



IoT Dual Mode Programming Manual

June 8,2022

V3.0

Barrot Confidential

Version History

Version	Amendment	Date	Author
1.0	Initial release	2017-04-11	Biao Han
1.1	Add descriptions	2017-05-04	Biao Han
1.2	Add multiple connection config. Command	2017-05-18	Biao Han
1.3	<ol style="list-style-type: none"> 1. Add OTA command 2. Add Pin configuration command 3. Add Random address configuration command 4. Remove command ADC 5. Change descriptions 	2017-06-23	Biao Han
1.4	<ol style="list-style-type: none"> 1. Add Turn off Bluetooth command 2. Add and highlight configuration command descriptions. 	2017-08-02	Biao Han
1.5	Add service mask description	2017-09-02	LiHua Liu
1.6	<ol style="list-style-type: none"> 1. Add PDU format description 2. Add Appendix 3. Add IOCAP command 4. Add MTU CREDIT command 	2017-11-04	JingLin Dong
1.7	<ol style="list-style-type: none"> 1. Add GATT MTU/CREDIT configuration query command 2. Add serial port usage 3. Format change 	2017-11-17	JingLin Dong
1.8	Modify GATT MTU/CREDIT value	2017-11-27	JingLin Dong
1.9	Add BR2141e-s	2018-10-20	KaiYue Wu
2.0	Add HID Command	2018-12-13	YongQiang Xu
2.1	Update disconnected PIN, wakeup PIN, sleep interval	2019-02-18	KaiYue Wu
2.2	<ol style="list-style-type: none"> 1. Add BR2141e module 2. Add AT+FUNCRPT Command , MFI Detection 	2019-07-22	SiHua Xie
2.3	Update document format	2019-07-31	KaiYue Wu
2.4	Add Connout command	2019-11-15	SiHua Xie
2.5	<ol style="list-style-type: none"> 1. Fix some reply error 2. Add command to set Bluetooth address 3. Add discoverable and connectable individual control command 	2020-02-24	YongQiang Xu

	4. Add HID connection status command		
2.6	1. Add inquiry	2020-04-09	Wenqing Qiu
2.7	1.Update inquiry 2.ADD BR2576e-s	2020-04-23	DianFeng Zhou
2.8	1.ADD BR2551e and BR2551e-s	2020-11-11	Guangqian Xu
2.9	1.Update default information about BR8051A01 2.Add the commands supported by BR8051A01	2022-04-14	Ye Liu
3.0	Add notes	2022-06-08	Yongqiang Xu

Barrot Confidential

Contents

1. Introduction	7
1.1. Default Configuration	7
2. FCC	7
3. Format Convention	8
3.1. Definition	8
3.2. Format	9
3.2.1. AT Commands Format	9
3.2.2. PDU Commands Format	9
4. Note	11
4.1. Modifying AT Command will delay writing flash	11
5. Commands & Indications	11
5.1. AT Commands	11
5.1.1. Query Firmware Version	11
5.1.2. Query Local Device Name	11
5.1.3. Set Local Device Name	11
5.1.4. Query PIN Code	12
5.1.5. Set PIN Code	12
5.1.6. Query COD	12
5.1.7. Set COD	12
5.1.8. Query Local Bluetooth Address	13
5.1.9. Set Local Bluetooth Address	13
5.1.10. Query Baud Rate	13
5.1.11. Set Baud Rate	13
5.1.12. Query Module Mode	14
5.1.13. Set Module Mode	14
5.1.14. Query Sleep Interval	14
5.1.15. Set Sleep Interval	14
5.1.16. Query SSP Mode	15
5.1.17. Set SSP Mode	15
5.1.18. Query Discoverable Mode	15
5.1.19. Set Discoverable Mode	15
5.1.20. Query Service Mask	15
5.1.21. Set Service Mask	16
5.1.22. Query Multiple Connection Feature	17
5.1.23. Set Multiple Connection Feature	17
5.1.24. Active connection	17
5.1.25. Query MTU [1]	18
5.1.26. Set MTU [1]	18
5.1.27. Query GATT MTU [2]	18
5.1.28. Set GATT MTU [2]	19

5.1.29. Query CREDIT [3]	19
5.1.30. Set CREDIT [3]	19
5.1.31. Query GATT CREDIT [4]	19
5.1.32. Set GATT CREDIT [4]	20
5.1.33. Query Pin Definition	20
5.1.34. Set Pin Definition	20
5.1.35. Query Random Address Enable/Disable Status	21
5.1.36. Set Random Address Enable/Disable Status	21
5.1.37. Query PDU Mode	22
5.1.38. Set PDU Mode	22
5.1.39. Enter OTA Mode	22
5.1.40. IniClear Pairing Info.	23
5.1.41. Restore Factory Setting	23
5.1.42. Reset	23
5.1.43. Shut Down Bluetooth	24
5.1.44. Report HID Keys	24
5.1.45. Query HID Parameters	24
5.1.46. Set HID Parameter	25
5.1.47. Release HID Connection	25
5.1.48. Recover HID Connection	26
5.1.49. HID Function Button	26
5.1.50. MFI Detection	26
5.1.51. Set BR discoverable mode	26
5.1.52. Set BR connectable mode	27
5.1.53. Set BLE discoverable mode	27
5.1.54. Set BLE connectable mode	27
5.1.55. Get HID connect status	27
5.1.56. Inquiry	28
5.1.57. Query the IO capability	28
5.1.58. Query MAC name mode	28
5.1.59. Set MAC name mode	29
5.2. AT Indication	29
5.2.1. Ready Status	29
5.2.2. Data Transprant Transfer Status Connection Indicataion	29
5.2.3. Inquiry Result	30
5.2.4. Inquiry Complete	30
5.3. PDU Mode Commands	31
5.3.1. Send data	31
5.3.2. Release Connection	32
5.3.3. Connection Status Indication	32
6. Appendix	32
7. Company Profile	33

