iMQ Flash Writer User Manual
V1.0(T)

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1.Change History

Version	Approved Date	Description
V1.0	2020/08/12	English Version 1st issue. Add note to "Switch" function.

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2 Introduction to Flash Writer

iMQ Programmer Flash Writer is developed by iMQ Technology Inc. Flash Writer can support both on-line mode (connect to PC) and off-line mode (disconnect to PC).

In on-line mode, the programmer has to connect with PC by USB cable, then user can execute the programming process by the software interface. In off-line mode, the programmer has to pre-download Flash Writer software from PC. Only complete the pre-download, the off-line mode programming would be active.

The main functions of Flash Writer as below:

(1) Program the H16 to MCU program memory, and read-out the data to verify.

(2) The data which is programmed to the memory of MCU. The data can read out to the interface of Flash Writer or output file to PC. User can also set protection to H16.

(3) Flash Writer supports both on-line mode and off-line program.

(4) Measurement pin is easier for problem solving.

3. Package Content

(1) Outer Box x 1

(2) Flash Writer (include PCBA) x1

(3) Software/firmware x1

(4) USB cable x1

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4. Introduction to Flash Writer and Installation

4.1 Hardware Introduction

Figure 4- 1 Flash Writer Top View

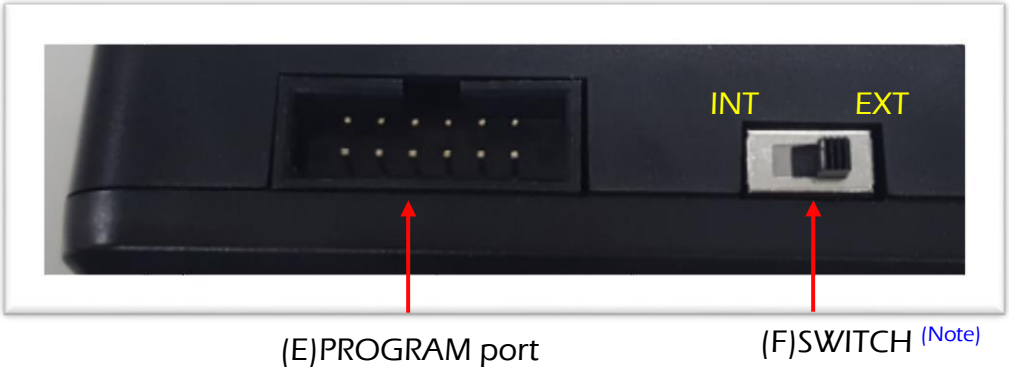

Figure 4- 2 Flash Writer Side View -1

Note: This feature is not available now. It is reserved for future implement.

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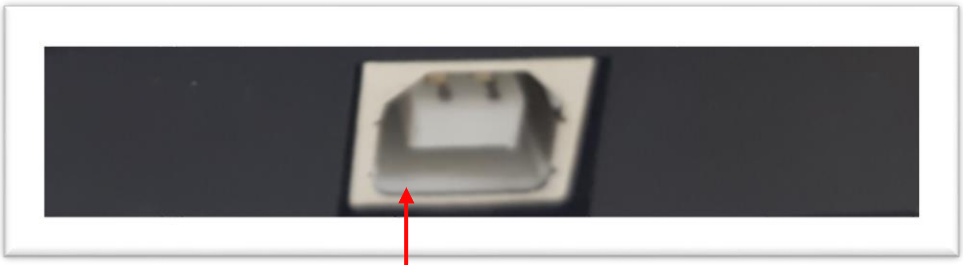
(G) AP port

Figure 4- 3 Flash Writer Side View -2



(H)USB port

Figure 4- 4 Flash Writer Side View- 3

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Flash Writer configuration as below:

No.	Name	Description
(A)	LED display	Display the information as software/firmware version, IC type, checksum, error code... etc.
(B)	LED	Green LED, the status is "OK", Yellow LED, the status is "Busy" ,Red LED, the status is "Fail"
(C)	ENTER	When "off-line programming", push ENTER to program
(D)	RESET	Restart Flash Writer
(E)	Program port	The bottom row of program port is used to programming. The upper row is used to measurement.
(F)	Switch(Note)	Switch the power source. INT: internal power (3.3V).EXT: external power (3.3V~5.5V) Before power on, please confirm the status of switch. Before switch the internal/external power, please power off (remove the USB power cable). When power switch is finished, then power on.
(G)	AP port	AP port is connected to auto programmer.VSS is for internal power. When AP is power supplied by external power, use "GND."
(H)	USB port	Connect to USB cable. Flash writer is power supplied by USB (5V). User can connect to PC/NB USB port or USB adapter for power supply.

Note: This feature is not available now. It is reserved for future implement.

PROGRAM port ：The bottom row of program port is used to programming. The upper row is used to measurement.

Measurement pin

Program pin

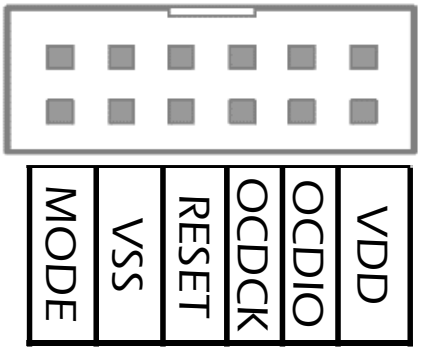

Figure 4- 5 PROGRAM port

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AP port: AP port is connected to auto programmer.VSS is for internal power. When AP is power supplied by external power, use "GND." Default is VSS.

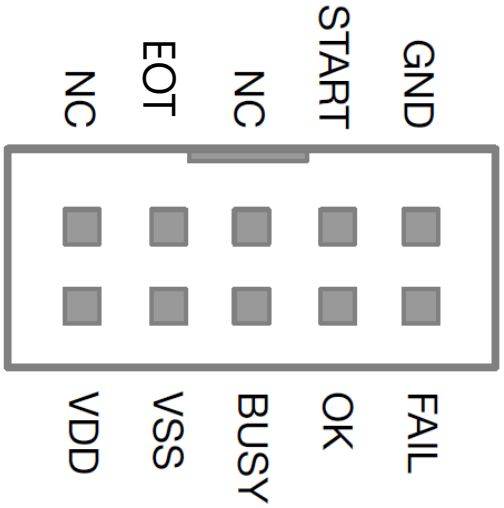

Figure 4- 6 AP port

4.2 Message of LED Display

The LED display shows the information of software version, IC type, checksum, operation procedure, error code... etc.

When Flash Writer power on or reset, LED display would shows the message as below order:

(1) Current software version: When the software/firmware version is V1.00, the LED display shows"v_1.00" as figure 4-7

Figure 4-7

(2)Date code: If the date is 1119, the date code would be displayed "d._1119".

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Figure 4-8

(3) IC type：If the IC type is TMP89FM45QUG, the LED display "45". as Figure 4-9.

IC type	LED display
TMP89FM09QUG	09
TMP89FM45QUG	45
TMP89FS61QDFG	61

Figure 4-9

(4)Programming procedure and condition: Here are five procedures, include Erase/Blank Check/Write/Verify /Rolling Code/Protect. Set procedures on the PC then download to programmer. The below table shows the code and different procedure.

Operation Procedure	Code
Erase	E
Blank Check	b
Write	P
Verify	v
Rolling Code	r
Protect	L

If the programming procedure is "Erase/Blank Check/Write/Verify/Rolling Code/Protect", LED display would show" EbPvrL" as figure 4-10. If the operation

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procedure is skipped; it will be showed as "_" .

Figure 4-10

(5) Checksum：LED can display the last 6 numbers of checksum. For example, if the checksum of Flash Writer is "0x03b726", the display message would be "03b726" as Figure 4-11.

Figure 4-11

(6) Rolling code：Rolling code is used to limit the program times.

Note: In order to avoid misunderstanding, LED display shows below letters with a dot. Display letter "b" as "b." ; letter "C" as "C."; letter "d" as "d."; letter "S" as "S.", letter "r" as "r.", and Letter "L" as "L.".

In normal operation, if user push ENTER key and program successfully, the LED display would show "Checksum". If there is error happened, the LED display will shows the "error code". The error code descriptions as below:

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Error Code	Description
Err_1	**Writer Test Fail**。 Flash Writer basic detection is fail.
Err_2	**Test Mode Fail** Entry "Test Mode" fail. The failure may cause by incorrect adaptor board, open short, wrong IC version.
Err_3	**Blank Check Fail**。 Blank Check fail. The failure may cause by " run out of program memory".
Err_B	**H16 Verify Fail**。 H16 verified error.
Err_D	**Erase Error**。 IC erase error
Err_E	**Failed Die**。 The IC without CP pass.

Other code explanation as below:

Code	Description
r_End	**Rolling Code End** When the times of rolling code meet the maximum value, the following program will not continue. " **r_End"** is a message to user, it is not an error.

