



# HM-BT220X

# User Guide

Version	Date	Release Note
V1.0	2020.12.7	Initial version

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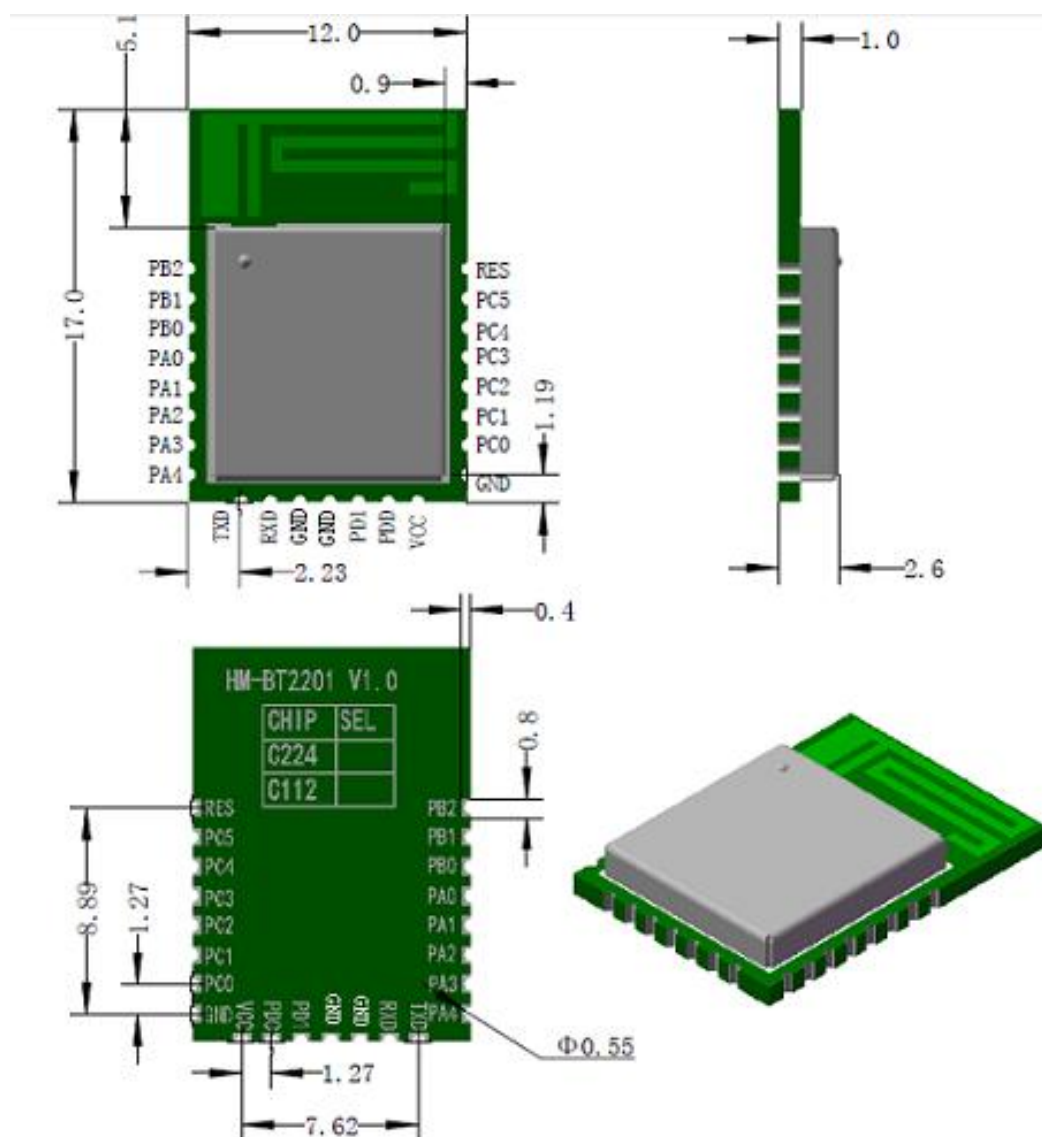
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## 1. Product Overview

HM-BT220X wireless transmission is based on the HM-BT220X module series developed by HOPERF with Bluetooth 5.2 low power SoC chip and ARM® Cortex®-M33 the 32-bit processor kernel. The main frequency is up to 76.8mhz with embedded 2.4GH RF transceiver, integrated with high-performance onboard antenna and module supports data transparent transmission. Thereby, it can quickly achieve wireless and data connection between the BLE devices such as mobile phones and tablet computer by using AT instructions for the reason of its low occupation of external MCU resources and easy development. The transparent transmission module supports master mode, slave mode as well as master-slave mode.

