

FP20 fingerprint recognition
module
Manual
Fingerprint Identification Module
User's Guide
(Ver 1.0)

2014 years 1 January

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I. Overview

FP20 is a fingerprint and fingerprint processor combo chip design fingerprint identification module secondary development, with small size, low power consumption, simple interface, high reliability, small fingerprint template (496 bytes), large capacity fingerprint recognition (2000 Fingerprint response time of less than one second), etc., can be very easy to embed a user's system components to meet customer demand for fingerprint identification products.

Especially with self-learning function, the fingerprint identification process, the latest feature values extracted fingerprint recognition to successful integration of the eigenvalues of the fingerprint database, allowing users in the course of using the more you use, the better.

FP20 module communication interface UART, the control module as a slave device, the master device sends its related commands.

The module has an adjustable level of security features, fingerprint characteristic data read / write functions and 1: N identification and verification functions of 1:1.

The main functions include the following:

- Send and receive commands via UART
- Achieve the minimum storage conditions fingerprint data registration and comparison: 496 bytes fingerprint template
- Optical reflection fingerprint sensor
- 1: N identification and 1:1 verification function
- Compared with circulating collection function (Identify Free): Host HOST after sending the command module has been in fingerprint matching and comparing the results returned HOST
- Fingerprint feature data read / write function
- The security level can be properly adjusted
- Fingerprint and extract eigenvalues upload, download fingerprint feature value and the current collection of fingerprint matching function
(This feature is particularly suitable for the fingerprint stored in the contactless IC card or contactless IC card to verify cardholder)
- The baud rate can be set
- You can set the device number

- You can set a password to access the module (14 digit character password), so that the module is password protected mode, which greatly improves the security of communications.

Application areas:

- Fingerprint Access Control
- Fingerprint attendance, fingerprint attendance machine
- Lock, fingerprint safe, etc.
- Fingerprint POS terminals and other handheld devices

Second, the module hardware description

2.1 Hardware Features

No	Item	Content
1	Model	FP20
2	CPU	AS602
3	Sensor	Optical reflection CMOS image sensor module +
4	Fingerprint image size	242 x 266 (pixel)
5	Input Voltage	DC3.3V ± 10%
6	Current	Less than 100mA
8	Communication	UART

Table 2-1 Hardware Features

2.2 Shape interface definition pictures

2.2.1 Shape pictures

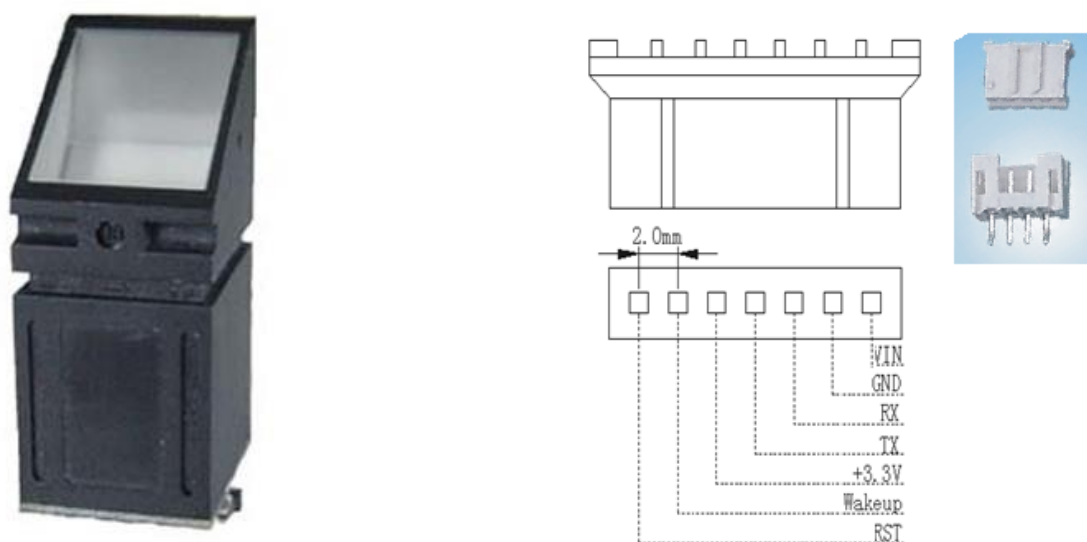
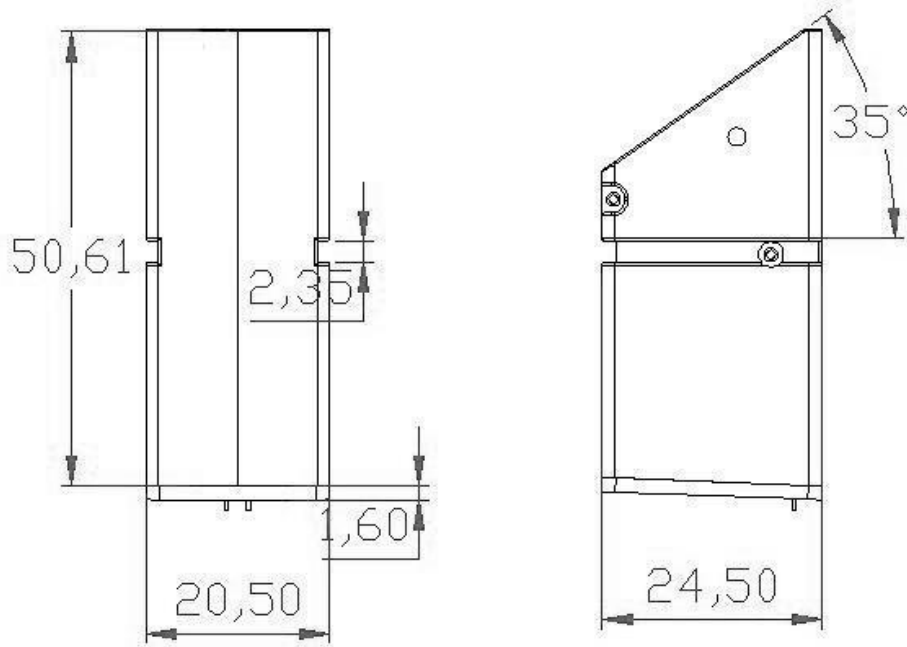


Figure 2-1 FP20 optical fingerprint module interface definition diagram

2.2.2 P F 20 Dimensional Drawings



Third, the technical characteristics of the module

3.1 Technical characteristics

Project	Description	Remark
CPU	CPU: AS602 120MHz clock speed, 1M Bits Flash Memory, 128KB SRAM	
Fingerprint scanner	CMOS image sensors: GC0303, optical reflection principle	
Fingerprint enrollment capacity	500 -5000 pieces scalable, standard configuration for 3000	
False Accept Rate (FAR)	<0.001% (Security Level Security Level 3)	
False Reject Rate (FRR)	<0.1% (Security Level Security Level 3)	
Than on the way	1: N and 1:1 ratio for	
Fingerprint template size	496 bytes Byte	

Security level settings	Level 1 to Level 5 can be set to the factory settings: Level 3	
Processing speed	Fingerprint feature extraction takes time <0.45 seconds	
	1:. N ratio of the time (3000 at full registration) <1 2 seconds	
Communication Interface	UART, 3.3V-TTL level	
Serial communication parameters	No parity Parity = NONE, 1 stop bit Stop B it = 1 No Flow Control Flow Control = NONE Baud rate 9600, 19200, 38400, 57600, 115200 (bps) Factory setting: 115200bps	
Operating Voltage	DC3.3V	
Current	Less than 100mA	
Work Environment	Working temperature: -10 °C - 60 °C	
	Relative Humidity: 20% - 80%	

Table 3-1 SM12/20 module technical characteristics

3.2 Factory settings

Project	The initial value
Security level Security Level (1 ~ 5)	3
Fingerprint timeout Finger Print Time Out (0 ~ 60S)	0 seconds
Baud BaudRate (9600, 19200, 38400, 57600, 115200 BPS)	115200 bps
Repeat fingerprint checks Duplication Check (ON / OFF)	ON

Table 3-2 The factory settings

Fourth, the communication protocol

4.1 Communication process

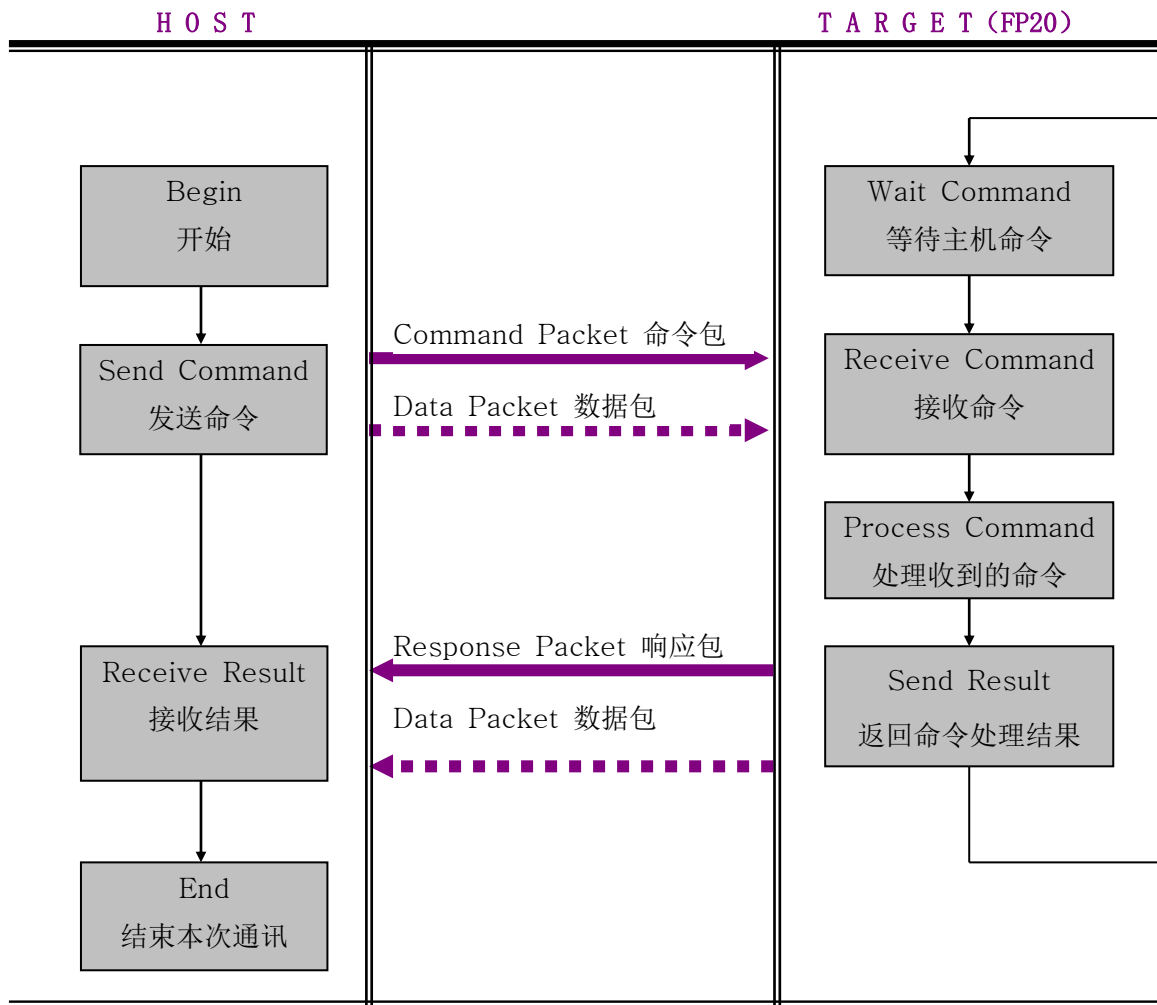


Figure 4-1 Communication Process

Note:

In addition to the communication process FP Cancel command, other commands to send, receive must follow the principle of pitch-catch.