8. Contact Information	33
8.1. Beijing	33
8.2. Shenzhen	33
8.3. Shanghai	34
9. Copyright	34

Barrot Confidential

1. Introduction

IoT Dual Mode module is Bluetooth 5.2 dual mode module. The module firmware supports SPP and GATT service and applications. This document introduces module default settings and its firmware commands/indications definitions. The detailed module function introductions and usages refer to 《BARROT_ IoT Dual Module Application Note》 .

This document is applied for BR2551e-sc modules.

- Some configuration commands take effective after restart. Please see the command note for details.
- A delay is required to write to the configuration to be saved. It writes modified configuration once it doesn't find new configuration within 1s. Therefore, if the module does hardware reset within 1s after sending the configuration command, this command will not take affective except the AT+RESET command. The AT+RESET command forces to directly write configuration, so it will take affective immediately after the command is sent.)

1.1. Default Configuration

- BR2551e-sc UART default setting: 115200 baud rate, 8bits data, 1bit stop, no parity bit, enable hardware flow control. Default device class type: 0x100680 (Printer)
- Default PIN code: 1234
- Default device name: BR2551e-sc.

2. FCC

FCC ID: 2AOXV-BR2551E-SC

This equipment may be operated in all European countries.

Labeling requirements. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modification warning. Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End user must follow the specific operating instructions for satisfying RF exposure greater than or equal to 20cm compliance. This transmitter must not be colocated or operating in conjunction with any other antenna or transmitter.

The portable device is designed to meet the requirements for exposure to radio waves established by the Federal Communications Commission (USA).

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3. Format Convention

3.1. Definition

The format of commands/indications in this document is using following grammatical definitions:

`\r` carriage return

`\n` line break

`<...>` command elements. Inside angle brackets. Angle brackets are not included in the command.

`[...]` Optional command elements. Inside angle brackets. Angle brackets are not included in the command. Optional command elements can be ignored in the

command and they may not appear in the indication.

3.2. Format

This command set includes two types command formats: AT command and PDU command.

3.2.1. AT Commands Format

AT command is composed of ASCII characters, and it ends with “\r” (0x0d). Therefore, it should avoid using “\r” (0x0d) in the command. Once “\r” is appeared in the command, all data following “\r” will be discarded.

- Command

Command is sent from host to control the module. The command is composed of three parts: prefix starting with “AT+”, command, suffix ending with “\r”.

Command format is as follows:

Query: AT+<COMMAND>?\r

Set: AT+<COMMAND>=< Parameter >[,< Parameter >...]\r

AT+	Command prefix
< COMMAND >	Command. For example: NAME
<Parameter>	Parameter. At least one parameter. Numbers should be transferred to ASCII characters.
\r	Indication suffix.

- Indication

Return command results or parameters. The prefix is “\r\n”, the command, and the suffix is “\r\n”. The indication format is as follows:

\r\n+<INDICATION>[:< Parameter >,< Parameter >...]\r\n

\r\n+	Indication prefix
INDICATION	Indication, For example: OK,ERROR,+NAME
Parameter	Parameter. At least one parameter. Numbers should be transferred to ASCII characters.
\r\n	Indication suffix.

3.2.2. PDU Commands Format

In the PDU command format, all command elements are represented by a hexadecimal little-endian value, except for special labels.

- Command

Command is sent from host to control the module. The command is composed of three parts: prefix starting with “AT>”, command, suffix ending with “\r”.

Command format is as follows:

LSB			MSB	
octet 0	octet 1	octet2	octet 3	octet 4
'A'	'T'	'>'	<Opcode>	
<Total Parameters length>		[Parameter]	[Parameter]	
.				
.				
.				
[Parameter]				'\r'

AT>	Command prefix. Three bytes ASCII characters.
Opcode	Operation code. Two bytes. Every command uses opcode as unique identification. Bluetooth 0x0101; WeChat 0x0102
Total Parameters length	Parameter length. Two bytes. The unit of this parameter is byte, not the number of parameters.
Parameter	Parameter2.
\r	Command suffix. One byte ASCII character.

- Indication

Indication returns results or parameters. The command is composed of three parts: prefix starting with “AT>”, command, suffix ending with “\r”. Command format is as follows:

LSB			MSB	
octet 0	octet 1	octet2	octet 3	octet 4
'\r'	'\n'	'<'	<Opcode>	
<Total Parameters length>		[Parameter]	[Parameter]	
.				
.				
.				
-	-	[Parameter]	'\r'	'\n'

\r\n<	Indication prefix. Three bytes ASCII characters.
Opcode	Operation code. Two bytes. Every command uses opcode as unique identification. Bluetooth 0x0101; WeChat 0x0102
Total Parameters	Parameter length. Two bytes. The unit of this parameter is byte,

length	not the number of parameters.
Parameter2	Parameter
\r\n	Indication suffix. Two bytes ASCII characters.

