HYCON 紘康科技

HY13S00

HY13P IDE Software User Manual

www.hycontek.com

Table of Contents

Attention：

1. HYCON Technology Corp. reserves the right to change the content of this datasheet without further notice. For most up-to-date information, please constantly visit our website: http://www.hycontek.com .
2. HYCON Technology Corp. is not responsible for problems caused by figures or application circuits narrated herein whose related industrial properties belong to third parties.
3. Specifications of any HYCON Technology Corp. products detailed or contained herein stipulate the performance, characteristics, and functions of the specified products in the independent state. We does not guarantee of the performance, characteristics, and functions of the specified products as placed in the customer's products or equipment. Constant and sufficient verification and evaluation is highly advised.
4. Please note the operating conditions of input voltage, output voltage and load current and ensure the IC internal power consumption does not exceed that of package tolerance. HYCON Technology Corp. assumes no responsibility for equipment failures that resulted from using products at values that exceed, even momentarily, rated values listed in products specifications of HYCON products specified herein.
5. Notwithstanding this product has built-in ESD protection circuit, please do not exert excessive static electricity to protection circuit.
6. Products specified or contained herein cannot be employed in applications which require extremely high levels of reliability, such as device or equipment affecting the human body, health/medical equipments, security systems, or any apparatus installed in aircrafts and other vehicles.
7. Despite the fact that HYCON Technology Corp. endeavors to enhance product quality as well as reliability in every possible way, failure or malfunction of semiconductor products may happen. Hence, users are strongly recommended to comply with safety design including redundancy and fire-precaution equipments to prevent any accidents and fires that may follow.
8. Use of the information described herein for other purposes and/or reproduction or copying without the permission of HYCON Technology Corp. is strictly prohibited.

1. HY13P IDE Overview

1.1 Introduction

To facilitate the product development process , HYCON-IDE platform is provided to develop the full range of HYCON MCUs. Customers can implement in-circuit emulation of the end-products on this platform and program the code onto OTP products of HY13P series

1.2 HY13P IDE Installation and System Requirement

Minimum requirements for operating HY13P IDE：

- PC Hardware Request:
  PC compatible system with PENTIUM® CPU
  128 MB Memory (256MB is recommended)
  10 GB Hard Disk Space

- Supporting Products:
  -HY13P56

- Supporting Hardware Model No.
  -HY13S00-DK01 development kit

- Supporting Software Version:
  HY13P IDE V1.0 以上

- OS:
  Windows 98SE
  Windows 2000
  Windows XP
  Windows Vista
  Windows 7
- Applicable Interface:
  USB Port

1.3 Install and Remove

Install

Note: For some Windows OS, it may require to have administrator identity to install the Hex Loader to the computer

- Find and run the file, Setup.exe in the CD ROM or file .
- Following the instruction window dialogs step by step to continue setup procedures., as shown in Figure 1.

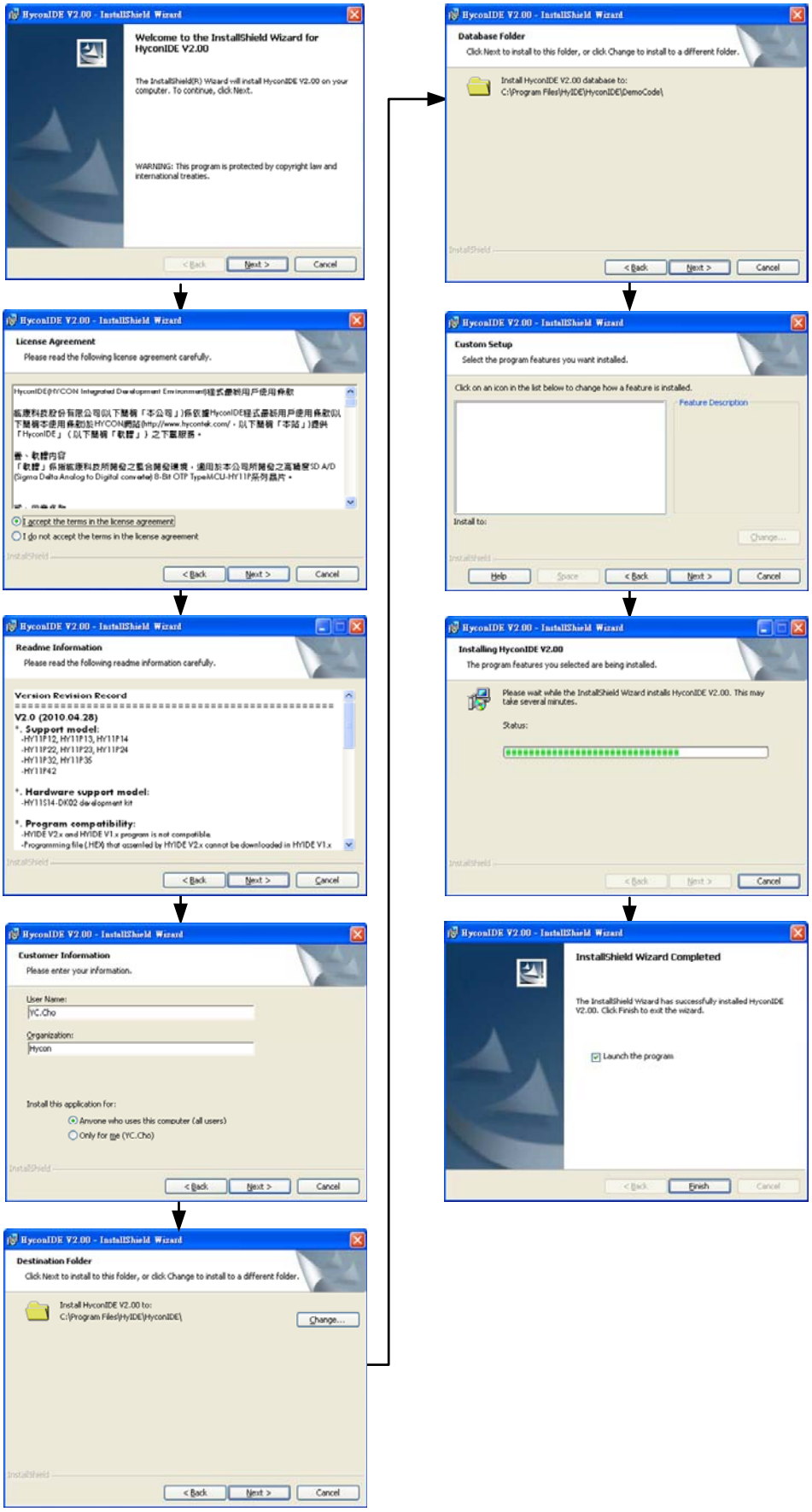

HyconIDE V2.00 - InstallShield Wizard
Welcome to the InstallShield Wizard for HyconIDE V2.00
The InstallShield(R) Wizard will install HyconIDE V2.00 on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel
License Agreement
Please read the following license agreement carefully.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Readme Information
Please read the following readme information carefully.
Version Revision Record
V2.0 (2010.04.28)
*. Support model:
-HY11P12, HY11P13, HY11P14
-HY11P22, HY11P23, HY11P24
-HY11P32, HY11P35
-HY11P42
*. Hardware support model:
-HY11S14-DK02 development kit
*. Program compatibility:
-HYIDE V2.x and HYIDE V1.x program is not compatible.
-Programming file (.HEX) that assembled by HYIDE V2.x cannot be downloaded in HYIDE V1.x
Customer Information
Please enter your information.
User Name:
YC.Cho
Organization:
Hycon
Install this application for:
Anyone who uses this computer (all users)
Only for me (YC.Cho)
Destination Folder
Click Next to install to this folder, or click Change to install to a different folder.
Install HyconIDE V2.00 to:
C:\Program Files\HyIDE\HyconIDE\
Change...
Database Folder
Click Next to install to this folder, or click Change to install to a different folder.
Install HyconIDE V2.00 database to:
C:\Program Files\HyIDE\HyconIDE\DemoCode\
Custom Setup
Select the program features you want installed.
Click on an icon in the list below to change how a feature is installed.
Feature Description
Install to:
Change...
Help
Space
Installing HyconIDE V2.00
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs HyconIDE V2.00. This may take several minutes.
Status:
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed HyconIDE V2.00. Click Finish to exit the wizard.
Launch the program
Finish

Figure 1

Remove

Please remove the file of “HY13P IDE” in “Add/Remove Program” under Control Panel.

1.4 Registration

For first time using ICE for simulation or program OTP chip, users must apply for a register code as to proceed operation.

Figure 2

Registration Procedures:

1. Please check the HY13P IDE Machine Number (HyIDE Code) on the parcel and send the number by e-mail or on-line registration. HYCON will send back another customer register code to you
2. Connect the HyIDE Control Board to PC through USB interface.
3. ExecuteHY13P IDE software (HY13PIDE.exe). Go to ”Option” and press ”Register”.
4. Fill in the customer code in “Register Number” and click “Write” to start.

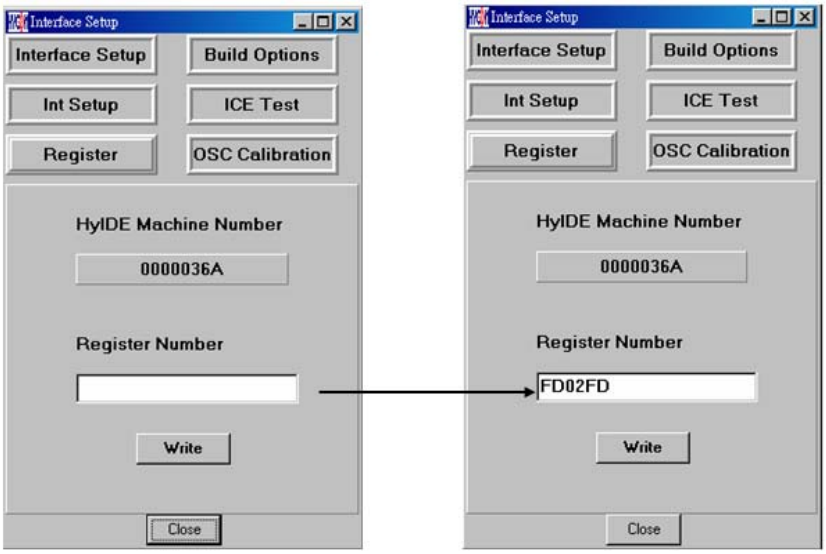


Figure 3

5. If the process is successful, a dialog will be shown as follows.

Figure 4

6. If the process failed, a dialog will be shown as Figure 6

Figure 5

7. Once the register is succeeded, Customers do not have to worry that other numbers may be written into the “Register Number”.

1.5 Demo Code Description

- Starting C:\Program Files\HyIDE\HY13PIDE\DemoCode.
- Set the file as assembly main file
- Assembly starts and proceeds program debug

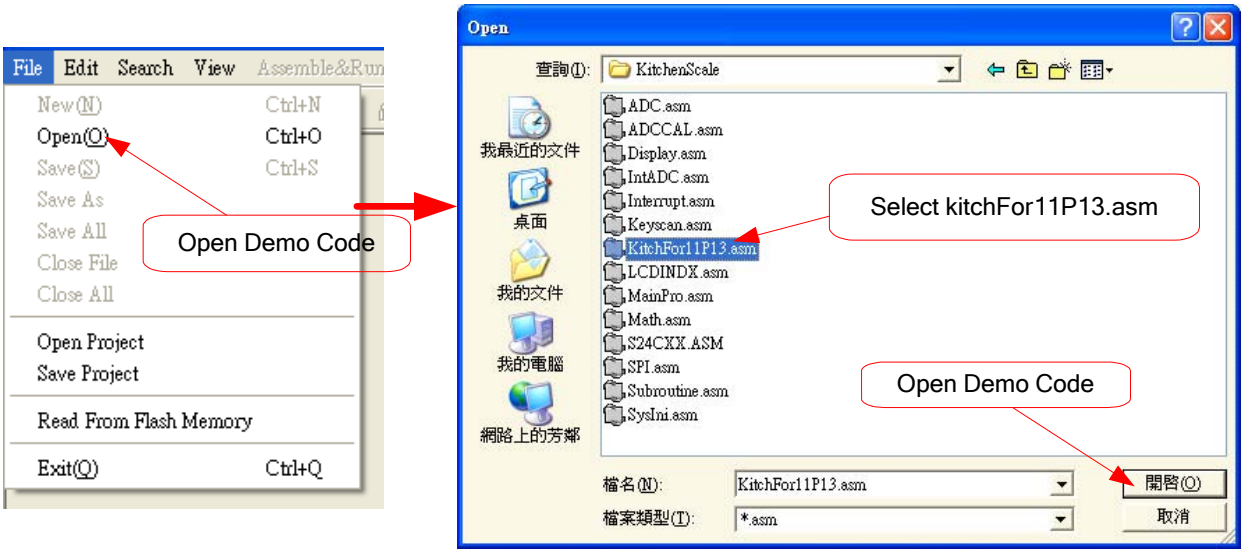


Figure 6

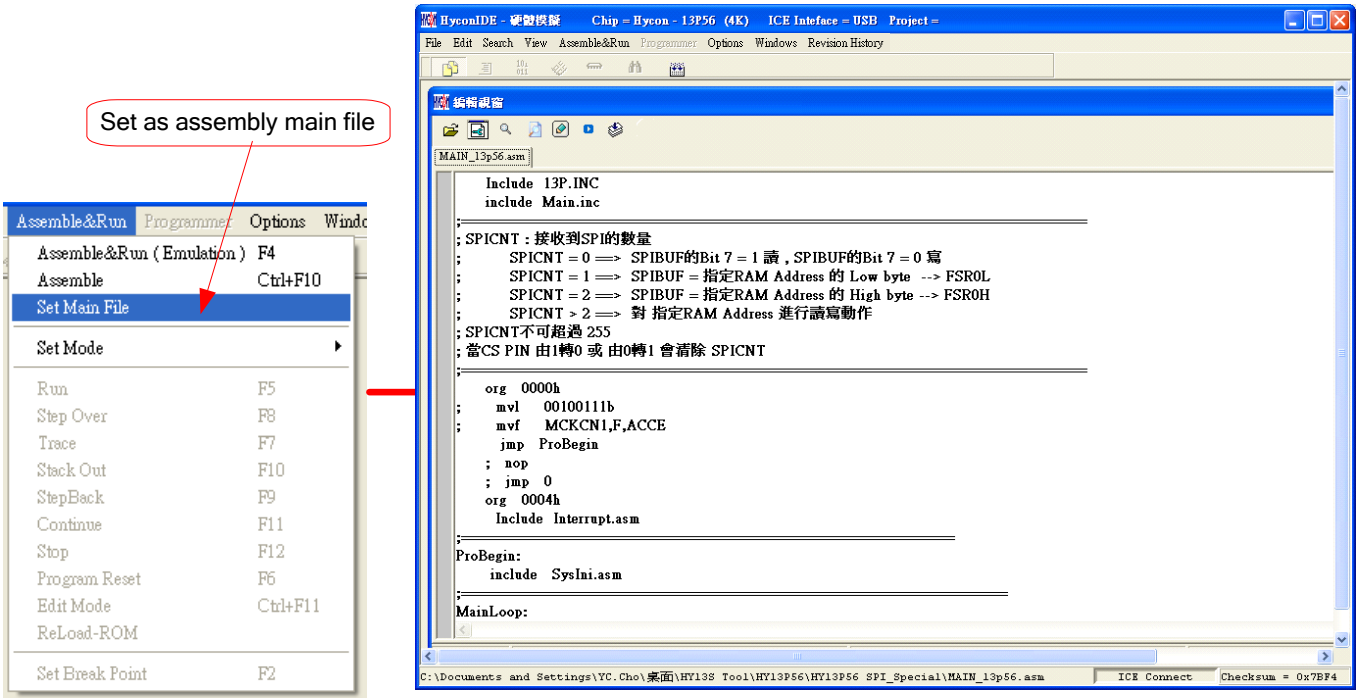


Figure 7

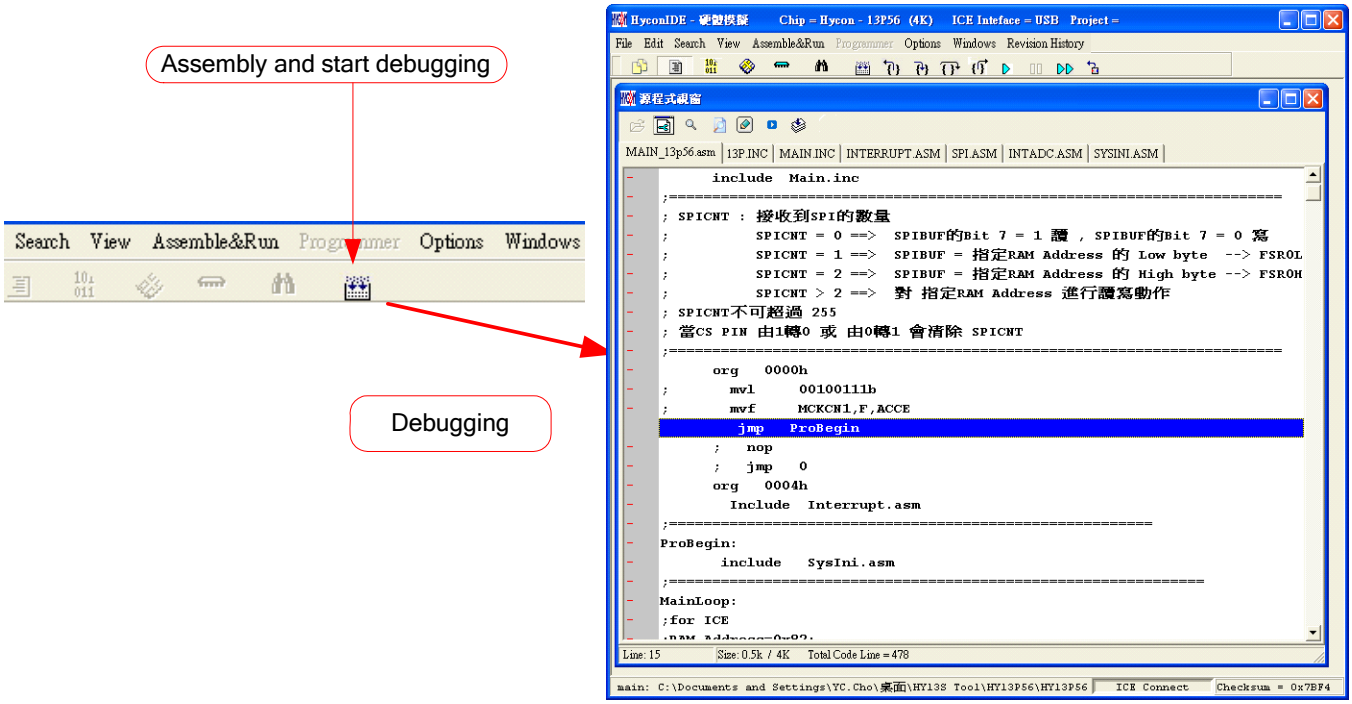


Figure 8

- Users can use any compiler to edit Source Code, as long as it can be stored in ASCII Code format. Source code will be reloaded when compiling program to ensure its correctness. Debugging and edit function will be depicted respectively in the following chapters.

1.6 Demo Code Operation

- After installing HY13P IDE software, users can refer to Demo Code that provided by HYCON at C:\Program Files\HyIDE\HY13PIDE\DemoCode.

