

User  
Manual

## ATK-AS608Fingerprint module user manual

High performance optical fingerprint recognition module

User Manual

### revise history

Version	date	reason
V1.00	2016/05/12	first release

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## 1.Characteristic parameters

ATK-AS608The fingerprint recognition module isALIENTEKA high-performance optical fingerprint recognition module launched. ATK-AS608The module adopts the famous domestic fingerprint recognition chip company Hangzhou Shengyuan Chip Technology Co., Ltd. (Synochip) ofAS608Fingerprint recognition chip. Built-in chipDSPThe computing unit integrates a fingerprint recognition algorithm, which can efficiently and quickly collect images and identify fingerprint features. The module is equipped with a serial port,USBCommunication interface, users do not need to study complex image processing and fingerprint recognition algorithms, they only need to use a simple serial port, USBThe module can be controlled according to the communication protocol. This module can be used in various attendance machines, safes, fingerprint access control systems, fingerprint locks and other occasions. Technical indicators are as shown in the table1.1shown.

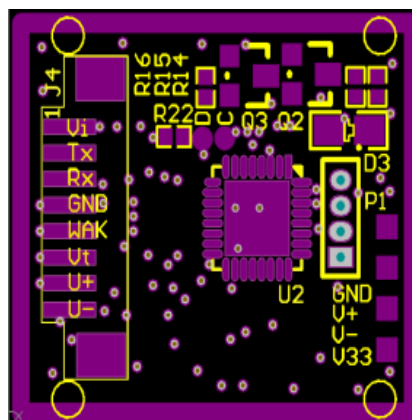
Table 1.1 Technical indicators:

project	illustrate
Operating Voltage(V)	3.0~3.6V, typical value:3.3V
Working current(mA)	30~60mA, typical value:40mA
USARTcommunication	baud rate (9600×N),N=1~12. defaultN=6,bps= 57600 (data bits:8Stop bit:1Check Digit:none TTLlevel)
USBcommunication	2.0FS (2.0full speed)
Sensor image size (pixel)	256*288pixel
Image processing time (S)	<0.4(S)
Power-on delay (S)	<0.1(S),After the module is powered on, it takes approximately0.1SInitialization work
search time (S)	<0.3(S)
Rejection rate (FRR)	<1%
False recognition rate (FAR)	<0.001%
Fingerprint storage capacity	300pieces (ID:0~299)
working environment	temperature(°C):-20~60 Humidity<90%(No condensation)

## 2. Instructions for use

### 2.1 Hardware interface

The module interface adopts8core1.25mmSpacing single row sockets,PCBAs shown in the picture2.1.1shown. There is a finger detection circuit built into the module, and the user can read the status pin (WAK)Determine whether there is finger pressing. The pin description is as shown in the table2.1.1shown.

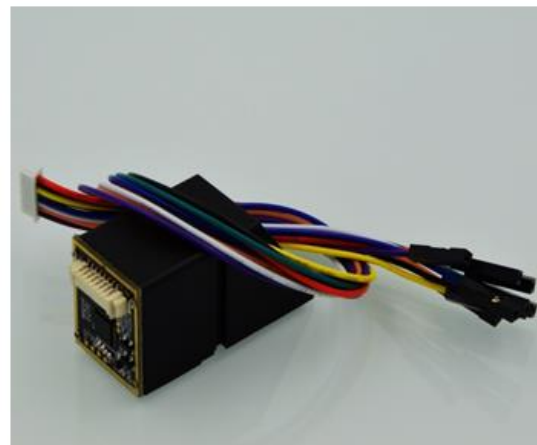
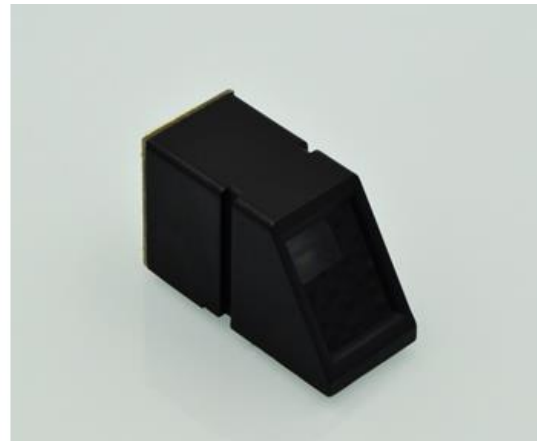


picture2.1.1modulePCB

surface2.1.1 ATK-AS608Module pin description

serial number	name	illustrate
1	Vi	Positive input terminal of module power supply.
2	Tx	Serial data output.TTLlogic level
3	Rx	Serial data input.TTLlogic level
4	GND	signal ground. Internally connected to power ground
5	WAK	Induction signal output, high level is active by default
6	Vt	Touch sensing power input,.3vpowered by
7	U+	USB D+
8	U-	USB D-

