Cubic iTrigger User Guide

1 Bluetooth BLE Advertising

```
                    ┌──────────────┐
                    │   Power ON   │
                    └──────────────┘
                           │
      ┌────────────────────┼────────────────────┐
      │                    ▼                     │
      │            ┌──────────────┐              │
      │            │ Advertising  │              │
      │            │   (3 min)    │              │
      │            └──────────────┘              │
      │    ┌──────────────┐                      │
      │    │              ▼                      │
      │            ◇ connection ◇──── Y ────▶ ┌──────────────┐
      │                    │                  │Stop Advertising│
      │                    N                  └──────────────┘
      │                    ▼                         │
      │   N   ◇ Advertising ◇        N  ◇ Disconnection ◇  Y
      └───────◇   > 3 min   ◇           │                  │
                    │        └──────────┘                  │
                    Y
                    ▼
            ┌──────────────┐
            │Stop Advertising│
            └──────────────┘
                    │        ◀─────────┐
                    ▼                   │
      Y    ◇ On-Board Key ◇    N        │
  ───────── ◇ is pressed?  ◇ ──────────┘
```
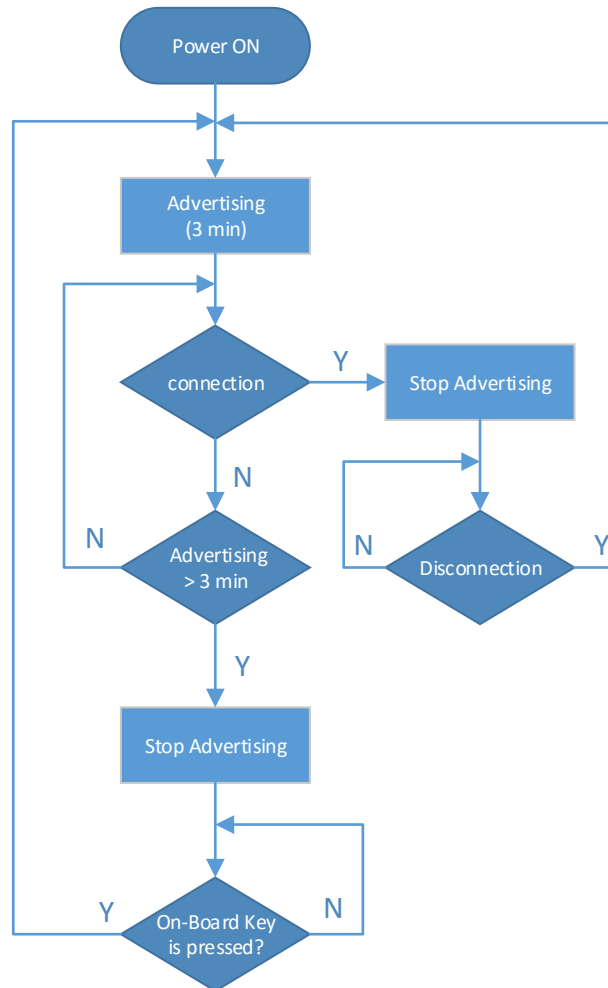
Note :

There are 2 identical images, Image_A & Image_B, in device's flash. normally Image_B is the first choice to run, Image_A is a backup image, both images support OAD Feature.

2 Key Code

On-board Key	vKey	Focus/Shutter Output (0 -> off, 1 -> on)	Key Definition
0x00	0x00	(Focus 0, Shutter 0)	All Keys are Released
0x01	0x01	(Focus 1, Shutter 0)	Focus
x	0x02	(Focus 0, Shutter 1)	Only Shutter
0x03	0x03	(Focus 1, Shutter 1)	Focus + Shutter
x	0x04	1. (Focus 0, Shutter 1) 2. Hold 100ms 3. (Focus 0, Shutter 0)	Shot (short shutter Click, hold 100ms)
x	0x05	1. (Focus 1, Shutter 1) 2. Hold 100ms 3. (Focus 0, Shutter 0)	Focus + Shot -> release all keys after 100ms
x	0x06	1. (Focus 1, Shutter 1) 2. Hold 100ms 3. (Focus 1, Shutter 0)	Focus + Shot -> leave Focus ON after 100ms
x	0x07	(Focus 0, Shutter 0)	All keys are released, use in ending vKey = 0x03
x	0x08	(Focus 1, Shutter 0)	Hold Focus, Use in ending vKey = 0x03