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4.3 Software Installation

Click file to install the software of iMQ Writer (iMQ_Writer_setup.exe). Install the software step by step (as figure 4-12~4-14), the default destination location is "C:\iMQ\iMQ Writer."

Step 1: Select the destination location.

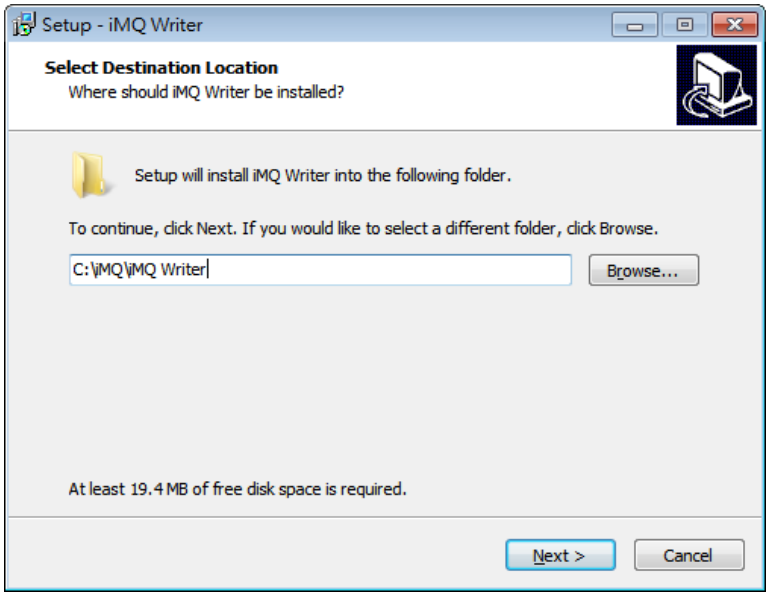

Figure 4-12

Step 2: Set the shortcut.

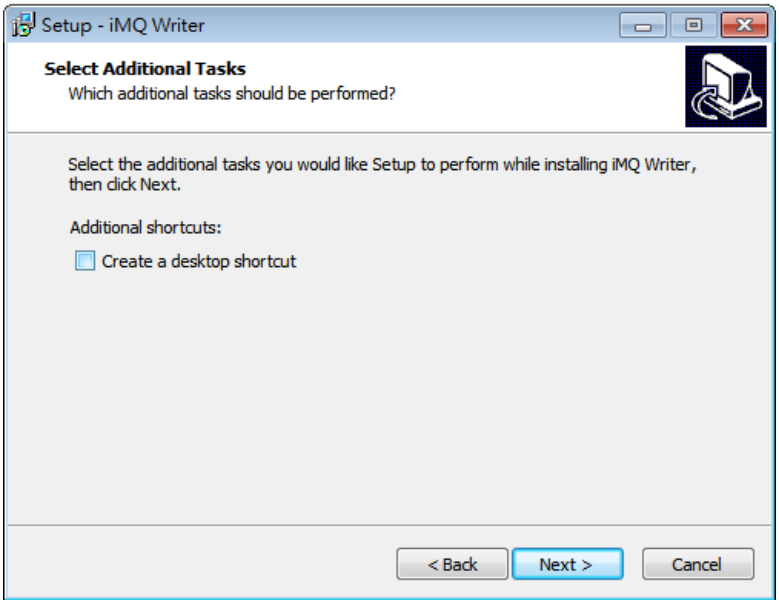

Figure 4-13

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Step3: The message of completing the installation. User check "Launch iMQ Flash Writer", and click "Finish" to continue to the main page of Flash Writer interface.

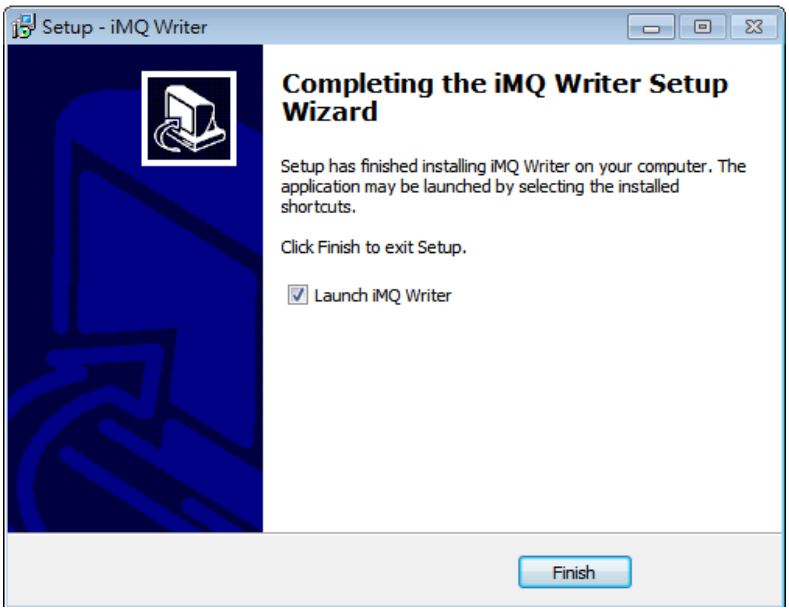

Figure 4-14

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4.4 Introduction of Software Interface

There are 5 blocks in the main page of Flash Writer interface(as Figure 4-15)：

(1) The picture Flash Writer：When Flash Writer connects to PC successfully, it will show a picture of Flash Writer. If Flash Writer disconnect to PC, the place will be blank.

(2) Function Block：There are four functions on the top of the main page : File, Option, About, and Exit.

(3) Data Block：There are three function keys - Type, Load , and Read IC. User can set IC parameters by "Type". Load file by "Load" and read the data from program memory by "Read IC". The destination location, device type and checksum are also showed in this block.

(4) Process Block：There are four function keys: Erase, Blank Check , Write, and Verify. It also shows the status of program protect.

(5) System Message：The operation record shows.

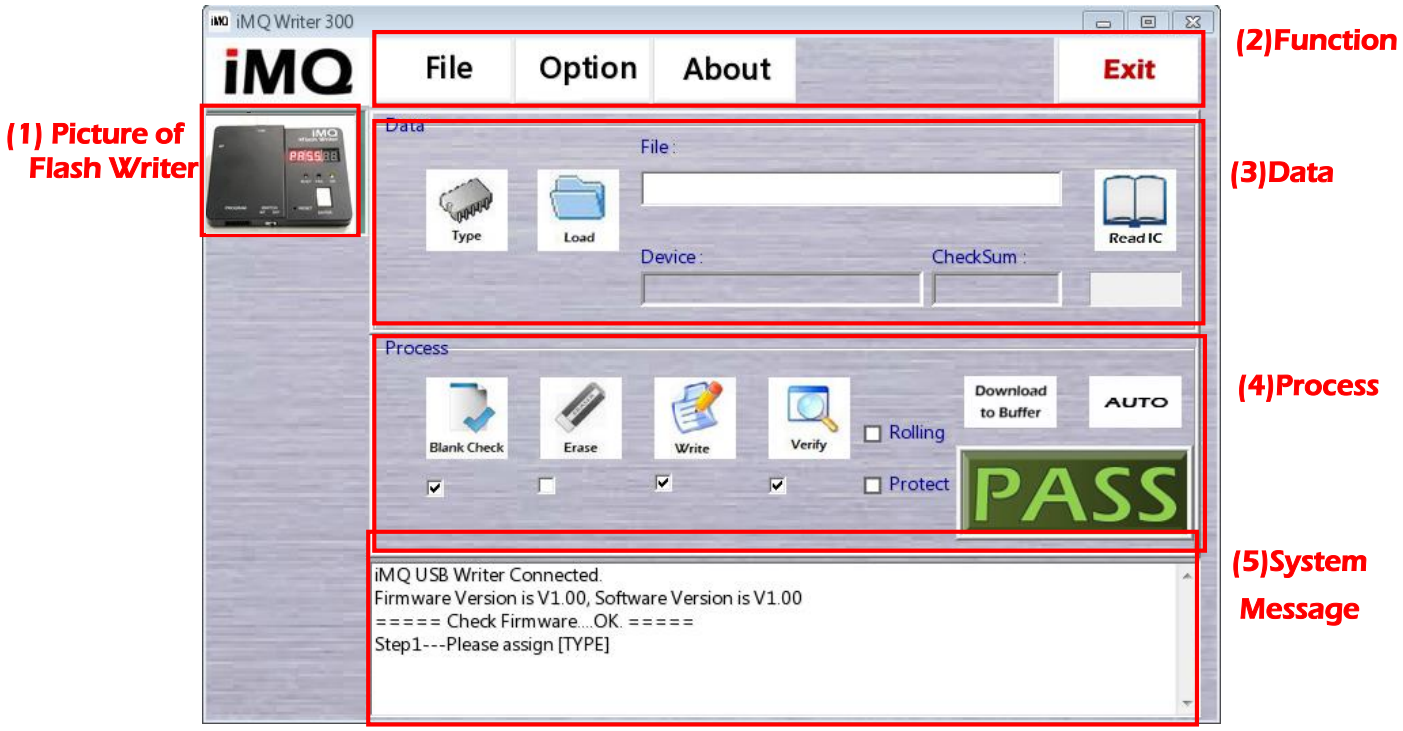

Figure 4-15

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5. On-Line Programming

5.1 Connection

(1) Connection the IC pin to program port (fig 4-5) via dupont line.

