

GTI-ATMBT2202 AT Command -part #2 AT command description

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1. Overview

This document describes the detailed description of the usage of the GTI-ATMBT2202 AT comment sets.

Please practice with your GTI-ATMBT2202 EVK as illustrated in “GTI-ATMBT2202 AT Command -part #1”

2. AT Command List

2.1 AT+BLEGATTDFTSERVER

Turn ON or OFF the default GATT server in system booting up	
AT+BLEGATTDFTSERVER= <action>	The setting will be applied after the system reset. <action>, ON or OFF

Result:

```

AT+BLEGATTDFTSERVER=?
+BLEGATTDFTSERVER:<ON|OFF>
OK
AT+BLEGATTDFTSERVER?
+BLEGATTDFTSERVER:OFF
AT+BLEGATTDFTSERVER=ON
OK
AT+SYSRESET=00
AT+BLEGATTDFTSERVER?
+BLEGATTDFTSERVER:ON
    
```

2.2 AT+BLEGATTDFTSERVICE

Set the UUID of the default service, and the default ATT server is available.	
<p>AT+BLEGATTDFTSERVICE= <sec_prop>, <uuid></p>	<p>The setting will be applied after the system reset.</p> <p><sec_prop> 0000: No security 0004: Unauthenticate 0008: Authenticate 000C: Security connection</p> <p><uuid>, the service UUID</p>

Result:

```

AT+BLEGATTDFTSERVICE=?
+BLEGATTDFTSERVICE:<sec_prop>,<uuid>
OK
AT+BLEGATTDFTSERVICE?
+BLEGATTDFTSERVICE:0000,41746D6F73696300000000000000000000
AT+BLEGATTDFTSERVICE=000C,41746D6F736963000000000000000000A
OK
AT+BLEGATTDFTSERVICE?
+BLEGATTDFTSERVICE:000C,41746D6F736963000000000000000000A
  
```

2.3. AT+BLEGATTDFTCHAR1

Set the UUID of the default characteristic 1, and the default ATT server is available.	
+BLEGATTDFTCHAR1= <sec_prop>, <uuid>	The setting will be applied after the system reset. <sec_prop>, see below table. <uuid>, the characteristic UUID

<p>If the default ATT server is available.</p> <pre> * 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 * +-----+-----+-----+-----+-----+-----+-----+-----+-----+ * X WS I N WR WC RD X NP IP WP RP * +-----+-----+-----+-----+-----+-----+-----+-----+ * * Bit [0-1] : Read Permission (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * Bit [2-3] : Write Permission (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * Bit [4-5] : Indication Permission (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * Bit [6-7] : Notification Permission (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * * Bit [8] : Reserved * Bit [9] : Read Command accepted * Bit [10] : Write Command accepted * Bit [11] : Write Request accepted * Bit [12] : Notification * Bit [13] : Indication * Bit [14] : Write Signed accepted </pre>
--

Result:

```
AT+BLEGATTDFTCHAR1=?
+BLEGATTDFTCHAR1:<sec_prop>,<uuid>
OK
AT+BLEGATTDFTCHAR1?
+BLEGATTDFTCHAR1:1800,41746D6F73696300000000000000000001
AT+BLEGATTDFTCHAR1=1A00,41746D6F736963000000000000000000B
OK
AT+BLEGATTDFTCHAR1?
+BLEGATTDFTCHAR1:1A00,41746D6F736963000000000000000000B
```

2.4. AT+BLEGATTDFTCHAR2

Set the UUID of the default characteristic 2, and the default ATT server is available.	
<p>+BLEGATTDFTCHAR2= <sec_prop>, <uuid></p>	<p>The setting will be applied after the system reset.</p> <p><sec_prop>, see below table. <uuid>, the characteristic UUID</p>

