

# **HT32F675x5 BLE Service Guide**

#### Revision History

Version	Date	Descriptions	Owner
0.1	2023-11-08	first draft	Johnny_Wei

## Contents

<b>1</b>	<b>Introduction.....</b>	<b>6</b>
<b>2</b>	<b>BLE setting.....</b>	<b>7</b>
2.1	set BLE address .....	7
2.2	set BLE name.....	7
2.3	set BLE power .....	7
2.4	set advertising parameters.....	7
2.5	set advertising data.....	8
2.6	set advertising enable.....	8
2.7	set connection interval .....	8
2.8	disconnect .....	8
<b>3</b>	<b>Wakeup BLE by IO .....</b>	<b>8</b>
3.1	Add Record to CGMS Database .....	8
<b>4</b>	<b>CGMS(Continuous Glucose Monitoring Service).....</b>	<b>9</b>
4.1	CGMS Service Characteristics.....	9
4.1.1	CGMS Measurement .....	10
4.1.2	CGMS Feature .....	10
4.1.3	CGMS Status .....	11
4.1.4	CGMS Session Start Time .....	11
4.1.5	CGMS Session Run Time .....	11
4.1.6	CGM Specific Ops Control Point .....	12
4.1.6.1	SOC Set Communication Interval.....	13
4.1.6.2	SOC Get Communication Interval .....	14
4.1.6.3	SOC Start Session .....	15
4.1.6.4	SOC Stop Session .....	16
4.1.7	Record Access Control Point .....	17
4.1.7.1	RAC Report Stored Records .....	19
4.1.7.2	RAC Report Number of Stored Records.....	25
4.1.7.3	RAC Delete Stored Records .....	26
<b>5</b>	<b>Current Time Service(CTS).....</b>	<b>29</b>
5.1	Current Time Data Format .....	29
5.2	Write Current Time .....	29
5.3	Read Current Time.....	30
<b>6</b>	<b>Transparent Transmission Service(TTS).....</b>	<b>30</b>
<b>7</b>	<b>Peripheral example path .....</b>	<b>31</b>
<b>8</b>	<b>OTA .....</b>	<b>31</b>
8.1	Check OTA service exist.....	31
8.2	Put OTA fw into phone .....	32

8.3	OTA by phone App step .....	32
-----	-----------------------------	----

## List of figures

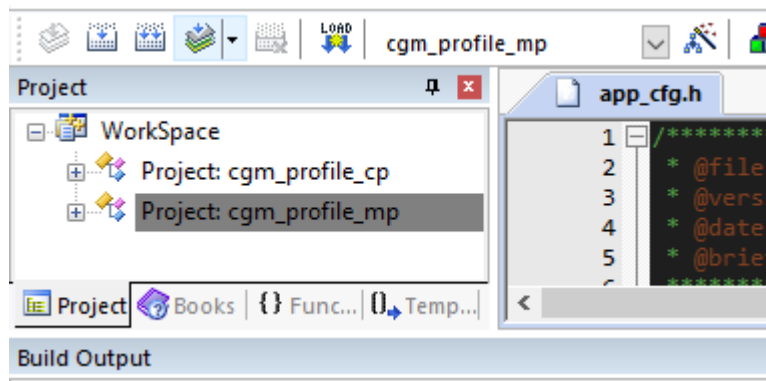
Figure 1 .....錯誤! 尚未定義書籤。

## 1 Introduction

This document give a brief description for BLE service usage.

HT32F675x5 is dual core(M0 and M33). M0 project is CP. M33 project is MP.

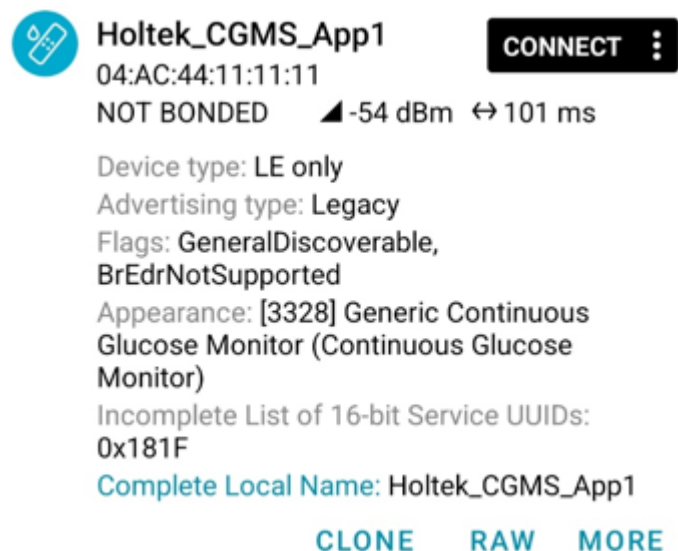
You need to build M0 project(CP) first, then build M33 project(MP). You must select MP as active project then download to flash by Keil.