4. Note

4.1. Modifying AT Command will delay writing flash

When the AT command is used to modify configuration items, the configuration items are written to the Flash. This action takes place 1000ms after the AT command is received, plus the time to write the Flash. During this period, if the chip is reset or powered off, the configuration information in the Flash may be lost and the chip (or module) cannot work properly. It is recommended that after sending the AT setting command, the bluetooth module can be reset or powered off AT least 1500ms later.

5. Commands & Indications

5.1. AT Commands

5.1.1. Query Firmware Version

Command	AT+GVER?\r	
Indication	\r\n<Firmware version>\r\n\r\nOK\r\n	
Parameter	Firmware version	
Note	N/A	

5.1.2. Query Local Device Name

Command	AT+NAME?\r	
Indication	\r\n+NAME:<name>\r\n\r\nOK\r\n	
Parameter	name	Local device name. Default device name: i435e-s, i482e-s, i482e, BR2135e-s, BR436e-s, BR2141e, BR2141e-s, BR2576e-s, BR8051A01.
Note	N/A	

5.1.3. Set Local Device Name

Command	AT+NAME=<name>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	

Parameter	name	Local device name. Default device name: i435e-s, i482e-s, i482e, BR2135e-s, BR436e-s, BR2141e, BR2141e-s, BR2576e-s, BR8051A01.
Note	The max length of device name is 31 bytes.	

5.1.4. Query PIN Code

Command	AT+PIN?\r	
Indication	\r\n+PIN:<PinCode>\r\n\r\nOK\r\n	
Parameter	PinCode	Bluetooth PIN code. Default PIN code: 1234
Note	Only for SPP	

5.1.5. Set PIN Code

Command	AT+PIN=<PinCode>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	PinCode	Bluetooth PIN code. Default PIN code: 1234. This parameter's minimum length is 1byte and its max length is 16types.
Note	Only for SPP	

5.1.6. Query COD

Command	AT+CLASS?\r	
Indication	\r\n+CLASS:<cod>\r\n\r\nOK\r\n	
Parameter	cod	Class of Device. Default setting: 100680 (Printer)
Note	Developers can use The Bluetooth SIG defined COD (refer to Table1) or use self-defined COD.	

5.1.7. Set COD

Command	AT+CLASS=<cod>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	cod	Class of Device. Default setting: 100680
Note	Developers can use The Bluetooth SIG defined COD (refer to Table1) or use self-defined COD.	

Table 1 Bluetooth SIG Defined COD

Class of Device	Hex
Computer (desktop, notebook, PDA, organizers etc.)	0x000100

Phone (cellular, cordless, payphone, modem)	0x000200
LAN/Network Access point	0x000300
Audio/Video (headset, speaker, stereo, video display etc.)	0x000400
Peripheral (mouse, joystick, keyboards etc.)	0x000500
Imaging (printing, scanner, camera, display etc.)	0x000600
Wearable	0x000700
Toy	0x000800
Uncategorized, specific device code not specified	0x001F00
Note	Developers can use The Bluetooth SIG defined COD (refer to Table1) or use self-defined COD.

5.1.8. Query Local Bluetooth Address

Command	AT+LBDADDR?\r	
Indication	\r\n+LBDADDR:<bdaddr>\r\n\r\nOK\r\n	
Parameter	bdaddr	Local Bluetooth address
Note	N/A	

5.1.9. Set Local Bluetooth Address

Command	AT+LBDADDR=<bdaddr>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	bdaddr	Local Bluetooth address, For example: 0015834563AE
Note	N/A	

5.1.10. Query Baud Rate

Command	AT+BAUD?\r	
Indication	\r\n+BAUD:<baud>\r\n\r\nOK\r\n	
Parameter	baud	Baud rate. Default setting: 115200
Note	N/A	

5.1.11. Set Baud Rate

Command	AT+BAUD=<baud>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	baud	Baud rate. Default setting: 115200
Note	It takes effect after restart the module. Commonly used baud rate: 38400, 57600, 115200, 230400, 256000, 460800, 921600 and etc.	

5.1.12. Query Module Mode

Command	AT+BTMODE?\r	
Indication	\r\n+BTMODE:<mode>\r\n\r\nOK\r\n	
Parameter	mode	Bit 0: 1-enable silent mode, 0-disable silent mode. Bit 1~7: reserved.
Note	BTMODE= 0: the module returns connection indication after it successfully establishes connection with smart phone. Silent mode value is 0 by default. BTMODE= 1: the module doesn't return any connection indication.	

5.1.13. Set Module Mode

Command	AT+BTMODE=<mode>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	mode	Bit 0: 1-enable silent mode, 0-disable silent mode. Bit 1~7: reserved.
Note	BTMODE= 0: the module returns connection indication after it successfully establishes connection with smart phone. Silent mode value is 0 by default. BTMODE= 1: the module doesn't return any connection indication.	

