Chapter 6

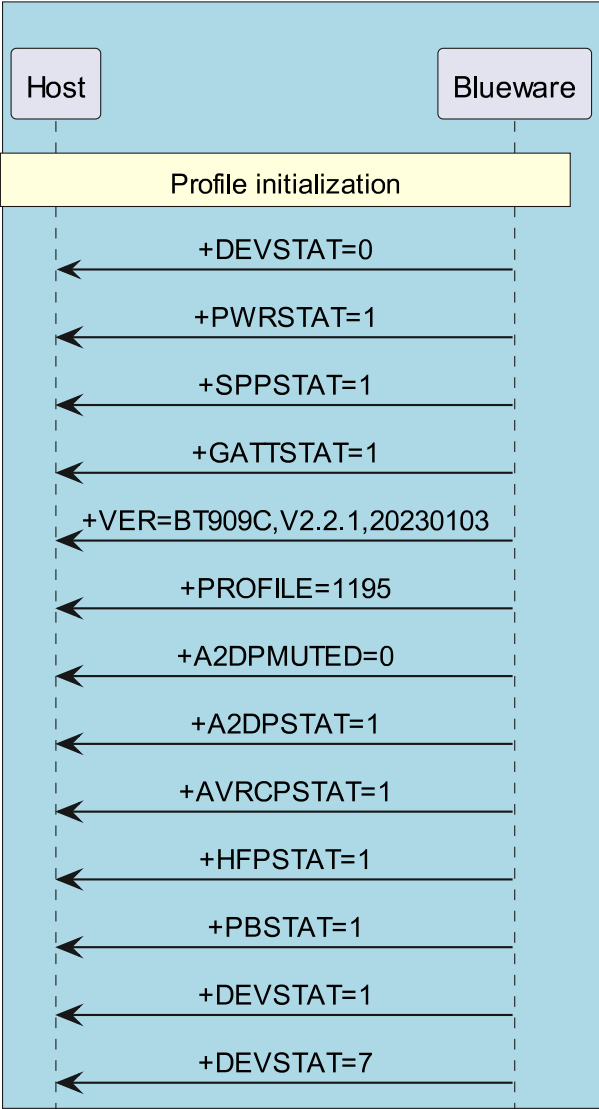
Development Examples

[中文版]

6.1 Profile Initialization

Module Profile initialization, examples:

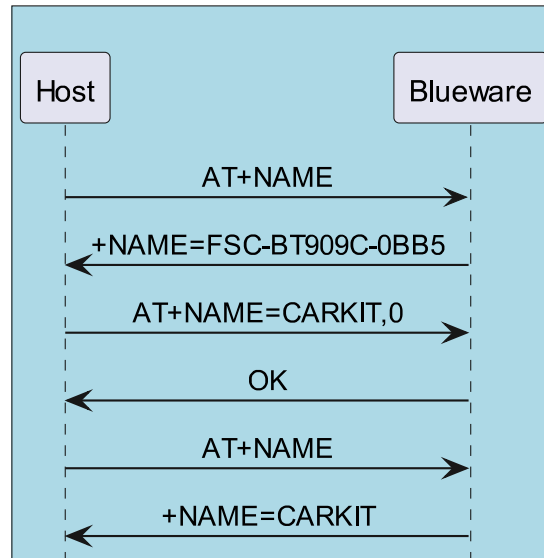
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6.2 Parameter Modification

6.2.1 Modify Bluetooth Name

Examples: Modify Bluetooth name to CARKIT(without address code suffix) and verify it.



6.2.2 Code Examples

Before the MCU modifies any parameters, it is recommended to first query, then modify, and finally verify.

