

KT6368A AT Command v1.0

1. Serial communication protocol

As a commonly used communication in the control field, the AT serial port command has been optimized and customized, which greatly simplifies the user's difficulty in use. Please operate strictly in accordance with the command format given by us.

1.1 Communication format

Support asynchronous serial port communication mode, accept commands sent by the host computer through the serial port	
Communication standard: 115200 bps --- The user can set through the serial port command.	
Data bits: 8	
Stop bit: 1	
Check digit: none	
Flow control: none	
Note: The design of all instructions is regular, not divided randomly, you can check the following to find the regularity	
Control instruction format: AT+<CMD>[<param>]\r\n All are characters, not hexadecimal numbers	
Data feedback format: <IND>[<param>]\r\n	
Data characteristics	Detailed description
AT+	The control command starting with "AT+"
<CMD>	Followed by <CMD> control, usually 2 characters
[<param>]	If there is a parameter after CMD, it will be followed by [<param>]
\r\n	Finally, it ends with "\r\n", the character type is line feed, and windows is the enter key. Hexadecimal is 0x0D, 0x0A
<IND>	1. Data feedback is the Bluetooth feedback of various status and data information to the host, starting with <IND>
	2. Followed by the parameters returned by the chip

Here is the key description of <CMD>:		
Functional division	command	Remarks
Common command	AT+C?	Common commands start with AT+C, and the following "?" are detailed functional commands
Music command	AT+A?	The music command starts with AT+A, and the following "?" is the detailed function command
Bluetooth command	AT+B?	The bluetooth command starts with AT+B, and the following "?" is the detailed function command

Here is the key description of <CMD>:		
For example	command	Remarks
Control command 1	AT+CZ\ r\n	On behalf of the system reset
Result returned by the query 1	QA+01	The returned query information is always Qn+xx, where n corresponds to the previous one
Result returned by query 2	QG+01	See 4.2.12 for details

1.2 Examples of communication commands

Common part-control command-description		
CMD	Function	Detail
AT+CT	Set the baud rate	There are parameters behind, see 3.3 Examples for details: AT+CT01/r/n
AT+CZ	Chip reset	Chip soft reset, see 3.3 example for details: AT+CZ/r/n
AT+CW	Chip reset to factory settings	Restore factory settings, clear all previously memorized parameters, see 3.3 example for details: AT+CW/r/n
AT+CL	Chip low power settings	See section 1.6 for details
AT+BM	Set BLE Bluetooth name	See section 1.4 for details
AT+BN	Set the MAC address of BLE	See section 1.4 for details
AT+BD	Set SPP Bluetooth name	See section 1.4 for details
AT+BS	Set BLE connection password	This function is not implemented, mainly because the compatibility of the mobile phone is not working
AT+QT	Query the baud rate of the system	See section 1.3 for details
AT+QL	Query the low power consumption status of the system	The returned data is QL+00
AT+TM	Query BLE Bluetooth name	See section 1.5 for details
AT+TN	Query BLE Bluetooth address	See section 1.5 for details
AT+TD	Query SPP Bluetooth name	See section 1.5 for details
AT+TS	Query BLE Bluetooth connection password	Keep

1.3 Specify the baud rate of the chip 【CT】 [CZ][CW]

AT+CT01\r\n == 9600	AT+CT06\r\n == 256000	AT+CT11\r\n == 31250
AT+CT02\r\n == 19200	AT+CT07\r\n == 512000	AT+CT12\r\n == 2400
AT+CT03\r\n == 38400	AT+CT08\r\n == 230400	AT+CT13\r\n == 4800
AT+CT04\r\n == 57600	AT+CT09\r\n == 460800	
AT+CT05\r\n == 115200	AT+CT10\r\n == 1000000	