For example, the project path of CGMS(Continuous Glucose Monitoring Service) is

*projects\application\cgm\_profile\ht32f675x5\_r2\project\cgm\_profile.uvmpw*

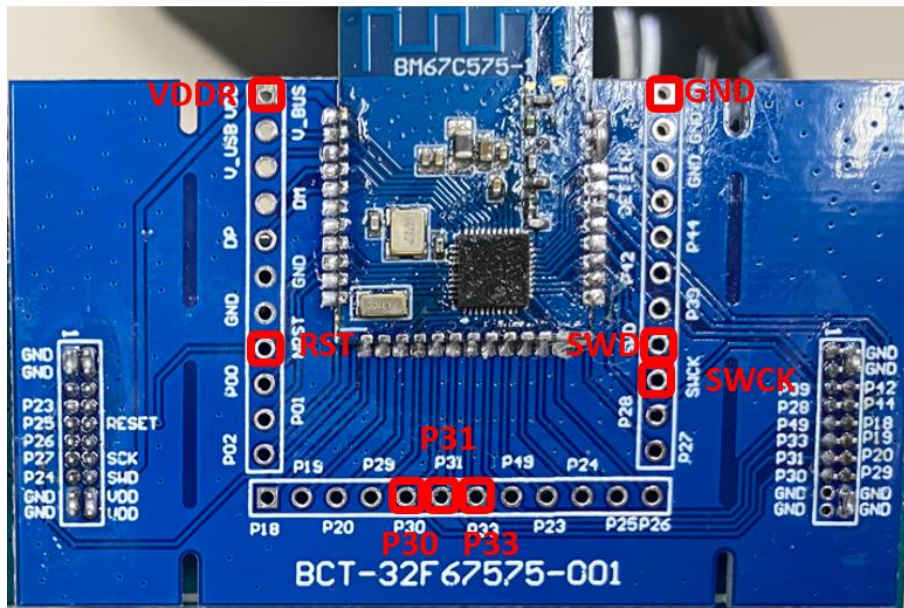
You can see BLE advertising after download CGMS project



## 2 BLE setting

Common BLE setting can find in **app\_cfg.h** which includes Advertising name, device mac and Advertising interval.

**app\_cfg.h** also includes uart setting, you can modify by your own application. UART1 RX **P30**/UART1 TX **P31** for CGMS cmd. UART2 TX **P33** for CGMS log



The following section describe common BLE API

### 2.1 set BLE address

You can modify BLE address by **rom\_gap\_api\_set\_public\_device\_address**

### 2.2 set BLE name

You can modify BLE name by **rom\_gap\_api\_set\_scan\_response\_data**

### 2.3 set BLE power

You can modify BLE tx power by **rom\_hal\_rf\_tx\_power\_set**

### 2.4 set advertising parameters

You can modify BLE advertising parameters by **rom\_gap\_api\_set\_advertising\_parameters**

## **2.5 set advertising data**

You can modify BLE advertising data by **rom\_gap\_api\_set\_advertising\_data**

## **2.6 set advertising enable**

You can enable or disable BLE advertising by **rom\_gap\_api\_set\_advertising\_enable**

## **2.7 set connection interval**

You can modify BLE connection interval **rom\_gap\_api\_connection\_parameters\_update**

## **2.8 disconnect**

You can force disconnect by **rom\_gap\_api\_disconnect**

# **3 Wakeup BLE by IO**

BLE will enter sleep in the CGMS project. Uart and DMA clock will be shut down during sleep mode. We set GPIO **P39** low level to wakeup BLE in the CGMS example code, BLE will back to active mode if P39 in low level, then CPU will enter sleep again if P39 is high level and system in idle state.

## **3.1 Add Record to CGMS Database**

In the CGMS example code, record data will not write to flash by uart if SOCP Start Session not start. After session start, current CGMS example code will write record to flash and notify to client(ex:phone)every one minutes. You can also modify SOCP to change communication interval



## 4 CGMS(Continuous Glucose Monitoring Service)

The Continuous Glucose Monitoring Service(CGMS) exposes glucose measurement and other data related to a personal CGM sensor for healthcare applications

The project path of CGMS(Continuous Glucose Monitoring Service) is

*projects\application\cgm\_profile\ht32f675x5\_r2\project\cgm\_profile.uvmpw*

### 4.1 CGMS Service Characteristics

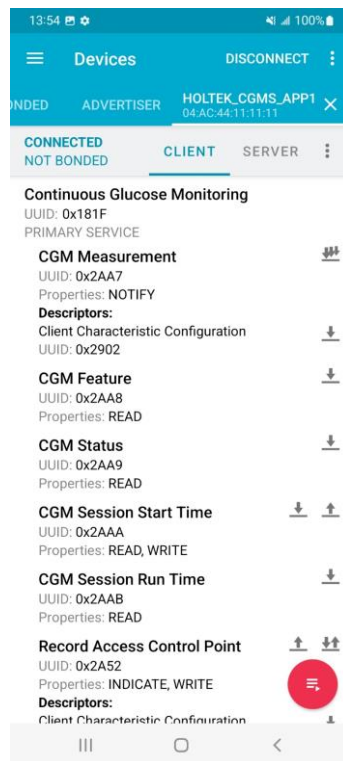
CGMS consist of 7 Characteristic and 3 descriptor like the following table

