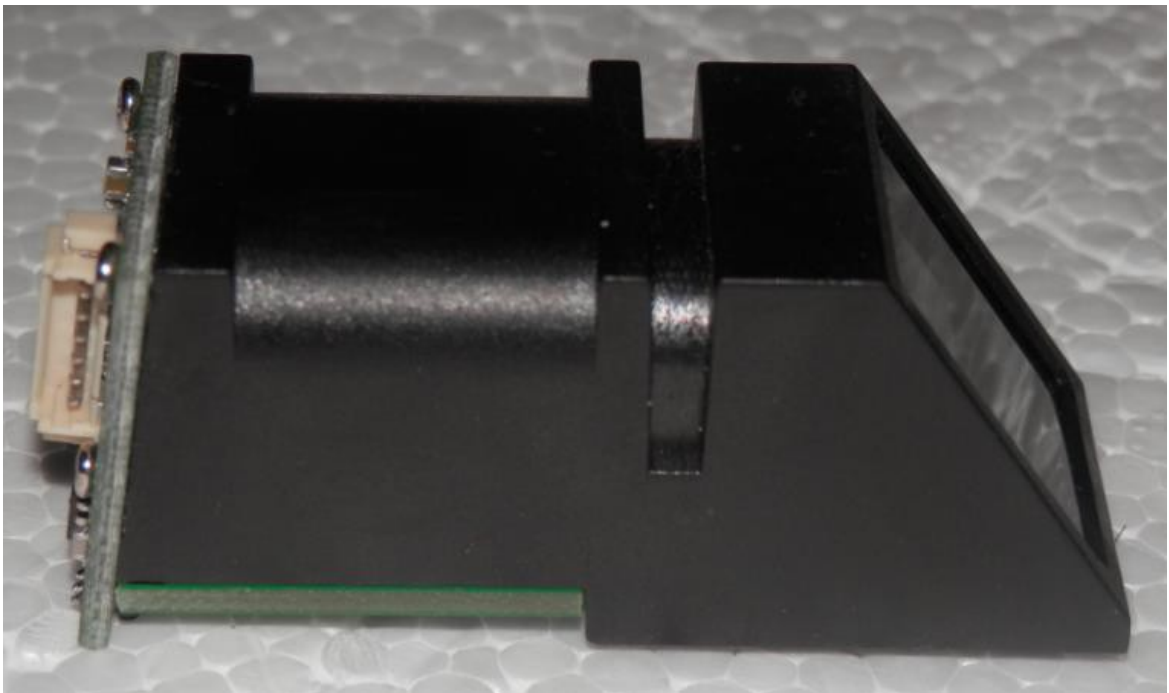

Biovo-C2Fingerprint Module useUser's Manual



Eyerecord

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Chapter Outline

Our fingerprint technology is focused on the research and development of enterprises, mainly in the fingerprint core module. Gold means through series fingerprint modules are our core products, excellent performance, reliable, cost-effective, all fingerprint modules are the best collaboration products, mainly divided into semiconductor capacitive, scratch-type semiconductor, optical thin three-dimensional.

1.1 working principle

Fingerprint processing consists of two processes: fingerprint logon process and the fingerprint matching process [which is the fingerprint search]. And fingerprint search in two ways.

Fingerprint logon, a fingerprint for authentication. Second input image processing, synthetic templates are stored in the module. Fingerprint matching, fingerprint sensor head, to verify the fingerprint image input and processing, then the module fingerprint template matching comparison (with a template module if specified in the match, called the fingerprint matching, template matching, called the fingerprint search mode), the module gives the matching results (pass or fail). method, namely

1: 1If a plurality of; way

Chapter The main technical Indicators summary

Profile:256 bytes
Template files:512 bytes

Supply voltage:5V, (3.3VOptional)

Supply Current:Standby current 5-10mA Working current<20mA Peak current<130mA

Fingerprint image input time:<0.5 seconds

Window size:20mm X 16mm

Match mode:Than on the way (1: 1)
Search mode (1: N)

storage:200

Security Level:Five (from low to high: 1,2,3,4,5) Default 3

False Accept Rate (FAR):<0.001% (security level 3)

False Rejection Rate (FRR):<1.0% (security level 3)

Search time:<1.0 seconds (1: 500 is average)

Resolution500dpi

PC Interface: UART (TTL logic level)

Baud rate (UART):(9600XN) bps where N = 1 ~ 12 (Default N = 6, that is 57600bps)

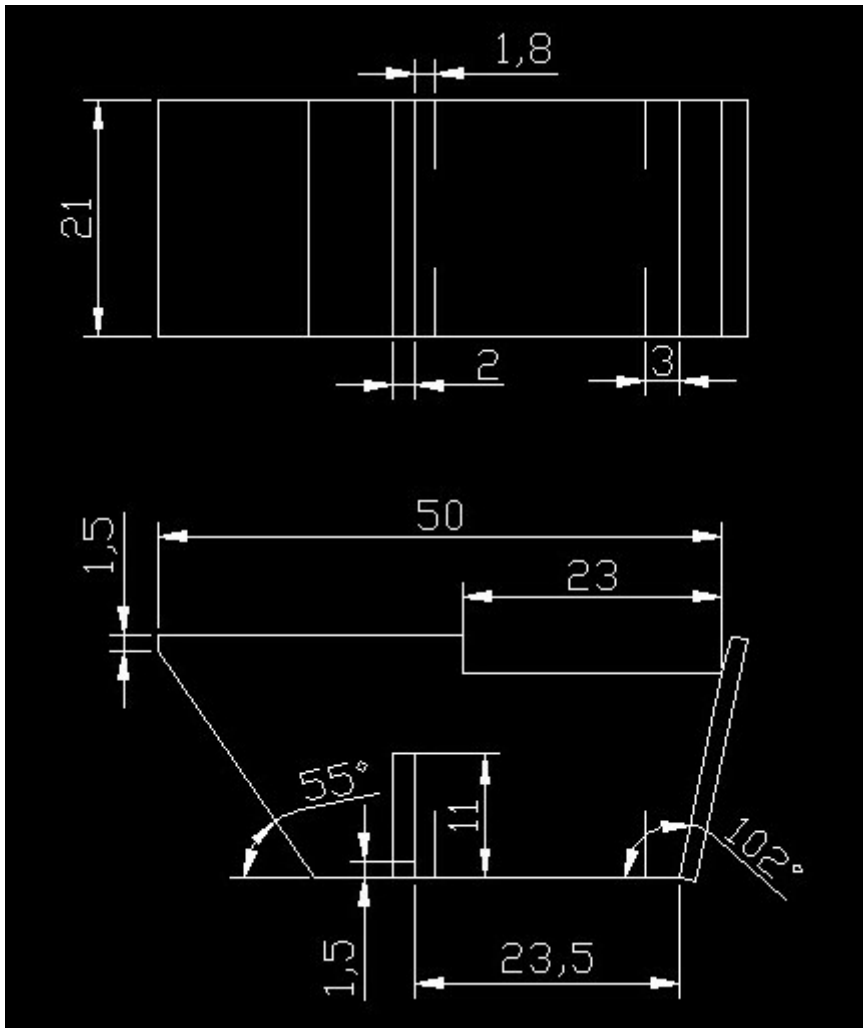
working environment:

Temperature: -25 °C - + 55 °C Relative
Humidity: 40% RH-85% RH (non-
condensing)

Storage environment:

Temperature: -40 °C - + 85
°C Relative humidity: <90%
H (no condensation)

Optical module (C3) Dimensions (LXWXH): long 47.65mmXwidth20.50mmXhigh 21.20mm



Semiconductor module Dimensions: MPU: Long 35mmXwidth28mmXhigh7mm

Capacitive module Dimensions: MPU: Long 35mmXwidth28mmXhigh7mm

Sensor: Long 33.4mmXwidth20.4mm

Scratch-off module Dimensions: main board: Long 35mmXwidth28mmXhigh7mm

Sensing plate 24mmXwidth20mmXhigh5mm

third chapter hardware interface

3.1 PC Interface (board marked: J1)

Module with the host computer via 6PIN 1.27mm pitch wire. Pin is defined as follows:

| No. | Pin Description | Remark |
|-----|-------------------------------|--------------------------------|
| 1 | Finger detection power supply | +3.6-5V |
| 2 | Finger detection signal | Standard output is active high |
| 3 | Power + | Power supply positive |
| 4 | Send module | TX |
| 5 | Module receives | RX |
| 6 | power supply- | Negative power supply |

Note: One end of the circuit board near the right side of the crystal to pin 1: finger detection power supply +

PC is recommended during development, the need to design the power supply control circuit (transistor).

3.1.1 Serial communication

Serial communication module with the user device interface as follows:

| Pin Number | Pin Name | Class type | Functional Description |
|------------|-------------------------|------------|--|
| 1 | V _{Touch} Out | finger | detection power supply positive output |
| 2 | T _{Single} Out | finger | detection signal output terminal |
| 3 | V _{in} | in | Positive power supply input. (Thread color: red) |
| 4 | TD | out | Serial data output. TTL logic levels. (Thread color: green) |
| 5 | RD | in | Serial data input. TTL logic levels. (Thread color: white) |
| 6 | GND | - | Signal ground. Internal power supply is connected to ground. (Thread color: black) |

Note: Type column, in represents the input to the module, out represents the output from the module.

3.1.1.1 Hardware connection

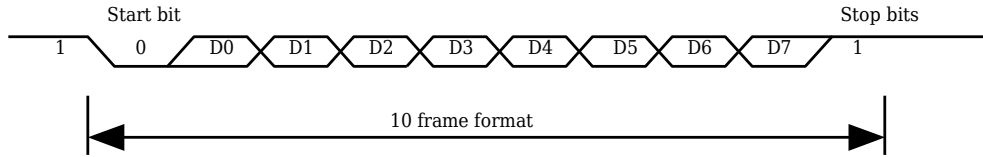
Module via the serial communication interface, can be directly adopted: data transmission module pin 4 (TD) Connected to the data sink bit mark (RD), Data receiving module pin 5 (RD) Connected to the data transmission bit mark (TXD).

For the RS-232Level (for example PC Machine) to communicate with the PC, increase the level of transfer between the mo

Conversion circuit (For 232C01).

3.1.1.2 Serial protocol

Half-duplex asynchronous serial communication 7700, default baud rate is 9600~115200bps.



Frame format for transmission: 1 level start bit, 8 bit data (LSB first) and one stop bit, no parity bit.

3.1.1.3 Power-up time

After the power module is started, it needs time for initialization. In the meantime, the module does not respond to the host computer.

3.1.1.4 Electrical parameters (All power levels to Signal ground GND. The reference level)

1. power input

| item | Eye | Ginseng number | | | unit | Equipment Note |
|-----------------|-----------|----------------|---------|---------|------|---|
| | | Least | typical | maximum | | |
| voltage | V_{in} | 3.0 | 3.3 | 3.6 | V | The normal operating value |
| Limit voltage | V_{max} | -0.3 | | 3.6 | V | Outside this range may cause permanent damage |
| Working current | | 90 | 100 | 110 | mA | |
| Peak current | peak | | | 150 | mA | |

2. TXD (Output, TTL Logic level)

| project | Article Item | Ginseng number | | | unit | Remark |
|----------|-----------------|----------------|---------|---------|------|---------|
| | | Least | typical | maximum | | |
| V_{OL} | $I_{OL} = -4mA$ | | | 0.4 | V | logic 0 |
| V_{OH} | $I_{OH} = 4mA$ | 2.4 | | 3.3 | V | logic 1 |

3. RXD (input, TTL Logic level)

| project | Article Item | Ginseng number | | | unit | Remark |
|------------|-----------------|----------------|---------|---------|------|---------------------|
| | | Least | typical | maximum | | |
| V_{IL} | | | | 0.6 | V | logic 0 |
| V_{IH} | | 2.4 | | | V | logic 1 |
| I_{IH} | $V_{IH} = 5V$ | | 1 | | mA | |
| | $V_{IH} = 3.3V$ | | 30 | | uA | |
| V_{Imax} | | -0.3 | | 5.5 | V | Limit input voltage |

3.2 Sensor Interface (board marked 12)

Split module provides a dedicated interface with optical fingerprint sensor plate (17-pin single row socket / pin, pitch 1.27mm). The interface is connected via a 17-pin ribbon cable and sensor board. When the user has no special requirements, provided for the split module. The integrated module interface is connected internally, without the user to consider.

Chapter FsystemSystem resources

In order to meet different customer needs, modular system provides a number of resources available to the user system

4.1 Buffer

RAM modules are equipped with an image buffer ImageBuffer with two 512 bytes buffer size profile CharBuffer1 and CharBuffer2. Users can read and write arbitrary instruction buffer. Image buffer and two signature file buffer contents are not saved when the module is powered down.

4.1.1 Image buffer

ImageBuffer image buffer for storing image data and an image processing module interface. Download, Upload, Image format 256x288 Pixels.

Through the UART port to upload or download images to speed up, only use pixel high four bytes, namely 16-level gray. Each byte represents two pixels (one pixel high four low four pixels in the same row as a next adjacent column is about two pixels into one byte transfer). Since the image is 16 gradations, upload PC When the display (corresponding) to Gradation should be extended (extended 8-bit Bitmap format).