5.1.14. Query Sleep Interval

Command	AT+IDLE?\r	
Indication	\r\n+IDLE:<interval>\r\n\r\nOK\r\n	
Parameter	interval	(Unit is ms) The time interval of how long the module enters sleep mode from idle mode.
Note	N/A	

5.1.15. Set Sleep Interval

Command	AT+IDLE=<interval>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	interval	(Unit is ms) The time interval of how long the module enters sleep mode from idle mode.
Note	Default value: 0ms, 0<= Interval < 65535 ms. For example, AT+IDLE=20000\r	

5.1.16. Query SSP Mode

Command	AT+SSP?\r	
Indication	\r\n+SSP:<mode>\r\n\r\nOK\r\n	
Parameter	mode	0: enable 1: disable
Note	SSP: security simple pairing. SSP is enabled by default. It takes affect after restart.	

5.1.17. Set SSP Mode

Command	AT+SSP=<mode>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	mode	0: enable 1: disable
Note	SSP: security simple pairing. SSP is enabled by default. It takes affect after restart.	

5.1.18. Query Discoverable Mode

Command	AT+DISCOVERABLE?\r	
Indication	\r\n+DISCOVERABLE:<mode>\r\n\r\nOK\r\n	
Parameter	mode	0: undiscoverable, unconnectable 1: discoverable, connectable. Default value.
Note	Default mode: discoverable	

5.1.19. Set Discoverable Mode

Command	AT+DISCOVERABLE=<mode>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	mode	0: undiscoverable, unconnectable 1: discoverable, connectable. Default value.
Note	Default mode: discoverable	

5.1.20. Query Service Mask

Command	AT+SVCMASK?\r	
Indication	\r\n+SVCMASK:<mask>\r\n\r\nOK\r\n	
Parameter	mask	Service mask value: bit 0: GATT data transprant(拼写错误) transfer service

		(Service UUID: 0xFF00) bit 1: GATT data transport transfer service (Service UUID: 128Bits type) bit 2: customized service bit 3: GATT WeChat service (Airsync) bit4: SPP service bit5: SPP WeChat service (Airsync) bit6: Handling GATT commands service bit7: YunDa express customized service bit8: YunDa express customized service bit9: Take out customized service bit10: BLUE device service bit 11~15: reserved
Note	Effective after reset module.The default value is 007B. BR8051A01 default value is 027F. 128bits type GATT Service UUID: 49535343FE7D4AE58FA99FAFD205E455	

5.1.21. Set Service Mask

Command	AT+SVCMASK=<mask>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	mask	bit 0: GATT data transport transfer service (Service UUID: 0xFF00) bit 1: GATT data transport transfer service (Service UUID: 128Bits type) bit 2: customized service bit 3: GATT WeChat service (Airsync) bit4: SPP service bit5: SPP WeChat service (Airsync) bit6: Handling GATT commands service bit7: YunDa express customized service bit8: YunDa express customized service bit9: Take out customized service bit10: BLUE device service bit 11~15: reserved
Note	Effective after reset module.The default value is 007B. BR8051A01 default value is 027F. 128bits type GATT Service UUID: 49535343FE7D4AE58FA99FAFD205E455	

5.1.22. Query Multiple Connection Feature

Command	AT+MULTICONN?\r	
Indication	\r\n+MULTICONN:<enable>\r\n\r\nOK\r\n	
Parameter	enable	0: multiple connection feature is disabled. 1: multiple connection feature is enabled.
Note	multiple connection feature is disabled by default (BR8051A01 multiple connection feature is enabled by default)	

5.1.23. Set Multiple Connection Feature

Command	AT+MULTICONN=<enable>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	enable	0: multiple connection feature is disabled. 1: multiple connection feature is enabled.
Note	Send the instruction reset module to take effect	

5.1.24. Active connection

5.1.24.1. Known Bluetooth address

Command	AT+CONNOUT=<type>,<addr>\r	
Indication	Succeeded: \r\nIM_CONN\r\n Failed: \r\n+CONNOUT:<err code> \r\n	
Parameter	type	0: SPP 1: IAP2 2: HID (BR8051A01 支持) 3: BLE(random address) (BR8051A01 support) 4: BLE(public address) (BR8051A01 support)
	addr	12bytes Bluetooth address
	err code	0: no equipment; 1: the connection already exists 2: the construction of the chain failed; 3: the search service failed;
Note	This command takes effect on r3110 versions and later versions BR2141e(-s) module and r6853 versions and later versions BR8051A01 module.	

5.1.24.2. Connect paired device

Command	AT+CONNOUT=<index>\r	
Indication	Succeeded: \r\nIM_CONN\r\n Failed: \r\n+CONNOUT:<err code> \r\n	
Parameter	index	0-9
	err code	0: no equipment; 1: the connection already exists 2: the construction of the chain failed; 3: the search service failed;
Note	The Index device is in the position of the pairing list, and 0 is the device that has been connected recently. This command takes effect on r3110 versions and later versions BR2141e (-s) module and r6853 versions and later versions BR8051A01 module.	

5.1.25. Query MTU [1]

Command	AT+MTU?\r	
Indication	\r\n+MTU:<mtu>\r\n\r\nOK\r\n	
Parameter	mtu	MTU default value: 490, (BR8051A01 MTU default value is 670).
Note	When MULTICONN=0, MTU is 490 When MULTICONN=1: MTU is 127 (BR8051A01 is not restricted)	

5.1.26. Set MTU [1]

Command	AT+MTU=<mtu>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	mtu	MTU default value: 490, (BR8051A01 MTU default value is 670).
Note	It takes affect after restart. Commonly used MTU value: 106, 234, 362, and 490. Interval is 128.	

