ALL-200

Universal Programmer

User's Manual

Apr. 2014

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- **EQUIPMENT: UNIVERSAL PROGRAMMER**
  MODEL NO. : FLASH-100S, ALL-200
  APPLICANT : HI-LO SYSTEM RESEARCH CO., LTD.
  4F, NO. 18, LN. 76, RUI GUANG RD.
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EN 55024:2010 (IEC 61000-4-2:2008, IEC 61000-4-3:2006/A1:2007/A2:2010,
IEC 61000-4-4:2004/A1:2010, IEC 61000-4-5:2005, IEC 61000-4-6:2008,
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THE PRODUCT SAMPLE RECEIVED ON Feb. 24, 2010 AND COMPLETELY TESTED ON **Jun. 04, 2014** AT **SPORTON INTERNATIONAL INC.** LAB.

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1. Introduction

This manual guides you to install and operate ALL-200 under Windows 2000/XP/Server 2003/Vista/7/8. ALL-200 works with PC through USB 1.1/2.0 (Universal Serial Bus) to perform high- speed data transmission. The high-speed processor in programmer precisely controls programming timing and flow, this ensures accurate programming waveforms always generated on ALL-200.

ALL-200 is embedded with 4Mbit memory to support the programming capacity for most E(E)PROM, MCU/MPU, and PLD. The software automatically uses PC memory as buffer to support high-density memory ICs, such as FLASH devices.

1.1 Programmer and Accessories

Each ALL-200 package contains the following standard accessories:

- Base Unit.
- DC 12V power adapter.
- A USB cable (Type A to Type B), 1.0 M in length.
- A CD-ROM for Driver Files.
- User's Manual.

✧ Optional Accessories:
Please find the required HEADs on HI-LO Website (http://www.hilosystems.com.tw/).

1.2 PC System Requirements

Minimal Requirements

- PC/Pentium III or above.
- Microsoft compatible mouse.
- A hard disk with at least 50 Mbyte free space.
- A CD-ROM drive with speed x2 or above.
- At least one USB port (Version 1.1/2.0)
- Equip 128MB memory space or above.
- Operating System: Windows 2000/XP/Server 2003/Vista/7/8.
- A monitor with 800 x 600 pixels or above.

Recommended Requirements

- PC/Pentium IX or above.
- Microsoft compatible mouse.
- A hard disk with at least 150 Mbyte free space.
- A CD-ROM drive with speed x8 or above.
- At least one USB port (Version 2.0)
- Equip 512MB memory space or above.
- Operating System: Windows 2000/XP/Server 2003/Vista/7/8.
- A monitor with 800 x 600 pixels or above.

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1.3 ALL-200 Specification

Device Support	Pin Count : from 8 pins up to over 300 pins Device Type : EPROM,EEPROM,Serial PROM, FLASH, PLD/CPLD/FPGA, MPU/MCU,
Device Contact	Optioal HEADs
Max Sockets in parallel	1 sockets on optional Programming Module
Controller	16 bits high-speed controller with big sized FPGA & CPLD
Interface Port	USB port
Data Transfer Rate	USB 1.1 : 12 Mb/s USB 2.0 : 480 Mb/s (suggested)
Max Sites in parallel	One site via star USB
Functions	Load file,Read Master,Program,Verify,Auto,ID Check, Checksum, Blank Check, Erase, Protect/Unprotect, Secure, Edit, Function Configuration, Self Test
Host Computer Requirements	● An Intel Pentium III or compatible processor with 128MB of RAM ● At least one USB port available (V 1.1/ 2.0) ● 50 MB free hard disk space with Windows 2000/XP/ Server 2003/Vista/7/8 operating system ● CD-ROM Drive
Power	DC voltage : On board DC 12V-In Power Supply convert to +5V/+3.3V for system
Dimension	L x W x H : 170mm x 130mm x 33mm
Weight	840g
Operating Temperature	0- 40 ¢J(32-105 ¢K)
Safety Standards	CE Approved

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2. ALL-200 Installation

2.1 Hardware

Before installation, make sure your PC has USB 1.1/2.0 port which can be connected to ALL-200 Programmer through USB cable.
USB 2.0 is suggested for fast data transmission with ALL-200 Programmer.

USB 1.1 (Full Speed) : Transmission rate 12 Mb/s

USB 2.0 (High Speed : Transmission rate 480 Mb/s (Suggested)

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2.1.1 ALL-200 Hardware Installation and Applications

Step 1:

Make sure power of Base Unit is in “OFF” state and then positioning and mounting HEAD onto Base Unit.
See figures below:

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Step 2:

Connect programmer and PC as figures below.

Connect the Type B end of USB cable to the USB Type B connector at rear panel of programmer, connect the Type A end of USB cable to the USB Type A connector on the PC.

Step 3:

Connect DC 12V power adapter to 12V power socket of ALL-200 Programmer and plug in the other end to the outlet of power source (100-240VAC/50-60 Hz).

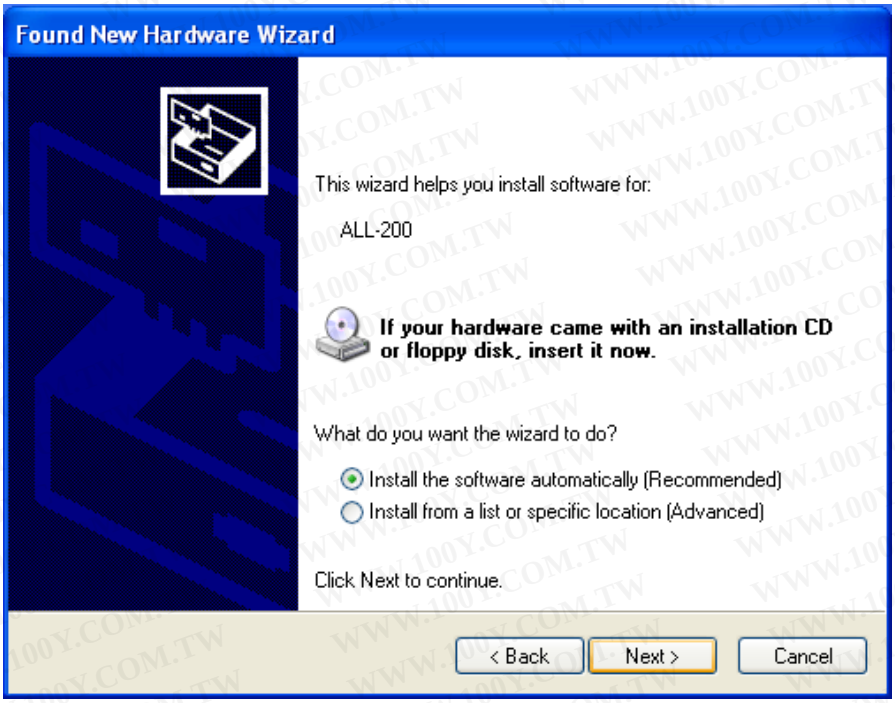
Power on ALL-200 from the switch above the AC power socket on the rear panel.

✧ Note: Please have PC completely powered on before turning on ALL-200 for installation and applications.

2.2 USB Driver

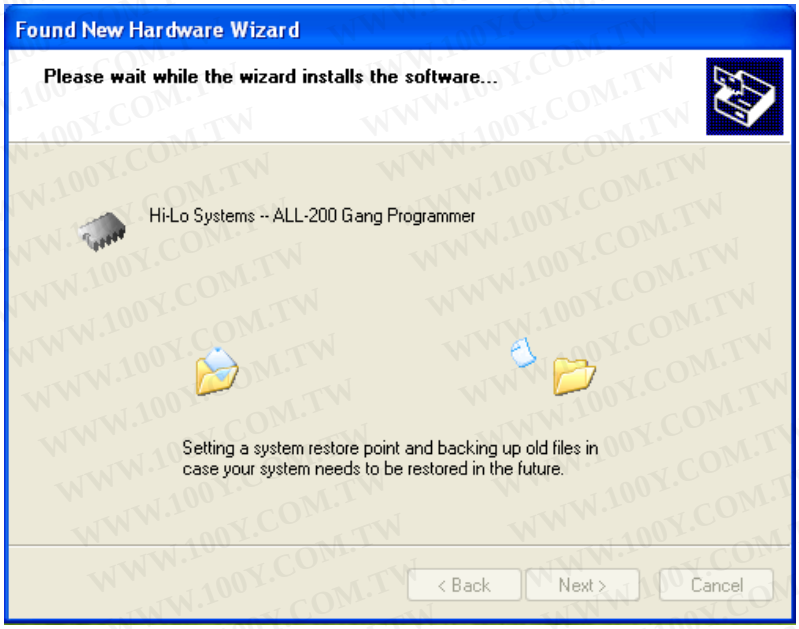
Insert the Driver Files CD into CD-ROM drive, connect USB cable between PC and ALL-200, power on ALL-200 Programmer, the PC will detect the new hardware and a window will pop up “Found New Hardware Wizard”.

Step 1:



✧ To install under Windows 2000/XP/Server 2003/Vista/7/8, you need to change Log-in authority to “Administrator” or “Power-User” in order to install new software/hardware driver.

Step 2:



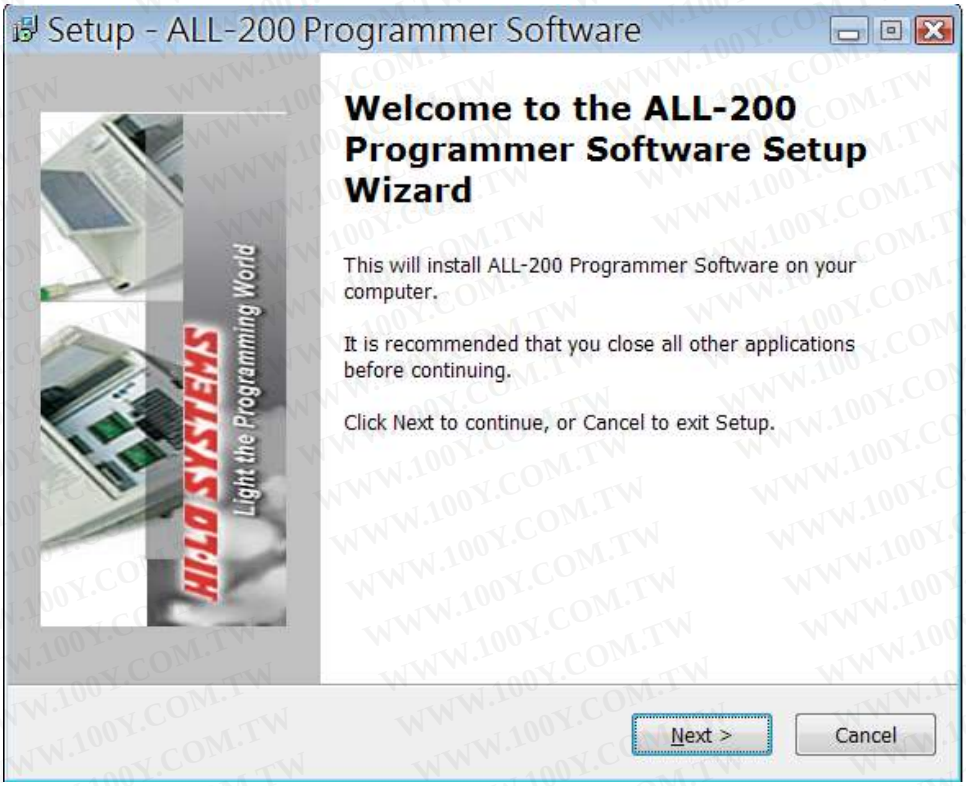
PC will allocate files named “ALL200.INF” and “ALL200” for installation. Then click “Next” to continue.

Step 3:

Windows has finished the USB driver installation for ALL-200. Then click “Finish” to complete USB driver installation.

2.3 Software

Insert Driver Files CD to CD-ROM drive and it'll run automatically.
But if it doesn't, go to directory of ALL-200 under File Manager to execute the SETUP.EXE file, or run the SETUP.EXE from START menu of WINDOWS and follow all steps accordingly as follows:



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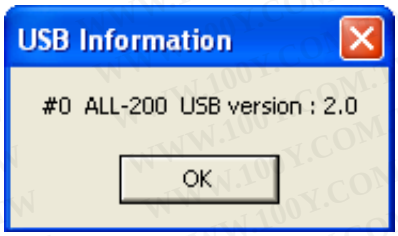
Check of installed software:

(1) Check the software installation with File Manager and make sure EACCESS.EXE, individual IC programming driver and Utility files exist under C:\Program Files\ALL-200 directory. EACCESS.EXE is a system file easy for you to select IC Manufacturer, Product Type and the corresponding programming driver.

(2) When programming driver is executed, software will automatically check the connection of ALL-200. If software cannot detect ALL-200, the connection and/or installation might have problem and it might not be possible to access ALL-200.

(3) Run "USB Info." option under EACCESS menu to check the connection between ALL-200 and PC.



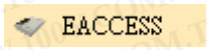
3. ALL-200 Basic Operation

3.1 Getting Started

We will have a brief description of ALL-200 basic operation, introduce how to access the desired IC programming driver through EACCESS, the main system program. We will also introduce functions of Device, Load, Blank check, and Program by taking SPANSION S29AL004D-TA-01 as an example.

✧ For best view of ALL-200 information displayed, user's screen should have resolution 800x600 pixels or above.

3.1.1 Start with EACCESS

Click the icon of EACCESS 

to activate EACCESS.EXE and get the following display on the window.

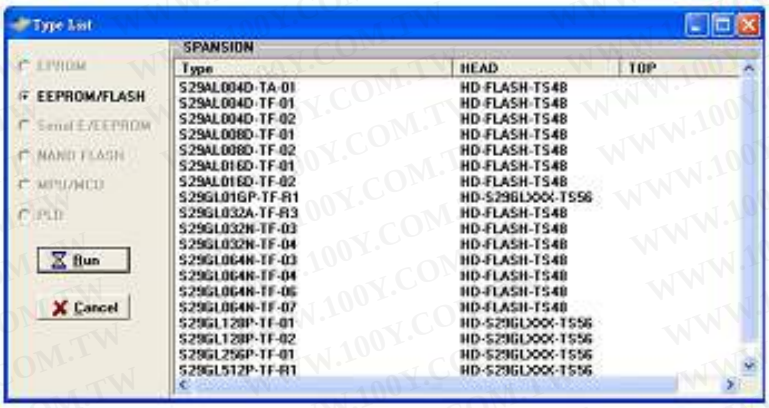
3.1.2 Entries to Programming Driver

Click "Device" and "Select Device" to display two entries to programming driver, "Select manufacturer/type" and "Search for type" (as the figure below).

(1) Select manufacturer/type

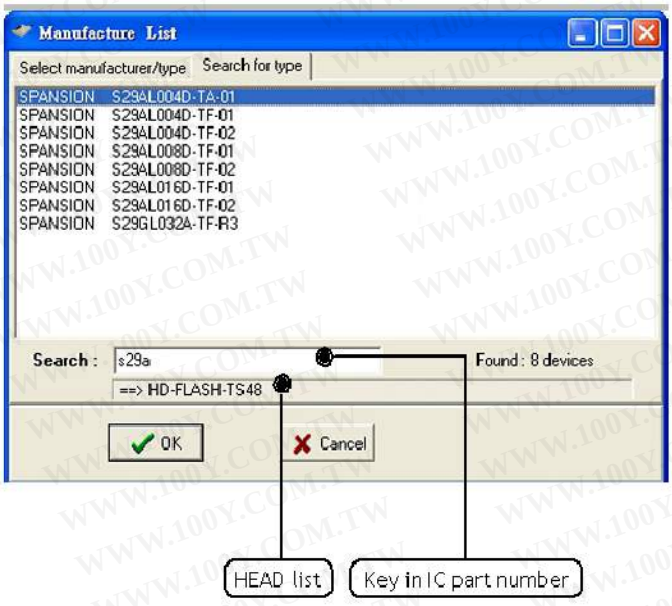
Click “Select manufacturer/type” in “Manufacturer List” to display IC Manufacturer options. Select “SPANSION” and click “OK” to display Type List.

Select “EEPROM/FLASH” in product groups at left side and select “S29AL004D-TA-01” in product types at right side of Type List and then click “Run”.



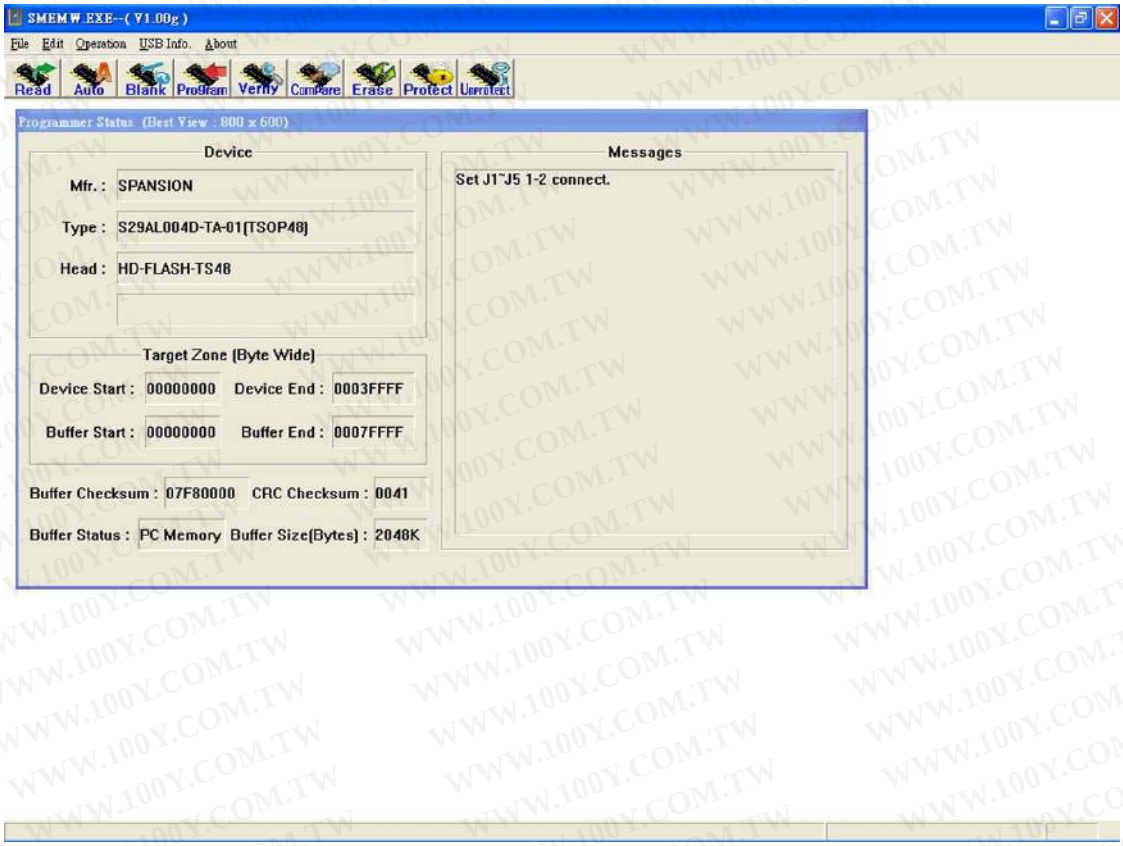
(2) Search for type

Click “Search for type” in “Manufacturer List”, select “S29AL004D- TA-01” and the required HEAD P/N is displayed under the block of Search. Then click “OK” to enter the main menu of driver file.