- Once the baud rate is set, the chip will remember it. The next time you turn it on, the baud rate will become the one you set. Of course you can query by[AT+QT]
- After setting the baud rate, please wait for 1 second before sending a reset command[AT+CZ], Or just turn off the power
- If you want to restore the default baud rate, please send the command to restore the factory settings, at this time the chip will automatically erase all the configurations
- Since the main frequency of our chip is very high, try to increase the baud rate of the serial port, the higher the better

1.4 Set the name and address of BLE Bluetooth [BM][BN][BD]

AT+BMBLE-1234\r\n	Set the Bluetooth name to "BLE-1234"
AT+BN112233445566\r\n	Set the address of BLE. The address displayed on the mobile phone is: 66 55 44 33 22 11
AT+BDSPP-1234\r\n	Set the Bluetooth name to "SPP-1234"

<p>1. After setting the Bluetooth name, you need to reset the chip, send a command or power off, and the new Bluetooth name will be displayed. Our default Bluetooth name is "KT6368A-BLE". The longest Bluetooth name set is "30" bytes, please do not exceed this range</p>
<p>2. If the Bluetooth name is modified by the AT command, please note that your mobile phone may not be updated synchronously, or the previous name will be displayed</p> <p>(1) Because you only modified the name of the Bluetooth, the MAC address of the Bluetooth has not changed, so the name will not be updated on the mobile phone.</p> <p>(2) What you have to do is try to search for another mobile phone, or delete the pairing information from the previous mobile phone and search again</p> <p>(3) As long as the Bluetooth name is set, the Bluetooth name must be updated, so there is no doubt. When the chip is powered on, it will return the Bluetooth name for you to check</p>

1.5 Query the name and address of BLE Bluetooth [TM][TN][TD]

AT+TM\r\n	return TM+1234\r\n Represents the Bluetooth name is 1234
AT+TN\r\n	return TN+12345678AABB\r\n Bluetooth address of BLE: 0xBB、0xAA、0x78、0x56、0x34、0x12
AT+TD\r\n	return TD+SPP1234\r\n Represents the Bluetooth name is SPP1234

1. Here is a description of the Bluetooth MAC address: The MAC addresses of BLE and SPP are symbiotic, so just set one.

(1) When the chip is powered on for the first time, it will automatically generate the Bluetooth MAC address, and it will survive randomly.

(2) The advantage of doing this is to avoid the problem of setting the address separately

(3) After the same excellent algorithm, the probability of repetition is one in a million. Bluetooth mac address is standard, 6 bytes

2. The SPP address is processed by adding 1 to the highest byte of the BLE address. So just set the BLE address. There is no query command for the SPP address, you can calculate it yourself

1.6 Chip low-power instruction description 【CL】

AT+CL00\r\n	Does not enter low power consumption mode. It will be effective next power-on. Pay attention to power on again after setting
AT+CL01\r\n	Enter low power mode. It will be effective next power-on. Pay attention to power on again after setting

<p>1. This command is of memory type. After the command is sent successfully, the chip will be stored. Switch on the next time the power is turned on</p> <p>2. This command is closed by default due to restrictions in many places</p>
<p>3. After setting low power consumption. The UART of the power-on chip will still actively return relevant data.</p> <p>(1), but all AT commands are invalid, because the chip will enter low power consumption, all peripherals are shut down</p> <p>(2) When the connection is successful, the chip is in normal working condition. But at this time only has the function of transparent transmission</p> <p>(3) So where you need to set the AT command, you must switch back to the non-low power consumption mode, that is, AT+CL00\r\n</p> <p>(4)Of course, the chip, the factory power-on default is the normal working mode.</p>
<p>4. If entering low power consumption mode, all IO ports of the chip are in high impedance state. This is very important</p> <p>(1) If possible, connect a pull-up resistor to pins 2/7/8 of the chip. To determine our IO status</p> <p>(2) Because some customers reported that the chip entered the low-power mode. His MCU keeps receiving FF data. For this application, try to use pin 2 of KT6368A to determine whether the chip is connected. Do not receive any data if not connected</p>
<p>5. After setting to low power consumption mode, the chip is not connected. AT commands can be recognized in the first 5 seconds of power-on, and AT commands cannot be recognized after 5 seconds</p> <p>(1) Because of low power consumption, all peripherals of the chip are all turned off</p> <p>(2) But many customer applications may need to modify some parameters under low power consumption. Therefore, the low power consumption is entered after the timeout of 5 seconds. Within these 5 seconds, the AT command can be recognized normally.</p> <p>(3) If you need AT commands to set parameters, try to send them in an unconnected state. Because after the connection, we automatically enter and exit the low-power mode</p>

