NITGEN®

RS-232C / LVCMOS serial protocol for Stand-Alone Fingerprint Recognition Device

Protocol Guide

Volume3. Examples

(Supported device: FIM40 Ver. 1.21 or higher,
FIM50 Ver 1.21 or higher,
FIM60 Ver 2.01 or higher)

Version 2.09

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Serial Number:

Specifications can be changed without notice.

Revision Information

Date	Version	Description
2010-05-03	2.0	Release
2010-12-10	2.01	Change Command CMD_DELETE_ALL_FP Add New Command CMD_CTL_IO CMD_CFG_IO Add New Chapter Appendix F
2011-03-21	2.02	Add New Model – FIM5130 New GPIO feature is added – Finger Status Change Command CMD_AUTO_IDENTIFY
2011-04-06	2.03	Add Latent Option – SI_USING_LATENT
2011-05-19	2.04	Change Command CMD_AUTO_IDENTIFY_RESULT
2011-06-27	2.05	Change Description CMD_CHG_EMULMODE (configure only) CMD_CHG_LENGTH_OF_USERID (configure only) SI_LENGTH_OF_USER_ID (read only) SI_EMULATION_MODE (read only)
2011-08-01	2.06	Change Command CMD_GET_TEMPLATE
2011-09-06	2.07	Change Command CMD_GET_DEVICE_INFO (Supported device list) CMD_SET_DEFAULT_SYSINFO (GPIO's default values) CMD_SET_CAPTURE_PERIOD (The unit of tick) CMD_ADD_FP (Description) Change Description FIM40/50 mode → none emulation mode Change Appendix B

		Update commands for each emulation mode. Change Appendix D Description of SI_CAPTURE_TIMEOUT is changed Change Appendix E Typographical and logical errors are fixed
2012-02-24	2.08	Document Renewal Protocol Document is divided into 3 docs Protocol Overview is added Example and Example Condition is added RS232 UART Waveform is added Design alternation
2015-02-23	2.09	Add New Model – FIM60

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1. REGISTRATION

■ NONE Emulation Mode

CMD_REGISTER_MULTI_FP (0x38) should be used in this mode.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x38	0x1	0x0	0x1B	0x0	0x54
	Data	0x31 32 33 34 00 00 00 00 00 00 00 35 36 37 38 00 00 00 00 00 00 00 00 00 00 00 00 00				D-Chksum	0x1A4
Acknowledge	0x7E	0x38	0x1	0x0	0x0	0x0	0x39
Command	0x7E	0x38	0x1	0x2	0x0	0x0	0x3B
Acknowledge	0x7E	0x38	0x1	0x0	0x0	0x0	0x39
Command	0x7E	0x38	0x1	0x10	0x0	0x0	0x49
Acknowledge	0x7E	0x38	0x1	0x0	0x0	0x0	0x39
Command	0x7E	0x38	0x1	0x13	0x0	0x0	0x4C
Acknowledge	0x7E	0x38	0x1	0x2	0x0	0x0	0x3B

Example Condition

Privilege = Master

Registration Type = Using specified ID and Password

LENGTH_OF_FPID = 11

LENGTH_OF_PASSWD = 16

Registered ID = 1234

Registered Password = 5678

Registered Template Count = 2

Total User Count after Registration = 2

Result = Succeeded

FIM20/FIM30 Emulation Mode

CMD_REGISTER_FP (0x33) should be used in these modes.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x33	0x1	0x0	0x1B	0x0	0x4F
	Data	0x31 32 33 34 00 00 00 00 00 00 00 35 36 37 38 00 00 00 00 00 00 00 00 00 00 00 00 00				D-Chksum	0x1A4
Acknowledge	0x7E	0x33	0x1	0x0	0x0	0x0	0x34
Command	0x7E	0x33	0x1	0x1	0x0	0x0	0x35
Acknowledge	0x7E	0x33	0x1	0x2	0x0	0x0	0x36

Example Condition

Privilege = Master

Registration Type = Using specified ID and Password

Template Number = 2

LENGTH_OF_FPID = 11

LENGTH_OF_PASSWD = 16

Registered ID = 1234

Registered Password = 5678

Total User Count after Registration = 2

Result = Succeeded

2. DELETION

■ Delete a single user

CMD_DELETE_FP (0x22) should be used to delete certain user.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x22	0x0	0x0	0xB	0x0	0x2D
	Data	0x31 32 33 34 00 00 00 00 00 00 00				D-Chksum	0xCA
Acknowledge	0x7E	0x22	0x1	0x2	0x0	0x0	0x25

Example Condition

LENGTH_OF_FPID = 11

Deleted ID = 1234

Remained User Count = 2

Result = Succeeded

■ Delete multiple users

CMD_DELETE_ALL_FP (0x23) should be used to delete multiple users at once.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x23	0x0	0x0	0x0	0x0	0x23
Acknowledge	0x7E	0x23	0x1	0x0	0x0	0x0	0x24