3.1.3 Enter Main Menu of the Driver File

Main Menu of the Driver File contains three major parts, the first row for menu of main functions, the second row for quick function keys, and the rest for dialogue boxes of IC information like IC Manufacturer, Product Type, HEAD needed... etc.

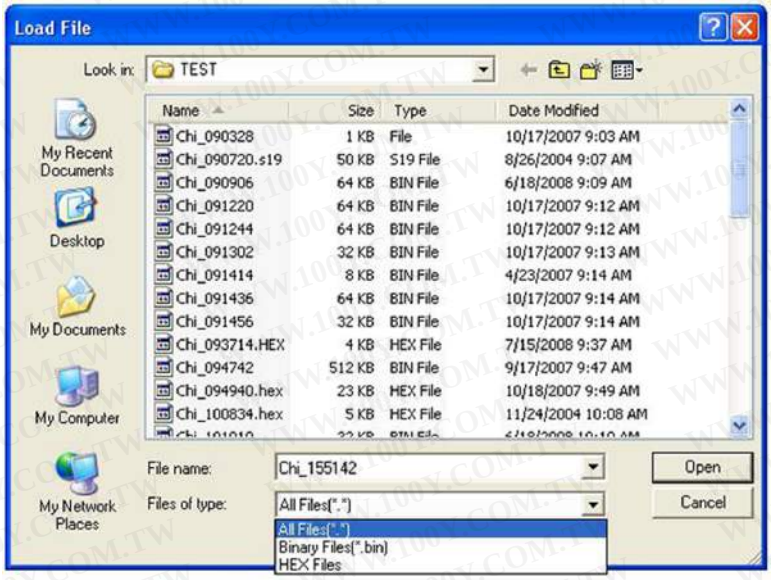


Remark:

When reselecting IC manufacturer and product type, the information in dialog box will be updated accordingly and the driver file will be downloaded to ALL-200 Programmer. If the message “File not found” appears, it means the driver file is not available in PC. Then check the attached Driver File CD or visit HI-LO web site at http://www.hilosystems.com.tw for S/W download. If a specific HEAD is needed, **“File not found”** may also indicate the absence of the required HEAD S/W. Try to install the S/W again.

3.2 Load File to Programmer buffer

Programming code should be loaded after you select IC Manufacturer and Product Type. In general, programming code is saved in a file in Bin/Hex format. This code needs to be loaded to programmer buffer and then programmed into Blank IC devices. To load file to programmer buffer, click “File” menu, select “Load File to Programmer Buffer” option, following dialogue box will appear:

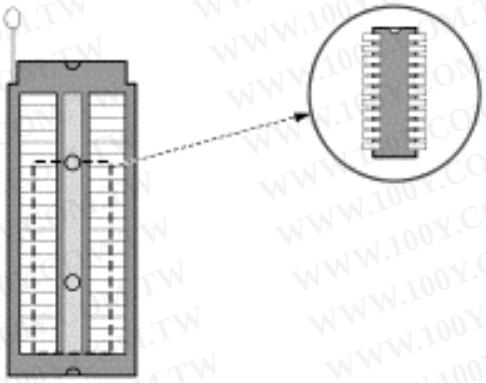


Function of file loading is similar to that under Windows environment. Enter the file name to be downloaded and click “Open”, the named file will be loaded to programmer buffer. **Note: Disk drive and file path must be correct.** Select and click the correct drive and folder that the file located to. If it cannot be operated by mouse, apply <TAB>, <UP>, <DOWN>, and <ENTER> keys for selecting and confirming.

3.3 Read Contents from Master IC to Buffer

When programming code is stored in a Master IC, insert the Master IC onto socket of HEAD # 1, click “Read” button on screen or press “R” key on keyboard to read programming code from Master IC to programmer buffer.

When inserting Master IC onto socket of HEAD # 1, make sure Pin 1 orientation identical with the indicative positioning diagram by socket. If IC’s pin count is less than the socket’s, please put IC onto socket as the diagram indicated overleaf.



✧ Caution! Incorrect IC positioning might cause IC damage or be programmed to an unknown state.

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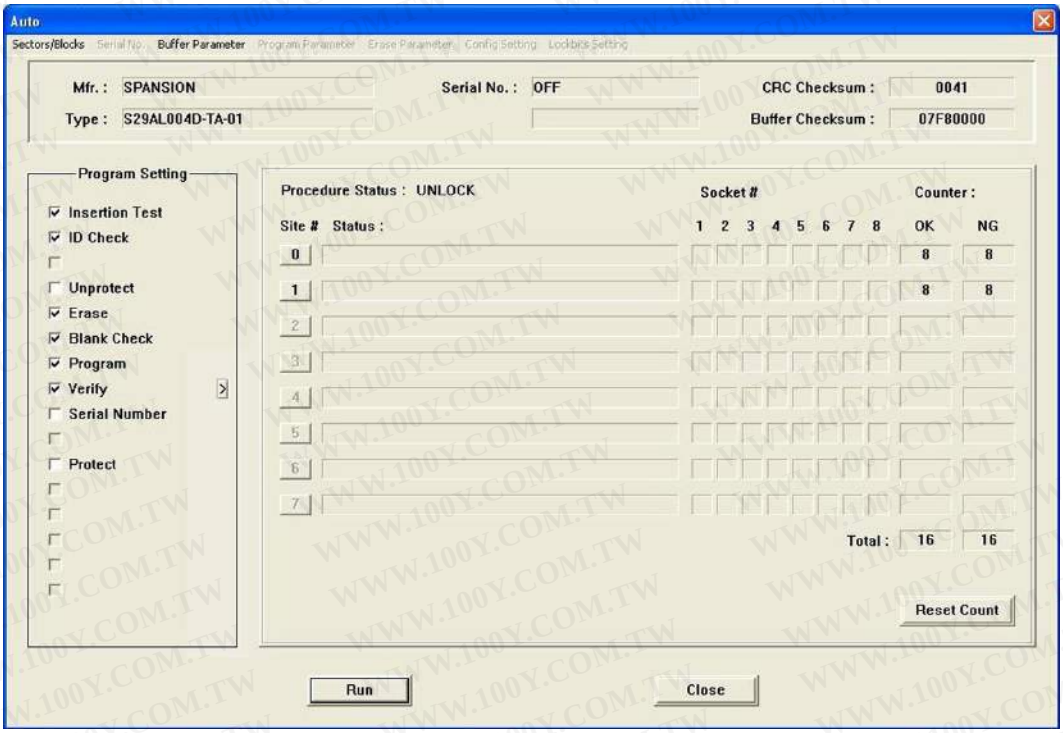
3.4 Program Buffer Contents to IC

Insert ICs to be programmed onto sockets, click “Auto” button on screen or press “A” key on keyboard, following dialogue box will appear.



Click “Run” button on screen or “Y” key on keyboard or “YES” on programmer to start programming buffer contents to blank ICs.

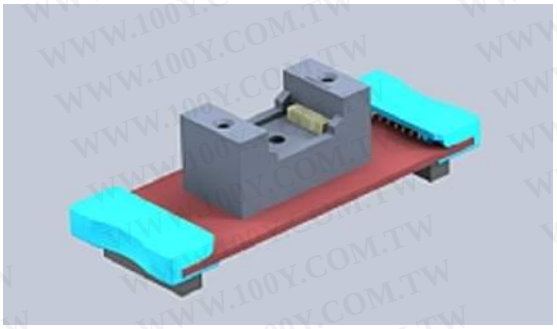
After programming, system will automatically verify data read from programmed ICs with data in programmer buffer. If both data match, the corresponding LED by the programming unit will be lit indicating successful programming; if it’s not lit, the programming fails.
For next IC programming cycle, the “BUSY” LED must be off. Then insert blank ICs onto sockets, click “Run” button on screen or “Y” on keyboard or “YES” on programmer to continue programming.

✧ Click “Close” button on screen or <ESC> key on keyboard to go back to main menu.

3.5 Optional

For the sake of supporting various ICs nowadays, HEADs are designed for most kinds of IC packages such as PLCC, SOP, TSOP, QFP, PGA, ... etc.

Each HEAD has 64 pins in various layouts that can be inserted onto 32 pins slot on the programmer. Each HEAD has one (or more) programming file(s) that needs to be loaded to the same directory as EACCESS.



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3.5.1 HEAD

- **S/W Installation:**

Copy the HEAD file(s) attached to the same directory as that for EACCESS file(s).

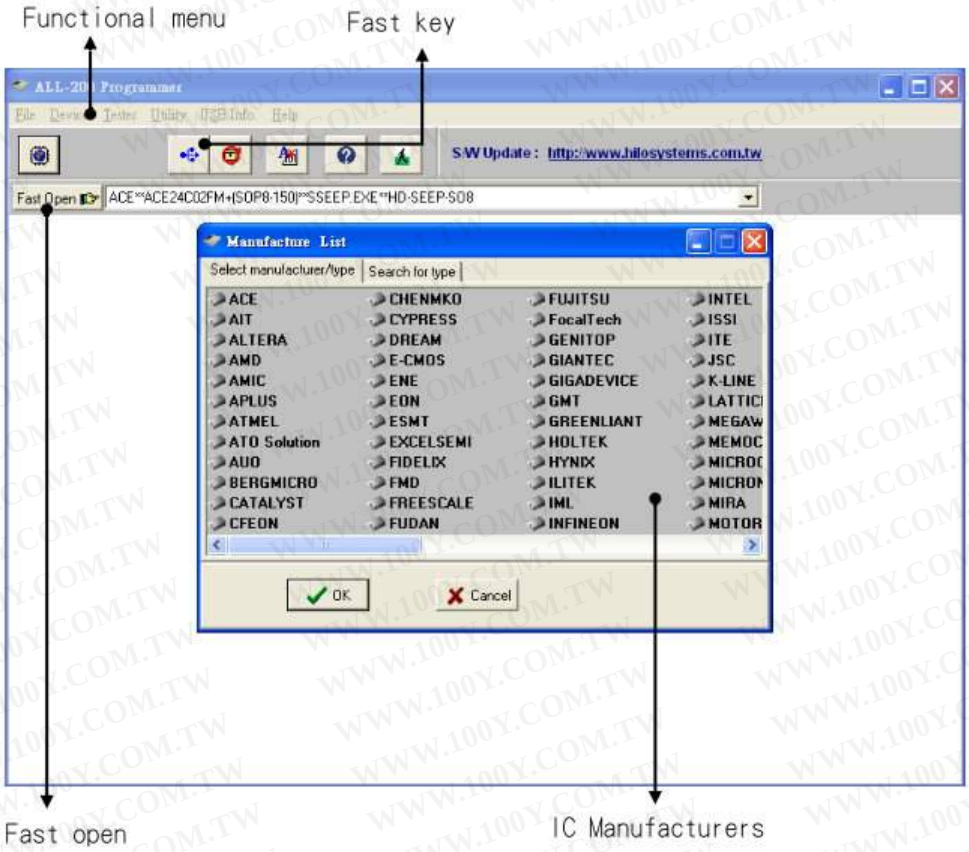
- **H/W Installation:**

Insert the required HEAD onto the programmer. See the figure below:

4. ALL-200 Software

4.1 EACCESS User

System Software “EACCESS” is an interface guiding user to locate the driver software for product type to be programmed. EACCESS also provides File Management Utilities as well as Data Base of programmable IC products.

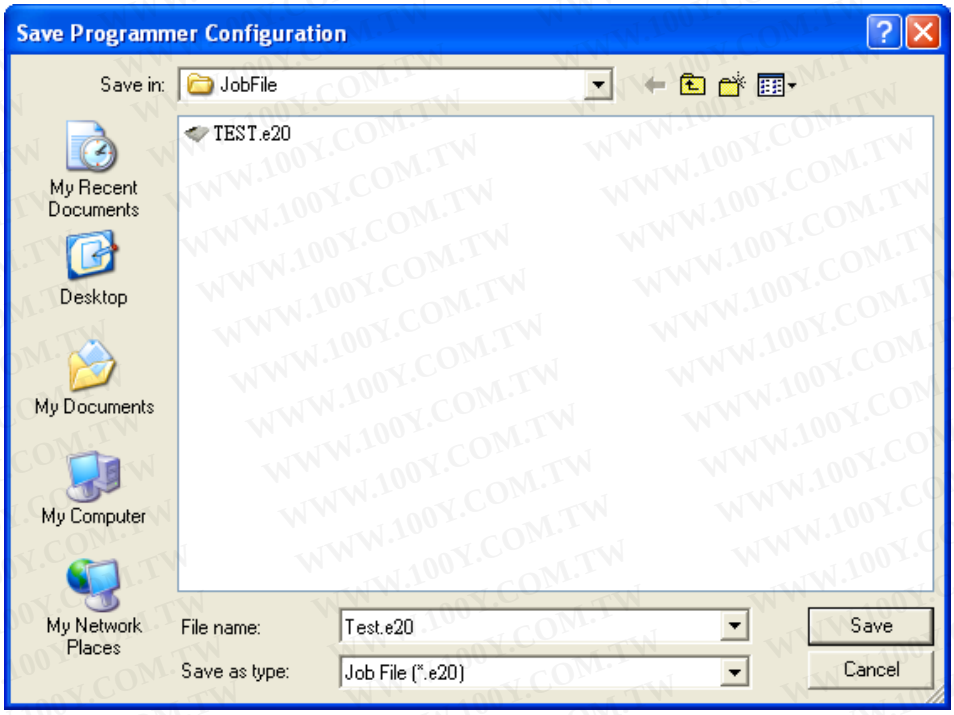


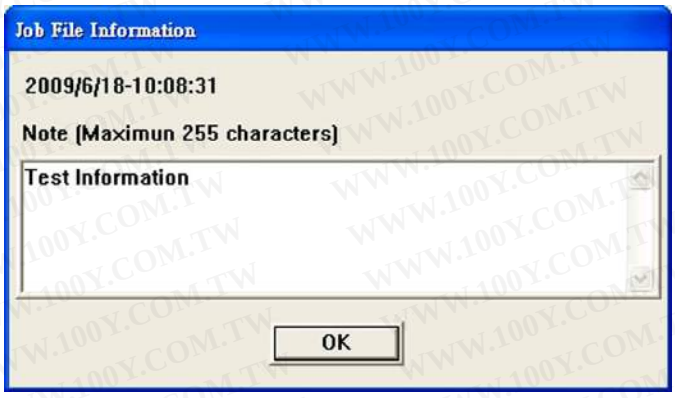
4.2 File

Under the “File” menu of EACCESS contains three special commands -- Save Programmer Configuration, Load Programmer Configuration and Enable Job Function.

4.2.1 Save Programmer Configuration

After all programming options are set, select “Save Programmer Configuration” to save all the info as a *.e20 file (Job File), including Target Zone settings (Device Start, Device End, Buffer Start, and Buffer End), Mfr. and Type selections, Load File setting, Auto function settings and Other programming settings.

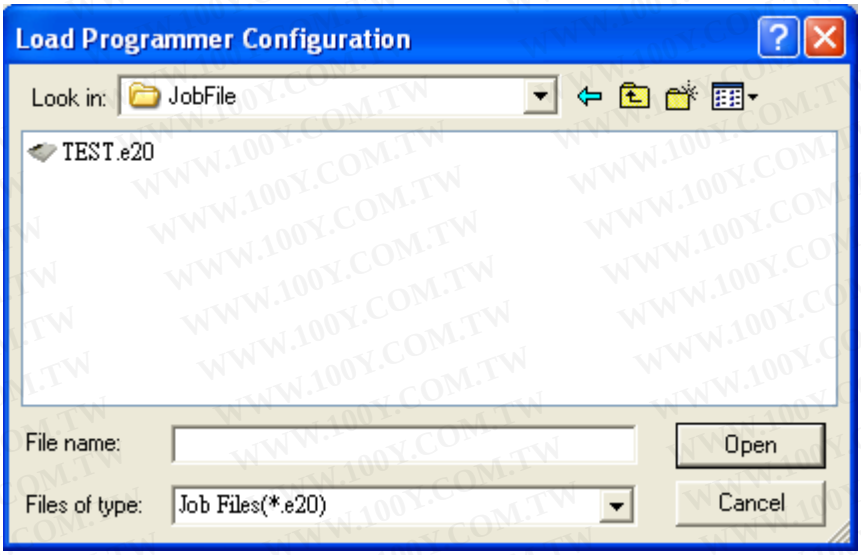


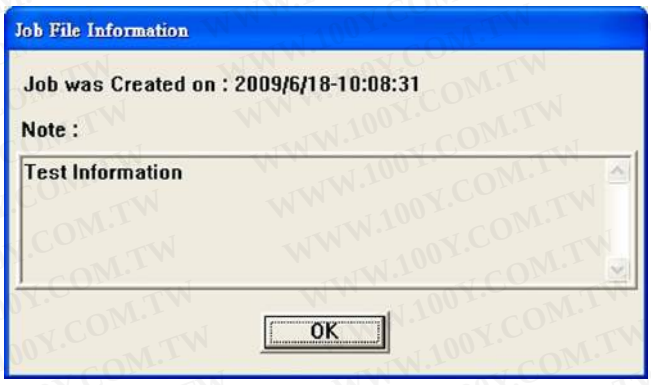


4.2.2 Load Programmer Configuration

After saving the programmer configuration, you may then use this command to load a desired configuration data file (Job file) back to the software driver whenever needed to reinstall all the programming data information (note: not all software contains Target Zone data) as well as “Auto” function with settings saved previously.

After loading Programmer Configuration, you only need to select “Auto” function to begin programming.





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4.2.3 Enable Job Function

This command allows users to enable or disable the Job Function selection.

After Job Function is enabled, select a configuration data file (Job file) and click “Open” to download all the configuration setting previously saved back to programmer.

You can also install a short cut in the Startup directory of Windows so that the driver will automatically start when your PC is activated and the operation system runs.