Host when no response is received, please do not send commands to the TARGET.

4.2 communication package Packet Classification

4.2.1 Command Packet Command packet

- Description command packet from Host to Target instruction content.
- All commands sent from the Host, and all packages via the command Command packet transmission.
- Command packet Command packet frame size is **24 bytes bytes**.

4.2.2 The response packet Respon se packet

- Refers to the response packet from Target (SM 12/20) to Host response content.
- The results of all instructions received appropriate treatment after that Response packet to terminate its mission.
- Response packet Response packet length is **24 bytes byte**.

4.2.3 command / response packet Data Packet

- When the command parameters or response data length is greater than **16byte**, use the command / response packet Data Packet data transmission.
- Host is required before sending the packet instructions, use the command packet Command packet instruction packet Data Packet length inform modules T arget
- Command parameters or the corresponding packet maximum length of **512byte**.

4.3 Frame structure of communication package

4.3.1 communications package Packet identification code

Packet communications package beginning of 2byte is a communications package packet type of identifier, which follows in Table 4-1:

Packet classification	Code package class ID
Command packet Command packet	0xAA55
Response packet response packet	0x55AA
Instruction Packet Data Packet	0xA 55A
Response Packet Response Data Packet	0x5AA5

Table 4-1 Packet Identification Code

4.3.2 Command Pack (Command packet) frame structure

PREFIX Packet identifier		CMD Command word		LEN Length		DATA Data				CKS Checksum	
0x55	0xAA	L	H	L	H	D0	D1	...	D15	L	H
0	1	2	3	4	5	6	7	...	21	22	23

OFFSET	FIELD	TYPE	SIZE	DESCRIPTION
0	PREFIX	WORD	2byte	Communication packet identifier Packet Identify code
2	CMD	WORD	2byte	Command code Comm and Code
4	LEN	WORD	2byte (= n, n <17)	Length of the command parameters Length of Command Parameter
6	DATA	Byte array	16byte	Command parameters Command Parameter (Actual data for the n byte)
22	CKS	WORD	2byte	Calibration and Check Sum Calculation method: DATA data from the beginning to the end of PREFIX by byte arithmetic and calculations, the calculated result is a minimum of 2 bytes

Table 4-2 Command packet structure

4.3.3 Response Pack (Response packet) frame structure

PREFIX Packet identifier		RCM Respond to commands		LEN Length		RET Result Code		DATA Data				CKS Checksum	
0xAA	0x55	L	H	L	H	L	H	D0	D1	...	D13	L	H
0	1	2	3	4	5	6	7	8	9	...	21	22	23

OFFSET	FIELD	TYPE	SIZE	DESCRIPTION
0	PREFIX	WORD	2byte	Communication packet identifier Packet Identify code
2	RCM	WORD	2byte	Response code Response Code
4	LEN	WORD	2byte (= n, n <17)	Response packet length: RET and DATA
6	RET	WORD	2byte	Result Code Result Code (0: Success 1: Failed)
8	DATA	Byte array	14byte	Response Data Response Data The actual data for the (n-2) byte
22	CKS	WORD	2byte	Calibration and Check Sum Calculation method: DATA data from the beginning to the end of PREFIX by byte arithmetic and calculations, the calculated result is minimum 2 byte

Table 4 -3 Response packet structure

4.3.4 Frame structure of the command data packet

PREFIX Packet identifier		CMD Command word		LEN Length		DATA Data				CKS Checksum	
0x5A	0xA5	L	H	L	H	D0	D1	...	Dn-1	L	H
0	1	2	3	4	5	6	7	...	6 + n - 1	6 + n	6 + n + 1

OFFSET	FIELD	TYPE	SIZE	DESCRIPTION
0	PREFIX	WORD	2byte	Communication packet identifier Packet Identify code
2	CMD	WORD	2byte	Command Code Command Code
4	LEN	WORD	2byte (= n, n <512)	Length of the command parameters Length of DATA
6	DATA	Byte Array	nbyte	Command parameters Command parameter
6 + n	CKS	WORD	2byte	Calibration and Check Sum Calculation method: DATA data from the beginning to the end of PREFIX by byte arithmetic and calculations, the calculated result is minimum 2 byte

Table 4-4 command data packet structure

Host required instruction packet before sending the first packet transfer command (Command packet), making the module Target enter the command packet reception wait state. In the command packet (Command packet) data field (DATA field), the need to set the length of command data to be transmitted packet.

Host should wait state after receiving confirmation packet transmission instruction module Target command data packet.

4.3.5 response packet (Response data packet) to the frame structure

PREFIX Packet identifier		RCM Response Code		LEN Length		RET Result Code		DATA Data				CKS Checksum	
0xA5	0x 5A	L	H	L	H	L	H	D0	D1	...	Dn-3	L	H
0	1	2	3	4	5	6	7	8	9	...	6 + n-1	6 + n	6 + n +1

OFFSET	FIELD	TYPE	SIZE	DESCRIPTION
0	PREFIX	WORD	2byte	Communication packet identifier Packet Identify code
2	CMD	WORD	2byte	Response Code Response Code
4	LEN	WORD	2byte (= n, n <512)	The resulting data length

				Length of result data (RET + DATA)
6	RET	WORD	2byte	Result code Result code (0: Success 1: Failed)
8	DATA	Byte Array	(N-2) byte	Response Data Response data
6 + n	CKS	WORD	2byte	Calibration and Check Sum Calculation method: DATA data from the beginning to the end of PREFIX by byte arithmetic and calculations, the calculated result is minimum 2 byte

Table 4-5 Response data packet structure

Note: Target transmitted from the module to the Host 14byte above data, the use of response packets (Response data packet)

Fifth, a detailed description of the communication command
Command

5.1 fingerprint feature template (Template Record) data structure

Template Data	Checksum
496 byte	2 byte
Template Data	Data Template Data template followed by byte arithmetic and calculations, Take the results of a minimum 2 byte

Table 5-1 Template Record structure

Note:

Each fingerprint template feature 498 bytes of data: Template Data (496Bytes) + CheckSum (2Bytes)

Table 5.2 Command List Command List

No	Function	Command			Response			
		CMD	LEN	DATA	RCM	LEN	RET	DATA
1	Verify	0x0101	2	Template No.	0x0101	4	0/1	Template No / Error Code
2	Identify	0x0102	0	-	0x0102h	4	0/1	Template No / Error Code
3	Enroll	0x0103	2	Template No.	0x0103	4/6	0/1	Template No / Error Code + Duplication ID
4	Enroll One Time	0x0104	2	Template No.	0x0104	4/6	0/1	Template No / Error Code
5	Clear Template	0x0105	2	Template No.	0x0105	4	0/1	Template No / Error Code
6	Clear All Template	0x0106	0	-	0x0106	4	0/1	Cleared Template Count / Error Code
7	Get Empty ID	0x0107	0	-	0x0107	4	0/1	Template No / Error Code
8	Get Template Status	0x0108	2	Template No.	0x0108	4	0/1	Template Status / Error Code
9	Get Broken Template	0x0109	0	-	0x0109	6	0/1	Broken Template Count + First Broken Template No / Error Code
10	Read Template	0x 010A	2	Template No.	0x 010A	(Template Record Size + 4) or (4)	0/1	Template No + Template Record Data / Error Code
11	Write Template	0x010B	Template Record Size + 2	Template No + Template Record Data	0x010B	4	0/1	Template No / Error Code
12	Set Security Level	0x 010C	2	Security Level Value	0x 010C	4	0/1	Security Level Value / Error Code
13	Get Security Level	0x010D	0	-	0x010D	4	0	Security Level Value

No	Function	Command			Response			
		Command	Length	Content	Response	Length	Content	Response
14	Set Finger Time Out	0x010E	2	Time Out Value	0x010E	4	0/1	TimeOut Value / Error Code
15	Get Finger Time Out	0x 010F	0	-	0x 010F	4	0	TimeOut Value
16	Set Device ID	0x0110	2	Device ID	0x0110	4	0	Device ID
17	Get Device ID	0x0111	0	-	0x0111	4	0/1	Device ID / Error Code
18	Get F / W Version	0x0112	0	-	0x0112	4	0	F / W Version
19	Finger Detect	0x0113	0	-	0x0113	4	0	Detect Result
20	Set BaudRate	0x0114	2	BaudRate Index	0x0114	4	0/1	BaudRate Index / Error Code
21	Set Duplication Check	0x0115	2	Duplication Check Option (1/0)	0x0115	4	0/1	Duplication Check Option / Error Code
22	Get Duplication Check	0x0116	0	-	0x0116	4	0	Duplication Check Option
23	Enter StadbY Mode	0x0117	0	-	0x0117	4	0	-
24	Enroll And Store in RAM	0x0118	0	-	0x0118	4	0/1	0 / ErrorCode
25	Get Enroll Data	0x0119	0	-	0x0119	(Template Record Size + 2) or (4)	0/1	Template Record Data / Error Code
26	Get Feature Data of Captured FP	0x 011A	0	-	0x 011A	(Template Record Size + 2) or (4)	0/1	Template Record Data / Error Code
27	Verify Downloaded Feature with Captured FP	0x011B	Template Record Size	Template Record Data	0x011B	4	0/1	0/Error Code
28	Identify Downloaded Feature with Captured FP	0x 011C	Template Record Size + 2	Index + Template Record Data	0x 011C	4	0/1	0/Error Code
29	Get Device Name	0x0121	0	-	0x0121	16	0/1	"ST020-OEM" / Error Code
30	Sensor LED Control	0x0124	2	0/1	0x0124	4	0	0
31	Identify Free	0x0125	0	-	0x0125	4	0/1	Template No / Error Code
32	Set Device Password	0x0126	14	Password	0x0126	4	0/1	0 / Error Code
33	Verify Device Password	0x0127	14	Password	0x0127	4	0/1	0 / Error Code

No	Function	Command			Response			
34	Get Enroll Count	0x0128	0		0x0128	4	0/1	Enroll Count / Error Code
35	Change Template	0x129	2	Template No	0x129	4/6	0/1	Template No / Error Code + Duplication ID
36	Set Operation Mode	0x011D	2	Operation Mode (1/2)	0x011D	4	0/1	Operation Mode / Error Code
37	Get Operation Mode	0x011E	0	-	0x011E	4	0	Operation Mode
38	FP Cancel	0x0130	0	-	0x0130	2	0	-
39	Test Connection	0x0150	0	-	0x0150	2	0	-
40	Incorrect Command	-	-	-	0x0160	2	0	-

Table 5-2 Command List

Describe 5.3 Command of

5.3.1 fingerprint verification Verify

- [Function]

Specifies the number of fingerprint templates between the current collecting fingerprints 1:1 verification and returns the result.

- [Work Process Sequence]

①, if specified Template number is invalid, it returns an error code ERR_INVALID_TMPL_NO.

②, if the specified number does not exist in the fingerprint Template, error code ERR_TMPL_EMPTY returned.

