

## PREPARATION FOR USE

The EGBT-045MS is pre-configured as a slave Bluetooth device. As shipped, it works under the following data mode default configuration:

Baud Rate: 38400/9600 bps – see “Entering Command Mode” section for details

Data : 8 bits

Stop Bits: 1 bit

Parity : None

Handshake: None

Passkey: 1234

Device Name: HC-05

If the default configuration suits your application, then you can use EGBT-045MS immediately. Once it is paired to a master Bluetooth device, its operation becomes transparent to the user. No user code specific to the Bluetooth module is needed at all in the user microcontroller program.

The EGBT-045MS works in Data Mode when the CMD pin (pin 34) is pulled to logic 0 level or is left unconnected. Transparent UART data transfer with a connected remote device occurs only while in Data Mode. The EGBT-045MS switches to Command Mode if CMD pin is set to logic HIGH. Command mode must be invoked to setup and configure EGBT-045MS. Pairing and connection to a remote Bluetooth slave device can be initiated only while the EGBT-045MS is in command mode (and configured in role as a Master) by entering a string of AT style commands. Any changes made to system parameters (e.g. password, baud rate, etc) will be retained even after power is removed, hence device configuration setup must not be repeated unless new changes need to be made.

### Entering Command Mode

EGBT-045MS is put in Command Mode by setting the CMD pin to logic High. There is one important point the user should be aware of when setting the device in Command Mode – the baud rate may assume a different value depending on the instance the CMD pin is switched to high:

- If EGBT-045MS is powered ON with CMD pin to +Vcc, the UART is set to 38400bps, 8 data bits, 1 stop bit, no parity, no handshake.
- If the EGBT-045MS is powered ON with the CMD

pin at logic low (or open circuit), and then pulled High a moment later, the UART parameters assumes a set of values that was previously fixed using the AT+UART command, with 9600bps, 8 data bits, 1 stop bit, no parity, and no handshake as default parameter values.

You can do configuration setup using the host controller itself (the microcontroller in your own circuit), or a PC running a terminal software using a serial to TTL (or USB to Serial TTL) converter. See Figure 6 for connection details.

## EGBT-045MS AT COMMAND REFERENCE

Symbols and Nomenclatures.

**<xxxx>** Descriptive ID of parameters that must be entered by the user or reported back by the EGBT-045MS.

Example:

AT+INQM=<inq1>,<inq2>,<inq3>

May in actual use appear as

AT+INQM=0,1,15

When <inq1> =0, <inq2>=1, and <inq3>=15

↵ = Carriage Return followed by Line Feed character<CR><LF>

Example:

OK↵ = OK<CR><LF>

**Important note:** All commands must be terminated by <CR><LF>. If the host controller send a <CR> only, EGBT-045MS will repeatedly send a respond that will stop only when <LF> is issued by the host controller

## AT COMMAND LISTING

	COMMAND	FUNCTION
1	AT	Test UART Connection
2	AT+RESET	Reset Device
3	AT+VERSION	Query firmware version
4	AT+ORGL	Restore settings to Factory Defaults
5	AT+ADDR	Query Device Bluetooth Address
6	AT+NAME	Query/Set Device Name
7	AT+RNAME	Query Remote Bluetooth Device's Name
8	AT+ROLE	Query/Set Device Role
9	AT+CLASS	Query/Set Class of Device CoD
10	AT+IAC	Query/Set Inquire Access Code
11	AT+INQM	Query/Set Inquire Access Mode
12	AT+PSWD	Query/Set Pairing Passkey
13	AT+UART	Query/Set UART parameter
14	AT+CMODE	Query/Set Connection Mode
15	AT+BIND	Query/Set Binding Bluetooth Address
16	AT+POLAR	Query/Set LED Output Polarity
17	AT+PIO	Set/Reset a User I/O pin
18	AT+MPIO	Set/Reset multiple User I/O pin
19	AT+MPIO?	Query User I/O pin
20	AT+IPSCAN	Query/Set Scanning Parameters
21	AT+SNIFF	Query/Set SNIFF Energy Savings Parameters
22	AT+SENM	Query/Set Security & Encryption Modes
23	AT+RMSAD	Delete Authenticated Device from List
24	AT+FSAD	Find Device from Authenticated Device List
25	AT+ADCN	Query Total Number of Device from Authenticated Device List
26	AT+MRAD	Query Most Recently Used Authenticated Device
27	AT+STATE	Query Current Status of the Device
28	AT+INIT	Initialize SPP Profile
29	AT+INQ	Query Nearby Discoverable Devices
30	AT+INQC	Cancel Search for Discoverable Devices
31	AT+PAIR	Device Pairing
32	AT+LINK	Connect to a Remote Device
33	AT+DISC	Disconnect from a Remote Device
34	AT+ENSNIFF	Enter Energy Saving mode
35	AT+EXSNIFF	Exit Energy Saving mode