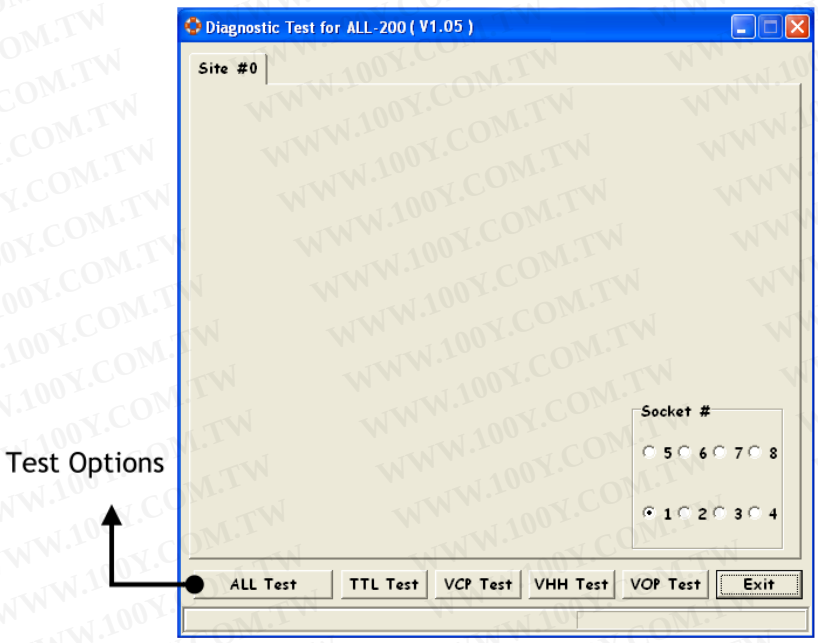
4.3 Diagnostic Test

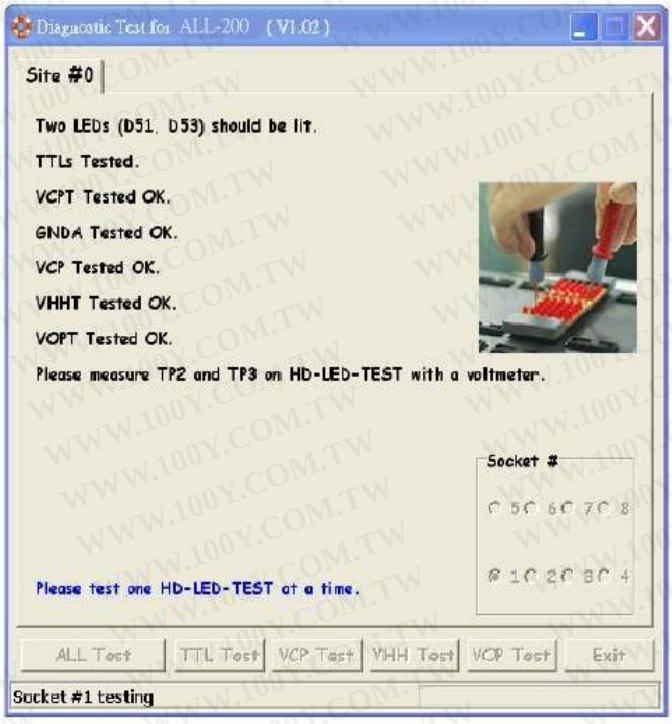
You can run “Diagnostic Test” with HD-LED-TEST board to check socket on ALL-200.

4.3.1 HD-LED-TEST for Diagnostic Tester

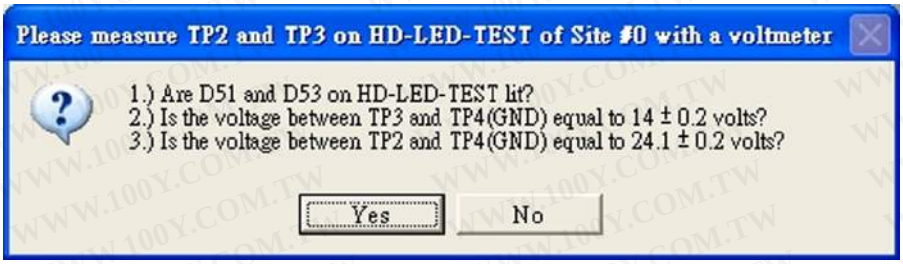
Insert HD-LED-TEST board onto a socket and run Diagnostic Test (see the figure below). The diagnostic includes ALL Test, TTL Test, BVCP Test, VHH Test, VOP Test and voltage measurement.

✧ Be sure to remove any HEAD from programmer before running Diagnostic Tester; otherwise HEADs or IC on HEADs might be damaged.





✧ After TTL Test, the following message appears for voltage measurement ; please check accordingly.

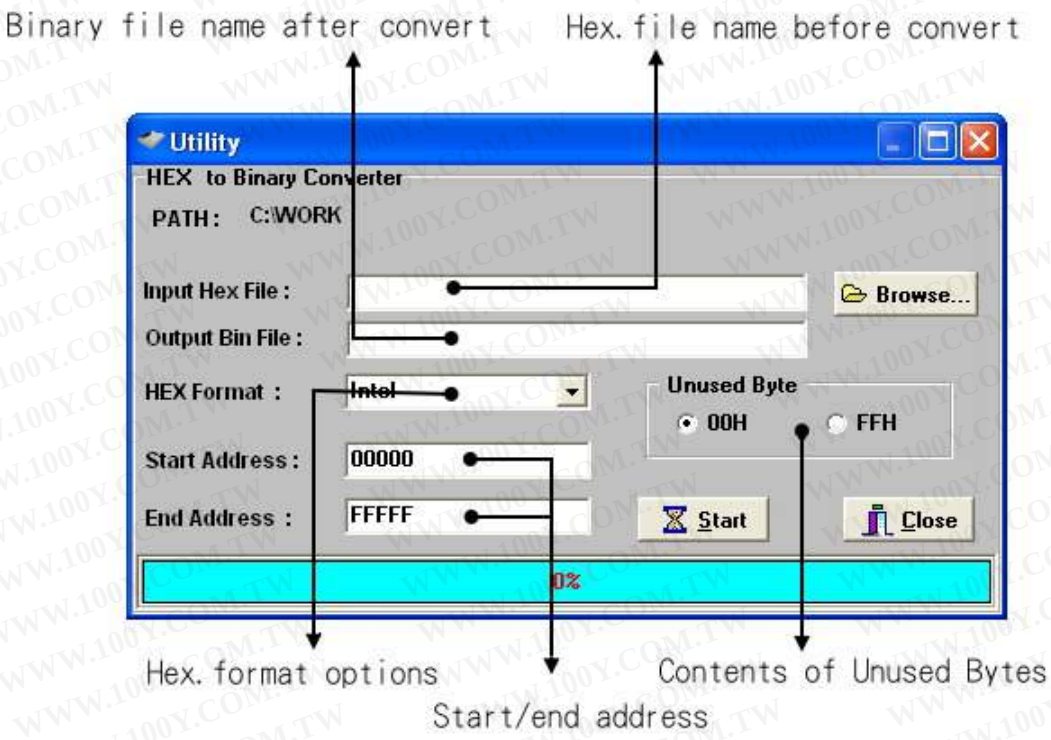


4.4 Utility

File Management Utilities include Hex to Bin Converter, Bin to Hex Converter, 2-way splitter, 4-way splitter, 2-way shffler, and 4-way shuffler, ...etc.

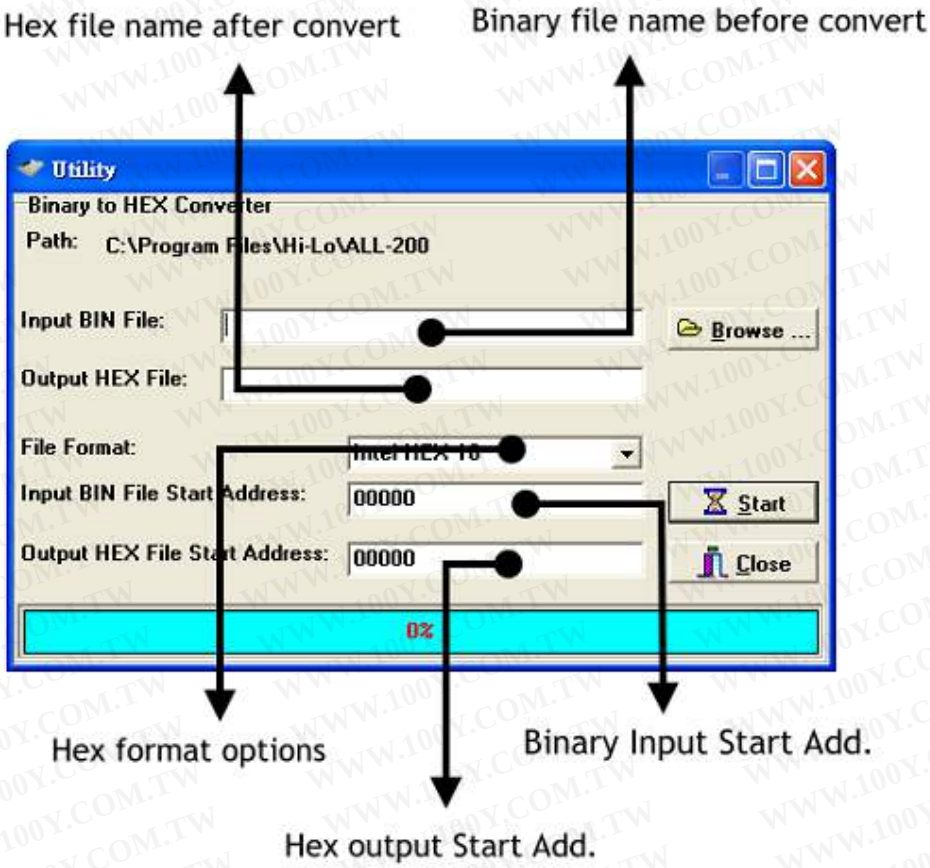
4.4.1 Hex to Bin Converter

Convert data from Hex format to Binary format for programmer Read/ Write.



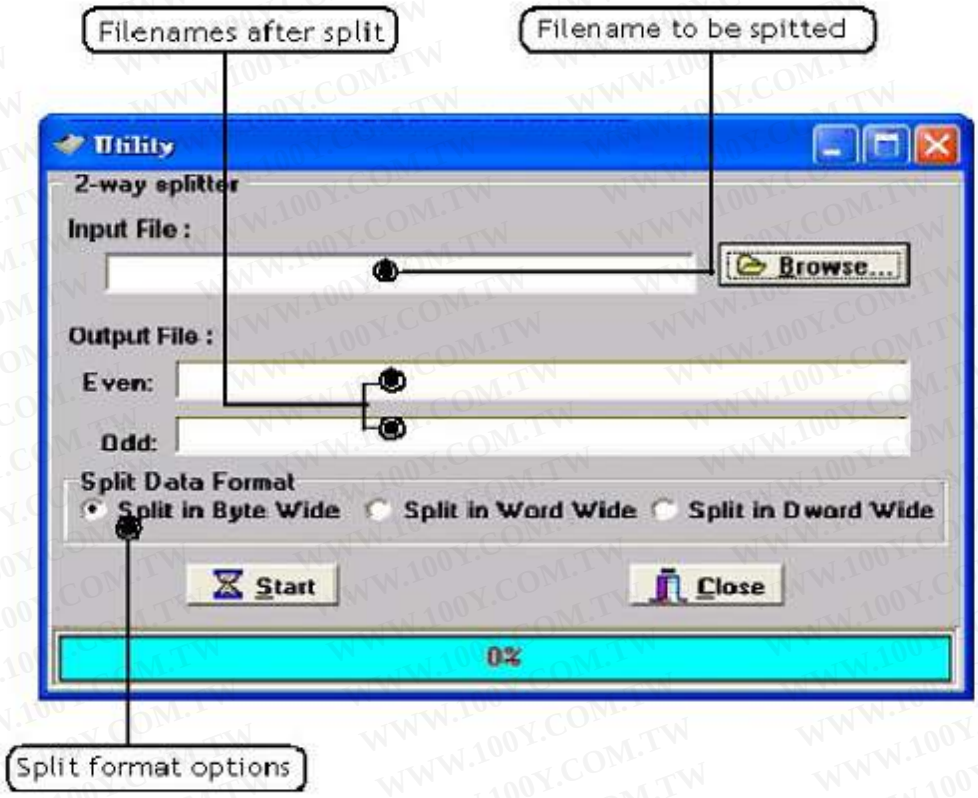
4.4.2 Bin to Hex Converter

Convert data from Binary format to Hex format.



4.4.3 2-Way Splitter

Split one file into two output files. One file contains odd-byte data of the original file and the other file contains even-byte data of the original file.

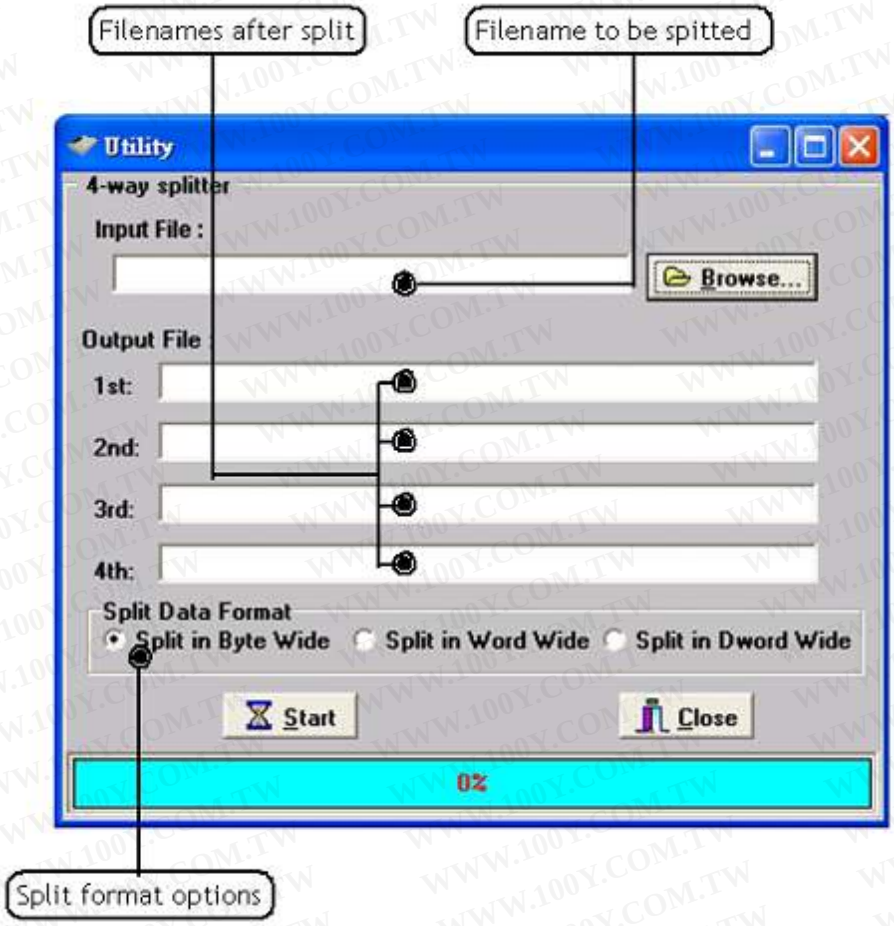


Split Data Format:

Normally the split data is in Byte Wide; however, user can choose Word Wide (two bytes) or Double Word Wide (four bytes) as unit of data split.

4.4.4 4-Way Splitter

Split one file into four output files. The 1st file contains the 1st byte of every 4-byte data segment of the original file. The 2nd, 3rd, and 4th file contains the 2nd, 3rd, and 4th byte of every 4-byte data segment of the original file.

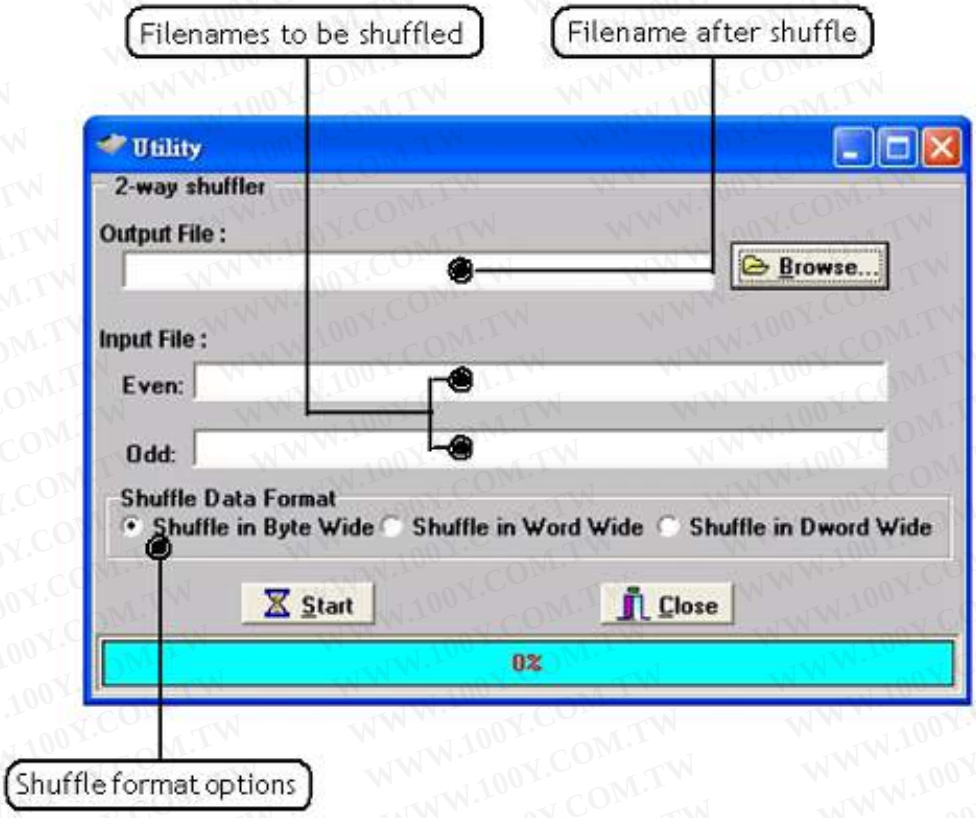


Split Data Format:

Normally the split data is in Byte Wide; however, user can choose Word Wide (two bytes) or Double Word Wide (four bytes) as unit of data split.

4.4.5 2-Way Shuffler

Combine two files into one. Insert data of Even file into even byte position of the combined file and insert data of Odd file into odd byte position of the combined file.

