

# SKB501 AT 指令集/ SKB501 AT Instruction and Examples

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## 1 引脚功能/Pin function

PIN	类型/Type	说明/Description
P0.03	TXD	模块数据输出端/ Data output end
P0.06	RXD	模块数据输入端/ Data entry terminal
P0.26	GPIO	模块从机角色连接状态: 未连接时高电平, 已连接时低电平/Module slave role connection status: high level when unconnected, low level when connected
P0.27	GPIO	模块从机角色发送数据使能状态: 未使能高电平, 已使能低电平/ Enable status of sending data from slave role: High level is not enabled, low level is enabled
P0.28	GPIO	模块主机角色连接状态: 未连接时高电平, 已连接时低电平/Module host role connection status: High level when disconnected, low level when connected
P0.29	GPIO	模块主机角色发送数据使能状态: 未使能高电平, 已使能低电平/Module host role connection status: High level is not enabled, low level is enabled
P0.30	GPIO	模块串口 BUFFER 缓存紧张状态指示: 不紧张时高电平, 紧张时低电平/ Module serial port BUFFER Indicates the cache tension status: high level when no tension, low level when tension

## 2 默认参数/Default parameters

### 2.1 蓝牙默认参数 /Bluetooth Default parameters

广播名称/Name of advertising: : nRF52

发射功率/Transmission power: 0dBm

广播间隔/Advertising interval: 100ms

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: P0.06 RX: P0.03

数据位/Data bits: 8 位

校验位/Parity bit: 无

停止位/Stop bit: 1 位

流控/Flow control: 无

## 3 蓝牙广播数据解析/Bluetooth broadcast data parsing

长度/Len	类型/Type	类型内容/Value	描述/Describe
2	0x01	0x06	
10	0xFF	0x11310121CA6CF39B EC38	CoID(4 字节)+0x0121+mac 地址/ CoID(4 bytes)+0x0121+mac address
17	0X09	0x6E52463532	蓝牙名称/Bluetooth name
11	0x07	0x9ECADC240EE5A9E 093F3A3B50100406E	UUID

## 4 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+"或"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+" or "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.

**注意:** 串口数据 20ms 作为一帧数据的超时, AT 指令识别以"AT+"或"AT?"开头, 后续参数不对(如格式, 参数, 长度等)会返回错误, 反之返回正确(如错误[AT]ER, 正确[AT]OK)。在进行主和(或)从连接后, AT 命令依然识别, 不作为透传数据, 若不以 AT+或 AT?开头则视为透传数据进行转发。

**Note:** Serial port data 20ms as a frame of data timeout, AT Command recognized as "AT+" or "AT?"Error ([AT]ER, correct [AT]OK); error ([AT]ER); After a master and(or) slave connection is made, the AT command is still recognized and does not act as passthrough data. If the AT+ or AT? At the beginning, it is regarded as transparent data for forwarding

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 AT commands help: AT?

指令/Command	样例/Example	可能返回的结果/Possible results returned	说明/Explain
AT?	AT?\r\n	<pre> ---AT Commands Help--- 1. AT? --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+SAVE --Store current parameters to FLASH. 8. AT+STATUS --Get current parameters. 9. AT+WSTA --Get BLE working state. 10. AT+DISCON=[s/m] --Disconnect to peer device when in connection. 12. AT+TXPWR=&lt;tx power&gt; --Set Radio TX power in dbm unit. --Could be 8,7,6,5,4,3,2,0,-4,-8,-12,-16,-20. 13. AT+DEV_NAME=&lt;name&gt; --Modify device's name. --Length of name less than 20. 14. AT+ADVINTVL=&lt;interval&gt; --Modify advertisement interval in ms unit. --Interval=[20~5000]. 15. AT+ADV=start/stop --Start or stop advertising if in a right time. --Return ERROR code if OP in connection. 17. AT+CON_MAC=&lt;mac addr&gt; --Connect a peripheral via MAC address 18. AT+CONNECT=&lt;dev name&gt; --Connect a peripheral via device name 19. AT+BLE5_REQ=&lt;p1=?/m/s&gt;,&lt;p2=phy1m/phy2m/coded&gt; --Start a procedure for updating PHYS mode --parameter 1 = m for master role, = s for slave role 20. AT+BLE5_STA=m/s --Query current PHYS update status. --return: p1: Current PHY mode update result,1:PHY1M,2:PHY2M,3:Coded p2: Peer device status,0:init,2:unsupport update,3:update ok p3/4: Real Current PHY tx/rx mode,1:1:PHY1M,2:PHY2M,4:Coded </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/Show 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> [AT]OK [DA]B0171,V1.22,May 5 2022 17:29:10 </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> [AT]OK [DA]DD:C6:3A:0A:5A:AD </pre>	获取蓝牙 MAC 地址/Get the Bluetooth MAC address

