



JP Sensor

Sensor with total solution

JP3360 Sensor Module

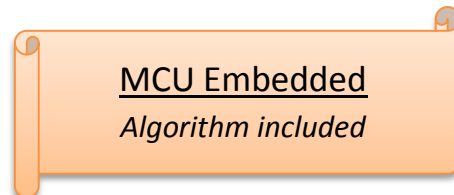


JP3360 is an ultra-thin CMOS fingerprint sensor combined with MCU which can be widely applied in various fields since it is neat and compact. Cermet-like coating provides up to 6H hardness and protects sensor against scratch, impact and daily wear-and-tear.

The JP3360 is an enhanced version since algorithm inside MCU is integrated together with sensor. The highly integrated module can reduce the system complication and be easily applied in various fields. Sensor with total solution is always JP Sensor's commitment.

Features:

- * Cermet-like coating up to 6H
- * USB, UART and GPIO interface
- * 64-bit encrypted security key
- * 15KV ESD protection HBM



Specifications:

Category	Specifications
Resolution	508 DPI
Sensing Area	10 x 10 mm
Sensor Type	Capacitance Type
Capture Area	192 x 192 pixels
Pixel resolution	256 true gray scale values
Security Key	64-bit encrypted
Hardness	6H
Surface	Cermet-like Coating
Power input	3.8V – 7V
Anti-ESD	+/-15kV
Operating temperature	-20~60 °C / < RH 90%
Storage temperature	-20 ~ 85 °C
Module Dimension	20.4 x 33.4 x 4.75 mm (W x L x T)
Weight	3.3 gram
Internal Flash	32 USER_ID (3 templates for each)
Interface	USB, UART, GPIO
Package type	8 pin, 1mm pitch FPC connector Micro USB connector
Certification	

Parameters:

Item	Description	Remarks
CPU	CPU: ATMEL SAMG55G19A/WLCSP49, Core: Cortex-M4 120 MHz, 160Kbytes SRAM, 512Kbytes Flash	
Sensor	Capacitance type JP2050S	
User ID number	UART mode: 32 ID GPIO mode: 32 ID	
Anti-ESD	+/-15kV	
Wear-and-tear	>2.5 million finger placements	
Resolution	508 DPI	
FAR	<0.01% (Security Level 3)	
FRR	<1% (Security Level 3)	
Authentication	Verify (1:1) or Identify (1:N)	
Template storage size	800 byte each	
Security level	Level 1 – Level 7	Default: Level 3
Processing time	UART mode: Extraction: 342ms Identification (1:N): 500ms GPIO mode: Extraction: 342ms Identification (1:N): 500ms	
Serial interface setting	Parity = None, Stop bit = 1, Baud rate = from 9600 to 115200 bps	default 9600 bps
Voltage	USB 5Volts DC 7 Volts (Max)	
Current	UART mode: Current in Enroll / Verify: 34mA (Max) Current in Standby: 14mA (Max) GPIO mode: Current in Enroll / Verify: 34mA (Max) Current in Standby: 14mA (Max)	
Operating temperature	-20~60 °C / < RH 90%	

Important!!

Avoid grounded surfaces or conductive material nearby the frame of the sensor module.

Contents:

1.	Revision history	5
2.	Pinouts and Pin description	6
3.	Electrical characteristics	9
4.	UART Software command	10
	4-1. General information.....	10
	4-2. Serial interface settings.....	10
	4-3. Command structure	10
	4-4. Response structure	11
	4-5. Table of commands	11
	4-6. Table of response code	12
5.	UART Command description	13
	5-1. ENROLL	13
	5-2. VERIFY_FLASH	13
	5-3. IDENTIFY_FLASH.....	14
	5-4. CAPTURE_IMAGE	14
	5-5. UPLOAD_IMAGE.....	15
	5-6. SAVE_TEMPLATE.....	15
	5-7. UPLOAD_TEMPLATE_FLASH.....	16
	5-8. DOWNLOAD_TEMPLATE_FLASH	16
	5-9. DELETE_TEMPLATE_FLASH.....	17
	5-10. DELETE_ALL_FLASH	17
	5-11. GET_USER_ID	18
	5-12. CHECK_IF_ENROLLED	18
	5-13. READ_FIRMWARE	19
	5-14. SET_BAUDRATE	19
	5-15. SET_FAR	20
	5-16. READ_FAR.....	20
6.	USB Software command	21
	6-1. USB SCSI user command	21
	6-2. SCSI command sequence	21
	6-3. Command structure	22
	6-4. Response structure	22
	6-5. Table of commands	23
	6-6. Table of response code	23
7.	USB Command description	24
	7-1. ENROLL START	24
	7-2. ENROLL 1	24

7-3. ENROLL 2	25
7-4. ENROLL 3	25
7-5. VERIFY 1:1.....	26
7-6. IDENTIFY	26
7-7. CAPTURE IMAGE	27
7-8. UPLOAD_IMAGE.....	27
7-9. DELETE_TEMPLATE	28
7-10. DELETE_ALL	28
7-11. GET_USER_ID	29
7-12. CHECK_IF_ENROLLED	29
7-13. READ_FIRMWARE	30
7-14. Check SCSI connect	30
7-15. SET_FAR.....	31
7-16. READ_FAR.....	31
8. PC software.....	32
8-1. Device Setting.....	32
8-2. Software UI Overview	32
8-3. Communication Information	33
8-4. Enroll.....	33
8-5. Verify.....	33
8-6. Single Identify.....	33
8-7. Continuously Identify/ Cancel	33
8-8. Get Image	33
8-9. Delete Single ID	34
8-10. Delete All IDs.....	34
9. Mechanical properties	35
9-1. Part drawing	35
9-2. Ultra-thin flex connector.....	36
9-3. Mating flex cable.....	37
10. Order information	38
10-1. Production codes	38
10-2. Package information	38
11. Application Note.....	40
11-1. Module integration	40
11-2. JP3360 Guideline for Locker application	41
11-3. FAQ.....	43
12. Disclaimer	44

1. Revision history

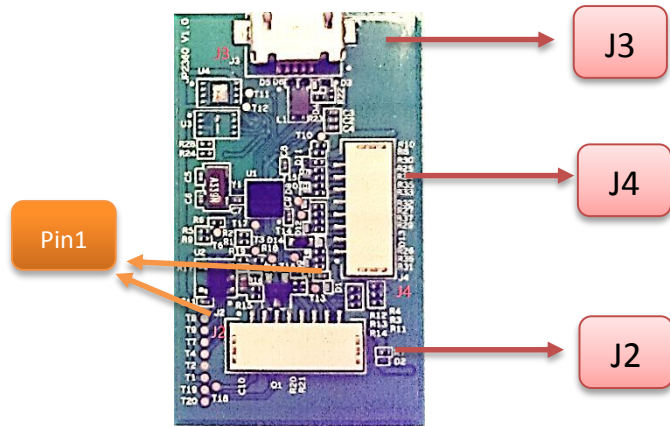
Date	Revision #	Description	Total Page
May 13, 2016	1.0.0	Preliminary release	32
May 16, 2016	1.0.0	Add parameter on p2	33
Jul 12, 2016	1.0.1	Add USB command on CH6-7	43
Aug 25, 2016	1.0.2	Adjustable FAR level 1-7 Operating temp. -20~60 °C	45