## ERROR CODES

ERROR CODE	VERBOSE
0	Command Error/Invalid Command
1	Results in default value
2	PSKEY write error
3	Device name is too long (>32 characters)
4	No device name specified (0 length)
5	Bluetooth address NAP is too long
6	Bluetooth address UAP is too long
7	Bluetooth address LAP is too long
8	PIO map not specified (0 length)
9	Invalid PIO port Number entered
A	Device Class not specified (0 length)
B	Device Class too long
C	Inquire Access Code not Specified (0 length)
D	Inquire Access Code too long
E	Invalid Iquire Access Code entered
F	Pairing Password not specified (0 length)
10	Pairing Password too long (> 16 characters)
11	Invalid Role entered
12	Invalid Baud Rate entered
13	Invalid Stop Bit entered
14	Invalid Parity Bit entered
15	No device in the Pairing List
16	SPP not initialized
17	SPP already initialized
18	Invalid Inquiry Mode
19	Inquiry Timeout occurred
1A	Invalid/zero length address entered
1B	Invalid Security Mode entered
1C	Invalid Encryption Mode entered

## 1. Test UART connection

COMMAND	RESPONSE
AT↵	OK↵

## 2. Reset Device

COMMAND	RESPONSE
AT+RESET↵	OK↵

## 3. Query firmware version

COMMAND	RESPONSE
AT+VERSION?↵	+VERSION:<VER>↵ OK↵

where <VER> = Version Number

## 4. Restore settings to Factory Defaults

COMMAND	RESPONSE
AT+ORGL↵	OK↵

Restore to the following settings:

Device Class: 0  
Inquiry Code: 0x009e8b33  
Device Mode: Slave  
Binding Mode: SPP  
UART: 38400bps, 8 bit, 1 stop bit, no parity  
Pairing Code: 1234  
Device Name: H-C-2010-06-01

## 5. Query EGBT-045MS Bluetooth Address

COMMAND	RESPONSE
AT+ADDR?↵	+ADDR:nn:uu:ll↵ OK↵

Bluetooth Address Format:

nn - NAP (16 bit Non-significant Address Portion)  
uu - UAP (8 bit Upper Address Portion)  
ll - LAP (24 bit Lower Address Portion)

Returned bluetooth address

Example: Query EGBT-045MS Bluetooth Address

From Host controller:

```
AT+ADDR?↵  
EGBT-045MS Response  
+ADDR:11:6:230154↵  
OK↵
```

Bluetooth Address is 11:06:23:01:54

## 6. Query/Set Device Name

COMMAND	RESPONSE
AT+NAME?↵	+NAME:<name>↵ OK↵
AT+NAME=<name>↵	OK↵

where <name> = Device Name (31 characters max.)

Example: Query device name

From Host controller:

```
AT+NAME?↵  
EGBT-045MS Response  
+NAME:HC-05↵  
OK↵
```

Example: Set device name to “e-Gizmo”

From Host controller:

```
AT+NAME=e-Gizmo↵  
EGBT-045MS Response  
OK↵
```

Example: Set device name to “supercalifragilisticexpialidocious”

From Host controller:

```
AT+NAME=supercalifragilisticexpialidocious↵  
EGBT-045MS Response  
ERROR:(3)↵ name too long (>31 characters)
```

## 7. Query Remote Bluetooth Device's Name

COMMAND	RESPONSE
AT+RNAME?<addr>↵	+NAME:<name>↵ OK↵

where <name> = Device name  
<addr> = 48 bit bluetooth address  
in NAP,UAP,LAP format

Example: Query remote Bluetooth device having address = 00:02:72:0A:3C:7F

Bluetooth address in NA:UAP:LAP format = 0002:72:0A3C7F

From Host controller:

```
AT+RNAME?0002,72,0A3C7F↵  
EGBT-045MS response if remote device name is “HC-05”  
+NAME:HC-05↵  
OK↵  
EGBT-045MS response if remote device name is unresolved  
FAIL↵
```

## 8. Query/Set Device Role

COMMAND	RESPONSE
AT+ROLE?↵	+ROLE:<role>↵ OK↵
AT+ROLE=<role>↵	OK↵

where <role>  
 0 - Slave (default)  
 1 - Master  
 2 - Slave-Loop

Slave - EGBT-045MS acts as discoverable wireless UART device ready for transparent data exchange.

