EH-MC30

Command Interface
User Guide

Ver 1.0

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Version	Date	Comments
V1.0	2017-02-09	Release

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1.Introduction

The Command Interface is a set of ASCII commands and indicators with which the user can Command the 's Bluetooth module (BLE) via UART interface by a host (PC, MCU, etc.).

The commands are used to Command the Bluetooth module sent by host. The indicators are output from the Bluetooth module to the host to indicate the status of the module.

In addition, there are some IO indicators available when the UART is used to transfer raw data . As a complement of ASCII commands and indicators, the IO indicators are also a part of AT COMMAND Spec.

1.1. Default UART Configuration

The default configuration of UART is given below:

Baud rate: 9600

Data bits: 8

Stop bits: 1

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Parity: None
Flow Command: None

2. Command and Indicator Syntax

2.1. General Syntax

The general syntax of AT command is shown as below:
→AT+CMD[=Para1][,Para2][, RawData] <CR><LF>

The general syntax of AT indicator is shown as below:

←IDC[=Para1]<CR><LF>

Note: *1. For the examples in this document, the command sent to the Bluetooth Module will be shown with "→" at the beginning of the line, while the indicator output by Bluetooth Module will be shown with "←" at the beginning of the line.*

2.2 Description of each field:

"AT+" is the command line prefix.
"CMD" is the command. All of the commands are listed in section 5.
"IDC" is the basic indicator. All of the indicators are listed in section 4.
"=" is the separator between command/indicator and parameter. It's only needed if a parameter is presented. Para1 is the first parameter. Not all of the commands have a parameter.
, is the separator between parameters. It's only needed if subsequent parameter is presented. Para2 is the second parameter if available.
RawData is the raw data which will be sent by the command. Only parts of the commands have this field.
<CR><LF> is the terminator of the command line.

Notes:
1.   All of the parameters are composed of ASCII characters while the RawData field can composed of any data contents.

2. In indicators, the module prints hex values in low case. For other places in the document we always use upper case characters for hex values.

2.3. Examples

Here is some examples show how to use the AT commands and indicators.

→AT+NM=EH-LINK<CR><LF> *configure the GAP device name characteristic. The new name is "EH-LINK".*

←OK<CR><LF> *response from the module to indicate the command is adopted.*

Notes:

   For the examples in this document, the command sent to the Bluetooth Module will be shown with "→" at the beginning of the line, while the indicator output by Bluetooth Module will be shown with "←" at the beginning of the line. "→"and"←" not send with the ascii data.

3. Command List

All the available AT commands are listed and briefly described in the tables below. The detailed description of each command is given in chapter5 .

Command	Short Description
BD	Query or configure the UART baud rate.
NM	Query or configure the GAP device name characteristic.
AI	Query or configure the advertise parameter
RT	Reset module
DC	Disconnect with remote BLE central (or phone)
DF	Configure all setting to factory default values
AR	Query the local MAC address of the module
CN	Query or configure the peripheral preferred connection parameter characteristic
DA	Send data packet to the connected BLE central.
VR	Query the current Firmware's version
BY	Query or configure the module work in bypass mode
UU	Query or configure the GATT service UUID128 the

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	module
PW	Query or configure the module RF TX power level
UP	Update the parameter of connection

Table 1. AT Command List for BLE

4. Indicator List

All the available AT Command indicators are listed and briefly described in the tables below. The detailed description of each indicator is given in chapter 5 and chapter 6.

Indicator	Short Description
OK	Indicates a command was adopted by the Bluetooth Module.
ER	Indicates there is an error detected in the command sent by the host.
BD	Reports the UART baud rate.
UU	Report the GATT service UUID128 the module
AR	Report the Bluetooth address of the Module
ST	Report the radio state.
NM	Reports the device name of the Bluetooth Module.
AI	Reports the device Advertisement Config
CN	Report the peripheral preferred connection parameter
VR	Report the Firmware's Version
BY	Report the Module's bypass mode

PW	Reprot the module's Tx power setting

<div align="center">Table 2. AT Indicator List for BLE</div>

5. Description of ASCII Commands

5.1. General Information Commands

5.1.1. BD—Query or Configure module UART baudrate

5.1.1.1 Description:

This command can query or change the UART baud rate of Bluetooth Module. Once changed, the new baud rate will take effect next power on. The Bluetooth module stores the value in its non-volatile memory so the value won't change until be set again.
If the parameter is not presented, the Bluetooth Module will report current baud rate by the Indicator BD.