Module physical picture:



## 2.2 System resources

### 1.Buffer and fingerprint library

The system has a 72Kbyte image buffer with two 512 bytes characteristic file buffers of different sizes, named respectively: ImageBuffer, CharBuffer1 and CharBuffer2. Users can read and write any buffer through instructions. CharBuffer1 or CharBuffer2It can be used to store both ordinary feature files and template feature files. Pass

PassUARTIn order to speed up uploading or downloading images, only the high pixel bytes are used.4bit, that is, combining two pixels into one byte for transmission. passUSBThe mouth is whole8bit pixels.

The capacity of the fingerprint database depends on the mountedFLASHIf the capacity changes, the system will automatically identify it. Fingerprint templates are stored according to serial numbers, which are defined as:0—(N-1)(Nis the fingerprint database capacity). Users can only access the content of the fingerprint database based on the serial number.

## 2.User Notepad

The system is inFLASHopened a512The storage area of bytes is used as the user notepad, which is logically divided into16pages, per page32byte. The host computer can passPS\_WriteNotepadinstructions andPS\_ReadNotepadCommand to access any page. Note that when writing on a certain page of notepad, the page32The entire byte content is written, and the original content is overwritten.

### 3.random number generator

The system has integrated hardware32Bit random number generator (no random number seed required) , the user can let the module The block generates a random number and uploads it to the host computer.

## 2.3 Software Development Guide

### 1.Module address (size:4bytes, attributes: read and write)

The default address of the module is0xFFFFFFF, can be modified through instructions, The address field of the packet must match this address, The command packet/data packet is received by the system.**Note: Communication with the host computer must be the default address0xFFFFFFF!**

### 2.Module password (size:4bytes, attribute: write)

The system default password is0, can be modified through instructions. If the default password has not been modified, the system does not require password verification, and the host computer andMCUCommunicate with the chip; if the password is modified, the first command for communication between the host computer and the chip must be to verify the password. Only after the password verification is passed, the chip will receive other commands.**Note: It is not recommended to change the password!**

### 2.Packet size settings (size:1bytes, attributes: read and write)

The length of the sent data packet and the received data packet is set according to this value.

### 3.Baud rate coefficientNsettings(size:1bytes, attributes: read and write)

USARTBaud rate =N×9600,N=1~12.

### 4.Security Levellevelsettings(size:1bytes, attributes: read and write)

The system sets the comparison threshold according to the security level.level=1~5. The security level is1The false recognition rate is the highest and the rejection rate is the lowest. The security level is5The false recognition rate is the lowest and the rejection rate is the highest.

**Note: The above settings can be modified through commands. Please refer to the detailed command configuration.ATK-AS608in the fingerprint recognition module data folderAS60x**Fingerprint recognitionSOCCommunication Manualv1.0.

## 2.4 Communication protocol

Host computer,MCUCommunicating with the module to send and receive module instructions and data is packaged according to the module instruction format, and parsing instructions and receiving data packets also follow this format.

## 2.4.1 Module command format

Module instruction formats are divided into three types: command package format (as shown in the table2.4.1.1),data packet format (such as table2.4.1.2),Finish Packet format (such as table2.4.1.3).

surface2.4.1.1Command package format

Number of bytes	2bytes	4bytes	1 bytes	2 bytes	1 bytes				2 bytes
name	Baotou	Chip address	Package ID	Packet length	instruction	parameter1	...	parametern	Checksum
content	0xEF01	XXXX	01	N=					

surface2.4.1.2Packet format

Number of bytes	2bytes	4bytes	1 bytes	2 bytes	N bytes	2 bytes
name	Baotou	Chip address	Package ID	Packet length	data	Checksum
content	0xEF01	XXXX	02			

surface2.4.1.3end packet format

Number of bytes	2bytes	4bytes	1 bytes	2 bytes	N bytes	2 bytes
name	Baotou	Chip address	Package ID	Packet length	data	Checksum
content	0xEF01	XXXX	08			