2. HY13P IDE Interface Description

2.1 HY13P IDE Edit Interface

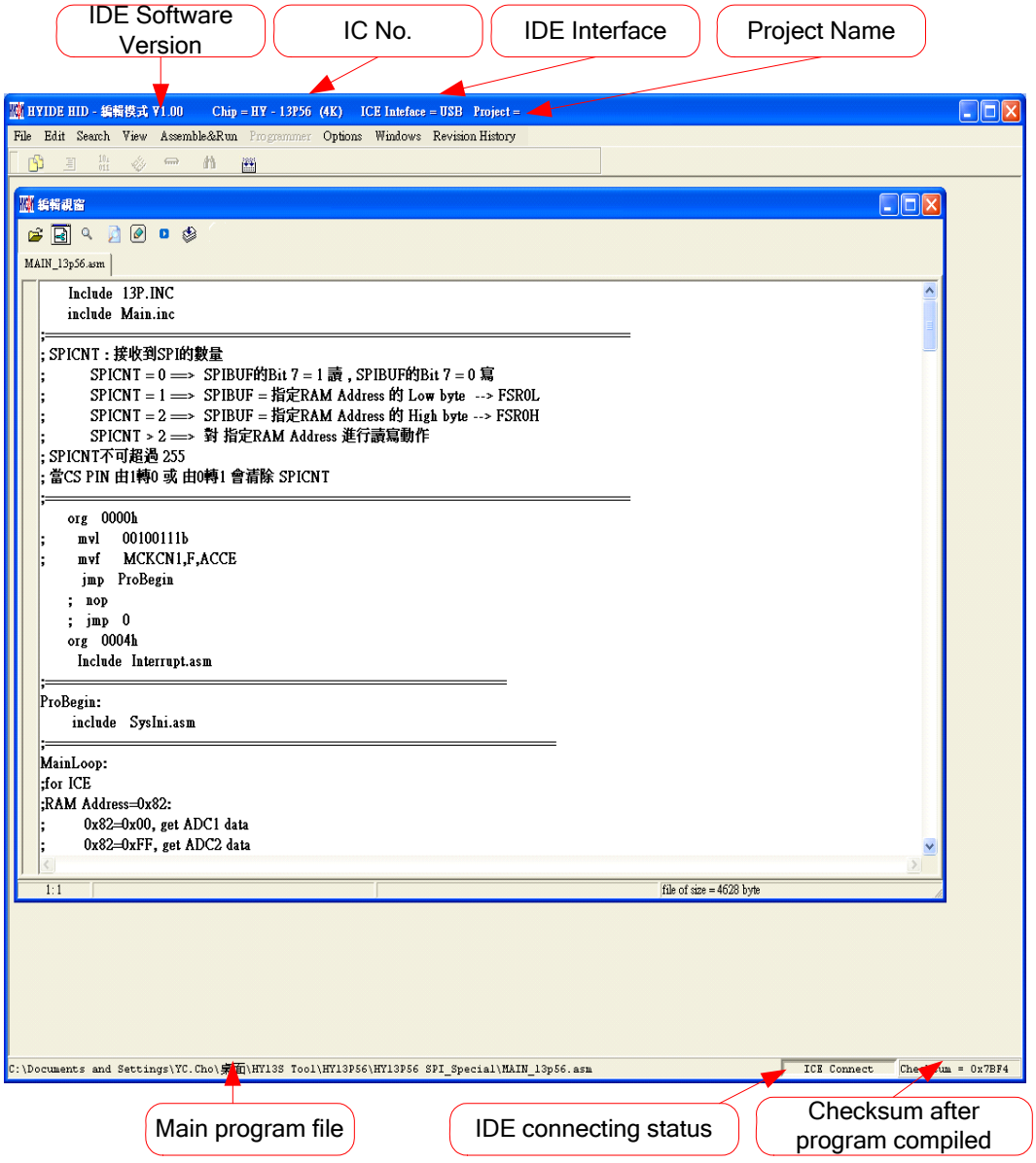


Figure 9

2.1.1Edit Window

- Open file 

  Open the existing edited file in the disk
- Set bookmark 

  Using this function to go back to the bookmark instantly when many files were opened
- Go to bookmark 

  Jump to the default bookmark
- Find string 

  Find input string
- Find next string 
- Go to page 

  Using this function to switch files
- Assemble 

  Only acting assemble function not debug status.

  After assembled, a message window will show up

2.1.2 File

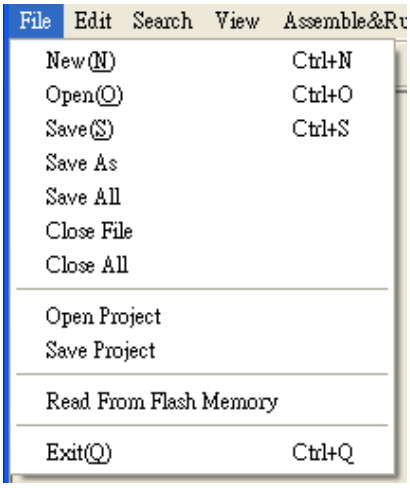


Figure 10

- Open Project → Project includes, IC No., IDE interface, main program file name, current status and checksum. The project status will be loaded once this function is activated.

2.1.3 Edit

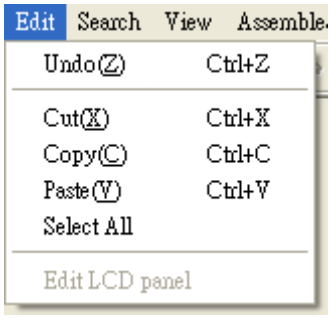


Figure 11

2.1.4View

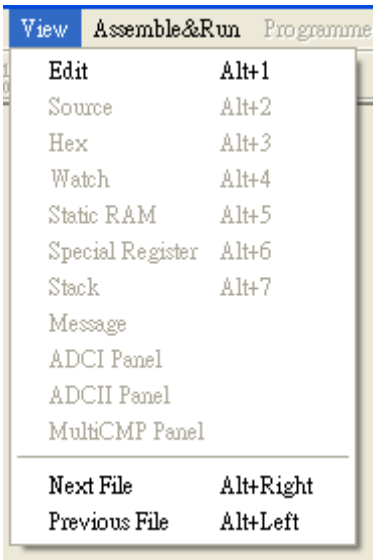


Figure 12

2.1.5 Assemble and Run

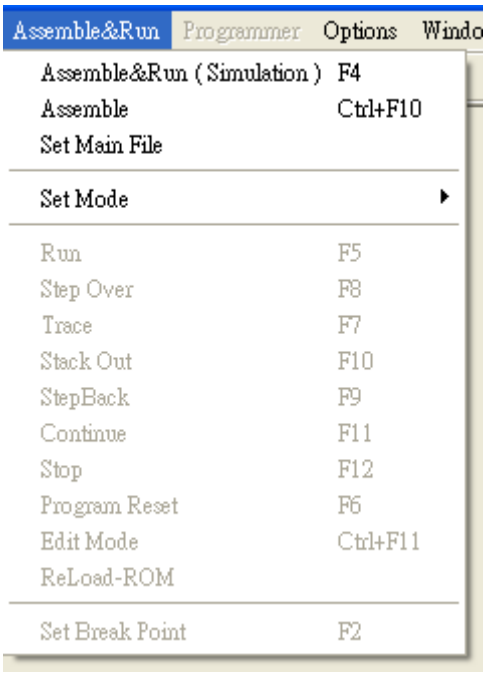


Figure 13

- Assemble & Run (Emulation) → Assemble Source Code and execute debug mode
- Assemble → Only executing assemble, not debugging. Error message will show up when the lines is error. It is usually used in generating OBJ Code (Object).
- Set Main File → Set the file as assembly main file. Files will be named after compiler generated file name, such as Hex, MAP, ASC…etc.
- Set Mode (Debug mode) → Debug through software or hardware is selective.

2.1.6 Interface Setup

- **Interface Setup**

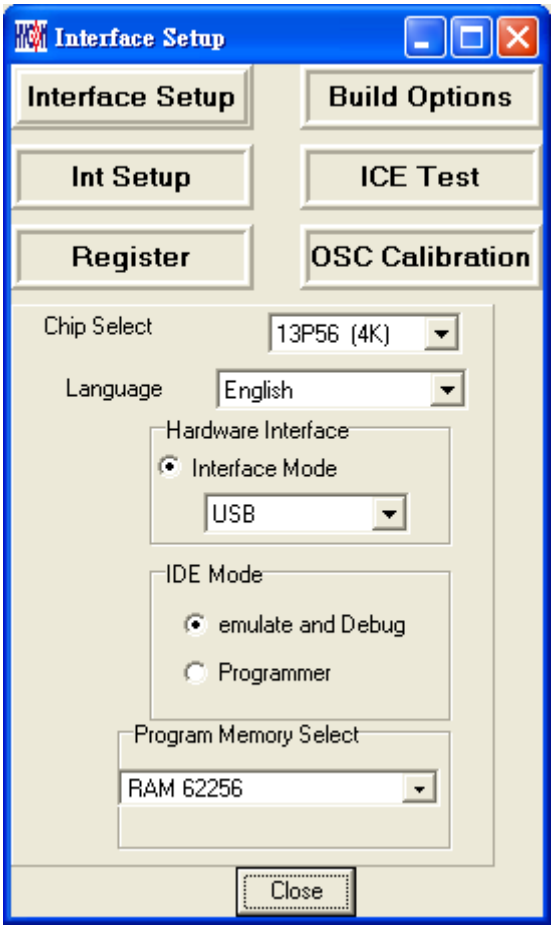


Figure 14

- Chip Select: Select IC part no. Compiler will assemble the selected part no.'s program file. It will determine whether there is any misuse or non-existing Register or SRAM, or has the program exceeded the ROM Size.
- Language option: English and Chinese interface are selectable.
- Communication interface option: Select IDE communication interface.
- Mode option: Two choices, Emulate and debug, and programmer

- **Build Option**

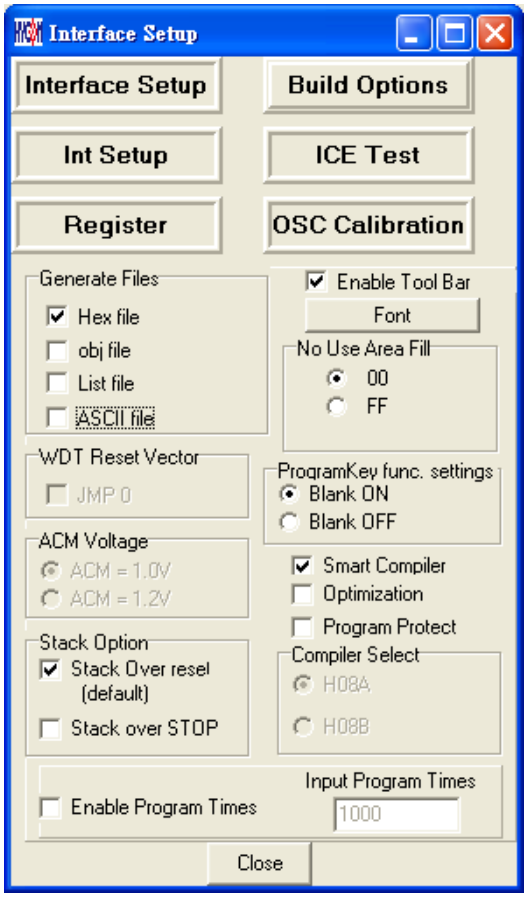


Figure 15

- Assembler generated extension: it is selectable to produce below file formats.

  1. Binary file : Hex
  2. Obj file : obj
  3. List file: lst
  4. ADCII file: asc

- Font option: Choose editor's fonts.
- Fill unused zone: Fill the unused zone with 0x0000 or 0xFFFF in the program.
- Simplified assemble: Simplified assemble function is selectable. When JMP or CALL is smaller than 2K, it will automatically transform to RJ or RCALL. If the arguments of CALL are set, it will not transform to RCALL.
- Program protection: Please refer to "Interface Setup" under Programming Window chapter.

- **Interrupt Setup**

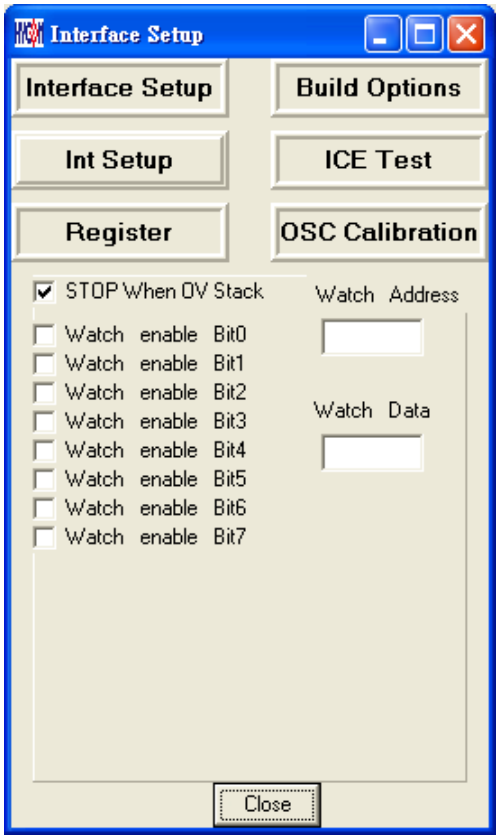


Figure 16

- Stop operation when Stack overflow: IDE will stop when Stack overflow.
- Monitor address: Select the monitored Register or RAM. The program will stop when the program executed RAM or Register value equals to the monitored Data.
- Monitor Data: Monitor value is set when the monitor Data is filled up.
- Monitor RAM bit: Monitor function will be activated if the monitor bit is ticked. The program will stop when the bit of Data value equals to the marked on bit.

- **ICE Test**

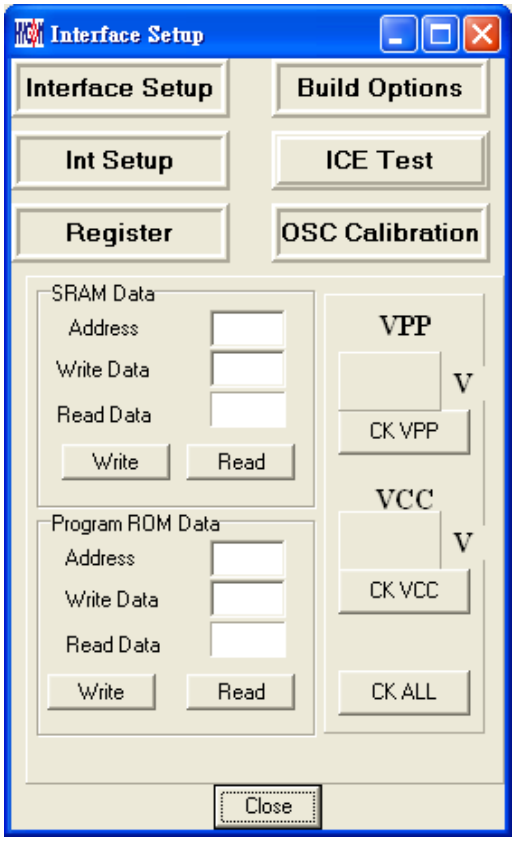


Figure 17

- **OSC calibration**

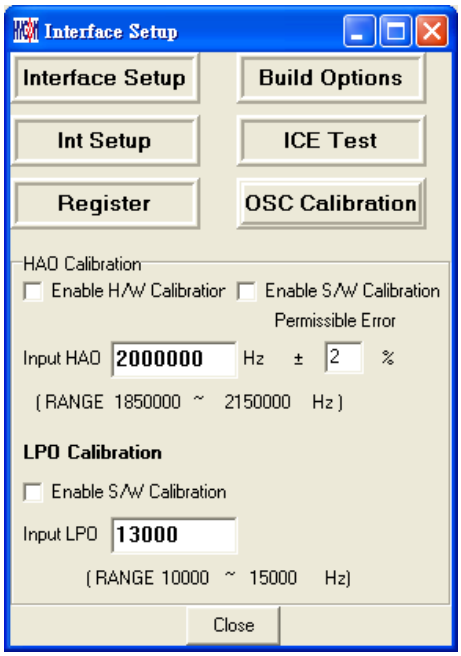


Figure 18

2.1.7 Windows

The window can be displayed horizontally or vertically.

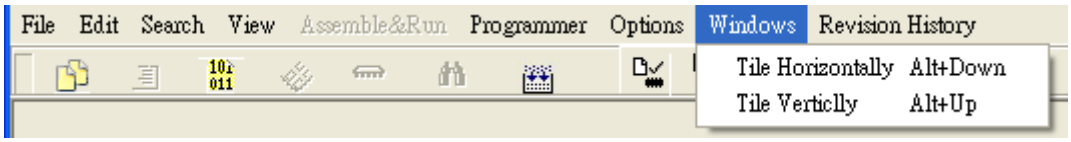


Figure 19

2.1.8 Program Structure

Before editing new program, user must select IC part number through interface setup;

Different IC will have different Instruction Set, according to IC part number definition; it is classified as H08A and H08B instruction set;

User can refer to the appendix software demo code, Chapter 1.6 gives illustration of demo code usage. Users can refer to following program structure to start writing program. Basic structure description is listed as below:

- Program Name Definition as: ***.ASM
- Register Name or RAM Definition as: ***.INC
- There are many program:
  - "Main.asm", "Initial.asm", "Interrupt.asm", "Sub.asm", "Mian.inc", "H08.inc"

- "Main.asm" structure:

```
                                ; Program name can be any name
ORG     00H                     ; Declare program start
JMP     BEGIN                   ; Jump to main program

ORG     04H                     ; Declare interrupt flag address
Include Interrupt.asm           ; Use "Interrupt.asm" interrupt vice program;
                                ; Max. 100include file.

BEGIN:                          ; Main program start. Label name definition can be any word
Include Initial.asm             ; Use "Initial.asm" hardware initial vice program
JMP     T1                      ; Jump to T1 vice program
…
T1:
NOP

Include Sub.asm                 ; Use "Sub.asm" vice program


Include 13P.inc                 ;HY13P series special register name, address definition
Include Main.inc                ;RAM name, address definition
END                             ; End program
```

- Reference Document:

  IP User Manual:

  Instruction Set User Manual: H08A Instruction Set Manual or H08B Instruction Set Manual

  Hycon-IDE Complier User Manual: HY-MCU COMPILER

2.1.9 Self-defined Instruction

- HY13P IDE includes user self-defined instruction function This function provides user to self-define HY13P series instruction as their familiar MCU instructions
- Usage Description:

1. All self-defined instruction function is installed under: Inst.txt file. It is separated into two rows. The first instruction (first row) of every row is HYCON origin instruction name; users cannot make amendment to it. The second instruction (second row) is "User" self-defined instruction name.
2. First and second instruction can only be separated by space, multi-space or Tab.
3. Second instruction can be followed by semicolon (;) as remark.
4. Second instruction name can be the same as the first one.
5. The name of second instruction cannot be defined as any of HYCON origin instruction name except the instruction in the same row. Otherwise, it is deemed as invalid and will adopt the origin instruction name to compile program.
6. After users self-define the second instruction name, the first or second instruction name can be used when program compiling.
7. Every row can only has one self-defined instruction name, any repeated instruction name will be deemed as invalid.

- Example:

  JMP JUMP JMM JPP JU ; ╳wrong definition

- Repeated defined instruction or self-define instruction will be deemed as invalid.

  Example:

  JMP JUMP

  JMP JPP ; ╳ Instruction name redefine. JUMP is invalid instruction at this point, only JPP is valid.

  JPP JU ; ╳ Cannot use self-define name to redefine.

  JMP JN ; ╳ Cannot define as HYCON existing instruction name.