**4.2.4 获取主与从连接设备的 MAC 地址/Get peer device MAC address when in connection: 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	未连接设备/Unconnected device: [AT]OK [DA]00:00:00:00:00:00,00:00:00:00:00:00 已连接设备/Connected devices: [AT]OK [DA]41:7B:E0:22:BE:CD,CA:6C:F3:9B:EC:38	返回结果为: 连接模块的主设备 mac,模块 连接其它从设备 mac 如果不存在主或从的连接,默 认回复 00:00:00:00:00:00/ The return result is: Connect the MAC of the master device of the module and the MAC of the slave device of the module. If there is no primary or secondary connection, the default reply is 00:00:00:00:00:00

**4.2.5 复位模块/Reset the module by software: 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	[AT]OK Started!	复位蓝牙模块/Reset the Bluetooth module

**4.2.6 恢复出厂设置/Restore factory parameters: 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	[AT]OK	使模块恢复出厂时的设置/ Restore the module to its factory Settings



#### 4.2.7 将当前参数写入 flash/Store current parameters to FLASH: AT+SAVE

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+SAVE	AT+SAVE\r\n	[AT]OK	设置此项后，当前参数配置将在下一次重启前与本次一致（除恢复出厂设置）/ After this parameter is set, the current parameter Settings will be the same before the next restart (except factory default Settings).

#### 4.2.8 获取模块状态/ Get current parameters: 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	[AT]OK [DA]115200,nRF52,1,100,0	波特率，蓝牙名称，广播开关状态，广播间隔，发射功率。/Baud rate, Bluetooth name, broadcast switch status, broadcast interval, transmission power

#### 4.2.9 获取蓝牙当前工作状态/Get BLE working state: AT+WSTA

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+WSTA	AT+WSTA\r\n	1、 [AT]OK [DA]adv,idle 2、 [AT]OK [DA]conn,conn	参数 1 为模块主机状态： adv 表为连接，且向周围广播 参数 2 为模块从机状态： idle 为空闲状态， conn 表主/从已处于连接中 Parameter 1 indicates the working status of the active role. Parameter 2 indicates the working status of the active role

**4.2.10 模块做主以 MAC 连接蓝牙从设备：AT+CON\_MAC/Connect a peripheral via MAC address: AT+CON\_MAC**

连接对等蓝牙设备：AT+CON\_MAC=MAC 地址\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=CA:6C: F3:9B:EC:38\r\n	1. 指令错误/Command error: [AT]ER 2. 扫描超时/Command error: [AT]OK [DA]Connecting [DA]Timeout 3. 连接成功/Command error: [AT]OK [DA]Connecting [DA]Connected=CA:6C:F3:9B:EC:38 4. 连接失败/Command error: [AT]OK [DA]Connecting [DA]Connected=CA:6C:F3:9B:EC:38 [DA]Disconnected=CA:6C:F3:9B:EC:38	使用 MAC 连接/ Using MAC connection

**4.2.11 模块做主机以名称连接蓝牙从设备/Connect a peripheral via device name:**

**AT+CONNECT**

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+CONNECT	AT+CONNECT=nRF52	1. 指令错误/Command error: [AT]ER 2. 扫描超时/Scan timeout: [AT]OK [DA]Connecting [DA]Timeout 3. 连接成功/Connection successful: [AT]OK	返回连接的 MAC 地址 /Returns the MAC of the connection