5.1.27. Query GATT MTU [2]

Command	AT+GMTU?\r	
Indication	\r\n+GMTU:<gmtu>\r\n\r\nOK\r\n	
Parameter	mtu	MTU default value: 185,(BR8051A01 is not restricted)
Note	MTU is 185 in Single link and multiple connections.	

	MTU is 124 in PDU mode (BR8051A01 is not restricted)
--	---

5.1.28. Set GATT MTU [2]

Command	AT+ GMTU =<mtu>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	mtu	MTU default value:185,(BR8051A01 is not restricted)
Note	It takes affect after restart. Commonly used MTU value: 106, 234, 362, 490. Interval is 128.	

5.1.29. Query CREDIT [3]

Command	AT+CREDIT?\r	
Indication	\r\n+CREDIT:<credit>\r\n\r\nOK\r\n	
Parameter	credit	CREDIT default value: 7
Note	CREDIT value is 7 in Single link and multiple connections. CREDIT value is 3 in PDU mode (BR8051A01 is not restricted)	

5.1.30. Set CREDIT [3]

Command	AT+ CREDIT =<credit>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR \r\n	
Parameter	credit	CREDIT default value: 7
Note	It takes affect after restart. When the setting value exceeds the maximum value, it will set to the max value 7. (BR8051A01 is not restricted)	

5.1.31. Query GATT CREDIT [4]

Command	AT+GCREDIT?\r	
Indication	\r\n+GCREDIT:<gcredit>\r\n\r\nOK\r\n	
Parameter	credit	CREDIT default value: 7
Note	CREDIT value is 7 in Single link and multiple connections. CREDIT value is 3 in PDU mode. (BR8051A01 is not restricted)	

5.1.32. Set GATT CREDIT [4]

Command	AT+ GCREDIT =<credit>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	credit	CREDIT default value: 7
Note	It takes affect after restart. The CREDIT parameter's max value is 7. When the setting value exceeds the maximum value, it will set to the max value 7. (BR8051A01 is not restricted)	

5.1.33. Query Pin Definition

Command	AT+DEFINEPIN?\r	
Indication	\r\n+DEFINEPIN:<disc>,<wakeup_host>,<conn_status>\r\n\r\nOK\r\n	
Parameter	disc	Release connection PIN (The i482e-s, BR2141e-s, BR2576e-s, i435e-s, BR8051A01 modules' default PIN is PIN16. The i482e module's default PIN is PIN28. The BR2141e module's default PIN is PIN10. No amendments are recommended.)
	wakeup_host	Wake up PIN (The i482e-s, BR2576e-s, i435e-s, modules' default PIN is PIN28, The BR2141e-s BR8051A01 modules' default PIN is PIN21. The i482e and BR2141e module's default PIN is PIN26. No amendments are recommended.)
	conn_status	Connection indication PIN (The i482e-s,i482e,BR2141e-s, BR2576e-s i435e-s,BR8051A01 modules' default PIN is PIN5, The BR2141e modules' default PIN is PIN33, No amendments are recommended.)
Note	N/A	

5.1.34. Set Pin Definition

Command	AT+DEFINEPIN=<disc>,<wakeup_host>,<conn_status>\r	
Indication	Command indication	
Parameter	disc	Release connection PIN (The i482e-s, BR2141e-s, BR2576e-s, i435e-s, BR8051A01 modules' default PIN is PIN16. The i482e module's default PIN is PIN28. The BR2141e

		module's default PIN is PIN10. No amendments are recommended.)
	wakeup_host	Wake up PIN (The i482e-s, BR2576e-s, i435e-s, modules' default PIN is PIN28, The BR2141e-s BR8051A01 modules' default PIN is PIN21. The i482e and BR2141e module's default PIN is PIN26. No amendments are recommended.)
	conn_status	Connection indication PIN (The i482e-s,i482e,BR2141e-s, BR2576e-s i435e-s,BR8051A01 modules' default PIN is PIN5, The BR2141e modules' default PIN is PIN33, No amendments are recommended.)
Note	BR2576e-s、 i435e-sp、 i482e-sp optional PINs: 14/16/17/18/24/16/27/28 i482e-p optional PINs : 7/8/9/10/16/17/18/19/20/23/24/25/26/27/28/29/31/32/33/34 BR2141e-s optional PINs : 6/10/14/16/17/18/22/23/24- BR2141e optional PINs : 9/10/23/24/26/27/31/32/33/34 BR8051A01 optional PINs: 5/6/10/11/12/14/16/17/18/21/22/23/24/25/26	

5.1.35. Query Random Address Enable/Disable Status

Command	AT+RANDOMADDR?\r	
Indication	\r\n+RANDOMADDR:<enable>\r\n\r\nOK\r\n	
Parameter	enable	0: Random address is disabled 1: Random address is enabled.
Note	After setting this mode, BLE is the default address. The maximum two Bits are set high, and BR is the default address. For example: address is 001583112233, BR address 001583112233, BLE address C01583112233	

5.1.36. Set Random Address Enable/Disable Status

Command	AT+RANDOMADDR=<enable>\r	
Indication	Command indication	
Parameter	enable	0: Random address is disabled 1: Random address is enabled.
Note	Refer to previous command's description.	