Master - Scans for a remote bluetooth (slave) device, pairs, and setup connection for a transparent data exchange between devices

Slave-Loop - Data loop-back Rx-Tx. Used mainly for testing.

Example: Set EGBT-045MS in master role

Bluetooth address in NA:UAP:LAP format = 0002:72:0A3C7F

From Host controller:  
 AT+ROLE=1↵  
 EGBT-045MS response  
 +ROLE:1↵  
 OK↵

## 9. Query/Set Class of Device CoD

COMMAND	RESPONSE
AT+CLASS?↵	+CLASS:<class>↵ OK↵
AT+CLASS=<class>↵	OK↵

where <class>  
 0 - (default)

The Class of Device identifier. For more info, see the Bluetooth\_Code\_Definition.pdf file included with the product documentation of this kit.

## 10. Query/Set Inquire Access Code

COMMAND	RESPONSE
AT+IAC?↵	+IAC:<iac>↵ OK↵
AT+IAC=<iac>	OK↵ / FAIL↵

where <iac> = Inquire Access Code  
 9e8b33 - default value

## 11. Query/Set Inquire Access Mode

COMMAND	RESPONSE
AT+INQM?↵	+INQM:<inq1>,<inq2>,<inq3>↵ OK↵
AT+INQM=<inq1>,<inq2>,<inq3>↵	OK↵ / FAIL↵

where <inq1> Inquire Access Mode  
 0 - standard  
 1 - rssi (default)

<inq2> Maximum number of devices response  
 0 to 32000  
 1 (default)

<inq3> Inquire timeout  
 1 to 48  
 48 (default)

Maximum number of devices response - EGBT-045MS will stop inquiring once the number of devices that responded reaches this value.

Inquire Timeout - Multiply this number by 1.28 to get the maximum time in seconds the EGBT-045MS will wait for a respond to an inquiry call.

Example: Set EGBT-045MS Inquire Access Mode at  
 Inquire access mode - 1 (rssi)  
 Number of devices - 3  
 Timeout - 10 (10\*1.28 = 12.8 seconds)

Bluetooth address in NA:UAP:LAP format = 0002:72:0A3C7F

From Host controller:  
 AT+INQM=1,3,10↵  
 EGBT-045MS response  
 OK↵

## 12. Query/Set Pairing Passkey

COMMAND	RESPONSE
AT+PSWD?↵	+PSWD:<password>↵ OK↵
AT+PWSD=<password>↵	OK↵

where <password> = Alphanumeric password 16 characters max.  
 1234 - (default)

Example: Set EGBT-045MS Password to "e-Gizmo"

From Host controller:  
 AT+PSWD=e-Gizmo↵  
 EGBT-045MS response  
 OK↵

## 13. Query/Set UART parameter

COMMAND	RESPONSE
AT+UART?↵	+UART:<baud>,<stop>,<parity>↵ OK↵
AT+UART=<baud>,<stop>,<parity>↵	OK↵

where <baud> =baud rate, any one of the following

4800  
9600 (default)  
19200  
38400  
57600  
115200  
234000  
460800  
921600  
1382400

<stop> = number of stop bits

0 - 1 bit (default)

1 - 2 bits

<parity> = Parity bit

0 - None (default)

1 - Odd parity

2 - Even Parity

Example: Set EGBT-045MS UART parameter to 115200bps, 2 stop bits, even parity

From Host controller:

AT+UART=115200,1,2↵

EGBT-045MS response

OK↵

#### 14. Query/Set Connection Mode

COMMAND	RESPONSE
AT+CMODE?↵	+CMODE:<mode>↵ OK↵
AT+CMODE=<mode>↵	OK↵

where <mode>

0 - Connect to a specified Bluetooth device only (default).

See related command Command 15.

1 - Can connect with any other Bluetooth device.

2 - Test mode

#### 15. Query/Set Binding Bluetooth Address

COMMAND	RESPONSE
AT+BIND?↵	+BIND:<addr>↵ OK↵
AT+BIND=<addr>↵	OK↵

where <addr> = 48 bit bluetooth address  
in NAP,UAP,LAP format

Example: Bind with Bluetooth device having address = 00:02:72:0A:3C:7F

Bluetooth address in NA,UAP,LAP format = 0002,72,0A3C7F

From Host controller:

AT+BIND=0002,72,0A3C7F↵

EGBT-045MS response

OK↵

#### 16. Query/Set LED Output Polarity

COMMAND	RESPONSE
AT+POLAR?↵	+POLAR:<led1>,<led2>↵ OK↵
AT+POLAR=<led1>,<led2>↵	OK↵

where <led1> = LED1 (pin 31) Polarity

0 - LED1 output active low

1 - LED1 output active high (default)

<led2> = LED2 (pin 32) Polarity

0 - LED2 output active low

1 - LED2 output active high (default)

#### LED 1

Flashes once each seconds to indicate EGBT-045MS is in Command Mode. Flashes two times per second when EGBT-045MS is in data mode.