3 LED Definition – Bluetooth BLE Mode / Key Mode

3.1 Bluetooth BLE Mode (Low Priority)

Bluetooth BLE Status	LED
Advertising	Continuously flash 1 time @ 1 sec
Connection Completed	Flash 3 times
Connection	Always ON
Non-Advertising	Continuously flash 1 time @ 5 sec

3.2 Key Mode (High Priority)

Key	LED
0x00	Always Off
0x01	Always ON
0x02	Continuously flash 1 time @ 1 sec
0x03	Flash 3 times -> Continuously flash 1 time @ 1 sec
0x04	Flash 3 times -> off
0x05	Flash 3 times -> off
0x06	Flash 3 times -> always on
0x07	Flash 3 times -> off
0x08	Flash 3 times -> always on

4 TI Profile

4.1 TI Simple Key Profile

UUID	GATT Server Permission	Note
0xFFE0		Simple Key Service UUID
0xFFE1	Notification	On-board key pressed status, refer to Key Code.

4.2 TI Simple GATT Profile

UUID	GATT Server Permission	Note
0xFFF0		Simple GATT Service UUID
0xFFF1	Read/Write	Char 1, Device Control, 4 bytes, 'w'(1 byte)+CMD(1 byte)+Data(2 bytes, D0/D1) 1. CMD=0x01, UART Baudrate 2. CMD=0x02, UART Configuration

1. CMD=0x01, UART Baudrate

D0	Baudrate (bps)
0x00	4800 (default)
0x01	9600
0x02	38400
0x03	57600
0x04	115200

2. CMD=0x02, UART Configuration

D0	Definition
b7	'0'
b6	Flow control, 1- enable, 0 – disable
b5	Parity, 1 – odd, 0 – even
b4	Data, 1 – 9-bit, 0 – 8-bit
b3	Parity Check, 1 – enable, 0 – disable
b2	Number of stop bit, 1 – 2-bit, 0 -1-bit
b1	Stop-bit level, 1 – Hi, 0 – Lo
b0	Start-bit Level, 1 – Hi, 0 – Lo

3. CMD=0x03, OAD Flag

D1	Flag value
0x0B	write Image-B
0xFE	write Image-A

4. CMD=0x04, Camera Shot-time, default 100ms

D1/D0	Definition
D1(h)/D0(l)	D1.7=1, us mode (about 30 us/step) Time : 0x8001 ~ 0x8015 (30 ~ 450 us) $\qquad$ > 0x8015, Time = default. D1.7=0, ms mode Time = D1[6-0] x 2^8 + D0 (ms) Note : if 0x0000, it will be set to default.

5. CMD=0x05, UART Tx Disable

D1	Definition
0x01	Manually stop Tx transmitting (if write to char 5, UART Tx will restart)

6. CMD=0x06, UART Tx re-sending time, default =1500ms
   Time = 1000 + (D0 x 100) ms

0xFFF2		Reserved
0xFFF3	Write	vKey – refer to key Code
0xFFF4	Notification	Returning message 0x00 – UART write ok 0x01 – UART Write Fail 0x02 – vKey received
0xFFF5	Write	Char 5, GPS Compressed Data, 20 bytes

4.3 TI OAD Profile

UUID	GATT Server Permission	Note
0xFFC0		TI OAD GATT Service UUID
0xFFC1	Write	TI OAD Identify Char (0 – Image_A, 1 – Image _B). Image matches, Returning - ver(2byes)+Len(2bytes)+ID(4bytes)
0xFFC2	Write	TI OAD Block Char,18 bytes, Frame = 2 bytes Block Num + 16 bytes data