③, the Time Out time if not detected fingerprint input, then return ERR_TIME_OUT.

④, checks the correctness of the input image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.

⑤, checks the correctness of the input image. If correct, then return GD_NEED_RELEASE_FINGER.

⑥, to compare the results between the Template and returns the input image on the specified number.

- If the match is successful, the fingerprint template DATA No. Template number.

- Otherwise, RET is ERR_FAIL and DATA is ERR_VERIFY.

⑦, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- [Command and Response]

PREFIX	0xAA55	
CMD	0x0101	
LEN	2	
DATA	Template number to be compared to the	
PREFIX	0x55AA	
RCM	0x0101	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: GD_NEED_RELEASE_FINGER or Template number Failed: error code

Table 5-3 Verify command

- [Command examples]

Host sends a command packet:

Fingerprints to be compared with the number 1 1:1 fingerprint verification template

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x01	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x04	0x01

Successful response fingerprint verification module package:

TimeOut time in fingerprints collected after:

First return to left finger (GD_NEED_RELEASE_FINGER) Tips

Then return than the results in the following example:

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x01	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0xF8	0x02
0xAA	0x55	0x01	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x06	0x01

5.3.2 Fingerprint Identify

- [Function]

Be between 1 and collected fingerprints and all current registered fingerprint template: N ratio and return on their results.

- [Working Sequence]

①, 若已 registered Template does not exist, it returns an error code ERR_ALL_TMPL_EMPTY.

②, the Time Out time if not detected fingerprint input, then return ERR_TIME_OUT.

③, check the correctness of the input image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.

④, check the correctness of the input image. If correct, then return GD_NEED_RELEASE_FINGER.

⑤, among all the templates for one registered with the current collected fingerprint template: N ratio and return on their results.

- If the match is successful, it returns ERR_SUCCESS and their numbers.

- Otherwise, the return ERR_FAIL and DATA is ERR_IDENTIFY

⑥, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- [Command and Response]

PREFIX	0xAA55	
CMD	0x0102	
LEN	0	
DATA	Data does not exist	
PREFIX	0x55AA	
RCM	0x0102	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: GD_NEED_RELEASE_FINGER / Template number, Failed: error code

Table 5-4 Identify command

- [Command examples]

Command packet:

Fingerprint

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x02	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x02	0x01

Response packet: to return to left finger (GD_NEED_RELEASE_FINGER) prompt, and then return recognition results

Fingerprint recognition success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x02	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0xF9	0x02
0xAA	0x55	0x02	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x07	0x01

5.3.3 Registration instructions Enroll

- [Function]
 - Fingerprint registration process to get the three temporary template integration, generates a template data storage and registration.
 - In three fingerprint input process, if the temporary template is incorrect, re-enter when the second finger.
 - If the error occurred during synthesis, then again three times a fingerprint input.
- [Working Sequence]
 - ①, if specified Template number is invalid, then return ERR_INVALID_TMPL_NO.
 - ②, if specified Template numbers registered there is another Template, then return ERR_TMPL_NOT_EMPTY.
 - ③, waiting for the return GD_NEED_FIRST_SWEEP said first fingerprint input, check the image input in the Time Out time.
 - ④, if not detected fingerprint input parameters within a set time-out Time Out Time Returns ERR_TIME_OUT.
 - ⑤, check the correctness of the input fingerprint images. If correct, it returns the corresponding error code (ERR_BAD_QUALITY, etc.), and re-enter the corresponding fingerprint wait state.
 - ⑥, if the first input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave the fingers and monitor whether the leave. Ruoyi leave, skip ⑦.
 - ⑦, return GD_NEED_SECOND_SWEEP, said second fingerprint input request, and repeat ④, ⑤.
 - ⑧, if the second input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave and to monitor whether the finger has left, Ruoyi leave, skip ⑨.
 - ⑨, the second fingerprint input if successful, returns GD_NEED_THIRD_SWEEP, fingerprint input request for a third time and repeating ④, ⑤.
 - ⑩, if the third input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave the fingers.
 - ⑪, using three templates have been acquired during the preceding generate a registration template data. If it fails, it returns E RR_GENERALIZE.
 - ⑫, if not set to repeat the fingerprint check Duplication Check, then register the template and return the registration number of the template.
 - ⑬, if set up duplicate checking Duplication Check, with all the templates all templates have been registered for comparison.

- If the same fingerprint, then return the fingerprint template number and ERR_DUPLICATION_ID.
 - If not the same as a fingerprint, the registration of the template data and returns the current number of registered fingerprint template.
- ⑭, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

● [Command and Response Command and Response]

PREFIX		0xAA55
CMD		0x0103
LEN		2
DATA		Number to be registered fingerprint template
PREFIX		0x55AA
RCM		0x0103
LEN		4/6
RET		Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	2byte	Success: GD_NEED_FIRST_SWEEP, GD_NEED_SECOND_SWEEP, GD_NEED_THIRD_SWEEP, GD_NEED_RELEASE_FINGER, Template number of newly registered.
	2byte	Failed: error code 0 or duplicate ID when ERR_DUPLICATION_ID

Table 5-5 Enroll instruction

● [Command examples]

Command packet:

The first one fingerprint registration

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x03	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x06	0x01

Response packet:

The first one successfully registered fingerprints

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x03	0x01	0x04	0x00	0x00	0x00	0xF1	0xFF	...	0x00	0xF7	0x02
0xAA	0x55	0x03	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0xFA	0x02
0xAA	0x55	0x03	0x01	0x04	0x00	0x00	0x00	0xF2	0xFF	...	0x00	0xF8	0x02
0xAA	0x55	0x03	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0xFA	0x02
0xAA	0x55	0x03	0x01	0x04	0x00	0x00	0x00	0xF3	0xFF	...	0x00	0xF9	0x02
0xAA	0x55	0x03	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0xFA	0x02
0xAA	0x55	0x03	0x01	0x06	0x00	0x00	0x00	0x01	0x00	...	0x00	0x0A	0x01

5.3.4 a registration command Enroll One Time

- [Function]

- Only one fingerprint image acquisition is completed registration.

- [Work Process Sequence]

- ①, if the specified template number is invalid, then return ERR_INVALID_TMPL_NO.
- ②, if the specified template number has been registered, the return ERR_TMPL_NOT_EMPTY.
- ③, if not detected in the input fingerprint Time Out Time Returns ERR_TIME_OUT.
- ④, check the correctness of the fingerprint image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.
- ⑤, check the correctness of the fingerprint image. If correct, then return GD_NEED_RELEASE_FINGER.
- ⑥, if not set to repeat the fingerprint check Duplication Check, then register the Template Data template data and return the registration Template template number.
- ⑦, if set to repeat the fingerprint checks Duplication Check, then the template with all the templates have been registered for comparison.
 - If the same fingerprint, then return the fingerprint template Template number and ERR_DUPLICATION_ID.
 - If not the same as a fingerprint, the registration of the Template Data and return the registration Template template number.
- ⑧, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- [Command and Response Command and Response]

PREFIX	0xAA55	
CMD	0x0104	
LEN	2	
DATA	Template number to be registered	
PREFIX	0x55AA	
RCM	0x0104	
LEN	4/6	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: GD_NEED_RELEASE_FINGER / newly registered Template number. Failed: error code
	2byte	0 or duplicate ID NO ERR_DUPLICATION_ID

Table 5-6 Enroll One Time Directive

- [Command examples]

Command packet:

The first one fingerprint registration

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x04	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x07	0x01

Response packet:

The first one successfully registered fingerprints

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x04	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0xFB	0x02
0xAA	0x55	0x04	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x09	0x01

- [Function]

- Delete the specified number of fingerprint templates.

- [Work Process Sequence]

- ①, if the fingerprint template specified number is invalid, then return ERR_INVALID_TMPL_NO.
- ②, if the fingerprint template data template ID specified does not exist, the return ERR_TMPL_EMPTY.
- ③, delete the specified number of template data and return the results.

- [Command and Response Command and Response]

PREFIX	0xAA55
CMD	0x0105
LEN	2

DATA	Template number to be deleted	
PREFIX	0x55AA	
RCM	0x0105	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: Template number has been removed, failed: error code

Table 5-7 Clear Template command

● [Command examples]

Command packet:

Delete the first one fingerprint

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x05	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x08	0x01

Response packet:

Delete the first one fingerprint success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x05	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x0A	0x01

5.3.6 Empty all fingerprint templates Clear All Template

- [Function]
 - Delete all fingerprint template data registered.
- [Working Sequence]
 - Delete all template data registered and returns the result.
- [Command and Response Command and Response]

PREFIX	0xAA55	
CMD	0x0106	
LEN	0	
DATA	Data does not exist	
PREFIX	0x55AA	
RCM	0x0106	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: Number Template deleted, failed: error code

Table 5-8 Clear All Template command

- [Command examples]

Command packet:

Clear all fingerprints

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x06	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x06	0x01

Response packet:

Clear all fingerprints success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x06	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x0B	0x01

5.3.7 obtain fingerprint template can register Get Empty ID number

- [Function]
 - Get fingerprint template numbers can be registered.
- [Work Process Sequence]
 - Finding no registration template first ID number. If there is, it returns the value. Otherwise, it returns ERR_EMPTY_ID_NOEXIST.
- [Command and Response Command and Response]

PREFIX	0xAA55	
CMD	0x0107	
LEN	0	
DATA	Data does not exist	
PREFIX	0x55AA	
RCM	0x0107	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: Template can be registered in the first number, failed: error code

Table 5-9 Get Empty ID command

- [Command examples]

Command packet:

Numbers can be registered to get the fingerprint template

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x07	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x07	0x01

Response packet:

Numbers can be registered fingerprint template to get success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x07	0x01	0x04	0x00	0x00	0x00	0x02	0x00	...	0x00	0x0D	0x01

5.3.8 obtain the status of the specified template ID Get Template Status

- [Function]
 - Returns the number of fingerprint registration status.
- [Working Sequence]
 - If the specified number is already registered Template, then return GD_TEMPLATE_NOT_EMPTY.
Otherwise, the return GD_TEMPLATE_EMPTY.
- [Command and Response Command and Response]

PREFIX	0xAA55	
CMD	0x0108	
LEN	2	
DATA	Template number	
PREFIX	0x55AA	
RCM	0x0108	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: registration status value, failed: error code

Table 5-10 Get Template Status command

- [Command examples]

Command packet:

The first one to get the status of system templates

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x08	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x0B	0x01

Response packet:

The first one to get the status of a successful system templates

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x08	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x0D	0x01

5.3.9 obtain fingerprint template database integrity Get Broken Template

- **[Function]**
 - All registered fingerprint template data checking whether there damaged.
 - Write Flash Memory in the process, due to unexpected power outages and other reasons may damage the fingerprint template database. Host issued the directive at any time, can detect breakage fingerprint template data. For the fingerprint template data is corrupted,
 - You can delete the re-registration.
- **[Working Sequence]**
 - Template check all the damage. If damaged Template exist, it returns the number of corrupted template Template third a corrupted template number (Template number). Otherwise, it returns the number of the template and the second template a number corrupted are "0."
- **[Command and Response]**

PREFIX	0xAA55		
CMD	0x0109		
LEN	0		
DATA	Data does not exist		
PREFIX	0x55AA		
RCM	0x0109		
LEN	6		
RET	Success: ERR_SUCCESS, failed: ERR_FAIL		
DATA	D0, D1	Success: Template number Failed: error code	
	D2, D3	Success: The first number is corrupted Template Failed: 0	

Table 5-11 Get Broke Template command

- **[Command examples]**

Command packet:

Get the fingerprint template database integrity

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x09	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x09	0x01

Response packet:

Being successful fingerprint template database integrity

PREFIX	RCM	LEN	RET	DATA	CKS
--------	-----	-----	-----	------	-----

0xAA	0x55	0x09	0x01	0x06	0x00	0x00	0x00	0x00	0x00	...	0x00	0x0F	0x01
------	------	------	------	------	------	------	------	------	------	-----	------	------	------

5.3.10 reads the specified fingerprint template data Read Template

- [Function]

- Reads the specified number of fingerprint template data Template Record Data and uploaded to Host.