#### LED2

Turns ON when EGBT-045MS remote connection is successfully opened.

#### 17. Set/Reset a User I/O pin

COMMAND	RESPONSE
AT+PIO=<pn>,<value>↵	OK↵

where <pn> = port number. Available port are as follows

2 - PIO2

3 - PIO3

4 - PIO4

5 - PIO5

6 - PIO6

7 - PIO7

10 - PIO10

<value>  
 0 - Logic Low  
 1 - Logic High

Example: Set PIO2 to logic High

From Host controller:  
 AT+PIO=2,1 ↵  
 EGBT-045MS response  
 OK ↵

### 18. Set/Reset multiple User I/O pin

COMMAND	RESPONSE
AT+MPIO=<iomap> ↵	OK ↵

where  
 <iomap> =12-bit I/O map presented in hexadecimal

x	PIO10	x	x	PIO7	PIO6	PIO5	PIO4	PIO3	PIO2	x	x
---	-------	---	---	------	------	------	------	------	------	---	---

x - don't care/reserved

Example:  
 Set PIO2 and PIO6 to logic High, all others to logic 0

Bit pattern is 0000 0100 0100 = 44 hexadecimal

From Host controller:  
 AT+MPIO=44 ↵  
 EGBT-045MS response  
 OK ↵

### 19. Query User I/O pin

COMMAND	RESPONSE
AT+MPIO? ↵	+MPIO:<iomap> ↵ OK ↵

where  
 <iomap> =12-bit I/O map presented in hexadecimal

x	PIO10	x	x	PIO7	PIO6	PIO5	PIO4	PIO3	PIO2	x	x
---	-------	---	---	------	------	------	------	------	------	---	---

x - reserved -used by system, may assume any values

Example:  
 Read PIO inputs

From Host controller:  
 AT+MPIO? ↵  
 EGBT-045MS response  
 +MPIO:944 ↵  
 OK ↵

Returned value in binary: 1001 0100 0100

In this example, the PIO are previously set in command 18 with PIO2 and PIO6 set. The returned value also shows reserved bits 11 and 8 set by the system.

## 20. Query/Set Scanning Parameters

COMMAND	RESPONSE
AT+IPSCAN? ↵	+IPSCAN:<int>,<dur>,<pint>,<pdur> ↵ OK ↵
AT+IPSCAN=<int>,<dur>,<pint>,<pdur> ↵	OK ↵

where <int> = inquire scan time interval  
 1024 - default  
 <dur> = inquire scan time duration  
 512 - default  
 <pint> = page scan time interval  
 1024 - default  
 <pdur> = page scan time duration  
 512 - default

All parameters must be represented with decimal integer value.

## 21. Query/Set SNIFF Energy Savings Parameters

COMMAND	RESPONSE
AT+SNIFF? ↵	+SNIFF:<tmax>,<tmin>,<retry>,<timeout> ↵ OK ↵
AT+SNIFF=<tmax>,<tmin>,<retry>,<timeout> ↵	OK ↵

where <tmax> = maximum time  
 0 - default  
 <tmin> = minimum time  
 0 - default  
 <retry> = retry time  
 0 - default  
 <timeout> = timeout  
 0 - default

All parameters must be represented with decimal integer value.

## 22. Query/Set Security & Encryption Modes

COMMAND	RESPONSE
AT+SENM? ↵	+SENM:<mode>,<encrypt> ↵ OK ↵
AT+SENM=<mode>,<encrypt> ↵	OK ↵

where <mode> = Security Mode  
 0 - sec\_mode\_off (default)  
 1 - sec\_mode1\_non-secure  
 2 - sec\_mode2-service  
 3 - sec\_mode3\_link  
 4 - sec\_mode\_unknown

<encrypt> = encryption mode  
 0 - hci\_enc\_mode\_off (default)  
 1 - hci\_enc\_mode\_pt\_to\_pt  
 2 - hci\_enc\_mode\_pt\_to\_pt\_and\_bcast

### 23. Delete Authenticated Device from List

COMMAND	RESPONSE
AT+RMSAD=<addr>↵	OK↵

where <addr> = 48 bit bluetooth address  
 in NAP,UAP,LAP format

Example: Remove from Authenticated Device list a Bluetooth device having address = 00:02:72:0A:3C:7F

Bluetooth address in NA,UAP,LAP format = 0002,72,0A3C7F

From Host controller:

AT+RMSAD=0002,72,0A3C7F↵

EGBT-045MS response if deletion is successful

OK↵

EGBT-045MS response if remote device address is not in the list

ERROR(15)↵

Caution:

Entering

AT+RMSAD↵

will delete ALL authenticated device from the list!