For the MCU to modify the device name to CARKIT, the reference code example is as follows:

```

1 void change_name(void)
2 {
3     uart_send("AT+NAME\r\n");
4     if(uart_read("+NAME", name_buf))
5     {
6         if(memcmp(name_buf, "CARKIT", 6))
7         {
8             uart_send("AT+NAME=CARKIT,0\r\n");           //default
9             ↪disable MAC address suffix
10            uart_send("AT+NAME\r\n"); // read bt name
11            if(uart_read("+NAME", name_buf))
12            {
13                if(memcmp(name_buf, "CARKIT", 6))
14                {
15                    //change name fail
16                }
17            }
18            else
19            {
20            }
21        }
22    }
23 }

```

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```

18 //change name success
19     }
20 }
21 }
22 }
23 }
```

6.3 Throughput Mode Application

6.3.1 What is Throughput Mode?

There are two data transmission modes for FSC-BT909C: **Throughput Mode** and **Command Mode**. Please refer to the [FSC-BT909C General Data AT Command Set](#) and use the AT command `AT+TPMODE` to query and switch the working mode.

The differences between the two work modes are as follows:

- **Throughput Mode :**

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

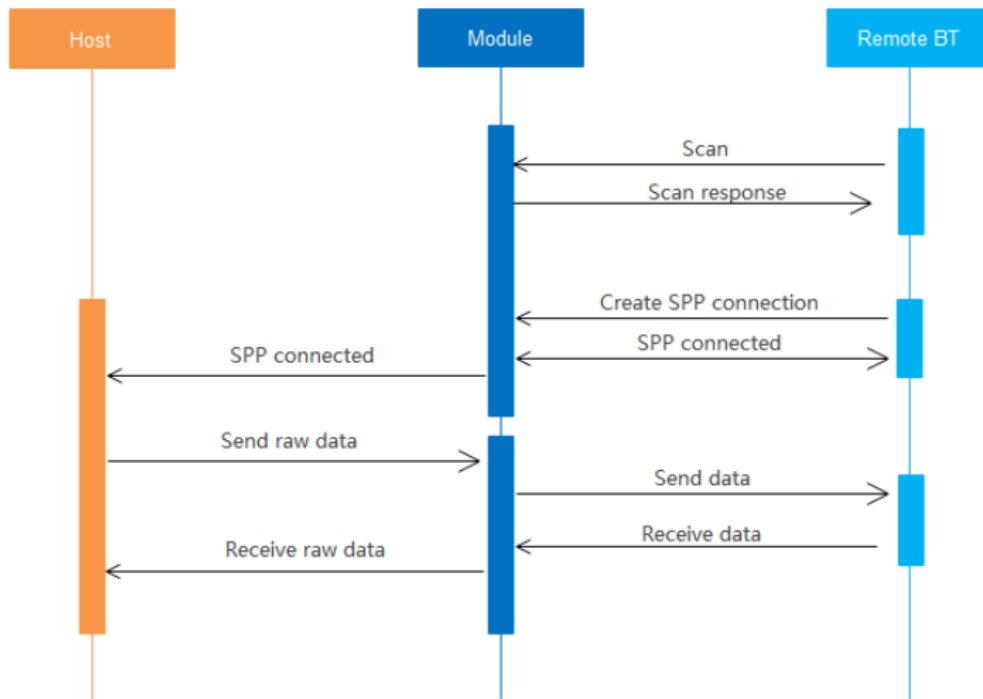
Bluetooth Connected : All data received via UART is sent as-is to the remote Bluetooth device. It does not contain any data headers or framing and does not require AT commands to send data.