It is transmitted through the USB port the entire 8-bit pixel, 256 shades of gray.

4.1.2 Characterized in file buffer

Characterized in file buffer CharBuffer1 CharBuffer2 or both can be used to store common feature can also be used to Template profile.

4.2 Fingerprint database

FLASH module in open storage areas in the period as a fingerprint template storage area, commonly known as the fingerprint. It is the power of protection.

Fingerprint template stored in accordance with the serial number, if the fingerprint storage capacity of N, the number 2 N-2, N-1. Users can access only fingerprint database content based on the serial number.

4.3 System configuration parameters

For the convenience of users, the open part of the system parameter module, allows users to command, specify a single (Number) parameter values. See Setting basic parameters of the system and reading instruction

When the host computer send commands to modify the system parameters, according to the original configuration module Configuration record to FLASH, the system after the next power-up, according to the new configuration.

4.3.1 Baud Rate Control (parameter ID: 4):

This parameter control module with the host computer via the communication baud rate when UART communication, if 12), corresponding to the baud rate (9600).

4.3.2 Security level (parameter ID: 5)

This parameter controls the threshold for fingerprint matching the device, divided into Security level 1 False highest rate, Reputation lowest rate. Security level 2 False Accept Rate lowest, Reputation highest rate.

4.3.3 Package content length (parameter ID: 6)

This parameter control module and PC communication, allowing the contents of the data packets transmitted every time 0,1,2,3 corresponding to the length (number of bytes) 3, 6, 12, 15, 30, 60, 120, 150.

4.4 System status register

System status register indicates the current operating status of the module. ReadSysPara instruction by instruction reads, length 1 Word. Its Members are defined as follows:

| Bit No. | 154 | 3 | 2 | 1 | 0 |
|--------------|----------|------------|-----|------|------|
| significance | Reserved | ImgBufStat | PWD | Pass | Busy |

Note:

- Busy: - one bit is set to 1 indicates that the system is executing commands, 0 indicates the system is idle;
- Pass: accounting for one, 1 indicates that fingerprint verification;
- PWD: accounting for one, set to indicate that the device handshake password verified;
- ImgBufStat: accounting for one, is set to indicate the presence of a fingerprint image buffer valid fingerprint.

4.5 Module password

After power-on reset module, will first check whether the device handshake password is changed. If it is not modified, the

There needs to verify the password directly into the normal working condition; or module password as the default password, you can not validate passwords. Password 4-byte, The factory default password is 0x00000000.

If the module inside the password has been modified (see Instruction Set), you must first verify that the device handshake

After the password, the password by the module only into normal working condition. Otherwise, the module refuses to execute

After the password change, the new password is stored in Flash memory, power is still preserved. See Verify Password instructions and set the password function.

4.6 Module address

Each module has an identification address, the module communicate with the host computer, each instruction / data in
Send each packet contains an address contains the address
items. Module only contain the same address with its own
address instructions and data packet respond.

Module address is 4 bytes, the default factory default value: 0xFFFFFFFF. Users can modify the command module address
See the instruction set module address SetAdder). After the module address changes, the new address in the module after p

4.7 Random number generator

Internal module integrates a 32-bit hardware random number generator (random number seed is not required), the use
Generates a random number and uploads, see the random number sampling instruction GetRandomCode.

chapter Five Through Communication protocol

Communication protocol defines the rules between the C2 series modules and PC information exchange. In either UART or USB interface type, have adopted the same set of communication protocols and instruction set. If the PC using a PC, it is recommended to use the USB interface to improve system speed (thanks to USB when uploading multiple grayscale image and fast, and the module can do more use).

5.1 Packet format

Module and PC communication, commands, data, receive and transmit the results, it is carried out in the form of data packets.

Packet Format:

| | | | | | | |
|--------|--------------|--------------------|---------------|--|----------|---------------------|
| Baotou | address code | Package Identifier | Packet length | Package contents (instruction / data / parameters) | Checksum | identification code |
|--------|--------------|--------------------|---------------|--|----------|---------------------|

Packet detailed definition table

| name | symbol | length | Explanation |
|--------------------|--------|---------|---|
| Baotou | START | 2 bytes | Fixed 0xef01, when transferring big endian. |
| address code | ADDR | 4 bytes | The default value 0xffffffff, the user can generate a new address by the instruction. Module will reject an address error packets. When transferring big endian. |
| Package Identifier | PID | 1 byte | 0x01 indicates a command packet (Command packet). |
| | | | 0x02 It indicates a packet (Data packet), and a follow-up package. Data packets can not enter a separate execution process, must follow the instruction packet or a response packet back. |
| | | | 0x07 represents a response packet (ACK packet), you can follow-up packet. |
| | | | 0x08 It represents the last data packet that end packet (EndData packet). |
| Packet length | LENGTH | 2 bytes | A maximum of 256 bytes; packet length refers to the package contents (instruction / data) plus the length of the efficacy and the length (ie, the contents of the packet length +2). Length in bytes, when transferring big endian. |
| Package Content | DATA | - | It may be instructions, data, command parameters, like the answer. (Fingerprint characteristic value, the fingerprint template are data) |
| Checksum | SUM | 2 byte | Package label, the packet length and the cumulative arithmetic content of all bytes and, more than two-byte binary ignored. When transferring big endian. |

5.2 Check with the response packet

Instruction only by the host computer to the module, the module up crew response. The module receives instructions, through the response packet, the implementation of the relevant commands and results will be reported to the host computer. Response contains ginseng Number, and with subsequent packets. PC only after receiving a response packet module to confirm receiving packets and the situation of the implementation of the command module.

The response packet includes a confirmation code byte (must have) and possibly some return parameters.

Confirmation code definition table:

1. 0x00: indicates the instruction is finished or OK;
2. 0x01: indicates the packet reception error;
3. 0x02: that there is no finger on the sensor;
4. 0x03: represents input fingerprint image failed;
5. 0x06: represents the fingerprint image is too messy and not green features;
6. 0x07: represents the fingerprint image is normal, but too few feature points (or too small) feature not born;
7. 0x08: indicates fingerprints do not match;
8. 0x09: indicates no search fingerprint;
9. 0x0a: Merge feature indicates failure;
10. 0x0b: indicates the address number to access the fingerprint database beyond the scope of the fingerprint da
11. 0x0c: indicates a read error or invalid from the fingerprint template library;
12. 0x0d: Upload feature indicates failure;
13. 0x0e: indicates that the module can not accept subsequent data packet;
14. 0x0f: Upload your image indicates failure;
15. 0x10: Delete template indicates failure;
16. 0x11: Empty fingerprint database indicates failure;
17. 0x13: indicates the password is incorrect;
18. 0x15: indicates that no buffer zone is not a valid original picture image is born;
19. 0x18: read and write FLASH indicates an error;
20. 0x1a: Invalid register number;
- twenty 0x20: address code error;
- twenty 0x21: password must be verified;
- twenty 0x22: System Reserved.