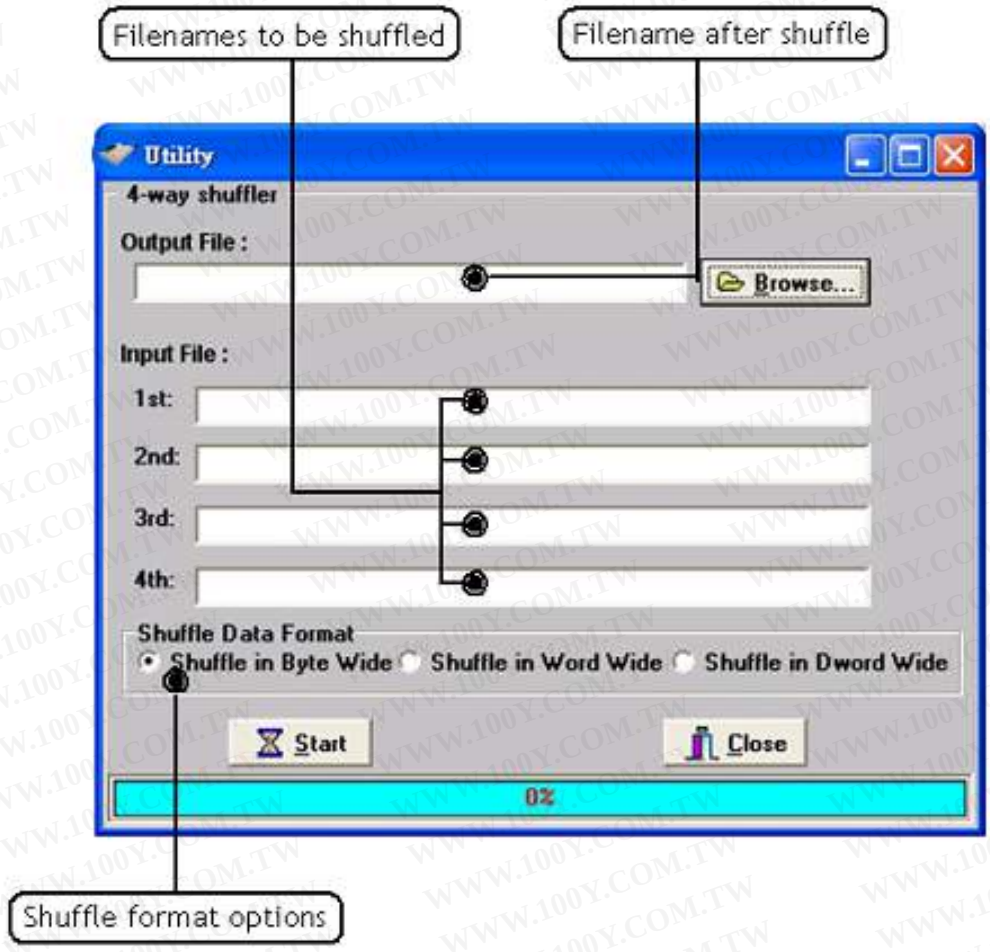


Shuffle Data Format:

Normally the shuffled data is in Byte Wide; however, user can choose Word Wide (two bytes) or Double Word Wide (four bytes) as unit of data shuffle.

4.4.6 4-Way Shuffler

Combine four files into one. Insert data of 1st file into the 1st byte of every 4-byte data segment of the combined file, insert data of 2nd, 3rd, and 4th file into the 2nd, 3rd, and 4th byte of every 4-byte data segment

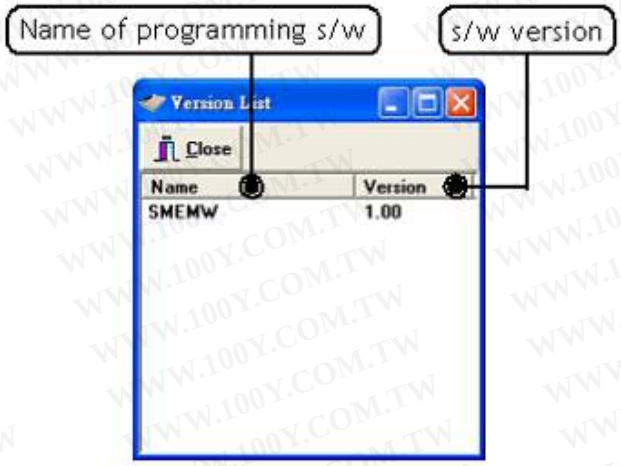


Shuffle Data Format:

Normally the shuffled data is in Byte Wide; however, user can choose Word Wide (two bytes) or Double Word Wide (four bytes) as unit of data shuffle.

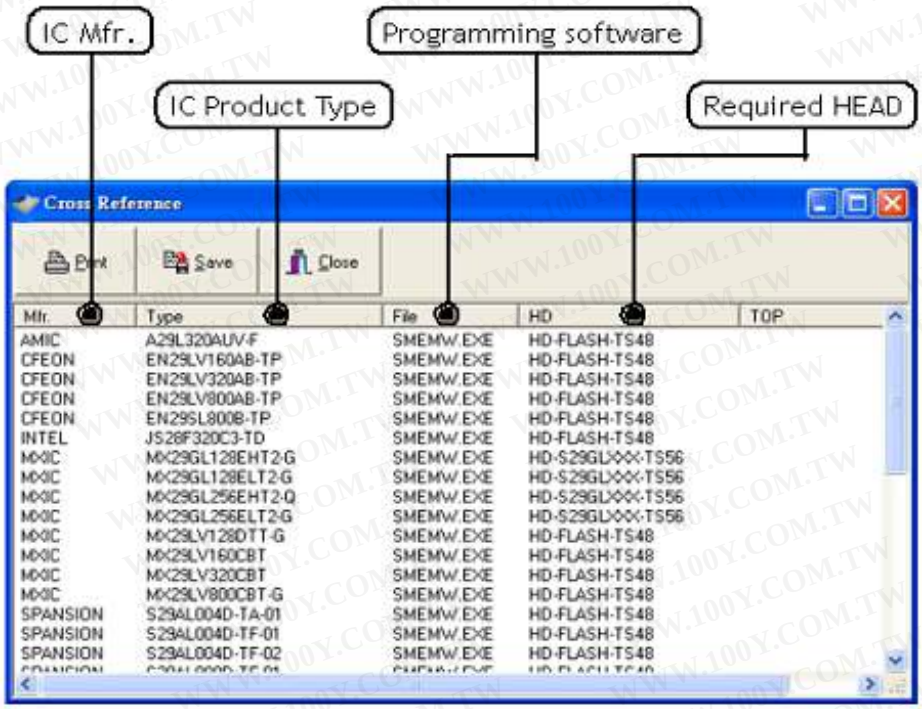
4.4.7 Version List

List version number of current programming software



4.4.8 Cross Reference

List the Cross Reference of IC Mfr., Product Type, and the corresponding programming software.



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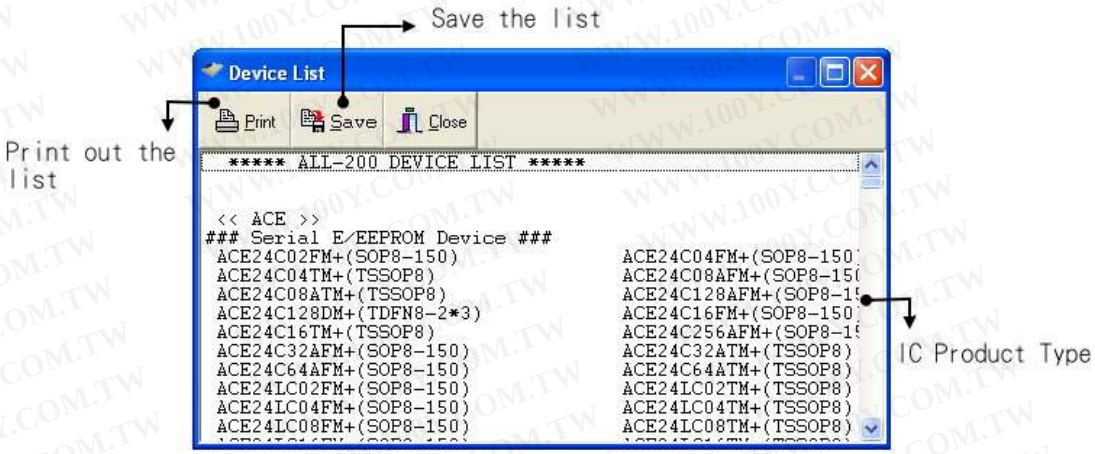
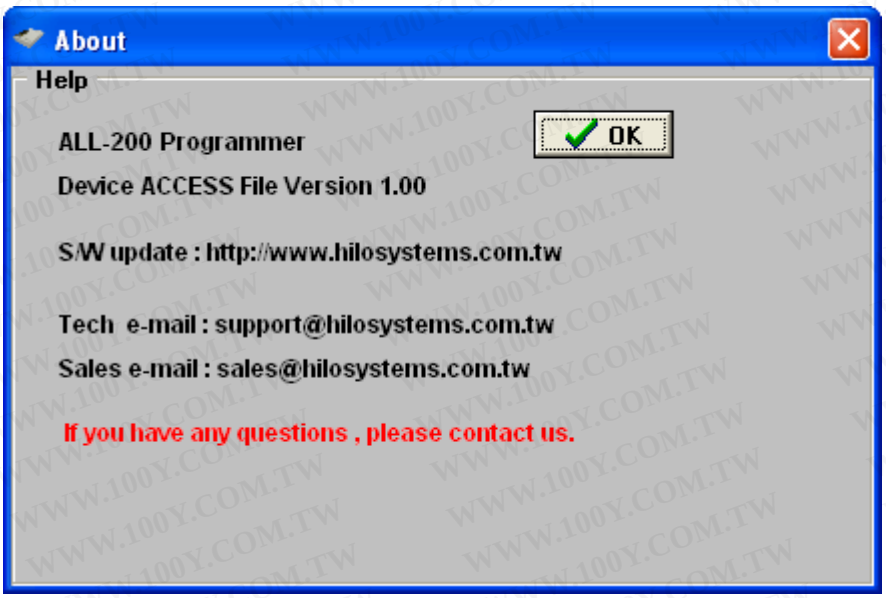
4.4.9 Device List

List all device types that are programmable at current version.



4.4.10 About

Provide information of current EACCESS file and contact addresses if any service needed.



4.5 Protect Mode

Protect Mode provides control of software access.

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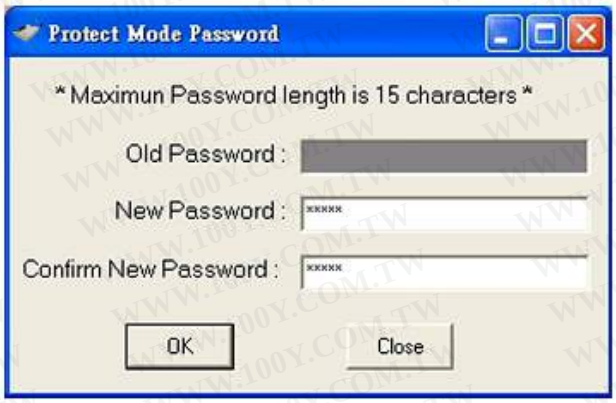
4.5.1 Protect Mode Password

For the first time to run Protect Mode, you need to key in new pass- word and confirm again; then click "OK" to enter Protect Mode Option.

To change the password or re-starting Protect Mode, you need to key in the original password, and then new password and confirm again.



To cancel Protect Mode, the password is also essential.

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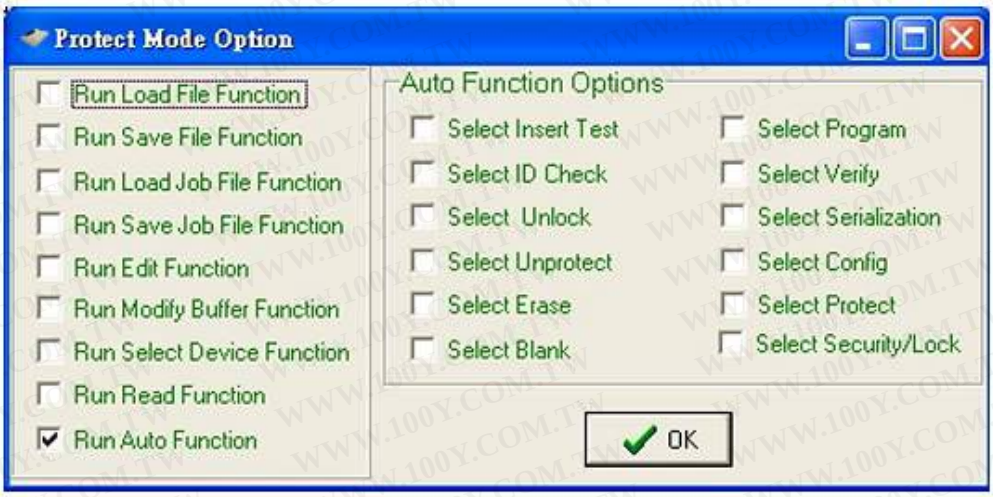
4.5.2 Protect Mode Option

After s/w enters Protected Mode, a functional menu is available for user to select functions to run on the left and then select options to execute on the right.

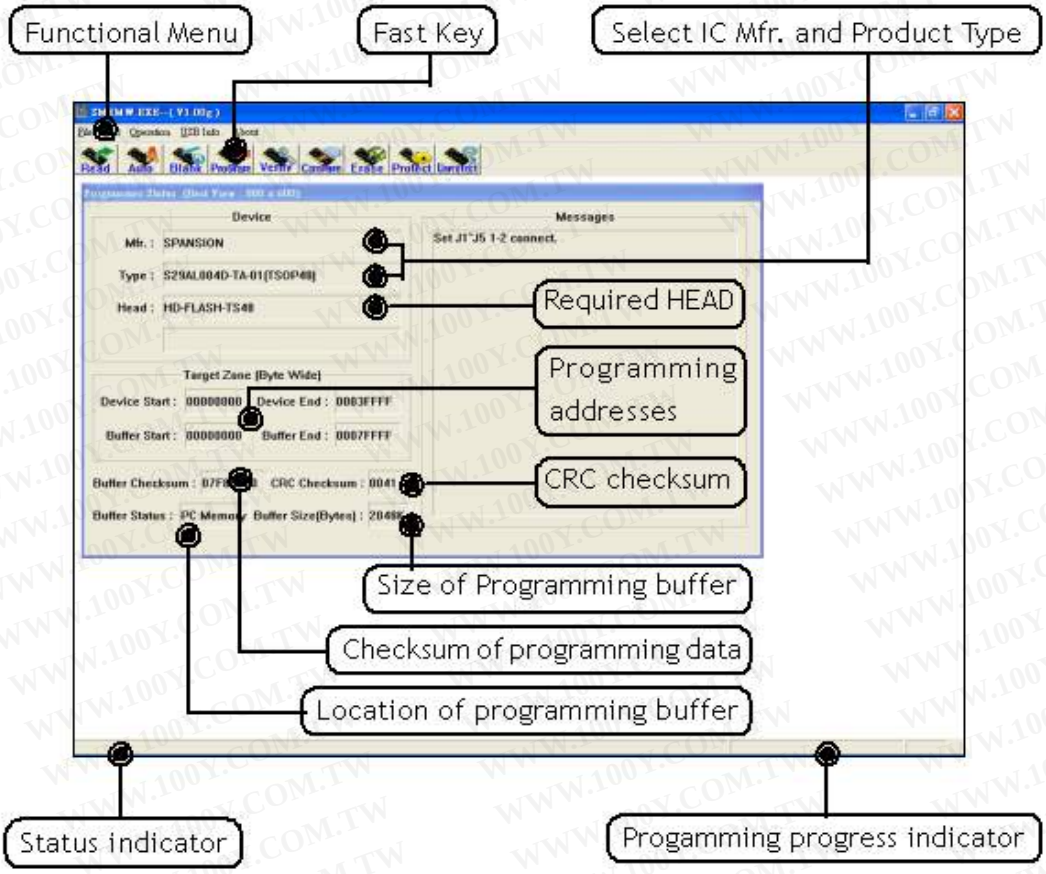


4.5.3 Reset Protect Mode Option

When Protect Mode Option is reset, the following message will pop up. If you click "Yes", all the settings will be changed back to the original default settings.

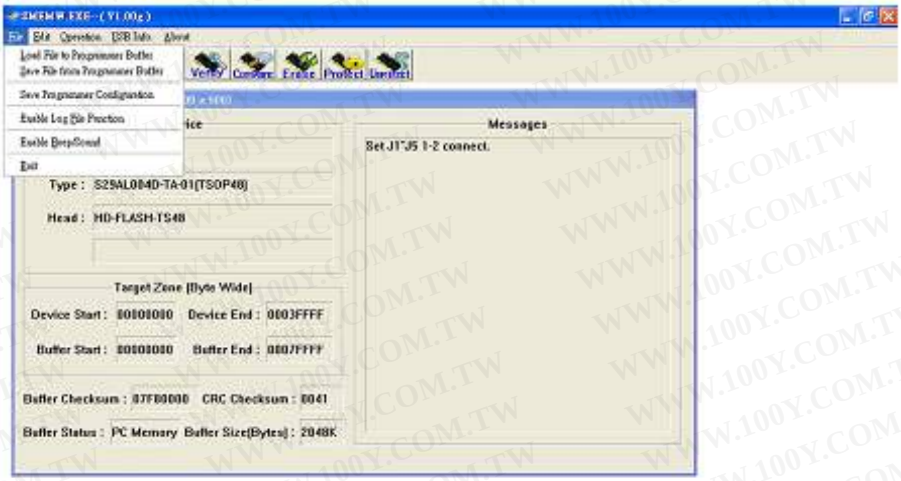
4.6 Programming Data / Function

Programming software includes loading of programming driver, utilities of data management, and control of programming function/operation.
Each programmable IC needs correct functional setup before programming. User needs to refer IC data sheet and/or application software for proper setup of programming function. See description below by taking SPANSION S29AL004D-TA-01 device as an example.

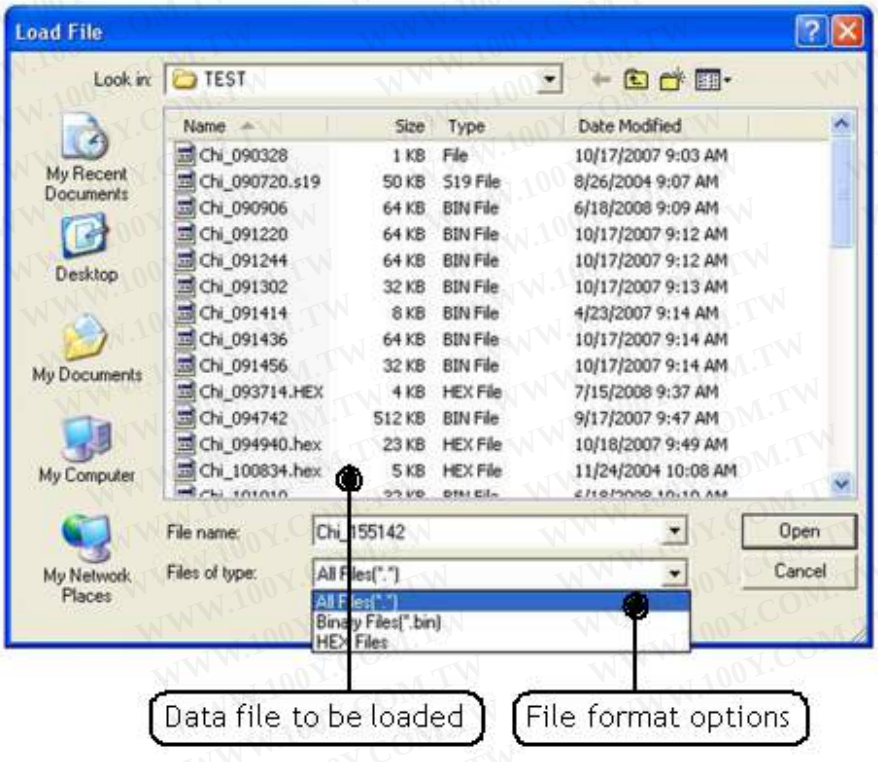


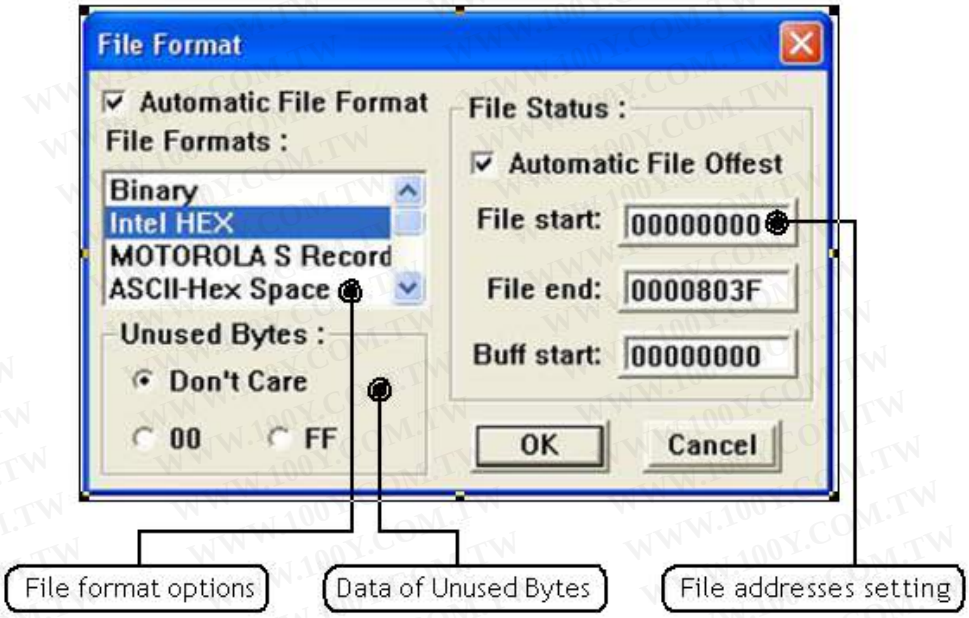
4.6.1 File

Load/Save of data file and configuration file. See dialogue boxes below.