- [Working Sequence]

- ①, if the fingerprint template specified number is invalid, then return ERR_INVALID_TMPL_NO.
- ②, if there is no fingerprint template data template specified number, then return ERR_EMPTY_TMPL.
- ③, using data response packet (Data response packet) to Host data to be received (template ID
Template No + template data Template Record Data) size as the return data transmission.
- ④, use the response packet Response data packet transmission specified number of template data Template Data.

- [Command and Response Command and Response]

PREFIX	0xAA55
CMD	0x 010A
LEN	2
DATA	Template number
PREFIX	0x55AA
RCM	0x 010A
LEN	4
RET	ERR_SUCCESS or ERR_FAIL
DATA	Success: the next data packet Data response packet in response to the data size (Template Record Size + 2) Failed: error code
Success	
PREFIX	0x5AA5
RCM	0x 010A
LEN	Template data size Template Record Size + 4
RET	ERR_SUCCESS
DATA	Template ID Template No (2byte) + Template Data Template Record Data

Table 5-12 Read Template command

- [Command examples]

Command packet:

Read the first one fingerprint template data

PREFIX		CMD		LEN		DATA				C KS	
0x55	0xAA	0x 0A	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x0D	0x01

Response packets and response packets:

Returns the size of the received data, the first one fingerprint template data

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x 0A	0x01	0x04	0x00	0x00	0x00	0xF4	0x01	...	0x00	0x03	0x02
0xA5	0x 5A	0x 0A	0x01	0xF6	0x01	0x00	0x00	0x01	0x00	498 bytes of data		CKS	

5.3.11 fingerprint template data is written to the specified template numbering Write Template

- [Function]

- Receive a fingerprint template data (Template Data) from the Host and write to the specified number.
- Regardless of whether the specified number already exists in the Template, a new fingerprint template data will be written into it.

- [Working Sequence]

Host sends a command packet allows the module into the fingerprint template data receiving state. In the command packet data field (DATA field) is set in the instruction having a length of the next transmission packet.

①, the command module detects the received packet (Command packet) is correct.

- If correct, the error code is returned and the process ends if the data size of the fingerprint template (Template Record Size) is not correct, returns ERR_INVALID_PARAM.
- If correct, the module enters the fingerprint template data reception wait state, transmits a response packet, and the fingerprint template data into the reception waiting state to the Host.

②, if the module is received into the Host Template Record fingerprint template data reception state response packet, sets the fingerprint template and the fingerprint template data ID in the command packet and send to the module.

After ③, command module receives a packet, if the specified number of fingerprint template number is invalid, then return ERR_INVALID_TMPL_NO. Detection has received fingerprint template data checksum (CheckSum of TemplateRecord). If correct, then return ERR_INVALID_PARAM.

④, the data received fingerprint template (Template Data) is written to the specified number.

Note:

It is recommended to use the "template for the specified number of states Get Template Status" command

Checks whether the specified number already exists in the fingerprint data to prevent coverage of existing fingerprint template data.

- [Command and Response Command Response]

Command packet Command Packet		
PREFIX	0xAA55	
CMD	0x010B	
LEN	2	
DATA	Fingerprint template size Template Record Size	
<hr/>		
PREFIX	0x55AA	
RCM	0x010B	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: 0 Failed: error code (ERR_INVALID_PARAM)
<hr/>		
Instruction Packet Data Packet		
PREFIX	0xA 55A	
CMD	0x010B	
LEN	Fingerprint template size Template Record Size + 2	
DATA	Fingerprint template ID Template No (2byte) + Template Record Data	
<hr/>		
PREFIX	0x5AA5	
RCM	0x010B	
LEN	4	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: fingerprint template ID Failed: error code

Table 5-13 Write Template command

- [Command examples]

Command packet:

Given the size of the fingerprint template data

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x0B	0x01	0x02	0x00	0xF2	0x01	.....	0x00	0x00	0x02

Response packets and response packets:

Notify HOST module has entered the fingerprint template data receiving state

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x0B	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x0F	0x01

Instruction packets:

Fingerprint feature data is written number 1 position

PREFIX		CMD		LEN		DATA				CKS		
0x5A	0xA5	0x0B	0x01	0xF4	0x01	0x01	0x00	498 bytes of data				CKS

Response packet:

Write a successful fingerprint feature data

PREFIX		RCM		LEN		RET		DATA		CKS	
0xA5	0x5A	0x0B	0x01	0x04	0x00	0x00	0x00	0x01	0x00	0x10	0x01

5.3.12 Set the security level to identify the command Set Security Level

- [Function]

- Set Security Level Security Level. The effective range can be set to 1-5.

- [Work Process Sequence]

- ①, if the specified Security Level is invalid, then return ERR_INVALID_SEC_VAL.

- ②, setting specifies the Security Level and returns the result.

- [Command and Response Command and Response]

PREFIX	0xAA55
CMD	0x 010C
LEN	2
DATA	The value of the security level Security Level
PREFIX	0x55AA
RCM	0x 010C
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: The Security Level set value failed: error code

Table 5-14 Set Security Level Instruction

- [Corresponding to the security level of recognition accuracy]

Security Level Security Level	Recognition accuracy	
Level 1	False acceptance rate FAR (False Acceptance Rate)	0.01%
	Rejection rate FRR (False Rejection Rate)	0.005%
Level 2	False acceptance rate FAR (False Acceptance Rate)	0.003%
	Rejection rate FRR (False Rejection Rate)	0.01%
Level 3	False acceptance rate FAR (False Acceptance Rate)	0.001%
	Rejection rate FRR (False Rejection Rate)	0.1%
Level 4	False acceptance rate FAR (False Acceptance Rate)	0.0003%
	Rejection rate FRR (False Rejection Rate)	0.5%

	Rate)	
Level 5	False acceptance rate FAR (False Acceptance Rate)	0.0001%
	Rejection rate FRR (False Rejection Rate)	1%

Table 5-15 corresponding to the security level of recognition accuracy

Note:

Security Level Security Level factory setting: 3

- [Command examples]

Command packet:

Set the security level to identify three

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x 0C	0x01	0x02	0x00	0x03	0x00	.....	0x00	0x11	0x01

Response packet:

Set Security Level 3 recognition success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x 0C	0x01	0x04	0x00	0x00	0x00	0x03	0x00	...	0x00	0x13	0x01

5.3.13 Get the security level last set of Get Security Level

- [Function]
 - Returns the value of the current security level Security Level has been set.
- [Working Sequence]
 - Security Level readout value has been set and returns the result.
- [Command and Response Command and Response]

PREFIX	0xAA55
CMD	0x010D
LEN	0
DATA	Data does not exist
<hr/>	
PREFIX	0x55AA
RCM	0x010D
LEN	4
RET	Success: ERR_SUCCESS
DATA	Current value has been set Security Level

Table 5-16 Get Security Level Instruction

- [Command examples]

Command packet:

Access to safe level

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x0D	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x0D	0x01

Response packet:

Get security level success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x0D	0x01	0x04	0x00	0x00	0x00	0x03	0x00	...	0x00	0x14	0x01

5.3.14 Set timeout parameters fingerprint Set Finger Time Out

- [Function]

- Treatment Verify, Identify, Enroll, Enroll One Time, Enroll And Store in RAM, Get Feature Data of Captured FP, Verify Downloaded Feature with Captured FP, when Identify Downloaded Feature with Captured FP, Identify Free and other instructions, set the wait timeout fingerprint limited time.
- Effective range can be set for 0-60 seconds, the default is 5 seconds.

- [Work Process Sequence]

- ①, Time Out if an invalid value is specified, returns ERR_INVALID_TIME_OUT.
- ②, set the Time Out specified value and returns the result.

- [Command and Response]

PREFIX	0xAA55
CMD	0x010E
LEN	2
DATA	Time Out Value
PREFIX	0x55AA
RCM	0x010E
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: Time Out value has been set, failed: error code

Table 5-17 Set Finger Time Out Directive

- [Command examples]

Command packet:

Set timeout parameter 10 seconds fingerprint

PREFIX	CMD	LEN	DATA	CKS
0x55 0xAA	0x0E 0x01	0x02 0x00	0x00 0x00 0x00	0x 0x01 1A

Response packet:

Set timeout parameter 10 seconds fingerprint success

PREFIX	RCM	LEN	RET	DATA	CKS
0xAA 0x55	0x0E 0x01	0x04 0x00	0x00 0x00	0x 0x00 ... 0x00 0A	0x 0x01 1C

5.3.15 Get the current timeout module parameter values Get Finger Time Out

- [Function]
 - Returns the value of the current Time Out has been set.
- [Working Sequence]
 - Read Time Out value has been set and returns the result.
- [Command and Response]

PREFIX	0xAA55
CMD	0x 010F
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x 010F
LEN	4
RET	Success: ERR_SUCCESS
DATA	Currently Time Out value has been set

Table 5-18 Get Finger Time Out Directive

- [Command examples]

Command packet:

Get the current value of the timeout parameter

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x 0F	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x 0F	0x01

Response packet:

Get the current timeout parameter success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x 0F	0x01	0x04	0x00	0x00	0x00	0x05	0x00	...	0x00	0x18	0x01

5.3.16 Set the device ID Set Device ID

- [Function]
 - Set the device number (Device ID). Device No. 1 byte number from 1 to 254.
- [Working Sequence]
 - ①, setting specifies the Device ID and returns the result.
 - ②, if beyond its set range, then return ERR_INVALID_PARAM.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0110
LEN	2
DATA	Device ID
PREFIX	0x55AA
RCM	0x0110
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: set the device number Device ID Failed: 2byte error code

Table 5-19 Set Device ID instruction

- [Command examples]

Command packet:

Set the device number is 1

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x10	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x13	0x01

Response packet:

Set the device number 1 success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x10	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x15	0x01

5.3.17 Get Device ID Get Device ID

- [Function]
 - Returns module configured device number (Device ID). The device number from 1 to 254.
 - The factory setting is: 0
- [Working Sequence]
 - Device ID is read out and returns its result.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0111
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0111
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: the current set of Device ID Failed: error code

Table 5-20 Get Device ID command

- [Command examples]

Command packet:

Get Device ID

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x11	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x11	0x01

Response packet:

Get Device ID success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x11	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x16	0x01

Get firmware version 5.3.18 Get F / W Version

- [Function]
 - Return the device firmware (Firmware) version.
- [Working Sequence]
 - Return to Firmware version information.
- [Command and Response Command and Response]

PREFIX	0xAA55	
CMD	0x0112	
LEN	0	
DATA	Data does not exist	
PREFIX	0x55AA	
RCM	0x0112	
LEN	4	
RET	Success: ERR_SUCCESS	
DATA	D0	The major version number Version Major
	D1	Auxiliary version number Version Minor

Table 5-21 Get F / W Version command

- [Command examples]

Command packet:

Get the firmware version number

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x12	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x12	0x01

Response packet:

Get the firmware version number is 2.9 success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x12	0x01	0x04	0x00	0x00	0x00	0x02	0x09	...	0x00	0x0D	0x01

5.3.19 detect whether there is a fingerprint pressed instruction Finger Detect

- [Function]
 - Detecting the received timing of the instruction whether a fingerprint is pressed and returns its result.
- [Working Sequence]
 - Return receiving appropriate instruction time fingerprint input state.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0113
LEN	0
DATA	Data does not exist
<hr/>	
PREFIX	0x55AA
RCM	0x0113
LEN	4
RET	Success: ERR_SUCCESS
DATA	Fingerprint input state: 1: fingerprint, 0: no fingerprints

Table 5-22 Finger Detect instruction

Note:

- The module sends the former to detect fingerprints (Finger Detect) command, you must first send acquisition backlight control command Sensor LED Control the backlight of the module is turned on, in order to correctly detect whether there is a fingerprint pressed.
- End Finger Detect instructions before sending off the backlight instructions.