Chapter SixoldThe block instruction

C2 Series modules total of 21 instructions. Applications through different combinations of instructions, to achieve a var

All instructions transmission of data are in the form of data packets transmitted. Packet formats and definitions, see

6.1 System class instruction

1) Verify Password VfyPwd

Function: Handshake Password Authentication Module (see 4.6 Module password).

Input parameters:
PassWord return
parameters:
Confirmation code
Instruction code: 0x13

Instruction packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 4 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Password | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0007 | 0x13 | PassWord | Sum |

Response packet format:

| | | | | | |
|---------|----------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Note: The confirmation code = 0x00 represents the correct password verification;

Confirmation code = 0x01
represents income package
is wrong; confirmation

- ★ Instruction packet base package Identity+Packet length(2 bytes)+Instruction code(1 byte)+Password(4 bytes);
- ★ Response packet base package Identity+Packet length(2 bytes)+Confirmation code(1 byte)
- ★ Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- ★ The default module address;"The default password is 000000. "

2) Set the password SetPwd

Function: Handshake password setting module (see 4.6 Module password).

Input parameters:
PassWord return
parameters: Confirm
word instruction
code: 0x12

Instruction packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 4 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Password | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0007 | 0x12 | PassWord | Sum |

Response packet format:

| | | | | |
|---------|----------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x0003 | X | Sum |

NOTE: Confirmation Code = 0x00 indicates OK;

Confirmation code = 0x01 represents income package is wrong;

- * Instruction packet (2 bytes) + Package Identity (4 bytes) + Packet length (2 bytes) + Instruction code (1 byte) + Password (4 bytes);
- * Response packet (2 bytes) + Package Identity (4 bytes) + Packet length (2 bytes) + Confirmation code (1 byte)
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 00000000. "

3) Set the module address SetAdder

Function: Set the module address
(see 4.7 module address). Input
parameters: The new module address
Return parameter: Confirm word
instruction code: 0x15

Instruction packet format:

| | | | | | | |
|---------|-------------------------|------------------|---------------|------------------|------------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 4 bytes | 2 bytes |
| Baotou | Module original address | Package Identity | Packet length | Instruction code | The new module address | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0007 | 0x15 | XXXX | Sum |

Response packet format:

| | | | | | |
|---------|------------------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | The new module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Note: The confirmation code generated address = 0x00 indicates success;

Confirmation code = 0x01 represents income package is wrong;

- * Instruction packet (2 bytes) + Package Identity (4 bytes) + Packet length (2 bytes) + Instruction code (1 byte) + The new module address (4 bytes)
- * Response packet (2 bytes) + Package Identity (4 bytes) + Packet length (2 bytes) + Confirmation code (1 byte)
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 00000000. "

4) Set the basic parameters of the module system SetSysPara

Function: Setting operating parameters
(see 4.4 System configuration
parameters). Input parameters:
Parameter number Return parameter:
Confirm word instruction code: 0x0e

Instruction packet format:

| | | | | | | | |
|---------|---------|--------|---------|--------|--------|--------|---------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 1 byte | 2 bytes |
|---------|---------|--------|---------|--------|--------|--------|---------|

| | | | | | | | |
|--------|----------------|------------------|---------------|------------------|------------|-------------|----------|
| Baotou | Module address | Package Identity | Packet length | Instruction code | Parameters | No. content | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0005 | 0x0e | 4/5/6 | X | Sum |

Response packet format:

| | | | | | |
|---------|----------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

NOTE: Confirmation Code = 0x00 indicates OK;

Confirmation code = 0x01
represents income
package is wrong;
0x01: The register number is incorrect;

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte) + Parameters (N byte) + content (1 byte);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000". "

| name | Parameters | No. | content |
|-------------------------|------------|-----|---|
| Baud Rate | 4 | | 9600 × N bps (N Range: 1 to 12) |
| Security Level | 5 | | Five levels, ranging from: 1,2,3,4,5 |
| Package Contents Length | | | Range: 0,1,2,3, corresponding to the length (number of bytes) were: 32,64,128,256 |

5) Read system parameters ReadSysPara

Function: read the module status registers and basic system configuration parameters (see 4.4 and 4.5 system configuration parameters and system status register).

Input parameters: none
Return parameter: + word confirm the basic parameters of the instruction code: 0x0f

Instruction packet format:

| | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x0f | Sum |

Response packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|-------------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 16 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Basic parameters | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0013 | X | Table structure | Sum |

NOTE: Confirmation Code = 0x00 indicates OK;

Confirmation code = 0x01 represents income package is wrong;

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte);

- * Response packet (checksum+Package Identity+Packet length)+Confirmation code+Basic parameter);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address"; The default password is "000000. "

| name | Description | Offset (word) | Size (word) |
|----------------------------|--|---------------|-------------|
| Status Register | State of the system register contents | 0 | 1 |
| System identification code | Fixed value: 0x0000 | 1 | 1 |
| Fingerprint data base size | Fingerprint storage capacity | 2 | 1 |
| Security Level | Security Level code number (1,2,3,4,5) | 3 | 1 |
| Device Address | 32-bit device address | 4 | 2 |
| Packet size | Packet size codes (0,1,2,3) | 6 | 1 |
| Baud rate setting N | (corresponding to a baud rate of 9600 × N bps) | | 1 |

6) Read fingerprint template index table ReadConList

Function: read module fingerprint template index table, and each read up to 256 fingerprint template of the index table. Input parameters: the index page

0 represents the index page reads 0 to 255 fingerprint templates index table

1 represents the index page reads 256 to 511 fingerprint templates index table

2 represents an index page reads 512 to 767 fingerprint templates on behalf of the index table index on page 3 reads 768 to 1,024 fingerprint templates index

Return parameter: 4 word confirm the fingerprint template index table

Instruction packet format: 0x1f

| | | | | | | |
|---------|--------------|------------------|---------------|------------------|------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes |
| Baotou | Chip address | Package Identity | Packet length | Instruction code | index page | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0004 | 0x1f | 0/1/2/3 | Sum |

Response packet format:

| | | | | | | |
|---------|--------------|------------------|---------------|-------------------|-----------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 32 bytes | 2 bytes |
| Baotou | Chip address | Package Identity | Packet length | Confirmation code | index Table | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0023 | X | Table structure | Sum |

Note: 1. Confirmation code = 0x00 indicates read success index table;

Confirmation code = 0x01 represents income package is wrong;

2, a maximum of 256 fingerprint template read index data, insufficient data complement 256 "0."

