

SKB378 AT 指令集/ SKB378 AT Instruction and Examples

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一、功能引脚/Pin function

PIN	类型/Type	说明/Description
PB.01	UART TXD	默认串口输出端/Default serial port output
PB.02	UART RXD	默认串口输入端/Default serial port input
PA.03	GPIO	默认低电平, 作为从机被连接后高电平, 断开后低电平/Default low level, becomes high level after being connected as slave, and restores low level after disconnecting
PA.04	GPIO	默认低电平, 作为从机连接后可进行通信时高电平/Default low level, becomes high level when the slave is connected to communicate
PA.05	GPIO	默认低电平, 作为主机连接从机后高电平, 断开低电平/Default low level, Switch to high level after connecting the slave as the host and restore low level after disconnecting
PA.06	GPIO	默认低电平, 作为主机连接后可进行通信时高电平/Default low level, becomes high level when connected as host for communication
PB.00	GPIO	对外唤醒引脚, 默认高电平, 电平跟随唤醒指令值/External wake up pin, default high level, level follows wake up instruction value

二、默认参数/Default parameters

2.1 蓝牙默认参数 /Bluetooth Default parameters

广播名称/Name of advertising: SKY_EFR32

发射功率/Transmission power: 0dBm

广播间隔/Advertising interval: 200ms

广播状态/State of advertising: 开启 /Open

串口状态/serial port state: 开启/Open

2.2 串口默认参数/Serial port Default Parameters

波特率/Baud rate: 115200 bps

引脚/PIN: TX: PB.01 RX: PB.02

数据位/Data bits: 8 位/ 8 bit

校验位/Parity bit: 无

停止位/Stop bit: 1 位 / 1 bit

流控/Flow control: 无

2.3 连接通信默认参数 /Communication default parameters

最大可连接设备个数/Maximum number of connectable devices: 从机/slave:4 个
主机/master: 1 个

通信/Communication:

1. 默认仅与最新连接的设备通信/Communicate with the newly connected device by default
2. AT+COMM_MAC: 可设置单个或多个通信设备/Single or multiple communication devices can be provided.

三、 蓝牙广播数据解析/Bluetooth broadcast data parsing

长度/Length	类型/Type	类型内容/Value	描述/Describe
2	0x01	0x06	
10	0x09	0x34B595F4546523332	蓝牙名称/Bluetooth name
17	0X07	0x6E400001B5A3F393E0A 9E50E24DCCA9E	UUID
11	0xFF	0x11310212003C8430A919	>Company:Reserved ID 0212->固定字节/Fixed bytes 003C8430A919->MAC 地址/MAC address

四、 蓝牙 AT 指令解析/Bluetooth AT Command parsing

4.1 AT 指令格式/AT Command format

指令串由五个部分构成: 指令头、指令、参数连接符、 [参数]、结束符, 指令头为:"AT+", 参数连接符为 "=", 结束符为"\r\n", 参数连接符、参数为可选项(即可以带参数、也可以不带参数), 当指令串携带有参数则表示设置指令, 若不带参数则表示查询指令。

The Command string consists of five parts: Command header, Command, parameter connector, [parameter], and terminator. The Command header is "AT+", the parameter concatenator is "=", and the end character is "\r\n". The parameter concatenator and parameter are optional (either with or without parameters). If the Command string contains parameters, it indicates that the Command is set; If it does not, it indicates that the Command is queried.

举例/For example:

设置广播间隔指令/Sets the broadcast interval command: **AT+ADVINTVL=1000\r\n**

查询广播间隔指令/Query broadcast interval instruction: **AT+ADVINTVL\r\n**

4.2 通用命令/General command

4.2.1 获取所有指令/Get all instructions: AT+? or AT+HELP

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+? or AT+HELP	AT+?\r\n AT+HELP\r\n	<pre> ---AT Commands Help--- 1. AT+? or AT+HELP --Get AT commands help. 2. AT+VER --Show Firmware version. 3. AT+MAC --Get device MAC address. 4. AT+PEER --Get peer device MAC address when in connection. 5. AT+RESET --Reset the module by software. 6. AT+FACTORY --Restore factory parameters. 7. AT+STATUS --Get current parameters. 8. AT+CON_MAC=<mac addr> --Connect a peripheral via MAC address 9. AT+DISCON=<n/s> --Disconnect to peer device when in connection. 10. AT+BAUD=<baudrate> --Set or Get UART's baudrate in bps unit. --Could be 2400/4800/9600/14400/19200/38400/57600/115200/230400/460800. 11. AT+TXFWR=<tx power> --Set or Get Radio TX power in dBm unit. --Could be -20/-16/-12/-8/-4/0/2/4/6 12. AT+DEV_NAME=<name> --Set or Get Modify device's name. --Length of name less than 18. 13. AT+ADVINTVL=<interval> --Set or Get Modify advertisement interval in ms unit. --Interval=[20~5000]. 14. AT+SCAN_BLE --Scan for peripherals </pre>	获取模块可支持的所有指令集 /Gets all command sets supported by the module