2. Pinouts and Pin description

Pinouts



(Top view)



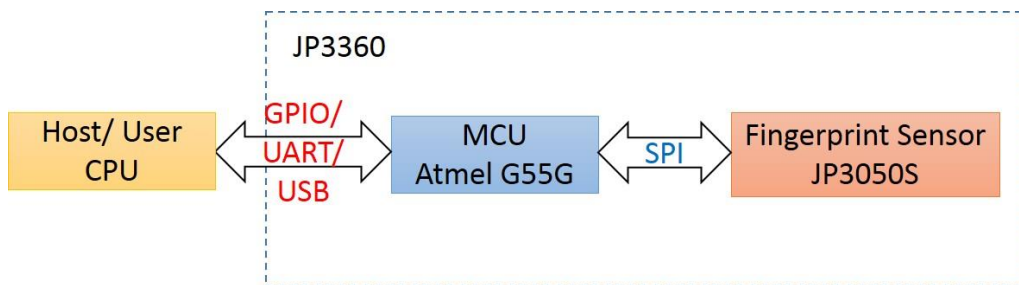
(Bottom view)

Notes:

1. J3 is a Micro-USB Connector.
2. J2, J4 are 8 pins 1.0mm pitch FPC connectors.

Type 1: For general application, only J4 exists and only UART interface is implemented.

Type 2: For locker application, J2, J4 exist and the dedicated interface are implemented.



Pin description

Type 1 UART mode (For General Application)

UART/Power Port (J4, 8 Pin FPC Connector)

PIN NUMBER	PIN DEFINITION	ATTRIBUTE	DESCRIPTION
1	-	-	NC, Reserved For Use.
2	5V	Power	Power In
3	UART TX	Output	UART TX
4	-	-	NC, Reserved For Use.
5	Ground	Power	Ground
6	-	-	NC, Reserved For Use.
7	-	-	NC, Reserved For Use.
8	UART RX	Input	UART RX

Micro USB Port (J3)

PIN NUMBER	PIN DEFINITION	ATTRIBUTE	DESCRIPTION
1	VCC	Power	5V
2	D-	I/O	Data Minus
3	D+	I/O	Data Plus
4	ID	NC	Device Only
5	Ground	Power	Ground

Type 2 GPIO mode (For Locker Application)**IO/Power Port (J4, 8 Pin FPC Connector)**

PIN NUMBER	PIN DEFINITION	ATTRIBUTE	DESCRIPTION
1	Enroll	Input	Up to 3.3V.
2	Battery Power	Power	Up to 7V.
3	-	-	NC
4	Delete	Input	Up to 3.3V.
5	Ground	Power	Ground
6	DC Motor	Output	Driving Control Signal
7	Position Detection	Input	NC, Reserved For Use.
8	-	-	NC

USB/IO/Power Port (J2, 8 Pin FPC Connector)

PIN NUMBER	PIN DEFINITION	ATTRIBUTE	DESCRIPTION
1	VCC	Power	USB 5V Power Input
2	D-	I/O	Data Minus
3	D+	I/O	Data Plus
4	Ground	Power	Ground
5	LED R	Output @1mA	Driving Red LED
6	LED G	Output @1mA	Driving Green LED
7	Buzzer	Output	Driving Buzzer
8	Power On	Input	Turn on Internal Regulator.

Micro USB Port (J3)

PIN NUMBER	PIN DEFINITION	ATTRIBUTE	DESCRIPTION
1	VCC	Power	5V
2	D-	Input	Data Minus
3	D+	I/O	Data Plus
4	ID	NC	Device Only
5	Ground	Power	Ground

3. Electrical characteristics

Voltage characteristics

SYMBOL	DESCRIPTION	MIN	TYP	MAX	UNIT
V _{CC}	USB Power		5		V
V _{Bat}	Battery Power			7	V

Current characteristics (Power consumption in different mode)

SYMBOL	DESCRIPTION	MIN	TYP	MAX	UNIT
I _{Ustby}	USB standby current (UART/GPIO mode)			14	mA
I _{vy}	Current in Enroll/Verify (UART/GPIO mode)			34	mA
I _{cap}	Current during Image capture (UART/GPIO mode)			27	mA

DC characteristics

SYMBOL	DESCRIPTION	MIN	TYP	MAX	UNIT
V _{IL}	Low-Level Input Voltage			0.8	V
V _{IH}	High-Level Input Voltage	2.4			
V _{OL}	Low-Level Output Voltage @4mA			0.4	
V _{OH}	High-Level Output Voltage @4mA	2.9			

Thermal characteristics

SYMBOL	DESCRIPTION	VALUE	UNIT
T _{STG}	Storage temperature range	-20 to +85	°C
RH _{STG}	Relative humidity range	< 90	%

4. UART Software command

4-1. General information

Interface	Serial (UART)
Authentication	Verify (1:1) or Identify (1:N)
FAR	<0.01%
FRR	<1%
Templates for each User ID	3
Template storage size	800 byte each
User ID	1-32

4-2. Serial interface settings

Baud rate	default 9600 (range from 9600 to 115200)
Data bit	8
Parity	None
Stop bit	1

4-3. Command structure

Command from host:

0	1	2	3	4	5	6	7
STX	Command	P0	P1	P2	P3	ChkSumL	ChkSumM

STX: Start byte, 0x02.

Command: Command code

P0-P3: Parameters 0-3

ChkSumL: Check sum LSB, check sum is the sum from STX to P3

ChkSumM: Check sum MSB

The command may follow by additional data (see command detail).

8	...	...	n	n+1	...	...	...
Data0	...	...	DataN	ChkSumL	...	...	ChkSumM

Note: do not send the next command before the response is return.

4-4. Response structure

Response from module:

0	1	2	3	4	5	6	7
STX	Response	P0	P1	P2	P3	ChkSumL	ChkSumM

STX: Start byte, 0x02.

Response: Response code

P0-P3: Parameters 0-3

ChkSumL: Check sum LSB, check sum is the sum from STX to P3

ChkSumM: Check sum MSB

The command may follow by additional data (see command detail).