(2) Connect PC and Flash Writer by USB cable.

(3) Start the software of Flash Writer, then entry the main page (as Figure 5-1). When Flash Writer connect to PC successfully, it will shows the picture of Flash Writer. If the connection fail, it will not shows the picture.

(4) The function keys in the main page are described as followiing chapters.

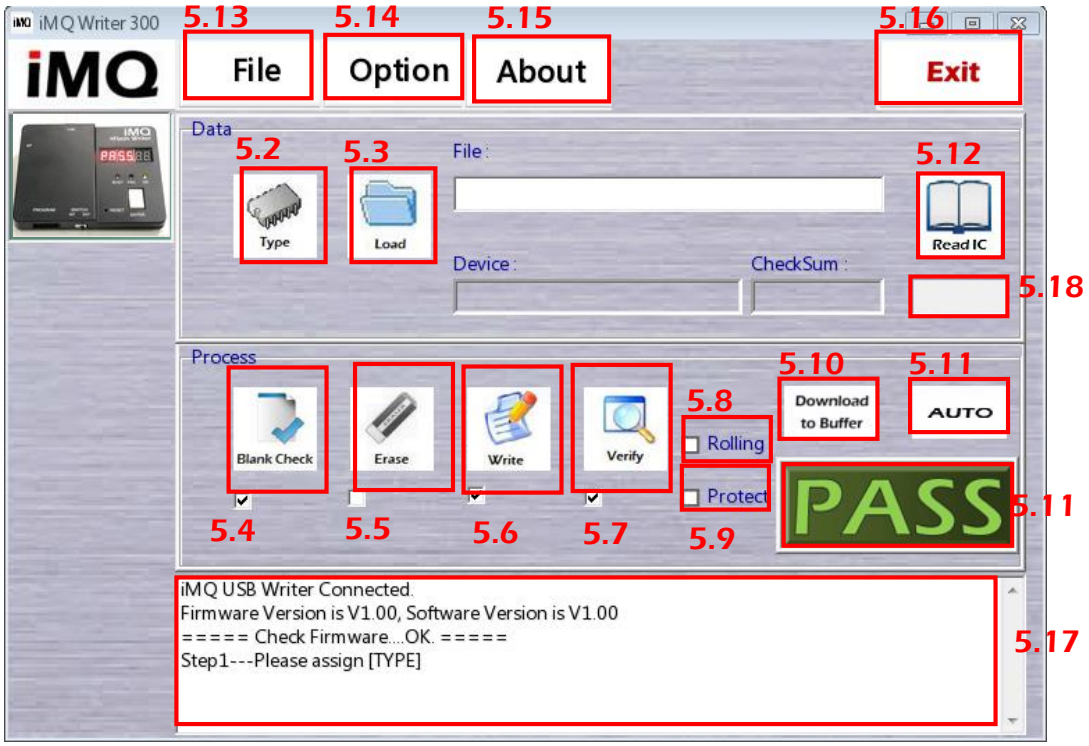

Figure 5-1

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5.2 Type (IC parameters setting)

This function key is used to set the basic parameters of MCU. The operation process as below:

Step 1: Click the "Type" in Figure 5-2, the IC parameters setting page shows (as Figure 5-4).

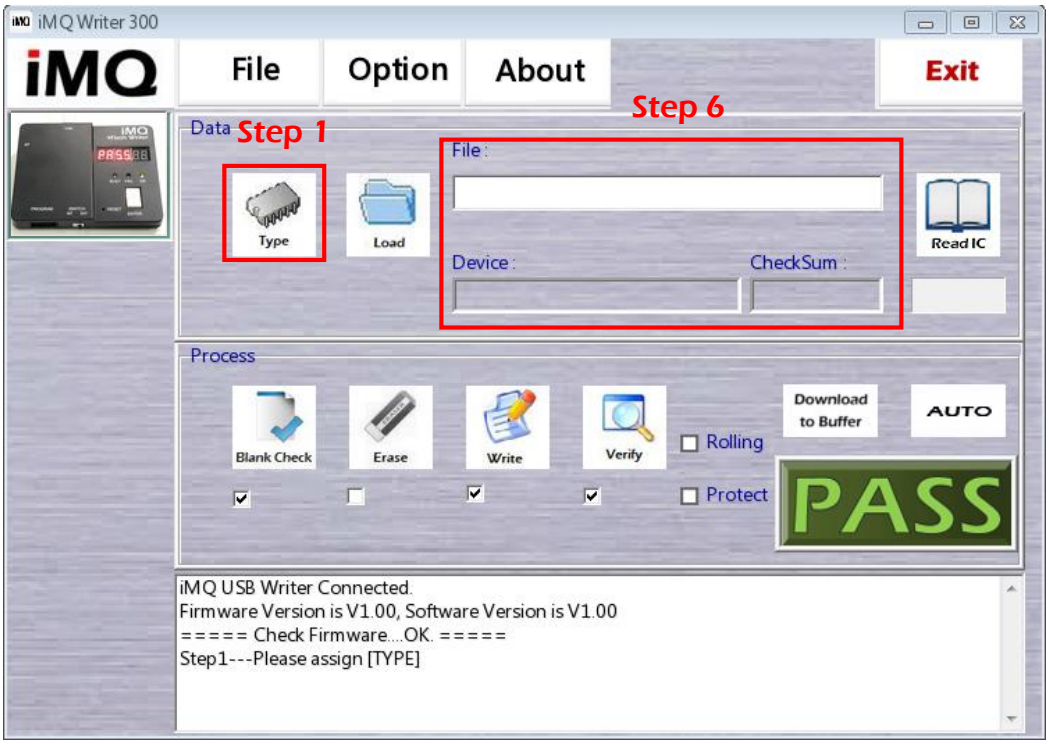

Figure 5-2

Step 2: Select the IC type by drop-down menu.

Step 3: Select package type or pin count by drop-down menu. For example, there is LQFP32 for TMP89FM09QUG.

Step 4: Some IC function has to set by writer. These function be selected will enable after programming. User can set program protect function here; this step can be ignored if it is not necessary.

Step 5: The rolling code is used to limit the programming times. User can check "Rolling Code" to enable and set the value. Rolling code can support both DEC and HEX (as figure 5-4). The value of rolling start points the start value, and the value of rolling end points the end value. Increase step means the value of the intervals. The increase step should be "1", then the number increase "1"

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every time. The rolling code area is 0~4294967280(in DEC) or 0~ 0xFFFFFFF0 (in HEX). This step can be ignored if there is no rolling code request.

Rolling code in Dec

Rolling code in Hex

Figure 5-3

Step 6: Complete the steps and click "OK" to back to main page. The" Device" will show the message of device type/ pin counts set by step2 and step3. User can use "Save CFG" to memory the configuration from step1 to step 6.

Besides, click "Type" , it will show the page of IC parameters setting. User can click "Load CFG" to call the memorized configuration to use.

Finish the setting, then click "OK" to back the previous page. In main page, "Device" shows the IC type and package type/pin count. The "rolling" is also checked if user set rolling code. User can save the configuration from step1 to step 6 by " Save CFG" key. "Type" button can show the page of IC parameter, user can call previous IC parameter by "Load CFG."

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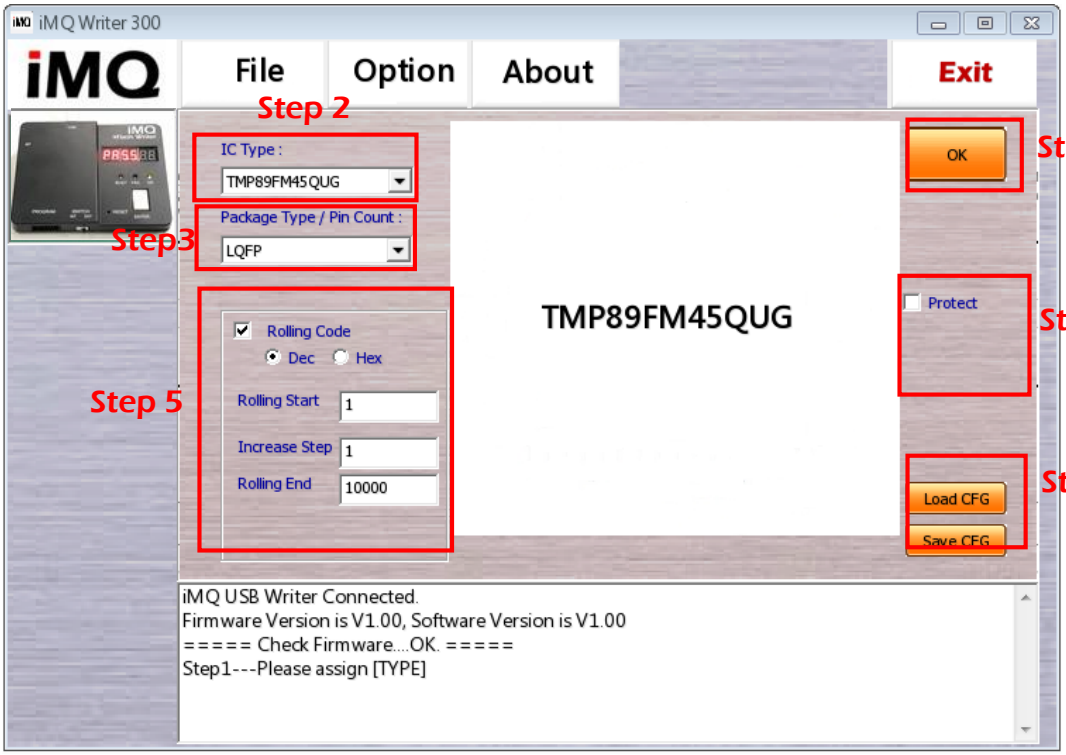

