



FEASYCOM

深圳市

FSC-BT671

BT5.0 Mesh Programming User Guide

Version 1.7

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Revision History

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1. Introduction

This specification presents design guidelines for software engineers that use FSC-BT630 Mesh series modules for Bluetooth requirements.

1.1 Terms

Throughout this specification:

- {} : Content between {...} is optional
- << : Content behind << represents a *COMMAND* sent from Host to Module
- >> : Content behind >> represents a *RESPONSE* sent from Module to Host

1.2 Hardware Interface

- GPIO
- PWM
- UART
- SPI Master
- I2C Master/Slave
- Analog Input / Output

1.3 Supported Bluetooth Profile

- GATT Server (Generic Attribute Profile)
- Mesh (Mesh Profile)

1.4 Command Format

AT+ Command {=Param1{, Param2{, Param3...}}} <CR><LF>

- All commands start with "AT", end with <CR><LF>
- <CR> stands for "carriage return", corresponding hex is 0x0D
- <LF> stands for "line feed", corresponding hex is 0x0A
- If command has parameter, parameter keep behind "="
- If command has multiple parameters, parameter must be separated by ","
- If command has response, response start with <CR><LF>, end with <CR><LF>
- Module will always report command's execution result using "OK" for success or "ERROR" for failure

e.g.

1. Read module's BR/EDR local name


```
<< AT+NAME
>> +NAME=Feasycom
>> OK
```

2. Write a baudrate which is not supported


```
<< AT+BAUD=0
>> ERROR
```

1.5 Indication Format

<CR><LF>+ Indication{=Param1{, Param2{, Param3...}}}<CR><LF>

- All indications start with <CR><LF>, end with <CR><LF>
- If indication has parameter, parameter keep behind "="
- If indication has multiple parameters, parameter must be separated by ","

e.g.

1. Received "1234567890" from node 4315


```
>> +DATA=4315,CA00,10,1231231231
```

1.6 Module Default Settings

Physical UART Setting

115200/8/N/1

2. Command Table

2.1 General Commands

2.1.1 UART Communication Test

Format: AT
Response: OK
Description: Test the UART communication between HOST and Module after power on, baudrate changed, etc.
Example: UART communication test

```
<<  AT
>>  OK
```

2.1.2 Read Firmware Version

Format: AT+VER

Response: +VER=Param1
Param1: Firmware version

Example: Read module's firmware version

```
<<  AT+VER
>>  +VER=1.1.3,FSC-BT671,Mesh
>>  OK
```

2.1.3 Read Bluetooth Address

Format: AT+ADDR

Response: +ADDR=Param1
Param1: Local Bluetooth address

Example: Read module's Bluetooth address

```
<<  AT+ADDR
>>  +ADDR=DC0D308B42FA
>>  OK
```

2.1.4 Read/Write Transmit Power

Format: AT+TXPOWER{=Param1}

Param1: TX power (0.1dBm steps, for example the value of 10 is 1dBm and 55 is 5.5dBm, default:200)

Response: + TXPOWER =Param1

Param1: TX power (0.1dBm steps, for example the value of 10 is 1dBm and 55 is 5.5dBm)

Example: Read module's tx power

```
<< AT+TXPOWER
>> +TXPOWER=200
>> OK
```

2.1.5 Read/Write UART Baudrate

Format: AT+BAUD{=Param1}

Param1: Baudrate (2400/4800/9600/19200/38400/57600/115200/230400/256000/460800/512000/921600, default:115200)

Response: +BAUD=Param1

Description: Need Reset Module.

2.1.6 Read/Write Work Mode

Format: AT+MODE{=Param1}

Param1: mode (0, app mode, provisioned by mobile app. 1, tian mao jing ling mode, provisioned by tian mao jing ling. 2, Self-organizing network, provisioned by self. default:0)

Response: +MODE=Param1

Description: Config module work mode.

2.1.7 Soft Reboot

Format: AT+REBOOT

Description: Module software reboot.

2.1.8 Restore Factory Settings

Format: AT+RESTORE

Description: Module restore all factory settings then reboot

2.1.9 Send Data to Publication Address

Format: AT+NDSSEND=Param1, Param2

Param1: Data size

Param2: Data

Response: OK

Description: Send Data to publication address, default address is 0xCA00.