<p>If the default ATT server is available.</p> <pre> * 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 * +-----+-----+-----+-----+-----+-----+-----+-----+-----+ * X WS I N WR WC RD X NP IP WP RP * +-----+-----+-----+-----+-----+-----+-----+-----+-----+ * * Bit [0-1] : Read Permission * (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * Bit [2-3] : Write Permission * (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * Bit [4-5] : Indication Permission * (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * Bit [6-7] : Notification Permission * (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON) * * Bit [8] : Reserved * Bit [9] : Read Command accepted * Bit [10] : Write Command accepted * Bit [11] : Write Request accepted * Bit [12] : Notification * Bit [13] : Indication * Bit [14] : Write Signed accepted </pre>	
---	--

Result:

```
AT+BLEGATTDFTCHAR2=?  
+BLEGATTDFTCHAR2:<sec_prop>,<uuid>  
OK  
AT+BLEGATTDFTCHAR2?  
+BLEGATTDFTCHAR2:1800,41746D6F73696300000000000000000002  
AT+BLEGATTDFTCHAR2=2800,41746D6F7369630000000000000000000C  
OK  
AT+BLEGATTDFTCHAR2?  
+BLEGATTDFTCHAR2:2800,41746D6F7369630000000000000000000C
```

2.5. AT+BLEADVLEGACYPARAM

Set advertising parameters.	
AT+BLEADVLEGACYPARAM= <adv_idx>, <interval_min>, <interval_max>, <duration>	The setting will be applied after enabling advertising. <adv_idx>, advertising index from 0 to max supported number. <interval_min>, the minimal advertising interval value from 32 to 16384. (unit: 0.625 ms) <interval_max>, the maximal advertising interval value from 32 to 16384. (unit: 0.625 ms) <duration>, how long the advertising is available, and the value from 0 to 65535. (unit: 10 ms). P.S. Set this value to 0 to keep advertising..

Result:

```

AT+BLEADVLEGACYPARAM=?
+BLEADVLEGACYPARAM:<adv_idx>,<interval_min>,<interval_max>,<duration>
OK
AT+BLEADVLEGACYPARAM=0,32,64,100
OK
    
```

2.6. AT+BLEADVDATA

Set advertising data.	
AT+BLEADVDATA= <adv_idx>, <advertising_data>	The GAP must be initialized (2.18 AT+BLEGAPINIT) before applying this setting. <adv_idx>, advertising index from 0 to max supported number. <advertising_data>, advertising data, the maximum is 31 bytes

Result:

```

AT+BLEADVDATA=?
+BLEADVDATA:<act_idx>,<advertising data>
OK
AT+BLEADVDATA=0,06FF4142434445
+BLEADVDATA:72
ERROR
AT+BLEGAPINIT=0F
OK
AT+BLEADVDATA=0,06FF4142434445
OK
    
```

2.7. AT+BLESCANRSPDATA

Set scan response data	
AT+BLESCANRSPDATA= <adv_idx>, <scan_response>	The GAP must be initialized (2.18 AT+BLEGAPINIT) before applying this setting. <adv_idx>, advertising index from 0 to max supported number. <advertising_data>, scan response data, the maximum is 31 bytes

Result:

```

AT+BLESCANRSPDATA=?
+BLESCANRSPDATA:<act_idx>,<scan response>
OK
AT+BLESCANRSPDATA=0,0808414746DF736963
+BLESCANRSPDATA:72
ERROR
AT+BLEGAPINIT=0F
OK
AT+BLESCANRSPDATA=0,0808414746DF736963
OK
    
```

2.8. AT+BLEADVENABLE

Enable advertising feature	
AT+BLEADVENABLE= <adv_idx>, <action>	The GAP must be initialized (2.18 AT+BLEGAPINIT) before applying this setting. <adv_idx>, advertising index from 0 to max supported number. <action>, ON or OFF

Result:

```

AT+BLEADVENABLE=?
+BLEADVENABLE:<act_idx>,<ON|OFF>
OK
AT+BLEADVENABLE=0,ON
+BLEADVENABLE:64
ERROR
AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=0,ON
OK
AT+BLEADVENABLE=0,OFF
OK
AT+BLEADVENABLE=1,ON
OK
    
```

2.9. AT+BLEGAPDISCONNECT

Disconnect the BLE connection by connection index

AT+BLEGAPDISCONNECT=
<conn_idx>

<conn_idx>, disconnect the current connection. The
<conn_idx> get form *BLEGATTFROMBLE* event after
connection establish.