  Correct definition is:

  JMP JUMP

3. HY13P IDE Debug Interface

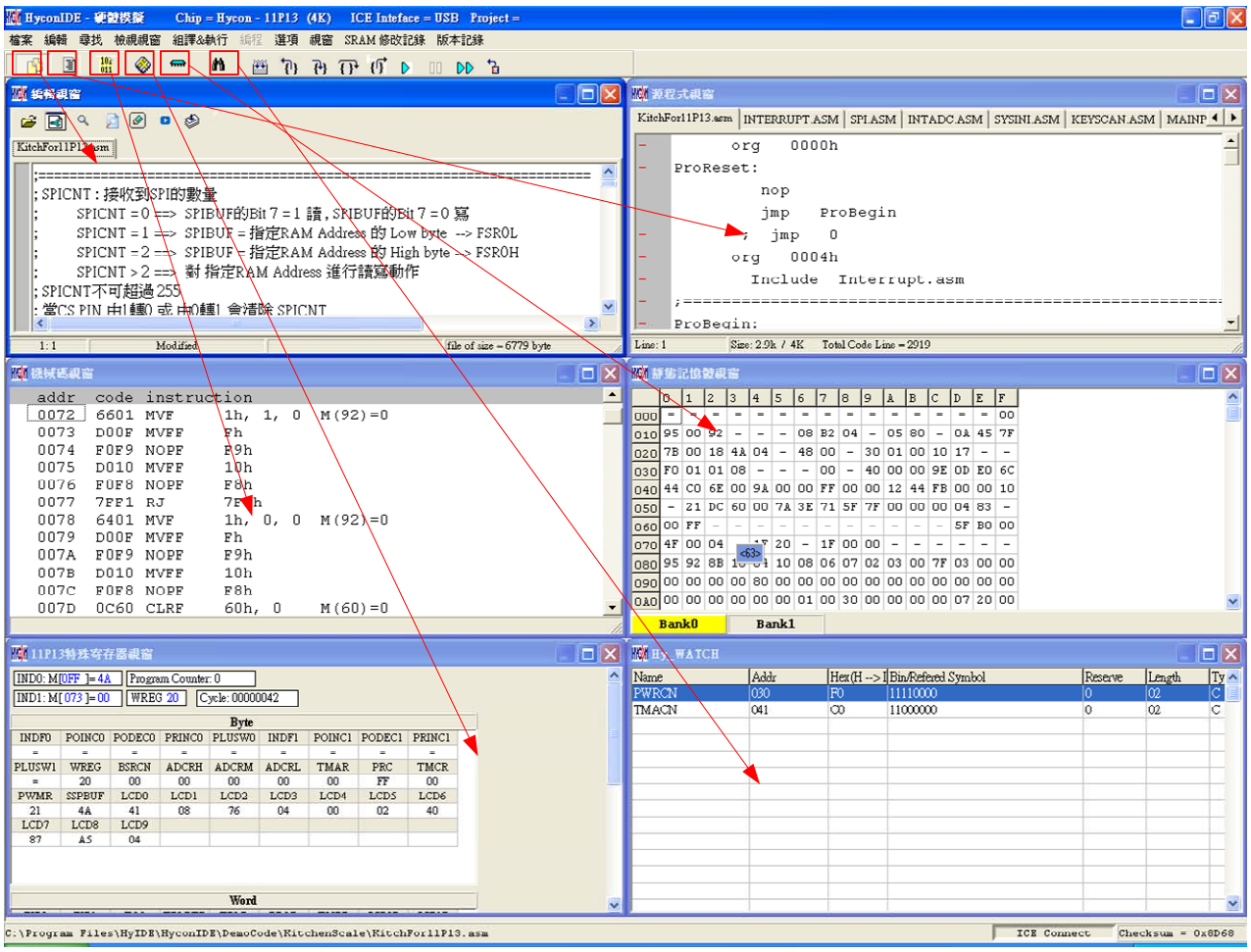
It can be classified into hardware debug and software debug:

- Hardware debug

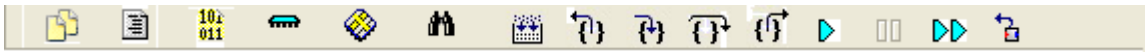
  The indication column is blue

- Software debug

  The indication column is green

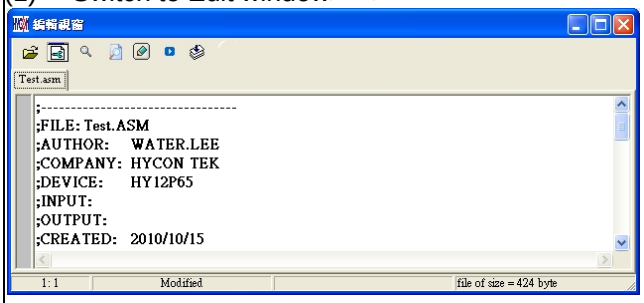


3.1 Fast Execution

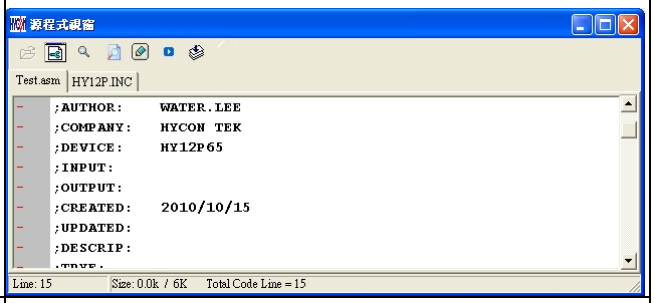


- **Fast Window Switch**

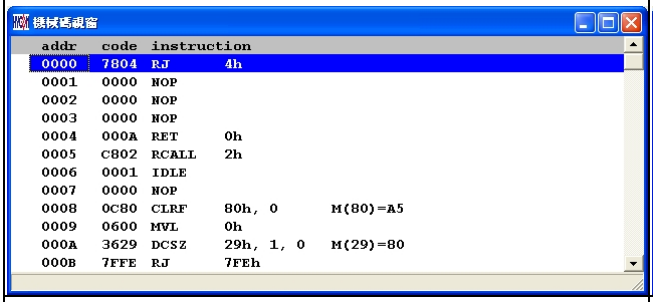
(1) Switch to Edit window



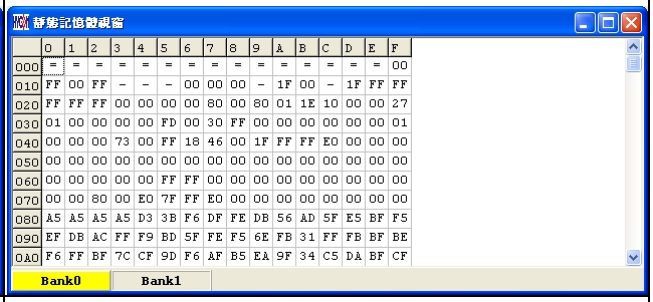
(2) Switch to Source window



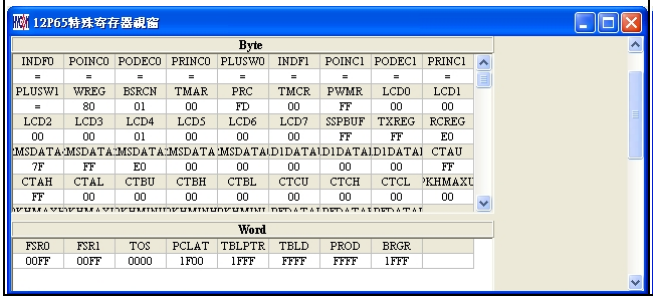
(3) Switch to Hex window



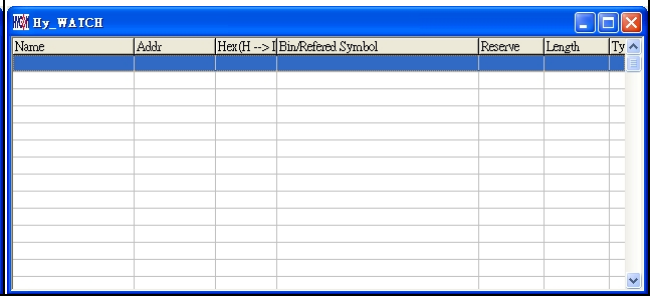
(4) Switch to Ram window



(5) Switch to Reg window



(6) Switch to Watch window



- **Fast Debug**

(1) Step back

(2) Trace (Enter into Macro/vice program)

(3) Step over (Not enter into Macro/vice program)

(4) Skip Call

(5) Execute (Free RUN)

(6) Pause

(7) Continue

(8) Program replace

(9) Back to edit mode

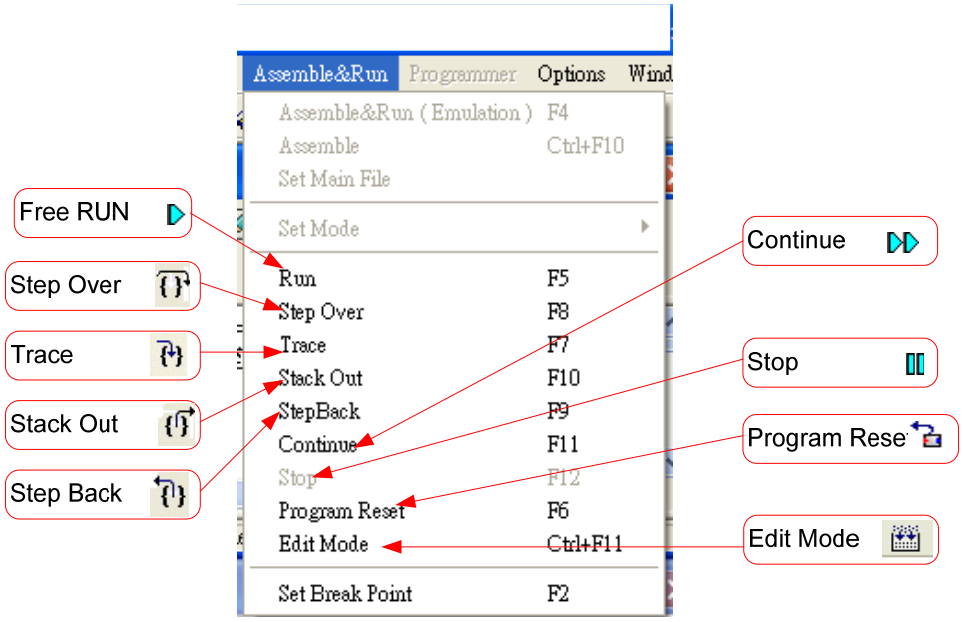


Figure 20

- **Two methods to set or remove interrupt:**

1. Use mouse to select interrupt place in program code window or machine code window, press “F2” button to set to remove interrupt.
2. Use mouse to select interrupt place in program code window or machine code window, double click the left key to set or remove interrupt.

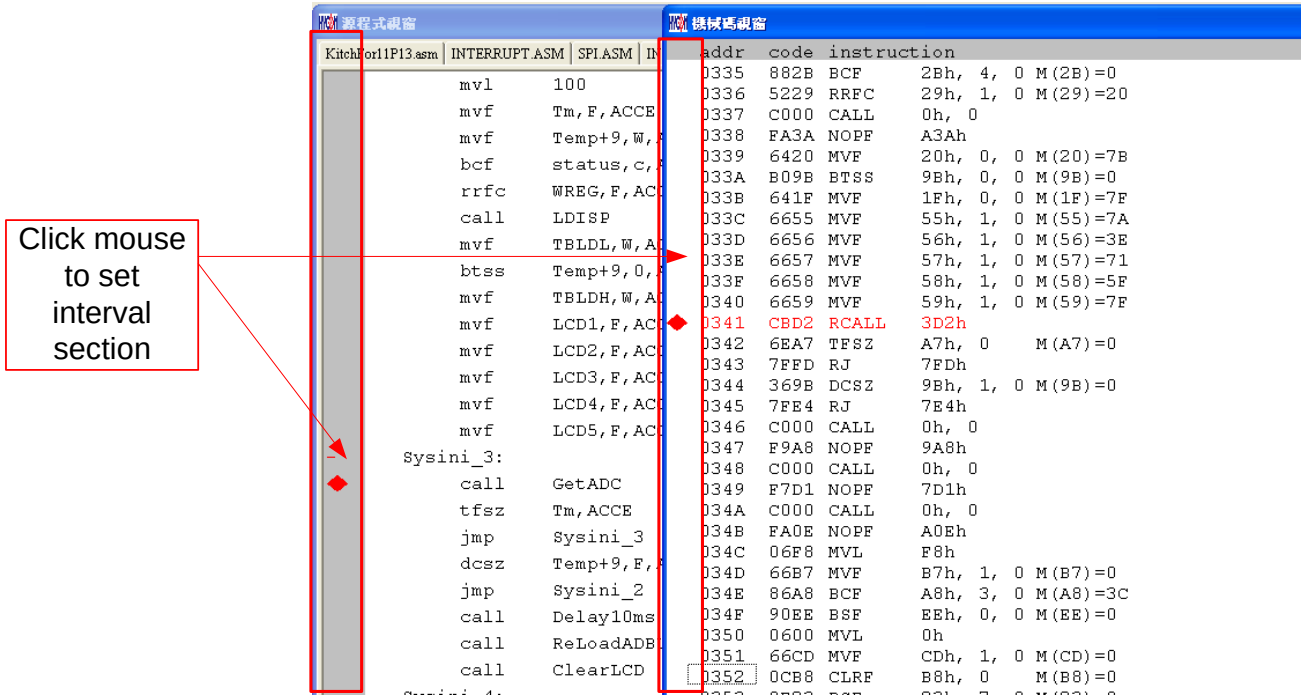
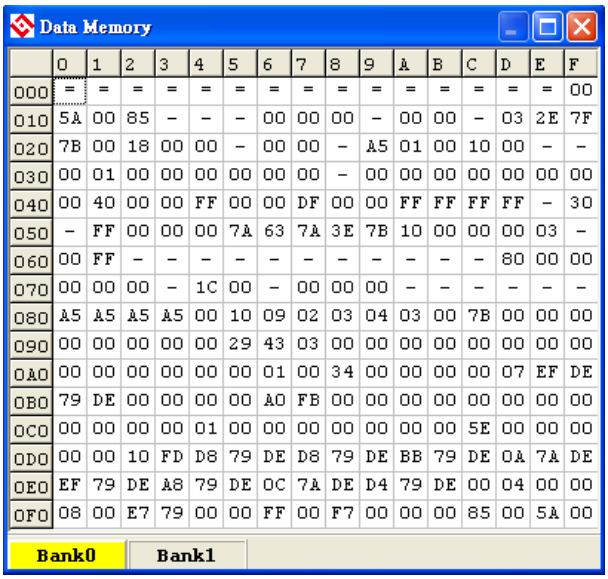

Click mouse to set interval section
KitchFor11P13.asm
INTERRUPT.ASM
SPI.ASM
addr code instruction
mvl 100
mvf Tm,F,ACCE
mvf Temp+9,W,
bcf status,c,
rrfc WREG,F,AC
call LDISP
mvf TBLDL,W,A
btss Temp+9,0,
mvf TBLDH,W,A
mvf LCD1,F,AC
mvf LCD2,F,AC
mvf LCD3,F,AC
mvf LCD4,F,AC
mvf LCD5,F,AC
Sysini_3:
call GetADC
tfsz Tm,ACCE
jmp Sysini_3
dcsz Temp+9,F,
jmp Sysini_2
call Delay10ms
call ReLoadADB
call ClearLCD
0335 882B BCF 2Bh, 4, 0 M(2B)=0
0336 5229 RRFC 29h, 1, 0 M(29)=20
0337 C000 CALL 0h, 0
0338 FA3A NOPF A3Ah
0339 6420 MVF 20h, 0, 0 M(20)=7B
033A B09B BTSS 9Bh, 0, 0 M(9B)=0
033B 641F MVF 1Fh, 0, 0 M(1F)=7F
033C 6655 MVF 55h, 1, 0 M(55)=7A
033D 6656 MVF 56h, 1, 0 M(56)=3E
033E 6657 MVF 57h, 1, 0 M(57)=71
033F 6658 MVF 58h, 1, 0 M(58)=5F
0340 6659 MVF 59h, 1, 0 M(59)=7F
0341 CBD2 RCALL 3D2h
0342 6EA7 TFSZ A7h, 0 M(A7)=0
0343 7FFD RJ 7FDh
0344 369B DCSZ 9Bh, 1, 0 M(9B)=0
0345 7FE4 RJ 7E4h
0346 C000 CALL 0h, 0
0347 F9A8 NOPF 9A8h
0348 C000 CALL 0h, 0
0349 F7D1 NOPF 7D1h
034A C000 CALL 0h, 0
034B FA0E NOPF A0Eh
034C 06F8 MVL F8h
034D 66B7 MVF B7h, 1, 0 M(B7)=0
034E 86A8 BCF A8h, 3, 0 M(A8)=3C
034F 90EE BSF EEh, 0, 0 M(EE)=0
0350 0600 MVL 0h
0351 66CD MVF CDh, 1, 0 M(CD)=0
0352 0CB8 CLRF B8h, 0 M(B8)=0

Figure 22

3.2 RAM Window



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
000	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	00
010	5A	00	85	-	-	-	00	00	00	-	00	00	-	03	2E	7F
020	7B	00	18	00	00	-	00	00	-	A5	01	00	10	00	-	-
030	00	01	00	00	00	00	00	00	-	00	00	00	00	00	00	00
040	00	40	00	00	FF	00	00	DF	00	00	FF	FF	FF	FF	-	30
050	-	FF	00	00	00	7A	63	7A	3E	7B	10	00	00	00	03	-
060	00	FF	-	-	-	-	-	-	-	-	-	-	-	80	00	00
070	00	00	00	-	1C	00	-	00	00	00	-	-	-	-	-	-
080	A5	A5	A5	A5	00	10	09	02	03	04	03	00	7B	00	00	00
090	00	00	00	00	00	29	43	03	00	00	00	00	00	00	00	00
0A0	00	00	00	00	00	00	01	00	34	00	00	00	00	07	EF	DE
0B0	79	DE	00	00	00	00	A0	FB	00	00	00	00	00	00	00	00
0C0	00	00	00	00	01	00	00	00	00	00	00	00	5E	00	00	00
0D0	00	00	10	FD	D8	79	DE	D8	79	DE	BB	79	DE	0A	7A	DE
0E0	EF	79	DE	A8	79	DE	0C	7A	DE	D4	79	DE	00	04	00	00
0F0	08	00	E7	79	00	00	FF	00	F7	00	00	00	85	00	5A	00

Figure 21

- After opening RAM window, Bank will show the volume of the selected IC. Every Bank has 256 byte.
- Bank0 starts from 0x00 to 0xFF. Bank1 starts from 0x100 to 0x1FF…etc.
- If the address does not exist, it will display "-".
- If users intend to switch Bank display, use cursor to point to the desired Bank zone, and then click the left key of the mouse to confirm.
- If Hint is set, the address will display numbers and will be underlined.
- **Notice: The Address 0x00 ~ 0x0Eof Bank0 is indirect addressing register, it cannot be revised directly, the displayed value is not referable. If revise is required, please refer to Chapter 3.3. Revise indirect addressing Data or Address.**

- **Function Display**

  Click the mouse selection key (right key)

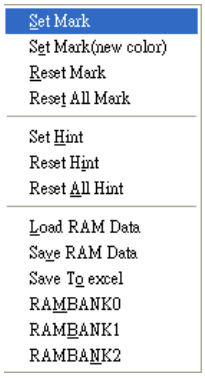


Figure 22

- Set Mark
- Set Mark(new color)
- Reset Mark

- Reset All Mark
- Set Hint
- Reset Hint
- Reset All Hint
- Load RAM Data
- Save RAM Data
- Save To excel
- RAMBANK0

- Hint

  Use DS defined SRAM; Hint will be automatically generated in corresponding window address. When cursor point to the address, it will show the defined string.

