FSC-BT6XX

BT5.0 MutilRole Programming User Guide

Version 5.0

Revision History

Version	Data	Notes	Author
1.0	2016/05/12	First Release	Eric
2.0	2016/10/13	Add Commands	Eric
3.0	2017/03/10	Add GPIO Indications	Navy
5.0	2019/05/04	Add MutilRole Command	Eric

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Contents

1. Introduction

This specification presents design guidelines for software engineers that use FSC-BT6XX 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/Slave
- I2C Master/Slave
- Analog Input/Output

1.3 Supported Bluetooth Profile

- GATT Server (Generic Attribute Profile)
- GATT Client (Generic Attribute Profile)
- HID Keyboard (Human Interface 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 mobile phone via GATT Server profile
   >>   *+GATTDATA=10,1234567890*

1.6 Module Default Settings

Local Name	Feasycom
Service-UUID	FFF0
Write-UUID	FFF2
Notify-UUID	FFF1
Physical UART Baudrate	115200bps/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=Param Param: Firmware version (15 Bytes ASCII)
Example: Read module's firmware version *<<   AT+VER* *>>   +VER=1.0.1,FSC-BT630* *>>   OK*

2.1.3 Read MAC Address

Format: AT+ADDR
Response: +ADDR=Param Param: Module's LE MAC address (12 Bytes ASCII)

2.1.4 Read/Write Local Name

Format: AT+NAME {=Param1{, Param2}}
Param1: BLE local name (1~29 Bytes ASCII, default: Feasycom)
Param2: MAC address suffix (0/1, default: 0)
      (0) Disable suffix
      (1) Enable suffix "-XXXX" (lower 4 bytes of MAC address) after local name

Response: +NAME=Param

Description: Write local name if parameter existence, otherwise read current local name

Example: Read current local name
<<   *AT+NAME*
>>   *+NAME=Feasycom*
>>   *OK*
Example: Change module's local name to "ABC"
<<   *AT+NAME=ABC*
>>   *OK*
Example: Change module's local name to "ABC" and enable suffix
<<   *AT+NAME=ABC,1*
>>   *OK*

2.1.5 Read/Write UART Baudrate

Format: AT+BAUD{=Param}
Param: Baudrate (1200/2400/4800/9600/19200/38400/57600/115200/
230400, default:115200)

Response: +BAUD=Param

Description: Module's baudrate will be changed immediately after received this command

2.1.6 Turn On/Off Throughput Mode

Format: AT+TPMODE{=Param}

Param: Throughput mode (0/1, default:0)

    (0) Turn Off

    (1) Turn On

Response: +TPMODE=Param

Description: When GATT profile connected and throughput mode is on, the AT command will be de-active, every byte received via physical UART will be sent to air, vice visa

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Example: Read current throughput mode

<<   *AT+TPMODE*

>>   *+TPMODE=1*

>>   *OK*

Example: Turn off throughput mode

<<   *AT+TPMODE=0*

>>   *OK*

2.1.7 Turn On/Off Low Power Mode

Format: AT+LPM{=Param}

Param: Low Power Mode (0/1, default: 0)

    (0) Turn Off

    (1) Turn On

Response: +LPM=Param

2.1.8 Turn On/Off Hardware Flow Control

Format: AT+FLOWCTL{=Param}

Param: Hardware Flow Control (0/1, default: 0)

    (0) Turn Off

    (1) Turn On

Response: +FLOWCTL=Param

2.1.9 PIO Function Configuration

Format: AT+PIOCFG{=Param1,Param2}	
Param1	0: Disable Command/Transmission mode switch function 1: Enable Command/Transmission mode switch function
Param2	0: Disable Bluetooth disconnect function 1: Enable Bluetooth disconnect function

Response: +PIOCFG=Param1,Param2

2.1.10 Scan Nearby Devices

Format: AT+SCAN =Param1{, Param2{, Param3}}
Param1: (0~3)
    (0) Stop scan
    (1) Scan nearby BLE devices
    (2) Scan nearby BLE devices, and report packet info.
Param2: (1~48) Scan period. unit:1.28s, default:12.8s
Param3: (1~25 Bytes ASCII) Name filter. Filter scan results with name if set

Description: Refer to Chapter 3 for format description of scan result

2.1.11 Release All Connections

Format: AT+DISCALL

Description: Module release all Bluetooth connections with remote device

2.1.12 Soft Reboot

Format: AT+REBOOT

Description: Module release all Bluetooth connections with remote device then reboot

2.1.13 Restore Factory Settings

Format: AT+RESTORE

Description: Module restore all factory settings then reboot

2.1.14 Establish GATT Connection

Format: AT+LECCONN=Param1{,Param2,Param3,Param4}
Param1: MAC address of target device & MAC address type (13 Bytes ASCII)
Param2: Service-UUID, Support 16 Bit and 128 Bit (4 Bytes/32 Bytes ASCII)
Param3: Write-UUID, Support 16 Bit and 128Bit (4 Bytes/32 Bytes ASCII)
Param4: Notify-UUID, Support 16 Bit and 128Bit (4 Bytes/32 Bytes ASCII)

Description: If parameter 2, parameter 3, parameter 4 do not exist, the module will automatically search for the GATT service connected to the remote device
Note: BT630 Only support 16bits UUID.