- The format of data packets sent to and received from the module is the same.
- The data packet is not sent and received separately, it must be after sending the command packet or after receiving the response packet. Packet length = the total number of bytes from the packet length to the checksum (command, parameter, or data), including the checksum, but excluding the number of bytes in the packet length itself.
- The checksum is the sum of all bytes from the packet ID to the checksum.
- The module address is the default before it is generated.0xFFFFFFFF, once the host computer generates the module address through instructions, all data packets must be sent and received according to the generated address. The module will reject packets with incorrect addresses.

## 2.4.2 Module response format

The response is to report the relevant command execution status and results to the host computer. The response contains parameters and can be followed by subsequent data packets. Only after receiving the module's response packet can the host computer confirm the module's packet receipt and instruction execution. The module response packet contains one parameter: confirmation code. The confirmation code indicates the completion of the instruction execution. The module response format is as shown in the table2.4.2shown.

surface2.4.2Module response format

2bytes	4bytes	1byte	2bytes	1byte	N bytes	2bytes
0xEF01	module address	Package ID07	Packet length	Confirmation code	Return parameters	Checksum

Confirmation code definition:

- 00H: Indicates that the instruction execution is completed
- orOK; 01H: Indicates data packet reception error;
- 02H: Indicates there is no finger on the sensor;
- 03H: Indicates that the fingerprint image entry failed;

04H: Indicates that the fingerprint image is too dry and too light to produce features; 05H:

Indicates that the fingerprint image is too wet and mushy to produce features; 06H:

Indicates that the fingerprint image is too messy to generate features;

07H: Indicates that the fingerprint image is normal, but there are too few feature points (or the area is too small) to generate features; 08H: Indicates fingerprint mismatch;

09H: Indicates that no fingerprint was found;

0aH: Indicates that feature merging failed;

0bH: Indicates that the address serial number exceeds the range of the fingerprint database when accessing the fingerprint

database; 0cH: Indicates an error or invalidity in reading the template from the fingerprint database;

0dH: Indicates failure to upload features;

0eH: Indicates that the module cannot accept subsequent data packets;

0fH: Indicates failure to upload the image;

10H: Indicates failure to delete the template;

11H: Indicates that clearing the fingerprint database failed;

13H: Indicates that the password is incorrect;

15H: Indicates that there is no valid original image in the buffer and the image cannot be generated; 18H: Indicates reading and writingFLASHError; 19H: undefined error;

1aH: Invalid register number;

1bH: Register setting content error number;

1cH: Notepad page number specified incorrectly;

1dH: Port operation failed;

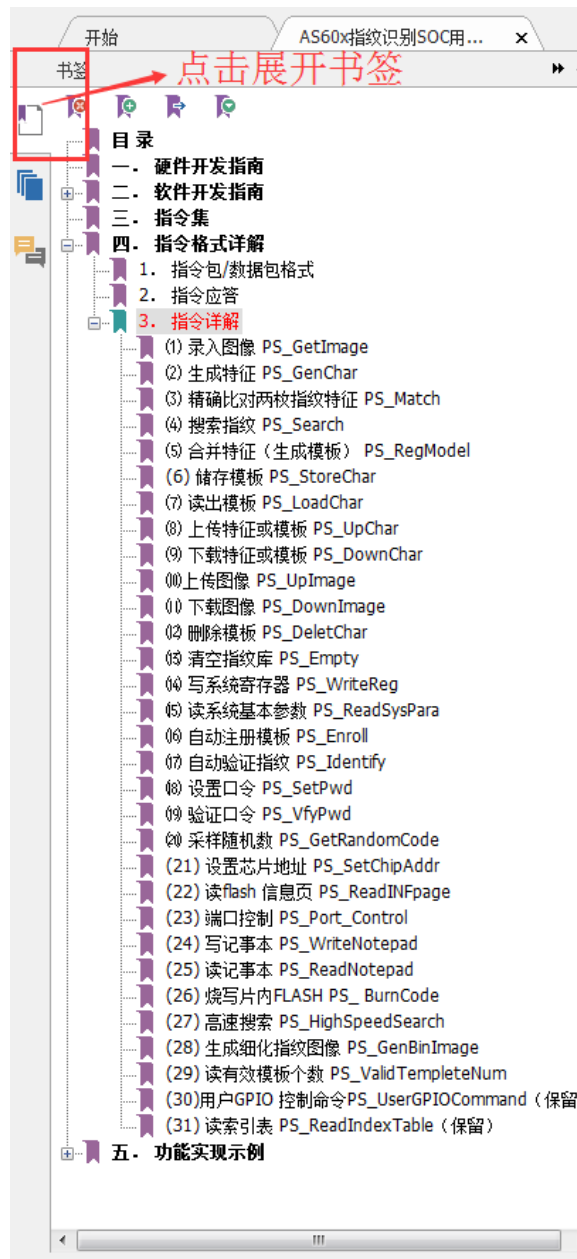
1eH:Automatic registration (enroll)fail; 1fH