(1) Click “Load File to Programmer Buffer” in File menu and the following dialogue box will show up.





- Automatic File Format:

  Enable this option if you are not sure the format of data file and a proper file format will be selected automatically.

- Automatic File Offset:

  Enable this option if you are not sure the offset of data file and the File Start will be automatically adjusted.

- Unused Bytes:

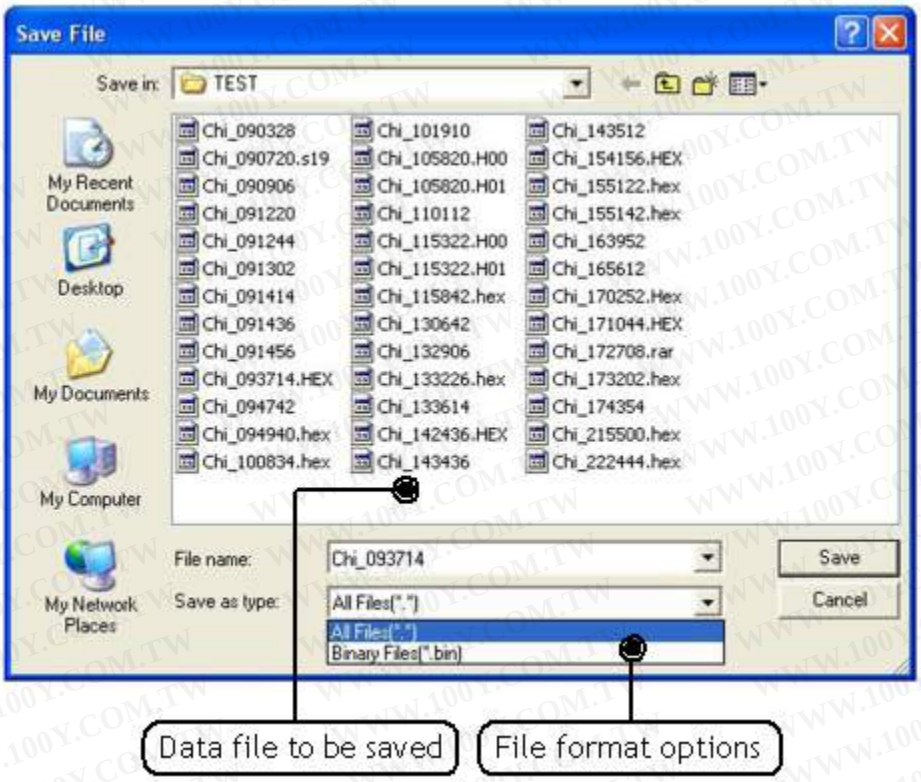
  [Don’t Care]: Keep the data as it was in unused bytes of buffer memory.

  [FF]: Write “FF” to unused bytes of buffer memory.

  [00]: Write “00” to unused bytes of buffer memory.

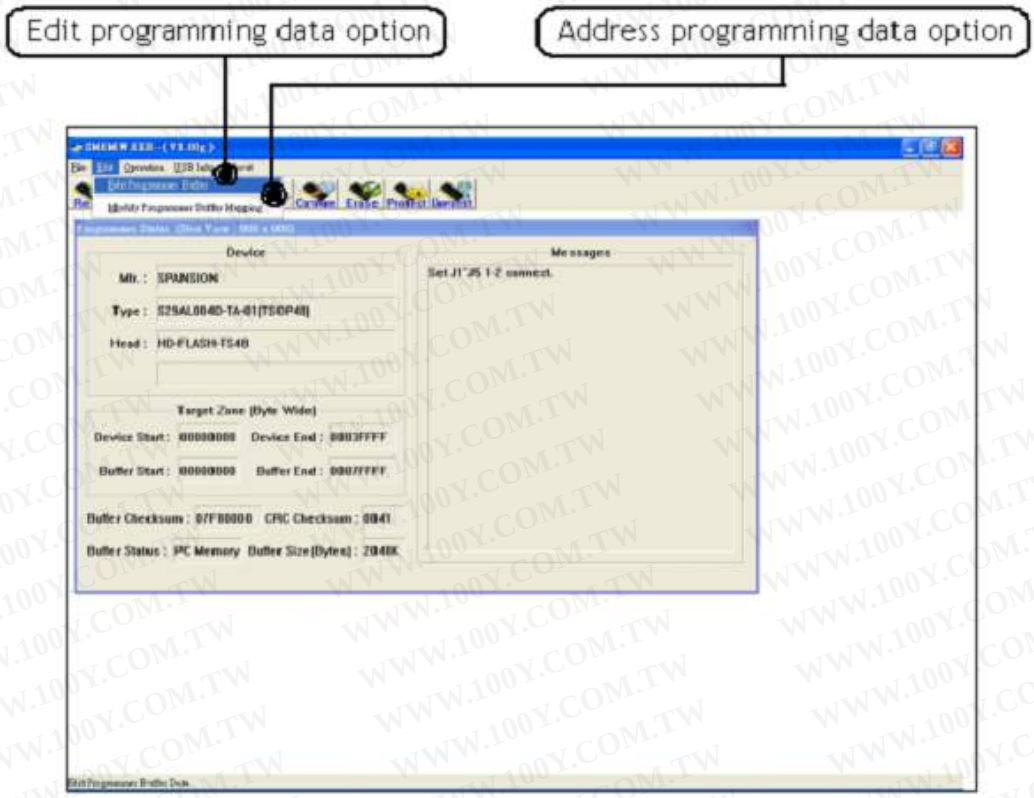
(2) Click “Save File from Programmer Buffer” in File menu to save a data file from programmer buffer as a Binary file; then the following dialogue box will show up.

But to save data files as other formats, please run “Utility” in main menu of EACCESS (see details in 4.4).



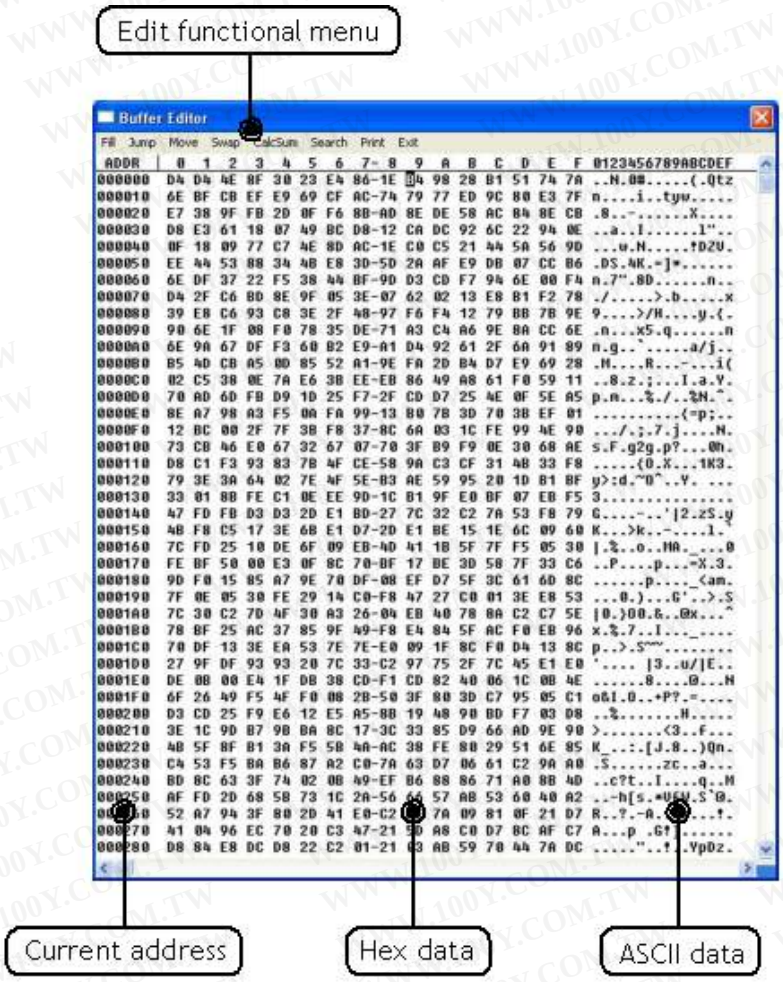
4.6.2 Edit

Includes programming data editing and addressing. See dialogue box below.



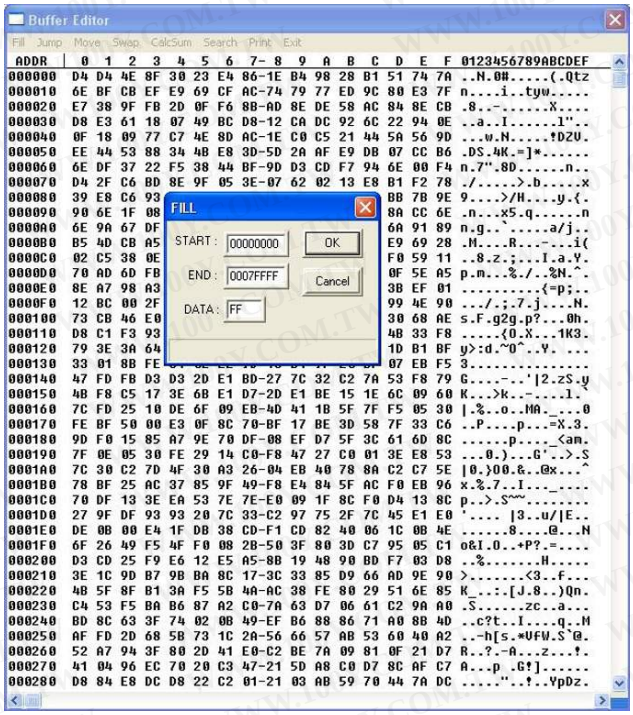
(1) Edit data:

Provides functions such as Fill, Jump, Swap, Calc, SUM, Search,...etc. for users to edit programming data in Hex and ASC II expressions.



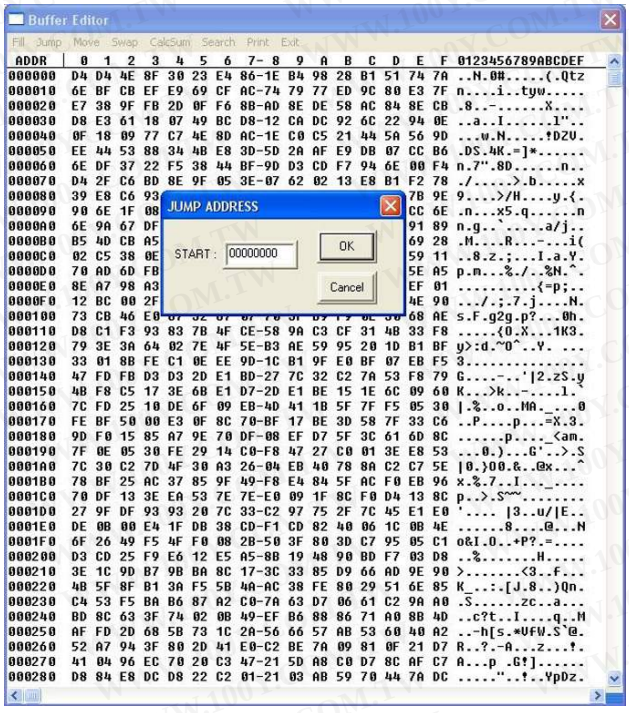
(2) Fill:

Specify start and end addresses and data to be filled in; then click “OK” and data will be filled into the specified area.



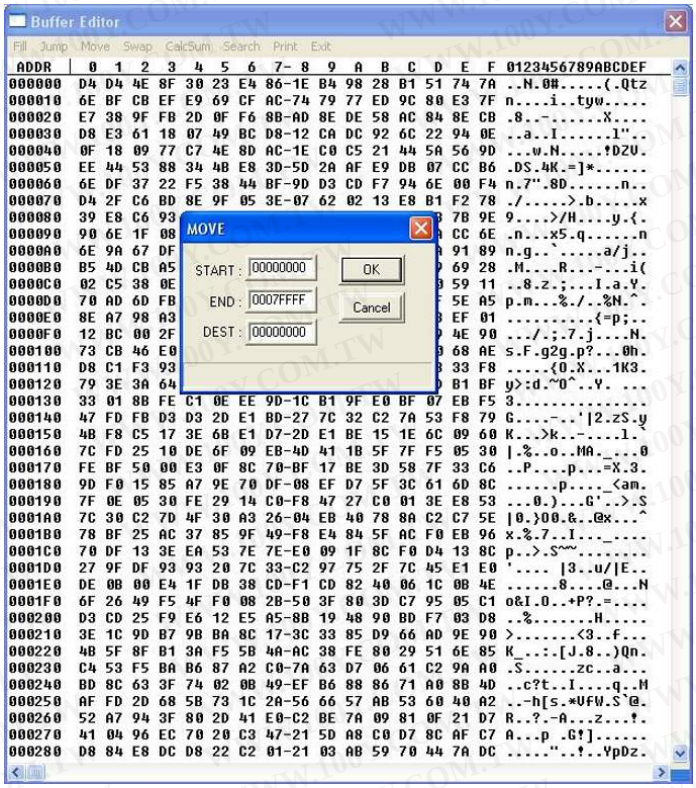
(3) Jump:

Specify the start address to jump to, then click “OK”, system will jump to the specified address with data displayed.



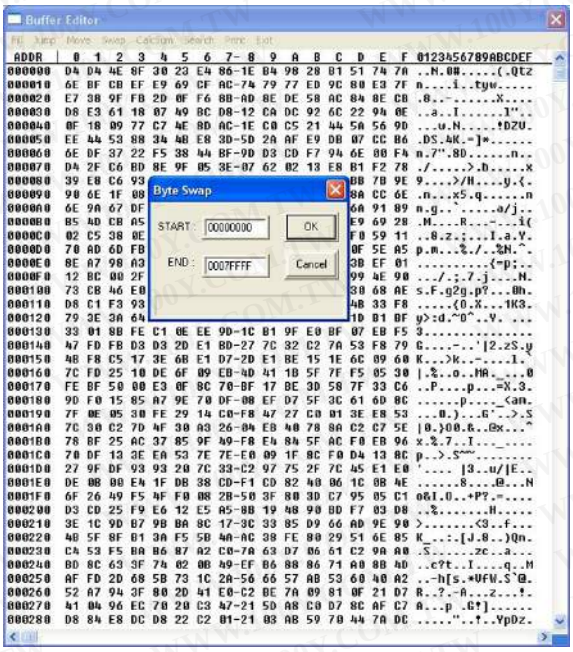
(4) Move:

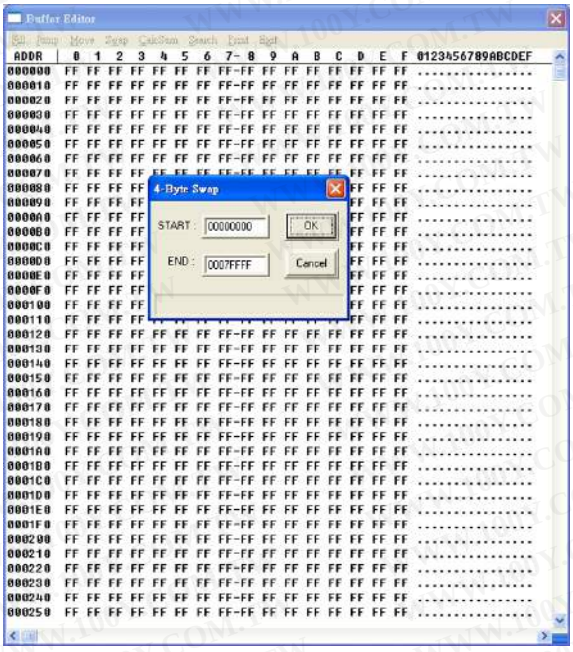
Specify start and end addresses in which data to be moved, and also specify the destination address to move to. Then click “OK”, and system will move data between specified addresses to the destination area.



(5) Swap - Byte and 4 Bytes:

Specify start and end addresses in which data to be byte-swapped or 4-byte-swapped; then click “OK” to start swapping.