Characteristic Name	UUID	ATT Property
CGM Measurement	0x2AA7	Notify   Authentication Required
CGM Measurement CCCD	0x2902	Write   Read   Authentication Required
CGM Feature	0x2AA8	Read   Authentication Required
CGM Status	0x2AA9	Read   Authentication Required
CGM Session Start Time	0x2AAA	Write   Read   Authentication Required
CGM Session Run Time	0x2AAB	Read   Authentication Required
Record Access Control Point	0x2A52	Indicate   Write   Authentication Required
Record Access Control Point CCCD	0x2902	Write   Read   Authentication Required
CGM Specific Ops Control Point	0x2AAC	Indicate   Write   Authentication Required
CGM Specific Ops Control Point CCCD	0x2902	Write   Read   Authentication Required

Each Characteristic feature is

Characteristic Name	Description
CGM Measurement	send measurement record to client.
CGM Measurement CCCD	enable/disable send measurement record
CGM Feature	read cgm device feature
CGM Status	read cgm device status
CGM Session Start Time	set or get start time of measurement session
CGM Session Run Time	read run time of measurement session
Record Access Control Point	read or delete measurement record
Record Access Control Point CCCD	enable/disable indicate
CGM Specific Ops Control Point	control cgm device running flow
CGM Specific Ops Control Point CCCD	enable/disable indicate

You can find CGMS Characteristics after connection





#### 4.1.1 CGMS Measurement

The CGM Measurement characteristic is used to represent one or more CGM Measurement Records.

We can use UART(P30,P31) send data (ex : 0x312E31(1.1)) to test CGM measurement.


NOTE: You need to wakeup BLE and make sure session has started.

**CGM Measurement**   
UUID: 0x2AA7  
Properties: NOTIFY  
Value: Glucose concentration: 1.1 mg/dL  
Sequence number: 0 (Time Offset in min)  
**Descriptors:**  
Client Characteristic Configuration   
UUID: 0x2902  
Value: Notifications enabled

#### 4.1.2 CGMS Feature


The CGM Feature characteristic is used to represent the supported features of a continuous glucose

monitor (CGM)

**CGM Feature**   
UUID: 0x2AA8  
Properties: READ  
Value: CGM Features:  
- Calibration Supported  
Type: Reserved for future use (0)  
Sample Location: Reserved for future use (0)



#### 4.1.3 CGMS Status

The CGM Status characteristic is used to represent the current status of a continuous glucose monitor (CGM) sensor.

**CGM Status**   
UUID: 0x2AA9  
Properties: READ  
Value: Time offset: 7 (minutes since Session Start Time)


#### 4.1.4 CGMS Session Start Time

The CGM Session Start Time characteristic is used to represent the time the continuous glucose monitor(CGM) session is started.

**CGM Session Start Time**    
UUID: 0x2AAA  
Properties: READ, WRITE  
Value: Session Start Time: 27 Oct 2023, 15:00:01  
Time Zone: UTC+0:0  
Standard Time

#### 4.1.5 CGMS Session Run Time

The CGM Session Run Time characteristic is used to represent the expected run time of the continuous glucose monitor (CGM) session

**CGM Session Run Time**   
UUID: 0x2AAB  
Properties: READ  
Value: Session Run Time: 10 hours

#### 4.1.6 CGM Specific Ops Control Point

The CGM Specific Ops Control Point characteristic is used to enable procedures related to a continuous glucose monitor (CGM).

In the CGMS project, write a command 0x1A (Start Session) to SOCP will generate a Start Session Event, the timer will be started and a Measurement Record will be sent to the client every communication interval (default is 1, Uint: Minute). The communication interval can be changed by writing command 0x01 to SOCP. CGMS device will generate Stop Session Even by writing command 0x1B(Stop Session), the timer will be closed and stop send measurement record

The table below shows the **support** opcode of CGM Specific Ops Control Point

Op code Value	Definition	Description
0x01	Set CGM Communication Interval	Operand is UINT8 containing Communication Interval in minutes
0x02	Get CGM Communication Interval	N.A.
0x1A	Start Session	N.A.
0x1B	Stop Session	N.A.
0x1C	Response Code	N.A.
others		Not support

##### Response Code Values

Response Code Value	Definition
0x01	Success
0x02	Op Code not supported
0x03	Invalid Operand
0x04	Procedure not completed
0x05	Parameter out of range