4.2.2 获取固件版本/Obtaining the Firmware Version: AT+VER

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+VER	AT+VER\r\n	<pre>[DA]EFR32BG22.00.01</pre>	获取模块固件版本信息/Obtain the module firmware version information

4.2.3 获取蓝牙 MAC/Get device MAC address: AT+MAC

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+MAC	AT+MAC\r\n	<pre>[DA]00:3C:84:30:A9:19</pre>	获取蓝牙 MAC 地址/Get the Bluetooth MAC address

4.2.4 获取连接设备的 MAC 地址/Obtain the MAC address of the connected module:

AT+PEER

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+PEER	AT+PEER\r\n	1. 未连接设备/Unconnected device: [DA]00:00:00:00:00:00,00:00:00:00:00:00 2. 已连接设备/Connected devices: [DA]00:3C:84:2C:78:30 , 74:77:FF:61:3E:02	获取与模块连接的蓝牙设备的 MAC 地址,以","为分隔符,前面是模块所连接从机 MAC,后面是模块所连主机 MAC/Gets the MAC address of the Bluetooth device connected to the module, With "," as the separator, the front is the slave MAC connected to the module, followed by the host MAC connected to the module.

4.2.5 复位模块/Reset the module: AT+RESET

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+RESET	AT+RESET\r\n	[DA]Reset OK	复位蓝牙模块/Reset the Bluetooth module

4.2.6 恢复出厂设置/Factory data reset: AT+FACTORY

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+FACTORY	AT+FACTORY\r\n	[DA]Factory OK	使模块恢复出厂时的设置/Restore the module to its factory Settings

4.2.7 获取模块状态/Obtaining module status: AT+STATUS

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+STATUS	AT+STATUS\r\n	[DA]115200, SKY_EFR32, 200, 0	其数据组成为: 波特率, 蓝牙名称, 广播间隔, 发射功率/ Its data composition is: baud rate, Bluetooth name, broadcast interval, transmission power

4.2.8 以 MAC 连接对等蓝牙设备/Using a MAC connect to a peer Bluetooth device:

AT+CON_MAC

连接对等蓝牙设备: AT+CON_MAC=MAC 地址\r\n

Connect to peer Bluetooth devices: AT+CON MAC=MAC address \r\n

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT+CON_MAC	AT+CON_MAC=12:34:56:78:90:AB\r\n	<ol style="list-style-type: none"> 指令错误/Command error: [DA]ERR:40002 [DA]ERR:40003 扫描超时/Command error: [DA]Timeout 连接成功/Command error: [DA]M Connect=62:FF:6F:B0:65:B1 连接失败/Command error: [DA]StartScan! [DA]Connected=DC:CC:45:8A:AA:A6 [DA]Disconnected 	<ol style="list-style-type: none"> 使用 MAC 连接/Using MAC connection 连接失败模块会自动重连(最多 3 次)/The failed module will be automatically reconnected (up to 3 times). 错误码/Error code: 40002: 参数错误/ parameter error 40003: 参数长度错误/ Parameter length error

4.2.9 断开对等蓝牙设备/Disconnect to peer Bluetooth devices device: AT+DISCON

断开对等蓝牙设备: AT+DISCON=s\r\n m:作为主机断开; s:作为从机断开。作为主机断开时, 后面可选择断开某一个设备

AT+DISCON=m/s\r\n m:master role; s:slave role。When you disconnect as a host, you can choose to disconnect a certain device later.