8	...	...	n	n+1	...	...	...
Data1	...	...	DataN	ChkSumL	...	...	ChkSumM

4-5. Table of commands

Biometric commands	HEX	Description
ENROLL	0x23	Enroll to template RAM
VERIFY_FLASH	0x50	Verify with the template of specific ID in Flash
IDENTIFY_FLASH	0x51	Identify with the templates in Flash

Image transfer	HEX	Description
CAPTURE_IMAGE	0x60	Capture image from sensor to RAM
UPLOAD_IMAGE	0x63	Upload image from RAM

Template handling	HEX	Description
SAVE_TEMPLATE	0x24	Save template to Flash
UPLOAD_TEMPLATE_FLASH	0x33	Upload template from Flash
DOWNLOAD_TEMPLATE_FLASH	0x34	Download template to Flash
DELETE_TEMPLATE_FLASH	0x40	Delete the template in Flash
DELETE_ALL_FLASH	0x41	Delete all templates in Flash
GET_USER_ID	0x42	Get USER_ID information
CHECK_IF_ENROLLED	0x21	Check if USER_ID is enrolled

Firmware command	HEX	Description
READ_FIRMWARE	0x01	Read firmware information

Communication	HEX	Description
SET_BAUDRATE	0x04	Set baud rate

FAR setting	HEX	Description
SET_FAR	0x10	Set FAR level
READ_FAR	0x11	Read FAR level

4-6. Table of response code

Response	HEX	Description
ACK	0x30	Command correct
NACK	0x31	Command incorrect

5. UART Command description

5-1. ENROLL

Command

0	1	2	3	4	5	6	7
0x02	0x23	P0	0	0	0	ChkSumL	ChkSumM

Enroll fingerprint image to template, store in RAM.

P0 is the template index in RAM, P0 = 0x31 – 0x33

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

Response Additional Data

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x36 = enrollment successful

0x37 = enrollment failed

5-2. VERIFY_FLASH

Command

0	1	2	3	4	5	6	7
0x02	0x50	P0	0	0	0	ChkSumL	ChkSumM

Verify the fingerprint image with the template in Flash.

P0 is the USER_ID, P0 = 1-32

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

Response Additional Data

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x36 = verify successful

0x37 = verify failed

5-3. IDENTIFY_FLASH**Command**

0	1	2	3	4	5	6	7
0x02	0x51	0	0	0	0	ChkSumL	ChkSumM

Identify the fingerprint image with the templates in Flash.

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	P1	0	0	ChkSumL	ChkSumM

P0: 0x36 = verify successful

0x37 = verify failed

P1 is the matched USER_ID, P1 = 1-32

5-4. CAPTURE_IMAGE**Command**

0	1	2	3	4	5	6	7
0x02	0x60	0	0	0	0	ChkSumL	ChkSumM

Capture the image from sensor to RAM.

The response indicates if the finger is present.

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x31 = finger present

0x30 = finger not present

5-5. UPLOAD_IMAGE**Command**

0	1	2	3	4	5	6	7
0x02	0x63	0	0	0	0	ChkSumL	ChkSumM

Upload image from RAM to host.

Response

0	1	2	3	4	5	6	7
0x02	0x30	LenLSB	LenMSB	0	0	ChkSumL	ChkSumM

LenLSB and LenMSB is the length of the image, not include checksum.

Response Additional Data

8	...	...	Len+7	Len+8	...	...	Len+11
Data1	...	...	DataLen	ChkSumL	...	...	ChkSumM

Check sum is four bytes.

5-6. SAVE_TEMPLATE**Command**

0	1	2	3	4	5	6	7
0x02	0x24	P0	0	0	0	ChkSumL	ChkSumM

Save the template in RAM to Flash.

P0 is the USER_ID, P0 = 1-32

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x36 = successful

0x37 = failed

5-7. UPLOAD_TEMPLATE_FLASH**Command**

0	1	2	3	4	5	6	7
0x02	0x33	P0	0	0	0	ChkSumL	ChkSumM

Upload template from Flash to host

P0 is the USER_ID, P0=1-32

Response

0	1	2	3	4	5	6	7
0x02	0x30	LenLSB	LenMSB	0	0	ChkSumL	ChkSumM

LenLSB and LenMSB is the length of the template, not include checksum.

Length = 2400 (800*3)

Response Additional Data

8	...	...	Len+7	Len+8	...	...	Len+11
Data1	...	...	DataLen	ChkSumL	...	...	ChkSumM

Check sum is four bytes.

5-8. DOWNLOAD_TEMPLATE_FLASH**Command**

0	1	2	3	4	5	6	7
0x02	0x34	P0	LenLSB	LenMSB	0	ChkSumL	ChkSumM

Download template from host to Flash.

P0 is the USER_ID, P=1-32

LenLSB and LenMSB is the length of the template, not include checksum.

Length = 2400 (800*3)

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

Command Additional Data

8	...	...	Len+7	Len+8	...	...	Len+11
Data1	...	...	DataLen	ChkSumL	...	...	ChkSumM

Check sum is four bytes.

Response Additional Data

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x36 = successful

0x37 = failed

5-9. DELETE_TEMPLATE_FLASH**Command**

0	1	2	3	4	5	6	7
0x02	0x40	P0	0	0	0	ChkSumL	ChkSumM

Delete the template in Flash.

P0 is the USER_ID, P0 = 1-32

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x36 = successful

0x37 = failed

5-10. DELETE_ALL_FLASH**Command**

0	1	2	3	4	5	6	7
0x02	0x41	0	0	0	0	ChkSumL	ChkSumM

Delete all the templates in Flash.

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x36 = successful

0x37 = failed

5-11. GET_USER_ID**Command**

0	1	2	3	4	5	6	7
0x02	0x42	0	0	0	0	ChkSumL	ChkSumM

Get USER_ID information in Flash.

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

Response Additional Data

8	...	...	17
Data1	...	...	Data10

Data1-Data10 indicate if the USER_ID is enrolled.

LSB bit = 1: USER_ID 1 enrolled

0: USER_ID 1 not enrolled

MSB bit = 1: USER_ID 32 enrolled

0: USER_ID 32 not enrolled

5-12. CHECK_IF_ENROLLED**Command**

0	1	2	3	4	5	6	7
0x02	0x21	P0	0	0	0	ChkSumL	ChkSumM

Check if the USER_ID is enrolled.

P0 is the USER_ID, P0 = 1-32

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0: 0x30 = USER_ID not enrolled

0x31 = USER_ID enrolled

5-13. READ_FIRMWARE**Command**

0	1	2	3	4	5	6	7
0x02	0x01	0	0	0	0	ChkSumL	ChkSumM

Read firmware information.

Response

0	1	2	3	4	5	6	7
0x02	0x30	LenLSB	LenMSB	0	0	ChkSumL	ChkSumM

LenLSB and LenMSB is the length of the information, not include checksum.

Response Additional Data

8	...	...	Len+7	Len+8	Len+9
Data1	...	...	DataLen	ChkSumL	ChkSumM

Check sum is two bytes.