  Ex: Program definition SRAM

```
MEMAR       080h
MD1         DS      1
MD2         DS      1
MD3         DS      1
MDL1        DS      1
MDL2        DS      1
MDL3        DS      1
MD4         DS      5
S_REG       DS      1
r_Len       DS      1
SQRTmp      DS      4
Temp        DS      16
```

  After assembling, it will enter into debug status, displaying memory window.

  When cursor points to 80h address, <80>:MD1 will be shown.

  When cursor points to 86h address, <86>:MD4[0] will show up.

  When cursor points to 87h address, <87>:MD4[1] will show up.

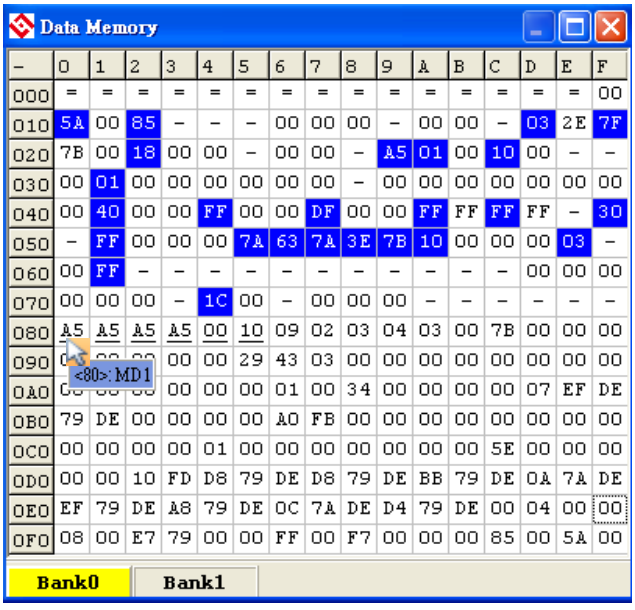


Figure 23

- **There are two ways to revise SRAM value:**
  1. Point the cursor to the selected revised lines, click mouse's left key and Key IN directly.
  2. Point the cursor to the selected revised lines, double click the mouse's left key, a window will pop up as Figure 27 shown. Users can key in on keyboard or press the button by mouse

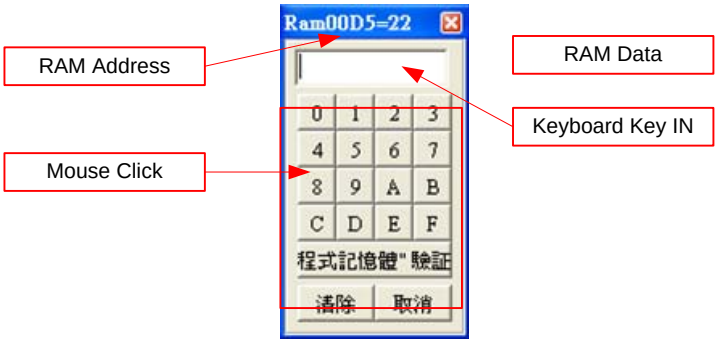


Figure 24

3.3 Register Window

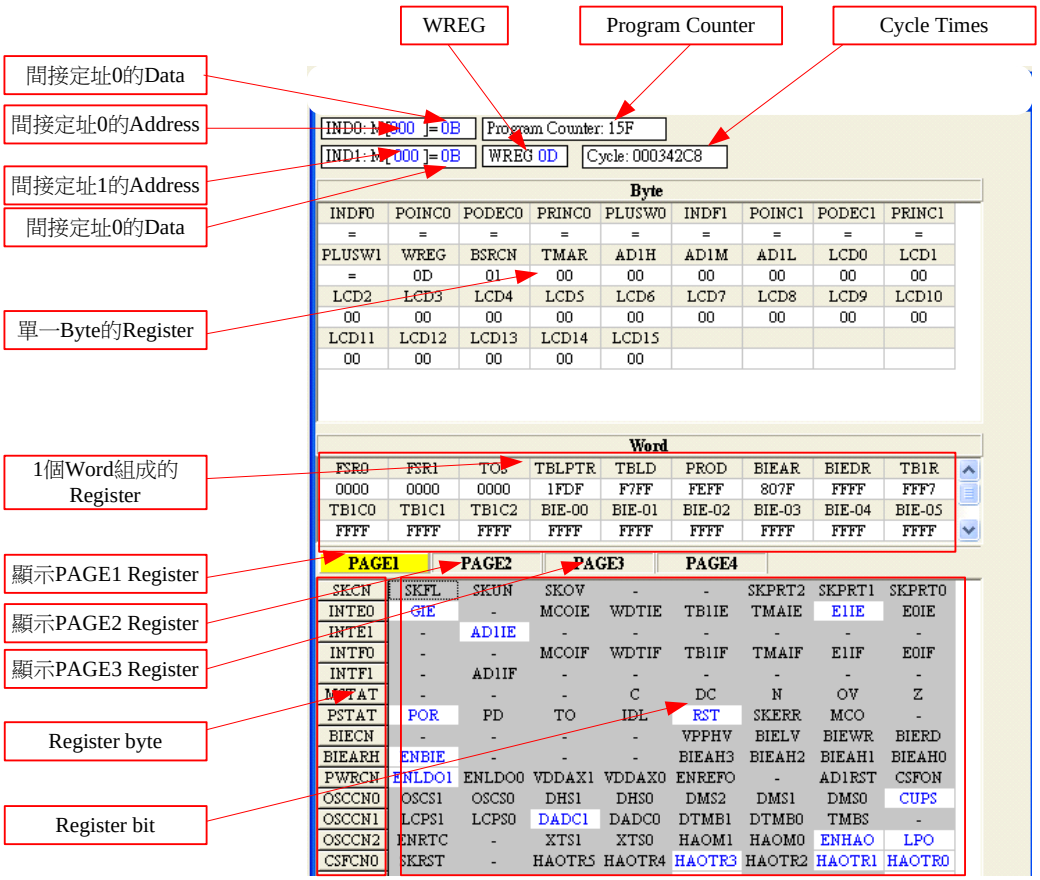


Figure 25

- Modify Indirect Data or Address

As Figure 269 configures, using keyboard to Key IN or using cursor to click data the Address can be modified

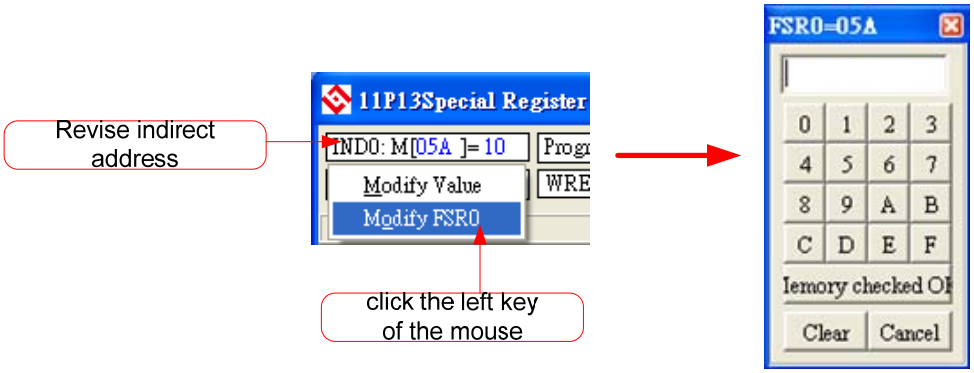


Figure 26

As shown in Figure 27, using Key IN of the keyboard or using cursor to click data the Data can be modified.

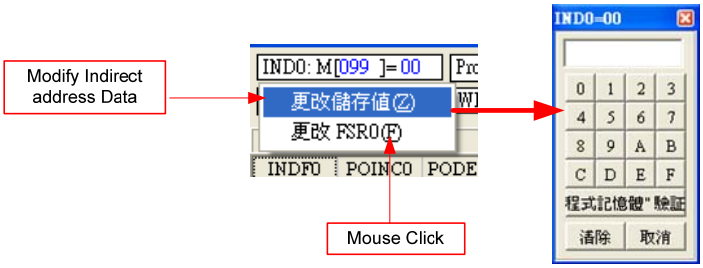


Figure 27

- Modify WREG Data

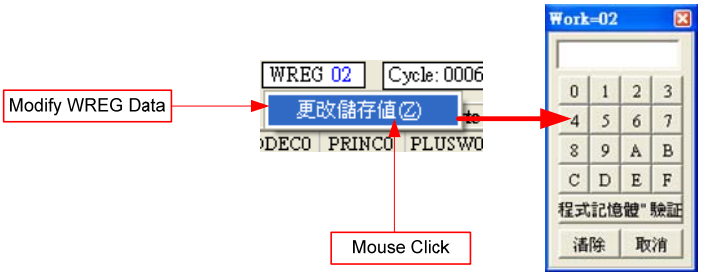


Figure 28

- Modify single 1byte or Word Register Data

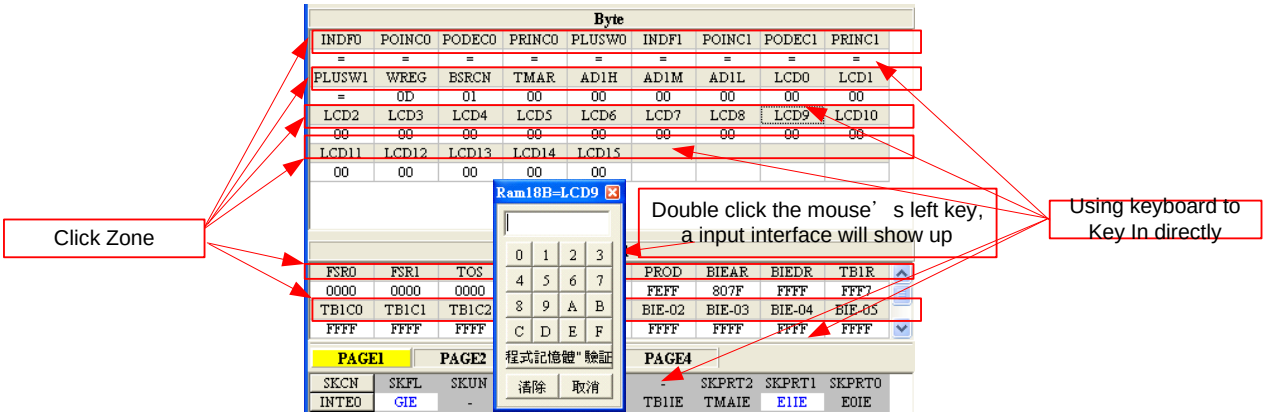


Figure 29

- Modify Register single 1 byte or single 1 bit

  After configuring Bit as 1, it will be highlighted in white, blue digit

  After configuring Bit as 0, it will be marked in black digit

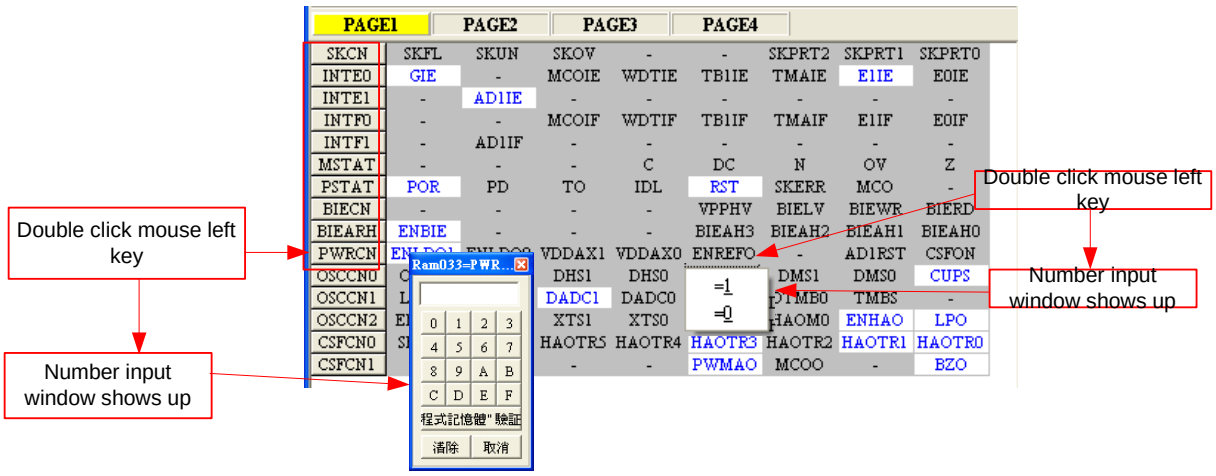


Figure 30

3.4 Watch Window

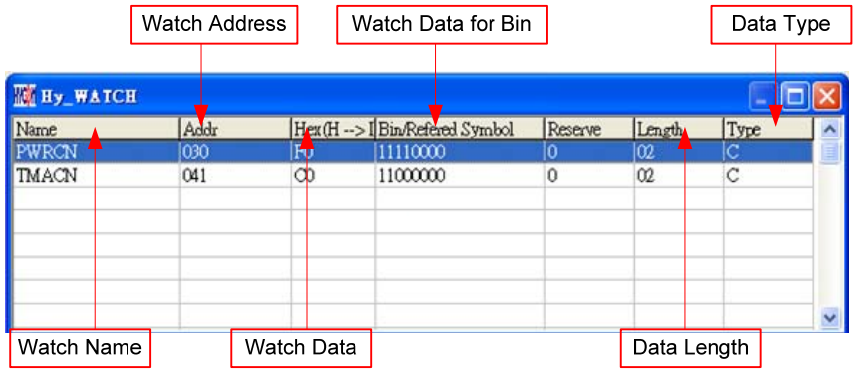


Figure 31

- Watch Name → Monitor Data name, program uses EQU or DS defined name
- Watch Address → Monitor Data Address
- Watch Data → Display value, can select display arrangement from right to left or from left to right or in decimal or hexadecimal system.

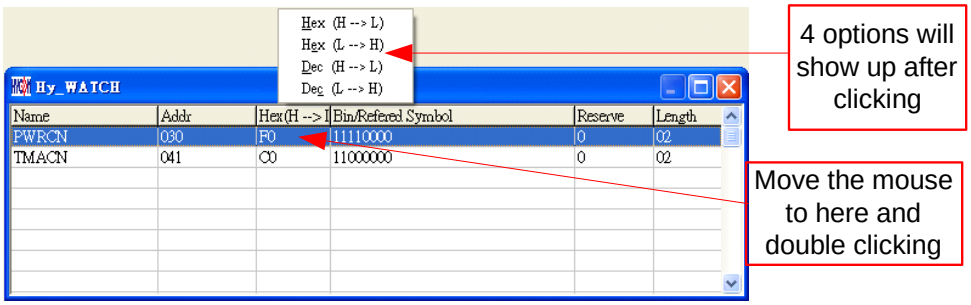


Figure 32

Hex (H → L): Hexadecimal display, address H/L from low to high

Hex (L → H): Hexadecimal display, address L/H from high to low

Dec (H → L): Decimal display, address H/L from low to high

Dec (L → H): Decimal display, address L/H from high to low

- Watch Data for Bin → Data display in decimal system, only show up when using EQU defined address
- Data Length → Data length, display DS definition length; it will display 2 when using EQU definition
- Data Type → D = DS definition; C = EQU definition

- Monitor EQU defined Register or RAM, click right key of the mouse and select the register or RAM to be monitored, as shown in Figure 33.