Result:

```

AT+BLEADVENABLE=1,ON
OK

+BLEGAPCONN:0
AT+BLEGAPDISCONNECT=0
OK

+BLEGAPDISCONN:0,22
    
```

2.10. AT+BLEGATTTOBLE

Transmit data to remote through BLE after connection establish.	
AT+BLEGATTTOBLE= <conn_idx>, <att_idx>, <action>, <data>	<conn_idx>, the <conn_idx> get form <i>BLEGAPCONN</i> event after connection establish. <att_idx>, it uses the static <att_idx> if the default ATT server is available. 01: Characteristic 1 03: Characteristic 2 <action> 00: Read 01: Write 02: Notification 03: Indication 04: Read Confirm 05: ATT info 06: ATT info Confirm

Result:

The default ATT server was ON in this example.

P.S. Please enable CCCD on the remote side before applying the notification.

```

AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=0,ON
OK
+BLEGAPCONN:0
AT+BLEGATTTOBLE=0,1,02,000102030405060708090A0B0C0D0E0F
OK
    
```

2.11. AT+SYSATCMDS

List all AT commands.

AT+SYSATCMDS?	
---------------	--

Result:

```

AT+SYSATCMDS?
+BLEADVDATA:<act_idx>,<advertising data>
+BLEADVENABLE:<act_idx>,<ON|OFF>
+BLEADVLEGACYPARM:<adv_idx>,<interval_min>,<interval_max>,<duration>
+BLEGAPDISCONNECT:<conn_idx>
+BLEGATTDFTCHAR1:<sec_prop>,<uuid>
+BLEGATTDFTCHAR2:<sec_prop>,<uuid>
+BLEGATTDFTSERVER:<ON|OFF>
+BLEGATTDFTSERVICE:<sec_prop>,<uuid>
+BLEGATTOBLE:<conn_idx>,<att_idx>,<action>,<data>
+BLESCANRSPDATA:<act_idx>,<scan response>
+DEBUG:<1 or 0>
+SYSATCMDS:
+SYSBDADDR:<Address>
    
```


2.12. AT+SYSBDADDR

Modify the BD address of the device.

AT+SYSBDADDR=
<address>

<address>, the BD address of the device.

Result:

```
AT+SYSBDADDR?  
+SYSBDADDR: 7C696BFF970B  
AT+SYSBDADDR=7C696B000001  
OK  
AT+SYSBDADDR?  
+SYSBDADDR: 7C696B000001
```

2.13. AT+BLEGATTADDSERVICE

Add service (dynamic)	
<p>AT+BLEGATTADDSERVICE= <sec_prop>, <uuid></p>	<p>The service will be activated by GAP initial command (2.18 AT+BLEGAPINIT). It needs to apply the active service (2.16 AT+BLEGATTSVCACTIVE) command if it adds the server after GAP initialized.</p> <p><sec_prop> 0000: No security 0004: Unauthenticate 0008: Authenticate 000C: Security connection</p> <p><uuid>, the service UUID</p> <p><return> att_idx</p>

Result:

```

AT+BLEGATTADDSERVICE=?
+BLEGATTADDSERVICE:<sec_prop>,<uuid>
OK
AT+BLEGATTADDSERVICE=0000,41746D6F73696300000000000000000001
+BLEGATTADDSERVICE:4
OK
  
```

2.14. AT+BLEGATTADDCHAR

Add characteristic (dynamic)	
AT+BLEGATTADDCHAR= <sec_prop>, <uuid>, <max_size>	<sec_prop>, see below table. <uuid>, the characteristic UUID <max_size> 1 ~ 1024 <return> att_idx

```

*           15  14  13  12  11  10  9  8  7  6  5  4  3  2  1  0
* +-----+-----+-----+-----+-----+-----+-----+-----+-----+
* | X | WS | I | N | WR | WC | RD | X |           NP |   IP |   WP |   RP
* +-----+-----+-----+-----+-----+-----+-----+-----+
*
* Bit [0-1] : Read Permission
  (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
* Bit [2-3] : Write Permission
  (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
* Bit [4-5] : Indication Permission
  (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
* Bit [6-7] : Notification Permission
  (0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
*
* Bit [8]   : Reserved
* Bit [9]   : Read Command accepted
* Bit [10]  : Write Command accepted
* Bit [11]  : Write Request accepted
* Bit [12]  : Notification
* Bit [13]  : Indication
* Bit [14]  : Write Signed accepted
    
```