5-14. SET_BAUDRATE**Command**

0	1	2	3	4	5	6	7
0x02	0x04	P0	0	0	0	ChkSumL	ChkSumM

Set baud rate, P0 is the baud rate parameter

0x10	9600
0x20	14400
0x30	19200
0x40	28800
0x50	38400
0x60	57600
0x70	76800
0x80	115200

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

5-15. SET_FAR

Command

0	1	2	3	4	5	6	7
0x02	0x10	P0	0	0	0	ChkSumL	ChkSumM

Set FAR level, P0 is the FAR parameter

P0	FAR
0x1	1000
0x2	5000
0x3	10000 (default)
0x4	50000
0x5	100000
0x6	500000
0x7	1000000

Response

0	1	2	3	4	5	6	7
0x02	0x30	0	0	0	0	ChkSumL	ChkSumM

5-16. READ_FAR

Command

0	1	2	3	4	5	6	7
0x02	0x11	0	0	0	0	ChkSumL	ChkSumM

Read FAR level

Response

0	1	2	3	4	5	6	7
0x02	0x30	P0	0	0	0	ChkSumL	ChkSumM

P0	FAR
0x1	1000
0x2	5000
0x3	10000 (default)
0x4	50000
0x5	100000
0x6	500000
0x7	1000000

6. USB Software command

6-1. USB SCSI user command

CBW

dCBWSignature	CBWCB
---------------	-----	-----	-----	-------

Write Command, CBWCB

EF	FE
----	----	-----	-----

Read Response, CBWCB

EF	FF
----	----	-----	-----

6-2. SCSI command sequence

Write Command

Host: CBW (write)
 Host: Command Code
 Device: CSW

Get Response

Host: CBW (read)
 Device: Response Code
 Device: CSW

If more response

Get Response

Host: CBW (read)
 Device: Response Code
 Device: CSW

6-3. Command structure

Command from host:

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Cmd	0x0	ChkL	ChkM

Cmd: Command code

P0-P3: Parameters 0-3

ChkL: Check sum LSB, check sum is the sum from byte0 to byte9

ChkM: Check sum MSB

The command may follow by additional data (see command detail).

0	1	2	3	4	5						
0x5a	0xa5	0x1	0x0	D0	D1	...	...	...	Dn	ChkL	ChkM

6-4. Response structure

Response from module:

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: Response code

P0-P3: Parameters 0-3

ChkL: Check sum LSB, check sum is the sum from byte0 to byte9

ChkM: Check sum MSB

The command may follow by additional data (see command detail).

0	1	2	3	4	5						
0x5a	0xa5	0x1	0x0	D0	D1	...	...	...	Dn	ChkL	ChkM

6-5. Table of commands

Biometric commands	HEX	Description
Enroll Start	0x22	Set ID and start enroll
ENROLL1	0x23	Enrol 1
ENROLL2	0x24	Enrol 2
ENROLL3	0x25	Enrol 3
VERIFY	0x50	Verify 1:1
IDENTIFY	0x51	Verify 1:N

Image transfer	HEX	Description
CAPTURE_IMAGE	0x60	Capture image from sensor to RAM
UPLOAD_IMAGE	0x63	Upload image from RAM
IF_FINGER_PRESS	0x26	Check if finger press

Template handling	HEX	Description
DELETE_TEMPLATE	0x40	Delete the template in Flash
DELETE_ALL	0x41	Delete all templates in Flash
GET_USER_ID	0x27	Get USER_ID information
GET_USER_COUNT	0x20	Get user ID count
CHECK_IF_ENROLLED	0x21	Check if USER_ID is enrolled

Firmware command	HEX	Description
READ_FIRMWARE	0x01	Read firmware information

Communication	HEX	Description
Check SCSI connect	0x03	Check SCSI connect

FAR setting	HEX	Description
SET_FAR	0x10	Set FAR level
READ_FAR	0x11	Read FAR level

6-6. Table of response code

Response	HEX	Description
ACK	0x30	Command correct
NACK	0x31	Command incorrect

7. USB Command description

7-1. ENROLL START

Command

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x22	0x0	ChkL	ChkM

Set ID and start enroll, P0 = ID

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = enrolment successful

0x31 = enrolment failed

7-2. ENROLL 1

Command

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x23	0x0	ChkL	ChkM

The fingerprint image is enrolled to the RAM.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = enrolment successful

0x31 = enrolment failed

7-3. ENROLL 2**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x24	0x0	ChkL	ChkM

The fingerprint image is enrolled to the RAM.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = enrolment successful

0x31 = enrolment failed

7-4. ENROLL 3**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x25	0x0	ChkL	ChkM

The fingerprint image is enrolled to the RAM.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = enrolment successful

0x31 = enrolment failed

7-5. VERIFY 1:1**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x50	0x0	ChkL	ChkM

Verify 1:1. P0 = ID

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = verify successful

0x31 = verify failed

7-6. IDENTIFY**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x51	0x0	ChkL	ChkM

Verify 1:N.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = verify successful, P0 = ID

0x31 = verify failed

7-7. CAPTURE IMAGE**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x60	0x0	ChkL	ChkM

Capture the image from sensor to RAM.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

7-8. UPLOAD_IMAGE**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x63	0x0	ChkL	ChkM

Upload image from RAM to host.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Response Additional Data

0	1	2	3	4	5						
0x5a	0xa5	0x1	0x0	D0	D1	...	...	...	Dn	ChkL	ChkM

Image data is 0x9000 bytes

7-9. DELETE_TEMPLATE**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x40	0x0	ChkL	ChkM

Delete the template in Flash.

P0 is the USER_ID, P0 = 1-32

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = delete successful

0x31 = delete failed

7-10. DELETE_ALL**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x41	0x0	ChkL	ChkM

Delete all the templates in Flash.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res: 0x30 = delete successful

0x31 = delete failed

7-11. GET_USER_ID**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x27	0x0	ChkL	ChkM

Get USER_ID information in Flash.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Response Additional Data

0	1	2	3	4	5						
0x5a	0xa5	0x1	0x0	D0	D1	...	...	...	Dn	ChkL	ChkM

data is 25 bytes

data bit = 1: USER_ID enrolled

0: USER_ID not enrolled

7-12. CHECK_IF_ENROLLED**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x21	0x0	ChkL	ChkM

Check if the USER_ID is enrolled. P0 = ID

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

If ID is enrolled, P=0x00001005, Res = 0x31

7-13. READ_FIRMWARE**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0x1	0	0	0	0x1	0x0	ChkL	ChkM

Read firmware information.