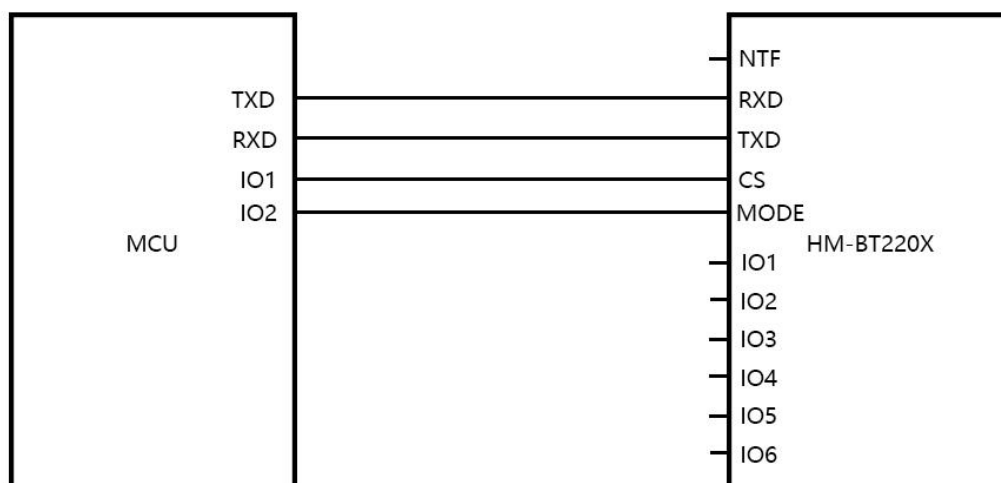
## 2. Product Outline



### 3. Pin Description

Pin No	Pin Name	Type	Description
1	PB2	I/O	Pin selection CS : low-effective
2	PB1	I/O	Pin in operation mode : High level AT mode , Low level wireless communication mode
3	PB0	I/O	Retention
4	PA0	I/O	Retention
5	PA1	I/O	Retention
6	PA2	I/O	Retention
7	PA3	I/O	Retention
8	PA4	DO	Notify pin NTF
9	TXD	DO	Serial port data transmitting pin
10	RXD	DI	Serial port data receiving pin
11	GND	DG	Power source ground
12	GND	DG	Power source ground
13	PD1	I/O	Retention
14	PD0	I/O	Retention
15	VCC	DV	Power supply 3.3V
16	GND	DG	Power source ground
17	PC0	I/O	Common GPIO
18	PC1	I/O	Common GPIO
19	PC2	I/O	Common GPIO
20	PC3	I/O	Common GPIO
21	PC4	I/O	Common GPIO
22	PC5	I/O	Common GPIO
23	RES	I/O	Hard reset pin : low level effective

## 4. Module Application Connection Diagram



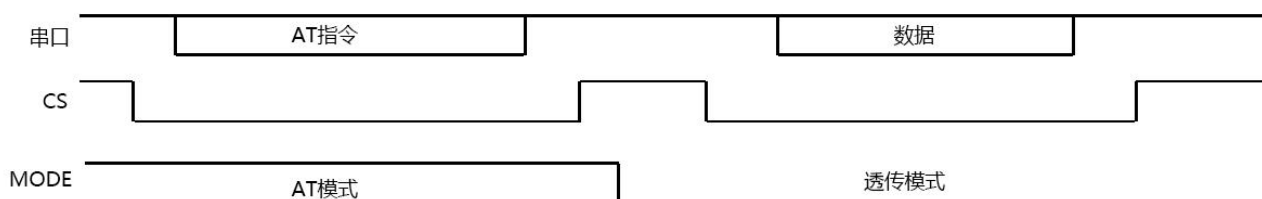
## 5. Transparent Transmission Function Description

Basic module applications generally require at least four pins to be connected: TXD, RXD, CS and MODE, with TXD and RXD as the serial port data communication pins and CS as the data transmitting enabling pin and MODE as the operation mode selection pin when low level is effective.