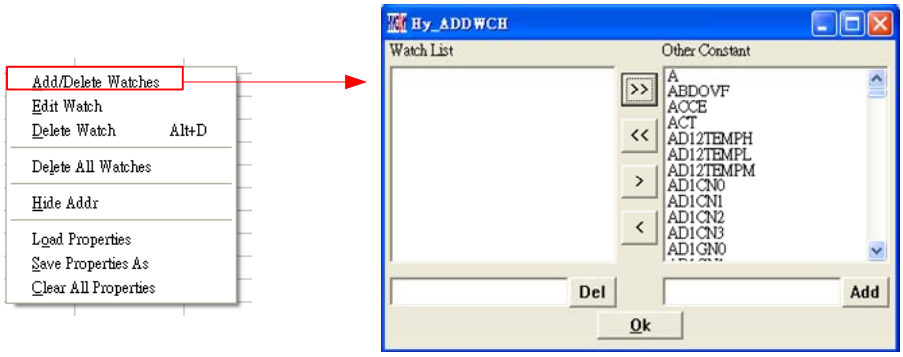


Figure 33

3.5 Stack Window

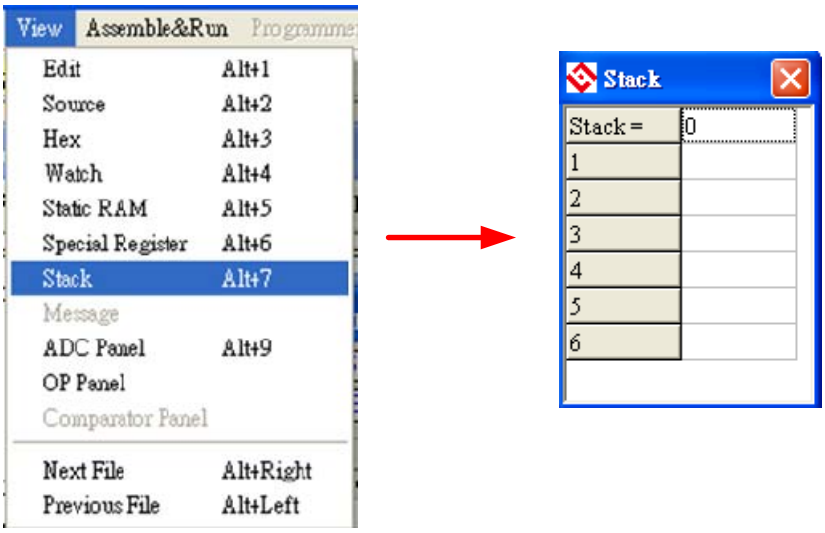


Figure 34

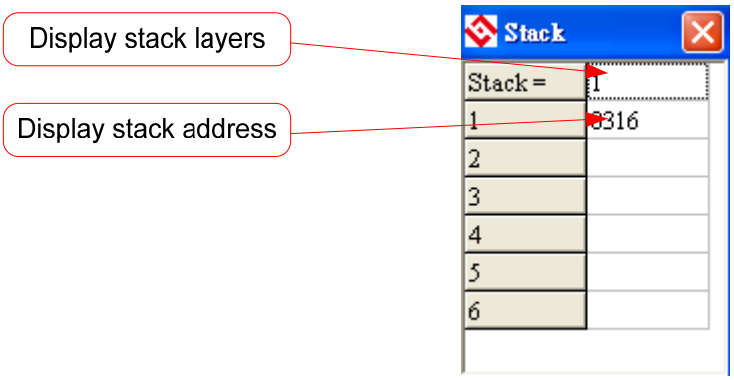


Figure 35

3.6 ADC Window

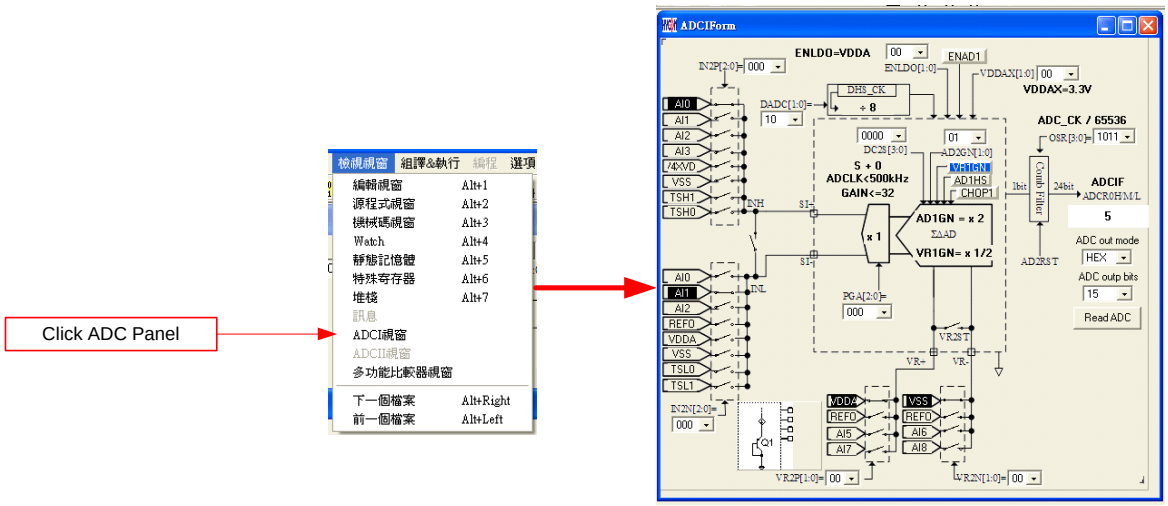


Figure 36

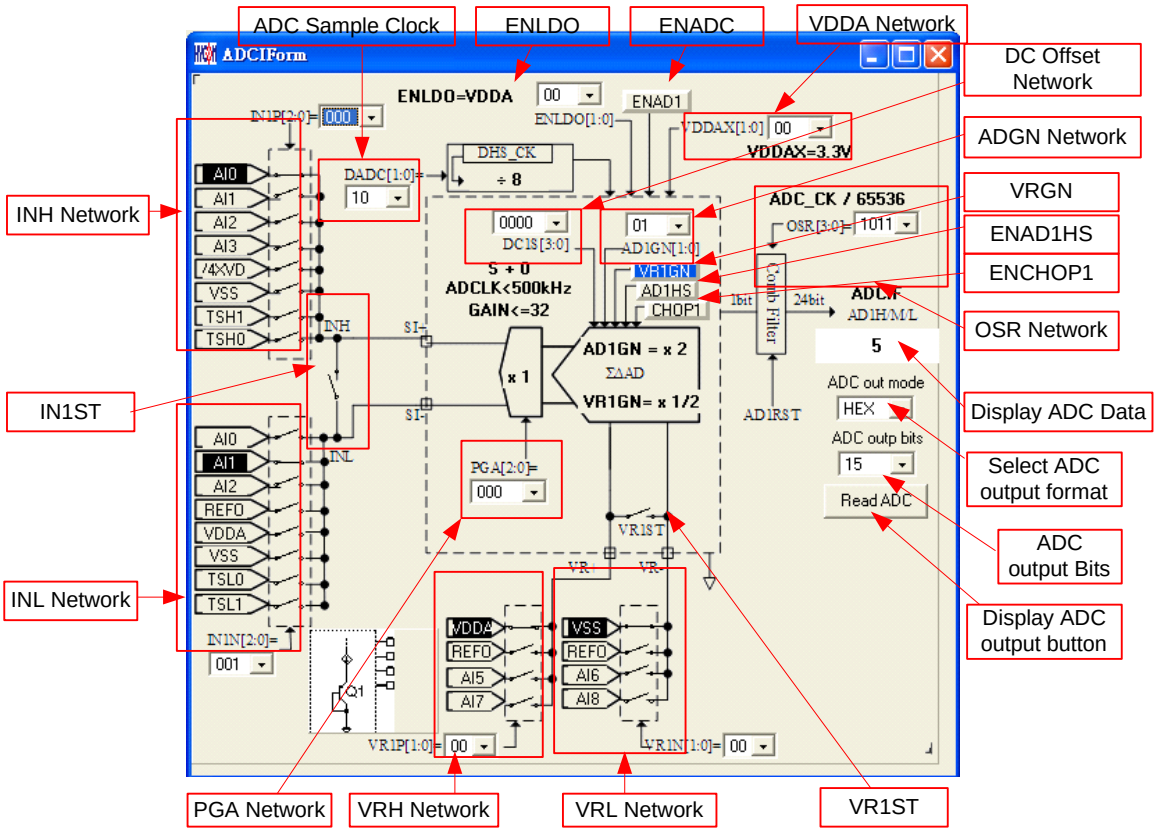


Figure 37

- IN1P Network
  - (1) Click mouse left key on the name of INH, to select INH network.
  - (2) Click mouse left key on the network switch, INH to select the network.
  - (3) Click mouse left key, window like Figure 38 will appear, users can select network switches.

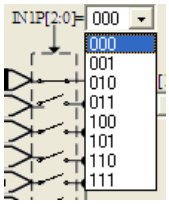


Figure 38

- IN1N Network
  - (4) Click mouse left key on the name of INL, to select INL network.
  - (5) Click mouse left key on the network switch, INL to select the network.
  - (1) Click mouse left key, window like Figure 382 will appear, users can select network switch.

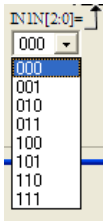


Figure 39

- IN1ST Switch
  - (1) Click mouse left key on the name of IN1ST, switch will be ON/OFF
  - (2) Click mouse left key on the network switch, IN1ST switch will be ON/OFF
- VR1P Network
  - (1) Click mouse left key on the name of VR1P to select the network
  - (2) Click mouse left key on the network switch, VR1P to select the network
  - (3) Click mouse left key on the network, window like Figure 40 will appear, users can select network switch.

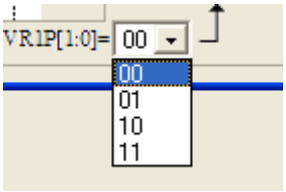


Figure 40

- VR1N Network
  - (1) Click mouse left key on the name of VR1N to select the network
  - (2) Click mouse left key on the network switch, VR1N to select the network
  - (3) Click mouse left key on the network, window like Figure 40 will appear, users can select network switch

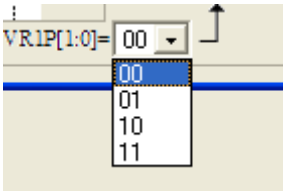


Figure 41

- ADC Sample Clock

  Click mouse left key, window like Figure 42 will show up, and then user can select the network switch

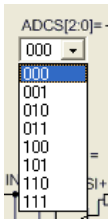


Figure 42

- ENADC

  Click mouse left key on network switch, ENADC will be ON/OFF. When ENADC = ON, ADC display zone will show value.

- VDDA Network

  ENVDDA control

  (1) Select ENVDDA switch ON/OFF

  (2) Select VDDA voltage

  Click mouse left key, window like Figure 43 will show up, users can select to the mode.

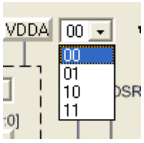


Figure 43

  (3) Display VDDA voltage

  When ENVDDA = 0, the zone display VDDA = External

  When ENVDDA = 1, the zone display VDDX select voltage

- PGA Network

  Click mouse left key, window like Figure 44 will show up, users can select to the network.

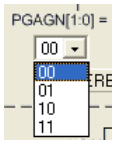


Figure 44

- VRH Network

  (1) Click mouse left key to the network name, VRH, to select the network

  (2) Click mouse left key to the network switch, VRH, to select the network.

(3) Click mouse left key, window likeFigure 45 will show up, users can select to the switch network.

Figure 45

- VRL Network

(1) Click mouse left key to the network name, VRL, to select the network

(2) Click mouse left key to the network switch, VRL, to select the network.

(3) Click mouse left key, window likeFigure 45 will show up, users can select to the switch network

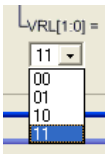


Figure 46

- DC Offset Network

Click mouse left key, window likeFigure 45 will show up, users can select to the network.

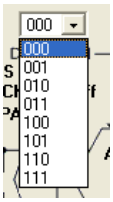


Figure 47

- ADGN Network

Click mouse left key, window likeFigure 45 will show up, users can select to the network.

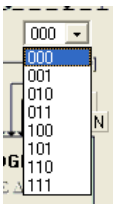


Figure 48

- VR1GN

Click mouse left key to the network name, VR1GN, to select the network

- OSR Network

Click mouse left key, window likeFigure 45 will show up, users can select to the network

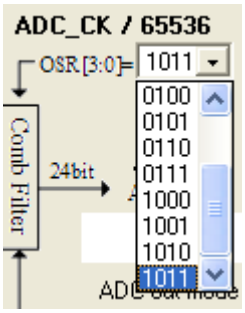


Figure 49

- ADC Display Zone
  - (1) Select ADC output form → Hex or Dec output is selectable
  - (2) Select ADC output Bit→ 8 ~ 24 Bit output is selectable
  - (3) Display output button→ clicking this button to display ADC output value

3.7 Comparator Window

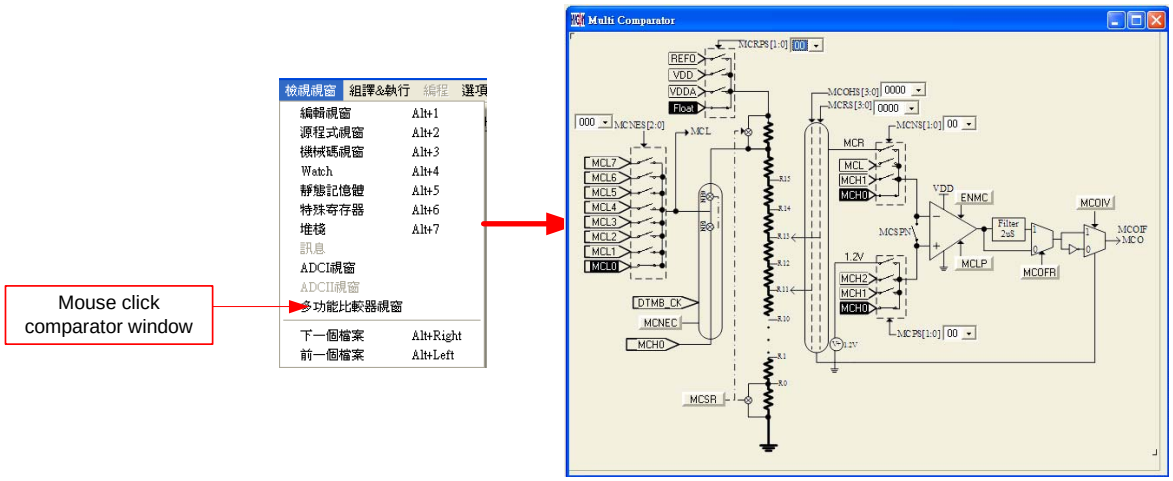


Figure 50

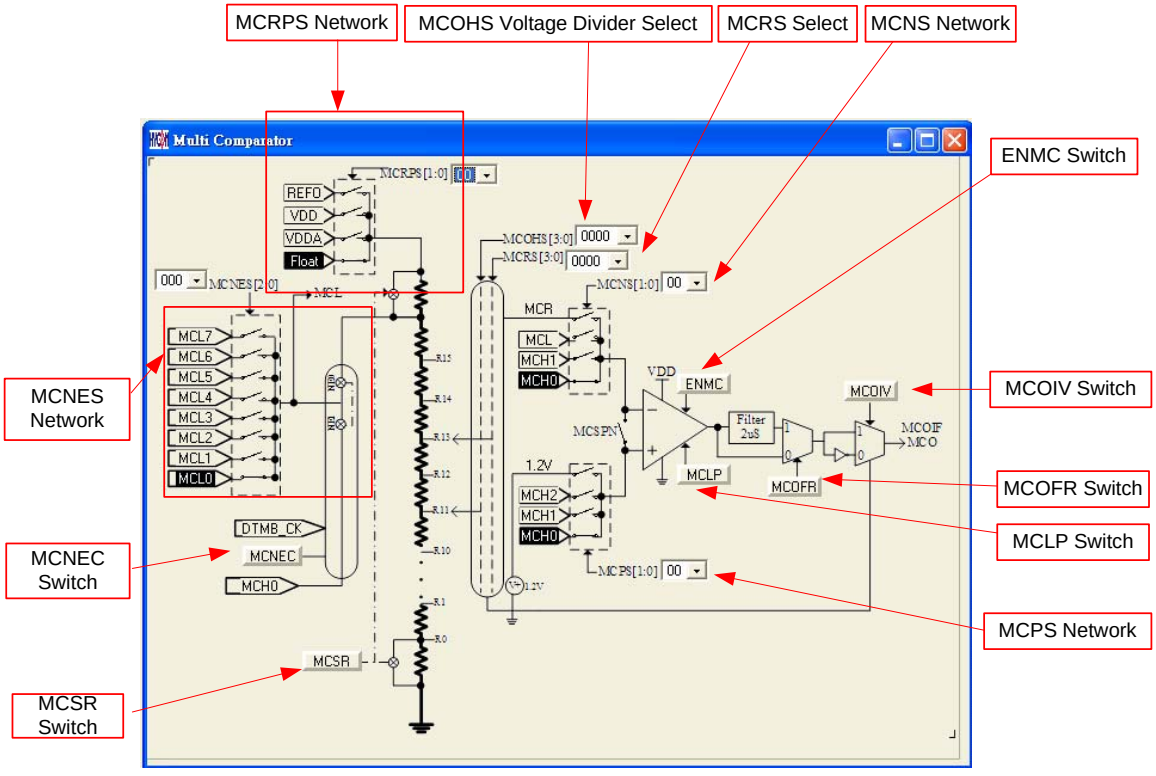


Figure 51

- MCNES Network
  - (1) Click mouse left key to the network name, CPIH, to select the network
  - (2) Click mouse left key to the network switch, MCNES to select the network
  - (3) Click mouse left key, window like Figure 52 shows up, then user can select the switch network

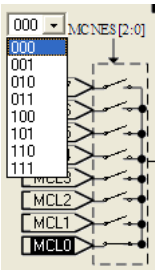


Figure 52

- MCRPS Network
  - (1) Click mouse left key to the network name, MCRPS, to select the network
  - (2) Click mouse left key to the network switch, MCRPS, to select the network
  - (3) Click mouse left key, window like Figure 53 shows up, then user can select the switch network

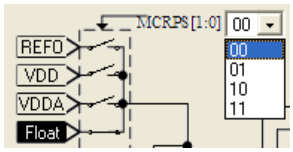


Figure 53

- MCOHS Network
  - (1) Click mouse left key to the network name, MCOHS, to select the network
  - (2) Click mouse left key to the network switch, MCOHS, to select the network
  - (3) Click mouse left key, window like Figure 54 shows up, then user can select the switch network

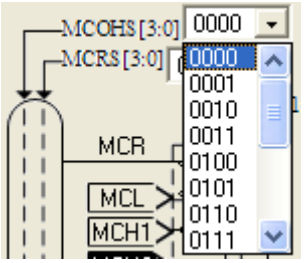


Figure 54

- MCRS Network
  - (1) Click mouse left key to the network name, MCRS, to select the network
  - (2) Click mouse left key to the network switch, MCRS, to select the network
  - (3) Click mouse left key, window like Figure 55 shows up, then user can select the switch network

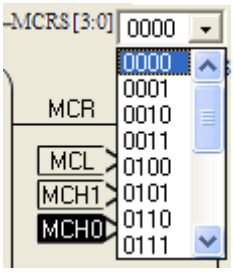


Figure 55

- MCNS Network
  - (1) Click mouse left key to the network name, MCNS, to select the network
  - (2) Click mouse left key to the network switch, MCNS, to select the network
  - (3) Click mouse left key, window like Figure 56 shows up, then user can select the switch network

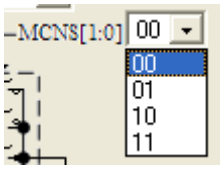


Figure 56

- MCPS Network
  - (1) Click mouse left key to the network name, MCPS, to select the network
  - (2) Click mouse left key to the network switch, MCPS, to select the network
  - (3) Click mouse left key, window like Figure 57 shows up, then user can select the switch network

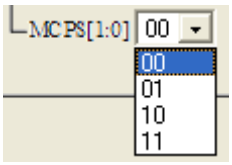


Figure 57

- VDDA Network (Please refer to ADC VDDA network)
- ENMC

  Click mouse left key to the network name, ENMC starts

  ENMC status display

  When ENMC = 1, enable comparator

  When ENMC = 0, disable comparator
- MCLP

  Click mouse left key to the network name, MCLP starts

  MCLP status display

  When MCLP = 1, high power consumption and high performance

  When MCLP = 0, low power consumption mode
- MCOFR Enable

  Click mouse left key to the network name, MCOFR module will be enabled or disabled

  MCOFR status display

  When MCOFR = 1, enable output filter module

  When MCOFR = 0, disable output filter module
- MCOIV Switch

  Click mouse left key to the network name, MCOIV will be ON/OFF

  MCOIV status display

  When MCOIV = 1, non-inverting

  When MCOIV = 0, inverting
- MCNEC Switch

  Click mouse left key to the network name, MCNEC will be ON/OFF

  MCNEC status display

  When MCNEC = 1, according to CCK_D1, doing open/close serial movement

  When MCNEC = 0, both open circuit

3.8 Register Record

If the register or SRAM has been revised manually after access to simulation window (hardware emulation or software simulation), the data will be recorded (no matter RAM, Register, ADC, OP and CMP was revised by which window). The data will be revealed after pressing the button “SRAM record”. At this time, windows will suspend until it is closed to execute other commands.