- **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+LESEND` or `AT+SPPSEND`.

The timing sequence for the module to enter the throughput mode is as follows:



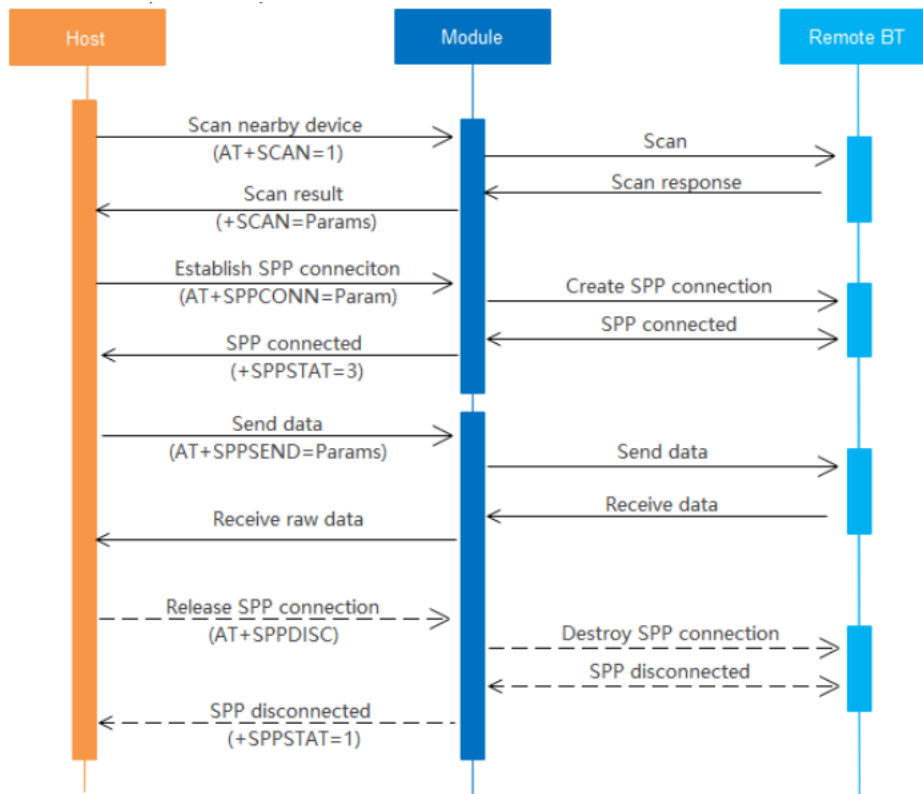
6.3.2 SPP Master and Slave Application

FSC-BT909C Universal Bluetooth dual-mode data transmission Application Firmware supports both SPP Master and SPP Slave functions simultaneously. When AT commands for the SPP Master function are used, the module acts as the Master role, otherwise, it acts as the Slave role.

Key AT Commands List for SPP Master Mode Function:

AT Commands
AT+SCAN
AT+SPPCONN
AT+SPPSTAT
AT+SPPDISC
AT+SPPSEND

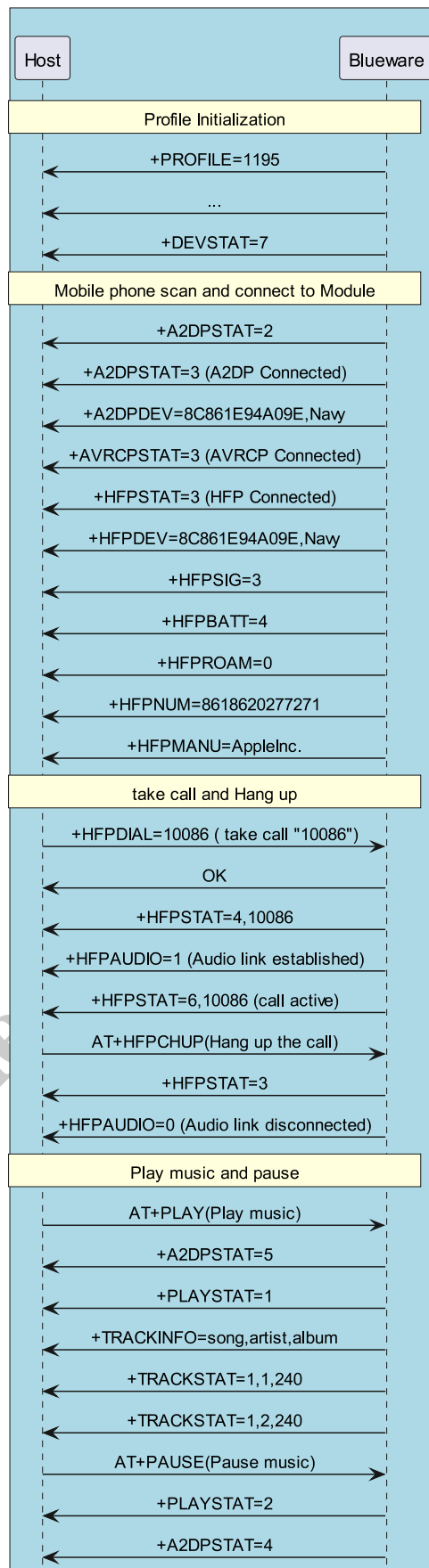
Example of SPP master interaction (AT command mode):



6.4 Audio Sink Mode Application

Note

If the factory firmware of the module is transceiver-in-one program, the default +PROFILE=339. You need to send the AT command AT+PROFILE=1195 to configure it to audio sink mode (enabling SPP, GATT Server, HFP Sink, A2DP Sink, AVRCP-Controller, and PBAP).

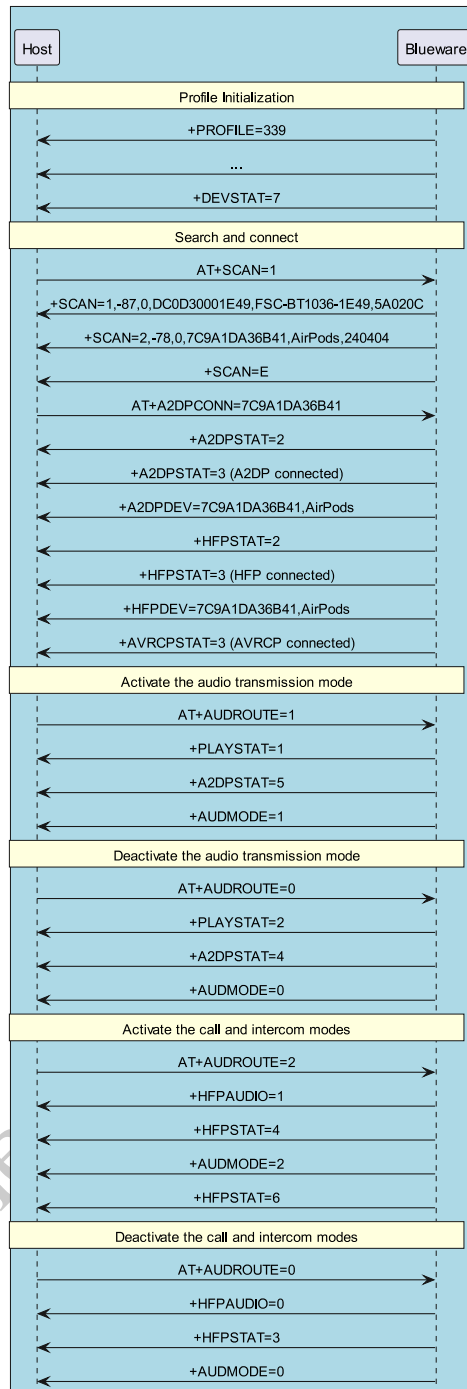


6.5 Audio Source Mode Application

6.5.1 Application Examples

Note

- It is necessary to configure the module to A2DP Source and HFP-AP.
- After connecting to the remote device, the module needs to select the audio route:
send audio (AT+AUDROUTE=1) and make calls (AT+AUDROUTE=2).



6.5.2 Code Examples

Connect to AirPods and start audio transmission