Example: Send Data 12345 to publication address without ack

<< AT+NDSSEND=5,12345

>> OK

2.1.10 Read / Write GATT Proxy Config

Format: AT+NDPROXY<=Param1>

Param1: enable proxy (0, disable GATT proxy 1, enable GATT proxy)

Response: OK

Description: Enable GATT proxy allow mobile phone connect and control mesh network.
Need reboot

Example: Enable GATT Proxy

<< AT+NDPROXY=1

>> OK

2.1.11 Read / Write Mesh Message Relay Config

Format: AT+NDRELAY<=Param1, Param2, Param3>

Param1: enable message relay (0, disable; 1, enable)

Param2: relay count

Param3: relay interval

Response: OK
Description: Enable and setting relay feature. Need reboot
Example: Enable relay feature << AT+NDRELAY=1,1,1 >> OK

2.1.12 Reset Mesh Network Setting

Format: AT+NDRESET
Response: OK
Description: Removes all keys and other settings that have been configured for this node.
Example: Reset Mesh Network Setting << AT+NDRESET >> OK

2.1.13 Read / Write Tian Mao Jing Ling Keys

Format: AT+TMCFG<=Param1, Param2, Param3> Param1: production id (Alibaba distribution) Param2: production secret (Alibaba distribution) Param3: address (Alibaba distribution)
Response: OK
Description: Config production id, production secret and address to module. Need reboot
Example: << AT+TMCFG=00000112, 60e989e27937b208cacf1c029442ec81,78da076bcf6c >> OK

2.1.14 Read / Write Node Publication Address

<p>Format: AT+NDPUBL<=Param1 > Param1: publication Address</p>
<p>Response: OK</p>
<p>Description: Config node publication Address. AT+NDSSEND will send data to publication address. Default Publication address is 0xCA00.</p>
<p>Example:</p> <pre><< AT+NDPUBL=CA00 >> OK << AT+NDPUBL >> +NDPUBL=CA00 OK</pre>

2.1.15 Read / Write Node Subscription Address

<p>Format: AT+NDSUBS<=Param1, Param2> Param1: 0, delete subscription address. 1, add new subscription address. Param2: subscription address.</p>
<p>Response: OK</p>
<p>Description: Add address to subscription list, delete address form subscription list or inquiry subscription list.</p>
<p>Example:</p> <pre><< AT+NDSUBS=0,CA00 >> OK << AT+NDSUBS=1,CA00 >> OK << AT+NDSUBS >> +UARTSUBS={ +UARTSUBS=CA00 +UARTSUBS=} OK</pre>

2.1.16 Read Node Address

Format: AT+NDID
Response: OK
Description: Get Current Node Address, if not provisioned, 0xFFFF will return.
Example: <pre><< AT+NDID >> +NDID=0013 OK</pre>

3. Indication Table

3.1 General Indications

3.1.1 Received data Indications

Format: +DATA=Param1, Param2, Param3, Param4 Param1: Source address Param1: Destination address Param2: Data Size Param3: Data
Example: Received data from 4315 (vendor model) <pre><< +DATA=4315,CA00,10,1231231231</pre>

3.1.2 Received generic on off client Message

Format: +ONOFF=Param1 Param1: 0, off. 1, on. 2, not support
Example: Received generic on off client message. <pre><< +ONOFF=0</pre>

3.1.3 Received generic power on off setup client message

Format: +ONPOWERUP=Param1

Example: Received generic power on off setup client message.

<< +ONPOWERUP=0

3.1.4 Received generic transition time client message

Format: +TRANSTIME =Param1

Example: Received generic transition time client message.

<< +TRANSTIME=2

3.1.5 Received generic lighting lightness client message

Format: +LIGHTNESS=Param1

Example: Received generic lighting lightness client message.

<< +LIGHTNESS=FFFF

3.1.6 Received generic level client message

Format: +LEVEL=Param1

Example: Received generic level client message.

<< +LEVEL=FFFF

3.1.7 Received generic lighting ctl client message

Format: +CTL=Param1,Param2,Param3

Param1: lightness

Param2: temperature

Param3: deltauv

Example: Received generic lighting ctl client message.

```
<< +CTL=FFFF,5555,4444
```

3.1.8 Received generic lighting ctl temperature client message

Format: +CTLTEMP=Param1,Param2

Param1: temperature

Param2: deltauv

Example: Received generic lighting ctl temperature client message.

```
<< +CTL=5555,4444
```