## CGM Specific Ops Control Point

UUID: 0x2AAC

Properties: INDICATE, WRITE

### Descriptors:

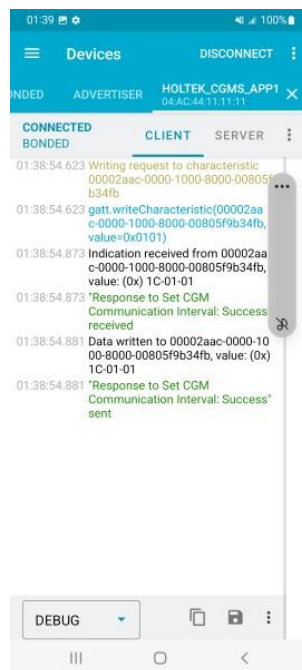
Client Characteristic Configuration

UUID: 0x2902



### 4.1.6.1 SOCP Set Communication Interval

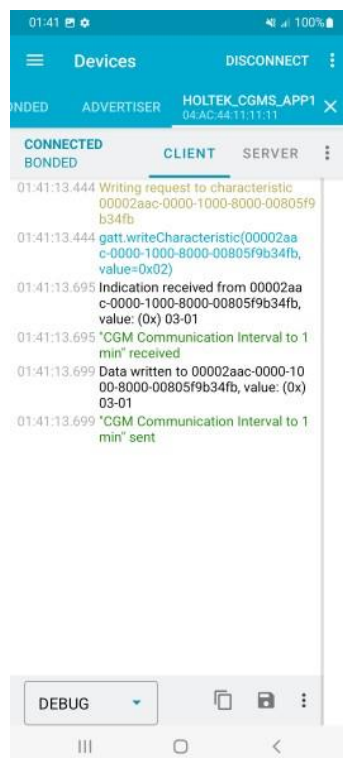
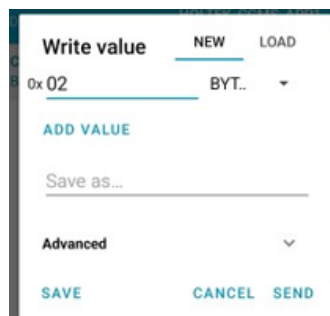
Opcode	Operand
Set CGM Communication Interval	Communication interval in minutes
0x01	0x01



```
[cgms_socp_cmd_parse][167] : CGM SOCP Opcode : 0x01 Operand : 0x01
[cgms_socp_send][138] : SOCP Response : 0x1C 0x01 0x01
[cgms_socp_event_process][503] : CGMS SOCP Communication Interval Changed,Communication Interval : 1 Minutes
```

#### 4.1.6.2 SOCP Get Communication Interval

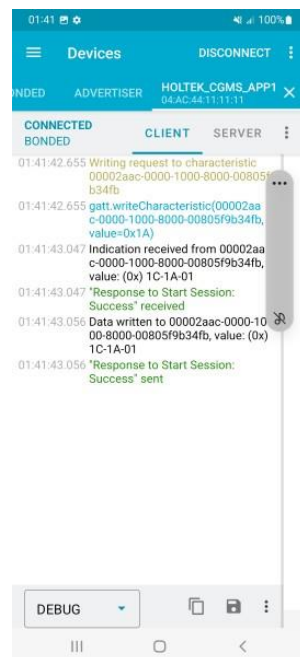
Opcode Get CGM Communication Interval	Operand
0x02	N.A.



```
[cgms_socp_cmd_parse][167] : CGM SOCP Opcode : 0x02 Operand :
[cgms_socp_send][138] : SOCP Response : 0x03 0x01
```

#### 4.1.6.3 SOCP Start Session

Opcode Start Session	Operand
0x1A	N.A.



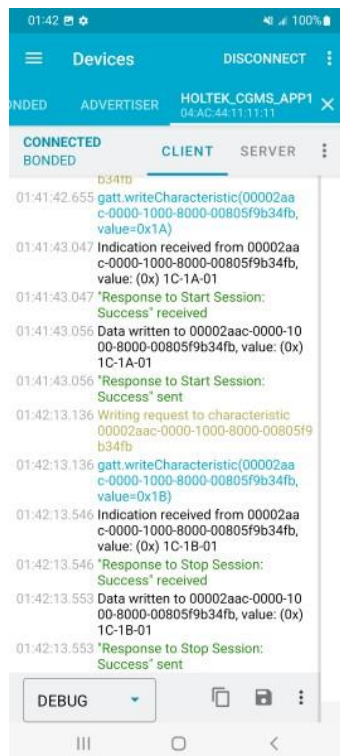
```

[cgms_socp_cmd_parse][167] : CGM SOCP Opcode : 0x1A Operand :
[cgms_socp_send][138] : SOCP Response : 0x1C 0x1A 0x01
[cgms_socp_event_process][469] : CGMS SOCP Start Session
[cgms_socp_event_process][486] : SOCP Session Timer Start,Communication Interval
: 1 Minutes

```

#### 4.1.6.4 SOCP Stop Session

Opcode Stop Session	Operand
0x1B	N.A.





```
[cgms_socp_cmd_parse][167] : CGM SOCP Opcode : 0x1B Operand :
[cgms_socp_send][138] : SOCP Response : 0x1C 0x1B 0x01
[cgms_socp_event_process][494] : CGMS SOCP Stop Session
[cgms_socp_event_process][497] : SOCP Session Timer Stop
```

#### 4.1.7 Record Access Control Point

The Record Access Control Point is used to enable device-specific procedures for basic management of a set of data records.

RACP operation instructions are divided into opcode (Opcode), operator (Operator), and operand (Operand). The following table shows the specific contents of RACP operations.