- [Command examples]

Command packet:

Detect whether there is a fingerprint Press

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x13	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x13	0x01

Response packet:

Test results: a fingerprint Press

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x13	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x18	0x01

5.3.20 Instruction Set Baudrate set baud rate

- [Function]
 - Set the module communication baud rate (Baudrate) values.
 - After setting the baud rate, before the module is not restarted invalid. Only after Power On Reset or valid.
- [Working Sequence]
 - ①, if specified Baudrate value is invalid, it returns an error code ERR_INVALID_BAUDRATE.
 - ②, setting specifies the Baudrate value and returns the result.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0114
LEN	2
DATA	Baudrate Index 1: 9600bps 2: 19200bps 3: 38400bps 4: 57600bps 5: 115200bps
PREFIX	0x55AA
RCM	0x0114
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: set the Baudrate Index, failed: error code

Table 5-23 Set Baudrate instruction

- [Command examples]

Command packet:

Set baud rate to 9600

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x14	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x17	0x01

Response packet:

Set the baud rate 9600 success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x14	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x19	0x01

5.3.21 Set fingerprint duplicate checking enable / disable Set Duplication Check

- [Function]

- Check the instruction in fingerprint enrollment process (Enroll, Enroll One Time), the fingerprint data if there is duplication.
- If you select the option to allow duplicate checking, processing Enroll, Enroll One Time Directive, the

Returns the corresponding template number and when discovered just registered fingerprint with the fingerprint template library has the same template data

Error code ERR_DUPLICATION_ID.

- [Working Sequence]

- ①, if repetitive inspections specified fingerprint Duplication Check Option option is invalid, then return ERR_INVALID_DUP_VAL.
- ②, setting specifies duplicate fingerprint check option and return the results.

- [Command and Response]

PREFIX	0xAA55
CMD	0x0115
LEN	2
DATA	Repeat fingerprint check option (a check is needed, 0 for no checks)
PREFIX	0x55AA
RCM	0x0115
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: check option has been set, failed: error code

Table 5-24 Set Duplication Check command

- [Command examples]

Command packet:

Set fingerprint checks allow repeat

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x15	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x18	0x01

Response packet:

Set repeat fingerprint checks allow successful

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x15	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x1A	0x01

5.3.22 acquisition module checks the current status of the fingerprint repetition
Get Duplication Check

- [Function]
 - Option returns the current settings of the fingerprint module repetitive inspections (On / Off).
- [Working Sequence]
 - Readout has been set Duplication check option and return the results.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0116
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0116
LEN	4
RET	Success: ERR_SUCCESS
DATA	Check option has been set 1: need to check fingerprints repeat 0: Do not check

Table 5-25 Get Duplication Check command

- [Command examples]

Command packet:

Repeat fingerprint acquisition module checks the current status

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x16	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x16	0x01

Response packet:

Repeat the current fingerprint acquisition module checks the status to allow

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x16	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x1B	0x01

5.3.23 Control Module into standby Enter Standby Mode

- [Function]
 - Target of the module into Sleep mode Standby Mode.
 - Into standby operating current of about 5mA.
- [Working Sequence]
 - Target the module to enter Standby Mode (reduced power state) and returns ERR_SUCCESS.
 - To wake up from sleep state Standby Mode, you must reboot (Reset) module, or Power On.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0117
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0117
LEN	2
RET	ERR_SUCCESS
DATA	-

Table 5-26 Enter Standby Mode command

- **Note: You need to switch the power off before sending the command (Enter Standby Mode), so the module into standby**

- [Command examples]

Command packet:

Set the module into standby

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x17	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x17	0x01

Response packet:

Set the module into standby success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x17	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x0B	0x01

5.3.24 registered fingerprint and scratch in RAM Enroll And Store in RAM

- [Function]

- Fingerprint registration process to get the three temporary template to generate a fingerprint template data integration and staging to **RAM**.
- In the three input process, if temporary template Template is incorrect, re-enter the fingerprints when the times.
- If the error occurred during synthesis, then again three times a fingerprint input.
- Sign in RAM fingerprint feature data can be uploaded to Get Enroll Data Directive Host

- [Work Process Sequence]

- ①, return GD_NEED_FIRST_SWEEP, said first request fingerprint input, and press your finger to check the situation in the Time Out time.
- ②, if not detected in the input fingerprint Time Out Time Returns ERR_TIME_OUT.
- ③, checks the correctness of the input image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.
- ④, if the first input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave the fingers, and to monitor whether the leave. Ruoyi leave, skip ⑤.
- ⑤, return GD_NEED_SECOND_SWEEP, said second fingerprint input request, and repeat ②, ③.
- .
- ⑥, if the second input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave the fingers, and to monitor whether the leave. Ruoyi leave, skip ⑦.
- ⑦, a second fingerprint input if successful, returns GD_NEED_THIRD_SWEEP, fingerprint input request for a third time and repeating ②, ③.
- ⑧, if the third input fingerprint correctly returned GD_NEED_RELEASE_FINGER told to leave the fingers.
- ⑨, has been the use of three templates Template Template Template data fusion to generate a registration. If it fails, it returns ERR_GENERALIZE.
- ⑩, would have been generated by Template Data is saved to RAM and returns 0.
- ⑪, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

● [Command and Response]

PREFIX	0xAA55
CMD	0x0118
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0118
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: GD_NEED_FIRST_SWEEP, GD_NEED_SECOND_SWEEP, GD_NEED_THIRD_SWEEP, GD_NEED_RELEASE_FINGER, 0 Failed: error code

Table 5-27 Enroll And Store In RAM command

● [Command examples]

Command packet:

Sign fingerprint and scratch in RAM

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x18	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x18	0x01

Response packet:

Sign up fingerprints and temporary success in RAM

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0xF1	0xFF	...	0x00	0x0C	0x03
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0x0F	0x03
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0xF2	0xFF	...	0x00	0x0D	0x03
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0x0F	0x03
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0xF3	0xFF	...	0x00	0x0E	0x03
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0x0F	0x03
0xAA	0x55	0x18	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x1C	0x01

5.3.25 Get registered fingerprint template data Get Enroll Data

- [Function]
 - Read utilization Enroll And Store in RAM to RAM command to save the template and upload the data to Host.
 - Before processing the instruction, Host must send Enroll And Store in RAM command.
- [Work Process Sequence]
 - The fingerprint template data stored in RAM using the response packet response packet Response data packet is sent to the Host. (Refer to the instruction Read Template)
- [Command and Response]

P PREFIX	0xAA55
CMD	0x0119
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0119
LEN	4
RET	ERR_SUCCESS or ERR_FAIL
DATA	Success: the next data packet Data Response Packet response data size (Template Record Size), Failed: error code
Success	
PREFIX	0x5AA5
RCM	0x0119
LEN	Fingerprint template size Template Record Size + 2
RET	ERR_SUCCESS
DATA	Template Record Data

Table 5-28 Get Enroll Data Directive

Note:

Must perform Enroll And Store in RAM command.

- [Command examples]

Command packet:

Get registered fingerprint module data

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x19	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x19	0x01

Response packets and response packets:

Returns the size of the received data, temporary storage of fingerprint template data in RAM

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x19	0x01	0x04	0x00	0x00	0x00	0xF2	0x01	...	0x00	0x10	0x02
0xA5	0x5A	0x19	0x01	0xF4	0x01	0x00	0x00	498 bytes of data				CKS	

5.3.26 fingerprint feature extraction and image acquisition value data upload Get Feature Data of Captured FP

- [Function]
 - Extraction of a fingerprint input fingerprint template data generated Template Record Data to the Host.
- [Working Sequence]
 - ①, if not detected in the input fingerprint Time Out Time Returns ERR_TIME_OUT.
 - ②, check the correctness of the fingerprint image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.
 - ③, the fingerprint template data generated by the response packet (Response data packet) sent.
 - ④, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.
- [Command and Response]

PREFIX	0xAA55
CMD	0x 011A
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x 011A
LEN	4
RET	ERROR_SUCCESS or ERR_FAIL
DATA	Success: the next data packet Data Response Packet response data size (Template Record Size), Failed: error code
Success	
PREFIX	0x5AA5
RCM	0x 011A
LEN	Fingerprint template size Template Record Size + 2
RET	ERR_SUCCESS
DATA	Template Record Data

Table 5-29 Get Feature Data of Captured FP instruction

- [Command examples]

Command packet:

Fingerprint image capture and extract data eigenvalues

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	01A	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x1A	0x01

Response packets and response packets:

Returns the size of the received data, fingerprint template data

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x1A	0x01	0x04	0x00	0x00	0x00	0xF2	0x01	...	0x00	0x11	0x02
0xA5	0x5A	0x1A	0x01	0xF4	0x01	0x00	0x00	498 bytes of data				CKS	

5.3.27 download fingerprint feature data and comparison Verify Downloaded Feature With Captured FP

- [Function]

- 1:1 ratio between downstream from the Host Template Data fingerprint template data collected with the current generation of fingerprint template data Template Data.

- [Work Process Sequence]

- ①, Host sends a command packet Command packet makes fingerprint template data into the module Target Template Record data reception wait state. The DATA field of the command packet, the next is set with the length of the command data packet transmitted. If this length is not a Template Record Size Returns ERR_INVALID_PARAM .
- ②, Target in order to inform yourself into Template Record data reception wait state, send Response Packet to Host and enter the Template Record data reception wait state.
- ③, if the Target Host module received data into the fingerprint template Template Record response packet reception wait state Response Packet, the fingerprint template is set in the command data packet and sent to the module.
- ④, Target After receiving instruction packet inspection Template Record Correctness of the data. If correct, then return ERR_INVALID_PARAM . If correct, then enter the fingerprint input wait state.
- ⑤, if not detected in the input fingerprint Time Out Time Returns ERR_TIME_OUT.
- ⑥, checks the correctness of the input image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.
- ⑦, Template Data generated between the receipt of the Template Data with 1:1 ratio and return on their results. If the match is successful, it returns ERR_SUCCESS . Otherwise, it returns ERR_FAIL And ERR_VERIFY .
- ⑧, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- [Command and Response Command and Response]

Command packet Command Packet	
PREFIX	0xAA55
CMD	0x011B
LEN	2
DATA	Template Record Size
PREFIX	0x55AA
RCM	0x011B
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: 0 When failed: error code
Command packet Command Data Packet	
PREFIX	0xA 55A
CMD	0x011B
LEN	Template Record Size
DATA	Template Record Data
PREFIX	0x5AA5
RCM	0x011B
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: 0, failed: error code

Table 5-30 Verify Downloaded Feature With Captured FP instruction

- [Command examples]

Command packet:

Fingerprint template data size

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x1B	0x01	0x02	0x00	0xF2	0x01	.....	0x00	0x10	0x02

Response packets and response packets:

Check the size of the data correctly

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x1B	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x1F	0x01

Instruction packets:

Download fingerprint feature data

PREFIX		CMD		LEN		DATA				CKS	
0x5A	0xA5	0x1B	0x01	0xF2	0x01	498 bytes of data				CKS	

Response packet:

Download fingerprint feature data on the success of the current fingerprint

PREFIX		RCM		LEN		RET		DATA		CKS	
0xA5	0x5A	0x1B	0x01	0x04	0x00	0x00	0x00	0x00	0x00	0x1F	0x01

5.3.28 download two fingerprint templates and comparison Identify Downloaded Feature With Captured FP

- [Function]

- Conduct a fingerprint module receives between two fingerprint template data from the Host Template Data collected with the current generation of fingerprint template Template Data: N matching.