5 OAD (on-air Download)

5.1 Notice

5.1.1 Image_A area : device runs in image_B,
   Image_B area : device runs in image_A.

5.1.2 Write image_B – if in image_B
   a. write Simple GATT Profile char 1 with 'w'+0x03+0x0B, it erases CRC of image_B Header, then reboot to image_A.
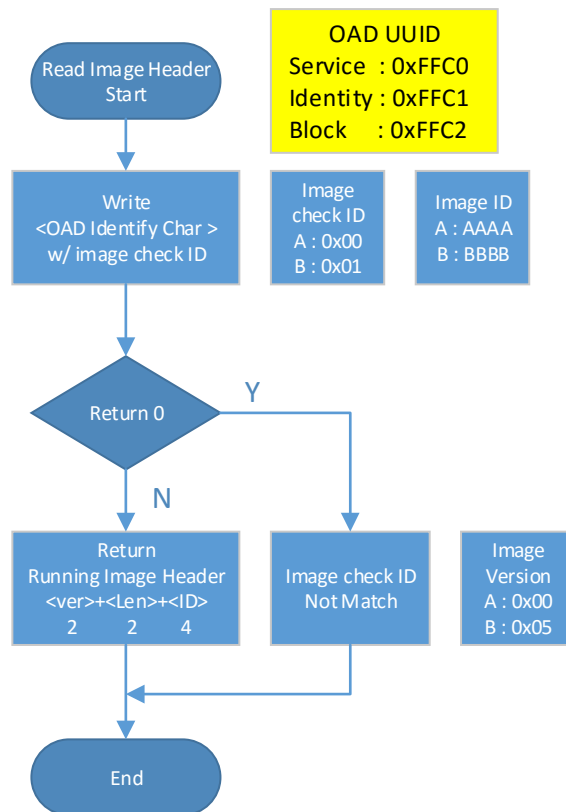   b. excute OAD Procedure

5.1.3 Write image_A – if in image_B
   a. write Simple GATT Profile char 1 with 'w'+0x03+0xFE, it erases CRC of Image_A Header.
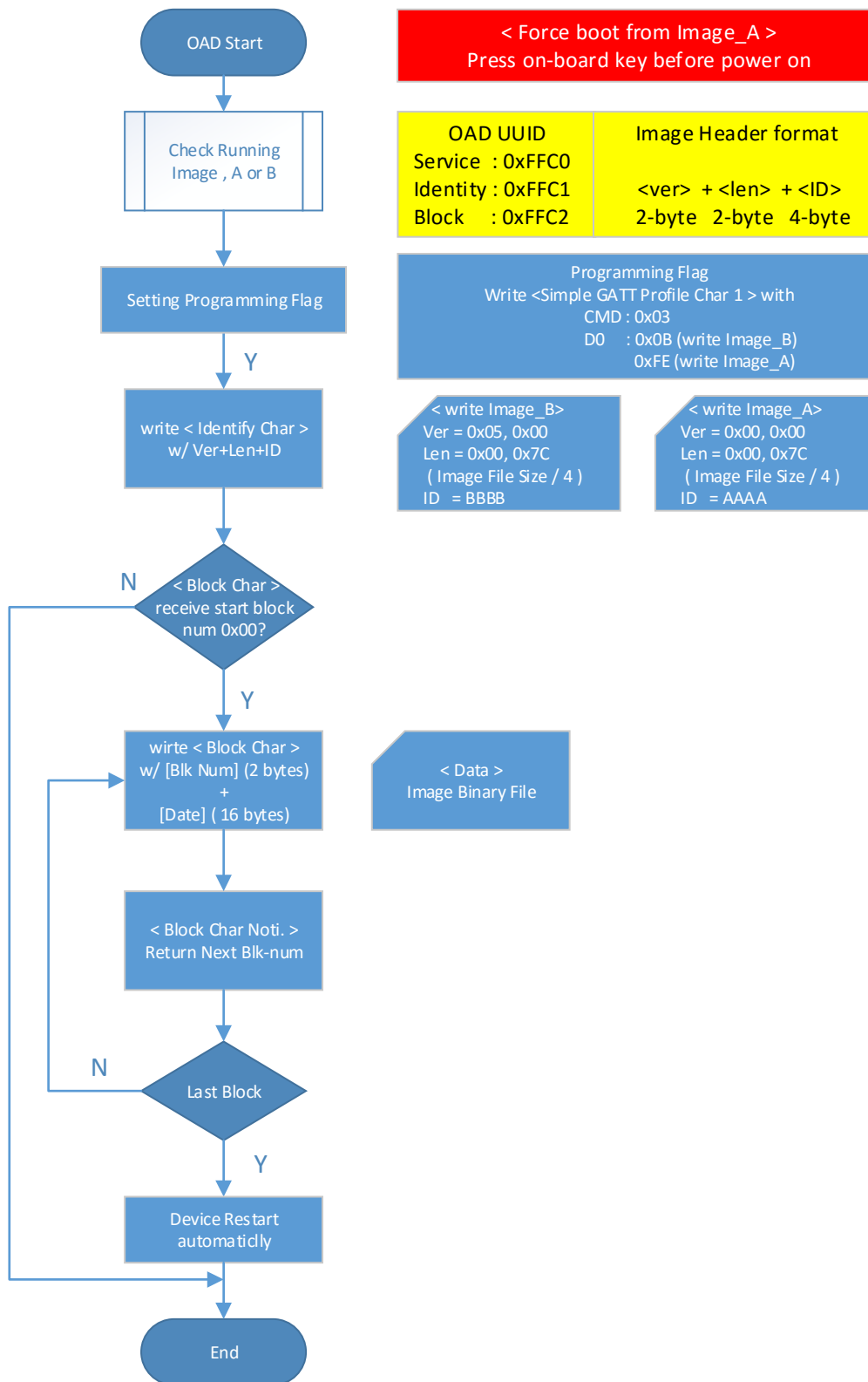   b. Excute OAD Procedure