4. Quick Start

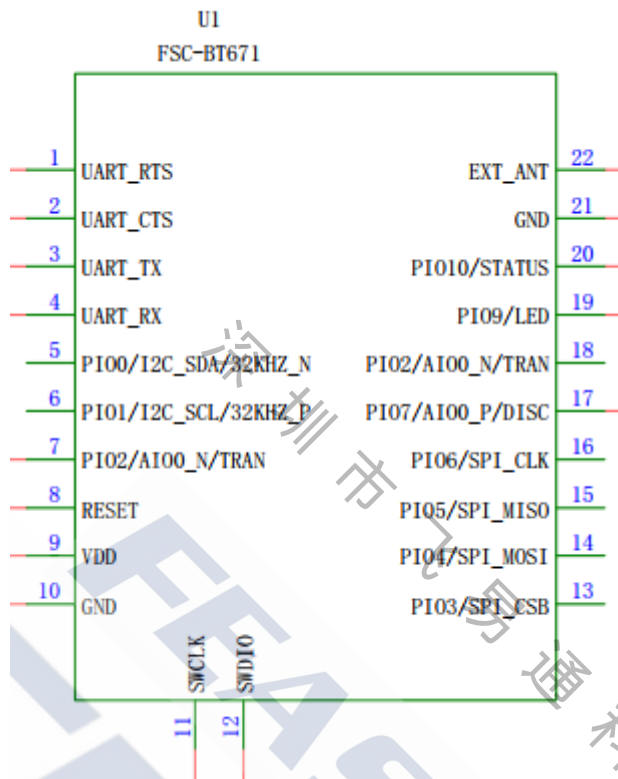
4.1.1 Introduction

FSC-BT671 provides Bluetooth networking solution, compatible with Bluetooth mesh, and supports Bluetooth 5.0.

FSC-BT671 support flow sig models and one vendor model use for data throughput:

MESH_GENERIC_ON_OFF_SERVER_MODEL,
MESH_GENERIC_POWER_ON_OFF_SETUP_SERVER_MODEL,
MESH_GENERIC_TRANSITION_TIME_SERVER_MODEL,
MESH_LIGHTING_LIGHTNESS_SERVER_MODEL,
MESH_GENERIC_LEVEL_SERVER_MODEL,
MESH_LIGHTING_CTL_SERVER_MODEL,
MESH_LIGHTING_CTL_SETUP_SERVER_MODEL,
MESH_LIGHTING_CTL_TEMPERATURE_SERVER_MODEL,

4.1.2 How to use FSC-BT671 in lighting solution?



In this solution, FSC-BT671 can be provisioned by mobile app, receive control signal from app and output PWM signal to drive LED. 2 PWM channels supported by default.

- 1) Connect VDD, GND, PIO2, PIO9, PIO10.
 - PIO2 used for restoring module network settings to defaults
 - PIO9, PIO10 used for PWM output
- 2) Set PIO2 to high level, reboot module, wait 1 second, so that module could restore network settings, then set PIO2 to low level
- 3) Download Bluetooth Mesh app, provision module in mesh network
- 4) Control Lightness in app
- 5) Module will output different PWM signals due to different control instructions

4.1.3 How to use FSC-BT671 access Tian mao jing ling (only available in China)?

In this solution, FSC-BT671 can be provisioned by tian mao jing ling, receive control signal from tian mao jing ling and output PWM signal to drive LED, 2 PWM channels supported by default.

- 1) Connect TX, RX, VDD, GND, PIO2, PIO9, PIO10
 - PIO2 used for restoring module network settings to defaults
 - PIO9, PIO10 used for PWM output
 - UART_TX and UART_RX used for interacting with module by AT commands

- 2) Set PIO2 to high level, reboot module, wait 1 second, so that module could restore network settings, then set PIO2 to low level
- 3) Send AT+MODE=1 to change module work mode. UART default settings are 115200/8/N/1
- 4) Send AT+TMCFG=<pid>,<p_sec>,<addr> to configure module
- 5) Let tian mao jing ling provision module
- 6) Give audio instruction to tian mao jing ling, such as “亮一点”, “暗一点”, etc.
- 7) Module will output different PWM signals due to different control instructions

4.1.4 How to transfer data through Fsc-BT671 in Bluetooth mesh network?

In this solution, FSC-BT671 can be provisioned by itself, receive message from network and send message to network.

- 1) Connect TX, RX, VDD, GND, PIO2
 - PIO2 used for restoring module network settings to defaults
 - UART_TX and UART_RX used for interacting with module by AT commands
- 2) Send AT+MODE=2 to change module work model. UART default settings are 115200/8/N/1
- 3) Send AT+REBOOT to reset module
- 4) when module received data packet, module will send +DATA=<source address>,<destines address>,<len>,<data> to host
- 5) If host need to send data through module to other devices in mesh network, host shall send AT+NDSSEND=<len>,<data> to module, then all the other devices in mesh network will receive the data