5.1.37. Query PDU Mode

Command	AT+COMMAND?\r	
Indication	\r\n+COMMAND:<value>\r\n\r\nOK\r\n	
Parameter	Mode	0: Disabled. Default value. 1: Enabled.
Note	<p>When the PDU mode is disabled and the first connection is established, it will return Data Transparent Transfer Mode Connection Status Indication. After the module enters data transparent transfer mode, all data input will be taken as pure data and sent to the remote device. No indications will be returned, and all returned data is the pure data received from the remote device. The indication will not return until the connection is released and it returns Ready indication. Therefore, the module doesn't response any command after its connection is established.</p> <p>When the PDU mode is enabled, it returns PDU Mode Connection Status Indication. The module responses to all commands. Therefore, it uses PDU Mode Data Transfer Command to send data. The module returns PDU mode received data indication when it receives data from the remote device.</p>	

5.1.38. Set PDU Mode

Command	AT+COMMAND=<mode>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	Mode	0: Disabled. Default value. 1: Enabled.
Note	Refer to previous command's description.	

5.1.39. Enter OTA Mode

Command	AT+OTA=<enable>\r	
Indication	\r\n+UPGRADE:INIT\r\n	
Parameter	enable	Mandatory to 1
Note	<p>For example, sending AT+OTA=1 The module enters OTA mode (Single command effective. After entering this module, restart if the module doesn't execute OTA upgrade, the module will exit this mode.) OTA upgrade workflow logs as follows (Pls contact us to enquiry OTA upgrade open protocol or SDK) \r\n+UPGRADE:INIT\r\n ----- OTA Initialization</p>	

	completes \r\n+UPGRADE:MASTER_CONN\r\n ----- OTA connection with Master is established. \r\n+UPGRADE: MASTER_START\r\n ----- OTA start-up (after the module enters this status, it will automatically enter OTA mode if OTA upgrade doesn't complete.) \r\n+UPGRADE:POS=<position>\r\n ----- OTA Progress(%d, Range 0 ~ 100) \r\n+UPGRADE:SUCCESS\r\n ----- OTA succeeds Or \r\n+UPGRADE:FAIL\r\n ----- OTA fails BR8051A01 doesn't need this command to OTA and doesn't have the above printed information. APP displays the information and queries whether the module version is determine whether OTA is successfully upgraded.
--	--

5.1.40. IniClear Pairing Info.

Command	AT+CLEARLINKKEY\r
Indication	Command indication
Parameter	N/A
Note	Clear up all pairing information stored in the module.

5.1.41. Restore Factory Setting

Command	AT+FACTORYRESET\r
Indication	N/A
Parameter	N/A
Note	The module automatically restarts after it restores factory settings.

5.1.42. Reset

Command	AT+RESET\r
Indication	N/A
Parameter	N/A
Note	Reset module

5.1.43. Shut Down Bluetooth

Command	AT+SHUTDOWN=<shutdown>\r	
Indication	Command indication	
Parameter	shutdown	Mandatory to 1
Note	Sending AT+SHUTDOWN=1 command to shut down Bluetooth. The recommended shutdown process is: send AT+SHUTDOWN=1, after returning successfully, reset the pins of the Bluetooth module. The recommended reply process is: reset the module through the Reset pin. Reset command is invalid. BR2551e and BR2551e-s does not support this command.	

5.1.44. Report HID Keys

Command	AT+KBRPT=<FuncKey>,<KEY1>,<KEY2>,<KEY3>,<KEY4>,<KEY5>,<KEY6>,\r	
Indication	Command indication	
Parameter	FuncKey	--bit0: Left Control is pressed down or not. Pressed down: 1 --bit1: Left Shift is pressed down or not. Pressed down: 1 --bit2: Left Alt is pressed down or not. Pressed down: 1 --bit3: Left GUI (Windows key) is pressed down or not. Pressed down: 1 --bit4: Right Control is pressed down or not. Pressed down: 1 --bit5: Right Shift is pressed down or not. Pressed down: 1 --bit6: Right Alt is pressed down or not. Pressed down: 1 --bit7: Right GUI is pressed down or not. Pressed down: 1
	KEY1---KEY6	HID key value(Refer to HID Usage Tables) Sending up to 6 keys at one time.
Note	Report HID key value This command is only supported by the firmware which supports HID functions.	

5.1.45. Query HID Parameters

Command	AT+HIDPARAM?\r
----------------	----------------

Indication	\r\n+ HIDPARAM:<Line Delay Time>,<Max Uncfm Pkts>\r\n\r\nOK\r\n	
Parameter	Line Delay Time	Line delay time. Unit is ms. Value range: 0~255.
	Max Uncfm Pkts	Max unconfirmed package number. Value range: 0~10.
Note	<p>Line Delay Time: When the Bluetooth receives the carriage return character from the host computer, it will delay the specified time and process the next line of data.</p> <p>Max Uncfm Pkts: To allow the host computer to continuously send the unacknowledged maximum number of packets.</p> <p>The combination of these two parameters is used to adjust the transmission speed of the HID button. Prevent the HID button from being sent too fast for the backend to process.</p> <p>This command is only supported by the i435e-s firmware which supports HID functions.</p> <p>BR8051A01 does not support this command.</p>	