When the upper computer MCU wants to send data to the module, the CS pin must be pulled down before transmitting as the module is in low-power operation mode. If CS pin was high, it means that the module has no tasks to be processed and it will enter sleep mode to reduce power consumption. In the sleep mode, the serial port of the module does not work. After CS is pulled down, the module will be in normal operation state and will not enter sleep mode. Only at this time, serial port data is valid and the receiving data is not affected by the CS pin state, and data will be sent at least 50us after CS is pulled down. MODE pin is in AT Command MODE when it is in high level and it can send AT command to communicate with the module and operate the module. Transparent transmission mode will be triggered when connection is established and lower the pin under low level. In addition, The NTF pin is notification pin using for notifying if there is data coming to the upper computer, and awakening it. When there's data in serial port to be sent to the upper computer, the NTF pin will pull the high level for 1ms and start transmission. After TX, the NTF pin will pull down, and it is only effective in the module low-power operation mode.

Different module firmware can create different maximum number of connections with an index number starting from 1; Each connected entity is independent of each other and can be set to either slave mode or master mode. For example, the master-slave mode can set the connection 1 as the master mode to connect to other devices, and then connection 2 can be set to wait for connection from the master device.

## Diagram of Operation Sequence:



## GATT Transparent Transmission Server Interface :



HM-BT220X has a special service for transparent data transmission. If the master device is a mobile phone or other non-HM-BT220X module devices, it can transmit the wireless data of the module according to the Server, which has three Characteristic of TXD, RXD and SW Version. The module sends data to the master device through Notify of TXD while master device sends data to the module through Write and Write Without Respond. When the module serves as the master device, the AT command can be used to set the Handle for receiving data from the device. The slave device can transmitting data to the module through the notify of any CHAR. SW Version is the software version information, which can be obtained from the Read operation.

### Module Related UUID:

Module Service: b810093a-9130-b955-2ba1-29a9807c0f69

TXD: 8001

RXD: 8002

SW Version: 8003

## 6. AT Instruction Using Description

### 6.1 Instruction Syntax

The AT command uses the ASCII command line and the command format are as follows:

The request message format is: AT+<CMD>[OP][para-1,para-2,.....para-n]<\r>

### Request format description:

Field	Description
AT+	Command message prefix
CMD	Instruction string
Op	Instruction operation symbol can be shown as the following: “=”: Indicates the parameter settings “?”: Indicates the current value of the query parameter “”: Indicates execute the instruction “=?”: Indicates query parameters of the setting instruction
para-1,para-2,.....para-n	Indicates the setting parameter or the specific query parameter
\r	Ending symbol, the ASCII code is 0x0D

The response message format is: [+CMD:][para-1,para-2,.....para-n]<\r\n>

Or: [+CMD:OK]<\r\n>

Or: [+ERR:][ErrorCode]<\r\n>

#### Response Format Description:

Field	Description
\n	Line break, the ASCII code is 0x0A
+CMD	The corresponding instruction symbol string
para-1,para-2,.....para-n	The corresponding parameter symbol string
+ERR	Error response prefix
ErrorCode	Error code, for details, please check the error code table

Serial port parameter configuration value: 115200 baud rate (factory default) , 8 data bit, 1 stop bit, no checking bit

## 6.2 AT Instruction Table

System Instruction	
AT	Testing instruction
AT+BAUD	Serial port rate
AT+INFO	Firmware Information
AT+DEF	Factory data reset
AT+RESET	Startup reset
AT+ECHO	Input echo
AT+MAC	Device MAC address
AT+SLP	Deep sleep
AT+PWR	Transmitting power



AT+IOC	IO port control
BLE Instruction	
AT+ADVSA	Boot broadcast
AT+ADVSO	Stop broadcast
AT+ADVINT	Broadcast interval
AT+ADVDAT	Radio data
AT+SCANSA	Start scanning
AT+SCANSO	Stop scanning
AT+SCANPM	Scanning parameter
AT+CONN	Connect to the slave device
AT+DISCON	Disconnect
AT+MTU	GATT MTU
AT+CONPM	Connection parameter
AT+SCM	Setting the connecting password
AT+LINKS	Query connection status
AT+RSSI	Receive RSSI Connection
AT+SEND	Sending data
AT+TXPORT	Setting handle of the input char
AT+AOADV	Automatic broadcast
AT+DEVNA	Modify the device name
AT+GADIS	Discover service properties
AT+READ	GATT read operation
AT+WRITE	GATT write operation
AT+PHY	Setting the physical rate
Testing Instruction	
AT+TXTEST	Transmitting test
AT+RXTEST	Receiving test
AT+STOPTEST	Stop test