Result:

```
AT+BLEGATTADDCHAR=?  
+BLEGATTADDCHAR:<sec_prop>,<uuid>,<max_size>  
OK  
AT+BLEGATTADDCHAR=1800,41746D6F736963000000000000000002,512  
+BLEGATTADDCHAR:6  
OK
```

2.15. AT+BLEGATTADDDESC

Add descriptor (dynamic)	
AT+BLEGATTADDDESC= <uuid>	<uuid> 2900: Characteristic extended properties descriptor 2902: Client characteristic configuration descriptor 2903: Server characteristic configuration descriptor 2904: Characteristic presentation format descriptor <return> att_idx

Result:

```

AT+BLEGATTADDDESC=?
+BLEGATTADDDESC:<uuid>
OK
AT+BLEGATTADDDESC=2902
+BLEGATTADDDESC:7
OK
    
```

2.16. AT+BLEGATTSVCACTIVE

Active service (dynamic)	
AT+BLEGATTSVCACTIVE= <reason>	<reason> 00: Apply

Result:

```

AT+BLEGATTSVCACTIVE=?
+BLEGATTSVCACTIVE:<reason>
OK
AT+BLEGAPINIT=0F
OK
AT+BLEGATTADDSERVICE=0000,41746D6F73696300000000000000000001
+BLEGATTADDSERVICE:4
OK
AT+BLEGATTADDCHAR=1800,41746D6F73696300000000000000000002,512
+BLEGATTADDCHAR:6
OK
AT+BLEGATTADDDESC=2902
+BLEGATTADDDESC:7
OK
AT+BLEGATTADDSERVICE=0000,41746D6F73696300000000000000000003
+BLEGATTADDSERVICE:8
OK
AT+BLEGATTADDCHAR=0200,41746D6F73696300000000000000000004,512
+BLEGATTADDCHAR:10
OK
AT+BLEGATTSVCACTIVE=00
OK
AT+BLEADVENABLE=0,ON
OK
+BLEGAPCONN:0
+BLEGATTFROMBLE:0,7,00,
AT+BLEGATTTOBLE=0,7,04,0100
OK
AT+BLEGATTTOBLE=0,6,02,000102030405060708090A0B0C0D0E0F
OK
+BLEGATTCOMPEVT:0,02,0,0

```

2.17. AT+SYSRESET

Reset system (software)	
AT+SYSRESET= <reason>	<reason> 00: No error

Result:

```
AT+SYSRESET=?  
+SYSRESET:<reason>  
OK  
AT+SYSRESET=00
```

2.18. AT+BLEGAPINIT

BLE GAP initial	
AT+BLEGAPINIT= <role>	This command could only apply once. It needs to be reset if it will change to the other role. <role> 0F: All role

Result:

```

AT+BLEGAPINIT=?
+BLEGAPINIT:<role>
OK
AT+BLEGAPINIT=0F
OK
    
```


2.19. AT+SYSPM

System power mode control	
AT+SYSPM= <mode>, <wakeup io>, <wakeup level>	<mode> 02: Hibernation mode <wakeup io>, the pin number depend on HW design pin number <wakeup level> 0: Low 1: High

Result:

```

AT+SYSPM=?
+SYSPM:<mode>,<wakeup_io>,<wakeup_level>
OK
AT+SYSPM=2,20,0
  