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Response Additional Data

0	1	2	3	4	5						
0x5a	0xa5	0x1	0x0	D0	D1	...	...	...	Dn	ChkL	ChkM

Data is 24 bytes

7-14. Check SCSI connect**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0x1	0	0	0	0x3	0x0	ChkL	ChkM

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

Res = 0x30, P0 = 0x55

7-15. SET_FAR**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	0	0	0	0x10	0x0	ChkL	ChkM

Set FAR level, P0 is the FAR parameter

P0	FAR
0x1	1000
0x2	5000
0x3	10000 (default)
0x4	50000
0x5	100000
0x6	500000
0x7	1000000

Response

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

7-16. READ_FAR**Command**

0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	0	0	0	0	0x11	0x0	ChkL	ChkM

Read FAR level

Response

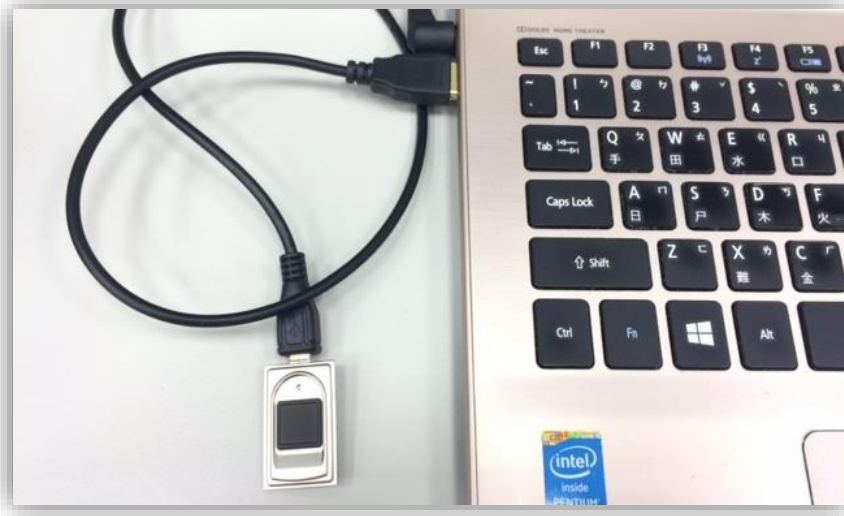
0	1	2	3	4	5	6	7	8	9	10	11
0x55	0xaa	0x1	0x0	P0	P1	P2	P3	Res	0x0	ChkL	ChkM

P0	FAR
0x1	1000
0x2	5000
0x3	10000 (default)
0x4	50000
0x5	100000
0x6	500000
0x7	1000000

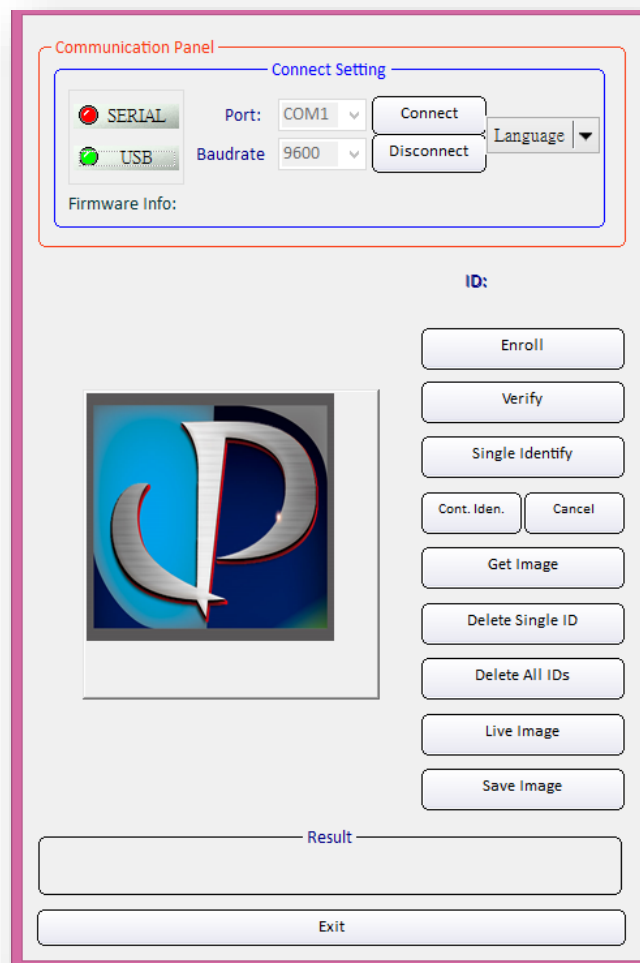
8. PC software

8-1. Device Setting

USB Port Connection: Connect the device with the PC with a USB cable



8-2. Software UI Overview



8-3. Communication Information

Serial Port connection:

User can choose the correct com port which could be identified from device manage of OS (For example, Windows XP, 7 or 8) and set the preferred baud rate

USB Port connection:

User can directly open this port once your device is connected with your host PC

Firmware Information:

When user presses the “Open button”, the tool will connect the preferred port (either serial com port or USB port) and then read firmware information.

Error message:

Some error message will show in the result tab if incorrect operation or software/hardware problem arise.

8-4. Enroll

User can enroll their fingerprint after picking an empty ID.

An enrollment takes 3 times finger placements on the sensor.

8-5. Verify

Compare the chose ID with currently placed finger.

8-6. Single Identify

Identify the currently placed finger belonging to which used ID.

8-7. Continuously Identify/ Cancel

Keep identifying till “Cancel” button is clicked.

8-8. Get Image

The windows will show the live image of the currently placed finger.

(PS. In the meanwhile, the tool will save the image as a file named “MyFinger.bmp” which is a bitmap format with 192*192 pixel in PC. This function might be changed to the button “Save Image to File” in official release)

Error message:

If no finger is detected for a while (default setting: 18 seconds), timeout message shows up and procedure will be terminated.

8-9. Delete Single ID

This unrecoverable operation will delete the enrolled ID template.

8-10. Delete All IDs

This unrecoverable operation will delete all enrolled ID templates.

9-3. Mating flex cable

JP3360 Sensor Module adopts an ultra-thin connector which is compatible with standard 8-pin flex cable. There are also several flex cable brands available in the market and manufacturing a custom design flex is also workable. According to experience, we will recommend that the maximum flex length should be 200 mm.

Below are custom design type of flex cable and standard type of flex cable for your reference.

Custom design type

Supplier: Molex (www.molex.com)

Part number: 0210390227 (Standard type)
0982670227 (High temperature)

Description: 1.00mm (.039") Pitch
Premo-Flex™ FFC Jumper,
Same Side Contacts (Type A),
8 Circuits,
76.00mm (3.000") Length

Additional: Other lengths are available

Standard type

Supplier: Techwave Industrial Co LTD

Contact: Mr. Alex Liao
alex@techwave.com.tw

Part number: FPC5207 rev 1B
EL-0005 (Techwave internal no)

Description: Soft flex, 1.00mm Pitch
Same Side Contacts, 8 Circuits
70 mm Length, 0.2 mm Thickness

Additional: Minimum bend radius
- Static application 0.3 mm
- Dynamic application 1.5 mm

IMPORTANT: The flex should not be bent close to the stiffener. Exposing the stiffener to mechanical stress can degrade the reliability.