	Stat us	Curre nt	Description
AT+CL01 Status, enter low power consumption mode	Instant	25mA	1. The chip needs to initialize the peripherals to boot. The instantaneous current is relatively large 2. When this time is maintained for 300ms, it enters a low power consumption state
	Working status-not connected	20uA 4mA alternate	3. The chip works normally, broadcasts normally to the outside world, and is in a periodic state of sleep, wake-up broadcast, and sleep. The purpose is to save power consumption 4, the cycle is 500ms. 100ms broadcast once, 400ms sleep 5. The primary current of broadcast is 4mA. Into sleep, it becomes 20uA
	Working status-connected	4.3mA	6. When the connection is successful, the chip will no longer go to sleep. But has been working
AT+CL00 Enter normal working mode	Instant	25mA	1. The chip needs to initialize the peripherals to boot. The instantaneous current is relatively large 2. When this time is maintained for 300ms, it will enter the 5mA working state
	Regardless of whether it is connected or not.	5mA	3. The chip is always in working condition. Small fluctuations in current, negligible

1.7 BLE enable and SPP enable [B4][B5][T4][T5]

AT+B401\r\n	Turn on the BLE function. Of course AT+B400\r\n is closed
AT+B500\r\n	Turn off the function of SPP. Of course AT+B501\r\n is turned on
AT+T4\r\n	Query whether the BLE function is enabled. The chip will return T4+01 or T4+00
AT+T5\r\n	Check whether the SPP function is enabled. The chip will return T5+01 or T5+00

1. After turning off the BLE function, you must re-power on for this function to take effect. Of course it's the same for turning on

2. It only needs to be set once, the chip automatically saves the parameters, and there is no need to set it next time

3. After turning off the BLE function, the phone cannot search for the name of BLE

4. After turning off the SPP function, you must re-power on for this function to take effect. Of course, it's the same when you turn it on. You only need to set it once, the chip automatically saves the parameters, and you don't need to set it next time.

After turning off the SPP function, the phone cannot search for the name of the SPP

1.8 Description of the error message returned by the chip 【 ER】

ER+1\r\n	The received data frame is incorrect
ER+2\r\n	The received command does not exist, that is, the character string you sent AT+KK cannot be found
ER+3\r\n	The received AT command did not receive carriage return and line feed, which is \r\n
ER+4\r\n	The parameter sent by the command is out of range, or the format of the command is incorrect. Please check your AT commands
ER+5\r\n	Keep
ER+6\r\n	Keep
ER+7\r\n	The MCU sends data to the mobile phone, but the mobile terminal does not open notify. When the ble connection is successful
ER+8\r\n	Keep

The chip will provide real-time feedback on some error states. Specifically, please refer to the above table to focus on notify [listening]. After the test APP on the mobile phone is connected to the Bluetooth chip, notify must be turned on. The Bluetooth chip can send data to the mobile phone.

2. Detailed description of AT commands and transparent data transmission

1. At present, our serial port commands support AT commands and also support Bluetooth data transparent transmission
2. The AT command exists throughout the life cycle of the chip. As long as the Bluetooth is initialized by the chip, the Bluetooth data will be transparently transmitted and it will always run in the background. It supports AT commands whether it is connected or not
3. But please note that we also have a low power consumption mode, please refer to the detailed description in section 1.6

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