:Fingerprint database is full

29. 20—efH:Reserved.

### 2.4.3 Common instruction set

ATK-AS608The module has rich functions and many instructions. OpenATK-AS608Fingerprint recognition module\AS60x\Fingerprint recognitionSOC Communication Manualv1.0.pdf, expand the "bookmark" to see all instructions of the module. As shown in the picture2.4.3.1shown.



picture2.4.3.1Instruction Set

From the picture above 2.4.3.1 it can be seen that there are many instructions, but there are only a few commonly used instructions. The commonly used instruction set and function description are as follows: 2.4.3.1 shown.

surface2.4.3.1Common instruction set

refer to make code	function name	Function description
01H	PS_GetImage	Read the image from the sensor and store it in the image buffer
02H	PS_GenChar	Generate fingerprint features based on the original image and store them in CharBuffer1 or CharBuffer2
03H	PS_Match	Accurate comparison CharBuffer1 and CharBuffer2 Feature files in
04H	PS_Search	by CharBuffer1 or CharBuffer2 Search the entire or partial fingerprint library for signature files in



05H	PS_RegModel	WillCharBuffer1andCharBuffer2The feature files in are merged to generate templates stored inCharBuffer1andCharBuffer2
06H	PS_StoreChar	Store files in feature buffer toflashIn fingerprint database
0CH	PS_DeletChar	deleteflashA feature file in the fingerprint database
0DH	PS_Empty	ClearflashFingerprint database
0EH	PS_WriteReg	Set system parameters
0FH	PS_ReadSysPara	Read basic system parameters
1BH	PS_HighSpeedSearch	High speed searchFLASH
1DH	PS_ValidTemplateNum	Read the number of valid templates

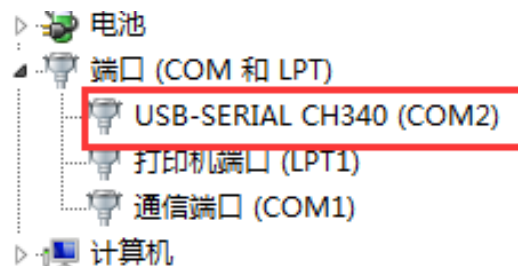
Note:AS60xFingerprint recognitionSOCCommunication Manualv1.0.pdfThe detailed instructions in "Detailed Explanation of Instructions" details the sending format of each instruction and the format of receiving responses. This document will not go into details. For detailed instructions and more user instructions, please refer toATK-AS608Fingerprint identification module informationVAS60xFingerprint recognitionSOCCommunication Manualv1.0.pdf.

## 2.5 PC test

### 2.5.1 Serial port mode

Step 1: Change the module'sTx,RxConnected toUSBConvert serial device(hint: The development board can use the onboardCH34Q)

Step 2: Find the identified serial number in the computer device manager, as shown in the figure2.5.1.1shown.



picture2.5.1.1

Step 3: Open module information\2, supporting software\fingerpint module test host computer\fingerpint test.exe, and then select the corresponding serial port number on the host computer, as shown in the figure2.5.1.2shown.



picture2.5.1.2

Step 4: Click "OK", the communication is successful as shown in the figure2.5.1.3shown.



picture2.5.1.3

Step 5: After successful communication, you can view the hardware information, baud rate, etc., and click the buttons on the panel to operate.