10. Order information

10-1. Production codes

All parts are laser marked on the backside with production code.

The code comprises information about production date, production lot, part number and configuration.

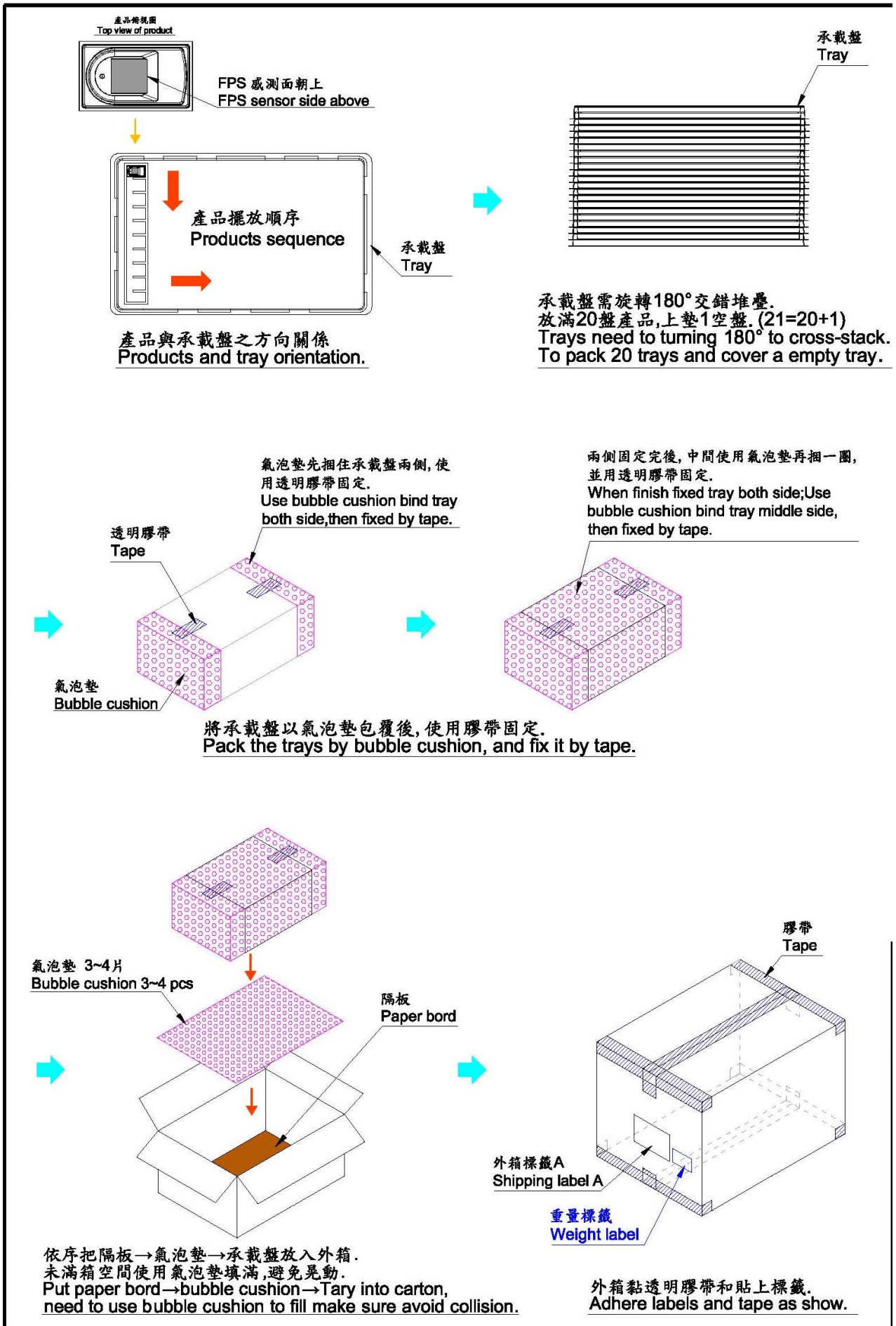
**XXXXXX
XXEFGG**

Code	Description	Rule
E	Year	Ex: 2015, E = 5
F	Month	Jan= A, Feb= B,...,Nov=K, Dec=L
GGG	Production batch	Serial number

10-2. Package information

Parts are supplied face up in standard trays, 100 sensor units per tray. 1 carton contains 1 empty tray placed on the 20 full trays.

Description	Quantity	Dimension	Weight
1 Tray	100pcs	N/A	N/A
1 Carton	20 trays, 2000pcs	462 x 357 x 313 mm	9.1kg (2000*3.3gram+2500gram)



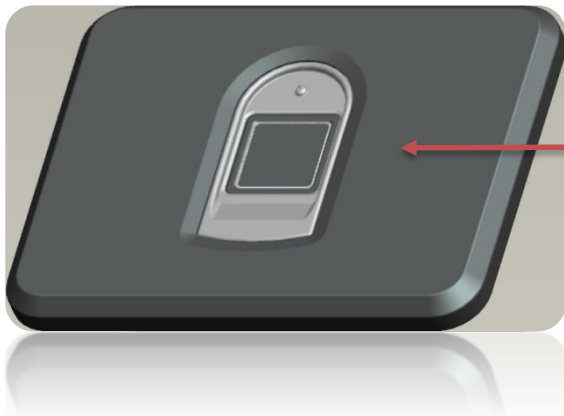
11.Application Note

11-1. Module integration

Important! Avoid galvanic contact

Sensor module should be mounted in such way that electrical insulation to adjacent conductive surface is achieved. It is also recommended to **avoid grounded surfaces** nearby the conductive frame.