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+DISCON	AT+DISCON=m/s\r\n AT+DISCON=m,00:11: 22:33:44:55\r\n	1. 设置成功/Successfully set: [DA]Set OK [DA]M Disconnect=00:3C:84:2C:78:30	1. 断开对等蓝牙设备/Disconnect to peer Bluetooth devices device

4.2.10 查询/设置串口波特率/Query and set the baud rate of the serial port :

AT+BAUD

1. 可查询当前波特率, 或从固定波特率中选择一项设置为当前波特率/ You can query the current baud rate or select a fixed baud rate to set the current baud rate

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+BAUD	查询/Query: AT+BUAD\r\n 设置/Set: AT+BUAD=115200\r\n	1. 查询/Query: [DA]Baud:115200 2. 设置成功/Successfully set: [DA]Set OK 3. 设置失败/Setup failed: [DA]ERR:40002	1. 查询/设置串口波特率 /Query and set the baud rate of the serial port 2. 可选项/Options: 2400/4800/9600/14400/ 19200/38400/57600/ 115200/230400/460800 2. 错误码/Error code: 40002: 参数错误/ parameter error

4.2.11 查询/设置发射功率/Query or set the transmitted power: AT+TXPWR

设置此指令模块须处于未连接状态/To set this command, the module must be disconnected.

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+TXPWR	查询/Query: AT+TXPWR\r\n 设置/Set: AT+TXPWR=0\r\n	1. 查询/Query: <pre>[DA]TxPower:0</pre> 2. 设置成功/Successfully set: <pre>[DA]Set OK</pre> 3. 设置失败/Setup failed: <pre>[DA]ERR:40002</pre>	1. 可选项/Options: -20/-16/-12/-8/-4/0/2/4/6 2. 错误码/Error code: 40002: 参数错误/parameter error

4.2.12 查询/设置广播名称/Query/Set the broadcast name: AT+DEV_NAME

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+DEV_NAME	查询/Query: AT+DEV_NAME\r\n 设置/Set: AT+DEV_NAME=SKY\r\n	1. 查询/Query: <pre>[DA]Name:SKY_EFR32</pre> 2. 设置成功/Successfully set: <pre>[DA]Set OK</pre> 3. 设置失败/Setup failed: <pre>[DA]ERR:40003</pre>	1. 查询/设置广播名称 /Query/Set the broadcast name 2. 范围: 名称最长为 20 字节 /Range: The maximum length of the name is 20 bytes 3. 错误码/Error code: 40003: 参数长度错误 /Parameter length error

4.2.13 查询/设置广播间隔/Query or set the broadcast interval: AT+ADVINTVL

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+ADVINTVL	查询/Query: AT+ADVINTVL\r\n 设置/Set: AT+ADVINTVL=500\r\n	1. 查询/Query: <pre>[DA]AdvIntval:200</pre> 2. 设置成功/Successfully set: <pre>[DA]Set OK</pre> 3. 设置失败/Setup failed: <pre>[DA]ERR:40002</pre>	1. 查询/设置广播间隔/Query or set the broadcast interval 2. 设置范围/The set range: 20ms~10000ms 步进/step value: 10ms 3. 错误码/Error code: 40002: 参数错误/parameter error

4.2.14 扫描周围 BLE 设备/Scan around BLE devices: AT+SCAN_BLE

扫描并通过串口输出 BLE 设备，最大可输出 100 个设备

Scan and output BLE devices through serial ports, up to 100 devices can be output

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+SCAN_BLE	AT+SCAN_BLE\r\n	<pre>[DA]StartScan: 开始扫描/Start scanning</pre> <pre>[DA]StartScan!</pre> <pre>[1th]EF:19:20:D6:D5:16,GW2.EF1920D6D516,-53</pre> <pre>[2th]EA:A1:5A:EA:B3:79,GW2.EAA15AEAB379,-44</pre> <pre>[3th]CB:24:FC:2D:26:86,null,-97</pre> <pre>[4th]7E:BD:40:95:3E:10,null,-63</pre> <pre>[5th]D3:E5:AB:28:05:95,null,-98</pre> <pre>[6th]F0:BE:9B:BC:08:B1,null,-97</pre> <pre>[7th]73:71:37:6A:64:78,null,-83</pre> <pre>[DA]Timeout: 扫描结束/End of scan</pre> <pre>[DA]Timeout</pre>	1. 扫描周围 BLE 设备/Scan around BLE devices 2. 数据组成/The data of: MAC 地址, 蓝牙名称(无名称显示 null), rssi/ MAC address, Bluetooth name (null if no name), RSSI 3. 扫描时间为 10s, 带名称设备在扫描期间输出, 未扫描到名称设备在扫描结束后输出/The scanning time is 10 seconds. Devices with a name output output during the scanning, and devices without a name output output after the scanning