3, the index table data structure: every eight to a group, and each output from the peak beginning. Table below:

| | | | | | | | | | |
|--------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|
| Transmission order | High output from the low byte byte order, and each byte output from the peak beginning. | | | | | | | | |
| lowest | Template number | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Significant Byte | Template index table data | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

| | | | | | | | | | |
|--------------------------------|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| The lower two Significant Byte | Template number | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| | Template index table data | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |
| ... | ... | ... | | | | | | | |
| highest Significant Byte | Template number | 255 | 254 | 253 | 252 | 251 | 250 | 249 | 248 |
| | Template index table data | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 | 0/1 |

NOTE: The index table data "0" represents the corresponding position without a valid template; "1" represents the corresponding position with a valid template.

- ★ Instruction packet (2 bytes Package Identity + Packet length (2 bytes) + Instruction code (1 byte) + Index page (1 byte));
- ★ Response packet (2 bytes Package Identity + Packet length (2 bytes) + Confirmation code (1 byte) + Index Table (16 bytes));
- ★ Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- ★ The default module address; The default password is 00000000. "

7) Read valid number template TemplateNum

Function: read the number of fingerprint templates stored in the module. Input parameters: none Return parameter: + word template confirm the number N of the instruction code: 0x1d

Instruction packet format:

| | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x1d | 0x0021 |

Response packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|-------------------|-------------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | The number of templates | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0005 | X | N | Sum |

NOTE: Confirmation Code = 0x00 indicates read success;

Confirmation code = 0x01 represents income package is wrong;

- ★ Instruction packet (2 bytes Package Identity + Packet length (2 bytes) + Instruction code (1 byte));
- ★ Response packet (2 bytes Package Identity + Packet length (2 bytes) + Confirmation code (1 byte) + The number of templates (2 bytes));
- ★ Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- ★ The default module address; The default password is 00000000. "

6.2 Fingerprint processing class instruction

8) Recorded the fingerprint image GenImg

Function: detecting a finger, after detecting the input fingerprint image stored in ImageBuffer, and returns the enter code. If undetectable finger, the finger directly back without confirmation code.

Input parameters:
none Return parameter:
Confirm word

Instruction code: 0x01

Instruction packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x01 | 0x0005 |

Response packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|-------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

NOTE: Confirmation Code = 0x00 indicates successful entry;

Confirmation code = 0x01
 represents income package is
 wrong; confirmation code =
 0x02 means no finger on the
 sensor; confirmation code =
 0x03 indicates successful

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte) + Checksum (2 bytes)
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte) + Checksum (2 bytes)
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000".

9) Upload images Uplmage

Function: the data module in the image buffer ImageBuffer uploaded to the host computer to upload to the host computer (1.1.1Image buffer).

Input parameters: none

Return parameter: Confirm word

Instruction code: 0x0a

Instruction packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x0a | 0x000e |

Response packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|-------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Packets (follow-up package) format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
|---------|----------------|------------------|---------------|-----------------|----------|
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x02 | N + 2 | Image data | Sum |

End packet (no follow-up package) format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
|---------|----------------|------------------|---------------|-----------------|----------|
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x08 | N + 2 | Image data | Sum |

Note: 1, then sends confirmation code = 0x00 indicates subsequent packets;

Confirmation code = 0x01
represents income package is
wrong; that they can not send a

2, sending instruction packet, send data packets or after the end
packet response module, and the data packet and an end packet
without response packet; 3, the number of bytes N package

- * Instruction packet length = Package Identity + Packet length + Instruction code
- * Response packet length = Package Identity + Packet length + Confirmation code
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address; The default password is 000000. "

10) Download image DownImage

Function: PC to download the image data to the module see in the image buffer ImageBuffer (Area).

Input
parameters:
none Return
parameter:
Confirm word

Instruction packet format:
code: 0x0b

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x0b | 0x000f |

Response packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|-------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Packets (follow-up package) format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
|---------|----------------|------------------|---------------|-----------------|----------|
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x02 | N + 2 | Image data | Sum |

End packet (no follow-up package) format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
|---------|----------------|------------------|---------------|-----------------|----------|
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x08 | N + 2 | Image data | Sum |

Note: 1. Confirmation code = 0x00 means that
you can receive the subsequent data packet;
confirmation code = 0x01 represents received
packet is wrong; confirmation code = 0x0e
unable to receive subsequent data packets.

2, sending instruction packet, receive packet after packet or the
end of the module response. 3, the number of bytes N package
content value is determined by the length of the packet contents,
the factory package content length is set to 128 bytes.

- * Instruction packet length = Package Identity + Packet length + Instruction code
- * Response packet length = Package Identity + Packet length + Confirmation code
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;

- * The default module address;"The default password is 00000000. "

11) Image generation feature Img2Tz

Function Description: ImageBuffer original fingerprint image generation feature, or documents stored in CharBuffer1 and CharBuffer2.

Input parameters: BufferID (feature buffer number) Return parameters: Confirm word instruction code: 0x02

Instruction packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|------------------|------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Buffer No. | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0004 | 0x02 | BufferID | Sum |

Note: The buffer CharBuffer1, CharBuffer2 of BufferID are 0x01 and 0x02, if you specify its value, according to CharBuffer2 process.

Response packet format:

| | | | | | |
|---------|----------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

NOTE: Confirmation Code = 0x00 indicates success generating feature;

Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x06 represents a fingerprint image is too messy and not green features; confirmation code = 0x07 represents a fingerprint image is normal, but too few students not feature point feature; confirmation code = 0x15 represents the image buffer area without a valid original picture image not form.

- * Instruction packet (2 bytes+Package Identity+Packet length)+Instruction code+Buffer No. (1 byte);
- * Response packet (2 bytes+Package Identity+Packet length)+Confirmation code
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 00000000. "

12) Feature synthetic template RegModel

Function Description: CharBuffer1 and CharBuffer2 the merge feature to generate a template file, the result in CharBuffer1 and CharBuffer2 (both the same content).

Input parameters: none Return parameter: Confirm word instruction code: 0x05

Instruction packet format:

| | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x05 | 0x0009 |

Response packet format:

| | | | | | |
|---------|---------|--------|---------|--------|---------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|---------|--------|---------|--------|---------|

| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
|--------|----------------|------------------|---------------|-------------------|----------|
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Note: The confirmation code = 0x00 represents a successful merger;

Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x0a merger represents failure (two fingerprints do not belong to the same finger);

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000".