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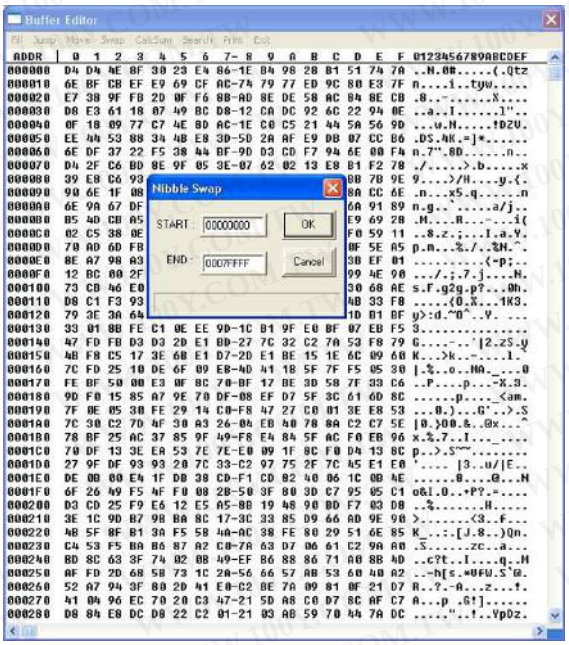
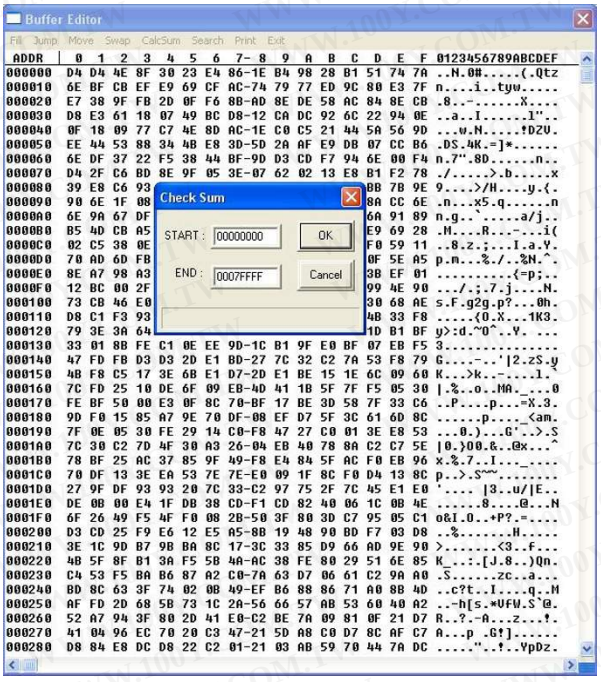
(6) Swap - Nibble:

Specify start and end addresses in which data to be nibble- swapped; then click “OK” to start Nibble-swapping.



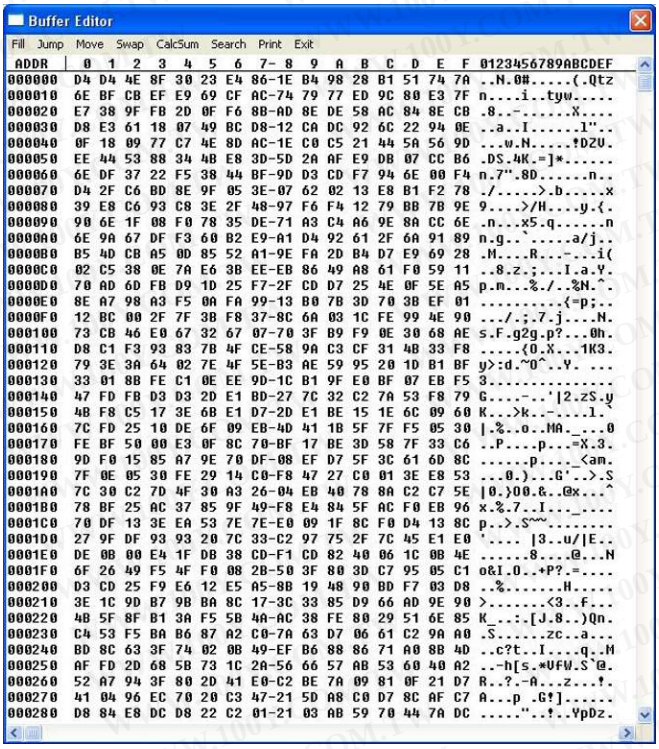
(7) CalcSum:

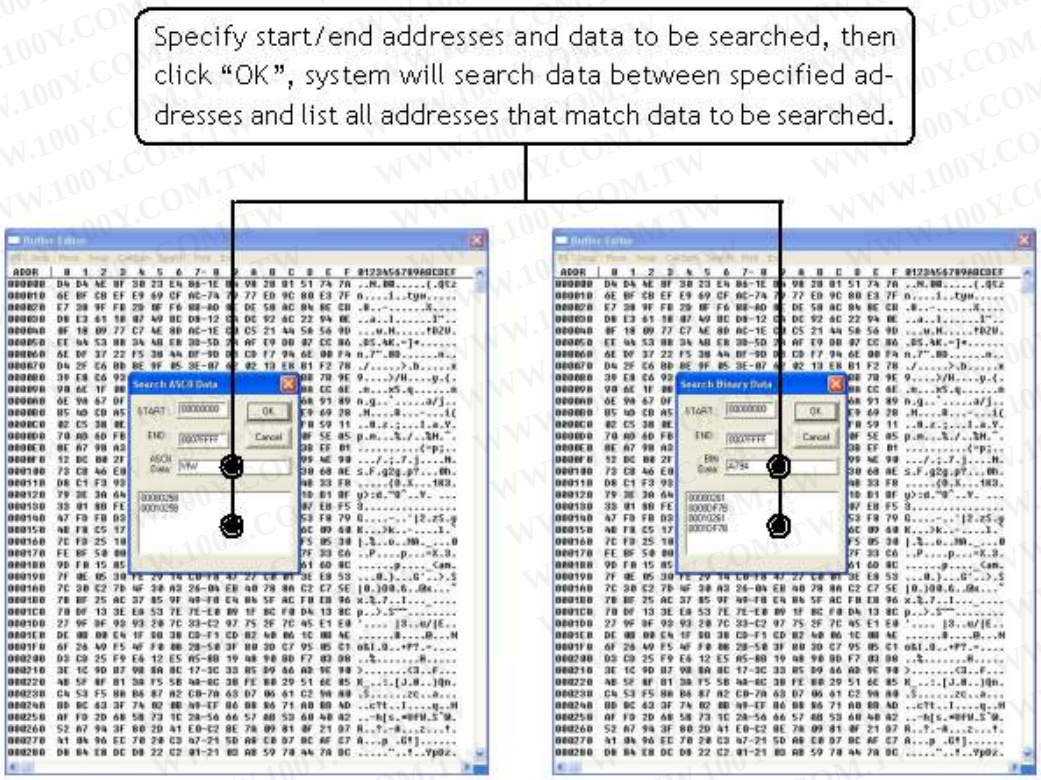
Specify start/end addresses in which data to be calculated for checksum; then click “OK” to calculate and display checksum on screen.



(8) Search:

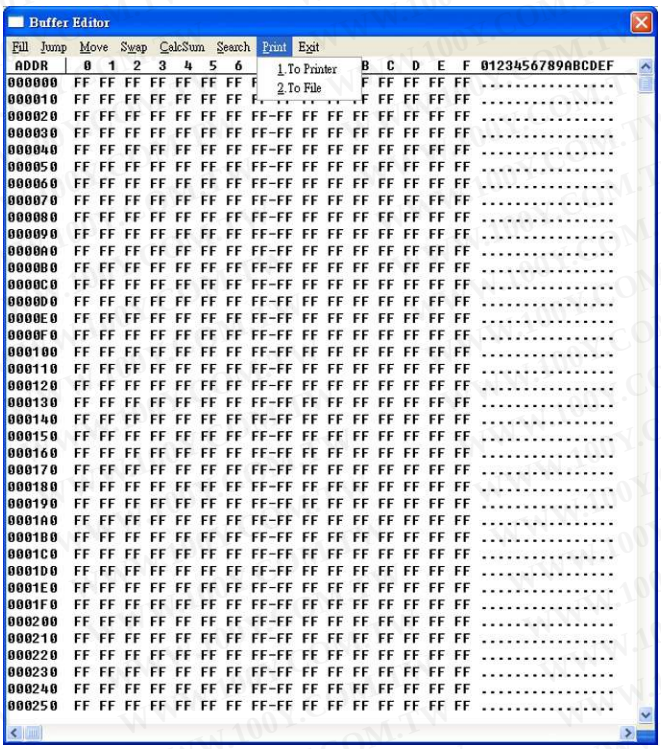
Two options available, search ASC II data or search Binary data.

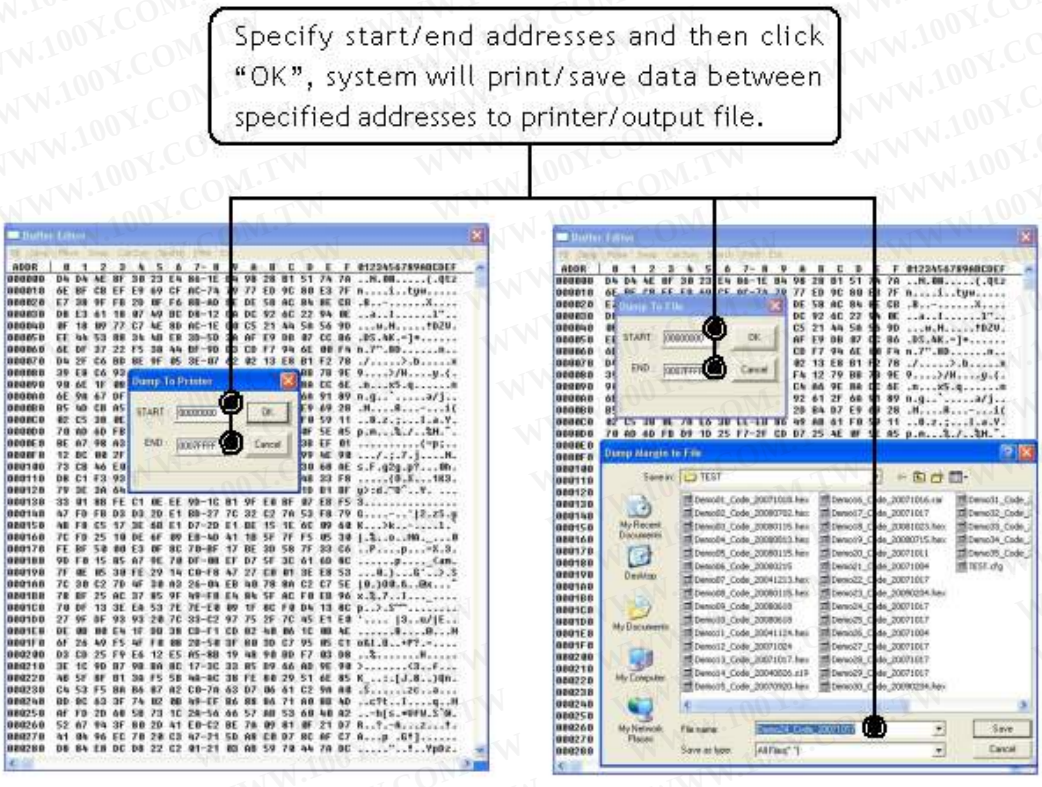




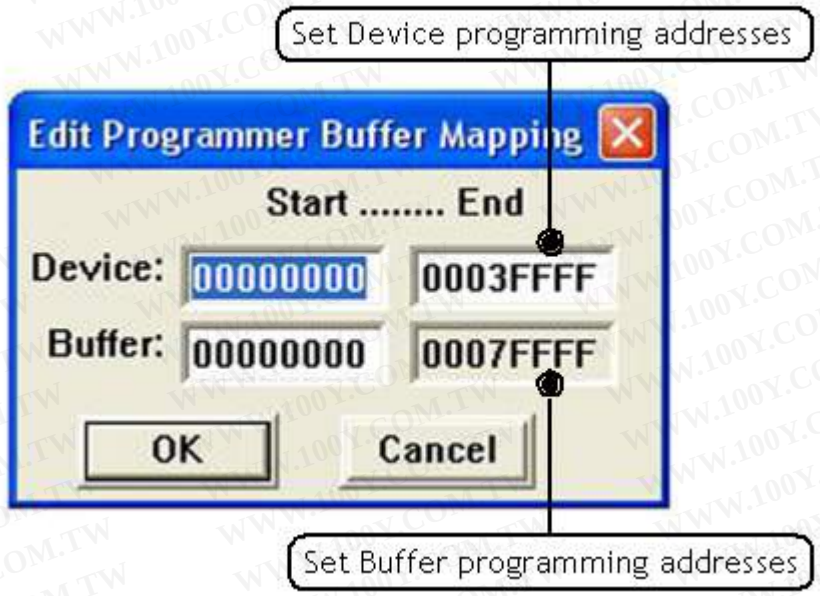
(9) Print:

Two options available, print to printer or output to file.

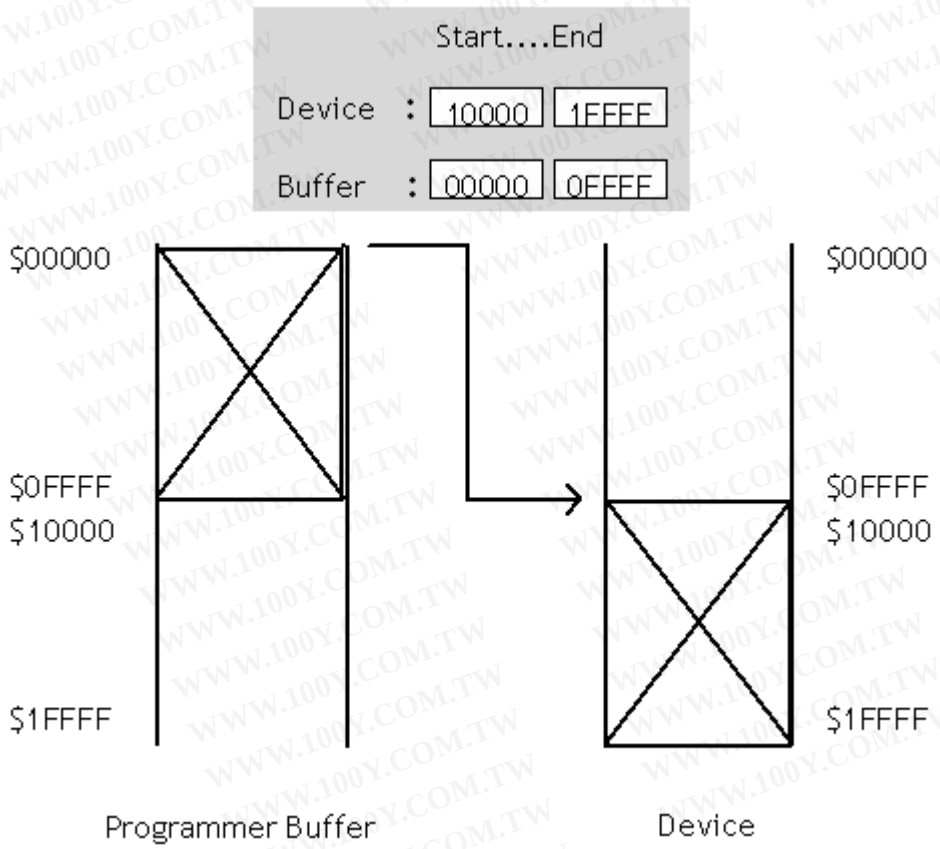




(10) Modify Programmer Buffer Mapping:

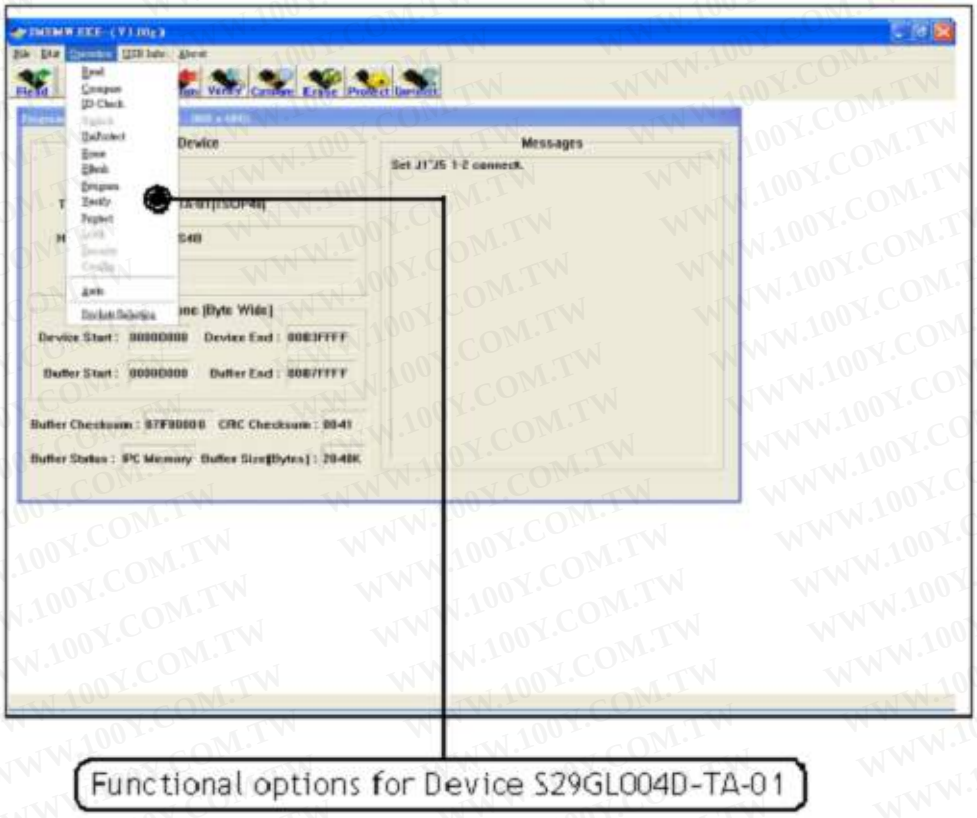


Eg.: Program data from Buffer address $00000 - $0FFFF to Device address $10000 - $1FFFF.



4.6.3 Operation

Different IC product type might have different options of programming functions. Basically, programming functions include options of Erase, Blank, Program, Verify, Lock, Auto, ...etc.

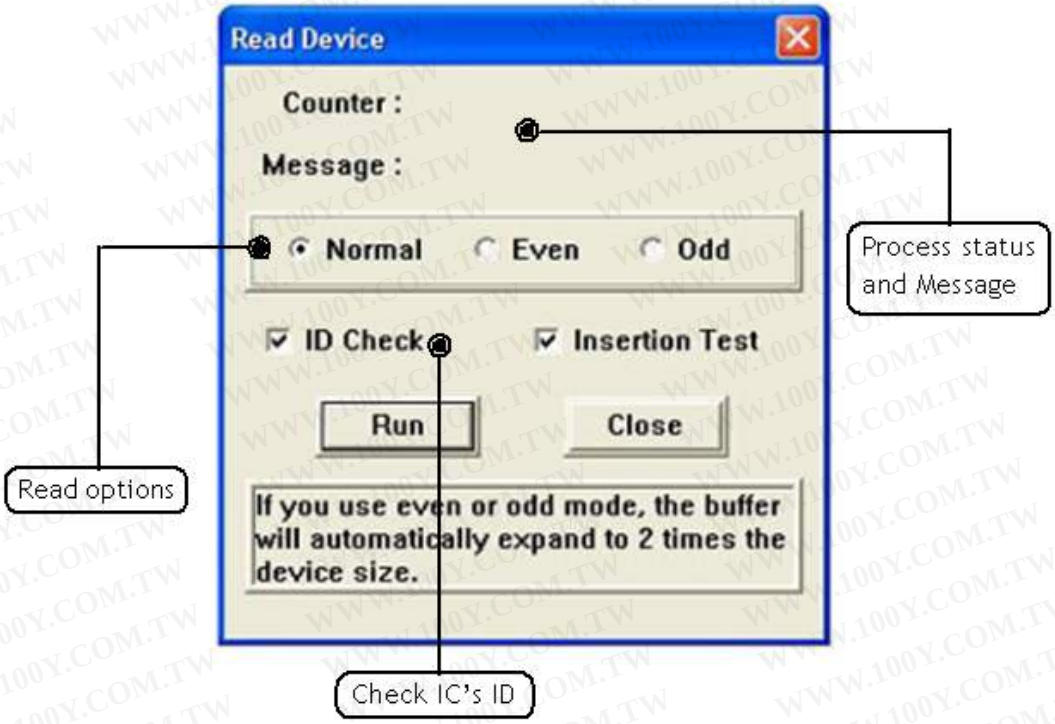


User can also click <Fast Key> to execute program functions.