- [Work Process Sequence]

- ①, Host Command packet sent into making the Target Template Record data reception wait state. The DATA field of the command packet, the length of the next transmission has been set to the first instruction data.
- ②, Target Detect Template Record The length of the data. If correct, then return ERR_INVALID_PARAM . If correct, then send Response Packet to Host (said to enter the reception wait state) and enter the first fingerprint template Template Record data reception wait state.
- ③, if the Host Module receives the fingerprint into the fingerprint template Template Record Target data reception wait state response packet Response Packet, the command is set in a data packet (for the first Template Data) and first and send data to the Template Record Target.
- ④, fingerprint module Target after receiving the first packet indicates that the received command status response packet Response packet (Response Code: GD_DOWNLOAD_SUCCESS), and enter the second Template Record data wait state.
- ⑤, if the Target Host has entered the fingerprint module receives the second data reception wait state Template Record response packet Response Packet, 2 is set in the command packet (indicating that the second Template Data), and the second data and Template Record Send to Target.
- ⑥, fingerprint module Target after receiving the second instruction packet enters the fingerprint input wait state.
- ⑦, if not detected in the input fingerprint Time Out Time Returns ERR_TIME_OUT.
- ⑧, checks the correctness of the input image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.
- ⑨, generate and receive between Template Data Template Data conduct two 1: N matching and returns the result. If successful, it returns ERR_SUCCESS . Otherwise, it returns ERR_FAIL And ERR_IDENTIFY .
- ⑩, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- [Command and Response]

Command packet	
PREFIX	0xAA55
CMD	0x 011C
LEN	2
DATA	Template Record Size
<hr/>	
PREFIX	0x 55 AA
CMD	0x 011C
LEN	4
RET	Success : ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: 0, failed: error code (ERR_INVALID_PARAM)
Data packet	
PREFIX	0xA 55A
CMD	0x 011C
LEN	Template Record Data + 2
DATA	Template Index (2Byte) + Template Record Data
<hr/>	
PREFIX	0x55AA
RCM	0x 011C
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: 0, failed: error code

Table 5-31 Identify Downloaded Feature with Captured FP instruction

- [Command examples]

Command packet:

Fingerprint template data size

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x1C	0x01	0x02	0x00	0xF2	0x01	.....	0x00	0x11	0x02

Response packets and response packets:

Check the size of the data correctly

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x1C	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x20	0x01

Instruction packets:

Download the first one fingerprint feature data

PREFIX		CMD		LEN		DATA				CKS	
0x5A	0xA5	0x1C	0x01	0xF4	0x01	0x01	0x00	498 bytes of data			CKS

Response packet:

Download the first success of a fingerprint feature data

PREFIX		RCM		LEN		RET		DATA		CKS	
0xA5	0x5A	0x1C	0x01	0x04	0x00	0x00	0x00	0xA1	0x00	0xC1	0x01

Instruction packets:

Download the first two fingerprint feature data

PREFIX		CMD		LEN		DATA				CKS	
0x5A	0xA5	0x1C	0x01	0xF4	0x01	0x02	0x00	498 bytes of data			CKS

Response packet:

Download two fingerprint characteristic fingerprint comparison with the current success

PREFIX		RCM		LEN		RET		DATA		CKS	
0xA5	0x5A	0x1C	0x01	0x04	0x00	0x00	0x00	0x00	0x00	0x20	0x01

5.3.29 Get Device Name Get Device Name

- [Function]
 - Returns fingerprint module Target device name Device Name. The device name is fixed to "ASO20-OEM-3K".
- [Working Sequence]
 - Return the device name Device Name.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0121
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0121
LEN	16
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	On success: "STO20-OEM", Failure: 2byte error code

Table 5-32 Get Device Name command

- [Command examples]

Command packet:

Get Device ID

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x21	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x21	0x01

Response packet:

Get Device ID success

PREFIX		RCM		LEN		RET		DATA	CKS
0xAA	0x55	0x21	0x01	0x10	0x00	0x00	0x00	ASCII representation of the device name	CKS

5.3.30 fingerprint reader backlight control commands Sensor LED Control

- [Function]
 - Open or close the acquisition backlight.
- [Working Sequence]
 - Parameter is 1: turn on the lights.
 - Parameter to 0: the lights.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0124
LEN	2
DATA	LED status (1: ON, 0: OFF)
PREFIX	0x55AA
RCM	0x0124
LEN	4
RET	Success: ERR_SUCCESS
DATA	0

Table 5-33 Sensor LED Control Directive

- [Command examples]

Command packet:

Open collector backlight

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x24	0x01	0x02	0x00	0x01	0x00	.....	0x00	0x27	0x01

Response packet:

Open collector backlight success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x24	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x28	0x01

5.3.31 Continuous Fingerprint Identify Free

- **[Function]**

- This command allows the module is in circulation fingerprint and fingerprint registered between 1: N matching, and returns the result. Until it receives FpCancel command and returns the results so far.
- Identify the difference between the instruction that is not Finger Timeout time limit,

The loop is executed "→ fingerprint → 1: N matching →" operation until it receives FpCancel instruction so far.

- The Finger TimeOut time not collect fingerprints, return ERR_TIME_OUT, and auto-reload timer after TimeOut continue scanning fingerprint input conditions.

- **[Working Sequence]**

- ①, 若已 registered Template does not exist, it returns an error code ERR_ALL_TMPL_EMPTY.
- ②, have been waiting until the input fingerprint fingerprint input so far.
- ③, check the correctness of the input image. If correct, the corresponding error code (ERR_BAD_QUALITY etc.) is returned.
- ④, check the correctness of the input image. If correct, then return GD_NEED_RELEASE_FINGER.
- ⑤, for comparison between the image and returns its result to the input of all the Template registered. If the match is successful, it returns ERR_SUCCESS and its corresponding template Template number. Otherwise, the return ERR_FAIL and DATA is ERR_IDENTIFY or ERR_NO_RELEASE (by the same finger on the sensor has not left, and identify failures)
- ⑥, repeating steps 2-5 until you receive FPCancel instruction so far.
- ⑦, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- **[Command and Response]**

PREFIX	0xAA55
CMD	0x0125
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0125
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL

DATA	2byte	Success: GD_NEED_RELEASE_FINGER / Template number, Failed: error code
------	-------	--

Table 5-34 Identify Free Instruction

- [Command examples]

Command packet:

Continuous Fingerprint Identification

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x25	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x25	0x01

Response packet:

Continuous fingerprint recognition success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x25	0x01	0x04	0x00	0x00	0x00	0xF4	0xFF	...	0x00	0x1C	0x03
0xAA	0x55	0x25	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x2A	0x01

5.3.32 Set the device communication password Password Set Device Password

- [Function]
 - Set the device communication password, a password is not set to read.
 - The password must be 14byte. If less than 14 bytes, the device will fail to confirm.
 - If the equipment fails to confirm the communication password password, you can not set a new password. Therefore, please note that this command usage.
 - With this instruction set communication password password for device communication when through Verify Device Password Confirm password was used.
 - Password use, please refer to Verify Device Password command.
- [Working Sequence]
 - The 14 bytes bytes of password reset as for the equipment.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0126
LEN	14
DATA	14 byte password
PREFIX	0x55AA
RCM	0x0126
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	0 / error codes

Table 5-35 Set Device Password command

Note:

If you need to cancel the password settings, 14-byte passwords are set to 0x00.

- [Command examples]

Command packet:

Set the device communication password Password

PREFIX		CMD		LEN		DATA	CKS
0x55	0xAA	0x26	0x01	0x0E	0x00	ASCII 14-byte password	CKS

Response packet:

Set the password for the password successfully communications equipment

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x26	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x2A	0x01

5.3.32 Set the device communication password Password Set Device Password

- [Function]
 - Set the device communication password, a password is not set to read.
 - The password must be 14byte. If less than 14 bytes, the device will fail to confirm.
 - If the equipment fails to confirm the communication password password, you can not set a new password. Therefore, please note that this command usage.
 - With this instruction set communication password password for device communication when through Verify Device Password Confirm password is used.
 - Password use, please refer to Verify Device Password command.
- [Work Sequence]
 - The 14 bytes bytes of password reset as for the equipment.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0126
LEN	14
DATA	14 byte password
PREFIX	0x55AA
RCM	0x0126
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	0 / error code

Table 5-35 Set Device Password command

Note:

If you need to cancel the password settings, 14-byte passwords are set to 0x00.

- [Command examples]

Command packet:

Set the device communication password Password

PREFIX		CMD		LEN		DATA	CKS
0x55	0xAA	0x26	0x01	0x0E	0x00	ASCII 14-byte password	CKS

Response packet:

Set the password for the password successfully communications equipment

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x26	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x2A	0x01

5.3.33 Verify that the device communication password Password Verify Device Password

- [Function]

- To compare and confirm the password is correct password is entered between validation and set the device password.
- If the device has not yet set a password, do not carry the device and can be used to confirm all instructions.
- If the device without a password has been set for device password to confirm, then in addition to TestConnection, Verify Device Password for all commands return an error code ERR_NOT_AUTHORIZED.
- To use this module the user password protected mode under way, the first instruction set using the Set Device Password 14 byte password, when you use this module, you must use the Verify Device Password command confirmation before allowing the use of other commands to control the module (otherwise only perform TestConnection, Verify Device Password command)

- [Work Sequence]

- ①, for comparison between the password and the password for the user in the form of input parameters have been set.
- ②, if the password confirmation is successful, the status is set to confirm the status of the device and return ERR_SUCCESS.
- ③, if the password validation fails, the state will be set to a non confirm the status of the device and return ERR_NOT_AUTHORIZED.