5.1.1.2   Syntax:

→AT+BD[= BaudRate]<CR><LF>

←BD=BuadRate<CR><LF>

5.1.1.3. Parameter Description:

Parameter	Description	Nvram	Comments
BaudRate Value: 00 - 09 Default: 01	The new BaudRate of the Module. 00: 2400 bps	YES	Default Baudrate: 9600

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	01: 9600 bps **02: 19200 bps** **03: 38400 bps** **04: 57600 bps** **05: 115200 bps** **06: 230400 bps** **07: 460800 bps** **08: 921600 bps** **09: 1382400 bps**		

Note:

　　1. Please do NOT try to change to a new baud rate if you don't have a host which can work in that baud rate, for there is no other way to reset it except for UART port.

　　2. If the uart is open, please keep pulling up the UART wakup pin during sending data to the module.

5.1.1.4. Examples:

Ex. 5.1. To query the baud rate of Bluetooth Module:

→AT+BD<CR><LF> *query the baud rate.*

←BD=00<CR><LF> *report the baud rate, it's 2400.*

Ex. 5.2. To change the baud rate of Bluetooth Module:

→AT+BD=01<CR><LF> *change the baud rate to 9600.*

←OK　　*response from the module to indicate the command is adopted.*

5.1.2. NM—Query or Configure module's name

5.1.2.1 Description:

This command can query or configure the BLE Module's name.

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5.1.2.2. Syntax:

→AT+NM[=Name]<CR><LF>

←NM=Name<CR><LF>

5.1.2.3. Parameter Description:

Parameter	Description	Nvram	Comments
Name	**query or configure the BLE Module's name.**	**YES**	**The lenth of the name can't over 20 bytes**.

5.1.2.4. Examples:

Ex. 5.3 To query the name of module:
→AT+NM<CR><LF>   *Query the name of module*
←NM=EH-Link-MC-10<CR><LF>   *response the name of the module .*
Ex. 5.4 configure the name of the module:
→AT+NM=EH-LINK<CR><LF>   *Configure the name of module as EH-LINK*
←OK<CR><LF>   *response from the module to indicate the command is adopted.*

5.1.3. AI — Query or Configure advertise parameter

5.1.3.1 Description:

This command can query or configure the advertise type

5.1.3.2. Syntax:

→AT+AI[=FastInterval, FastTimeout,SlowInterval, SlowTimeout]<CR><LF>

←AI=Type<CR><LF>

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5.1.3.3. Parameter Description:

Parameter	Description	Nvram	Comments
FastInterval Lenth: 2 bytes	The advertising Interval when fast advertising; unit:ms	YES	Default: 0064 (100ms)
FastTimeout Lenth: 2 bytes	The time of Fast advertising, unit: second	YES	Default:001E(30s), 0:stay fast advertising
SlowInterval Lenth: 2 bytes	The advertising Interval when Slow advertising; unit:ms	YES	Default: 01F4 (500ms)
SlowTimeout Lenth: 2 bytes	The time of Slow advertising, unit: second	YES	Default: 0000(0 s), 0: stay slow advertising

5.1.3.4. Examples:

Ex. 5.5　To query the advertise type of the module:

→AT+AI<CR><LF>　　*query the module advertising type.*

←AT=0032,0000,01F4,0000<CR><LF> the module will always fast advertising with 50ms

Ex. 5.6　To configure the advertise type of the module:

→AT+AI=0032,0100,01F4,0100<CR><LF>　　*make the module fast advertising for 256 seconds with 50ms interval, and slow advertising for 256 seconds with 500ms interval, then stop advertising.*

←OK<CR><LF>　　*response from the module to indicate the command is adopted.*

5.1.4. RT— Reset the module

5.1.4.1 Description:

This command can reset the module by UART.

5.1.4.2. Syntax:

→AT+RT<CR><LF>

←OK<CR><LF>

5.1.4.3. Parameter Description:

None

Note:

When at command send ,indicate OK, and after 1s, the module reset

5.1.4.4. Examples:

Ex. 5.7. To reset the module.
→AT+RT<CR><LF>   _reset the module._
←OK<CR><LF>   _response from the module to indicate the command is adopted._

5.1.5. DC— Disconnect from Module

5.1.5.1 Description:

This command can disconnect the module

5.1.5.2. Syntax:

→AT+DC<CR><LF>

←OK<CR><LF>

5.1.5.3. Parameter Description:

None

Note:

This command only valid when the module in connected state.