5.1.46. Set HID Parameter

Command	AT+HIDPARAM=<Line Delay Time>,<Max Uncfm Pkts>\r	
Indication	Command indication	
Parameter	Line Delay Time	Line delay time. Unit is ms. Value range: 0~255.
	Max Uncfm Pkts	Max unconfirmed package number. Value range: 0~10.
Note	<p>Line Delay Time: When the Bluetooth receives the carriage return character from the host computer, it will delay the specified time and process the next line of data.</p> <p>Max Uncfm Pkts: To allow the host computer to continuously send the unacknowledged maximum number of packets.</p> <p>The combination of these two parameters is used to adjust the transmission speed of the HID button. Prevent the HID button from being sent too fast for the backend to process.</p> <p>This command is only supported by the i435e-s firmware which supports HID functions.</p> <p>BR8051A01 does not support this command.</p>	

5.1.47. Release HID Connection

Command	AT+HIDDISCONN\r
Indication	Command indication
Parameter	N/A
Note	This command is only supported by the firmware which supports HID

	functions. BR8051A01 command is AT+HIDDISC\r and compatible with HIDDISCONN\r
--	---

5.1.48. Recover HID Connection

Command	AT+HIDRECONN\r
Indication	Command indication
Parameter	N/A
Note	This command is only supported by the firmware which supports HID functions.

5.1.49. HID Function Button

Command	AT+FUNCRPT=<param>\r
Indication	Command indication
Parameter	param B8: Hide/popup keyboard
Note	This function is only valid for iOS system. Android system can control pop-up and hide keyboard.

5.1.50. MFI Detection

Command	AT+CPTTEST?\r
Indication	\r\n +CPTTEST:<result>\r\n
Parameter	result 0: MFI Chip is not working properly 1: MFI Chip works normally
Note	Check if MFI Chip is working properly only the i435e-s BR2141e (-s) and BR8051A01 software versions support this instruction

5.1.51. Set BR discoverable mode

Command	AT+SPPDISCOVER=<enable>\r
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n
Parameter	enable 0: BR undiscoverable. 1: BR discoverable.
Note	This command takes effect on r4107 versions and later versions BR2141e(-s) module. This command takes effect on BR2576e-s module. This command is enabled in the configuration file. BR8051A01 does not support this command.

5.1.52. Set BR connectable mode

Command	AT+SPPCONNECT=<enable>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	enable	0: BR unconnectable 1: BR connectable
Note	This command takes effect on r4107 versions and later versions BR2141e(-s) module. This command is enabled in the configuration file. BR8051A01 does not support this command.	

5.1.53. Set BLE discoverable mode

Command	AT+GATTDISCOVER=<enable>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	enable	0: BLE undiscoverable. 1: BLE discoverable.
Note	This command takes effect on r4107 versions and later versions BR2141e(-s) module. This command takes effect on BR2576e-s module. This command is enabled in the configuration file. BR8051A01 does not support this command.	

5.1.54. Set BLE connectable mode

Command	AT+GATTCONNECT=<enable>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	enable	0: BLE unconnectable 1: BLE connectable
Note	This command takes effect on r4107 versions and later versions BR2141e(-s) module. This command takes effect on BR2576e-s module. This command is enabled in the configuration file. BR8051A01 does not support this command.	

5.1.55. Get HID connect status

Command	AT+HIDCONNSTS?\r
Indication	\r\n+HIDCONNSTS:<sts>\r\n\r\nOK\r\n

Parameter	sts	0: HID is not connected. 1: HID is connected.
Note	This command takes effect on r4107 versions and later versions BR2141e(-s) module. This command is enabled in the configuration file. BR8051A01 does not support this command.	

5.1.56. Inquiry

Command	AT+INQUIRY=<length>,<num>\r	
Indication	\r\nOK\r\n	
Parameter	length	Max inquiry time Time = length * 1.28s Range: 0x01 - 0x30
	num	Max response number range: 0x01 - 0xFF
Note	Events generated: IM_RMT "INQUIRY COMPLETE" This command takes effect on r4400 versions and later versions BR2141e(-s) module. This function is optional, according to customer needs to decide whether to turn on this function. BR8051A01 does not support this command.	

5.1.57. Query the IO capability

Command	AT+IOCAP?	
Indication	\r\n+IOCAP:<gap_iocap>\r\n	
Parameter	gap_iocap	0x0:DISPLAY_ONLY 0x1:DISPLAY_YESNO 0x2:KEYBOARD_ONLY 0x3:NO_INPUT_NO_OUTPUT 0x4:KEYBOAED_DISPLAY
	Note	The default value is 0x3; AT+FEAMASK=0193\CR (The REQ_MITM bit in FEAMASK must be 1)

5.1.58. Query MAC name mode

Command	AT+MACNAME?
Indication	\r\n+MACNAME:<mode>\r\n

Parameter	mode	1: Enable 0: Disable
Note	1: Bluetooth name followed by the last four bit of the MAC address 0: Only Bluetooth name is displayed	

5.1.59. Set MAC name mode

Command	AT+MACNAME=<mode>\r	
Indication	Succeeded: \r\nOK\r\n Failed: \r\nERROR\r\n	
Parameter	mode	1: Enable 0: Disable
Note	1: Bluetooth name followed by the last four bit of the MAC address 0: Only Bluetooth name is displayed	

5.2. AT Indication

This chapter's indications are returned in data non-transparent transfer mode.