Figure 5-4

5.3 Load (File Loading)

This function key is used to load H16 file. Click "Load" as Figure 5-2, then load compiled H16 file to prepare programming. Complete the file loading, it will return to main page automatically, and file location, file name and checksum will be show in the main page. After loading file , the checksum is the" iMQ checksum" .

iMQ Checksum = h16 Checksum + Info Checksum

(Note: Info Checksum is always zero).

"h16 Checksum" is the checksum of H16 file, "Info Checksum" is the checksum of parameters setting of "Type". System message window will show the result of h16 Checksum、Info Checksum、iMQ Checksum.

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5.4 Erase

As Figure5-2, there is a check column below the" Erase" key. If the box be checked, then "Erase" function will be executed when auto programming.

5.5 Blank Check

This function is used to check the unused flash(0xFF) size of program memory. If the left program memory is not enough to program file, the system message will shows "Process Fail, ErrCode=03, ERR_Blank!!!"

As Figure5-2, there is a check box below the" Blank Check" key. If the box be checked, then "Blank Check" function will be executed under auto programming.

5.6 Write

Write program file and IC parameters configuration into IC. If user checked "Writer", then "Write" function will be executed under auto programming.

5.7 Verify

This is used to verify the data written in program memory with the data in buffer of Flash Writer, after write procedure. If the result is consistent, the message box shows" Verify..... ===Process OK===" then shows "iMQCKSum" in the LCD display. If the result is not consistent, the message box shows "Process Fail, ErrCode=04, ERR_Verify !!!"

If user check the box under "Verify" button, then "Verify" function will be executed under auto programming.

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5.8 Protect

There is "protect" key in "process" window. If user checks "protect"; the program file written to IC cannot be read again. This is higher security programming procedure.

Note : Generally, we suggest not click "Protect" in developing status. Otherwise, user can not able to read out the program content to verify.

5.9 Rolling Code

The setting of rolling code, please refer to 5.2 IC parameters setting (Type).

5.10 Download to Buffer

Download program file to programmer; the H16 file is programmed to the target IC in the programmer. Click "Download to Buffer" to start the procedure.

5.11 Auto Program

There are six processes, user can set the auto program of six processes - "Erase", "Blank Check", "Write", "Verify", "Rolling", and "Protect". Complete setting the operation procedure, then click "Auto" to auto program.

For example: If user check "Blank Check", "Write", "Verify" and click "AUTO" to start. The auto program procedure will be "Blank Check" →"Write" →"Verify", and the erase will not be in the process.

The status of auto programming will show on the LED display, after user click "AUTO". It shows "PASS", when program successfully. It shows "BUSY", when program is ongoing. It shows "FAIL", when program fail. The error code will also be showed, user can check the detail of error code in "4.2 message of LED display".

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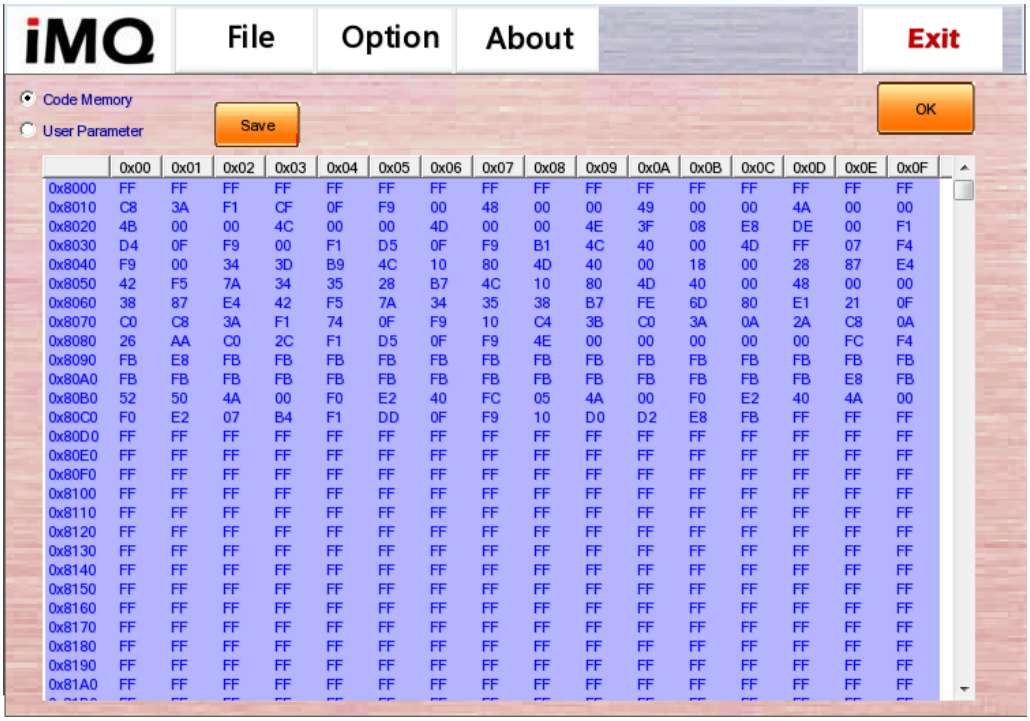
Figure 5-5

5.12 Read IC

The "Read IC" function is reading the data from program memory of MCU. Clicking "Read IC" to the page of reading data. There are two options on the left-up side. User select "Code Memory" to read out the H16 data (as figure 5-7). The data shows as blue font and blue background color. User can save the selected file and destination location by clicking "Save".

Note) When the data displayed is all "00", it means the program data is all "00", or the program data has been protected.



	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x8000	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8010	C8	3A	F1	CF	0F	F9	00	48	00	00	49	00	00	4A	00	00
0x8020	4B	00	00	4C	00	00	4D	00	00	4E	3F	08	E8	DE	00	F1
0x8030	D4	0F	F9	00	F1	D5	0F	F9	B1	4C	40	00	4D	FF	07	F4
0x8040	F9	00	34	3D	B9	4C	10	80	4D	40	00	18	00	28	87	E4
0x8050	42	F5	7A	34	35	28	B7	4C	10	80	4D	40	00	48	00	00
0x8060	38	87	E4	42	F5	7A	34	35	38	B7	FE	6D	80	E1	21	0F
0x8070	C0	C8	3A	F1	74	0F	F9	10	C4	3B	C0	3A	0A	2A	C8	0A
0x8080	26	AA	C0	2C	F1	D5	0F	F9	4E	00	00	00	00	00	FC	F4
0x8090	FB	E8	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB
0x80A0	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	FB	E8	FB
0x80B0	52	50	4A	00	F0	E2	40	FC	05	4A	00	F0	E2	40	4A	00
0x80C0	F0	E2	07	B4	F1	DD	0F	F9	10	D0	D2	E8	FB	FF	FF	FF
0x80D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x80E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x80F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8100	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8110	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8120	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8130	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8140	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8150	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8160	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8170	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8180	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x8190	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0x81A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

Figure 5-7

If user has checked " User Parameter", the parameter setting of IC would be read out.