Record Access Control Point Procedure Requirements

Opcode	Operator	Operand	
		Filter Type	Filter Parameters
Report Stored Records	All Records	No Operand Used	
	Less than or equal to	Time Offset	Maximum Filter Value
	Greater than or equal to	Time Offset	Minimum Filter Value
	Within range of(inclusive)	Time Offset	Minimum Filter Value Maximum Filter Value
	First Record	No Operand Used	
	Last Record	No Operand Used	
Opcode	Operator	Operand	
		Filter Type	Filter Parameters
Delete Stored Records	All Records	No Operand Used	
	Less than or equal to	Time Offset	Maximum Filter Value
	Greater than or equal to	Time Offset	Minimum Filter Value
	Within range of(inclusive)	Time Offset	Minimum Filter Value

			Maximum Filter Value
	First Record	No Operand Used	
	Last Record	No Operand Used	
Abort Operation	NULL	No Operand Used	
Report Number of Stored Records	All Records	No Operand Used	
	Less than or equal to	Time Offset	Maximum Filter Value
	Greater than or equal to	Time Offset	Minimum Filter Value
	Within range of(inclusive)	Time Offset	Minimum Filter Value Maximum Filter Value
	First Record	No Operand Used	
	Last Record	No Operand Used	
Responses			
Opcode	Operator	Operand	
Number of Stored Records	NULL	UINT16 containing number of records	
Response Code	NULL	Request Opcode, Response Code Value	

The Op Code values and associated Operator and Operand values are

Op code Value	Definition
0x01	Report Stored Records
0x02	Delete Stored Records
0x03	Abort Operation
0x04	Report Number of Stored Records
0x05	Number of Stored Records
0x06	Response Code

Operator Value	Definition
0x01	All Record
0x02	Less or Equal to
0x03	Greater or Equal to
0x04	Within Range of(Inclusive)

0x05	First Record
0x06	Last Record

Operand <b>Filter</b> Type Value	Filter Type Description
0x01	Time Offset
0x02 – 0xFF	Reserved for future use

<b>Response</b> Code Value	Definition
0x01	Success
0x02	Op Code not supported
0x03	Invalid Operator
0x04	Operator not supported
0x05	Invalid Operand
0x06	No Records Found
0x07	Abort unsuccessful
0x08	Procedure not completed
0x09	Operand not supported

#### 4.1.7.1 RACP Report Stored Records

##### (1) Report All Stored Records

After the APP sends the RACP command to the CGMS Device, the CGMS device will notify all records to the APP through the CGMS Measurement characteristic..

**Write value**

Select Op Code:  
0x01 (Report stored recor.. ▾

Select Operator:  
0x01 (All records) ▾

Advanced ▾

CANCEL SEND




```

[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x01 Operator : 0x01 Operand :
[cgms_racp_event_process][529] : CGMS Report All Stored Resords
[cgms_racp_record_all_report][120] : [1] Glucose Concentration : -59200.000000 mg/dL Time Offset : 1 mins
[cgms_racp_record_all_report][120] : [2] Glucose Concentration : -0.254000 mg/dL Time Offset : 2 mins
[cgms_racp_record_all_report][120] : [3] Glucose Concentration : 104900000.000000 mg/dL Time Offset : 3 mins
[cgms_racp_record_all_report][120] : [4] Glucose Concentration : 124.099998 mg/dL Time Offset : 4 mins
[cgms_racp_record_all_report][120] : [5] Glucose Concentration : -13660.000000 mg/dL Time Offset : 5 mins
[cgms_racp_record_all_report][120] : [6] Glucose Concentration : -18660000.000000 mg/dL Time Offset : 6 mins
[cgms_racp_record_all_report][120] : [7] Glucose Concentration : 160400.000000 mg/dL Time Offset : 7 mins
[cgms_racp_record_all_report][120] : [8] Glucose Concentration : -0.000013 mg/dL Time Offset : 8 mins
[cgms_racp_record_all_report][120] : [9] Glucose Concentration : 35.599998 mg/dL Time Offset : 9 mins
[cgms_racp_record_all_report][120] : [10] Glucose Concentration : -0.181200 mg/dL Time Offset : 10 mins

```



When all the data has notified, the CGMS device will indicate result to the APP through the RACP characteristic

**Record Access Control Point**    
 UUID: 0x2A52  
 Properties: INDICATE, WRITE  
 Value: Response Code for Report stored records:  
 Success  
**Descriptors:**  
 Client Characteristic Configuration   
 UUID: 0x2902  
 Value: Indications enabled

## (2) Report Less than or Equal to x Stored Records

Use RACP command to get <=Maximum Time Offset Record

Write value

Select Op Code:  
0x01 (Report stored recor..

Select Operator:  
0x02 (Less than or equal t..

Enter filter:  
Other

01 (UINT8)

Enter operand(s):  
05 (UINT16)