```

1 #define PROFILE_HFP_HF                (uint16) (BIT3)
2 #define PROFILE_HFP_AG                (uint16) (BIT4)
3 #define PROFILE_A2DP_SINK             (uint16) (BIT5)
4 #define PROFILE_A2DP_SOURCE           (uint16) (BIT6)
  
```

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```

5
6 void bt_connect(void)
7 {
8     //enable hfp source, a2dp source, avrcp tg, spp, gatt
9     uart_send("AT+PROFILE=339\r\n"); //if profile changes, module_
    ↪will auto reboot,
10     wait_ms(500);
11     uart_send("AT+PROFILE\r\n");
12     uint32 profiles = uart_read("+PROFILE", profiles);
13     if(profiles & (PROFILE_A2DP_SOURCE|PROFILE_HFP_AG))
14     {
15         uint8 addr[6];
16         uint8 buf[30]={0};
17         uint8 a2dp_state=0
18         uart_send("AT+SCAN=1\r\n");
19         uart_read_scan_addr("+SCAN", addr);
20         sprintf(buf, "AT+A2DPCONN=%s\r\n", addr);
21         uart_send(buf); //send a2dp connect
22
23         uart_read("+A2DPSTAT", a2dp_state);
24         if(a2dp_state == 3) //a2dp connected
25         {
26             uart_send("AT+AUDROUTE=1"); // start a2dp audio
27         }
28         uart_read("+A2DPSTAT", a2dp_state);
29         if(a2dp_state == 5)
30         {
31             //a2dp streaming
32         }
33     }
34     else
35     { /*not support master*/ }
36 }