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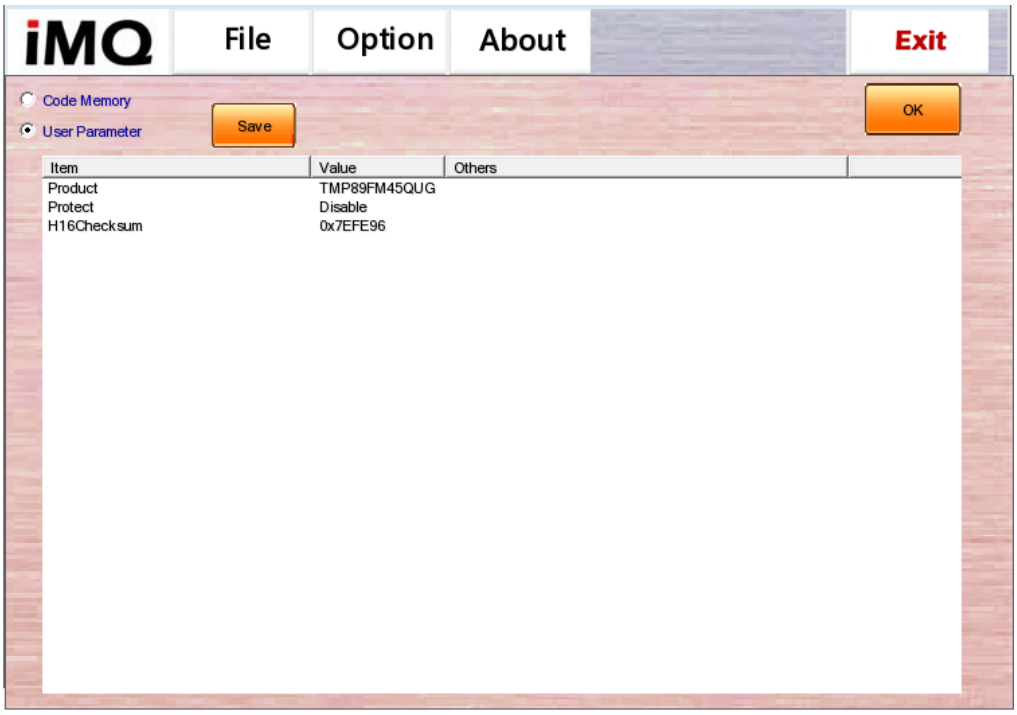

Figure 5-8

5.13 File

Click "File" on the top of main page to enter the "File" page (as figure 5-9). The functions of files detail described as below:

(1) iMQ Load：Load "*.imq" file which is saved previously. After user set the file name, IC type/pin count, and Cheksum, these information would be displayed in "File Name" window, " Device" window and " Checksum" window separately.
(2) iMQ Save：User load "*.h16" file and save the parameters as "*.imq " file.
(3) iMQ File Name：The file name and destination location of "*.imq" file.
(4) File: The file name and destination location of corresponding "*.imq" file.
(5) Device：The IC type and pin count of selected *.imq file.
(6) Checksum: The Checksum value of selected *.imq file.
(7) OK：User selects *.imq file, then clicks "OK' to load the file to PC and back to main page.

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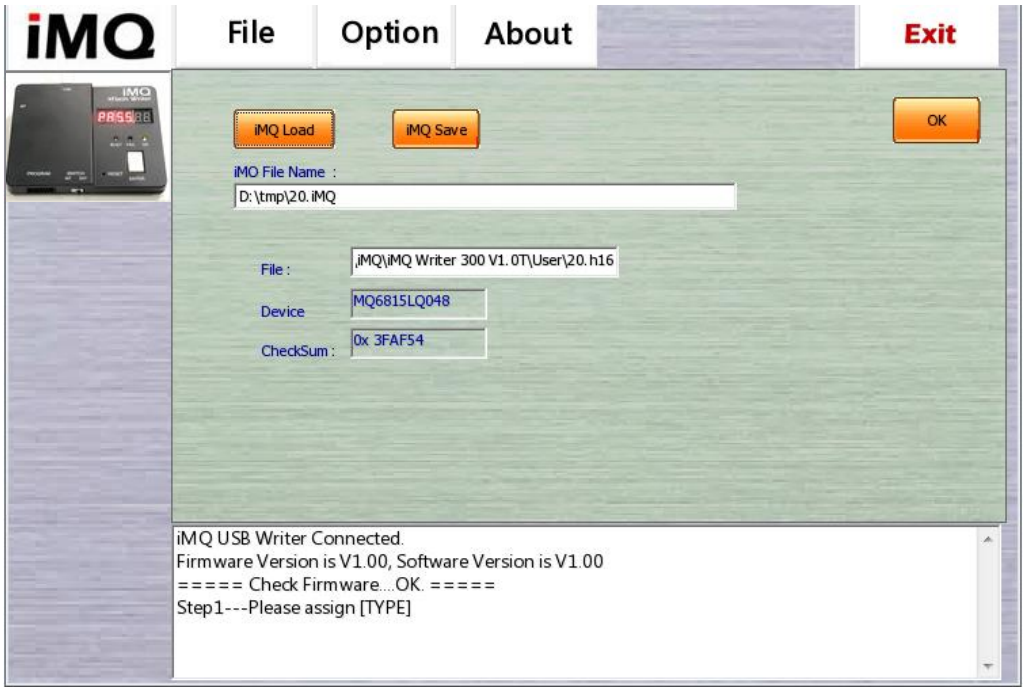

Figure 5-9

5.14 Option

In the main page, user clicks "Option" to enter the option page. The functions of option page as below:

(1) Buzzer：If user checked the "Buzzer", it will "beep" (a short beep sound) when program successfully. it will "beep beep~~~" (a short beep sound ,and a long beep sound) when program fail. Regardless of the "Buzzer" be selected or not, it would end with the sound "beep~~~ beep~~~ beep~~~" (long beep sound three times), when the programming times meet the max the max value of rolling code.
(2) Update Firmware：detail please refer to "9. Update the Firmware of Boot Loader".
(3) Flash Password Setting：detail please refer to "8.1 Password".
(4) Set RESET pin to floating after programming：If user checks " Set RESET pin to floating after programming" , the programmer will auto set the RESET pin to floating, and other program related pins are set to ground.

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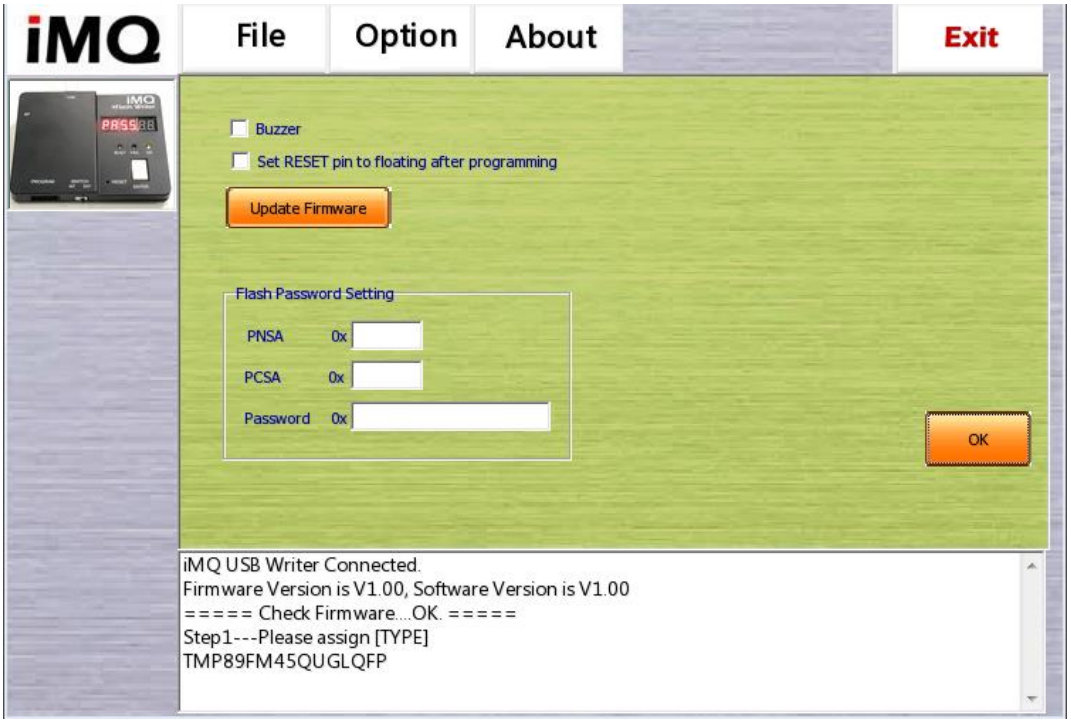

Figure 5-10

5.15 About

Click "About", the pop-up message as figure 5-11. The message is the version of the software/firmware. User can click "OK" to leave.

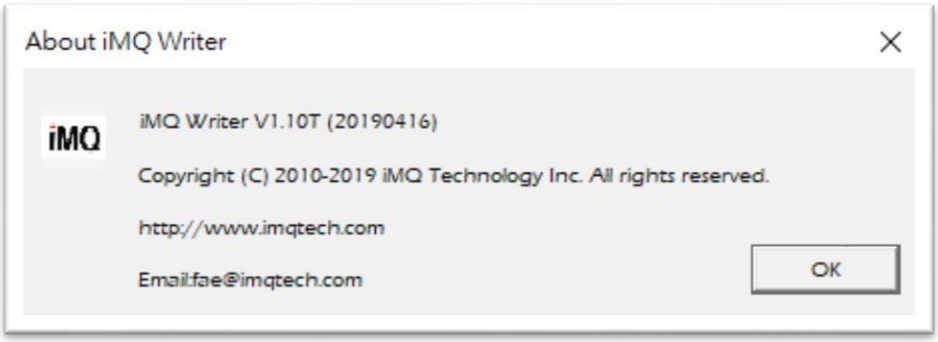

Figure 5-11

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5.16 Exit

Click "Exit" it will exit the program.