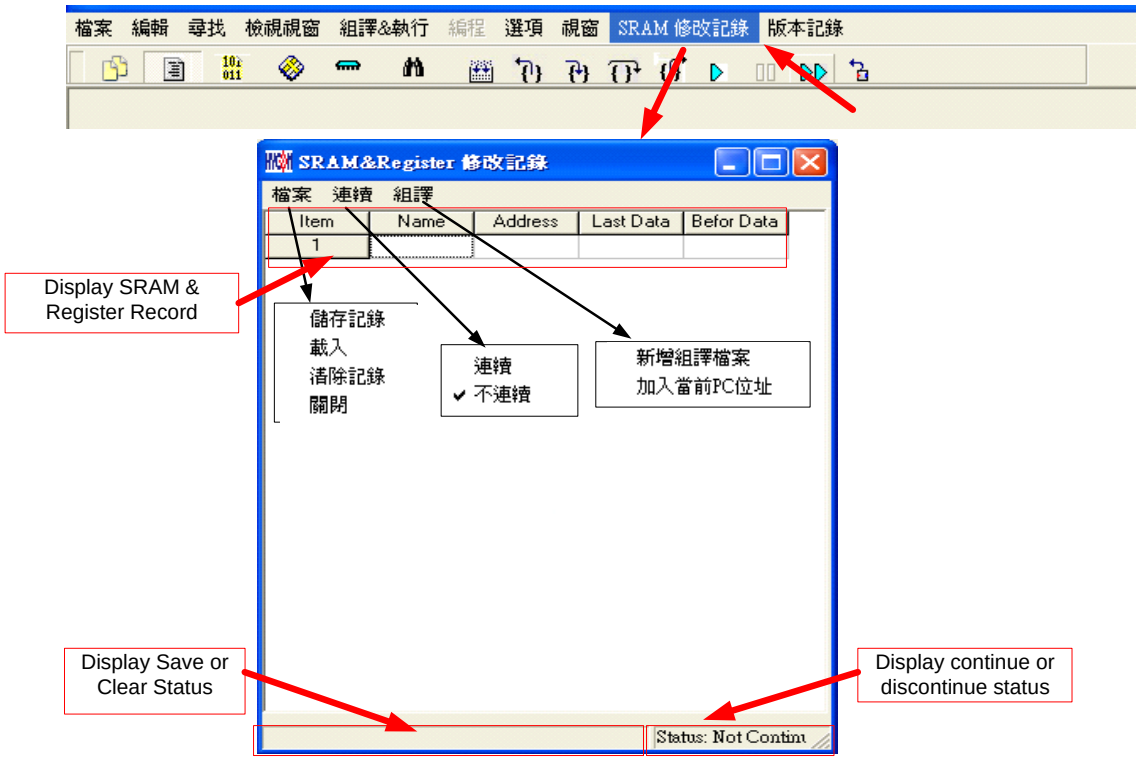


Figure 58

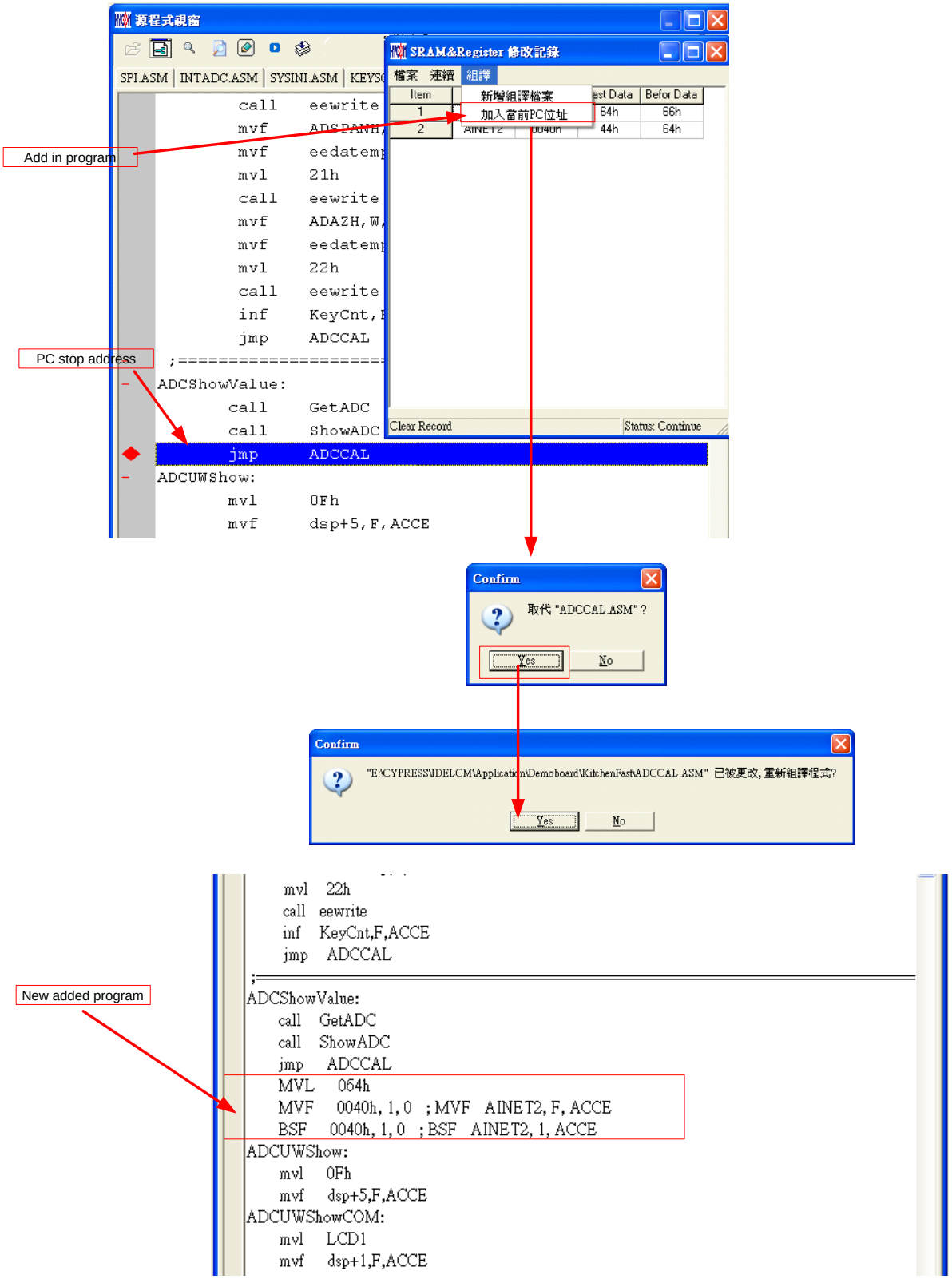

源程式視窗
SRAM&Register 修改記錄
檔案 連續 組譯
新增組譯檔案
加入當前PC位址
Item
Befor Data
Add in program
PC stop address
SPI.ASM
INTADC.ASM
SYSINI.ASM
call eewrite
mvf eedatemp
mvl 21h
call eewrite
mvf ADAZH,W
mvf eedatemp
mvl 22h
call eewrite
inf KeyCnt,F
jmp ADCCAL
;=====================
ADCShowValue:
call GetADC
call ShowADC
jmp ADCCAL
ADCUWShow:
mvl 0Fh
mvf dsp+5,F,ACCE
Clear Record
Status: Continue
Confirm
取代 "ADCCAL.ASM"?
Yes
No
Confirm
"E:\CYPRESS\IDELCM\Application\Demoboard\KitchenFast\ADCCAL.ASM" 已被更改, 重新組譯程式?
Yes
No
New added program
mvl 22h
call eewrite
inf KeyCnt,F,ACCE
jmp ADCCAL
;=====================
ADCShowValue:
call GetADC
call ShowADC
jmp ADCCAL
MVL 064h
MVF 0040h, 1, 0 ; MVF AINET2, F, ACCE
BSF 0040h, 1, 0 ; BSF AINET2, 1, ACCE
ADCUWShow:
mvl 0Fh
mvf dsp+5,F,ACCE
ADCUWShowCOM:
mvl LCD1
mvf dsp+1,F,ACCE

Figure 59

3.9 Hint Function of Source Code Window

If users intend to know Register, SRAM value and Address in source code window, point the cursor to Register or SRAM, the name, address and data can be revealed.

This function is only applicable to the instructions below:

CLRF, ADDF, INF, INSZ, DCF, DCSZ, SUBF, COMF, ADDC, ANDF, IORF, XORF, SUBC, RRF, SETF, MULF, RLF, JZ, RRFC, RLFC, SWPF, DAW, INSUZ, DCSUZ, ARLC, ARRC, CPSG, CPSL, CPSE, TFSZ, BTFG BSF, BCF, BTSS, BTSZ, MVFF(不是Macro)。

- Only the first parameter is effective when instruction is under byte operation, as Figure 603 described.
- When command is BCF, BSF, BTSS, BTSZ and BTGF, Byte value will be revealed if the cursor points to the first argument. If the cursor points to the second argument, it will display the specified Bit value (1 or 0) as Figure 614 illustrated.
- When command is MVFF (not Macro), the first argument value will appear if the cursor points to the first argument. If the cursor points to the second argument, the argument value will show up as shown in Figure 62.
- If the argument is INDF0, POINC0, PODEC0, PRINC0, INDF1, POINC1, PODEC1 and PRINC1, the Data will be FSR0 or the address Data of FSR1 as Figure 63 described.
- If the argument is PLUSW0 or PLUSW1, the Data is FSR0+WREG or the address Data of FSR1+WREG as illustrated in Figure 64.

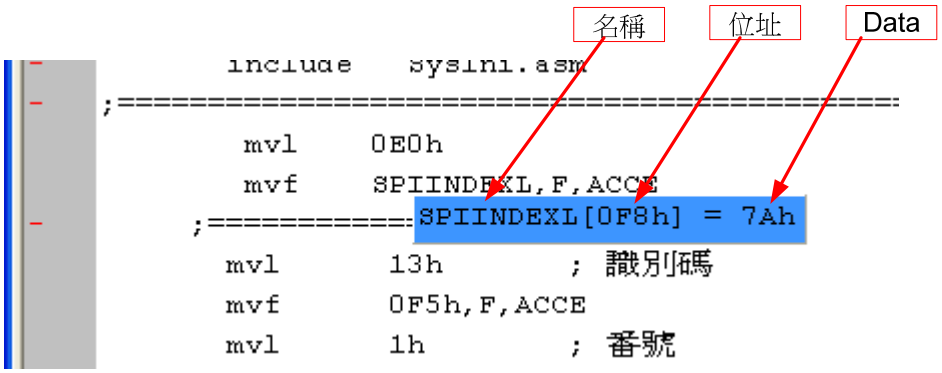


Figure 60

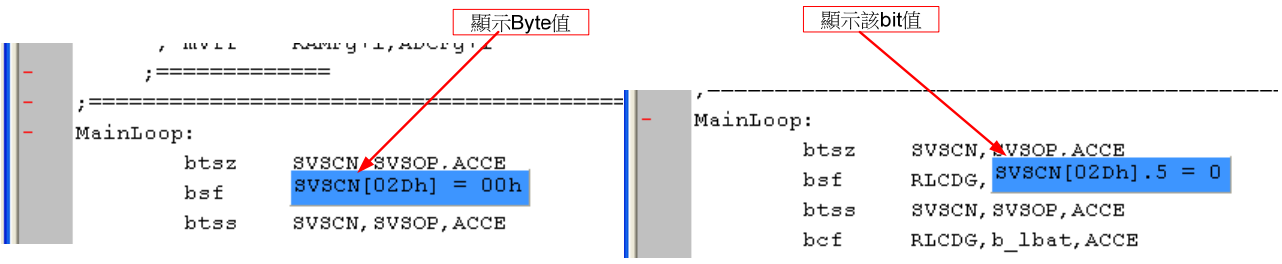


Figure 61

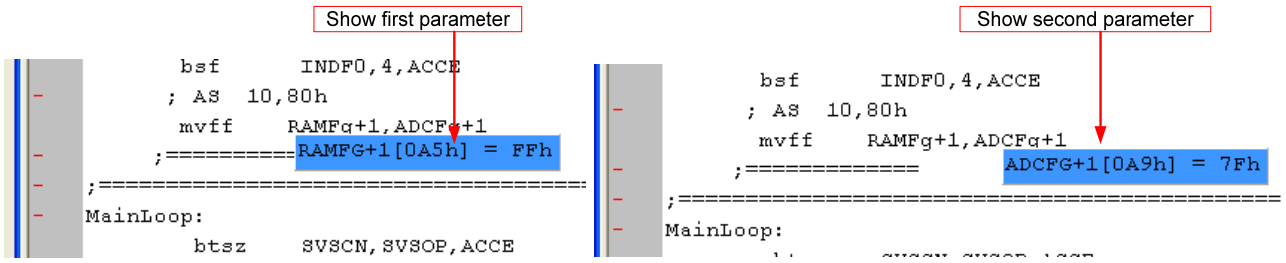


Figure 62

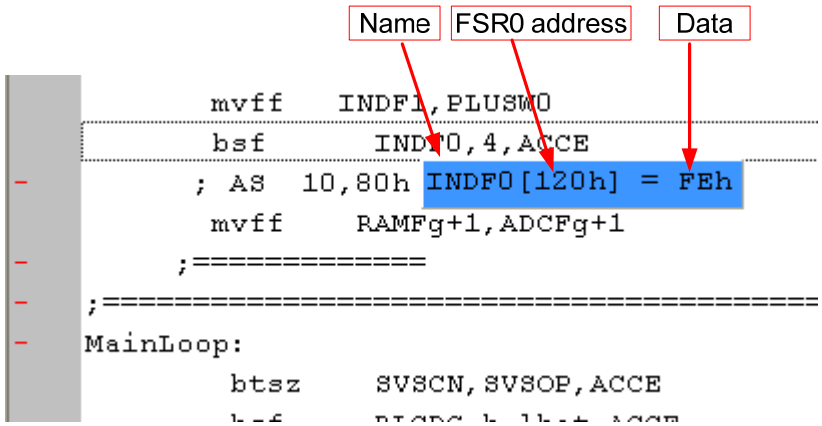


Figure 63

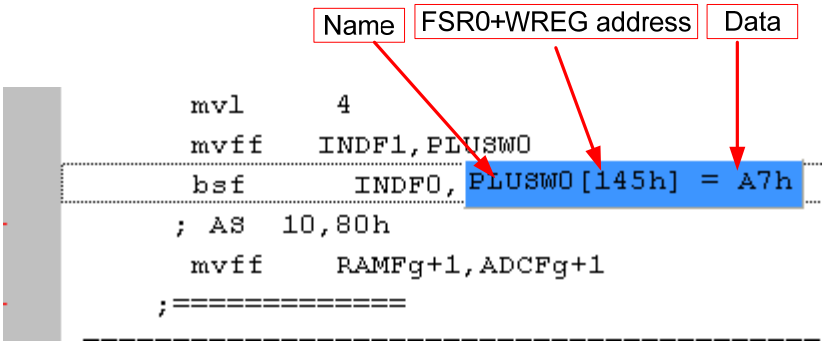


Figure 64

4. Programming Windows

4.1 Interface Setup

Click “Options”, a window will appear. Click the interface setup, as shown in Figure 65.

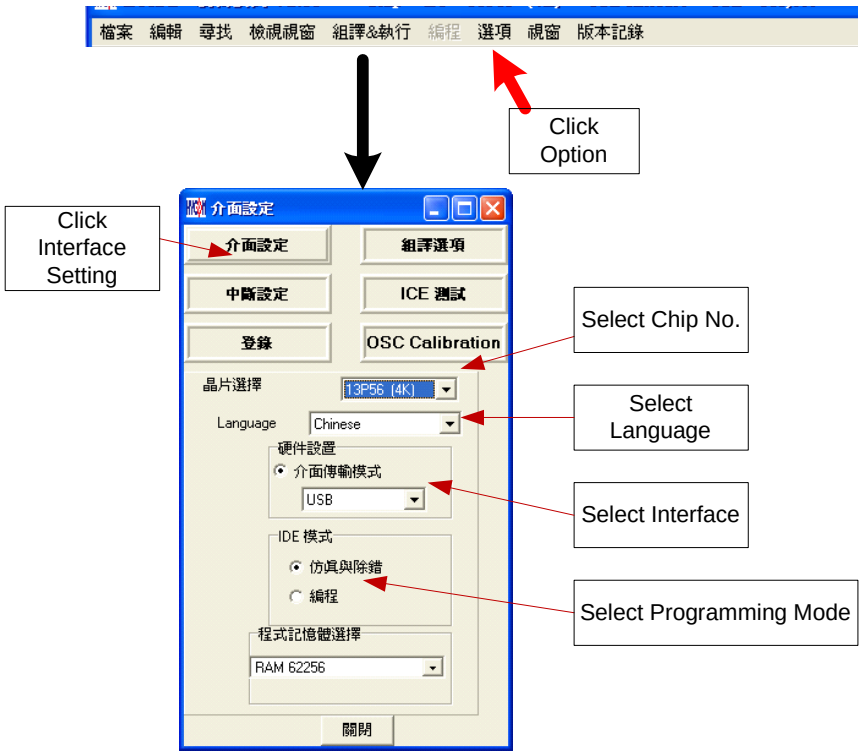


Figure 65

Chip Select → Choose the specific programming IC part no. If programmed IC part no. differs from that of the selected IC, Blank Check, Program and Verify will fail.

Language → Choose operation interface language, like Chinese or English.
Hardware Interface → USB interface or Parallel Port interface is selectable.

IDE Mode → Programmer or emulate and Debug is selectable.

When interface setup finished, click Build Options to select programming configuration. As described in Figure 66.

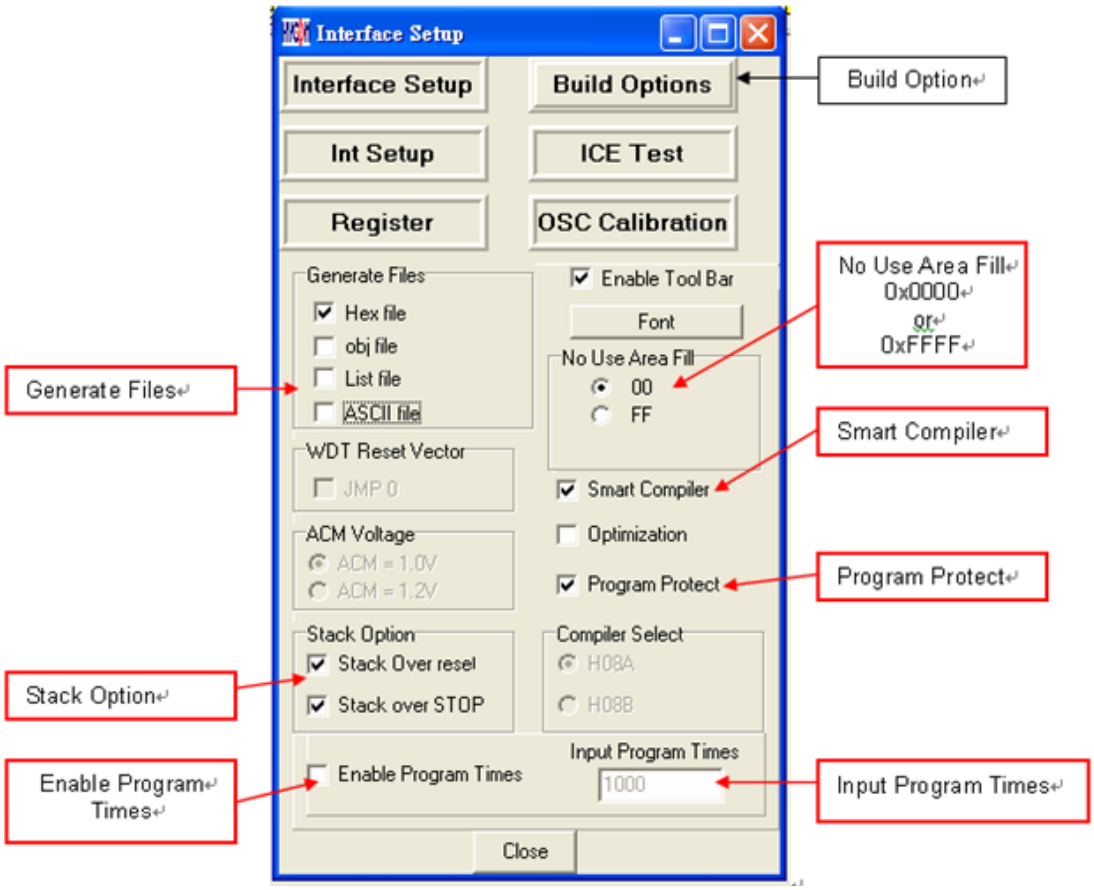

Interface Setup
Interface Setup
Build Options
Int Setup
ICE Test
Register
OSC Calibration
Generate Files
Hex file
obj file
List file
ASCII file
Enable Tool Bar
Font
No Use Area Fill
00
FF
WDT Reset Vector
JMP 0
Smart Compiler
ACM Voltage
ACM = 1.0V
ACM = 1.2V
Optimization
Program Protect
Stack Option
Stack Over resel
Stack over STOP
Compiler Select
H08A
H08B
Enable Program Times
Input Program Times
1000
Close
Build Option
No Use Area Fill
0x0000
or
0xFFFF
Generate Files
Smart Compiler
Program Protect
Stack Option
Enable Program Times
Input Program Times

Figure 66

Generate Files → Choose generated file after assembly

Stack Option → Choose whether to reset when stack overflow or stack full after OTP program operation.

No Use Area Fill → Fill up 00 or FF in unused program space after assembly.

Smart Compiler → Choose whether to simplify assembly.

Enable Program Times → Choose whether to enable Download program times.