13) Template or upload feature UpChar

Function: the feature buffer CharBuffer1 or CharBuffer2 the signature file uploaded to the host machine. Input parameters: BufferID (buffer number)
Return parameters: Confirm word instruction code: 0x08

Instruction packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|------------------|------------|----------|
| Baotou | Module address | Package Identity | Packet length | Instruction code | Buffer No. | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0004 | 0x08 | BufferID | Sum |

Note: The buffer CharBuffer1, CharBuffer2 of BufferID are 0x01 and 0x02

Response packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|-------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Packets (follow-up package) format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
|---------|----------------|------------------|---------------|-----------------|----------|
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x02 | N + 2 | Template data | Sum |

End packet (no follow-up package) format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
|---------|----------------|------------------|---------------|-----------------|----------|
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x08 | N + 2 | Template data | Sum |

Note: 1. Confirmation code = 0x00 signifies that the following data packets;

Confirmation code = 0x01 represents income package is wrong; confirmation code

= 0x0d represents sending instruction packet, send data packets or after the end packet response module, and the data packet and an end packet without response packet. 3, the number of bytes N package content value is determined by the length of the packet contents, the factory package content length is set to 128 bytes. 4, the

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte) + Good buffer (1 byte);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000".

14) Features or download a Download

Function: PC to download the file to a characteristic feature buffer module.
 Input parameters: BufferID (buffer number) Return parameters: Confirm word instruction code: 0x09

Instruction packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|------------------|------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Buffer No. | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0004 | 0x09 | BufferID | Sum |

Note: The buffer CharBuffer1, CharBuffer2 of BufferID are 0x01 and 0x02

Response packet format:

| | | | | | |
|---------|----------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Packets (follow-up package) format:

| | | | | | |
|---------|----------------|------------------|---------------|-----------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x02 | N + 2 | Template data | Sum |

End packet (no follow-up package) format:

| | | | | | |
|---------|----------------|------------------|---------------|-----------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | N bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Package Content | Checksum |
| 0xef01 | XXXX | 0x08 | N + 2 | Template data | Sum |

Note: 1. Confirmation code = 0x00 means that you can receive the subsequent data packet;

- Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x0e unable to receive subsequent data packet;
- 2. Sending instruction packet, receive packet after packet or the end of the module response.
- 3, the number of bytes N package content value is determined by the length of the packet contents, the fact

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte) + Buffer No. (1 byte);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte)
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000". "

15) Stored template Store

Function: The characteristics specified buffer (CharBuffer1 or CharBuffer2) template data stored FlashFingerprint database specified location.

Input parameters: BufferID (buffer number) + PageID (fingerprint location number, two bytes, high byte first). Return parameter: Confirm word instruction code: 0x06

Instruction packet format:

| | | | | | | | |
|---------|---------|--------|---------|--------|--------|---------|---------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes | 2 bytes |
|---------|---------|--------|---------|--------|--------|---------|---------|

| Baotou | Module address | Package Identity | Packet length | Instruction code | Buffer No. | Position number | Checksum |
|--------|----------------|------------------|---------------|------------------|------------|-----------------|----------|
| 0xef01 | XXXX | 0x01 | 0x0006 | 0x06 | BufferID | PageID | Sum |

Note: The buffer CharBuffer1, CharBuffer2 of BufferID are 0x01 and 0x02

Response packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|-------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Note: The confirmation code = 0x00 represents saved successfully;

Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x0b represents PageID beyond the scope of the fingerprint database; confirmation code= 0x18It indicates a

- * Instruction packet (2 bytes)+Package Identity+Packet length (2 bytes)+Instruction code (1 byte)+Buffer No. (1 byte)+Position number;
- * Response packet (2 bytes)+Package Identity+Packet length (2 bytes)+Confirmation code
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 000000. "

16) Reads the template LoadChar

Function: The specified flash database ID number read into the fingerprint template or stencil buffer CharBuffer1 CharBuffer2.

Input parameters: BufferID (buffer number) + PageID (fingerprint template library number, two bytes, high byte first). Return parameter: Confirm word instruction code: 0x07

Instruction packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes | 2 bytes |
|---------|----------------|------------------|---------------|------------------|------------|-------------|----------|
| Baotou | Module address | Package Identity | Packet length | Instruction code | Buffer No. | page number | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0006 | 0x07 | BufferID | PageID | Sum |

Note: The buffer CharBuffer1, CharBuffer2 of BufferID are 0x01 and 0x02

Response packet format:

| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
|---------|----------------|------------------|---------------|-------------------|----------|
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

NOTE: Confirmation Code = 0x00 indicates read success;

Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x0c indicates read wrong or invalid template; confirmation code = 0x0bShowPageIDBeyond the scope of the

- * Instruction packet (2 bytes)+Package Identity+Packet length (2 bytes)+Instruction code (1 byte)+Buffer No. (2 bytes)+page number(2 bytes);
- * Response packet (2 bytes)+Package Identity+Packet length (2 bytes)+Confirmation code
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 000000. "

17) Remove Template Char

Function Description: Remove module fingerprint database for a specified period (the beginning of the specified II

Input parameters: PageID (fingerprint template library number) + N Delete template number.
Return parameter: Confirm word instruction code: 0x0c

Instruction packet format:

| | | | | | | | |
|---------|----------------|------------------|---------------|------------------|-------------|---------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes | 2 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | page number | Delete number | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0007 | 0x0c | PageID | N | Sum |

Response packet format:

| | | | | | |
|---------|----------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

Note: The confirmation code = 0x00 represents Remove Templates success;

Confirmation code = 0x01 represents income package is wrong; confirmation code

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte) + page number (2 bytes) + Delete number (1 byte);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte)
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "0x00000000"; The default password is "00000000."

18) Empty fingerprint database Empty

Function: Remove all modules in the library fingerprint fingerprint template.

Input parameters: none
Return parameter: Confirm word

Instruction packet format:
code: 0x0d

| | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x0d | 0x0011 |

Response packet format:

| | | | | | |
|---------|----------------|------------------|---------------|-------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0003 | X | Sum |

NOTE: Empty the confirmation code = 0x00 represents success;

Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x11 showing empty failure;

- * Instruction packet (2 bytes) = Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte);
- * Response packet (2 bytes) = Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000". "

19) Exact matching two fingerprint characteristics Match

Function: Module precise alignment CharBuffer1 and CharBuffer2 the profile, and to more than Results.

Input parameters: none
 Return parameter: + word alignment score
 confirmation instruction code: 0x03

Instruction packet format:

| | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x03 | 0x0007 |

Response packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|-------------------|---------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | Score | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0005 | X | XX | Sum |

Note: 1. Confirmation code = 0x00 represents fingerprint matching;

Confirmation code = 0x01 represents income package is wrong; confirmation code = 0x08 indicates After the instruction is executed, two features the buffer contents remain unchanged; fingerprints do not match;

- * Instruction packet (2 bytes) = Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte);
- * Response packet (2 bytes) = Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte) + Score (2 bytes);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address is "00000000"; The default password is "00000000". "

20) Fingerprint search Search

Function: In CharBuffer1 or CharBuffer2 the feature to search the entire document or part of the fingerprint data. Cable to Returns page.