5.17 System Message

As Figure 5-2, the program record display on the bottom of main page.

5.18 Progress Bar

There is a progress bar under "Read IC" icon. The progress bar will show the status when reading program memory or download buffer (as figure 5-12).

Figure 5-12

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6. On-line Programming Procedure

(1) Click "Type" to enter the page setting IC type, package type/pin count, rolling code, and other functions. User can refer "5.2 IC parameters setting (type)". Complete setting , then click "OK" back to main page. User can confirm the setting of IC type and/ pin count. If user have set rolling code, please confirm the "Rolling" be checked. If user has set protect function, please also confirm the "Protect" be checked.

Note: Generally, it suggest not check " Protect" in development stage. The MCU cannot be read out the data after setting "Protect".

(2) Click "Load" in the main page, and select "*.h16" file. Please check the file location destination, file name, and checksum value.

(3) This step is to set the program process; user check the necessary process in the "Process" block. For flash product, the procedure is usually " Erase" →" Blank Check" →" Write" →" Verify".

(4) Execute " Download to Buffer" to download the data to the buffer of programmer.

(5) Click "AUTO" to execute the auto programming with the processes set by step (3). It shows "PASS", when program successfully. It shows "BUSY", when program is ongoing. It shows "FAIL", when program fail. The error code will also be showed; user can check the description of error code in "4.2 message of LED display".

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7. OFF-Line Programming

(1) User have to pre-download the program code, setting configuration or rolling code function from PC to programmer. After the download complete, the off-line programming can start.

(2) Put MCU on the socket and use the handle to set the IC firmly. User clicks "Enter" to program.

(3)The programming status will be showed in LED display. It shows "PASS", when programming successfully. It shows "FAIL", when programming fail. If user have checked "Buzzer", the buzzer would "beep"(a short beep sound) when programming successfully, the buzzer would "beep,beep~"(a short beep sound, and a long beep sound) when programming fail.

(3) If the programming processes are included " Verify" but no "Rolling Code" , the LED display would only show "Checksum" when programming complete.

(5)If the programming processes are included " Verify" and "Rolling Code", the LED display would show " Checksum" and "Rolling Code" every programming until last rolling code complete. When the program rolling code over the max value , the buzzer would buzz "beep~~~ beep~~~ beep~~~" (three long beep sounds), and the programming is invalid.

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8. Other Function

8.1 Password

There are two methods to erase the protected IC data or read the IC data, after IC programming completed. The length of password should be 8~32 bytes.

Method 1: Loading HEX file to PC, then execute "Download to Buffer" to load the data to programmer buffer, then erase the encrypted flash data or read the IC data.

Method 2: User inputs the value(in HEX) to PNSA（Password Count Storage Address）、PCSA（Password Comparison Start Address）and Password on setting "Option" page. As figure 8-3, these three password would be different according to different HEX file. Click "OK" back to main page, then continue to "Download to Buffer" to erase encrypted flash data, or read the IC data.

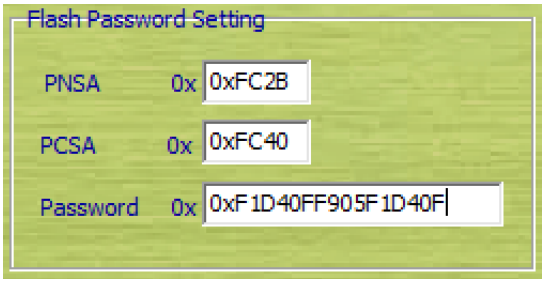

Figure 8-3

Following are the explanation of PNSA, PCSA, and Password.
- PNSA: The value of this address is the length of password string.
- PCSA: The value of this address is the start address of password string.
- Password String: the password string to comparison.

The example as figure 8-4:
- Input "0xFC2B " to PNSA column. The value of this address is 0x08 (the number in the red circle), the password string is 8 bytes.
- Input "0xFC40" to PCSA column. The start address of password string is 0xFC40(the number in blue circle).
- Input "0xF1D40FF905F1D40F " to password string column. The password string is 8 bytes from 0xFC40(the number in red dotted circle).

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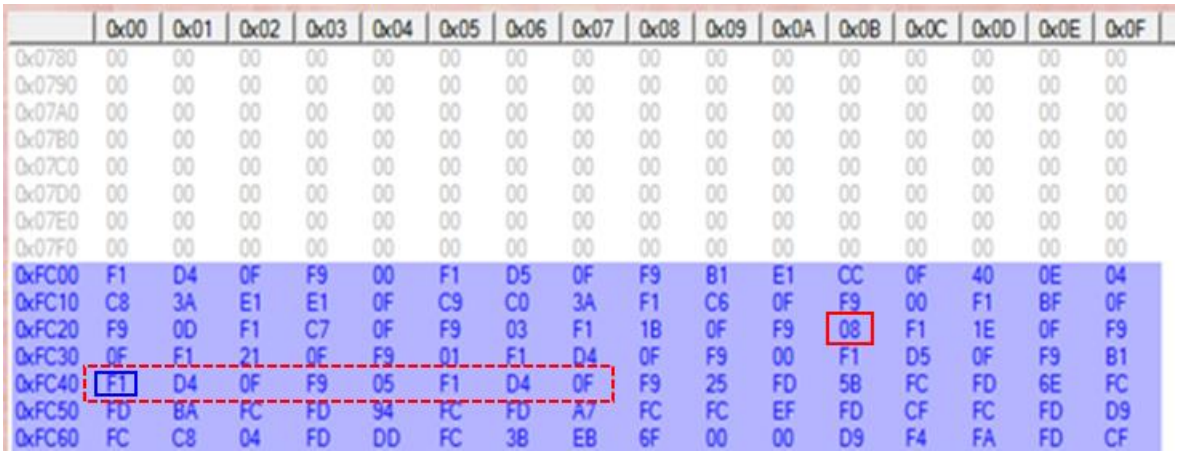

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x0780	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x0790	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x07A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x07B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x07C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x07D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x07E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0x07F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0xFC00	F1	D4	0F	F9	00	F1	D5	0F	F9	B1	E1	CC	0F	40	0E	04
0xFC10	C8	3A	E1	E1	0F	C9	C0	3A	F1	C6	0F	F9	00	F1	BF	0F
0xFC20	F9	0D	F1	C7	0F	F9	03	F1	1B	0F	F9	08	F1	1E	0F	F9
0xFC30	0F	F1	21	0F	F9	01	F1	D4	0F	F9	00	F1	D5	0F	F9	B1
0xFC40	F1	D4	0F	F9	05	F1	D4	0F	F9	25	FD	5B	FC	FD	6E	FC
0xFC50	FD	BA	FC	FD	94	FC	FD	A7	FC	FC	EF	FD	CF	FC	FD	D9
0xFC60	FC	C8	04	FD	DD	FC	3B	EB	6F	00	00	D9	F4	FA	FD	CF

Figure 8-4

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9. Update the Firmware of Boot Loader

9.1 Program the Firmware of Bootloader

Use the Bootloader function at first time, user have to use USB Debugger ICE provided by Silicon Lab to download "Bootloader Firmware". If Flash Writer has downloaded Bootloader Firmware already, user can pass this step and update by the steps as 9.2. update firmware of Flash Writer.

Execute Silicon Laboratories Flash Utility software, and connect to Flash Writer to program bootloader firmware：

Step 1 : Select the "USB_F38X_64K.hex" to download.
Step 2 : Check the item- "Erase all code space before download"
Step 3 : Click "Download"
Step 4 : Click "Go"。

Bootloader Firmware has programmed to Flash Writer successfully.