4.2.15 打开或关闭串口/Enable or disable the serial port: AT+UART_EN

打开或者关闭串口(掉电不保存), 关闭串口达到降低功耗的目的; 关闭串口后无法通过串口发送指令去打开串口, 可选择使用手机连接设备后发送此指令打开串口或重新上电。

Open or close the serial port (power failure does not save), close the serial port to reduce power consumption; After the serial port is closed, you cannot open the serial port by sending a command through the serial port. You can use a mobile phone to connect the device and send the command to open the serial port or power on the device again.

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+UART_EN	AT+SCAN_BLE=1/0\r\n	设置即更改, 无返回结果/ The setting is changed and no result is returned	1. 打开或者关闭串口/Enable or disable the serial port 2. 1: 打开串口/Open the serial port 2: 关闭串口/Close a serial port

4.2.16 唤醒其他模块/Wake up other modules: AT+WAKE_UP

模块出厂默认拉高唤醒引脚(PB.00), 引脚电平跟随设置值

By default, the module raises the wake pin (Pb.00), and the pin level follows the set value

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+WAKE_UP	AT+WAKE_UP=1/0\r\n	1. 设置成功/Successfully set: <u>[DA]Set OK</u>	1. 唤醒其他模块/Wake up other modules 2. 0: 拉低电平/Lower level 1: 拉高电平/higher level

4.2.17 选择通讯设备/Select communication equipment: AT+COMM_MAC

根据 MAC 地址选择一个或者多个需要进行数据通讯的从机

According to the MAC address, select one or more slave machines that need data communication.

指令	样例	可能返回的结果	说明
AT+COMM_MAC	AT+COMM_MAC=00:3C:84:2A: DB:C4,00:3C:84:2C:89:2D\r\n	1. 设置失败: <u>[DA]ERR:40008</u> 2. 设置成功: <u>[DA]Set OK</u>	1. 指令格式错误、未连接该设备/The instruction format is wrong or the device is not connected. 2. 选择 MAC 后, 模块只会向选中的 MAC 发送数据/When

			a MAC is selected, the module will only send data to the selected MAC.
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4.2.18 设置通讯服务 UUID/Set the service UUID of communication.: AT+SUUID

设置通讯的服务 UUID

Set the service UUID of communication.

指令	样例	可能返回的结果	说明
AT+SUUID	AT+SUUID=FF00\r\n AT+SUUID=0000FF00000010 00800000805F9B34FB\r\n	1. 设置失败: [DA]ERR:40008 2. 设置成功: [DA]Set OK	1. 指令格式错误、UUID 错误 /Error in instruction format or UUID

4.2.19 设置通讯写服务 UUID/Set the write service UUID of communication :

AT+WUUID

设置通讯的写服务 UUID

Set the write service UUID of communication

指令	样例	可能返回的结果	说明
AT+WUUID	AT+WUUID=FF00\r\n AT+WUUID=0000FF00000010 00800000805F9B34FB\r\n	1. 设置失败: [DA]ERR:40008 2. 设置成功: [DA]Set OK	1. 指令格式错误、UUID 错误 /Error in instruction format or UUID

4.2.20 设置通讯通知服务 UUID/Set the communication notification service UUID:

AT+NUUID

设置通讯的通知服务 UUID

Set the notification service UUID of communication

指令	样例	可能返回的结果	说明
AT+NUUID	AT+NUUID=FF00\r\n AT+NUUID=0000FF00000010	1. 设置失败: [DA]ERR:40008	1. 指令格式错误、UUID 错误 /Error in instruction format or

	00800000805F9B34FB\r\n	2. 设置成功: [DA]Set OK	UUID
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4.2.21 查看通讯 UUID 当前设置/Read the current setting of communication UUID:

AT+UUID_STATUS

查询通讯服务的 UUID 当前设置

Query the current setting of UUID of communication service.

指令	样例	可能返回的结果	说明
AT+UUID_STATUS	AT+UUID_STATUS\r\n	[DA]SUUID=0000FF0000001000800000805F9B34FB [DA]WUUID=0000FF0100001000800000805F9B34FB [DA]NUUID=0000FF0100001000800000805F9B34FB	当前通讯所需要的 3 个 UUID/ UUID required for current communication

5 联系方式/Contact information

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