```

2.20. BLEGATTADDDESCUSERDFD

System power mode control	
AT+BLEGATTADDDESCUSERDFD= <sec_prop>, <uuid>, <max_size>	<sec_prop>, see below table. <uuid>, the characteristic UUID <max_size> 1 ~ 1024 <return> att_idx

```

*           15  14  13  12  11  10  9  8  7  6  5  4  3  2  1  0
* +-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
* | X | WS | I | N | WR | WC | RD | X |           NP |   IP |   WP |   RP |
* +-----+-----+-----+-----+-----+-----+-----+-----+-----+
*
* Bit [0-1] : Read Permission
(0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
* Bit [2-3] : Write Permission
(0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
* Bit [4-5] : Indication Permission
(0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
* Bit [6-7] : Notification Permission
(0 = NO_AUTH, 1 = UNAUTH, 2 = AUTH, 3 = SEC_CON)
*
* Bit [8]   : Reserved
* Bit [9]   : Read Command accepted
* Bit [10]  : Write Command accepted
* Bit [11]  : Write Request accepted
* Bit [12]  : Notification
* Bit [13]  : Indication
* Bit [14]  : Write Signed accepted
    
```

Result:

```
AT+BLEGATTADDDDESCUSERDFD=?
+BLEGATTADDDDESCUSERDFD:<sec_prop>,<uuid>,<max_size>
OK
AT+BLEGATTADDSERVICE=0000,41746D6F73696300000000000000000006
+BLEGATTADDSERVICE:4
OK
AT+BLEGATTADDCHAR=1800,41746D6F73696300000000000000000007,512
+BLEGATTADDCHAR:6
OK
AT+BLEGATTADDDDESCUSERDFD=0A00,41746D6F736963000000000000000008,8
+BLEGATTADDDDESCUSERDFD:7
OK
AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=00,ON
OK
+BLEGAPCONN:0
+BLEGATTFROMBLE:0,7,00,
AT+BLEGATTTOBLE=00,7,04,0100020003000400
OK
+BLEGATTFROMBLE:0,7,01,1234567890
```

2.21. BLEATTMTUSET

Set ATT MTU size	
AT+BLEATTMTUSET= <conn_idx>, <mtu>	<conn_idx>, connection index <mtu>, ATT MTU size form 23 to 515

Result:

```

AT+BLEATTMTUSET=?
+BLEATTMTUSET:<conn_idx>,<mtu>
OK
AT+BLEATTMTUSET=0,111
OK
  
```

2.22. BLEGATTMTUEXCHGREQ

Apply the MTU exchange request (only available once per connection)

AT+BLEGATTMTUEXCHGREQ= <conn_idx>	<conn_idx>, connection index
--------------------------------------	------------------------------

Result:

```

AT+BLEGATTMTUEXCHGREQ=?
+BLEGATTMTUEXCHGREQ:<conn_idx>
OK
AT+BLEGATTMTUSET=0,111
OK
AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=00,ON
OK
+BLEGAPCONN:0
AT+BLEGATTMTUEXCHGREQ=0
OK
+BLEGATTMTUEXCHGREQ:0
+BLEGATTMTUEXCHANGE:0,111
    
```

3. AT Event List

3.1. BLEGAPCONN

Retrieve this event to MCU after BLE connection is established.	
+BLEGAPCONN: <conn_idx>	<conn_idx>, the connection index after connection established.

3.2. BLEGAPDISCONN

Retrieve this event to MCU after BLE connection is disconnected.	
+BLEGAPDISCONN: <conn_idx>, <reason>	<conn_idx>, the connection index. <reason>, the reason code after disconnected. P.S. It is hex value.

3.3. BLEGATTFROMBLE

<p>+BLEGATTFROMBLE: <conn_idx>, <att_idx>, <action>, <data></p>	<p><conn_idx>, the <conn_idx> get form <i>BLEGAPCONN</i> event after connection establish.</p> <p><att_idx>, it uses the static <att_idx> if the default ATT server is available.</p> <ul style="list-style-type: none"> 01: Characteristic 1 03: Characteristic 2 <p><action></p> <ul style="list-style-type: none"> 00: Read 01: Write 02: Notification 03: Indication 04: Read Confirm 05: ATT info 06: ATT info Confirm

Result:

```
AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=0,ON
OK
+BLEGAPCONN:0
+BLEGATTFROMBLE:0,1,01,41424344454647
```