Example: Specified remote device service connections
<<   *AT+LECCONN=123456ABCDEF0,FFF0,FFF2,FFF1*
>>   *OK*

2.1.15 Send Data Via GATT

Format: AT+LESEND=Param1, Param2, Param3
Param1: Link channel (0~5)
Param2: Payload length (1~155)
Param3: Payload (1~155 Bytes UTF8)

Description: If throughput mode is on, this command is de-active

Example: Send data "1234567890" to remote device via GATT
<<   *AT+LESEND=0,10,1234567890*
>>   *OK*

2.1.16 Release Specified Channel

Format: AT+LEDISC=Param1 Param1: Link channel (0~5)
Description: Disconnect specified channel.
Example: Disconnect channel 0. *<<   AT+LEDISC=0* *>>   OK*

2.1.17 Inquiry All Channel Info

Format: AT+CHINFO
Description: Inquiry all channel info. Response
Example: Inquiry all channel info *<<   AT+CHINFO* *>>   +CHINFO{* *   +CHINFO=0,1,0,000000000000,0,0,0* *   +CHINFO=1,1,0,000000000000,0,0,0* *   +CHINFO=2,1,0,000000000000,0,0,0* *   +CHINFO=3,1,0,000000000000,0,0,0* *   +CHINFO=4,1,0,000000000000,0,0,0* *   +CHINFO=5,1,0,000000000000,0,0,0* *   +CHINFO}* *   OK*

3. Indication Table

3.1 General Indications

3.1.1 AT+SCAN=1 Scan Result

Format: +SCAN =Param1, Param2, Param3, Param4{, Param5, Param6}
Param1: Index (1~8)
Param2: Device address type (0~2)
    (0)LE public address
    (1)LE random address
Param3: MAC address (12 Bytes ASCII)
Param4: RSSI (-255 ~ 0)
Param5: Size of Param6 if exist
Param6: Remote Device Name

Description: Param5/Param6 may not exist if remote device out of distance

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Example: Scan nearby BLE devices
<<   *AT+SCAN=1*
>>   *OK*
    +SCAN=1,0, DC0D30000003, -32,8, Feasycom
    +SCAN=2,1, DC0D30000044, -64,8, Feasycom_0044
    +SCAN=3,0, DC0D30000097, -47,8, FSC_BT906

3.1.2 AT+SCAN=2 Scan Result

Format: +SCAN =Param1, Param2, Param3, Param4, Param5, Param6
Param1: Device address type (0~3)
    0: Public
    1: Random Static
    2: Random Private Resolvable
    3: Random Private Non Resolvable
Param2: MAC address (12 Bytes ASCII)
Param3: RSSI (-255 ~ 0)
Param4: Packet type (0~3)
    0: Adv Ind
    1: Adv Direct Ind

2: Adv Scan Ind
        3: Adv Non Conn Ind
Param5: Packet length
Param6: Packet data

Description:

Example: Scan nearby BLE devices
<<   AT+SCAN=2
>>   OK
    +SCAN=0,DC0D30001B1B,-67,0,34,02010A030200FF09FF0000DC0D30001B1B
    +SCAN=3,0E436C624FBA,-76,3,62,1EFF0600010920026E6EB566567A13438D6FA3A1
    3D7D737B3803227985B543
    +SCAN=1,DC0D30000EB6,-69,0,22,060942573232360302F018

3.1.2 GATT Received Data

Format: +GATTDATA=Param1, Param2, Param3
Param1: Channel
Param2: Payload length
Param3: Payload

Example: Received data "1234567890" from channel 0 via GATT
<<   +GATTDATA=0,10,1234567890

3.1.3 Channel Info

Format: +CHINFO=Param1, Param2, Param3, Param4
Param1: Channel
Param2: State (0: uninitialized, 1 ready, 2 connecting, 3 connected)
Param3: Role (0: slave 1: master)
Param4: Remote Device Address.

3.2 GPIO Indications

3.2.1 LED Pin

PIN32 (Output)
Low Level   Initializing
Blink in 1Hz   Ready to connecting
High Level   Connected

3.2.2 State Pin

PIN33 (Output)
Low Level   Disconnected
High Level   Connected