Next we click the "Enter Fingerprint" button, as shown in the figure after clicking 2.5.1.4 shown, and enter 88 to enter fingerprints ID.



picture2.5.1.4

Step 6: Click "OK", the software prompts "Please place your finger flat on the sensor" as shown in the figure 2.5.1.5 shown.



picture2.5.1.5

Step 7: Follow the prompts and place your finger flat on the sensor and wait for the image to be uploaded, as shown in the picture2.5.1.6shown. Tip:

Uploading takes a little longer. The higher the baud rate, the faster the speed, useUSBModule testing will be faster.



picture2.5.1.6

Step 8: After successfully recording the image for the first time, the software will prompt "2.Please place your finger flat on the sensor" means recording images for the second time. As shown in the figure2.5.1.7shown.



picture2.5.1.7

Step 9: After the fingerprints of the twice entered images are compared and matched, if they are consistent, the fingerprints have been successfully entered. Successful entry as shown in the picture2.5.1.8shown.



picture2.5.1.8

Step 10: The previous operation is to enter a fingerprint. Next, let's test the fingerprint (fingerprint verification). firstly, I We click "Search", as shown in the figure2.5.1.9shown.



picture2.5.1.9

Step 11: After clicking search, the software prompts "Please place your finger flat on the sensor" as shown in the figure2.5.1.10shown.



picture2.5.1.10

Step 12: Follow the prompts and place your finger on the sensor. After the image is successfully recorded, the system compares the entered image with the fingerprint database. If the comparison is successful, it will prompt "The same finger was found.FingerID=88..."As shown in the picture2.5.1.11shown.



picture2.5.1.11

Tip: If the communication is unsuccessful, please check whether the wiring method is correct. The correct method is moduleTx,RxReceived respectivelyUSB Convert to serial deviceRx,Tx. If the module address is changed, it must be changed back to the default0xFFFFFFF, and the password must also be the default value0, so that communication can be normal!CH340 USBThe driver for converting the serial port is in the module information\3, supporting software\CH340driver.

## 2.5.2 USB mode

Step 1: Change the module'sU+,U-passUSBcable to the computer. (Tip: The development board can be connected with Dupont cable)

After connecting, the system prompts you to install the driver. Select custom installation.USBThe driver is in module information\2.Supporting software\PC USBDriver. The installation is successfully completed as shown in the figure2.5.2.1shown.



picture2.5.2.1

Step 2: Open module information\2, supporting software\fingerpint module test host computer\fingerpint test.exe, and then directly click the "Open Device" button on the host computer. As shown in the picture2.5.2.2shown.



picture2.5.2.2

Step 3: After successfully opening the device, you can follow the above serial port mode test steps to complete the corresponding functional operations of fingerprint recording and fingerprint swiping (verification).

Tip: If communication fails, please check the connection method, the moduleU+,U-respectively with the data lineU+,U-connect.

## 2.6 Use serial port assistant to test instructions

Before using the serial port assistant to test, let us first understand the test instructions. Here our test instructions are PS\_GetImage (Enter image). Other instruction tests are also tested according to the following method, and the document will not go into details. The detailed format of input image instructions is as shown in the figure 2.6.1 shown.



**AS60x SOC 通讯手册**

先验证设备握手口令，口令通过后 SOC 才进入正常工作状态。

### 3. 指令详解

**(1) 录入图像 PS\_GetImage**

- 功能说明：探测手指，探测到后录入指纹图像存于 ImageBuffer。返回确认码表示：录入成功、无手指等。
- 输入参数：none
- 返回参数：确认字
- 指令代码：01H
- 指令包格式：

2 bytes	4bytes	1 byte	2 bytes	1 byte	2 bytes
包头	芯片地址	包标识	包长度	指令码	校验和
0xEF01	xxxx	01H	03H	01H	05H