Input Program Times → Input Download program times (Maximum: 2147483646. Minimum: 1).

After assembly finished, click “ICE Test” to test ICE operation voltage as Figure 67 (Connect Adapter 9V and connect USB Line to ICE. Make sure the ICE is connected, and then click “Option”).

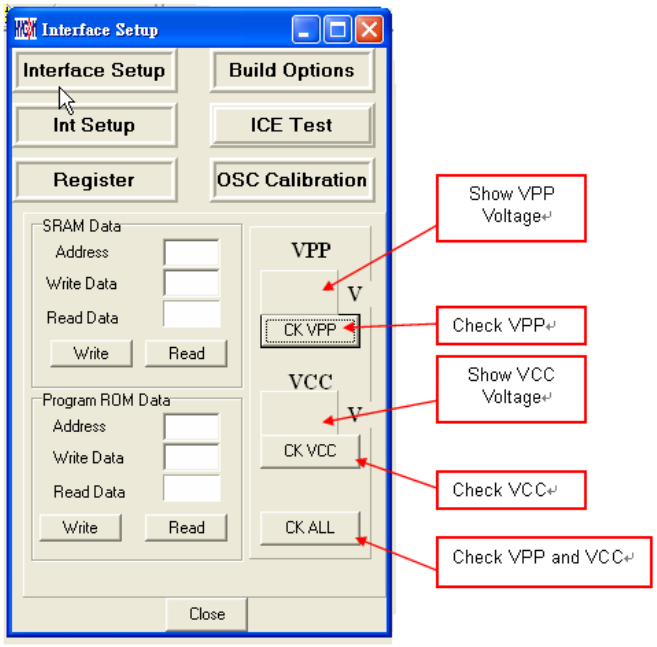


Figure 67

VPP voltage when programming: 5.6<VPP<6.6

VDD voltage when programming: 2.7<VDD<3.6

After voltage testing completed, click ”OSC Calibration” to software/hardware frequency calibration.

- **Notice of using this function:**
  - If software HAO/LPO calibration programming is activated, RAM 0FEH/0FFH address data will be meaningful after powering up the IC.
  - Single site programming time will increase about 500msec (software LPO calibration programming is enabled)
  - Software HAO/LPO calibration function is not actual calibration frequency, only providing frequency deviation for calculation.
  - Online programming only support hardware calibration, HAO, not software calibration function.

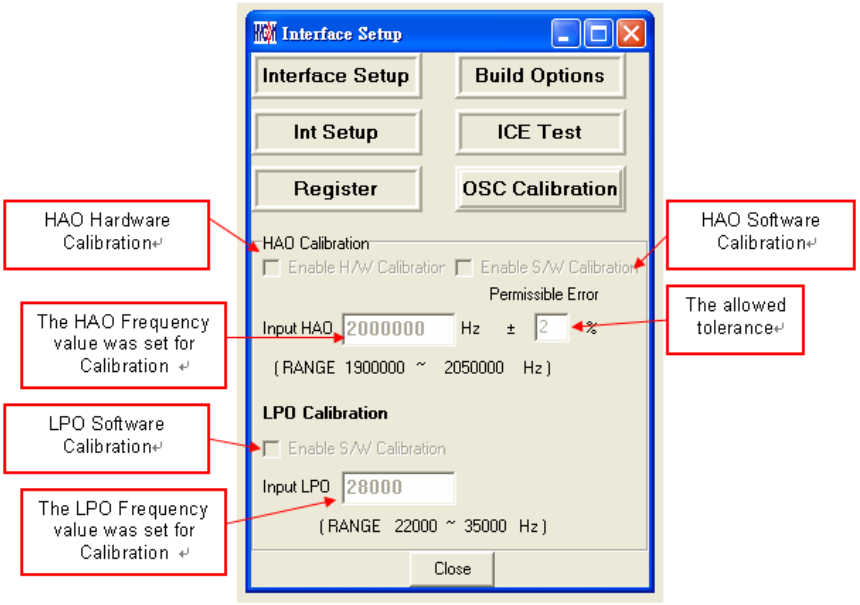


Figure 68

- HAO Calibration:
  - Enable H/W Calibration：Enable hardware HAO calibration function, actually calibrates system frequency. Hardware calibration function must be confirmed after choosing IC part no.
  - Enable S/W Calibration：Enable software HAO deviation calibration function. Deviation stores at RAM **0FEH** address.
- LPO Calibration：
  - Enable S/W Calibration：Enable software LPO deviation calibration function. Deviation stores at RAM **0FFH** address.
- Input HAO or Input LPO：Frequency value to be calibrated.
- Permissible Error：Permissible range of frequency value after calibrated and to be calibrated.

Software calibration will be described in below:

- HAO Software Calibration：
  - Frequency deviation value was stored at RAM **0FEH.** Deviation will be written to RAM when IC Power on. This action is not actual frequency calibration source.
  - HAO Hardware Calibration and HAO Software Calibration can be co-existed. Executing Hardware Calibration first, then to calculate Software Calibration.
  - HAO deviation basic frequency is defined as **4000HZ/LSB.**
  - Data format of **OFEH** address:
    - Bit7：0= +, 1= -; Bit6~Bit0 represents frequency differences
    - 01H represents frequency difference is +4000HZ while FFH represnets -4000HZ;
  - Example：

    HAO is about to calibrate 2000000HZ frequency, and the actual IC HAO=1920000HZ. Then (1920000-2000000)/4000 = -80000/4000= -20. Thus the RAM 0FEH data is **1110 1100b**

- Example1：

  HAO is about to calibrate 2000000HZ frequency, and the actual IC HAO=2008000HZ. Then (2008000-2000000)/4000 = 8000/4000=2. Thus the RAM 0FEH data is **0000 0010b**

- LPO Software Calibration：
  - The calculated frequency deviation stores at RAM **0FFH** address and will be written to RAM after IC Power on. This action is not actual calibration frequency source.
  - LPO deviation basic frequency is defined as **64HZ/LSB.**
  - **OFFH** address data format：
    - Bit7: 0= +, 1= -；Bit6~Bit0 represents frequency differences;
    - 01H represents frequency value as +64HZ；FFH represents frequency value as -64HZ;
  - Example:

    LPO is about to calibrate 28000HZ frequency, and the actual IC LPO=28128HZ. Then (28128-28000)/64 = 128/64 = 2. Thus RAM 0FFH data is **0000 0010b**
  - Example1:

    LPOs about to calibrate 28000HZ frequency, and the actual IC LPO=27872HZ. Then (27872-28000)/64 = -128/64 = -2. Thus RAM 0FFH data is **1111 1110b**

After the completion of interface setup, click close. All configured parameters will be recorded and reloaded automatically when initiated next time. Title window will show the defaulted programming IC part no., as shown in Figure 69.

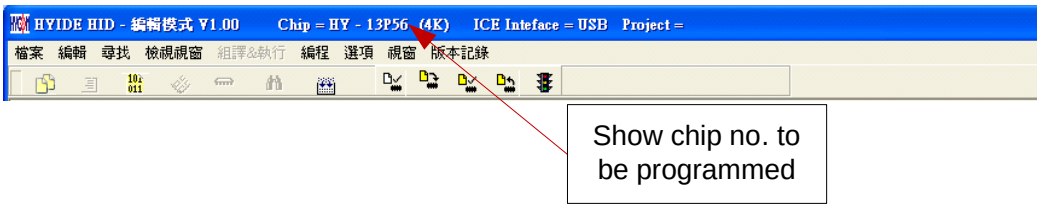


Figure 69

4.2 Operation Procedures

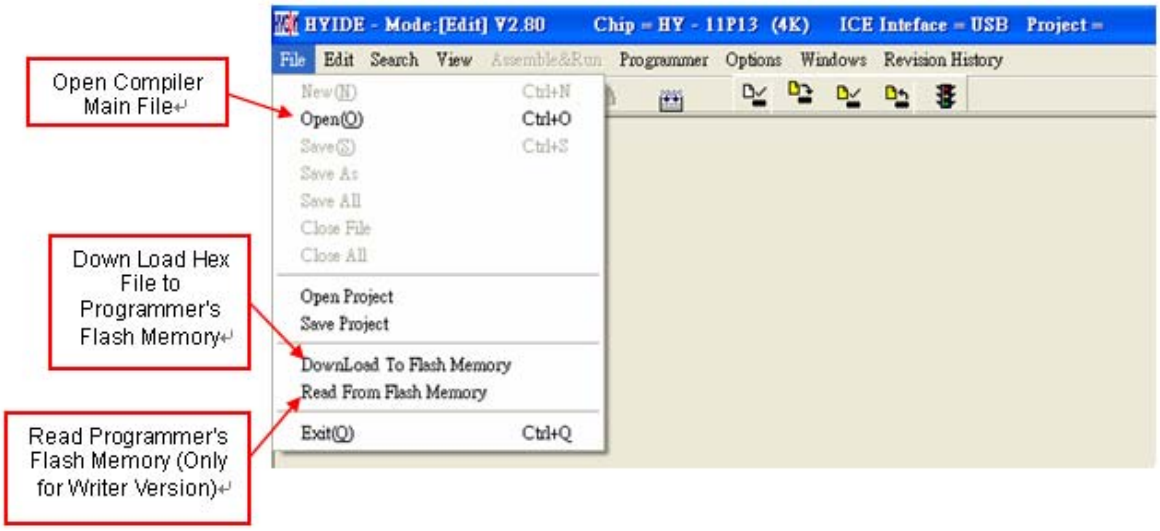


Figure 70

Open → Open the programmed source code main file.
Open Project → Open the saved project.
Save Project → Save the finished project.

4.2.1 Open File and Assembly

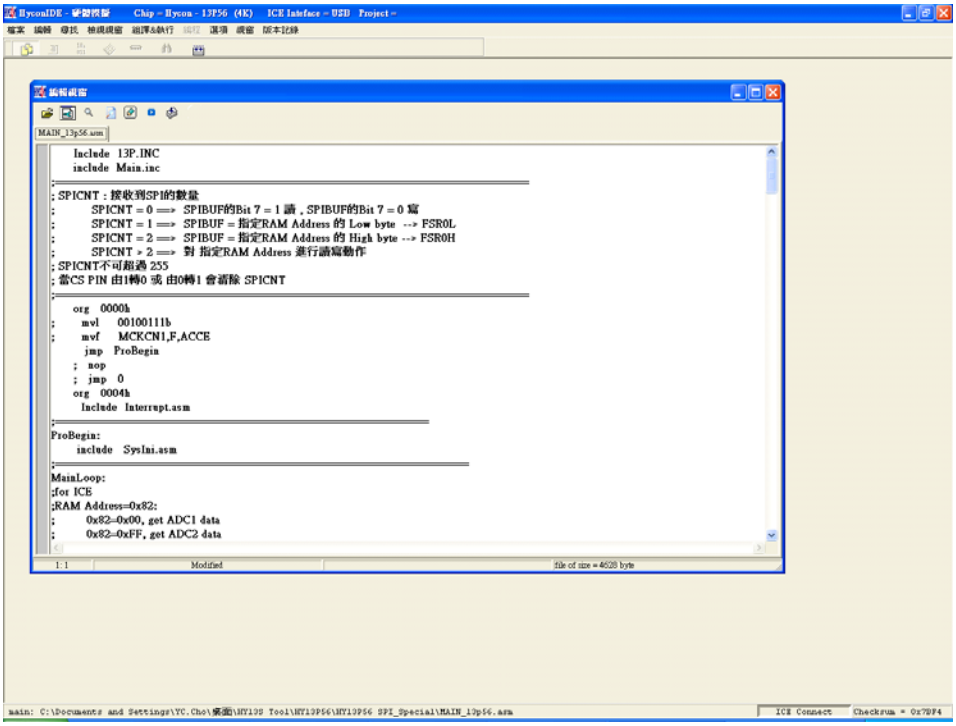


Figure 71

Open source code main file and it will be displayed as the assembly file. If the displayed name differs from main file, points the mouse to the specific file and presses mouse right key. Set this file as the assembly main file as shown in

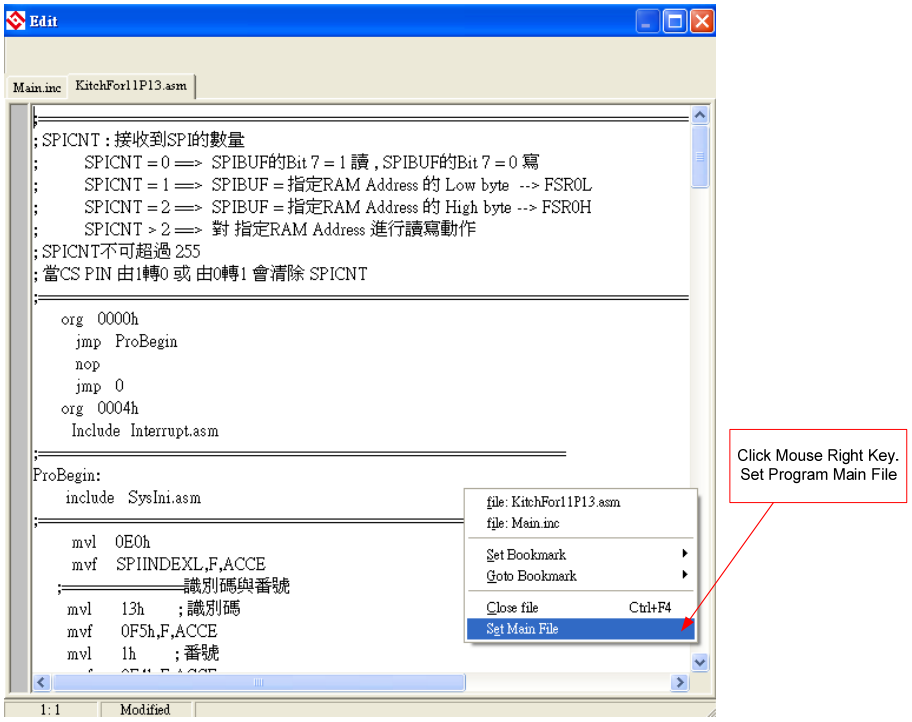


Figure 72.

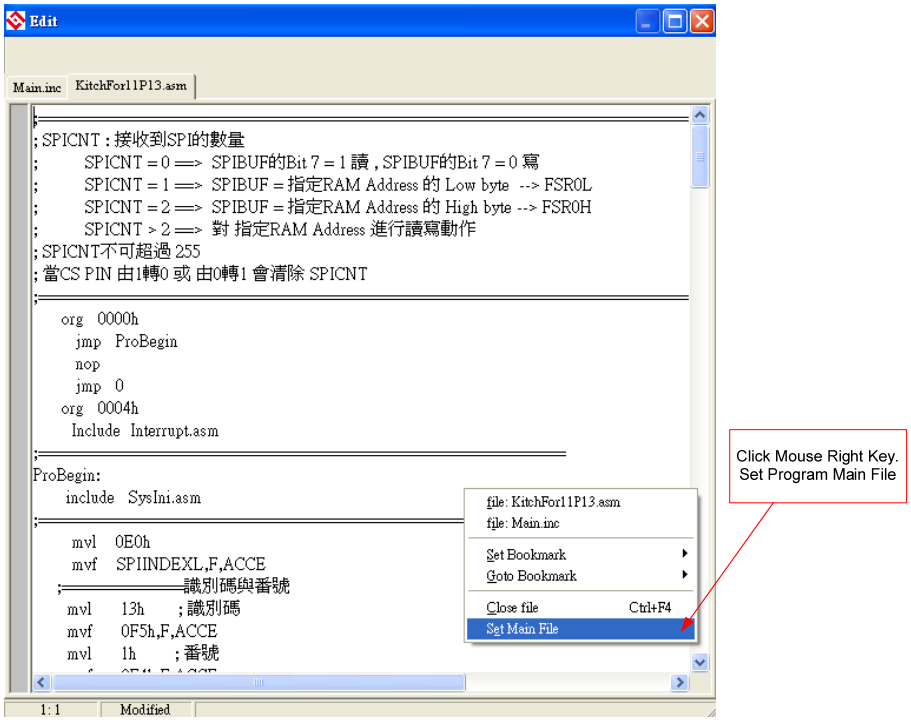
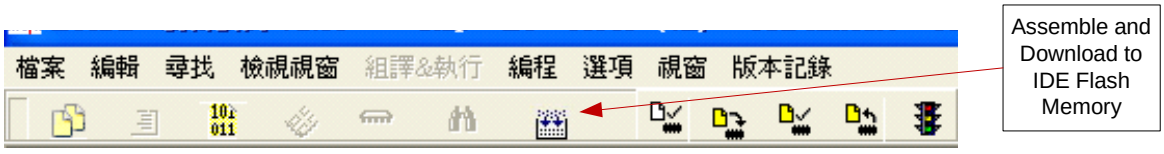


Figure 72

Assembles Source Code and download the file to programmer or IDE Flash Memory, as Figure 73 illustrated.



Figure

73

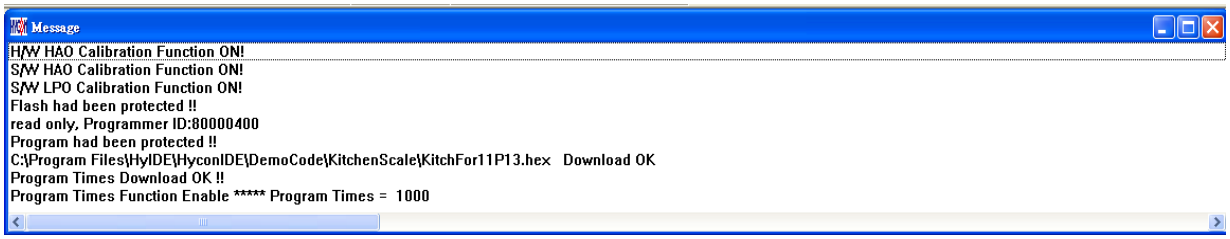


Figure 74

1. When using USB interface, the program code will be loaded into programmer or Flash Memory of IDE for mass production programming.
2. If there is enabled program times in the assembly option, information column will display the programming times as shown in Figure 74.
3. After assembling completed, Hex filename and Checksum will be displayed in underneath section, as Figure 75 illustrated.

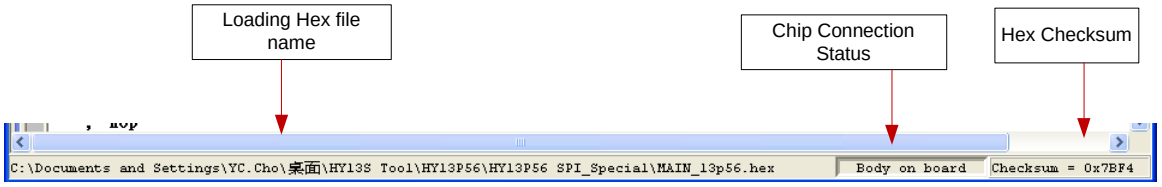


Figure 75

4.2.2 Download HEX File

To download Hex File, please use HY13P-Hex Loader software and operate according to the user manual.