- [Command and Response]

PREFIX	0xAA55
C MD	0x0127
LEN	14
DATA	14 byte password
PREFIX	0x55AA
RCM	0x0127
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	0 / ERR_NOT_AUTHORIZED

Table 5-36 Verify Device Password command

- [Command examples]

Command packet:

Verify that the device communication password Password

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x27	0x01	0x0E	0x00	ASCII 14-byte password				CKS	

Response packet:

Verify that the device communication password Password success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x27	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x2B	0x01

5.3.34 Get the total number of registered fingerprints Get Enroll Count

- [Function]
 - Get the total number of the fingerprint data has been registered in the module.
- [Work Sequence]
 - Returns the total number of fingerprint data registered in the module.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0128
LEN	0
DATA	Data does not exist
<hr/>	
PREFIX	0x55AA
RCM	0x0128
LEN	4
RET	Success: ERR_SUCCESS, failed: ERR_FAIL
DATA	Success: Template total currently registered Failed: error code

Table 5-37 Get Enroll Count command

- [Command examples]

Command packet:

Gets the total number of registered fingerprints

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x28	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x28	0x01

Response packet:

Get the total number of registered fingerprints success

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x28	0x01	0x04	0x00	0x00	0x00	0x01	0x00	...	0x00	0x2D	0x01

5.3.3 5 Change Template

- [Function]
 - Fingerprint registration process to get the three temporary template integration, and registration data to generate a template storage.
 - In three fingerprint input process, if the temporary template is incorrect, re-enter when the second finger.

- If the error occurred during synthesis, then again three times a fingerprint input.
 - And Enroll Except that the input is not detected in the presence or absence of the registered ID Template.
- **[Work Sequence]**
 - ①, if specified Template number is invalid, then return ERR_INVALID_TMPL_NO.
 - ②, waiting for the return GD_NEED_FIRST_SWEEP said first fingerprint input, check the image input in the Time Out time.
 - ③, if not detected fingerprint input parameters within a set time-out Time Out Time Returns ERR_TIME_OUT.
 - ④, check the correctness of the input fingerprint images. If correct, it returns the corresponding error code (ERR_BAD_QUALITY, etc.), and re-enter the corresponding fingerprint wait state.
 - ⑤, if for the first time entered the correct fingerprint, finger returns GD_NEED_RELEASE_FINGER told to leave and to monitor whether the leave. Ruoyi leave, skip ⑥.
 - ⑥, return GD_NEED_SECOND_SWEEP, fingerprint input indicates a request for a second time, and repeat ③, ④.
 - ⑦, if the second input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave and to monitor whether the finger has left, Ruoyi leave, skip ⑧.
 - ⑧, return GD_NEED_THIRD_SWEEP, fingerprint input request for a third time and repeating ③, ④.
 - ⑨, if the third input fingerprint is correct, then return GD_NEED_RELEASE_FINGER told to leave the fingers.
 - ⑩, three templates using the aforementioned process of registration has been obtained to generate a template data. If it fails, it returns ERR_GENERALIZE.
 - ⑪, if not set to repeat the fingerprint check Duplication Check, then register the template and return the registration number of the template.
 - ⑫, if set up duplicate checking Duplication Check, with all the templates all templates have been registered for comparison.
 - If the same fingerprint, then return the fingerprint template number and ERR_DUPLICATION_ID.
 - If not the same as a fingerprint, the registration of the template data and returns the current number of registered fingerprint template.
 - ⑬, if received FpCancel instruction, then terminate the command and return ERR_FP_CANCEL.

- [Command and Response]

PREFIX	0xAA55	
CMD	0x01 29	
LEN	2	
DATA	Number to be registered fingerprint template	
PREFIX	0x55AA	
RCM	0x0129	
LEN	4/6	
RET	Success: ERR_SUCCESS, failed: ERR_FAIL	
DATA	2byte	Success: GD_NEED_FIRST_SWEEP, GD_NEED_SECOND_SWEEP, GD_NEED_THIRD_SWEEP, GD_NEED_RELEASE_FINGER, Template number of newly registered.
	2byte	Failed: error code 0 or duplicate ID when ERR_DUPLICATION_ID

5.3.3.6 Set Operation Mode

- **[Function]**

Set work modules.

That set the Access Reader Mode Work, or in Command Mode Work.

- **[Work Sequence]**

① Setting specifies the work and return the results.

② If the specified mode is invalid, then return `ERR_INVALID_OPERATION`.

- **[Command and Response]**

PREFIX	0xAA55
CMD	0x011D
LEN	2
DATA	Work (1 indicates Access Reader Mode, 2 shows the Command Mode)
PREFIX	0x55AA
RCM	0x011D
LEN	4
RET	Success: <code>ERR_SUCCESS</code> , failed: <code>ERR_FAIL</code>
DATA	Success: set work 1: AccessReader Mode 2: Command Mode Failed: error code

5.3.3 7 Get Operation Mode

- [Function]

- ① Returns the current set of working.

- [Work Sequence]

- Get the current set of work and returns its results.

- [Command and Response]

PREFIX	0xAA55
CMD	0x011E
LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x011E
LEN	4
RET	Success: ERR_SUCCESS
DATA	Work set 1: AccessReader Mode 2: Command MOde

5.3.3 8 to cancel the fingerprint operation FP Cancel

- [Function]

- Cancellation instructions about fingerprint collection.
- If the deal Verify, Identify, Enroll, Enroll One Time, Enroll And Store in RAM, Get Feature Data of Captured FP, Verify Downloaded Feature with Captured FP, FP Cancel receive instruction Identify Downloaded Feature with Captured FP instruction, then the moment, suspend the processing of the current instruction and enters the initial state. In the above command response returned ERR_FP_CANCEL, indicates that the instruction has been canceled operations, and for FP Cancel command itself also has the response back ERR_SUCCESS, said the success of these operating instructions to cancel.
- Instruction does not affect other operations.

- [Work Sequence]

After setting the current instruction Unmark flag processing, return ERR_SUCCESS

- [Command and Response]

Table 5-38 FP Cancel command

PREFIX	0xAA55
CMD	0x0130
LEN	0
DATA	Data does not exist
<hr/>	
PREFIX	0x55AA
RCM	0x0130
LEN	4
RET	ERR_SUCCESS
DATA	-

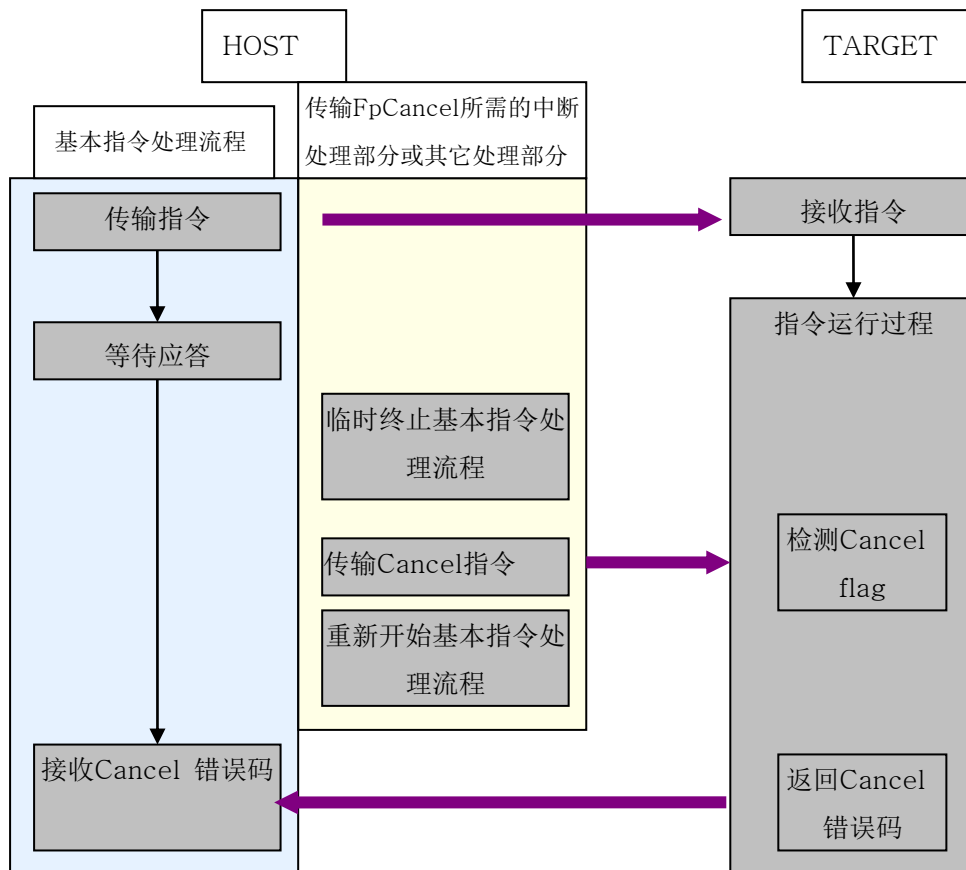


Figure 5-1 FP Cancel Process

- [Command instance a]: Send FP Cancel command when no operation

Command packet:

Cancel the operation command

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x30	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x30	0x01

Response packet:

Successful cancel

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x30	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x34	0x01

- [Command instance two]: Verify, Identify, Enroll, Enroll One Time, Enroll And Store in RAM, Get Feature Data of Captured FP, Verify Downloaded Feature with Captured FP, Identify Downloaded Feature sent FP Cancel instruction with Captured FP instruction

Command

packet:

C

ancel the operation command (Enroll Process)

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x30	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x30	0x01

Response

packet:

C

ancel the successful operation (cancel Enroll)

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x03	0x01	0x04	0x00	0x01	0x00	0x41	0x00	...	0x00	0x49	0x01
0xAA	0x55	0x30	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x34	0x01

5.3.3 9 connection status detection command Test Connection

- [Function]
 - Check the connection status between Target and Host.
 - Host On initial power to send the command to check the connection status of the Target.
- [Work Sequence]
 - If the connection is correct, then return if the connection is correct, then return ERR_SUCCESS.
- [Command and Response]

PREFIX	0xAA55
CMD	0x0150

LEN	0
DATA	Data does not exist
PREFIX	0x55AA
RCM	0x0150
LEN	4
RET	ERR_SUCCESS or ERR_FAIL
DATA	-

Table 5-39 Test Connection instructions

● [Command examples]

Command packet:

Detect connection state

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x50	0x01	0x00	0x00	0x00	0x00	.....	0x00	0x50	0x01

Response packet:

Successful connection

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x50	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x54	0x01

5.3 40 errors command Incorrect Command

- [Function]

- Due to a communication error, error and other reasons, when the fingerprint module received incorrect instructions to Host returns the response packet.

- [Command and Response]

PREFIX	0x55AA
RCM	0x0160
LEN	4
RET	ERR_SUCCESS
DATA	-

Table 5-40 Incorrect Command Instruction

- [Command examples]

Command packet:

Send a wrong instruction

PREFIX		CMD		LEN		DATA				CKS	
0x55	0xAA	0x01	0x00	0x00	0x00	0x00	0x00	.....	0x00	0x00	0x01

Response packet:

Response Error operating instructions

PREFIX		RCM		LEN		RET		DATA				CKS	
0xAA	0x55	0x60	0x01	0x04	0x00	0x00	0x00	0x00	0x00	...	0x00	0x64	0x01

5.4 Precautions

1. In handling Enroll, Enroll One Time, Identify, Verify, Enroll And Store in RAM, Get Feature Data of Captured FP, Verify Downloaded Feature with Captured FP, when Identify Downloaded Feature with Captured FP instruction, the module will automatically open collector backlight. If properly collected fingerprints will automatically turn off the backlight. If not properly collected fingerprints, the acquisition lamp has been lit. Users can also be based on their own needs on / off the backlight. You can use according to their own needs Sensor LED Control command control to open or close the acquisition backlight.
2. The device can be password protected mode to use this module. After the device password is set, if not through the module to enter the password to confirm communication status, you can not use all commands. Use of unauthorized devices is not possible to control the module. Thus, although the module stolen, it can protect the registered fingerprint data, and safer to use the module. If you did not set the device password, you do not have a password confirmation can also be used by all instructions.