Advanced

CANCEL SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x01 Operator : 0x02 Operand : 0x01 0x05 0x00
[cgms_racp_event_process][536] : CGMS Report <= 0x0005 Stored Resords
[cgms_racp_record_less_or_equal_report][170] : [1] Glucose Concentration : -59200.000000 mg/dL Time Offset : 1 mins
[cgms_racp_record_less_or_equal_report][170] : [2] Glucose Concentration : -0.254000 mg/dL Time Offset : 2 mins
[cgms_racp_record_less_or_equal_report][170] : [3] Glucose Concentration : 104900000.000000 mg/dL Time Offset : 3 mins
[cgms_racp_record_less_or_equal_report][170] : [4] Glucose Concentration : 124.099998 mg/dL Time Offset : 4 mins
[cgms_racp_record_less_or_equal_report][170] : [5] Glucose Concentration : -13660.000000 mg/dL Time Offset : 5 mins
```



### (3) Report Greater than or Equal to x Stored Records

Use RACP command to get  $\geq$  Minimum Time Offset Record

**Write value**

Select Op Code:  
0x01 (Report stored recor..

Select Operator:  
0x03 (Greater than or equa..

Enter filter:  
Other

01 (UINT8)

Enter operand(s):  
05 (UINT16)

Advanced

CANCEL SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x01 Operator : 0x03 Operand : 0x01 0x05 0x00
[cgms_racp_event_process][543] : CGMS Report  $\geq$  0x0005 Stored Resords
[cgms_racp_record_greater_or_equal_report][220] : [1] Glucose Concentration : -13660.000000 mg/dL Time Offset : 5 mins
[cgms_racp_record_greater_or_equal_report][220] : [2] Glucose Concentration : -18660000.000000 mg/dL Time Offset : 6 mins
[cgms_racp_record_greater_or_equal_report][220] : [3] Glucose Concentration : 160400.000000 mg/dL Time Offset : 7 mins
[cgms_racp_record_greater_or_equal_report][220] : [4] Glucose Concentration : -0.000013 mg/dL Time Offset : 8 mins
[cgms_racp_record_greater_or_equal_report][220] : [5] Glucose Concentration : 35.599998 mg/dL Time Offset : 9 mins
[cgms_racp_record_greater_or_equal_report][220] : [6] Glucose Concentration : -0.181200 mg/dL Time Offset : 10 mins
```



#### (4) Report Within Range of x Stored Records

Use RACP command to get  $\leq$ Maximum Time Offset and  $\geq$ Minimum Time Offset Record

**Write value**  
UNIT (REPORT STORED RECORDS) ▼  
Select Operator:  
0x04 (Within range of (incl.. ▼  
Enter filter:  
Other ▼  
01 (UINT8)  
Enter operand(s):  
05 (UINT16)  
10 (UINT16)  
Advanced ▼  
CANCEL SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x01 Operator : 0x04 Operand : 0x01 0x05 0x00 0x0A 0x00
[cgms_racp_event_process][551] : CGMS Report  $\geq$  0x0005 &&  $\leq$  0x000A Stored Records
[cgms_racp_record_range_of_report][269] : [1] Glucose Concentration : -13660.000000 mg/dL Time Offset : 5 mins
[cgms_racp_record_range_of_report][269] : [2] Glucose Concentration : -18660000.000000 mg/dL Time Offset : 6 mins
[cgms_racp_record_range_of_report][269] : [3] Glucose Concentration : 160400.000000 mg/dL Time Offset : 7 mins
[cgms_racp_record_range_of_report][269] : [4] Glucose Concentration : -0.000013 mg/dL Time Offset : 8 mins
[cgms_racp_record_range_of_report][269] : [5] Glucose Concentration : 35.599998 mg/dL Time Offset : 9 mins
[cgms_racp_record_range_of_report][269] : [6] Glucose Concentration : -0.181200 mg/dL Time Offset : 10 mins
```

19:48 100%  
DISCONNECT  
HOLTEK\_CGMS\_APP1  
04:AC:44:11:11:11  
CONNECTED  
BONDED  
CLIENT SERVER  
19:47:56.962 "Glucose concentration: 160400.0 mg/dL Sequence number: 7 (Time Offset in min)" received  
19:47:56.969 Notification received from 00002aa7-0000-1000-8000-00805f9b34fb, value: (0x) 06-00-C9-8A-08-00  
19:47:56.969 "Glucose concentration: -1.335E-5 mg/dL Sequence number: 8 (Time Offset in min)" received  
19:47:56.970 Notification received from 00002aa7-0000-1000-8000-00805f9b34fb, value: (0x) 06-00-64-F1-09-00  
19:47:56.970 "Glucose concentration: 35.6 mg/dL Sequence number: 9 (Time Offset in min)" received  
19:47:56.979 Notification received from 00002aa7-0000-1000-8000-00805f9b34fb, value: (0x) 06-00-EC-C8-0A-00  
19:47:56.979 "Glucose concentration: -0.1812 mg/dL Sequence number: 10 (Time Offset in min)" received  
19:47:56.980 Indication received from 00002aa52-0000-1000-8000-00805f9b34fb, value: (0x) 06-00-01-01  
19:47:56.981 "Response Code for Report stored records: Success" received  
DEBUG  
III O <

## (5)First Record

Use RACP command to get first record

### Write value

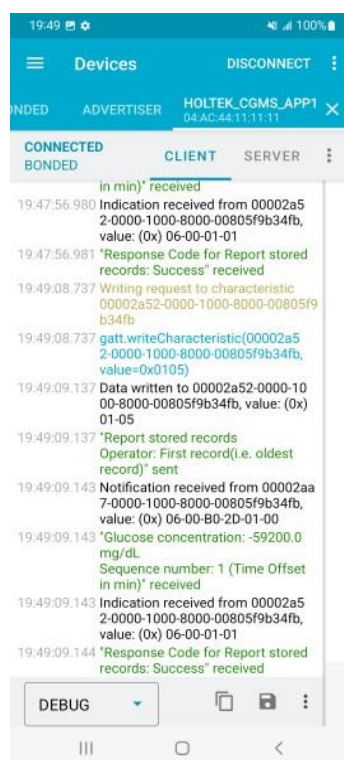
Select Op Code:  
0x01 (Report stored recor..

Select Operator:  
0x05 (First record (i.e. olde..

Advanced

CANCEL SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x01 Operator : 0x05 Operand :  
[cgms_racp_event_process][556] : CGMS Report First Stored Resord  
[cgms_racp_record_first_report][310] : [1] Glucose Concentration : -59200.000000 mg/dL Time Offset : 1 mins
```





## (6)Last Record

Use RACP command to get last record

Write value

Select Op Code:  
0x01 (Report stored recor..