HY-Hex Loader Software User Manual

4.3 PC Online OTP Programming

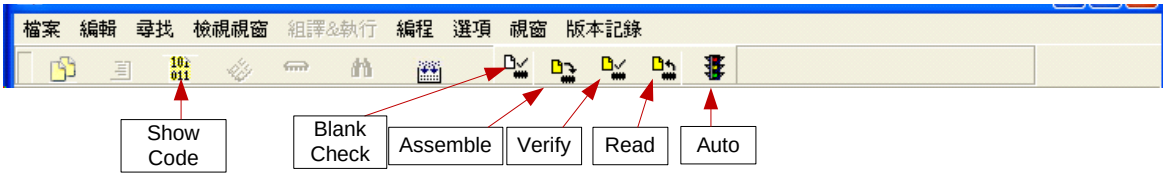


Figure 76

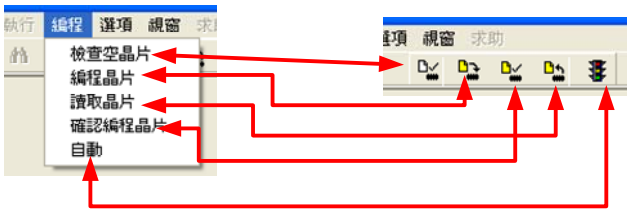


Figure 77

Blank Check, Programming, Verify and Read Commands can be implemented when the programmed file being successfully loaded into programmer or IDE Flash Memory. On the contrary, those commands will not be activated if the download failed.

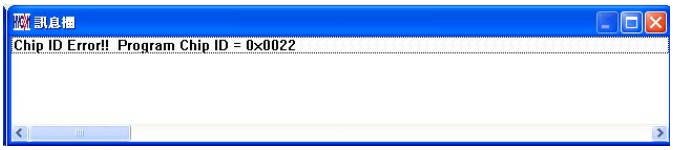


Figure 78

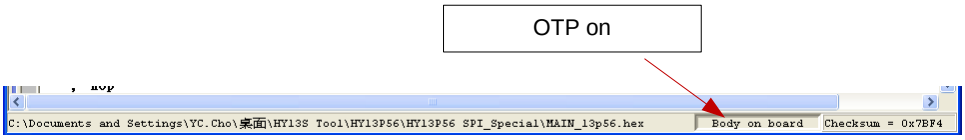


Figure 79

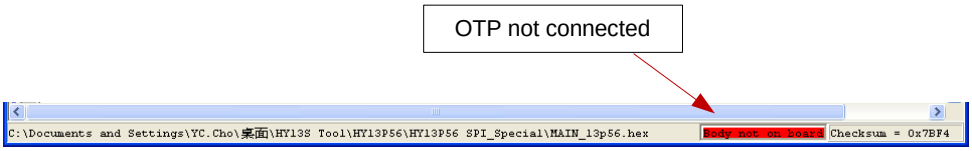


Figure 80

Make sure the selected programming IC part number is the same with the OTP part number in the topic window as Figure 65 described. When programmer executes Blank Check, Programming and Verify commands, program will check whether the IC part number and OTP programming part number are identical. If the part number is different, the data will not be written into OTP and an error message will be displayed in information column as Figure 78 described.

If users intend to find out whether the part number is correct before programming, point the cursor to ”IC

Connection Status Display" and click the mouse left key. If the selected IC is correct, a message will show up as Figure 79. If it is incorrect, the message will be displayed as Figure 83. If "Enable Program Times" has been marked up, the spare program times will display in the message column as Figure 81 illustrated.

Figure 81

4.3.1 Blank Check

Blank Check icon is . The internal code of Blank ICs that have yet been programmed is 0xFFFF. The purpose of checking the IC is to make sure the OTP address content is 0xFFFF. If the IC selection is correct and the content is empty, a message will appear as Figure 82

Figure 82

If the IC selection is incorrect or the content is not empty, a message will show up as Figure 83.

Figure 83

4.3.2 Program

The icon of Program is . The purpose of programming is to write Compiler accomplished program into IC OTP. When programming is completed and the IC is assembled as finished goods, programmer can operate the program as user commanded.

Program the downloaded or assembly finished Hex file (displayed at the bottom of the column) in the selected IC and verify the correctness of the programming content (please refer to Chapter 4.2.1 or 4.2.2 for programming procedures).

If the selected IC is correct and the programming succeeds, message will appear at the information column as Figure 84 illustrated. If "Enable Program Times" is ticked up, the enable program times will minus 1 and the program times left will be revealed in the message column.

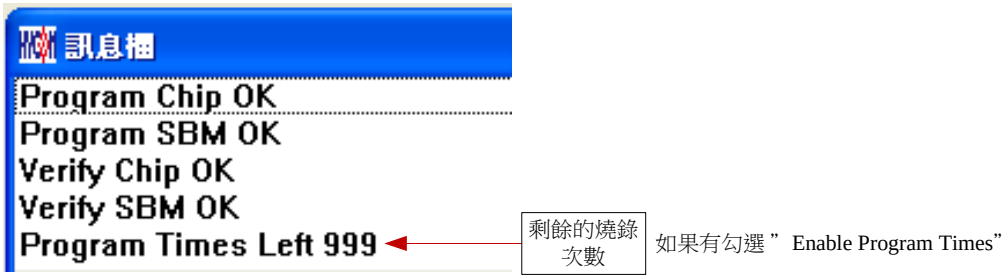


Figure 84

If the IC selection is incorrect or the programming fails, a message will show up as Figure 85.

Figure 85

4.3.3 Verify

The icon of Verify is . The purpose to verify programming IC is to compare if the program written into IC OTP equals to the program downloaded to programmer or IDE Flash Memory.

Verify programming IC content consistency with the downloaded or assembled Hex file (displayed at the bottom of the column). If the IC is protected by program, this verification is ineffective or the comparison failed.

If IC selection and program verification is success, a message will appear as Figure 86.

Figure 86

f IC selection is incorrect or the program verification miscarries, a message will pop up as Figure 87.

Figure 87

4.3.4 Read

The icon of Read is . The purpose to read the IC is to verify the consistency of OTP Checksum and programmed Hex file. To read IC content, the procedures are illustrated as Figure 88. Its content will reveal at ”Display Code” window.◦

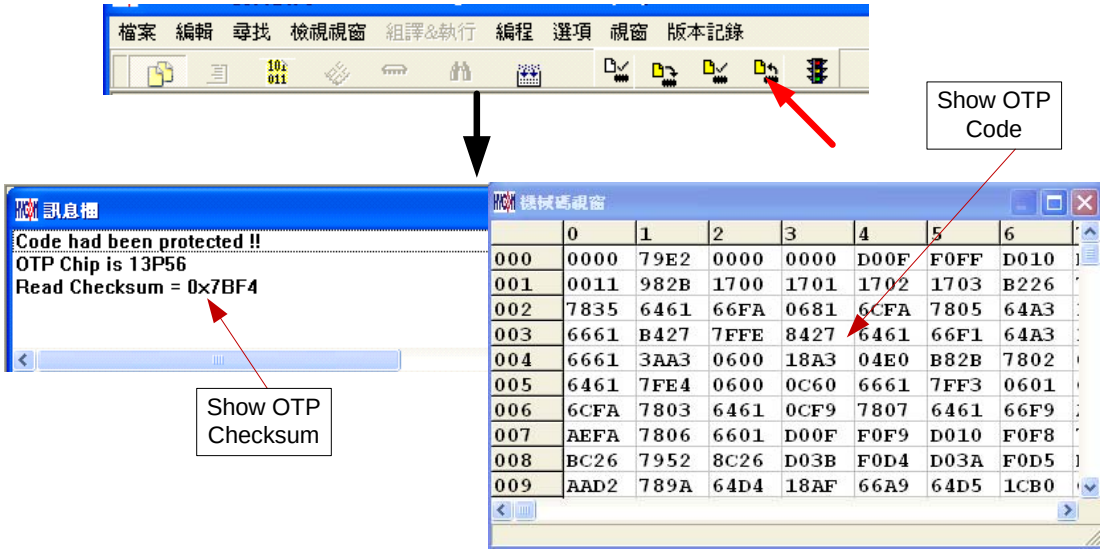

檔案 編輯 尋找 檢視視窗 組譯&執行 編程 選項 視窗 版本記錄
Show OTP Code
訊息欄
Code had been protected !!
OTP Chip is 13P56
Read Checksum = 0x7BF4
Show OTP Checksum
機械碼視窗
0 1 2 3 4 5 6
000 0000 79E2 0000 0000 D00F F0FF D010
001 0011 982B 1700 1701 1702 1703 B226
002 7835 6461 66FA 0681 6CFA 7805 64A3
003 6661 B427 7FFE 8427 6461 66F1 64A3
004 6661 3AA3 0600 18A3 04E0 B82B 7802
005 6461 7FE4 0600 0C60 6661 7FF3 0601
006 6CFA 7803 6461 0CF9 7807 6461 66F9
007 AEFA 7806 6601 D00F F0F9 D010 F0F8
008 BC26 7952 8C26 D03B F0D4 D03A F0D5
009 AAD2 789A 64D4 18AF 66A9 64D5 1CB0

Figure 88

4.3.5 AUTO

The icon of Auto is . Auto integrates Blank Check, Program and Verify function. If user selects Auto, it will first check whether the IC is blank, then to program and verify.

After the execution succeeded, a message will be displayed as Figure 89 displayed. If the option, ”Enable Program Times” is ticked up, the program permitted times will reduce 1 and the program times left will be shown in the message column.

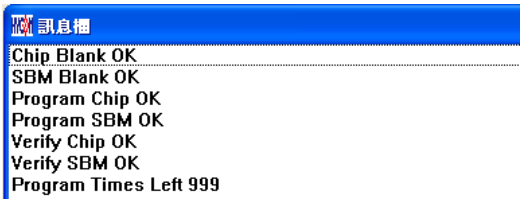


Figure 89

If any function fails, the whole process will stop and display an error message in the message column.

4.4 Offline Programming

4.4.1 Programming Description

As the development process evolves to engineering trial production, the programmer can be used alone. It is not necessary to connect programmer to PC.

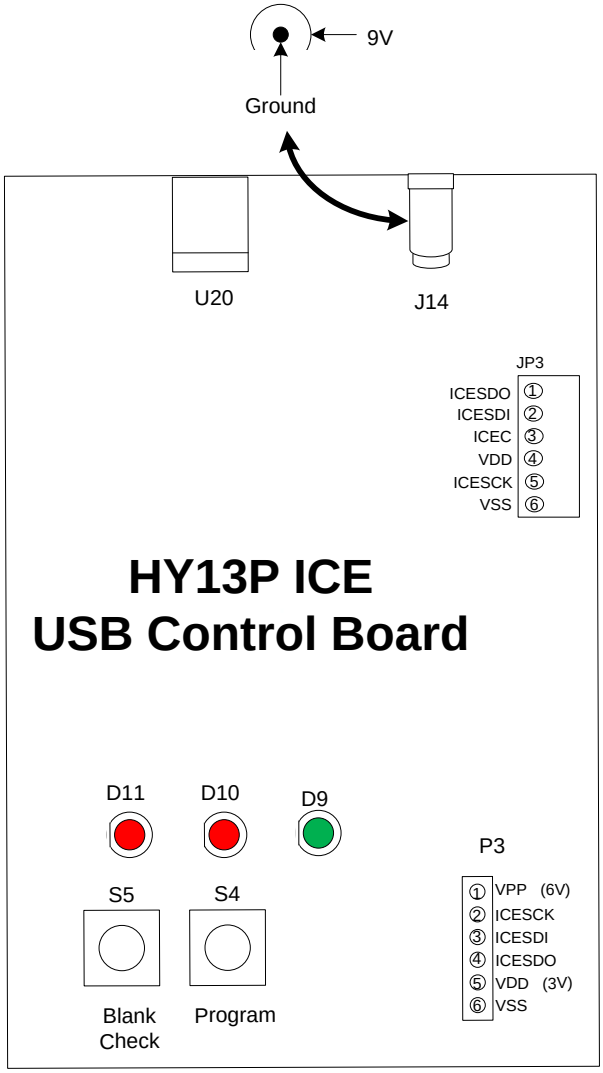


Figure 90

- J14 : Adapter 9V input

  supply programming power source, connected when programming OTP
- U20 : USB connector to PC

  Downloading program for emulation and debug

  Downloading programming code for HY13P series
- P3 : HY13P series programming control port

  PIN 1 VPP(6V) connects to VPP

  PIN 2 ICECK connects to PSCK

  PIN 3 ICESDI connects to PSDI

PIN 4 ICESDO connects to PSDO

PIN 5 VDD(3V) connects to VDD

PIN 6 VSS connects to VSS

- S4 : Program, IC programming button
- S5 : Blank Check, Blank Check key
- D9 Green LED：USB or Adapter power on, OTP programming, Blank Check…successful execution display light

D10 Red LED：OTP programming, Blank Check, frequency calibration… error execution display light

D11 Red LED: Under programming

Figure 91 shows the connection way of connecting programming IC to control board programming pin when PC online:

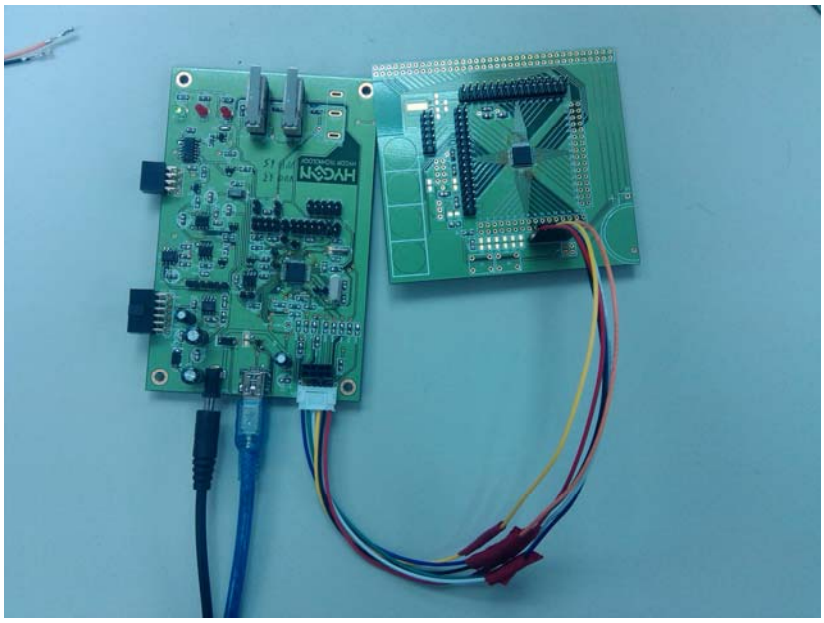


Figure 91

Figure 92 shows the connection way of connecting offline programming IC to control board programming pin when PC offline:

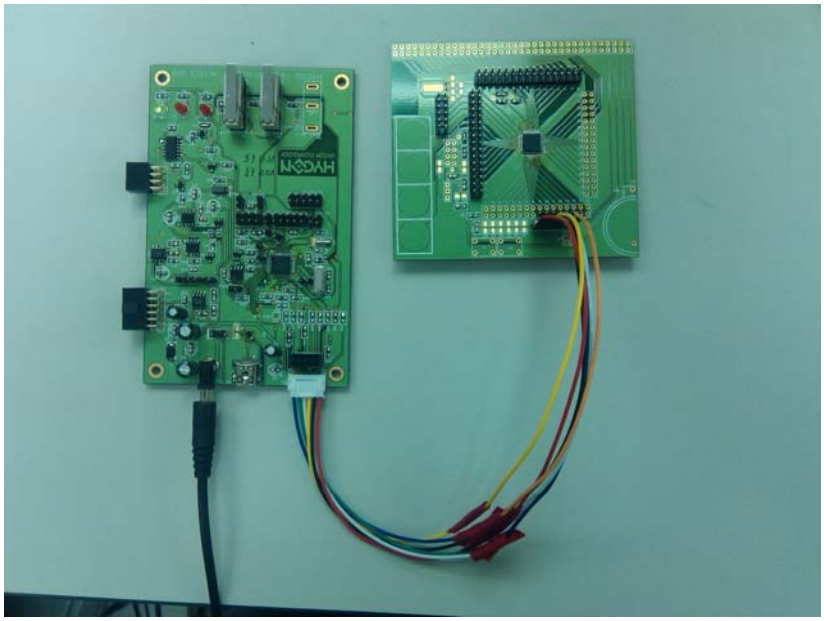


Figure 92

- To implement offline operation, Hex file must be firstly downloaded to programmer Flash Memory. The procedure can refer to chapter 4.2.1 or chapter 4.2.2.
- To implement offline operation, press S5 button to check if the IC is blank and the D9 Green LED should be lighted up.
- S4 Button is programming button. Its procedures are: Blank Check → Program → Verify.
  If ”Program Protection” of “Assemble Option” is ticked before downloading data to Flash Memory,

program protection will be executed after Verify completed. If ”Program Protection” is not picked up, it will stop after Verify accomplished and D4 Green LED will be lighted up.

- When Programming finished, please press S5 to check if the IC is blank. At this moment, the D10 Red LED should be lighted up, which means the programming is successful (data has been programmed into IC, so Blank Check failed).
- If any failure or error happened during execution procedures, D10 Red LED will be lightened up. On the contrary, D9 Green LED will be lighted up if success.

4.4.2 Program Times Restriction

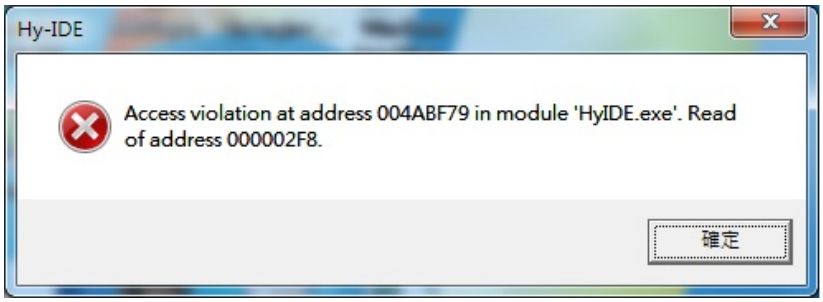
The menu of Assemble Option in interface setup has an option of Enable Program Times as described Figure 66. This option restricts the permitted program times of download program.

This is a safety mechanism that restrains the permitted program times, preventing it from over-programming on the production line.

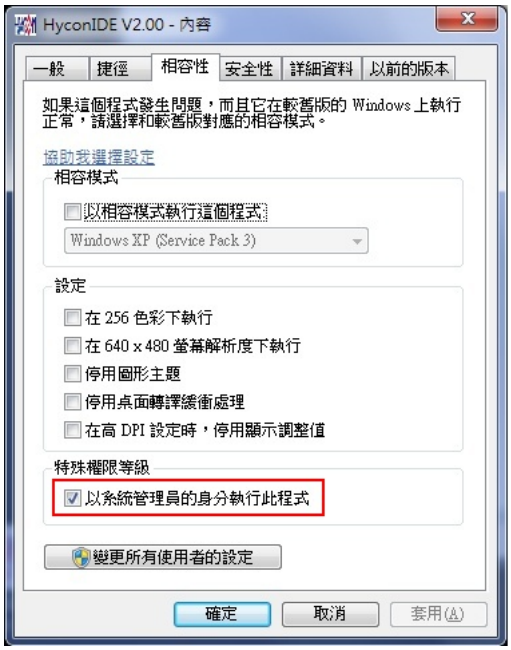
After ticking up Enable Program Times, key in the program times in the column below Input Program Times (maximum is 99999999, minimum is 1). This argument will be written into EEPROM of the programmer after the compiler programmed file is downloaded to Flash Memory. Afterwards, the enabled program times will reduce 1 each time when programming completed. If the value reduced to 0, the programming action may not be executed. At this time, an error signal (Red LED) will be lighted up but Blank Check still operates normally.

5. Troubleshooting

5.1 HYCON-IDE Execution Problem



The problem might be happened under Microsoft Vista or Windows 7 system environment. To avoid the problem, the limit of authority for HYCON-IDE execution has to be set as system administrator to execute HYCON-IDE by administrator status.



6. Revision History

Major differences are stated thereinafter:

Version	Page	Revision Summary
V01	ALL	First Edition