### 6.3 AT Test Command

Command type	Command format	Response
Test command	AT	AT

### 6.4 AT+BAUD Serial Interface Baud Rate

Command type	Command format	Response
Query command	AT+BAUD?	+BAUD:<baud>
Setting command	AT+BAUD=<save>,<baud>	+BAUD:OK

		+ERR:<ErrorCode>
Parameter description	<save>: Whether to save the settings value to the FLASH 1: Save 0: Do not save <baud>: Baud rate value	
Returned value description	Permitted value: 2400 4800 9600 19200 38400 115200 230400	
Example	AT+BAUD=1,115200 +BAUD:OK	

## 6.5 AT+INFO Query Firmware Information

Command type	Command format	Response
Query command	AT+INFO?	+ INFO:<version>,<max link>,<series>,<manufacturer >
Parameter description	< version >: Firmware version number < max link >: Maximum connection number	
Returned value description	< series >: Series type < manufacturer >: Module manufacturers	
Example	AT+INFO? +INFO:V1.0,4,HMBT220X,HopeRF	

## 6.6 AT+DEF Restore Factory Defaults

Command type	Command format	Response
Execute command	AT+DEF	
Remark	When the command is executed without acknowledge, restore all configurations to factory defaults and restart the module Factory default configuration Baud rate: 115200 Minimum broadcast interval: 500ms Maximum broadcast interval: 600ms Minimum connection interval: 100ms Maximum connection interval: 150ms Skipped connected event number : 0 Transmitting power: 0dbm Device name: HM-BT220X Broadcast data: 02010607ff486f706552460a08484d2d425432323058 Access code: 0	

Automatic broadcast: 0x01

## 6.7 AT+RESET Reset Switch

Command type	Command format	Response
Execute command	AT+RESET	
Remark	No response to this command and restart module after execution	

## 6.8 AT+ECHO Input Echo

Command type	Command format	Response
Setting command	AT+ECHO=<open>	+ECHO:OK +ERR:<ErrorCode>
Parameter description	< open >: 1: Turn on echo 0: Turn off echo After the echo command is enabled, characters sent by the serial port will return. This function is disabled by default. It is recommended to disable when no debugging is required.	
Return value description		
Instance	AT+ECHO=1 +ECHO:OK	

## 6.9 AT+MAC Configure MAC Address

Command type	Command format	Response
Query command	AT+MAC?	+MAC:<mac>
Setting command	AT+MAC=<type>,<mac>	+MAC:OK +ERR:<ErrorCode>
Parameter description	< type >: Address type 1: Static device address 0: Public device address < mac >: MAC Address Value	
Return value description		
Instance	AT+MAC? +MAC:11:22:33:44:55:66 AT+MAC=1,112233445566 +MAC:OK	
Remark	Active after device startup	

## 6.10 AT+ SLP Deep Sleep

Command type	Command format	Response
Execute command	AT+SLP	
Remark	This command has no response and can only enable when the module is disconnected. After this command is executed, it enters deep sleep to reduce module power consumption, awakening by the MODE pin. It will restart after 10ms when the device is awakened.	

## 6.11 AT+PWR TX Power Setting

Command type	Command format	Response
Query command	AT+PWR?	+PWR:<power>
Setting command	AT+ PWR =<save>,<power>	+PWR:OK +ERR:<ErrorCode>
Parameter description	< save >: Whether to save the value to FLASH or not 1: Save 0: Not save < power >: Setting value of -200~60 with corresponding -20.0~6.0dbm 0.1dbm/step	
Return value description		
Instance	AT+ PWR =1,60 +PWR:OK	
Remark	This parameter can only be set when all connections are idle	

## 6.12 AT+IOC IO Port Control

Command type	Command format	Response
Setting command	AT+IOC=<pinidx>,<mode>[,<val>]	+IOC:OK +IOC:<val> +IOC:<ErrorCode>
Parameter description	< pinidx >: IO index 0~5 with corresponding pin of PC0 ~ PC5 < mode >: Input or output 0: Output 1: Input	
Return value description	<val>: Output high/low level 1: High level 0: Low level	
Instance	AT+IOC=0,1 +IOC:1 AT+IOC=0,0,1	