Select Operator:  
0x06 (Last record (i.e. mos...

Advanced

CANCEL SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x01 Operator : 0x06 Operand :  
[cgms_racp_event_process][561] : CGMS Report Last Stored Resord  
[cgms_racp_record_last_report][344] : [1] Glucose Concentration : -0.181200 mg/dL Time Offset : 10 mins
```



### 4.1.7.2 RACP Report Number of Stored Records

APP sends the RACP command to get number of stored record

## (1)Report Number of All Stored Records

Write value

Select Op Code:

0x04 (Report number of st..

Select Operator:

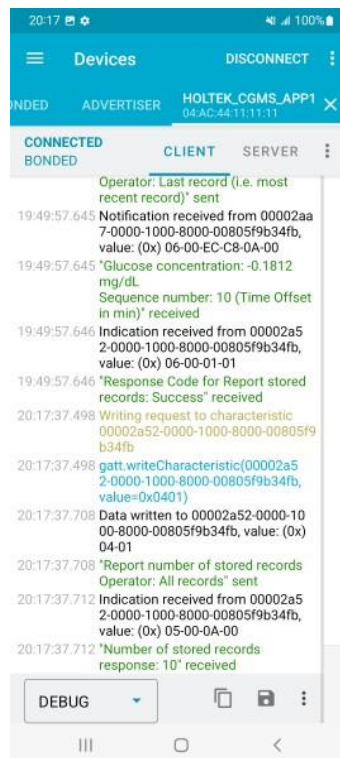
0x01 (All records)

Advanced

CANCEL

SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x04 Operator : 0x01 Operand :
[cgms_racp_event_process][595] : CGMS Report Number of All Stored Resords
[cgms_racp_event_process][639] : CGMS Report Number of Records : 10
```



The rest of the filter example can refer to section 4.1.7.1

### 4.1.7.3 RACP Delete Stored Records

APP sends the RACP command to delete stored records

#### (1) Delete Report Within Range of x Stored Records

Use RACP command to delete **<=Maximum Time Offset and >=Minimum Time Offset** Record

Write value

Select Op Code:

0x02 (Delete stored record..

Select Operator:

0x04 (Within range of (incl..

Enter filter:

Other

01

(UINT8)

Enter operand(s):

06

(UINT16)

07

(UINT16)

Advanced

CANCEL

SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x02 Operator : 0x04 Operand : 0x01 0x06 0x00 0x07 0x00
[cgms_racp_event_process][677] : CGMS Delete Stored Resords >= 0x0006 && <= 0x0007
[cgms_racp_record_range_of_delete][674] : CGMS Deleted 2 Stored Records Successful
```

The records will become

```
[cgms_racp_record_all_report][120] : [1] Glucose Concentration : -59200.000000 mg/dL Time Offset : 1 mins
[cgms_racp_record_all_report][120] : [2] Glucose Concentration : -0.254000 mg/dL Time Offset : 2 mins
[cgms_racp_record_all_report][120] : [3] Glucose Concentration : 104900000.000000 mg/dL Time Offset : 3 mins
[cgms_racp_record_all_report][120] : [4] Glucose Concentration : 124.099998 mg/dL Time Offset : 4 mins
[cgms_racp_record_all_report][120] : [5] Glucose Concentration : -13660.000000 mg/dL Time Offset : 5 mins
[cgms_racp_record_all_report][120] : [6] Glucose Concentration : -0.000013 mg/dL Time Offset : 8 mins
[cgms_racp_record_all_report][120] : [7] Glucose Concentration : 35.599998 mg/dL Time Offset : 9 mins
[cgms_racp_record_all_report][120] : [8] Glucose Concentration : -0.181200 mg/dL Time Offset : 10 mins
```



## (2) Delete All Stored Records

Use RACP command to delete all records

**Write value**

Select Op Code:  
0x02 (Delete stored record..

Select Operator:  
0x01 (All records)

Advanced

CANCEL SEND