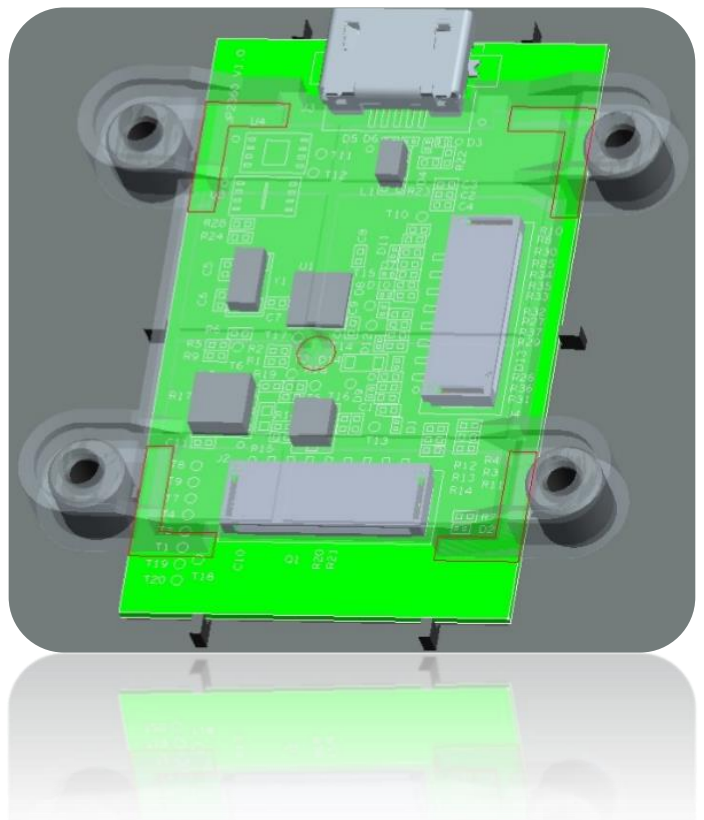
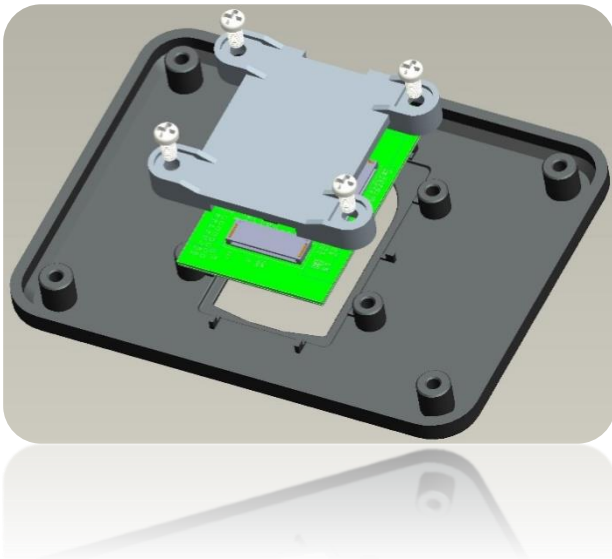
Contact JP Sensor to retrieve the mechanical reference design (2D and 3D drawings).



Non-conductive material (plastics)
No grounded area nearby

Proper mechanical support

The best way to ensure a solid sensor module mount is to apply a stable, non-conductive support to the backside of the sensor module. The non-conductive support can preferably be attached to the empty backside area.



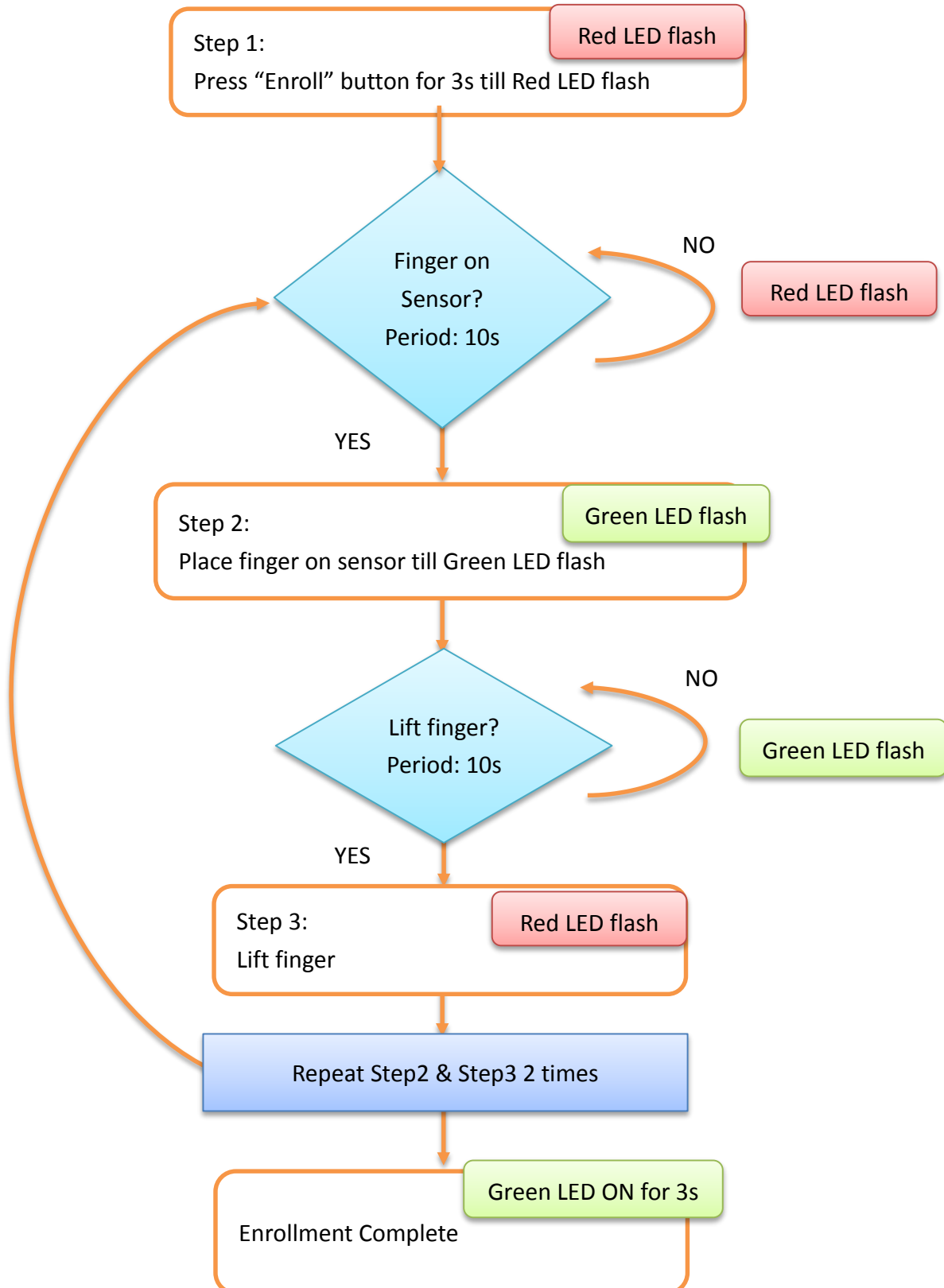
11-2. JP3360 Guideline for Locker application

Important!

The firmware for locker application (TYPE2) is different from that for general application (TYPE1).