Input parameters: BufferID + StartPage (Home) + PageNum (Page)
 Return parameter: + word confirmation page (matching fingerprint template) Command code: 0x04

Instruction packet format:

| | | | | | | | | |
|---------|----------------|------------------|---------------|------------------|----------------------------|---------|---------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 1 byte | 2 bytes | 2 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Buffer No. | Home | Pages | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0008 | 0x04 | BufferID StartPage PageNum | Sum | | |

Note: The buffer CharBuffer1, CharBuffer2 of BufferID are 0x01 and 0x02

Response packet format:

| | | | | | | | |
|---------|----------------|------------------|---------------|-------------------|--------------|---------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes | 2 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | page number | Score | Checksum |
| 0xef01 | XXXX | 0x07 | 0x007 | X | PageID Match | Score | Sum |

Note: 1. Confirmation code = 0x00 represents searched;

Confirmation code = 0x01
represents income
package is wrong;

2. After this instruction is executed, the buffer contents remain unchanged characteristics.
confirmation code = 0x09
means no search;

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte) + Buffer No. (1 bytes) + parameter (2 bytes) + Home (2 bytes) + Pages (2 bytes);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte) + page number (2 bytes) + Score (2 bytes);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 000000. "

6.3 Other instructions

twenty one) Random seed RandomCode

Function: make chip module generates a random number and returned to the host computer (see 4.8 random number generator). Input parameters: none Return parameter: Confirm word instruction code: 0x14

Instruction packet format:

| | | | | | |
|---------|----------------|------------------|---------------|------------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Instruction code | Checksum |
| 0xef01 | XXXX | 0x01 | 0x0003 | 0x14 | 0x0018 |

Response packet format:

| | | | | | | |
|---------|----------------|------------------|---------------|-------------------|---------------|----------|
| 2 bytes | 4 bytes | 1 byte | 2 bytes | 1 byte | 4 bytes | 2 bytes |
| Baotou | Module address | Package Identity | Packet length | Confirmation code | random number | Checksum |
| 0xef01 | XXXX | 0x07 | 0x0007 | X | XXXX | Sum |

NOTE: Confirmation Code = 0x00 indicates generate success;

Confirmation code = 0x01 represents income package is wrong;

- * Instruction packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Instruction code (1 byte);
- * Response packet (2 bytes) + Package Identity (1 byte) + Packet length (2 bytes) + Confirmation code (1 byte) + random number (4 bytes);
- * Checksum bytes are added, more than two-byte binary ignored when transferring big endian;
- * The default module address;"The default password is 000000. "