5.1.5.4. Examples:

Ex. 5.8. To disconnect the module.

→AT+DC<CR><LF>   _disconnect the module._

←OK<CR><LF>   _response from the module to indicate the command is adopted._

5.1.6. DF— Reset module's nvram

5.1.6.1 Description:

This command can configure the setting of the module to default.

5.1.6.2. Syntax:

→AT+DF<CR><LF>

←OK<CR><LF>

5.1.6.3. Parameter Description:

None

Note:
     This command send, all of the configure data is clear, and set the default.

5.1.6.4. Examples:

Ex. 5.9.To reset the module's configure data

→AT+DF<CR><LF>   _reset the all configure data of the module_

←OK<CR><LF>   _response from the module to indicate the command is adopted._

5.1.7. AR— Query Module's address

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5.1.7.1 Description:

This command can query the module's address.

5.1.7.2. Syntax:

→AT+AR<CR><LF>

←AR=MAC<CR><LF>

5.1.7.3. Parameter Description:

Parameter	Description	Nvram	Comments
MAC	**The module's local MAC address** **6 Hex byte**	**NC**	**The MAC address is writing in factory, and the mac address can used for module's ID.**

5.1.7.4. Examples:

Ex. 5.10. To query the module's address.
→AT+AR<CR><LF>   *query the module's address*
←AR=000196F00018<CR><LF>   *response the module's address*

5.1.8. CN — Query or Configure the respect connect parameter

5.1.8.1 Description:

This command can query or configure the respect connect parameter of the module

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5.1.8.2. Syntax:

→AT+CN[=MinInterval, MaxInterval, Latency, Timeout]<CR><LF>

←CN=MinInterval,MaxInterval,Latency,Timeout<CR><LF>

5.1.8.3. Parameter Description:

Parameter	Description	Nvram	Comments
MinInterval Value: 0006- 0C80 Default:0190	**The minimum value for the connection interval. 2 Hex Byte**	**YES**	**Uinit: 1.25 ms**
MaxInterval Value: 0006- 0C80 Default:0190	**The Maximum value for the connection interval. 2 Hex Byte**	**YES**	**Uinit: 1.25 ms**
Latency Value: 0000-03E8 Default:0004	**The slave latency for the connection in number of connection events. 2 Hex Byte**	**YES**	
Timeout Value: 0006- 0C80 Default:03E8	**The connection supervisor timeout multiplier as a multiple of10ms. 2 Hex Byte**	**YES**	**Unit: 10 ms**

Note:

The Mininteral and MaxInterval just a range for connect parameter. The real interval need query after the comminicate successful between the slave and central.

5.1.8.4. Examples:

Ex. 5.11. _query the module's connection parameter_

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→AT+CN<CR><LF> *query the module's connection parameter*

←CN=0190,0190,0004,03e8<CR><LF>   *response the module's connection parameter*

Ex. 5.12. *configure the module's connection parameter*

→AT+CN=0010,0050,0004,0256<CR><LF>   *configure the module's connection parameter*

←OK<CR><LF>   *response from the module to indicate the command is adopted.*

Note: IOS device, like iphone or ipad, this parameter must valid for ios rule.

5.1.9. DA— Send the data to BLE Central

5.1.9.1 Description:

This command can send a pakage data to BLE Central

5.1.9.2. Syntax:

→AT+DA=data<CR><LF>

←OK<CR><LF>

5.1.9.3. Parameter Description:

Parameter	Description	Nvram	Comments
data lenth:<=20 bytes	**The data need send,and must end by "\r\n", The max lenth of the data is 20**	**NC**	**Note:The DA command will work in AT mode. If in bypass mode, "AT+DA" will transmit as data.**

Note:
   This command valid only the module in connected state.