### 24. Find Device from Authenticated Device List

COMMAND	RESPONSE
AT+FSAD=<addr>↵	OK↵

where <addr> = 48 bit bluetooth address  
 in NAP,UAP,LAP format

Note: AT+FSAD returns a FAIL response if device is not in the authenticated list

### 25. Query Total Number of Device from Authenticated Device List

COMMAND	RESPONSE
AT+ADCN?↵	+ADCN:<total>↵ OK↵

where

<total> = total number of devices in the authenticated device list

### 26. Query Most Recently Used Authenticated Device

COMMAND	RESPONSE
AT+MRAD?↵	+MRAD:<addr>↵ OK↵

where <addr> = 48 bit bluetooth address  
 in NAP:UAP:LAP format

### 27. Query Current Status of the Device

COMMAND	RESPONSE
AT+STATE?↵	+STATE:<stat>↵ OK↵

where

<stat> = Current Status, any one of the following:

INITIALIZED  
 READY  
 PAIRABLE  
 PAIRED  
 INQUIRING  
 CONNECTING  
 CONNECTED  
 DISCONNECTED  
 UNKNOWN

### 28. Initialize SPP Profile

COMMAND	RESPONSE
AT+INIT↵	OK↵ / FAIL↵

### 29. Query Nearby Discoverable Devices

COMMAND	RESPONSE
AT+INQ↵	+INQ: <addr>,<class>,>rssi>↵ OK↵

where <addr> = 48 bit bluetooth address  
 in NAP:UAP:LAP format

<class> = Device Class

<rssi> = RSSI

This command will scan and report all nearby discoverable Bluetooth devices. The same device may be reported more than once.

This command will work only if EGBT-045MS is set to work as a master device, i.e. AT+ROLE=1, and after AT+INIT is executed.

Example: Discover nearby devices

From Host controller: Set device role as master

AT+ROLE=1 ↵

EGBT-045MS response

OK ↵

From Host controller: Initialize SPP

AT+INIT ↵

EGBT-045MS response

OK ↵

From Host controller: Set inquire mode as RSSI, look for 9 devices, and 48 as timeout

AT+INQM=1,9,48 ↵

EGBT-045MS response

OK ↵

From Host controller: Start Device Discovery

AT+INQ ↵

EGBT-045MS response (sample only, actual report will vary)

+INQ:101D:C0:2E7B54,5A0204,7FFF ↵

+INQ:25:48:21AD1A,5A020C,7FFF ↵

OK ↵

In this example, EGBT-045MS found only two discoverable devices. It will quit searching after the timeout time specified by the AT+INQM command or if the number of discovered devices equals the number of specified devices.

### 30. Cancel Search for Discoverable Devices

COMMAND	RESPONSE
AT+INQC ↵	OK ↵

AT+INQ can be stopped at anytime by executing this command.

### 31. Device Pairing

COMMAND	RESPONSE
AT+PAIR=<addr>,<timeout> ↵	OK ↵ / FAIL ↵

where <addr> = 48 bit bluetooth address  
in NAP,UAP,LAP format  
<timeout> = Timeout time in sec

### 32. Connect to a Remote Device

COMMAND	RESPONSE
AT+LINK=<addr> ↵	OK ↵ / FAIL ↵

where <addr> = 48 bit bluetooth address  
in NAP,UAP,LAP format

### 33. Disconnect from a Remote Device

COMMAND	RESPONSE
AT+DISC ↵	+DISC:<results> ↵

where

<results> = Disconnection results, any one of the following:

SUCCESS  
LINK\_LOSS  
NO\_SLC  
TIMEOUT  
ERROR

### 34. Enter Energy Saving mode

COMMAND	RESPONSE
AT+ENSNIFF=<addr> ↵	OK ↵

where <addr> = 48 bit bluetooth address  
in NAP,UAP,LAP format

### 35. Exit Energy Saving mode

COMMAND	RESPONSE
AT+EXSNIFF=<addr> ↵	OK ↵

where <addr> = 48 bit bluetooth address  
in NAP,UAP,LAP format