➤ 应答包格式：

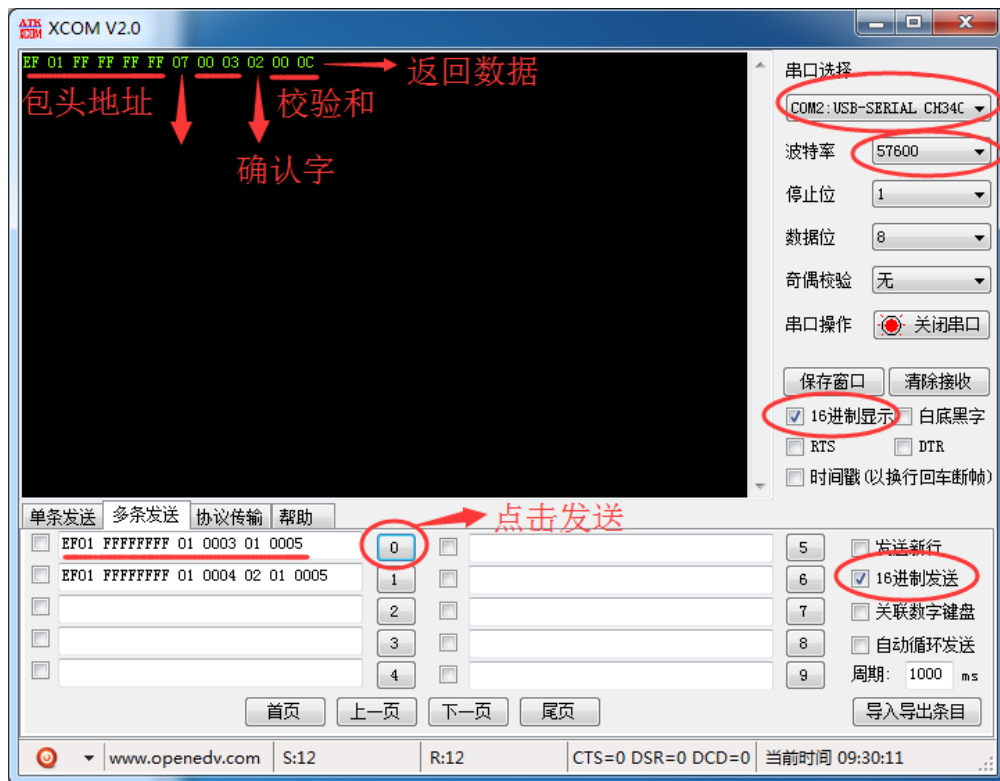
2 bytes	4bytes	1 byte	2 bytes	1 byte	2 bytes
包头	芯片地址	包标识	包长度	确认码	校验和
0xEF01	xxxx	07H	03H	xxH	sum

注：确认码=00H 表示录入成功；  
 确认码=01H 表示收包有错；  
 确认码=02H 表示传感器上无手指；  
 确认码=03H 表示录入不成功；  
 sum 指校验和

picture2.6.1

First we follow the above 2.5.1. The first step in serial port mode is to pass the module USB Connect the serial port device to the computer, and then open the module information \3.Supporting software\serial port debugging assistant\XCOM V2.0.exe, select the port number, baud rate, data bits, stop bits, check hexadecimal display and hexadecimal send; then follow the figure above 2.6.1 Enter the image recording command and send it. The steps are as follows: 2.6.2 shown.





picture2.6.2

It can be seen that the module returns the data format as shown above.2.6.1The response packet format is consistent. The data contains the header address (EF01FFFFFF) package identifier (07) package length (0003) Confirmation code (02) checksum (000C) . in front2.4.1 The instruction format states: The checksum is the sum of all bytes between the packet ID and the checksum (excluding the checksum). here  $07+03+02=0C$ (hexadecimal) , indicating that the checksum is correct! From the picture above2.6.1It can be seen that the confirmation code (02) represents the sensor There are no fingers on it.