+IOC:OK

## 6.13 AT+ADVSA Startup Broadcast

Command type	Command format	Response
Execute command	AT+ ADVSA	+ ADVSA:OK +ERR:<ErrorCode>
Setting command	AT+ ADVSA =<linkidx>	+ ADVSA:OK +ERR:<ErrorCode>
Parameter description	< linkidx >: Linking index, the execute command uses index 1 by default	
Return value description		
Instance	AT+ ADVSA =2 +ADVSA:OK	
Remark	Can only be used when connection is idle	

## 6.14 AT+ADVSO Stop Broadcast

Command type	Command format	Response
Execute command	AT+ ADVSO	+ ADVSO:OK +ERR:<ErrorCode>
Setting command	AT+ ADVSO =<linkidx>	+ ADVSO:OK +ERR:<ErrorCode>
Parameter description	< linkidx >: Linking index, the execute command uses index 1 by default	
Return value description		
Instance	AT+ADVSO=2 +ADVSO:OK	
Remark	It can only be used in broadcast mode.	

## 6.15 AT+ADVINT Setting Broadcast Interval

Command type	Command format	Response
Query command	AT+ ADVINT?	+ ADVINT: <minInt>,< maxInt >
Setting command	AT+ADVINT=<save>,<minInt>,< maxInt >	+ ADVINT:OK +ERR:<ErrorCode>

Parameter description	<save>: Save the setting value to FLASH    1: Save   0: Not save
Return value	<minInt>: Minimum connection interval is configured from 32~65535
description	<maxInt>: Maximum connection interval is configured from 32~65535 minInt has to be no more than maxInt with actual interval time of ms= interval * 0.625ms
Instance	AT+ ADVINT =1,100,150 + ADVINT:OK

## 6.16 AT+ADVINT Setting Broadcast Data

Command type	Command format	Response
Query command	AT+ ADVINT	+ ADVINT:<data>
Setting command	AT+ ADVINT =<save>,<data>	+ ADVINT:OK +ERR:<Error Code>
Parameter description	<save>: Save the setting value to FLASH    1: Save   0: Not save <data>: Broadcast data    Hexadecimal input with up to 31 byte broadcast data	
Return value		
Instance	AT+ ADVINT =1,02010a + ADVINT:OK	

## 6.17 AT+SCANSA Start Scanning

Command type	Command format	Response
Execute command	AT+ SCANSA	+ SCANSA:OK +ERR:<ErrorCode>
Setting command	AT+ SCANSA =<mode>	+ SCANSA:OK +ERR:<ErrorCode>
Parameter description	< mode >: Scan mode   0: Passive scanning    1: Active scanning Passive scanning is used by default under execute command with a maximum scanning devices of 16, and the response format is shown as follows: [SCAN]:<num>,<type>,<addrtype>,<mac> ,<rsssi>[,<devname>] <num>: Scan number: 1~16 <type>: 0 : Connectable scannable undirected advertising 1 : Connectable undirected advertising 2 : Scannable undirected advertising 3 : Non-connectable non-scannable undirected advertising 4 : Scan Response <addrtype>: 0: Public address	
Return value		
description		

	l: Random address <mac>: MAC Address <rssi>: RSSI value of receive signal <devname>: Device name
Instance	AT+ SCANSA =1 + SCANSA:OK

## 6.18 AT+ SCANS0 Stop Scanning

Command type	Command format	Response
Execute command	AT+ ADVSO	+ ADVSO:OK +ERR:<ErrorCode>
Parameter description	Stop scanning	
Return value description		
Instance	AT+ ADVSO + ADVSO:OK	

## 6.19 AT+SCANPM Setting Scanning Parameters

Command type	Command format	Response
Setting command	AT+ SCANPM =<interval>,<window>	+SCANPM:OK +ERR:<ErrorCode>
Parameter description	< interval >: scanning interval    Setting value: 4~65535 < window >: scanning window    Setting value: 4~65535	
Return value description	Real time ms= Setting time * 0.625ms    Default value of device startup: interval: 10ms window: 10ms	
Instance	AT+SCANPM=100,100 +SCANPM:OK	
Remark	Configuration takes effect after the next scan starts.	