Example Condition

Deletion mode = Delete all users

Result = Succeeded

3. VERIFICATION (1:1 Matching)

CMD_VERIFY_FP (0x11) should be used to find a certain user with user's ID.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x11	0x1	0x0	0x1B	0x0	0x2D
	Data	0x31 32 33 34 00 00 00 00 00 00 00 35 36 37 38 00 00 00 00 00 00 00 00 00 00 00 00				D-Chksum	0x1A4
Acknowledge	0x7E	0x11	0x1	0x0	0x0	0x0	0x12

Example Condition

Matching method: Password Matching

LENGTH_OF_FPID = 11

LENGTH_OF_PASSWD = 16

ID = 1234

Password = 5678

Result = Succeeded

4. IDENTIFICATION (1:N Matching)

■ Find a user without ID

CMD_IDENTIFY_FP (0x12) should be used to find a user without ID.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x12	0x1	0x0	0x0	0x0	0x13
Acknowledge	0x7E	0x12	0x1	0x0	0xC	0x0	0x1F
	Data	0x31 32 33 34 00 00 00 00 00 00 00 03				D-Chksum	0xCD

Example Condition

Matching method: User ID and Template Index request

LENGTH_OF_FPID = 11

Template Index = 4th template (0x3)

Matched ID = 1234

Result = Succeeded

Find a user with limited length of ID

CMD_IDENTIFY_RID_FP (0x13) should be used to find a user with limited length of ID.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x13	0x0	0x0	0xB	0x0	0x1E
	Data	0x31 32 2A 2A 00 00 00 00 00 00 00				D-Chksum	0xB7
Acknowledge	0x7E	0x13	0x1	0x0	0xB	0x0	0x1F
	Data	0x31 32 33 34 00 00 00 00 00 00 00				D-Chksum	0xCA

Example Condition

Matching method: User ID request only

LENGTH_OF_FPID = 11

Reduced ID = 12**

Matched ID = 1234

Result = Succeeded

5. INSTANT MATCHING

Instant Matching is a way to find a user by using template data.

Three kinds of Instant Matching are provided: CMD_INSTANT_MATCHING (0x15), CMD_INSTANT_VERIFY (0x18) and CMD_INSTANT_IDENTIFY (0x19).

■ CMD_INSTANT_MATCHING

This command matches template data and scanned fingerprint. 1:1 Matching.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x15	0x0	0x0	0x194	0x0	0xAA
	Data	404 bytes template data (Header 4 byte + Template 400 bytes)				D-Chksum	-
Acknowledge	0x7E	0x15	0x1	0x0	0x0	0x0	0x16

Example Condition

Emulation mode: NONE

Inserted template format: Nitgen format

Result = Succeeded

CMD_INSTANT_VERIFY

This command matches template data and stored user data by using ID. 1:1 Matching.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x18	0x0	0x0	0x19F	0x0	0xAD
	Data	0x31 32 33 34 00 00 00 00 00 00 00 + 404 bytes template data (Header 4 byte + Template 400 bytes)				D-Chksum	-
Acknowledge	0x7E	0x18	0x1	0x0	0x0	0x0	0x19

Example Condition

Emulation mode: NONE

ID: 1234

Inserted template format: Nitgen format

Result = Succeeded

CMD_INSTANT_IDENTIFY

This command matches template data and stored user data without ID. 1:N Matching.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x19	0x1	0x0	0x194	0x0	0xAF
	Data	404 bytes template data (Header 4 byte + Template 400 bytes)				D-Chksum	-
Acknowledge	0x7E	0x19	0x1	0x0	0xC	0x0	0x26
	Data	0x31 32 33 34 00 00 00 00 00 00 00 01				D-Chksum	0xCB

Example Condition

Matching method: User ID and Template Index request

LENGTH_OF_FPID = 11

Template Index = 2nd template (0x1)

Matched ID = 1234

Result = Succeeded

6. GET USER LIST

■ Get a list of whole users

CMD_GET_FP_LIST2 (0x30) should be used to get whole user list.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x30	0x0	0x0	0x0	0x0	0x30
Acknowledge	0x7E	0x30	0x1	0x0	0xF	0x0	0x40
	Data	0x00 01 00 0B 31 32 33 34 00 00 00 00 00 00 00				D-Chksum	0xD6

Example Condition

List Type = User count & ID list

User Count = 1 normal user

LENGTH_OF_FPID = 11

Registered ID = 1234

Result = Succeeded

■ Get a list of masters

CMD_GET_MASTER_LIST2 (0x30) should be used to get master user list.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x31	0x0	0x0	0x0	0x0	0x31
Acknowledge	0x7E	0x31	0x1	0x0	0x4	0x0	0x40
	Data	0x00 00 00 0B				D-Chksum	0x0B