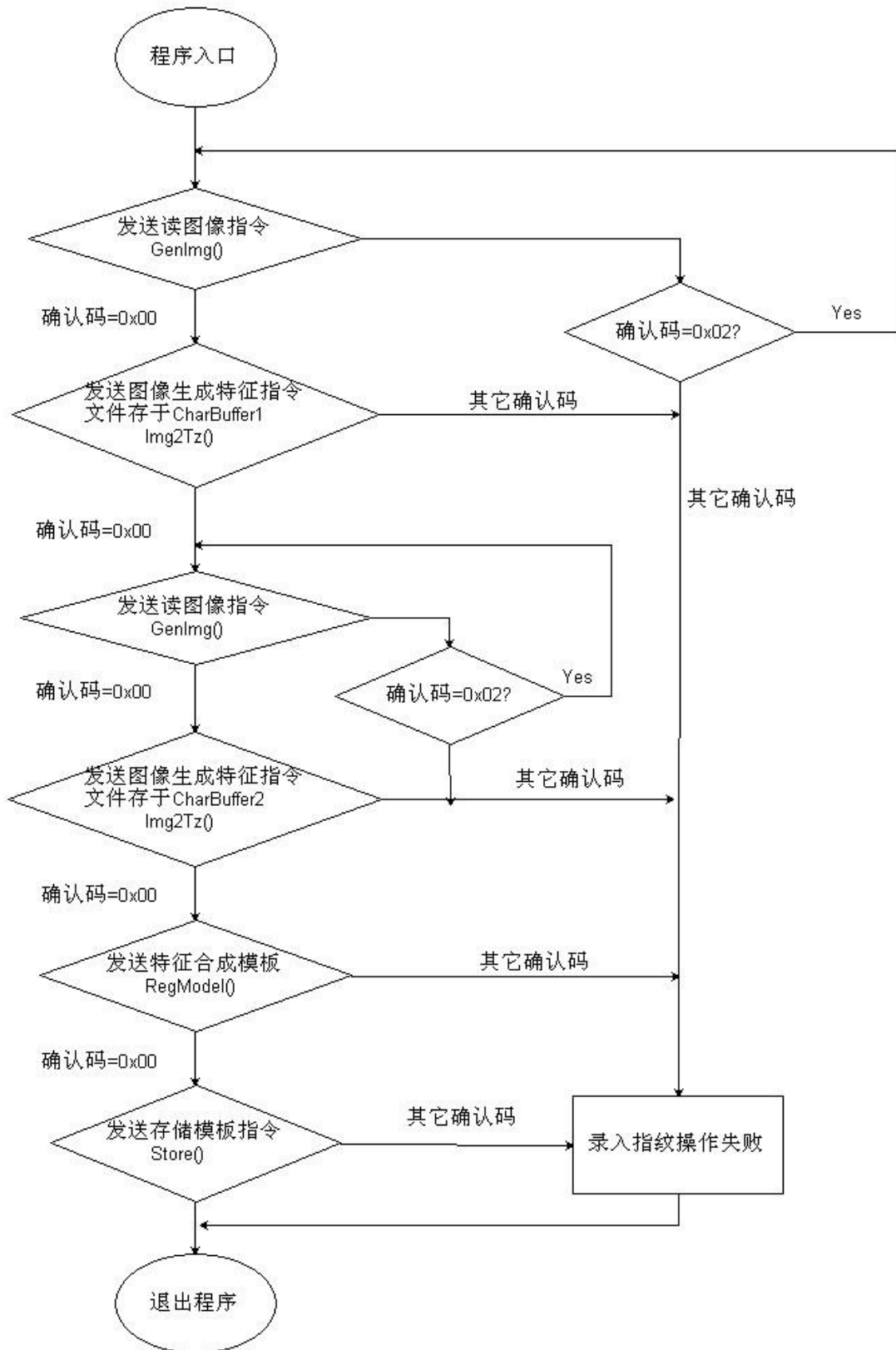


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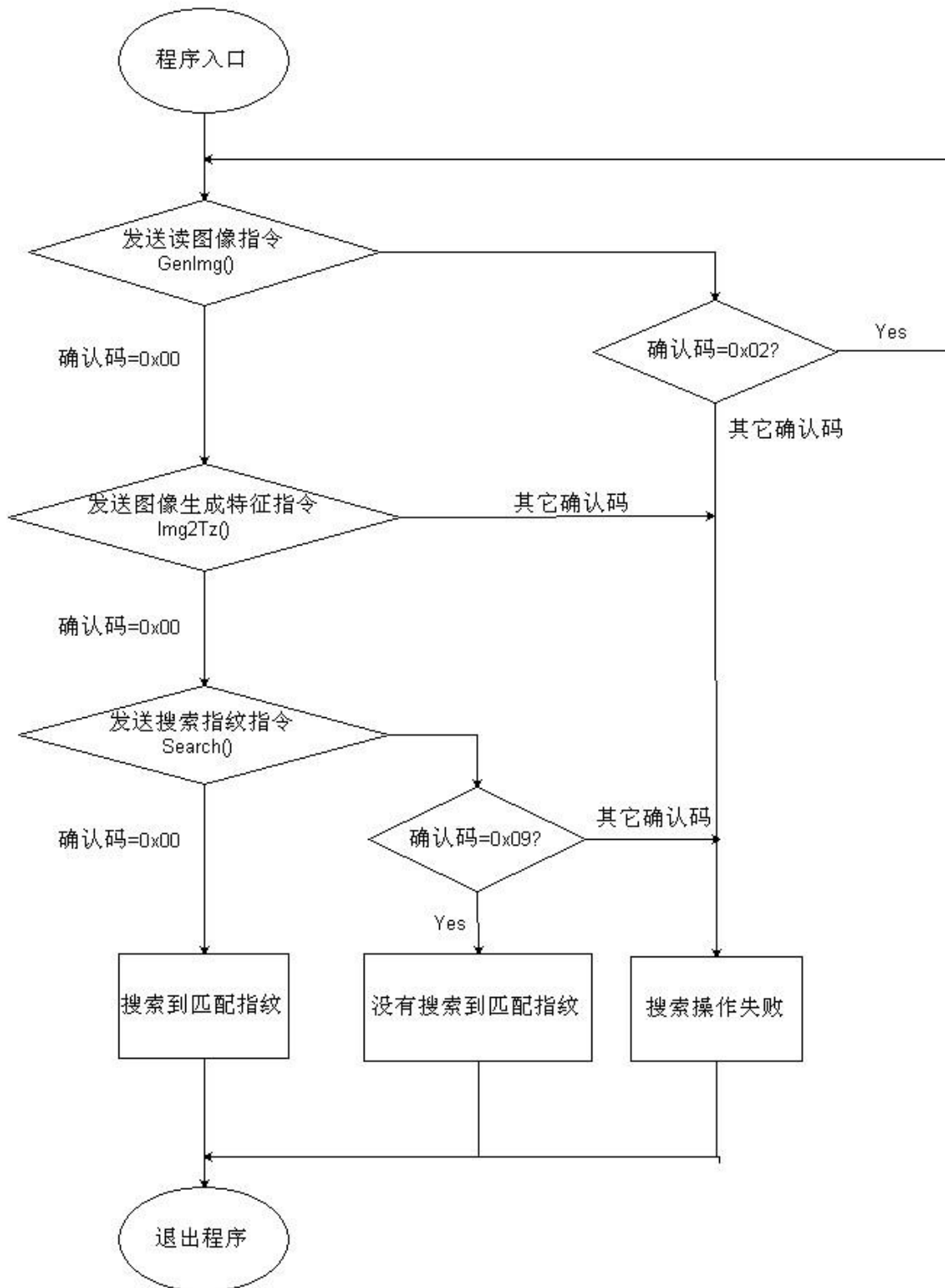
7. Program flow chart



Input fingerprint flowchart



Fingerprint search elements flowchart



6.4 Instruction Set Summary Table

6.4.1 Functional classification

| Types of | No. | generationcode | FeaturesExplanation | Types of | No. | generationcode | FeaturesExplanation |
|-------------------------------|-----|----------------|-----------------------------|---|--------|--------------------|----------------------------|
| system Commission class | 1 | 0x13 | efficacy password | Finger Grain Office index table Reason number class | 13 | 0x08 | upload feature |
| | 2 | 0x12 | set a password | | 14 | 0x09 | Download feature |
| | 3 | 0x15 | Set Address | | 15 | 0x06 | stored template |
| | 4 | 0x0e | set system parameters | | 16 | 0x07 | read-out template |
| | 5 | 0x0f | read system parameters | | 17 | 0x0c | Remove Templates |
| | 6 | 0x1f | read fingerprint template | | 18 | 0x0d | Empty fingerprint database |
| | 7 | 0x1d | read fingerprint template | | 19 | 0x03 | fingerprint match |
| Finger | 8 | 0x01 | recorded fingerprint image | 20 | 0x04 | fingerprint search | |
| Grain | 9 | 0x0a | Upload your image | | | | |
| Office | 10 | 0x0b | download images | its | twenty | 0x04 | random sampling |
| Reason | 11 | 0x02 | image transfer feature | he | | | |
| class | 12 | 0x05 | features synthetic template | class | | | |

6.4.2 Press the instruction code sequence

| generationcode | helpFu Kee | FeaturesExplanation | generationcode | helpFu Kee | FeaturesExplanation |
|----------------|------------------|--------------------------|----------------|---------------|---------------------------------------|
| 0x01 | GenImg | Record fingerprint image | 0x0d | Empty | Empty fingerprint database |
| 0x02 | Img2Tz | Image transfer feature | 0x0e | SetSysPara | Set system parameters |
| 0x03 | Match | Fingerprint matching | 0x0f | ReadSysPara | read system parameters |
| 0x04 | Serach | Search Fingerprint | 0x12 | SetPwd | Set a password |
| 0x05 | RegModel feature | synthetic template | 0x13 | VfyPwd | Efficacy password |
| 0x06 | Store | Templates are stored | 0x14 | GetRandomCode | random sampling |
| 0x07 | LoadChar | read template | 0x15 | SetAdder | Set Address |
| 0x08 | UpChar | Upload feature | 0x1d | TempleteNum | read fingerprint template number |
| 0x09 | DowFMhr | download feature | 0x1f | ReadConList | Read fingerprint template index table |
| 0x0a | UpImage | Upload your image | | | |
| 0x0b | DownImage | download images | | | |
| 0x0c | DeletChar | Remove Templates | | | |