## 6.20 AT+CONN Connecting Device

Command type	Command format	Response
Setting command	AT+CONN=<linkidx>,<addrtype>,<mac>[,<passkey>]	+ CONN:OK +ERR:<ErrorCode>
Parameter	< linkidx >: Linking index	

description	<addrtype>: Address type, setting value 1 ~ 4
Return value	1: public_address
description	2: static_address
	3: random_resolvable_address
	4: random_nonresolvable_address
	< mac >: slave device mac address
	<passkey>: Connecting password 0~999999 (optional parameters)
	Response after successfully connect
	[BLE]:Connected,<linkidx>
	Slave device will keep trying to connect though address does not exist, use AT+DISCON to stop the operation
Instance	AT+ CONN =1,1,112233445566 + CONN:OK
Remark	Can only be used when connection is idle

## 6.21 AT+DISCON Interrupt Connection

Command type	Command format	Response
Setting command	AT+DISCON=<linkidx>	+ DISCON:OK +ERR:<ErrorCode>
Parameter description	< linkidx >: Linking index Response after interrupt successfully	
Return value	[BLE]: Disconnect,<linkidx>	
Instance	AT+ DISCON =1 + DISCON:OK	
Remark	Only available in the connecting state	

## 6.22 AT+MTU Setting the ATT Maximum Transmission Unit

Command type	Command format	Response
Setting command	AT+MTU=<server>,<mtu>	+ MTU:OK +ERR:<ErrorCode>
Parameter description	< server >: Setting module of GATT Server or GATT Client 0: Server    1: Client	
Return value	<mtu>: Setting value 23 ~ 250    Device default value: 247	
Instance	AT+MTU=1,247 + MTU:OK	



## 6.23 AT+CONPM Setting Connecting Parameters

Command type	Command format	Response
Query command	AT+CONPM?	+CONPM: <minint>,<maxint>,<latency>
Setting command	AT+CONPM=<linkidx>,<save>,<minint>,<maxint>,<latency> [,<timeout>]	+ CONPM:OK +ERR:<ErrorCode>
Parameter description	< linkidx >: Linking index <save>: save the setting value to FLASH    1: Save   0: Not save	
Return value description	<minint>: Minimum connection interval    Setting value 6~3200 <maxint>: Maximum connection interval    Setting value 6~3200 Minint needs to be no more than maxint    Real time = Setting time x 1.25 ms <latency>: Skipped connection events    Setting value 0~500 <timeout>: Optional parameters, Connection timeout    Setting value: 10~3200, Real time ms=Setting value*10ms	
Instance	AT+ CONPM =1,1,15,15,0 + CONPM:OK	
Remark	This parameter is available only when the device is connected. If the setting is saved then it will be treated as the default setting and later connection parameters of the slave device will be set according to it.	

## 6.24 AT+SCM Setting Connecting Password

Command type	Command format	Response
Query command	AT+SCM?	+ SCM: <level>,<passkey>
Setting command	AT+ SCM =<save>,<level>[,<passkey>]	+ SCM:OK +ERR:<ErrorCode>
Parameter description	<save>: Whether to save the setting value to FLASH    1: Save   0: Not save <level>: Setting value 0~1                      0: No encryption   1: Encryption connection	
Return value description	<passkey>: Connecting password: 0~999999    Optional Settings , if no setting then it is defaulted as 0	
Instance	AT+ SCM =1,123456789 + SCM:OK	
Remark	This setting does not improve the security level of existing connections, but only bring in new connections	

## 6.25 AT+LINKS Query Connection Status

Command type	Command format	Response
Query command	AT+LINKS?	+ LINKS: <linkidx>:<status>[,<role>][,<mixint>,<maxint>][,<mac>,<conInt>,<latency>,<phy>]
Parameter description	<linkidx>: Linking index <status>: 5 connection status are shown as followed:	
Return value description	idle: Connection idle adv: Broadcast status connected: Connected status initConnection: In the connection dev in DTM: Testing status <mixint>: Minimum broadcast interval, only displayed in the broadcast state <maxint>: Maximum broadcast interval, only displayed in the broadcast state <role>: master-slave role, either master or slave only displayed in the connecting state <mac>: MAC address of the connected opposite device, only displayed in the connecting state <conInt>: Connection interval, only displayed in the connecting state <latency>: Skipped connection events, only displayed in the connecting state <phy>: Using physical rate	
Instance	AT+ LINKS + LINKS: 1:idle 2:adv,150,150 3:connected,master,11:22:33:44:55:66,150,0	

## 6.26 AT+RSSI Obtaining Connected RSSI Value

Command type	Command format	Response
Setting command	AT+RSSI =<linkidx>	+ RSSI:OK +ERR:<ErrorCode>
Parameter description	<linkidx>: Linking index Response after successfully obtained:	
Return value description	[RSSI]:<rssi> <rssi>: The connected rssi value with unit of dbm	
Instance	AT+ RSSI =1 + RSSI:OK [RSSI]:-50	
Remark	This command can only be used under connection state.	