5.2.1. Ready Status

Indication	\r\nIM_READY\r\n	
Parameter	N/A	
Note	Initialization completes, or the connection is released. The module is in idle mode, and it is connectable.	

5.2.2. Data Transprant Transfer Status Connection Indicataion

Indication	\r\nIM_CONN\r\n	
Parameter	N/A	
Note	SPP/GATT connection establishes, and it returns only when it successfully establishes connection with the first remote device. Android and IOS app QR code as shown below	
	Smart Phone OS	APP

	Android	
	iOS	

5.2.3. Inquiry Result

Indication	\r\nIM_RMT:<addr>,<class>,<name>\r\n	
Parameter	addr	Bluetooth address, such as: 001583010203
	class	Class of device: Refer to 3.1.7 Set COD
	name	Device name
Note	This command takes effect on r4400 versions and later versions BR2141e(-s) module. This function is optional, according to customer needs to decide whether to turn on this function.	

5.2.4. Inquiry Complete

Indication	\r\nINQUIRY COMPLETE\r\n
Parameter	None
Note	This command takes effect on r4400 versions and later versions BR2141e(-s) module. This function is optional, according to customer needs to decide

	456789012345678\rCR Note: 0x0101 Bluetooth data fixed code 0x012c data length +2 bytes connection handle 0x0080 device connection handle Received data: \r\n<\x01\x01\x0C\x00\x80\x001234567890\r\n
--	---

5.3.2. Release Connection

Command	AT+DISCONN=<conn_hdl>\r	
Indication	\r\nOK\r\n\r\nIM_DISCONN:<conn_hdl>\r\n	
Parameter	conn_hdl	Connection handle
Note	Enter command mode after turning on PDU mode, it returns indication after the connection with the remote device is successfully established: IM_CONN xxxx, 001583xxxxxx , xx For example: IM_CONN 0080, 00158386920E,490 IM_CONN: connection established 0080: connection handle 00158386920E: Remote device's Bluetooth address 490: MTU value during data transfer Connection release example: AT+DISCONN=0080\r BR8051A01 Doesn't support this command.	

5.3.3. Connection Status Indication

Command	\r\n IM_CONN:<conn_hdl>,<bd_addr>,<mtu> \r\n	
Indication	conn_hdl	Connection handle, Hex.
Parameter	bd_addr	Connected remote device's Bluetooth address
Note	mtu	MTU value
Note	Enter command mode after turning on PDU mode, it returns indication after the connection with the remote device is successfully established: When sending data, the command must include HDL and the data length should be less than the MTU value.	

6. Appendix

Command	Note
AT+MTU ^[1]	Before the BARROT_IoT dual-mode module _xx_ 20171109_r842 version (excluding this version), the command query and settings are valid for both SPP and GATT. After the BARROT_IoT dual-mode module _xx_ 20171109_r842 version, the command query and

	settings are valid only for SPP.
AT+GMTU ^[2]	This command is supported in the version of the BARROT_ IoT dual mode module _xx_ 20171109_r842 and later versions.
AT+CREDIT ^[3]	Before the BARROT_ IoT dual-mode module _xx_ 20171109_r842 version (excluding this version), the command query and settings are valid for both SPP and GATT. After the BARROT_ IoT dual-mode module _xx_ 20171109_r842 version, the command query and settings are only valid for SPP.
AT+GCREDIT ^[4]	This command is supported in the version of the BARROT_ IoT dual mode module _xx_ 20171109_r842 and later versions.

7. Company Profile

Barrot Technology – Barrot is a world leading one-stop chipset level solution provider who offers wireless connectivity and audio intelligent hardware solutions featuring with own IPs. The company is an associated member of The Bluetooth SIG, and it is the only one who contributes to Bluetooth specification definition in Greater China. Barrot owns three high-tech IPs: Bluetooth RF, Bluetooth stack and Acoustic algorithms, so Barrot offers most integrated, robust, reliable, and easy-to-use wireless turn-key solutions for IOT, Automotive and Wireless audio applications.

Barrot devotes itself to being the most reliable short distance wireless technologies' solution provider in the world.

8. Contact Information

8.1. Beijing

Beijing Tel: +86 10 82702580

Fax: +86 10 82898219

Address: A1009, Block A, Jia Hua Building, No.9 Shangdisanjie St, Haidian District, Beijing

Marketing Email: marketing@barrot.com.cn

Support: support@barrot.com.cn

Web site: www.barrot.com.cn

8.2. Shenzhen

Shenzhen Tel: +86 755 27885822-603

Address: Floor 5, building 1, COFCO business park, district 67, Xingdong community, Xin'an street, Bao'an District, Shenzhen City, Guangdong Province

Support: support@barrot.com.cn

Web site: www.barrot.com.cn

8.3. Shanghai

Address: 2rd Floor, No. 500, Bibo Road, Zhangjiang Gaoke, Pudong New Area, Shanghai

Support: support@barrot.com.cn

Web site: www.barrot.com.cn

9. Copyright

Copyright ©2017-2022 Barrot Technology Limited

The Bluetooth trademark is owned by The Bluetooth SIG, and the usage of this trademark is licensed to Barrot Technology Limited.

Other trademarks included in this document are owned by their respective owners.