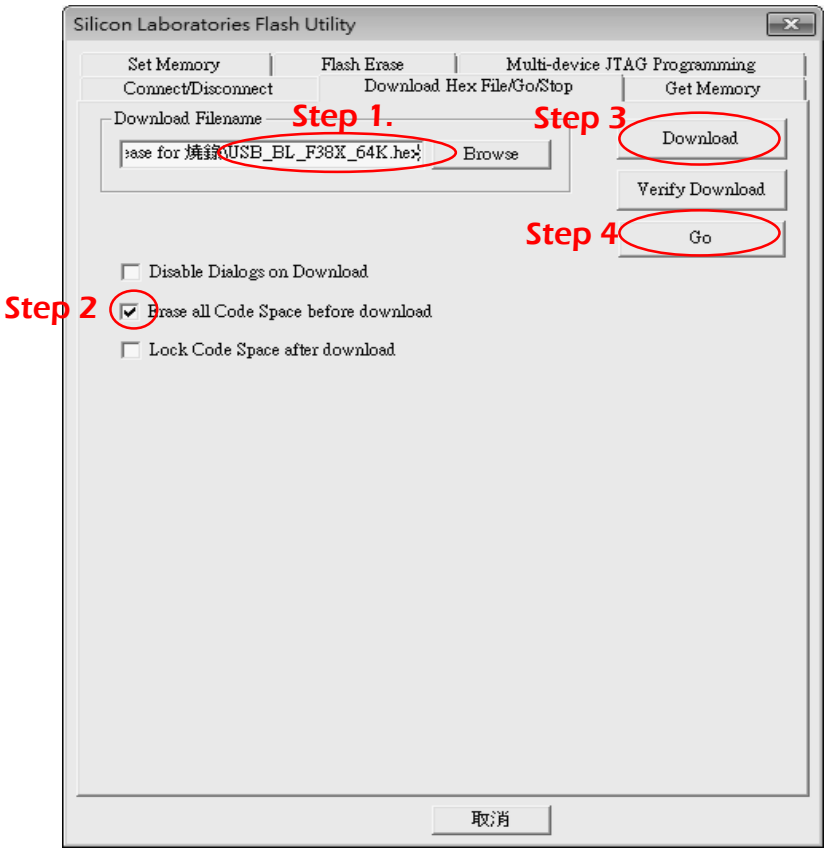

Figure 9-1

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9.2 Update Firmware of Flash Writer

Click the "Option" in the main page, then execute "Update Firmware" in the pop-up window. The "iMQBootloaderToolBox" window(as figure 9-3) will pop-up .

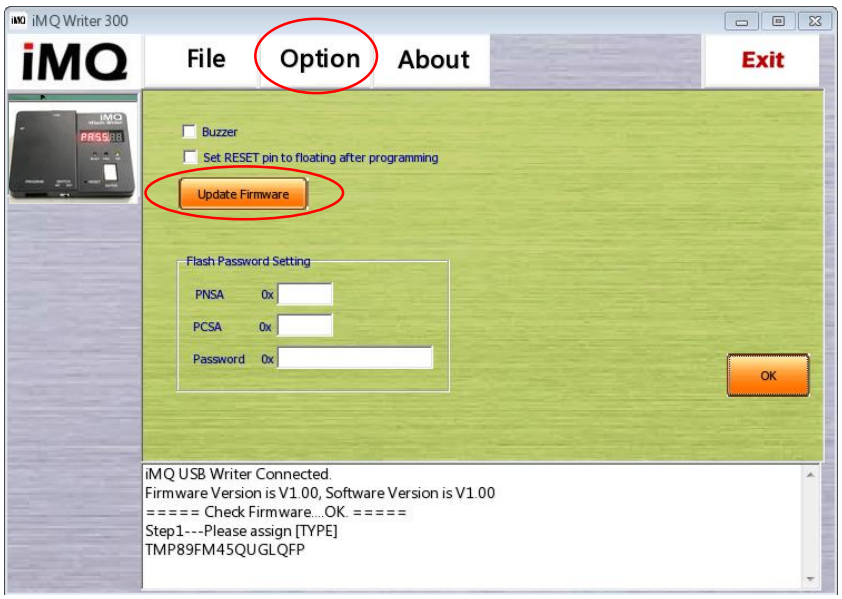

Figure 9-2

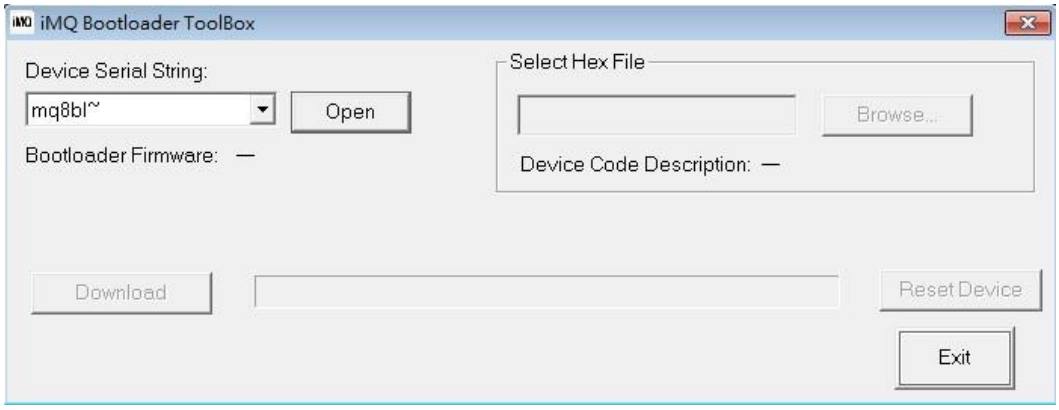

Figure 9-3

If there is no "mq8bl~" in "Device Serial String" column, please execute the action as figure 9-4：

Step 1 : keep pushing the enter key.
Step 2 : unplug the power cable then re-plug the power cable to power on Flash Writer.

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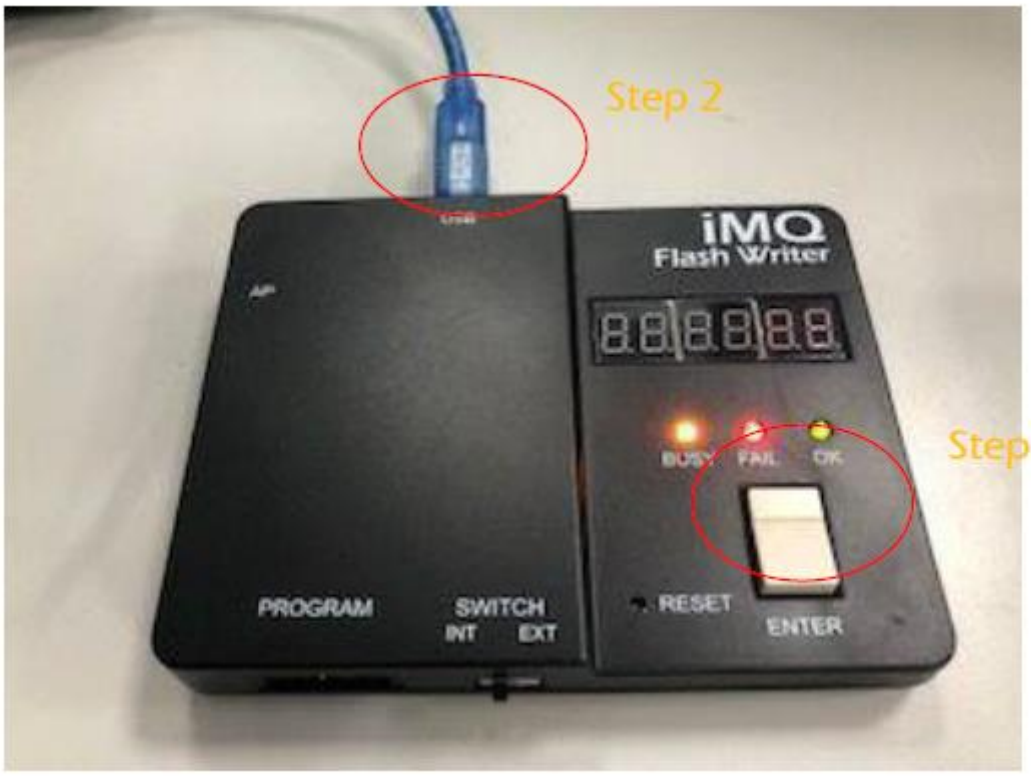

Figure 9-4

When Flash Writer PC software connects to Bootloader Firmware of programmer successfully, it will shows "mq8bl~" in Device Serial String column. Then continue to update Flash Writer Firmware, the steps as following:

Step 1 : Click "Open" key (If update successfully, the key will change to " Close" and it will shows the version of "Bootloader Firmware"
Step 2 : Click "Browse" key to update the Flash Writer Firmware. This file is in "fw" document, the file name is "iMQWriter_Fw.hex"as figure 9-5.
Step 3 : Click "Download" key to update the file.
Step 4 : Click "Reset Device" key to loading the updated Flash Writer Firmware。
Step 5 : Click "Exit" key to leave "iMQBootloaderToolBox"