See <Fast Key> indicated below:

(1) Read:

Read contents in IC memory. Read function is only valid for IC on following position.

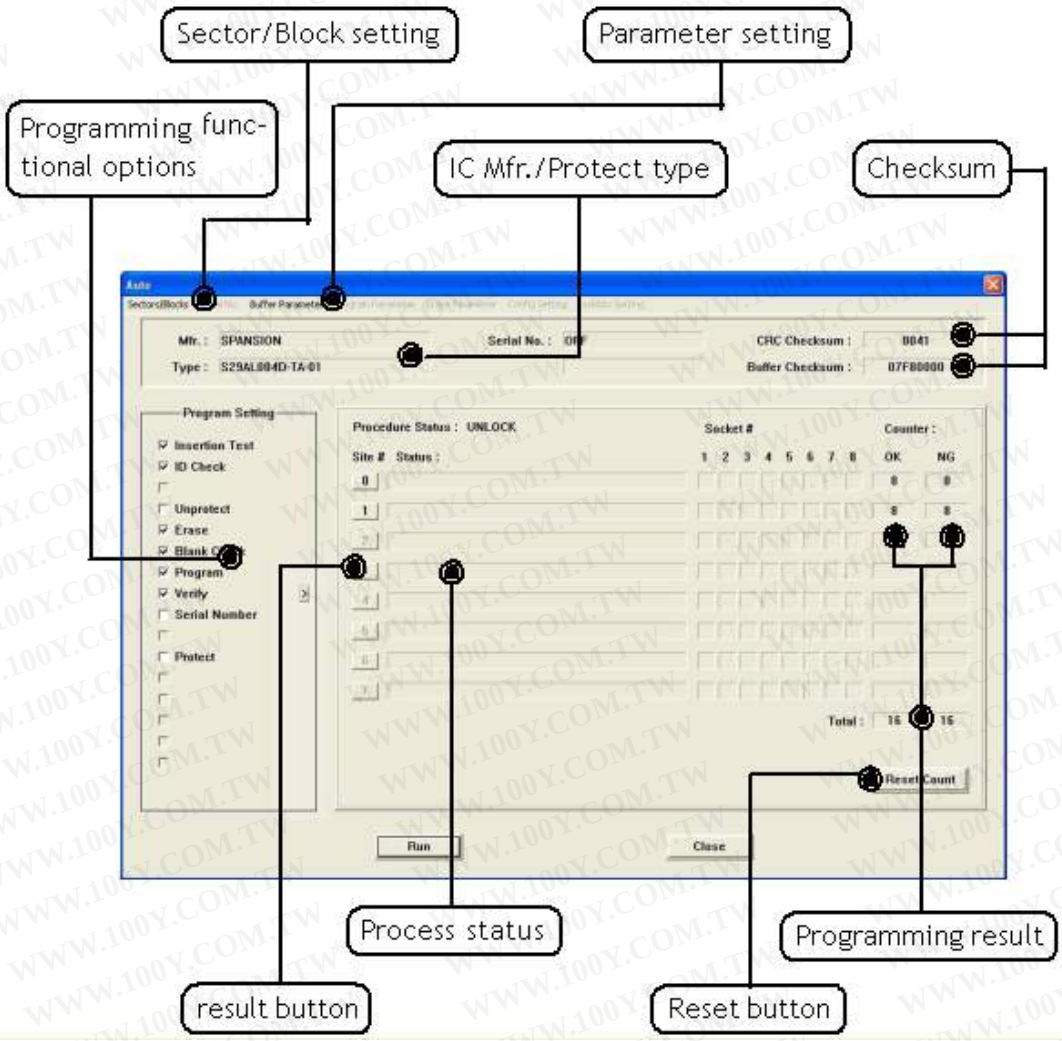


✧ After Read operation, suggest user to double-check to confirm checksum and the data read are all correct.

(2) Auto:

■ Protect Mode inactivated

Enter programming mode with all programming functions activated.

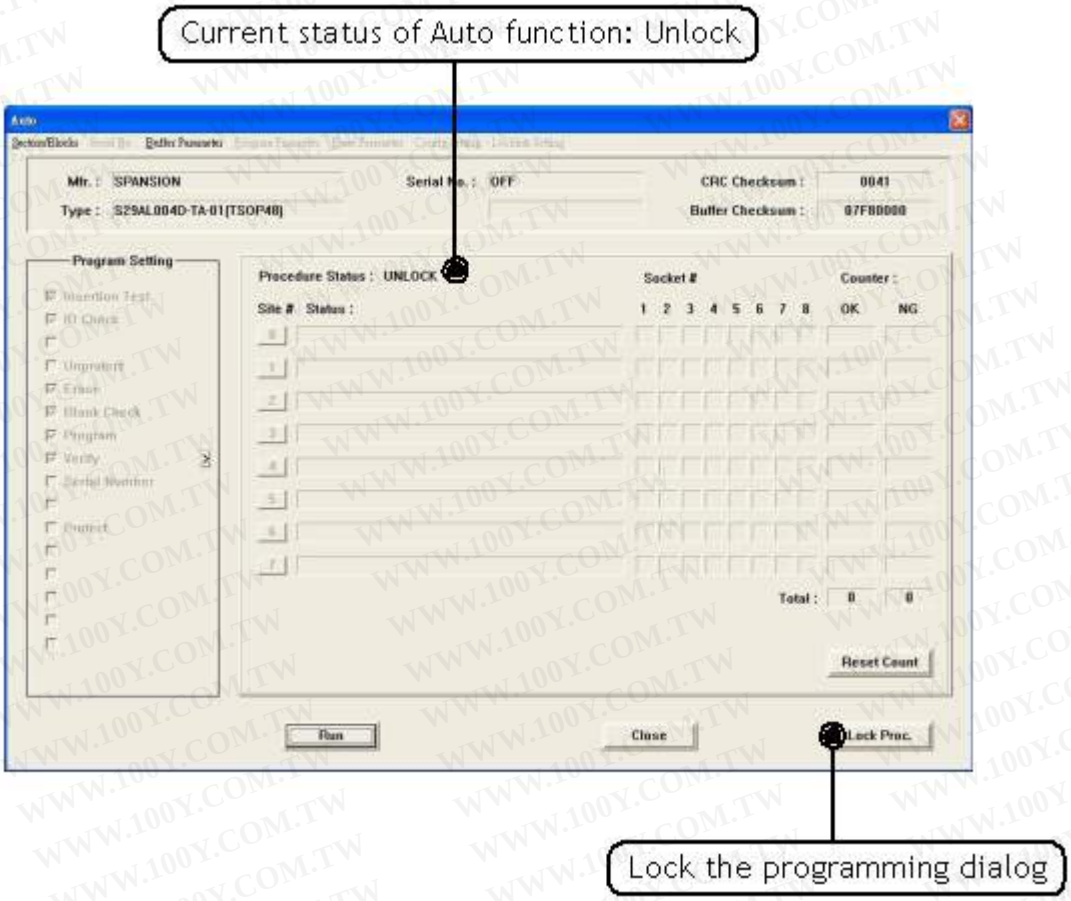


✧ Different IC product type might have different programming functional setting and parameter setting. User needs to refer IC data sheet for proper settings of programming functions and programming parameters.

- Protect Mode activated:

  After Protect Mode is activated in EACCESS, all programming settings of Auto function will run based on the setting of Protect Mode Option.

  Besides, at the lower right corner of Auto dialog appears an additional button of "Lock Proc.", which locks the thorough programming dialog except the <RUN> button.

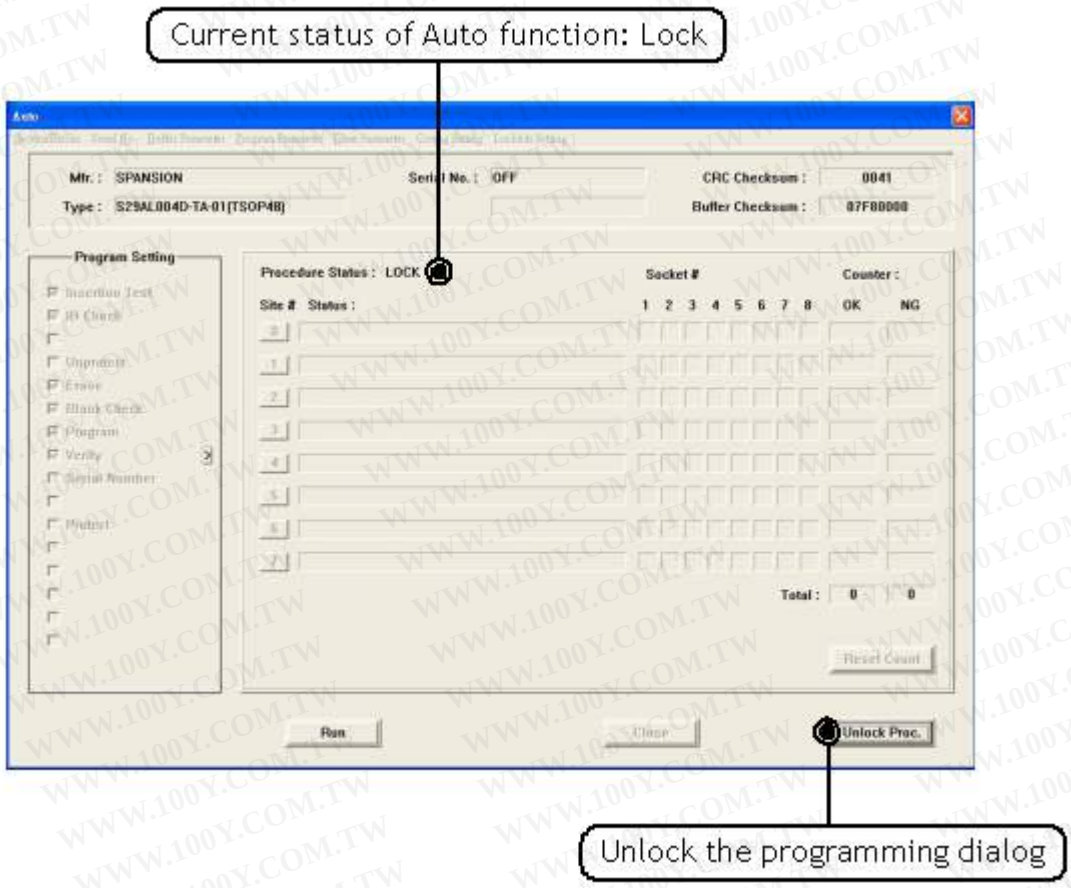


■ Lock Process:

After Protect Mode is activated in EACCESS, click <Lock Proc.> to lock the thorough programming dialog of Auto function but <RUN> button is excepted.
The procedure status will show "LOCK" and <Lock Proc.> will change into <Unlock Proc.>.

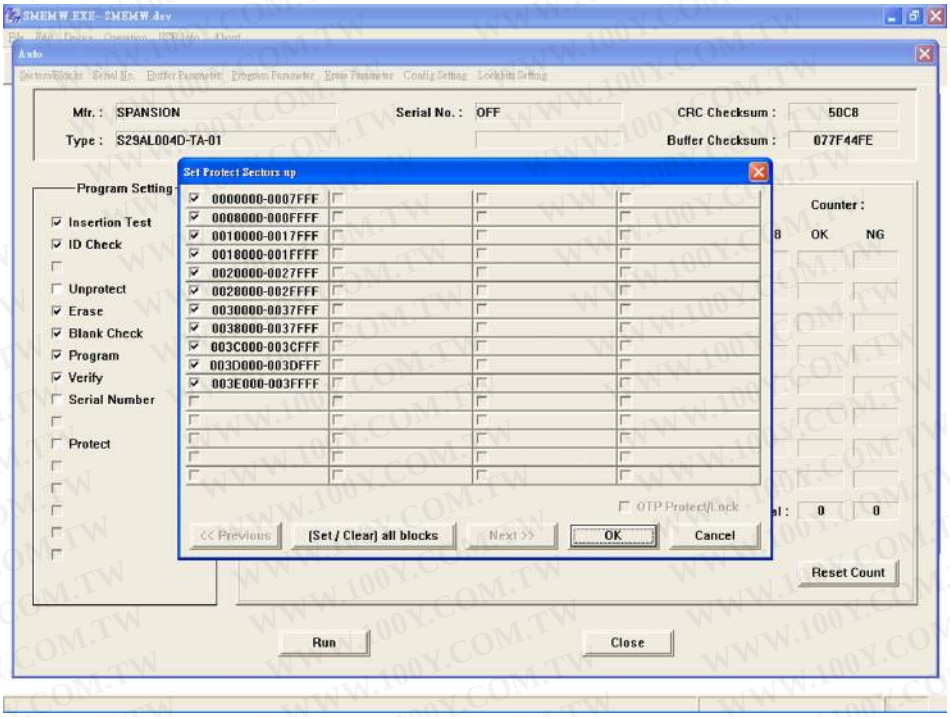
You can either click <RUN> to start programming or <Unlock Proc.> to unlock the dialog.

✧ Entering password is essential for Lock and Unlock process.



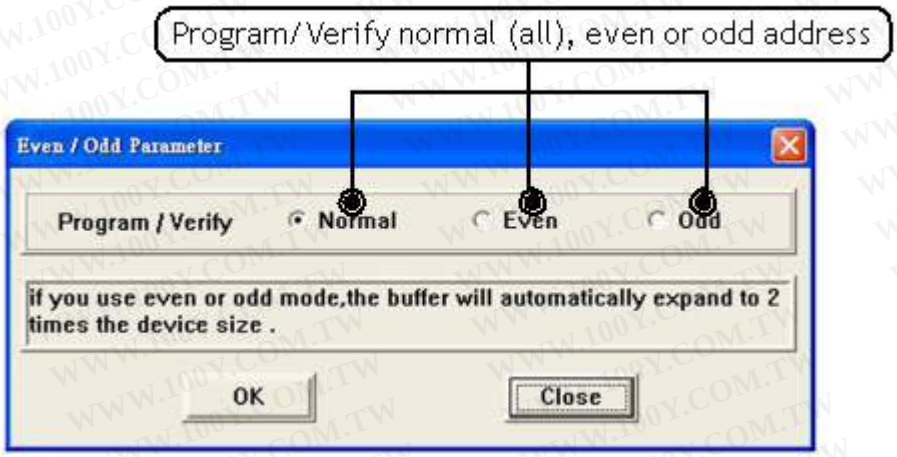
- Sector/Block:

  Specify sectors/blocks to protect if needed.



- Parameter:

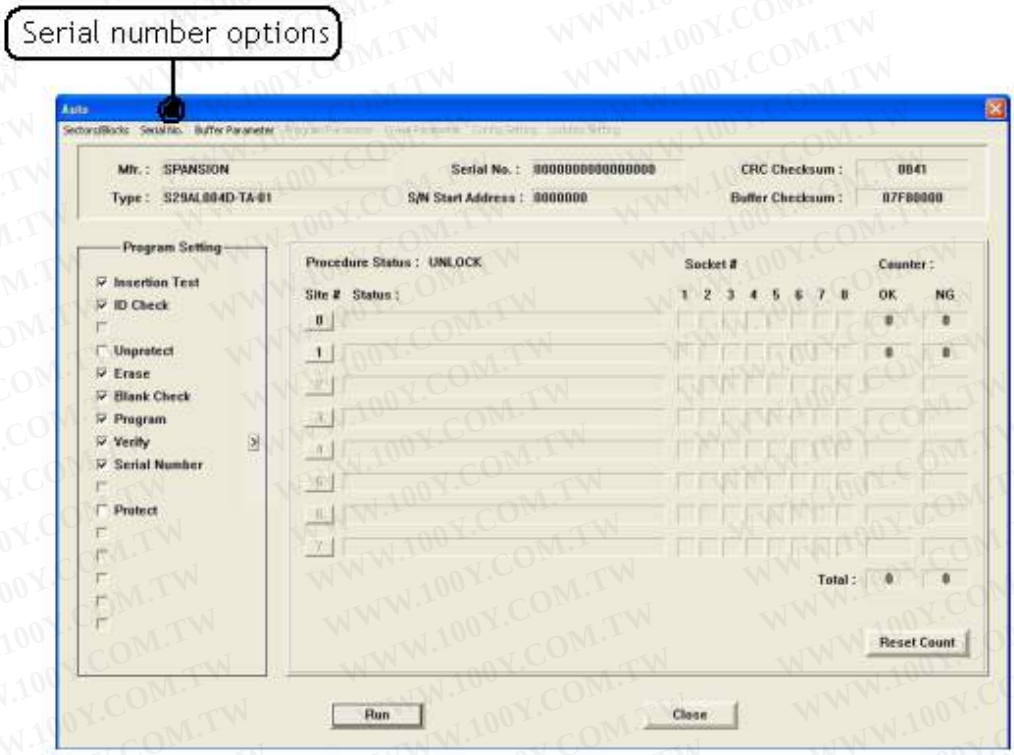
  Special setting for programming if needed. If any of the options is shown in gray, it's not available.