Example Condition

List Type = Master count & ID list

User Count = 1 normal user, no master user

LENGTH_OF_FPID = 11

Result = Succeeded

7. GET IMAGE

CMD_GET_FP_IMAGE2 (0x63) should be used to get a fingerprint image by scanning.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x63	0x0	0x0	0x0	0x0	0x63
Acknowledge	0x7E	0x63	0x1	0x14	0xE88	0x0	0x10E
	Data	3720 bytes image data				D-Chksum	-
Command	0x7E	0x63	0x0	0x1	0x0	0x0	0x64
Acknowledge	0x7E	0x63	0x1	0x114	0xE88	0x0	0x10F
	Data	3720 bytes image data				D-Chksum	-
Transmitting continuously							
Command	0x7E	0x63	0x0	0x13	0x0	0x0	0x76
Acknowledge	0x7E	0x63	0x1	0x1314	0xE88	0x0	0x121
	Data	3720 bytes image data				D-Chksum	-
Command	0x7E	0x63	0x0	0x14	0x0	0x0	0x77
Acknowledge	0x7E	0x63	0x1	0x1414	0xE10	0x0	0xAA
	Data	3600 bytes remained image data				D-Chksum	-

Example Condition

Module Name = FIM4060

Image Size = 78,000 bytes (260 x 300)

Result = Succeeded

8. FIRMWARE UPDATING

CMD_UPGRADE_FIRMWARE2 (0x64) should be used to update firmware.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x64	0x0	0x97	0xC04	0x0	0x10B
	Data	F/W Size (4 bytes) + F/W Data (3072 bytes)				D-Chksum	-
Acknowledge	0x7E	0x64	0x1	0x97	0x0	0x0	0xFC
Command	0x7E	0x64	0x0	0x197	0xC04	0x0	0x10C
	Data	F/W Size (4 bytes) + F/W Data (3072 bytes)				D-Chksum	-
Acknowledge	0x7E	0x64	0x1	0x197	0x0	0x0	0xFD
Transmitting Continuously							
Command	0x7E	0x64	0x0	0x9697	0xC04	0x0	0x1A1
	Data	F/W Size (4 bytes) + F/W Data (3072 bytes)				D-Chksum	-
Acknowledge	0x7E	0x64	0x1	0x9697	0x0	0x0	0x192
Command	0x7E	0x64	0x0	0x9797	0xC04	0x0	0x1A2
	Data	F/W Size (4 bytes) + F/W Data (3072 bytes)				D-Chksum	-
Acknowledge	0x7E	0x64	0x1	0x9797	0x0	0x0	0x193

Example Condition

Source Firmware = FIM5060(V1_20)_B1.bin

Transferred Data Size = 467,552 bytes (= (4 + 3072) * 152)

Transferred Firmware Size = 466,944 bytes (= 3072 * 152)

Firmware Size (Exact firmware size) = 466,172 bytes

Garbage data size = 772 bytes (= Transferred Firmware Size – Firmware Size)

Result = Succeeded

* Garbage data is not processed.

9. DB UPLOADING

CMD_ADD_FP (0x35) should be used to register user DB data.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x35	0x20	0x0	0x1D8	0x0	0x12E
	Data	FIM_MT_DB structure data (472 bytes)				D-Chksum	-
Acknowledge	0x7E	0x35	0x1	0x0	0x0	0x0	0x36

Example Condition

Emulation Mode = NONE

DB Structure Version = FIM_MT_DB

Number of Template in the DB = 1

Template Format = Nitgen format

LENGTH_OF_FPID = 11

Result = Succeeded

* Structure information can be found in the ComProtocol Vol2. ErrorCode & Structures document.

10. DB DOWNLOADING

CMD_GET_FP (0x36) should be used to obtain user DB data from the module.

Example

Packet Type	StartByte	Command	Param1	Param2	DataSize	ErrorCode	H-Chksum
Command	0x7E	0x36	0x0	0x20	0xB	0x0	0x61
	Data	0x31 32 33 34 00 00 00 00 00 00 00				D-Chksum	0xCA
Acknowledge	0x7E	0x36	0x1	0x0	0x1D8	0x0	0x110
	Data	FIM_MT_DB structure data (472 bytes)				D-Chksum	-

Example Condition

Get Operation = FPID DB

Emulation Mode = NONE

LENGTH_OF_FPID = 11

FPID = 1234

DB Structure Version = FIM_MT_DB

Number of Template in the DB = 1

Template Format = Nitgen format

Result = Succeeded

* Structure information can be found in the ComProtocol Vol2. ErrorCode & Structures document.

Appendix A. Support Information

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