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5.1.9.4. Examples:

<u>Ex. 5.13. To send the data bypass to central</u>
→AT+DA=0123456789<CR><LF> send "0123456789" to central (ex. iphone)
←OK<CR><LF>   *response from the module to indicate the command is adopted.*

5.1.10. VR— Query Firmware's Version

5.1.10.1 Description:

This command can query the Firmware's version

5.1.10.2. Syntax:

→AT+VR<CR><LF>

←VR=version<CR><LF>

5.1.10.3. Parameter Description:

Parameter	Description	Nvram	Comments
version	**Report the firmware's version**	**NO**	**Just read**

5.1.10.4. Examples:

<u>Ex. 5.14. To query the firmware's version</u>
AT+VR<CR><LF>   *query firmware's version*
VR=C000_V1.0.1<CR><LF>   *response the firmware's version:C000_V1.0.1*

5.1.11. BY— Query or Configure bypass mode and PIO function

5.1.11.1 Description:

This command can query or Configure the module bypass mode and PIO3, PIO11 mode

5.1.11.2. Syntax:

→AT+BY[=Bypass,IOCfg]<CR><LF>

←BY=Bypass<CR><LF>

5.1.11.3. Parameter Description:

Parameter	Description	Nvram	Comments
Bypass Value: 0000-FFFF Default: 0000	**Bit0: Bypass enable 1:enable, 0:disable Bit1: Indicate enable 1: enable, 0:disable Bit2-Bit13: reserve** **2 Hex bytes**	**YES**	**Bypass enable: mean the data translate don't have "DA="when output data, needn't "AT+DA="when send data.** **Indicate enable:will output "ST=", and other indicate string.** **Note: when disable indicate, AT command also work when the**

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			module is not in connected state.
IOCfg	**LSB byte: the GPIO number for indicate the module state** **MSB byte: the GPIO number use for control the module's uart sleep or open** **FF: GPIO not work** **2 Hex bytes**		**This value have two chanel gpio setting, use for indicate the state of module, and make uart open or sleep**

5.1.11.4. Examples:

Ex. 5.15. To query the bypass configure

AT+BY<CR><LF>   *query the bypass configure*

BY=0000,11,15<CR><LF> *response the bypass mode configure, 0000 mean in AT mode and disable indicate state of uart, the GPIO21 is indicate gpio, and GPIO17 is uart control gpio.*

Ex. 5.16. To configure the bypass mode

AT+BY=0003,1008<CR><LF>   *configure the module enable the indicate information, and enable bypass mode; indicate gpio is GPIO16, uart control gpio is GPIO08*

OK<CR><LF>   *response from the module to indicate the command is adopted.*

Note: when set the module disable the indicate information, this time send the at command, don't have response. Only send AT+BY=000X<CR><LF>. (X&2==0), enable the indicate information enable, then response is display.

Ex. 5.17. To configure the bypass mode

AT+BY=0001,FFFF<CR><LF>   *configure the module enable bypass mode, and disable indicate state, the indicate gpio and uart control not use, module's uart always open*

OK<CR><LF>   *response from the module to indicate the command is adopted.*

5.1.12. UU— Query or Config the 128bits UUID

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5.1.12.1 Description:

This command can query or Configure the128bits UUID

5.1.12.2. Syntax:

→AT+UU[=uuid128]<CR><LF>

←UU=uuid128<CR><LF>

5.1.12.3. Parameter Description:

Parameter	Description	Nvram	Comments
Uuid128 Default: 1122,3344,5566, 7788,99AA,BBCC,DDEE,FF00	128bits UUID, display as 8 HEX words, with ",'' separate 16 Hex Byte	YES	This command used for query configure the 128bits by one command, and the 128bits uuid will change to the advertising data for app filter the product.

5.1.12.4. Examples:

Ex. 5.18. To query the 128bits UUID
AT+UU<CR><LF>   *query the ibeacon module's* Power value
UU=1122,3344,5566,7788,99AA,BBCC,DDEE,FF00<CR><LF>   *response 128bits UUID*
Ex. 5.19. To configure the 128bits UUID
AT+UU=1111,2222,3333,4444,5555,6666,7777,8888<CR><LF>   *configure the UUID as 1111,2222,3333,4444,5555,6666,7777,8888*
OK<CR><LF>   *response from the module to indicate the command is adopted.*

5.1.13. PW— Query or Configure the TX Power Level

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5.1.13.1 Description:

This command can query or Configure the tx Power value

5.1.13.2. Syntax:

→AT+PW[=Power, Save]<CR><LF>

←PW=Power<CR><LF>

5.1.13.3. Parameter Description:

Parameter	Description	Nvram	Comments
Power Value: EC-04 Default: 00	**BLE's tx power value, 1Hex Byte, mean: -20 ~ 4 db, and the change unit is:4, example:EC,F0,F4,F8,FC, 00,04 (-20,-16,-12,-8,-4,0,4 db)**	**YES**	**After the command setting, the tx power will active at once.**
Save Value: 00-01	**Used to change the value to nvram, and after reset, will also valid**		**When query, will not display this value.**

5.1.13.4. Examples:

Ex. 5.20. To query the module's tx Power level

AT+PW<CR><LF>   _query the module's_ Power value

PW=04<CR><LF>   _response the module's tx_ Power value, level: 4

Ex. 5.21. To configure the module's tx Power level

AT+PW=04,01<CR><LF>   _configure the module's tx_ Power is 4 db, and save the nvram

OK<CR><LF>   _response from the module to indicate the command is adopted._

5.1.14. UP— Update to the respect connect parameter

5.1.14.1 Description:

This command can update to the respect connect parameter of the module

5.1.14.2. Syntax:

→AT+UP[=MinInterval, MaxInterval, Latency, Timeout]<CR><LF>

←CN=MinInterval,MaxInterval,Latency,Timeout<CR><LF>

5.1.14.3. Parameter Description:

Parameter	Description	Nvram	Comments
MinInterval Value: 0006- 0C80 Default:0190	**The minimum value for the connection interval. 2 Hex Byte**	**YES**	**Uinit: 1.25 ms**
MaxInterval Value: 0006- 0C80 Default:0190	**The Maximum value for the connection interval. 2 Hex Byte**	**YES**	**Uinit: 1.25 ms**
Latency Value: 0000-03E8 Default:0004	**The slave latency for the connection in number of connection events. 2 Hex Byte**	**YES**	
Timeout Value: 0006- 0C80 Default:03E8	**The connection supervisor timeout multiplier as a multiple of10ms.**	**YES**	**Unit: 10 ms**

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	2 Hex Byte		

Note:

The Mininteral and MaxInterval just a range for connect parameter. After the command is send, update the parameter at once..

5.1.14.4. Examples:

Ex. 5.21. _Update the module's connection parameter_

→AT+UP=0010,0050,0004,0256<CR><LF>   update _the module's connection parameter_

←OK<CR><LF>   _response from the module to indicate the command is adopted._

Note: IOS device, like iphone or ipad, this parameter must valid for ios rule.

6. Description of ASCII Indicators

6.1. General Indicators

6.1.1. OK—Command is Adopted by the Bluetooth Module

6.1.1.1. Description:

This indicator indicates a command was adopted by the Bluetooth Module successfully.

6.1.1.2. Syntax:

←OK<CR><LF>

6.1.1.3. Parameter Description:

None

6.1.1.4. Examples:

Ex. 6.1. To configure the module's work baud rate as 9600:

→AT+BD=01<CR><LF>

←OK<CR><LF>   *response from the module to indicate the command is adopted.*

6.1.2. ER—Error

6.1.2.1. Description:

This indicator indicates there is an error detected in the command sent by the host.

6.1.2.2. Syntax:

←ER=Code<CR><LF>

6.1.2.3. Parameter Description:

Parameter	Description	Comments
Code	**The error code to give the reason** **01: The command is not support** **02: The command Parameter is not right** **03: The command is not allowed in current state.**	

6.1.2.4. Examples:

Ex. 6.1. To make Bluetooth Module discoverable:

→AT+DC<CR><LF> Disconnect comamnd

←ER=03<CR><LF>   *response from the module to indicate the command is not allowed.*

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6.1.3. ST—State indicate

6.1.3.1. Description:

This indicator indicates the module state.

6.1.3.2. Syntax:

←ST=Code[:MAC]<CR><LF>

6.1.3.3. Parameter Description:

Parameter	Description	Comments
Code	00: The module is in idle 01: The module is in fast advertising 02: The module is in slow advertising 03: The module is in connected.	Only connect mode will have parameter. And must keep indicate state funtion is open. See AT+BY command
MAC	The mac address of the module	Lenth: 6 bytes. The mac address is the host address, example cell phone's address.

6.1.3.4. Examples:

Ex. 6.2 To indicate the state of module:

←ST=01<CR><LF>   the module indicate the fast advertising state.

←ST=03:112233445566<CR><LF>   the module indicate the connected state, and the host address is 112233445566