		<p>[DA]Connecting</p> <p>[DA]Connected=CA:6C:F3:9B:EC:38</p> <p>4. 连接失败/Connection fail:</p> <p>[AT]OK</p> <p>[DA]Connecting</p> <p>[DA]Connected=CA:6C:F3:9B:EC:38</p> <p>[DA]Disconnected=CA:6C:F3:9B:EC:38</p>	
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**4.2.12 主/从断开对等蓝牙设备/Disconnect to peer device when in connection :**

**AT+DISCON**

AT+DISCON=m/s\r\n m:作为主机断开/Master role; s:作为从机断开/Slave role

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	<p>1. 设置成功/Successfully set:</p> <p>[AT]OK</p> <p>[DA]Disconnected=CA:6C:F3:9B:EC:38</p> <p>[DA]Connected=4E:65:41:C9:62:03</p> <p>[AT]OK</p> <p>[DA]Disconnected=4E:65:41:C9:62:03</p> <p>2. 设置失败/Setup failed:</p> <p>[AT]ER</p>	

**4.2.13 设置发射功率/Set Radio TX power in dBm unit: AT+TXPWR**

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+TXPWR	<p>AT+TXPWR=param\r\n</p> <p>Param:{8,7,6,5,4,3,2,0,-4,-8,-12,-16,-20}</p>	[AT]ER or [AT]OK	设置发射功率/Set transmitting power

#### 4.2.14 设置广播名称/Setting device's 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	AT+DEV_NAME=SKY\r\n	[AT]ER or [AT]OK	设备名称需小于 14 位/ Length of name less than 14

#### 4.2.15 设置广播间隔/Setting broadcast interval in ms unit: AT+ADVINTVL

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+ADVINTVL	AT+ADVINTVL=500\r\n	[AT]ER or [AT]OK	设置范围/Range: 20ms~5000ms

#### 4.2.16 开启/关闭当前模块的蓝牙广播/Start or stop advertising if in a right time:

##### AT+ADV

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+ADV	AT+ADV=stop\r\n	[AT]ER or [AT]OK	start:开启广播/open the adv stop:关闭广播/stop the adv

#### 4.2.17 启动更新 PHYs mod 的程序/Start a procedure for updating PHYs mode :

##### AT+BLE5\_REQ

设置蓝牙传输物理特性（主、从机需设置相同参数）

Set the physical characteristic of Bluetooth transmission (the same parameters must be set for the master and slave)

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+BLE5_STA	主机/Master role: AT+BLE5_REQ=m,phy1m\r\n 从机/Slave role: AT+BLE5_REQ=s,phy1m\r\n	1、命令或参数错误/The command or parameter is incorrect: [AT]ER 2、参数及命令正确/The parameters and commands are correct: [AT]OK	p1 = m/s : 选择设备为从机还是主机（发起连接的设备为主机） p2 参数见 AT?的提示/ P1 = m/s: Select slave or host (the device initiating the connection is the host) P2 parameters, see the prompt of AT?

#### 4.2.18 查询主/从机连接状态参数/Query currentPHYs update status AT+BLE5\_STA

指令/Command	样例/Example	可能返回的结果/ Possible results returned	说明/Explain
AT+BLE5_STA	AT+BLE5_STA=s\r\n	1、命令或参数错误 [AT]ER 2、参数及命令正确 [AT]OK	查询连接状态，选择主机查询还是从机查询/To query the connection status, select host or slave 1. 连接模式 p1/Connection mode p1 1:PHY1M 2:PHY2M 3:Coded 2. 连接状态 p2/Connection status p2 0:init; 2:unsupport update; 3:update ok 3. TX phy 1:PHY1M 2:PHY2M 4:Coded 4. RX phy 1:PHY1M 2:PHY2M 4:Coded

## 5 联系方式/Contact information

### **Skylab M&C Technology Co., Ltd.**

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