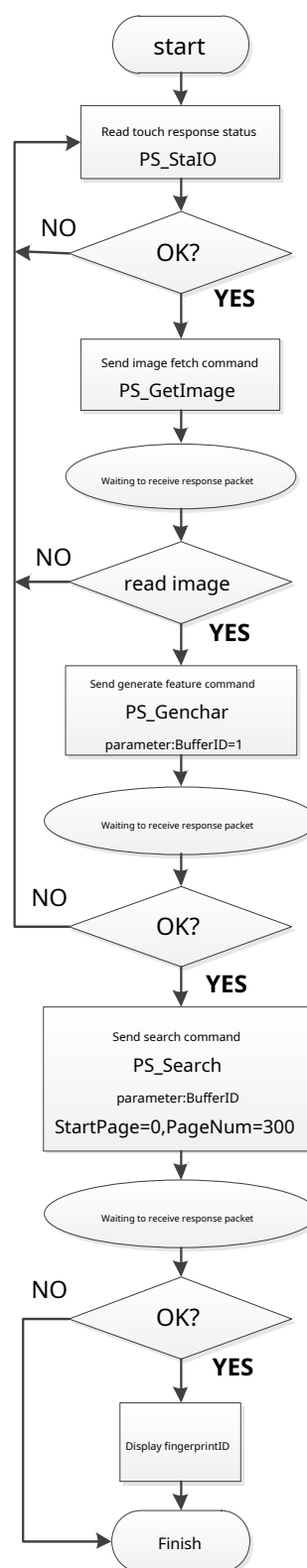
**Note:** Be sure to debug according to the configuration in the picture. Other instructions are also tested according to this method. For a detailed explanation of the command format, please refer to ATK-AS608Fingerprint recognition module data folderAS60x\Fingerprint recognitionSOCCommunication Manualv1.0.pdf.

**Fingerprint entry process:**

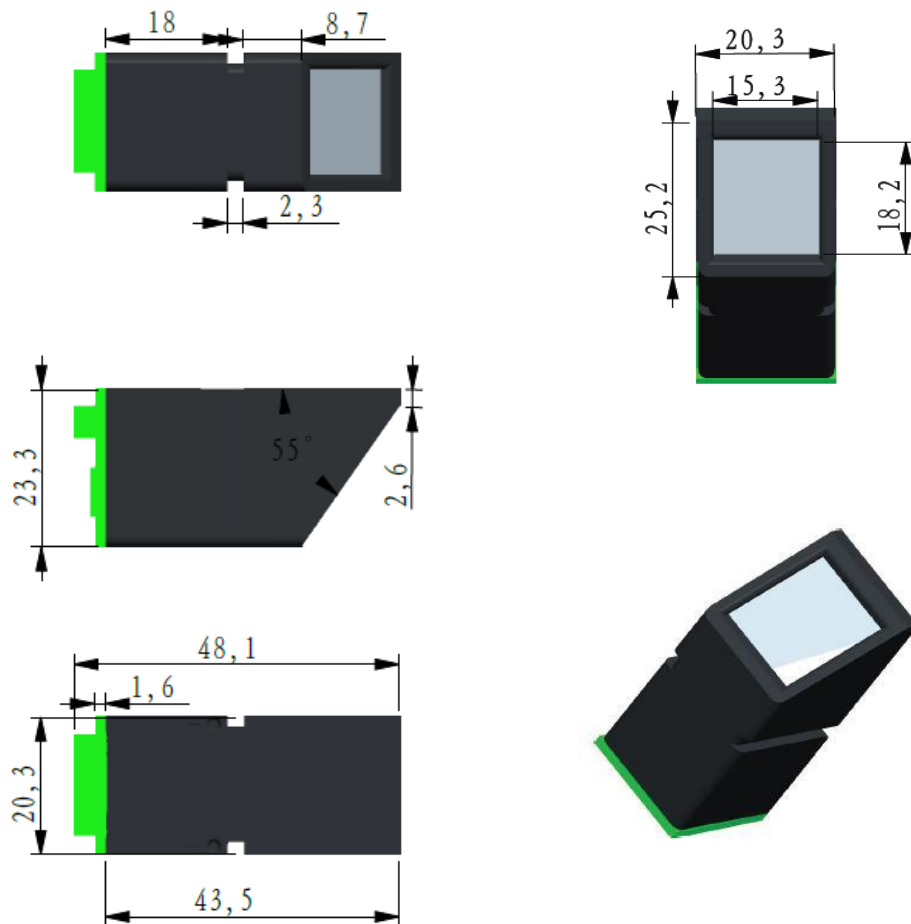
**Fingerprint entry process:**



**Fingerprint swiping process:**



### 3. Structural dimensions



## 4.Others

### 1,purchase address:

Official store1:<http://shop62103354.taobao.com>

Official store2:<http://shop62057469.taobao.com> 2

### ,Download

ATK-AS608Fingerprint identification module data download address:<http://www.openedv.com/thread-77992-1-1.html> 3,Technical

### Support

company website:[www.alientek.com](http://www.alientek.com)

technology Forum:[www.openedv.com](http://www.openedv.com)

contact number:020-38271790