```

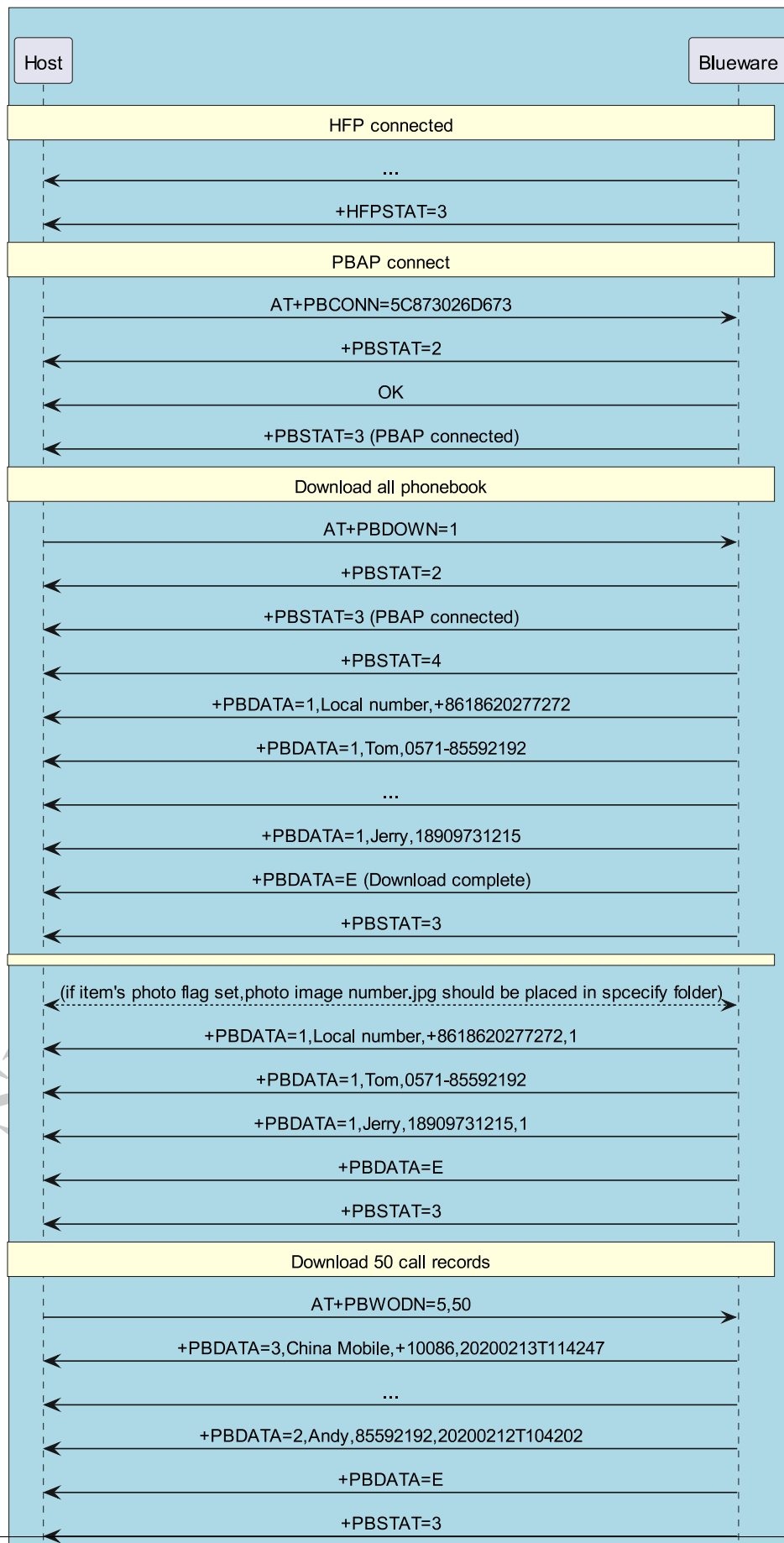
6.6 PhoneBook Download

Note

During PBAP(Phone Book Access Profile) download, some firmware versions may not support automatic PBAP connection. It is necessary to first send the AT command AT+PBCONN to establish the connection before performing the PBAP download.