3.4. BLEGATTCOMPEVT

<pre>" +BLEGATTCOMPEVT: <conn_idx>, <action>, <status>, <seq_num>"</pre>	<p><conn_idx>, the <conn_idx> get form <i>BLEGAPCONN</i> event after connection establish.</p> <p><action></p> <ul style="list-style-type: none"> 00: Read 01: Write 02: Notification 03: Indication 04: Read Confirm 05: ATT info 06: ATT info Confirm <p><status>, Please refer to 4 Status Code</p> <p><seq_num></p>

Result:

```
AT+BLEGATTADDSERVICE=0000,41746D6F736963000000000000000001
+BLEGATTADDSERVICE:4
OK
AT+BLEGATTADDCHAR=1800,41746D6F736963000000000000000002,512
+BLEGATTADDCHAR:6
OK
AT+BLEGATTADDDDESC=2902
+BLEGATTADDDDESC:7
OK
AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=00,ON
OK
+BLEGAPCONN:0
AT+BLEGATTTOBLE=0,6,02,000102030405060708090A0B0C0D0E0F
OK
+BLEGATTCOMPEVT:0,02,0,0
```


3.5. BLEGATTMTUEXCHANGE

<pre>" +BLEGATTMTUEXCHANGE: <conn_idx>, <mtu>"</pre>	<pre><conn_idx>, the <conn_idx> get form <i>BLEGAPCONN</i> event after connection establish. <mtu>, ATT MTU size</pre>

Result:

```
AT+BLEGAPINIT=0F
OK
AT+BLEADVENABLE=00,ON
OK
+BLEGAPCONN:0
+BLEGATTMTUEXCHANGE:0,253
```

4. Status Code

There are two kinds of status codes in the Atmotic AT command, AT Error Code and Application Error Code. The Atmotic AT parser will check the input content and will return the AT Error Code if the input has wrong arguments. Below figure is the example if the user input the wrong <role> for the *AT+BLEGAPINIT* command.

```
AT+BLEGAPINIT=?  
+BLEGAPINIT:<role>  
OK  
AT+BLEGAPINIT=00  
ERROR:6
```

It will return an Application Error Code If there is an error that occurred after applying AT command. The below figure shows an example if the user did not apply *AT+BLEGAPINIT* command before applying *AT+BLEADVENABLE* command.

```
AT+BLEADVENABLE=?  
+BLEADVENABLE:<act_idx>,<ON|OFF>  
OK  
AT+BLEADVENABLE=0,ON  
+BLEADVENABLE:64  
ERROR
```

4.1. AT Error Code

AT_ERR_NO_ERROR (0)
AT_ERR_CMD_NOT_SUPPORT (1)
AT_ERR_WRONG_ARGU_CNT (2)
AT_ERR_WRONG_ARGU_RANGE (3)
AT_ERR_WRONG_ARGU_TYPE (4)
AT_ERR_WRONG_ARGU_TYPE_OR_RANGE (5)
AT_ERR_WRONG_ARGU_CONTENT (6)
AT_ERR_CMD_SPECIFIC_ERR (128)

4.2. Application Error Code

4.1.1 ATT Error Code

ATT_ERR_NO_ERROR (0)
ATT_ERR_INVALID_HANDLE (1)
ATT_ERR_READ_NOT_PERMITTED (2)
ATT_ERR_WRITE_NOT_PERMITTED (3)
ATT_ERR_INVALID_PDU (4)
ATT_ERR_INSUFF_AUTHEN (5)
ATT_ERR_REQUEST_NOT_SUPPORTED (6)
ATT_ERR_INVALID_OFFSET (7)
ATT_ERR_INSUFF_AUTHOR (8)
ATT_ERR_PREPARE_QUEUE_FULL (9)
ATT_ERR_ATTRIBUTE_NOT_FOUND (10)
ATT_ERR_ATTRIBUTE_NOT_LONG (11)
ATT_ERR_INSUFF_ENC_KEY_SIZE (12)
ATT_ERR_INVALID_ATTRIBUTE_VAL_LEN (13)
ATT_ERR_UNLIKELY_ERR (14)
ATT_ERR_INSUFF_ENC (15)
ATT_ERR_UNSUPP_GRP_TYPE (16)
ATT_ERR_INSUFF_RESOURCE (17)
ATT_ERR_APP_ERROR (128)