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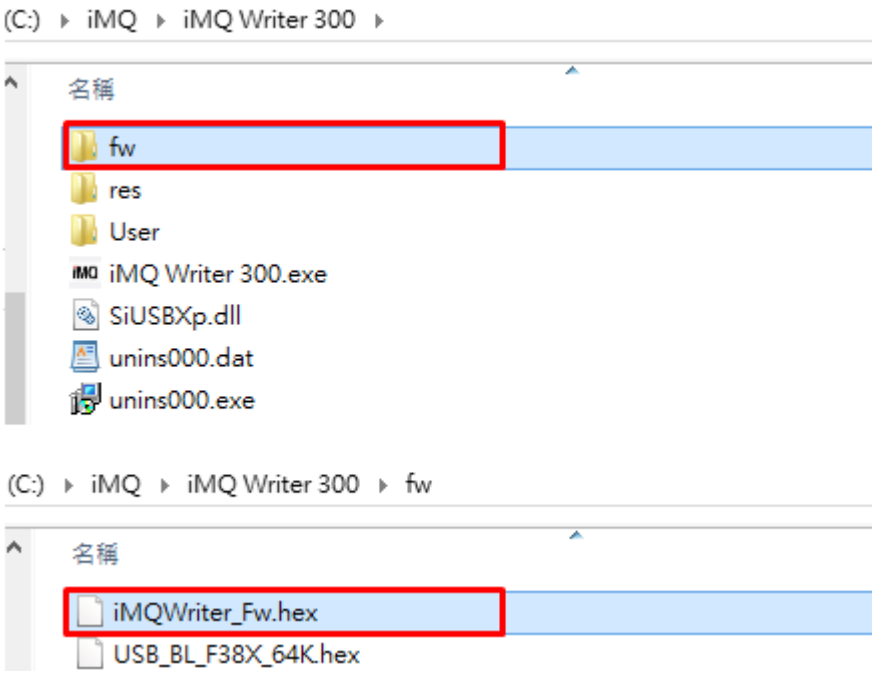

Figure 9-5

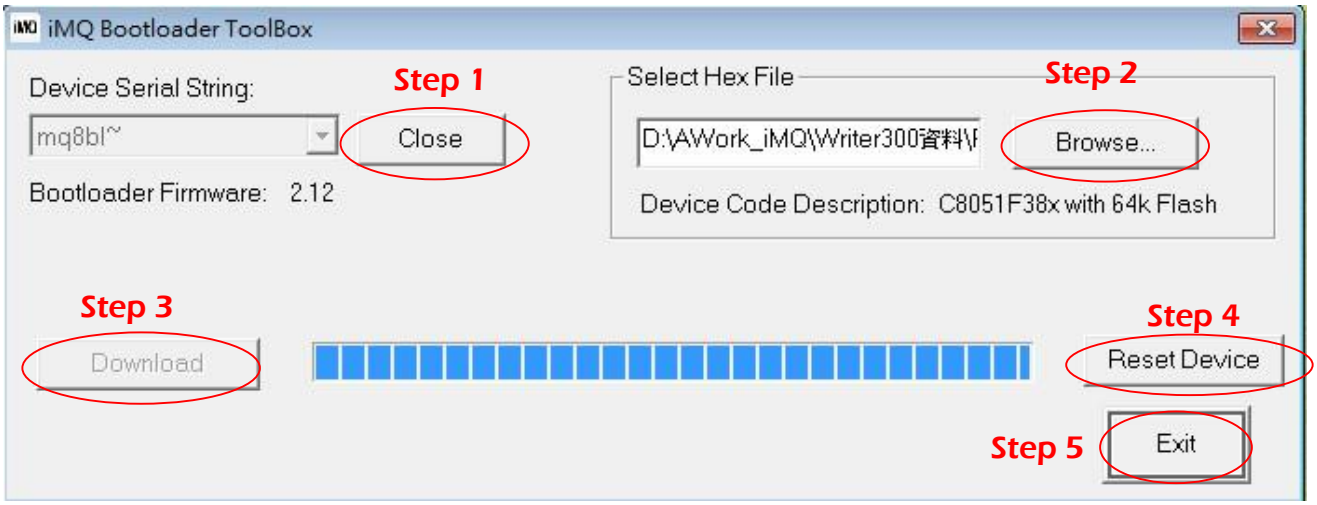

Figure 9-6

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10. Connect to Auto Programming Machine

10.1 Auto Program Process

Step 1：As figure 10-1, connect OK, BUSY、NG、START ,EOT signal cable, and GND to corresponding pins of auto programming machine. The pins may be different because of the different programming machines.

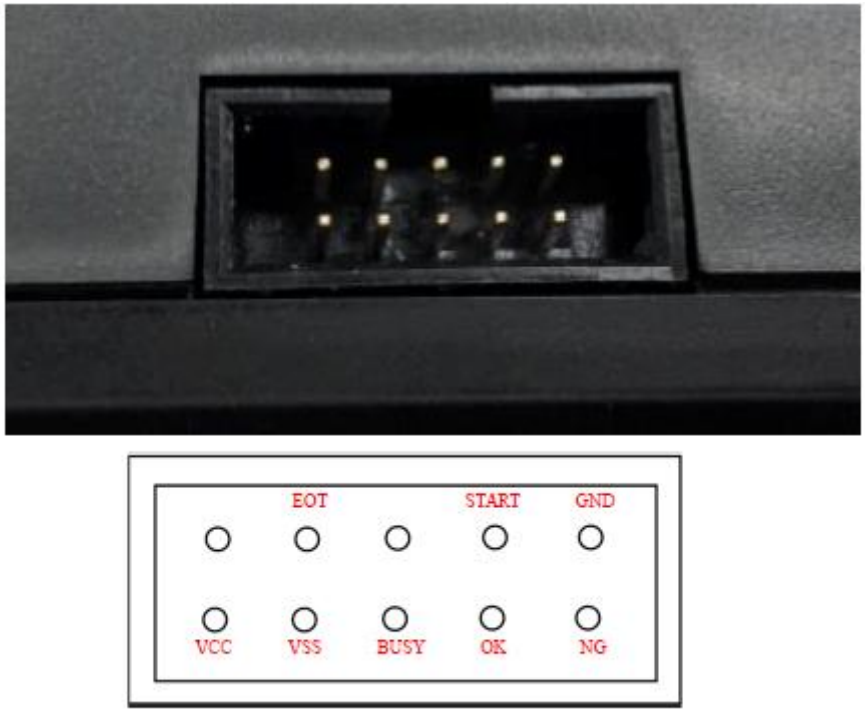

Figure 10-1 the AP port

Step2：According to the parameter table of auto programming machine (as Table 10-1), user sets the parameters. OK signal, NG signal and EOT signal are effective and low active. Busy signal depends on the programming machine, the minimum is 25ms.

Step3：Reference the instruction of product programming pins, user connect the program pin to correspond pins via dupont line .

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Parameter of auto programming machine		
Name of Parameters	Value（IMQ）	Description
DelayHoldTime	50	IC in the program area, then hold the IC after a time period. (Unit: ms)
DelayStartTime	100	Detect the IC is hold, then delay start time for stable status. (Unit: ms)
StartSignalWide	100	The pulse width of the start signal. (Unit: ms)
WriteTimeLimit	10	After start signal, and there is no finish signal detected in the write time limit. It reports "Time out" ,and stop holding IC. (Unit: s)
NumbersLimit	25 / 50 / 100	The maximum volume of the tube for IC. When it meet the number, stop supplying IC, and shows the remind message. (Unit:pcs)
AutoWriteType	A, B, AB	One unit to auto writer or two units(A,B) programmer at the same time.
BuzzerAlarm	Y / N	Set the buzzer alarm when fault occurs.
WriterID	0——12	Select standard signal or corresponding writer ID.
StartSignal	L	Set the active level to enable the signal. L：low level active H：high level active
BusySignal	X	Set the active level of busy signal L：low level active H：high level active X：invalid（do not use this signal cable）
OKSignal	L	Set the active level of OK signal. L：low level active . H：high level active.
NGSignal	L	Set the active of NG signal L：low level active H：high level active
DelayCheckBusy	100	Set the time interval between finish sending "start " instruction and start to verify the programming status. (Unit: ms)
EOTDDebounce	10	Set busy signal active. When it finishes programming, the busy status will change to ready from busy status. In this time, if

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		the signal is always ready, then continue to verify the OK and NG signal.
iOKNGDebounce	10	If there is no busy signal, it will verify "ok" and "NG" signal when completing sending the start instruction. During the serial time of de-bounce, detect stable "OK" /"NG" signal, it will judge "OK" or NG".
TwoSocketFlag	N	Set to programmer two IC at the same time. The flag is "Y" : There are ICs in Socket A, and socket B separately. And send "start program" instruction at the same time.
NGRetryTimes	2	Programming NG. Try to program again or not. "0 ": not retry again.

Table 10-1

10.2 Auto Programming

The process of auto programming as below. The steps may be partial changed according to different programming machines.

Step1：Charge in IC, and hold it.
Step2：Send "Start" instruction to the programmer.
Step3：After time of "DelayCheckBusy" , continued to step4.
Step4：Verify "OKSignal" and NGSignal" . If "OKSignal" and NGSignal" are H then continue to step5. If "OKSignal" and NGSignal" are not H, then back to step 2.
Step5：Verify "NGSignal" . if "NGSignal" us L, it means the programming NG, continue to step 7, otherwise continued to step 6.
Step6：Verify "OKSignal" If "OKSignal" is L, it means the programming successful, continued to step 7; otherwise，back to step 5.
Step7：According the result (OK or NG) to discharge the ICs .
Step8：Continue to program next IC(back to step1).
Step9：Because the IC stock or other reasons, the good ic may be misjudged as NG IC. Suggest to reprogram the NG IC again.

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