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6.6.1 Application Examples



Chapter 7

Firmware upgrade

[中文版]

7.1 OTA upgrade

7.1.1 App Download

- FeasyBlue App (Base on Andriod or iOS)

7.1.2 User Guide

1.Run the FeasyBlue App, select **Setting - OTA Upgrade** to enter the OTA Upgrade function page. After entering, it will redirect to the device search page where you can select the Bluetooth device to be upgraded.

2.Scan and select the Bluetooth devices that need to be upgraded. After selecting the device, you will enter the **Firmware Loading** interface to load the firmware update file.

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

- **Select firmware:** Choose to load the firmware update file stored locally on the phone (the firmware update file is provided by Feasycom).
- **Get the firmware:** By entering the **DFU name**, the corresponding firmware update file can be downloaded and imported from the Feasycom cloud server via the network (the DFU name is provided by Feasycom).

4.After successfully loading the firmware update file, click the **Start Upgrade** button. The message “**Upgrading**” and the upgrade progress will be displayed, indicating that the upgrade mode has been successfully entered and the upgrade is in progress.

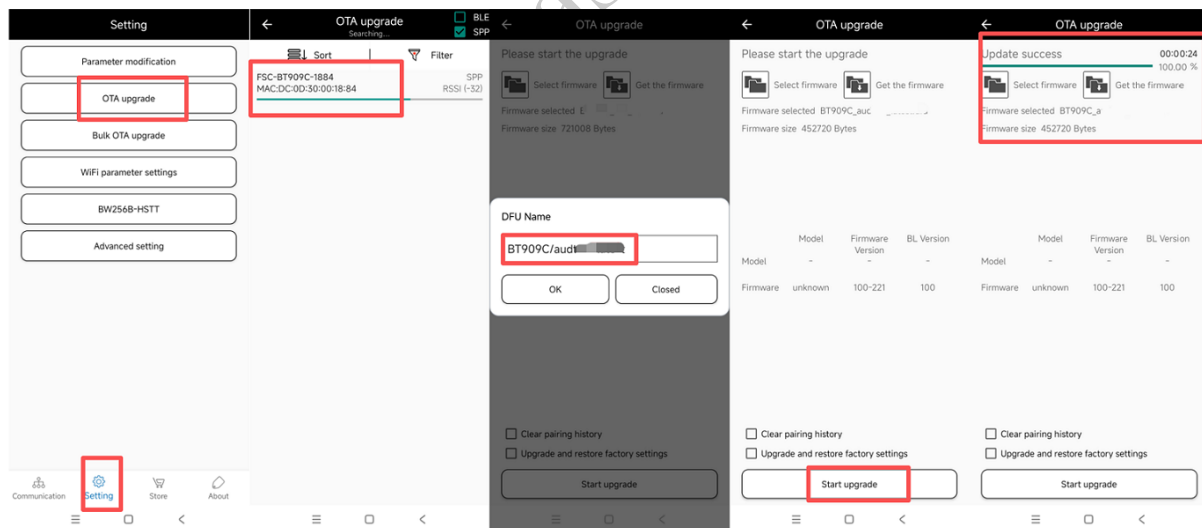
5.Wait for the upgrade progress bar to complete and display “**Upgrade Completed**” , then the upgrade is considered complete.

Warning:

1. When installing and running the FeasyBlue App, please allow the App to access **nearby devices, location information, and media and file access** permissions. Otherwise, it will result in the inability to search for nearby Bluetooth devices and load firmware update files.
2. If you choose to import the firmware update file by obtaining the firmware through the **DFU name**, please note that your phone needs to be connected to the Internet and ensure that the DFU name is entered correctly (case sensitive), otherwise an error message of **network or file error** will be displayed.
3. During the upgrade process, do not disconnect the power supply.

7.1.3 OTA Upgrade Example

Note: The following example is based on operations on the Android platform. The involved device name, parameters, and firmware DFU name are for demonstration purposes only. Please refer to the actual information during project implementation.



Chapter 8

Contact Information

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Support Forum : forum.feasycom.com

Chapter 9

Appendix

9.1 PDF Download

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