4.1.2 GAP Error Code

GAP_ERR_NO_ERROR (0)
GAP_ERR_INVALID_PARAM (64)
GAP_ERR_PROTOCOL_PROBLEM (65)
GAP_ERR_NOT_SUPPORTED (66)
GAP_ERR_COMMAND_DISALLOWED (67)
GAP_ERR_CANCELED (68)
GAP_ERR_TIMEOUT (69)
GAP_ERR_DISCONNECTED (70)
GAP_ERR_NOT_FOUND (71)
GAP_ERR_REJECTED (72)
GAP_ERR_PRIVACY_CFG_PB (73)
GAP_ERR_ADV_DATA_INVALID (74)
GAP_ERR_INSUFF_RESOURCES (75)
GAP_ERR_UNEXPECTED (76)
GAP_ERR_MISMATCH (77)

4.1.3 GATT Error Code

GATT_ERR_INVALID_ATT_LEN (80)
GATT_ERR_INVALID_TYPE_IN_SVC_SEARCH (81)
GATT_ERR_WRITE (82)
GATT_ERR_SIGNED_WRITE (83)
GATT_ERR_ATTRIBUTE_CLIENT_MISSING (84)
GATT_ERR_ATTRIBUTE_SERVER_MISSING (85)
GATT_ERR_INVALID_PERM (86)

5. Example

5.1. Use Default ATT Server

```
# get default ATT server state
AT+BLEGATTDFTSERVER?

+BLEGATTDFTSERVER:ON

# BLE initialize
AT+BLEGAPINIT=0F
OK

# advertising enable
AT+BLEADVENABLE=00,ON OK

# use Nordic app to make connection
+BLEGAPCONN:0
```

5.2. Turn Off Default ATT Server

```
# turn off default server
AT+BLEGATTDFTSERVER=OFF

# reset system
AT+SYSRESET=00
```


5.4. Dynamic Add Server (After BLEGAPINIT)

```
# get default ATT server
state
AT+BLEGATTDFTSER
VER?

+BLEGATTDFTSERVER:ON

# BLE initialize
AT+BLEGAPIN
IT=0F OK

# advertising enable
AT+BLEADVENABLE=0
0,ON OK

# use Nordic app to make connection
+BLEGAPCONN:0

# add service
AT+BLEGATTADDSERVICE=0000,41746D6F73696330000000000000000001
+BLEGATTADDSERVI
CE:4 OK

# add characteristic
AT+BLEGATTADDCHAR=1200,41746D6F73696330000000000000000002,512
+BLEGATTADDCH
AR:6 OK

# add ccc descriptor
AT+BLEGATTADDDESC=
2902
+BLEGATTADDDE
SC:7 OK

# active service and will see the service after refresh service in Nordic
app AT+BLEGATTSVCACTIVE=00

OK
```

5.5. Notification

```
# get default ATT
server state
AT+BLEGATTDFTSER
VER?

+BLEGATTDFTSERVER:OFF

# add service
AT+BLEGATTADDSERVICE=0000,41746D6F736963000000000000000001

+BLEGATTADDSERV
ICE:0 OK

# add characteristic
AT+BLEGATTADDCHAR=1200,41746D6F736963000000000000000002,512

+BLEGATTADDC
HAR:2 OK

# add ccc descriptor
AT+BLEGATTADDDESC
=2902

+BLEGATTADDD
ESC:3 OK

# BLE
initialize
AT+BLEGAPI
NIT=0F OK

# advertising enable
AT+BLEADVENABLE=0
0,ON OK

# use Nordic app to make connection
+BLEGAPCONN:0

# read ccc descriptor, and Nordic app will wait for response
+BLEGATTFROMBLE:0,3,00,

# read confirm
AT+BLEGATTTOBLE=0,3,04
,0100 OK
```



```
# send notification to Nodic app through att index (2)
AT+BLEGATTTOBLE=00,02,02,000102030405060708090A0B
0C0D0E0F OK

# notification sent event
+BLEGATTCOMPEVT:0,02,0,0
```

6. Contacts

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