VI Appendix

6.1 Response (Response), and error code table

No	Response and Error Codes	Value	Explanation
1	ERR_SUCCESS	0x00	Command processing successfully.
2	ERR_FAIL	0x01	Command processing failed.
3	ERR_VERIFY	0x11	Template specified numbers 1:1 ratio of failure.
4	ERR_IDENTIFY	0x12	Conducted 1: N matching, but the same Template does not exist.
5	ERR_TMPL_EMPTY	0x13	Template registered in the specified number does not exist.
6	ERR_TMPL_NOT_EMPTY	0x14	Template already exists in the specified number.
7	ERR_ALL_TMPL_EMPTY	0x15	Template registered does not exist.
8	ERR_EMPTY_ID_NOEXIST	0x16	May be registered Template ID does not exist.
9	ERR_BROKEN_ID_NOEXIST	0x17	Template absence corrupted.
10	ERR_INVALID_TMPL_DATA	0x18	Specify the Template Data invalid.
11	ERR_DUPLICATION_ID	0x19	The fingerprint has been registered.
12	ERR_BAD_QUALITY	0x21	Fingerprint image quality is not good.
13	ERR_TIME_OUT	0x23	Time Out at the time did not detect the fingerprint input.
14	ERR_NOT_AUTHORIZED	0x24	No device password confirmation. If the device password has been set and there is no use Verify Device Password instruction recognized, in addition to Test Connection, Verify Device Password command all instructions to return the error code. If you do not set the device password, the device is not confirmed by password can also perform all functions.
15	ERR_GENERALIZE	0x30	Registration Template production failures.
16	ERR_FP_CANCEL	0x41	Instruction has been canceled.
17	ERR_INTERNAL	0x50	Internal software error.

18	ERR_MEMORY	0x51	Internal software error.
19	ERR_EXCEPTION	0x52	Internal software error.
20	ERR_INVALID_TMPL_NO	0x60	Template specified number is invalid.
21	ERR_INVALID_SEC_VAL	0x61	Invalid value specified Security Level.
22	ERR_INVALID_TIME_OUT	0x62	Time Out value specified is invalid.
23	ERR_INVALID_BAUDRATE	0x63	Baud Rate value specified is invalid.
24	ERR_INVALID_DUP_VAL	0x65	Duplication Check Option specified value is invalid.
25	ERR_INVALID_PARAM	0x70	An invalid argument.
26	ERR_NO_RELEASE	0x71	During the execution IdentifyFree instruction, Unsuccessful not leave fingerprint identification
27	ERR_INVALID_OPERATION_MODE	0x72	Specify work incorrectly.
28	GD_DOWNLOAD_SUCCESS	0xA1	Template Record data has been received.
29	GD_NEED_FIRST_SWEEP	0xFFF1	The first fingerprint input wait state.
30	GD_NEED_SECOND_SWEEP	0xFFF2	The second fingerprint input wait state.
31	GD_NEED_THIRD_SWEEP	0xFFF3	Third fingerprint input wait state.
32	GD_NEED_RELEASE_FINGER	0xFFF4	Left finger
33	GD_DETECT_FINGER	0x01	Instructions issued FingerDetect moment, has detected a fingerprint input
34	GD_NO_DETECT_FINGER	0x00	FingerDetect instruction issue time, the input fingerprint is not detected
35	GD_TEMPLATE_NOT_EMPTY	0x01	Template is not empty.
36	GD_TEMPLATE_EMPTY	0x00	Template empty.

6.2 Registration and compared to the flowchart

6.2.1 Registration Process Enroll

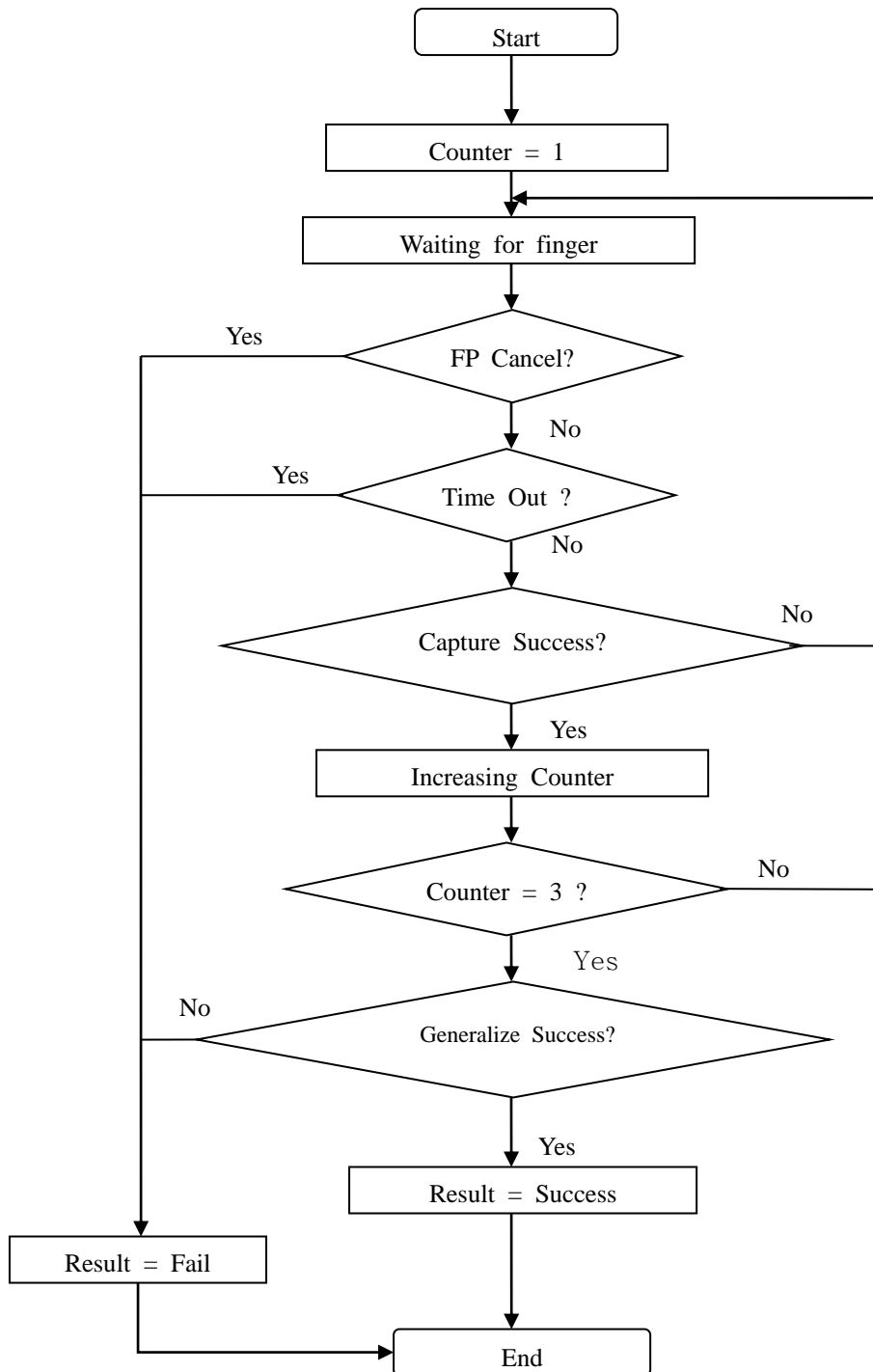


Figure 6-1 Registration Process

6.2.2 verification and identification process Verify & Identify

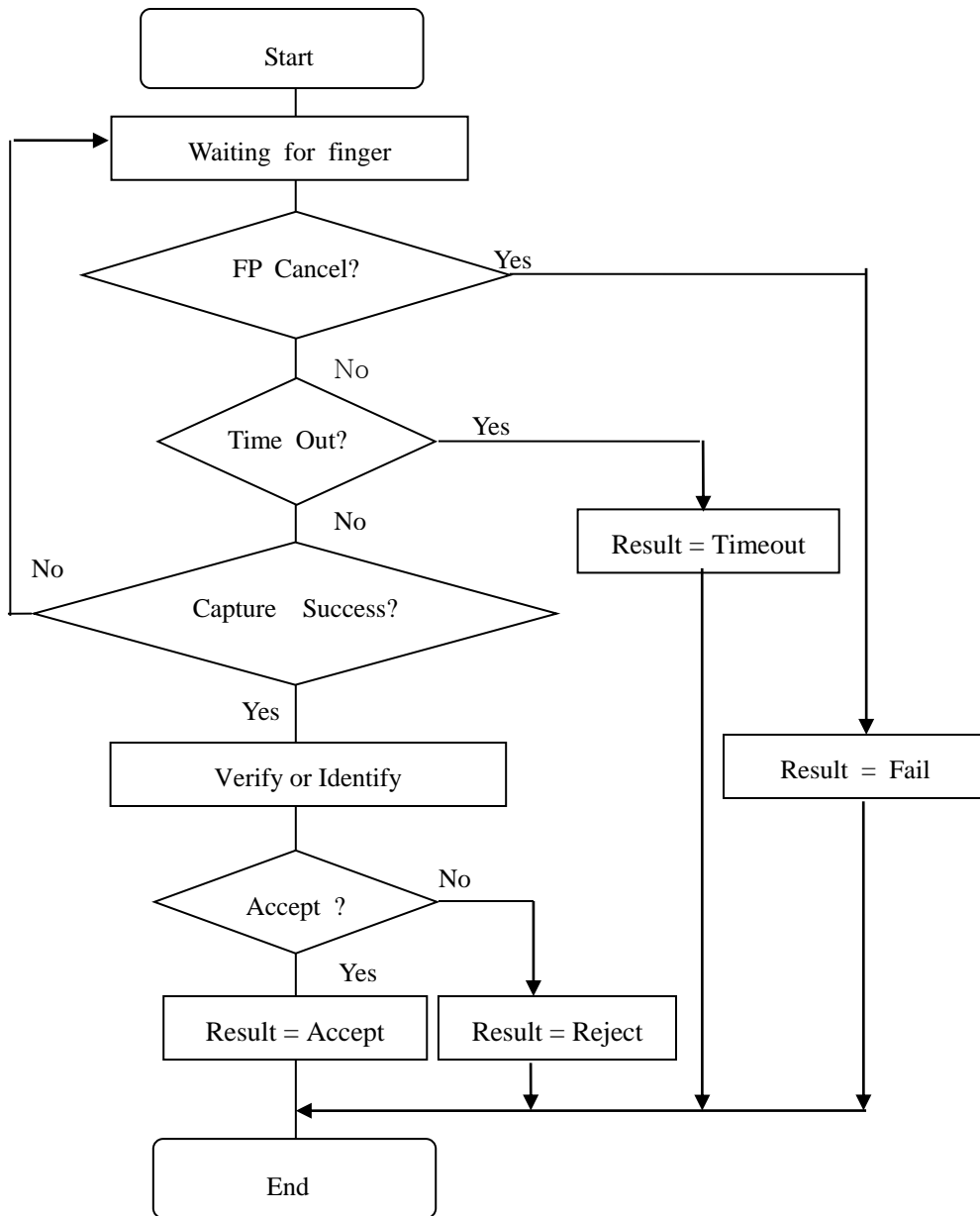


Figure 6-2 Authentication and Identification Process