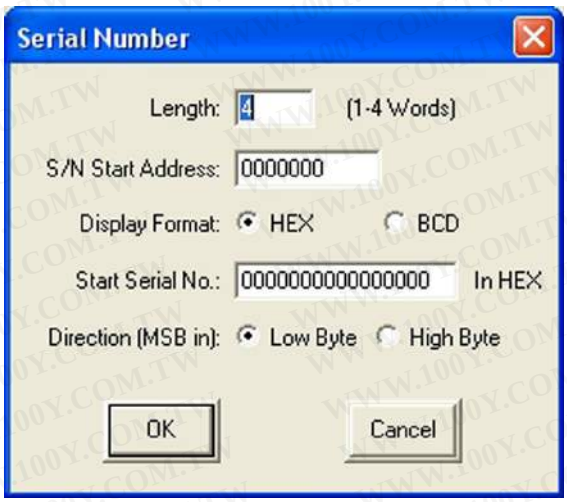


■ Serial Number:

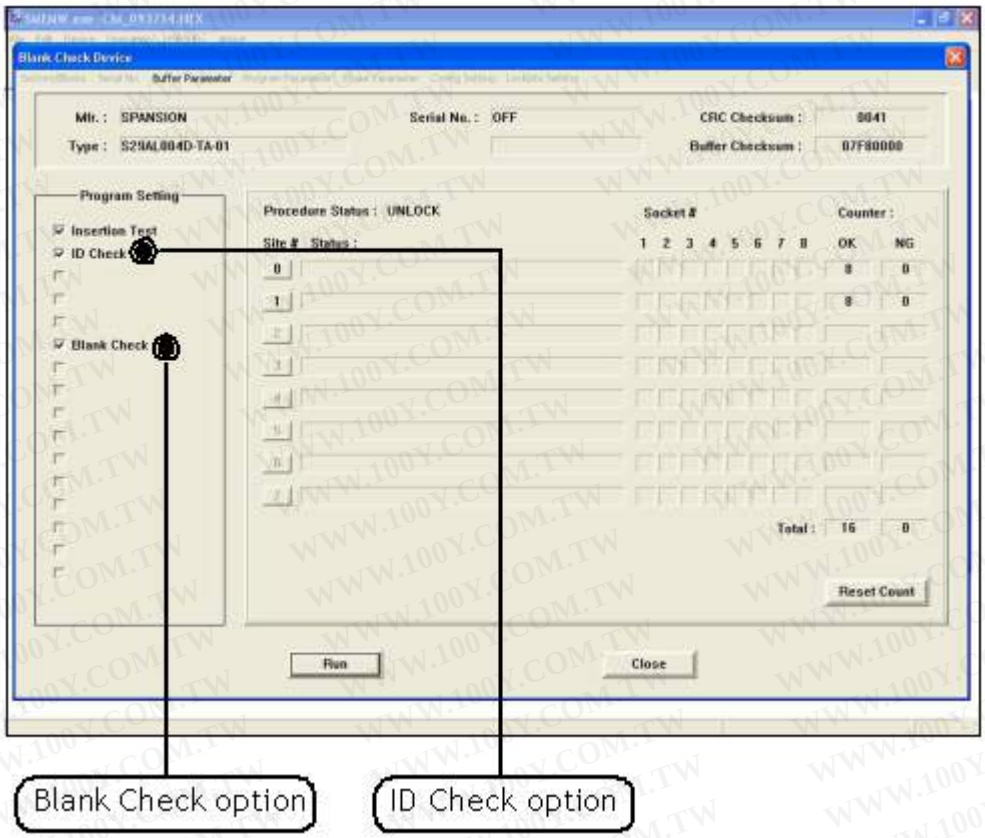
Select “Serial Number" option of the programming setting to enable "Serial No." of Auto function; then click "Serial No." to set the length, start address and format, etc.

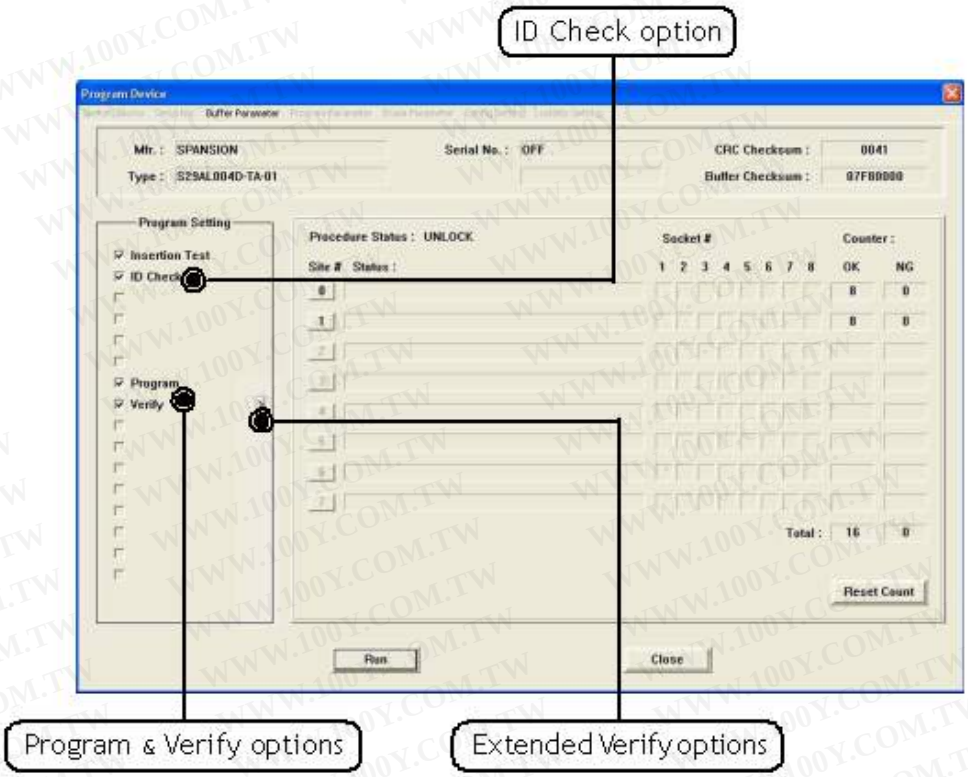
✧ This feature is provided based on algorithm/application of IC product so it is not available for all ICs.



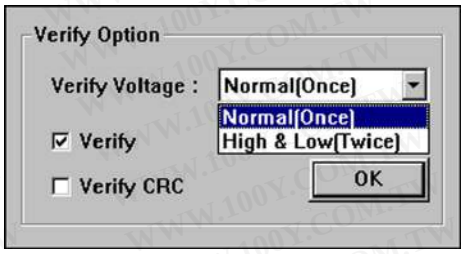


(3) Erase : Enter programming mode with Erase function activated.
Blank : Enter programming mode with Blank check activated.
Program : Enter programming mode with Program function activated.
Verify : Enter programming mode with Verify function activated.
Protect : Enter programming mode with Protect function activated.





- Extended Verify options : Click the button ≥ beside Verify function to view extended options below.

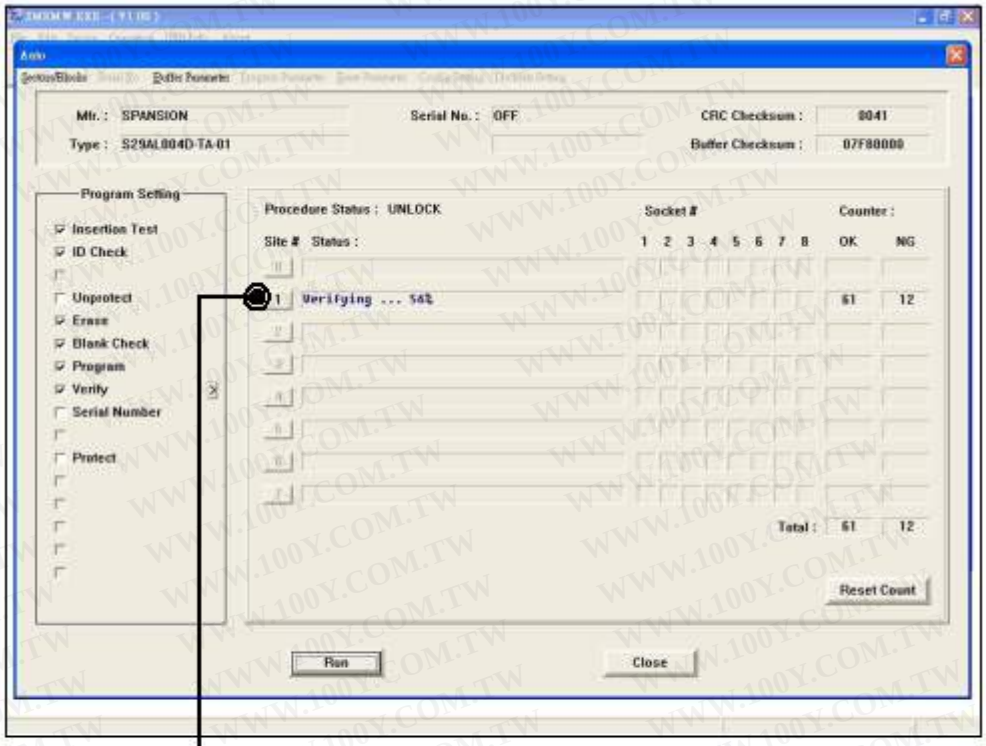


- Verify Voltage :

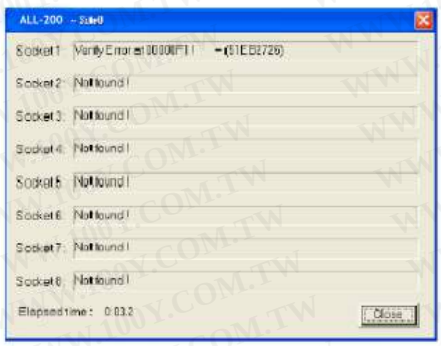
  Normal [Once] : Verify with IC's standard voltage.

  High & Low [Twice] : Verify with the range of high and low voltages.

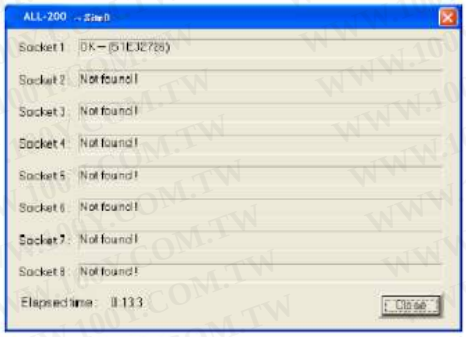
- Verify : Verify programming result.
- Verify CRC : Verify CRC code after programming.



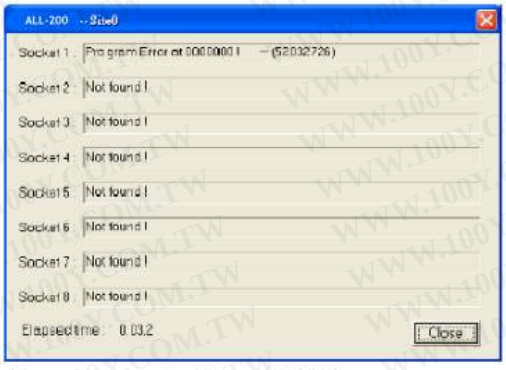
Result button, displaying programming result and elapsed time



Verify error at address 00000F1



Programming finished



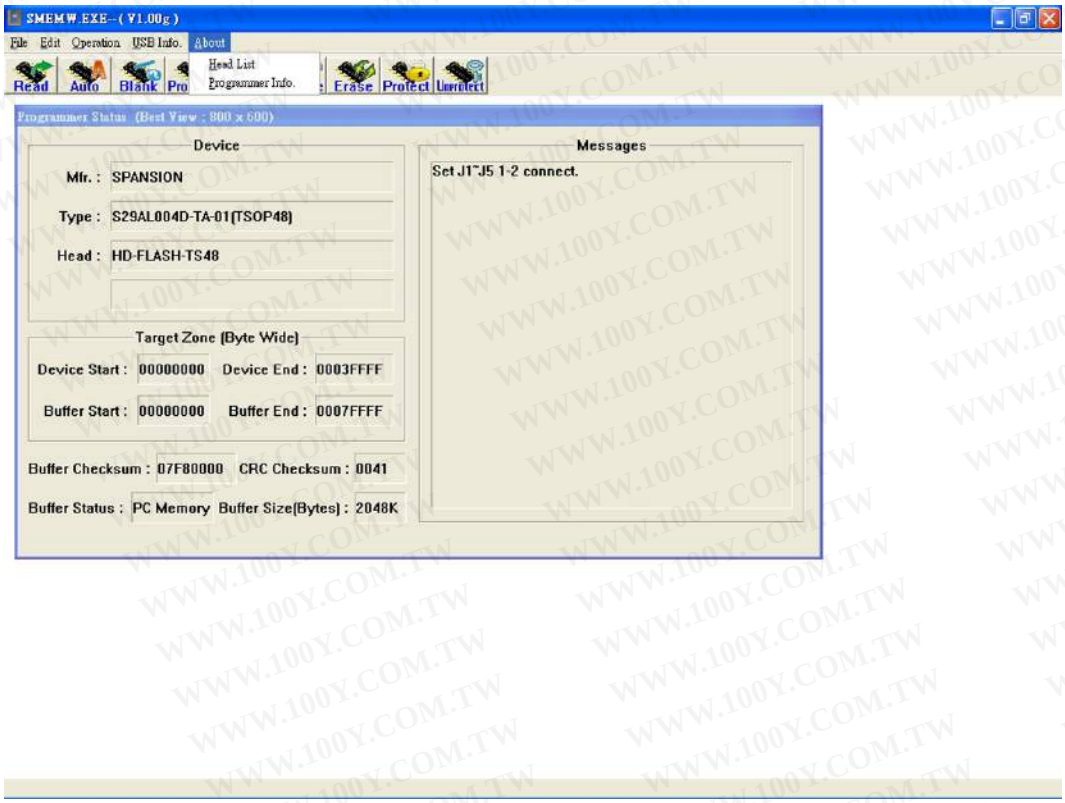
Program error at address 0000000

4.6.4 USB Info.

Display current ALL-200 connection status through USB interface.

5.6.5 About

Provide information of the required HEAD(s) and programmer hardware/software.



(1) HEAD List: Display the supported IC packages and required HEAD.

(2) Programmer Info.: Display model number of current programmer and version number of current programming driver.

5. ALL-200 Troubleshooting

After power on, ALL-200 will run self-diagnostics and USB connection check. Green/Red LED will display test result. Table listed below summarize test result with possible causes/dispositions for troubleshooting.

Condition	Possible cause/Dispositions
After power on, Green and Red LED off.	Poor contact / operation abnormal: 1. Check power cable connection. 2. Need troubleshooting. Contact your local dealer for service.
After power on, Green and Red LED flash.	Fail self diagnostic test: 1. Check if there is IC on socket (Should be removed). 2. Need troubleshooting. Contact your local dealer for service.
After power on, Green LED off but Red LED flash.	Fail ALL-200 memory diagnostic test: 1. Try to power on again. 2. Need troubleshooting. Contact your local dealer for service.
After power on or during programming, Green LED flash but Red LED off.	Fail USB connection check: 1. Check USB cable connection. 2. Check PC BIOS setup to see if USB is disabled (Should be enabled). 3. Need troubleshooting. Contact your local dealer for service.
During programming, Greend LED on but Red ED flash.	USB communication error: 1. Check USB cable connection. 2. Need troubleshooting. Contact your local dealer for service.

6. Glossary

6.1 EPROM, EEPROM, BPROM, and MPU

Programmable device: An integrated circuit (IC) that can be programmed.

- **Bit, Nibble, Byte, Word, Double Word**

Bit : A basic unit of binary data.
Nibble : A group of 4-bit binary data.
A nibble ranges from 0H to FH.
Byte : A group of 8-bit binary data.
A byte ranges from 0H to FFH.
Word : A group of 16-bit binary data.
A word ranges from 0H to FFFFH.
Double word : A group of 32-bit binary data.
A double word ranges from 0H to FFFFFFFFH.

- **Buffer**

There is 4 Mbit memory buffer in ALL-200 Programmer. IC driver file can automatically allocate/arrange these 4Mbit memory space for programming depending on IC memory size and read/write needs.
When data needs to be programmed to IC, data needs to be loaded to programmer buffer first and then program to IC. When data is read from Master IC, the data is also stored in programmer buffer, it can then be edited or saved to disk for future use.

- **Buffer Start and Buffer End Address**

It specifies the start and end addresses in programmer buffer in which data is to be programmed to IC in sequence. This is also the area that data is used for Checksum calculation.

- **CheckSum**

This is the SUM of all data contents between buffer start and buffer end addresses. All data are added and the least significant 16 bits (4 HEX) are displayed as the Checksum. (Some data in some ICs might not be covered in Checksum calculation.) Checksum will be calculated after IC reading, file loading, type changing, or buffer editing.

- **Bit Count of data**

  A NIBBLE contains 4-bit data. A BYTE contains 8-bit data.
  A WORD contains 16-bit data.

  MPU is normally in 8 or 16 bit width, but still have some in 12 or 14 bit width.

- **Device Start and Device End address**

  It specifies the start and end addresses inside IC device. During IC programming, data stored in programmer buffer will be written to this specified area.

- **USB interface**

  USB, Universal Serial Bus, is a high speed data transmission bus initiated by Intel and then supported by NEC, IBM, MicroSoft, Compaq,...etc. It is now a data transmission standard between PC and peripheral devices.

  V1.1 USB Full-Speed : 12 Mb/s

  V2.0 USB High-Speed : 480 Mb/s (Suggested)

- **Security fuse**

  Security fuse is available in most of programmable ICs. Once the Security fuse has been blown, the data stored in IC cannot be read out correctly and IC cannot be programmed either. However, IC can still operate functionally no matter the Security fuse has been blown or not.

✧ Note: Once the Security fuse has been blown. IC data can no longer be read out or programmed correctly, please double-check before programming Security fuse.

- **Lock bits**

  Some MCU/MPU use Lock bits to protect data programmed. Normally user has options to select individual Lock bit to protect different area of memory data. Please refer IC data sheet for definition of Lock bits.

- **Encryption**

  Some MCU/MPU use Encryption code for data protection. If an IC has been programmed with Encryption code, then a correct decryption code must be given to read the correct data.

- **Protection Fuse**
  Some FLASH memory use Protection fuse for data protection. It can prevent data change from accident programming. The Protection fuse must be reset to Unprotection state, if the programmed data need to be changed. The default state of Protection fuse is Unprotection.

6.2 PLD, PAL, GAL, PEEL, CPLD, EPLD, and FPGA

Programmable Logic Device (PLD)

PLDs are usually grouped into following four categories:
PLD: A one time Programmable Logic Device such as PAL.
EPLD: A UV Erasable PLD such as EPLD, CPLD, and FPGA. These devices have transparent window on top of package for UV light exposure.
EEPLD: An Electrically Erasable PLD such as GAL,PEEL,CPLD.
CPLD: A more complex PLD device.

- **JEDEC fuse map file of PLD**
  JEDEC fuse map file is a standard format used for PLD programming. It contains fuse information and functional test vectors of PLD to be programmed. Most PLD assemblers or compilers such as PALASM, OPAL, CUPL, ABEL, AMAZE, and PDK-1, can create JEDEC fuse map file.

- **POF fuse map file of PLD**
  POF fuse map file is a format used for ALTERA PLD programming. POF file can store more programming data than JEDEC file.

- **Fuse blown and intact**
  Most of unprogrammed (blank) PLD have fuses in intact (connect) state. After programming, PLD fuses are blown to open state. For one time programmable PLD, once fuses are blown (opened), they cannot be changed back to intact (connect) state. However, the UV erasable PLD can be erased to change fuses back to intact (connect) state by UV light exposure and the electrically erasable PLD can be electrically erased to change fuses back to intact (connect) state by using Erase function on this Programmer.

- **Array fuse, Configuration fuse**

  Array fuses are the main logic fuses in a PLD. Different types ofPLD have different logic function arrangement. Configuration fuses define the I/O architecture of a PLD such as Combinatorial/Registered, Output feedback/Output enable, and so on. Generally, user do not have to understand the details of these fuses because logic compiler will automatically translate logic statements and equations into JEDEC format file.

- **Security fuse**

  Most of PLD have Security fuse. Once Security fuse is blown, data in PLD can no longer be read out correctly. Generally, the PLD will be read as blank if Security fuse is blown.

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