## 6.27 AT+SEND Transmitting Data

Command type	Command format	Response
Setting command	AT+ SEND =<linkidx>,<format>,<data>	+ SEND:OK +ERR:<ErrorCode>
Parameter description	<linkidx>: Linking index, Special index: 255 connected devices, 254 connected to master device, 253 connected to slave device	
Return value description	<format>: Data format      0: ascii data   1: Hexadecimal data <data>: Transmitting data, input as the setting format with a total length command of no more than 256 Bytes for the data length is limited. This instruction provides a data interaction method in AT mode, which can be received and displayed as the opposite data sent and format is as followed: [RCV]: < linkidx >,<datalen>,<rawdata> <datalen>: The received data length <rawdata>: Raw byte data	
Instance	AT+ SEND =1,0,1234567890 + SEND:OK AT+ SEND =1,1,0a0b03040506070f + SEND:OK	
Remark	This command can only be used under connection state.	

## 6.28 AT+TXPORT Setting Transmitting Handle

Command type	Command format	Response
Setting command	AT+TXPORT=<linkidx>[,<handle>]	+ TXPORT:OK +ERR:<ErrorCode>
Parameter description	< linkidx >: Linking index, Special index: 255 connected devices, 254 connected to master device, 253 connected to slave device	
Return value description	<handle>: A handle for receiving data on the oppositedevice This command is used for setting the transmitting port under transparent transmission. If the firmware is multi-connection and connected to multiple devices, it needs to select which device to send data in transparent transmission mode. The default device startup is connected to 1, while the second parameter is optional. User can set receiving data handle of the opposite device. This parameter is compatible with modules of other series or from other manufacturers. However, parameters need to be neglected when they connected to the same series.	
Instance	AT+ TXPORT =2	

	+ TXPORT:OK
Remark	This command can only be used under connection state.

## 6.29 AT+AOADV Automatic Broadcast

Command type	Command format	Response
Query command	AT+AOADV?	+AOADV:<advval>
Setting command	AT+AOADV=<save>,<linkidx>,<open>	+AOADV:OK +ERR:<ErrorCode>
Parameter description	<save>: Save the setting value to FLASH    1: Save    0: Not save <linkidx>: Linking index	
Return value description	<open>: Setting value    0~1    0: Close    1: Open <advval>: Return to setting value    bit0: Connect 1    bit1: Connect 2 The rest are done in the same way.	
Instance	AT+ AOADV =1,1,1 + AOADV:OK	
Remark	Automatic broadcast will enable after connection number powered on again and automatic broadcast will startup after being disconnected..	

## 6.30 AT+DEVNA Device Name Setting

Command type	Command format	Response
Setting command	AT+ DEVNA =<save>,<devicename>	+ DEVNA:OK +ERR:<ErrorCode>
Parameter description	< save>: Save the setting value to FLASH    1: Save    0: Not save <devicename>: Device name, ascii characters is within 13 bytes.	
Return value description		
Instance	AT+ DEVNA =1,HM-BT2204 + DEVNA:OK	
Remark	This command changes the device name and broadcast name in GATT Server, so it overwrites the AT+ADVDAT Settings.	