5.2 Procedure
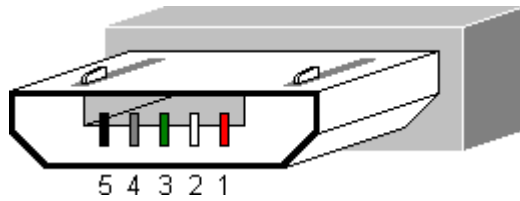
5.2.1 How to Check Running Image

5.2.2 Programming

```
┌─────────────┐
│  OAD Start  │
└─────────────┘
       │
       ▼
┌─────────────────────┐
│   Check Running     │
│   Image , A or B    │
└─────────────────────┘
       │
       ▼
┌─────────────────────┐
│ Setting Programming │
│        Flag         │
└─────────────────────┘
       │  Y
       ▼
┌─────────────────────┐
│ write < Identify Char > │
│   w/ Ver+Len+ID     │
└─────────────────────┘
       │
       ▼
      ◇ < Block Char >        N
      receive start block ─────→
        num 0x00?
       │  Y
       ▼
┌─────────────────────┐
│ wirte < Block Char >│
│  w/ [Blk Num] (2 bytes) │
│          +          │
│  [Date] ( 16 bytes) │
└─────────────────────┘
       │
       ▼
┌─────────────────────┐
│ < Block Char Noti. >│
│  Return Next Blk-num│
└─────────────────────┘
       │
       ▼
      ◇ Last Block      N
       ──────────────────→
       │  Y
       ▼
┌─────────────────────┐
│   Device Restart    │
│    automaticlly     │
└─────────────────────┘
       │
       ▼
┌─────────────┐
│     End     │
└─────────────┘
```

< Force boot from Image_A >
Press on-board key before power on

OAD UUID	Image Header format
Service : 0xFFC0	
Identity : 0xFFC1	<ver> + <len> + <ID>
Block : 0xFFC2	2-byte 2-byte 4-byte

Programming Flag
Write <Simple GATT Profile Char 1 > with
CMD : 0x03
D0   : 0x0B (write Image_B)
0xFE (write Image_A)

Ver = 0x05, 0x00
Len = 0x00, 0x7C
(Image File Size / 4)
ID = BBBB

Ver = 0x00, 0x00
Len = 0x00, 0x7C
(Image File Size / 4)
ID = AAAA

< Data >
Image Binary File

6 USB Pin Definition

6.1 Diagram

6.2 Pin

Pin	Name	I/O	Function
1	VCC	Input	Module power supply
2	FOCUS	Output	Focus On/Off output
3	SHUTTER	Output	Shutter On/Off output
4	UART TXD	Output	UART TxD output
5	GND	GND	System Ground

FCC Statement

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.

FCC Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment.
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.

Caution!

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