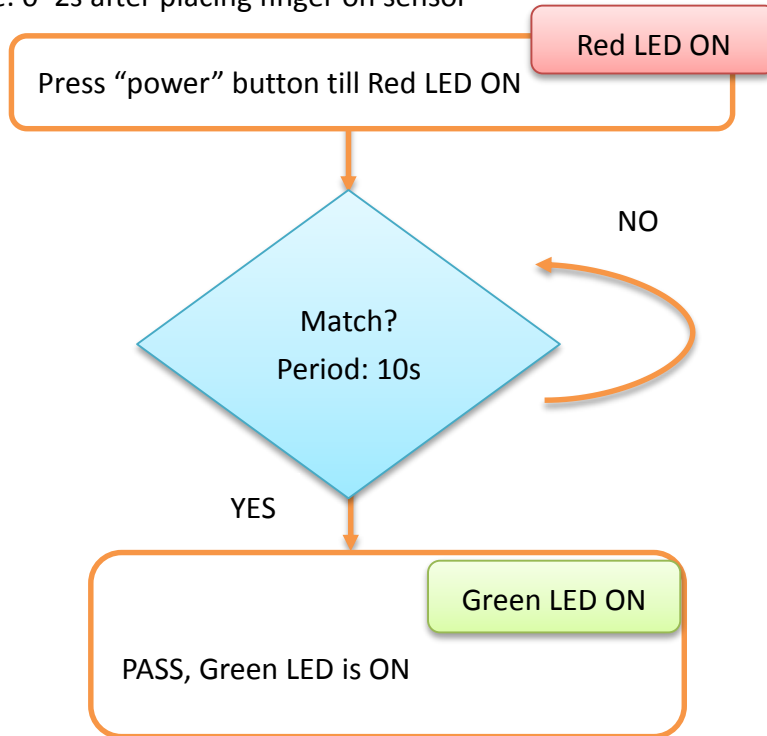
Be sure to have the right version firmware.

Enrollment:



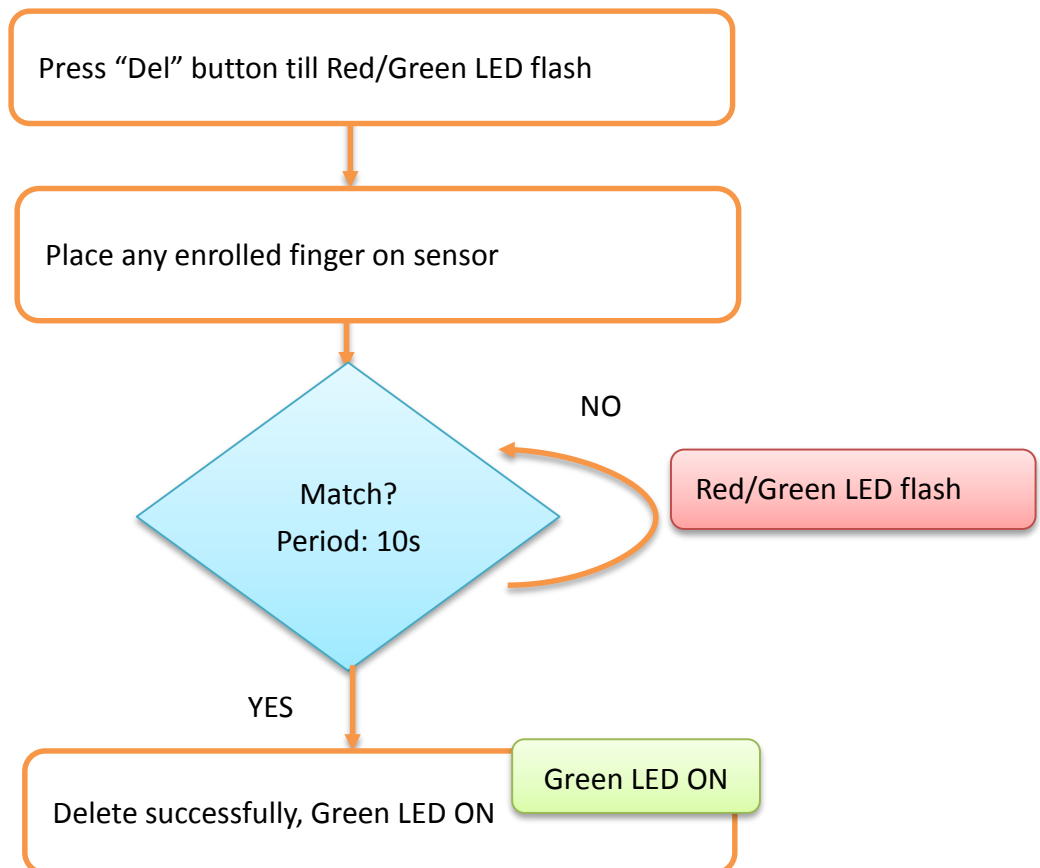
Verification:

Verification time: 0~2s after placing finger on sensor



Delete All:

Function works only when fingerprint is enrolled.



11-3. FAQ

Here we list the frequently asked questions for customer to quickly get familiar with sensor module.

1. Difference between General application (TYPE1) and Locker application (TYPE2).

	General application (TYPE1)	Locker application (TYPE2)
Enrolled ID number	32	32
How many finger placement for each enrolled ID	3 times	3 times
How to delete All ID	Through command set	Press "Del" button till Red/Green LED flash and then place any enrolled finger on sensor.
Firmware version	General	Specific, Please inform JP Sensor when placing order.

2. Sensor module can be served as demo kit as well as development kit since specification, sample code and software utility are also provided. If customer would like to integrate sensor module into host system, schematic can also be provided.

3. Question:

Does this sensor have a function with a sort of address, for authentication with its host? For example, if the sensor is stolen from its box and a criminal replaces with other JP3360 that have in the memory the fingerprint of him, it is possible to open the door. There is a function to avoid this problem?

Answer:

Step1: Get registered template back to the host MCU once user finishes enrollment process.

(By using upload template instruction to your host MCU)

Step2: After power on, host MCU check template again in case of fake JP3360 module be replaced. If comparison is correct, then boot up correctly. If no, the JP3360 is replaced by accident.

12.Disclaimer

The information appearing in this publication is believed to be accurate.

Integrated circuits sold by JP Sensor are covered by the warranty and patent indemnification provisions stipulated in the terms of sale only. JP Sensor makes no warranty, express, statutory implied or by description regarding the information in this publication or regarding the freedom of the described chip(s) from patent infringement.

FURTHERMORE, JP SENSOR MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

JP Sensor reserves the right to halt production or alter the specifications and prices at any time without notice. Accordingly, the reader is cautioned to verify that the data sheets and other information in this publication are current before placing orders. Products described herein are intended for use in normal commercial applications. Applications involving unusual environmental or reliability requirements, e.g. military equipment or medical life support equipment, are specifically not recommended without additional processing by JP Sensor for such applications. Please note that application circuits illustrated in this document are for reference purposes only.



JP Sensor

Sensor with total solution

If any question, please feel free to let us know.

JP Sensor Corporation Limited

6F., No.618, Ruiguang Rd., Neihu Dist., Taipei City 114, Taiwan

TEL: +886-2-26598608 FAX: +886-2-26598607

E-mail: sales@jpsensor.com.tw ; Web Site : <http://www.jpsensor.com.tw/>