```
[cgms_racp_cmd_parse][238] : CGMS RACP Opcode : 0x02 Operator : 0x01 Operand :  
[cgms_racp_event_process][655] : CGMS Delete All Stored Resords  
[cgms_racp_record_all_delete][537] : CGMS Delete All Stored Records Successful : 8
```



## 5 Current Time Service(CTS)

This service defines how a Bluetooth device can expose date and time information to other Bluetooth devices.

### 5.1 Current Time Data Format

Field	Size	description
Year	2	
Month	1	
Day	1	
Hour	1	
Minute	1	
Second	1	
Week of Day	1	1: Monday 2: Tuesday 3: Wednesday 4: Thursday 5: Friday 6: Saturday 7: Sunday
1/256th of seconds	1	The number of 1/256 fractions of a second. Valid range 0–255.
Adjust Reason	1	b0: Manual Time Update b1: External Reference Time Update b2: Change of Time Zone b3: Change of DST b4–b7: Reserved for Future Use

### 5.2 Write Current Time

You can use following example to write time 2023 Oct 30, 09:48:50 Monday, manual time update.

Data: E707 0A 1E 09 30 32 01 00 00

Field	hex	description
Year	E707	2023
Month	0A	Oct
Day	1E	30

Hour	09	09
Minute	30	59
Second	32	50
Week of Day	01	Monday
1/256th of seconds	00	0/256s
Adjust Reason	00	Manual Time Update

### 5.3 Read Current Time

Read current time example

**Current Time Service**  
 UUID: 0x1805  
 PRIMARY SERVICE

**Current Time**   

UUID: 0x2A2B  
 Properties: NOTIFY, READ, WRITE  
 Value: 30 Oct 2023, 09:49:09, Day of week:  
 Monday  
 Fractions: 0 / 256 s  
 Manual time update

**Descriptors:**  
 Client Characteristic Configuration   
 UUID: 0x2902


## 6 Transparent Transmission Service(TTS)

TTS(Transparent Transmission Service) is FFF0. There are two Characteristics.


0xFFFF1 is used for notify data to Client.


0xFFFF2 is used for receiving data from client

**Unknown Service**  
 UUID: 0xFFFF0  
 PRIMARY SERVICE

**Unknown Characteristic** 

UUID: 0xFFFF1  
 Properties: NOTIFY

**Descriptors:**  
 Client Characteristic Configuration   
 UUID: 0x2902

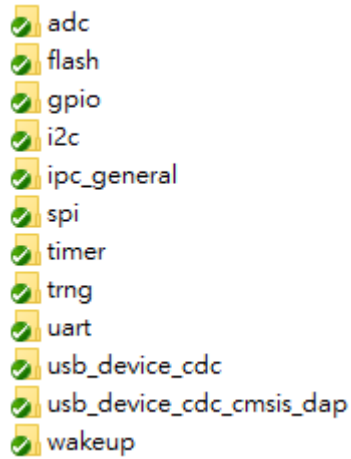
**Unknown Characteristic** 

UUID: 0xFFFF2  
 Properties: WRITE NO RESPONSE

## 7 Peripheral example path

You can find peripheral example in the *projects\peripheral\_example\* folder

Ex:\projects\peripheral\_example\*uart*\ht32f675x5\_r2\project\



## 8 OTA

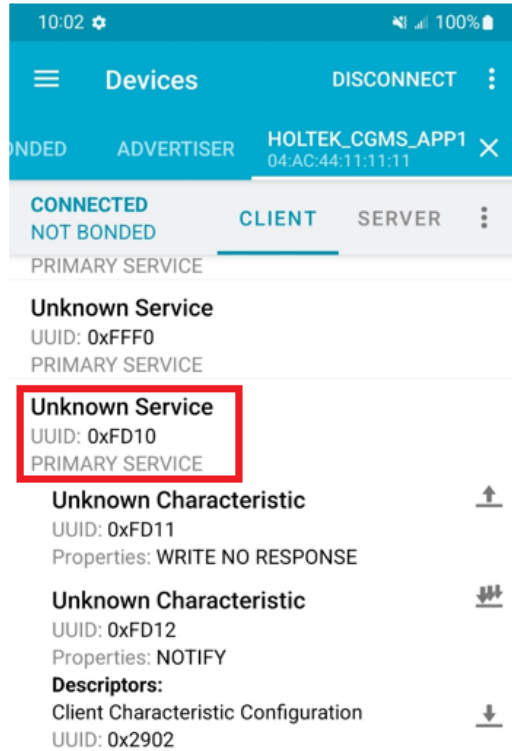
OTA(Over-the-Air) is used for firmware upgrade.

CGMS project support OTA feature.

HT32F675x5 is dual core, M33 and M0 will be updated during OTA

### 8.1 Check OTA service exist

OTA service is UUID **0xFD10**. We can check by phone app.



## 8.2 Put OTA fw into phone

CGMS project will generate bin file and put in MP project

*projects\application\cgm\_profile\ht32f675x5\_r2\project\mp\Objects\cgm\_profile\_mp.bin* **FW**

***UPGRADE\_CODE.bin***

Put this firmware into your phone

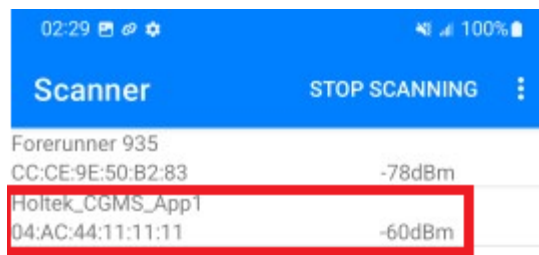
## 8.3 OTA by phone App step

1. install App





2. reboot fw and check BLE advertising data



3. check chip info

**rom version** and **boot2 version** can **not** modify, app version can modify in  
\\projects\\application\\cgm\_profile\\ht32f675x5\_r2\\config\\**app\_cfg.h**



4. check file info

tap load file and select the bin file(**FW\_UPGRADE\_CODE.bin**)



## 5. OTA