## 6.31 AT+GADIS Discover Service/Attributes/Description

Command type	Command format	Response
Setting command	AT+GADIS=<linkidx>,<distype>[,<starthandle>,<stophandle>][,<handle>]	+ GADIS:OK +ERR:<ErrorCode>
Parameter description	< linkidx >: Linking index < distype >: Setting value: 3 types of discovery in 0~2 : 0: Discover master service 1: Discover attributes 2: Discover description <starthandle>: Start handle value, only set under the discovering attributes. <stophandle>: End up handle value, only set under the discovering attributes. <handle>: Attributes of handle value, only set under the discovering descriptio. Discover task will enable after executing the command successfully and will receive the corresponding response: [SRV]:<linkidx>,<starthandle>,<stophandle>,<uuidlen>,<uuid> [CHAR]: <linkidx>,<thandle>,<uuidlen>,<uuid> [DSC]: <linkidx>,<thandle>,<uuidlen>,<uuid>	
Return value		
description		
Instance		
Remark		

## 6.32 AT+READ GATT Read Operation

Command type	Command format	Response
Setting command	AT+ READ =<linkidx>,<type>,<handle>	+ READ:OK +ERR:<ErrorCode>
Parameter description	<linkidx>: Linking index <type>: Read type setting value: 0~1 0: read characteristic 1: read descriptor <handle>: Handle of ATT to be read Returning format of the reading value is shown as followed: [READ]:<linkidx>,<len>,<rawdata>	
Return value		
description		
Instance	AT+ READ =1,0,50 + READ:OK	
Remark	This command can only be used under connection state.	

## 6.33 AT+WRITE GATT Write Operation

Command type	Command format	Response
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Setting command	AT+WRITE=<linkidx>,<type>,<handle>,<format>,<data>	+WRITE:OK +ERR:<ErrorCode>
Parameter description	<linkidx>: Linking index <type>: Input type      Setting value: 0~2	
Return value description	0: write characteristic 1: write descriptor 2: write characteristic without response <handle>: Handle of ATT to be input <format>: Data format      0: ascii data      1: Hexadecimal data <data>: Transmitting data, input as the setting format with a total length of no more than 256 Bytes	
Instance	AT+WRITE=1,0,50,0,1234567890 + WRITE:OK	
Remark	This command can only be used under connection state.	

## 6.34 AT+PHY Physical Rate Setting

Command type	Command format	Response
Setting command	AT+PHY=<linkidx>,<phy>	+PHY:OK +ERR:<ErrorCode>
Parameter description	<linkidx>: Linking index <phy>: Physical connection rate      Setting value: 1~4	
Return value description	1: 1M PHY 2: 2M PHY 3: 125k Coded PHY 4: 500k Coded PHY	
Instance	AT+PHY=1,1 +PHY:OK	
Remark	This command can only be used under connection state.	

## 6.35 AT+TXTEST Transmitting Test

Command type	Command format	Response
Setting command	AT+ TXTEST =<packet_type>,<length>,<channel>,<phy>	+ TXTEST:OK +ERR:<ErrorCode>
Parameter description	<packet_type>: Packet type 0: PRBS9 packet payload	
Return value description	1: 11110000 packet payload 2: 10101010 packet payload 3: 11111111 packet payload	

	4: 00000000 packet payload 5: 00001111 packet payload 6: 01010101 packet payload 7: PN9 continuously modulated output 8: Unmodulated carrier <length>: Data packet length 0-255 <channel>: Channel 0-39 <phy>: Physical layer 1: 1M PHY 2: 2M PHY 3: 125k Coded PHY 4: 500k Coded PHY
Instance	AT+ TXTEST =8,255,0,1 + TXTEST:OK
Remark	The instruction is available only when all connections are idle.

## 6.36 AT+RXTEST Receiving Test

Command type	Command format	Response
Setting command	AT+ RXTEST=<channel>,<phy>	+ RXTEST:OK +ERR:<ErrorCode>
Parameter description	<channel>: Channel 0-39	
Return value description	<phy>: Physical layer 1: 1M PHY 2: 2M PHY 3: 125k Coded PHY 4: 500k Coded PHY	
Instance	AT+ RXTEST =0,1 + RXTEST:OK	
Remark	The instruction is available only when all connections are idle.	

## 6.37 AT+STOPTEST Stop Testing

Command type	Command format	Response
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Execute command	AT+ STOPTEST	+ STOPTEST:OK +ERR:<ErrorCode>
Parameter description	Stop the transmitting test or receiving test; Reply the packet numbers after stopping the test.	
Return value description	[DTM]:<packnum>	
Instance	AT+ STOPTEST + STOPTEST:OK	

## 6.38 AT Error Code

Error code	Error description
1	Command format error
2	Command parameter number error
3	Command parameter illegal
4	Agreement-stack execution error
5	Saving flash failed
6	Cannot execute the command under the connecting state
7	Data length error