E-OCD II Debugger

User's Manual

Version 1.0.2

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1 Introduction

1.1 E-OCD II The Chip and Onboard Debugging Solution

E-OCD II is short for 'Enhanced On-Chip Debugger'. E-OCD II is a debugger tool for ABOV 8bit MCU. E-OCD II is MCU debugging control via 2pin or 3pin (added RunFlag) OCD interface. E-OCD II is dedicated to onboard programming and debugging via serial interfaces (DSCL, DSDA). E-OCD II debugger supports all of ABOV's M8051 devices.

In particular, the E-OCD II adds protection circuitry to the input and output ports for tough board-level manufacturing lines for added durability and safety. E-OCD II is advanced function for USB driver, Power out, low level detection more than OCD II. Power out function only supports 50mA current consumption environment.

1.1.1 Software Requirements

The following operating systems must be used to install and run the E-OCD II debugger. Both 32-bit and 64-bit versions are available.

- Microsoft Windows Vista
- Microsoft Windows 7
- Microsoft Windows 8 & 8.1
- Microsoft Windows 10

If you wish to carry out a full installation of the software, up to 20MB of hard disk space is required.

1.1.2 Hardware Requirements

The following are the minimum hardware requirements for installing and running the E-OCD II debugger.

- USB port
- Performance is based on the following factors:
- Processor performance
- USB port performance

The E-OCD II debugger is not affected by the USB version (V1.0, V1.1, V2.0, or higher).

1.2 Software Installation

The installer program can be downloaded from the ABOV website. It is recommended that the latest version of the E-OCD II software be used because ABOV constantly adds newer devices and features.

Both 32-bit and 64-bit versions are available. To check the operating system details of the PC, open the Control Panel and click on the System icon. The OS details can be identified as shown below.

1.2.1 Microsoft Windows 10

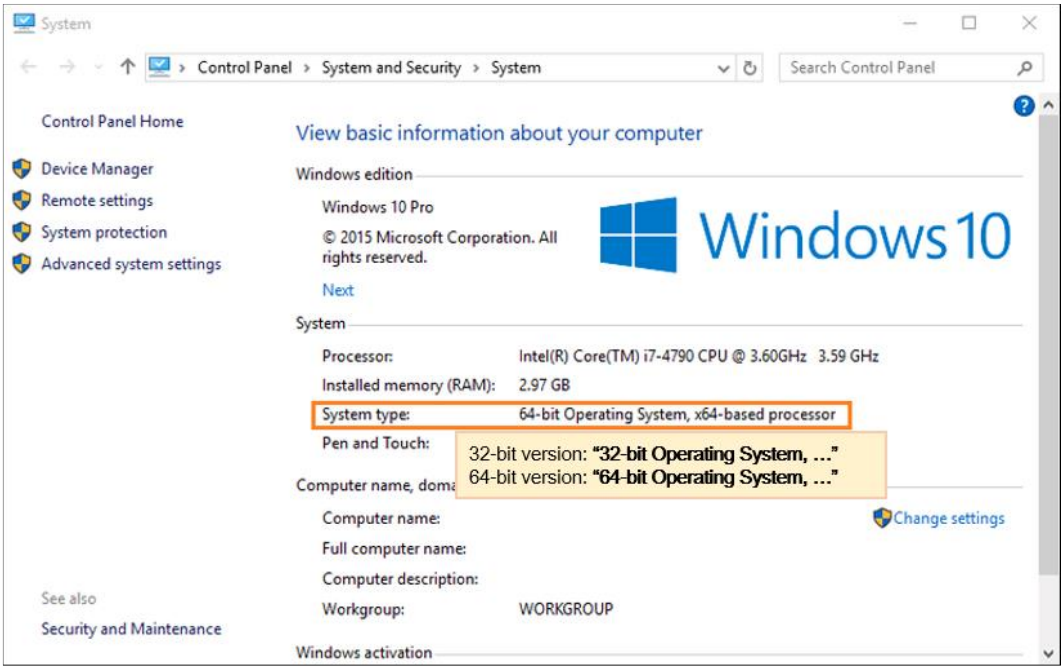


Figure 1-1 How to distinguish 32-bit & 64-bit operating systems for Windows 10

To install the E-OCD II software, perform the following:

1) Execute the installer.

   - The 32-bit installer file name starts with 'Setup32_' keyword.
   - The 64-bit installer file name starts with 'Setup64_' keyword.

2) [64-bit systems only] Once the warning message below message box, click 'Yes'.

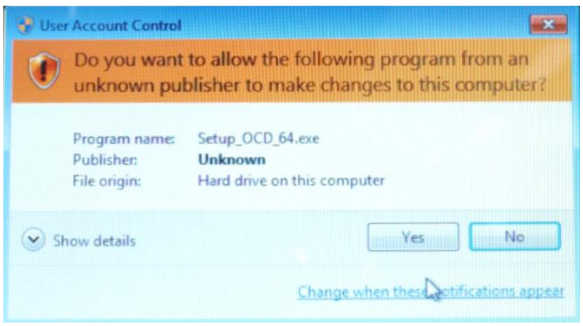


Figure 1-2 User Account Control Message Box

3) Once the dialog box shown below opens, click 'Next'.

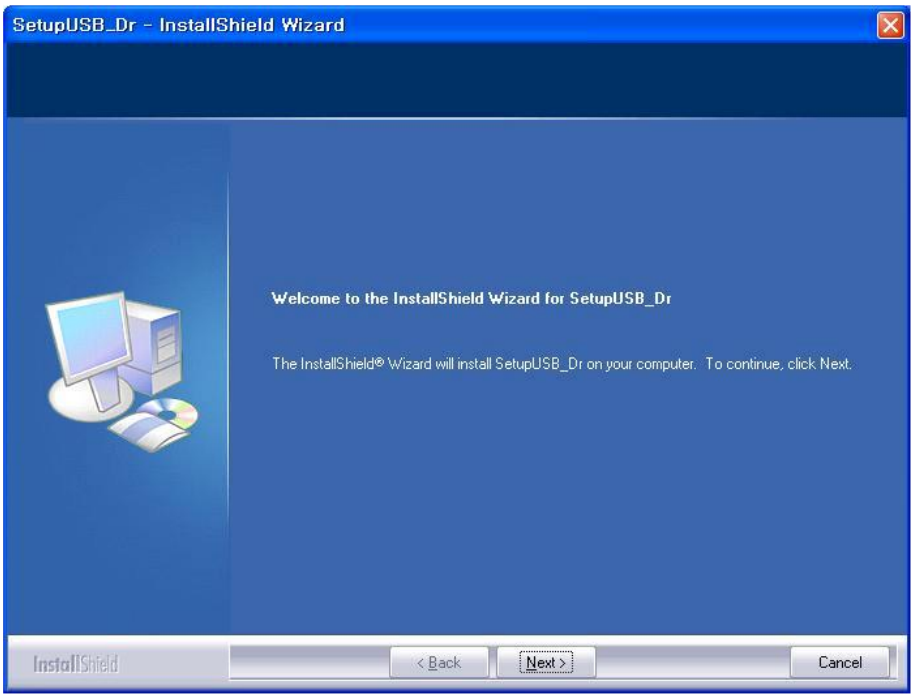


Figure 1-3 InstallShield Wizard

4) Read the license agreement. If agree, select I accept the items of the license agreement on the license agreement dialog box and click 'Next'.

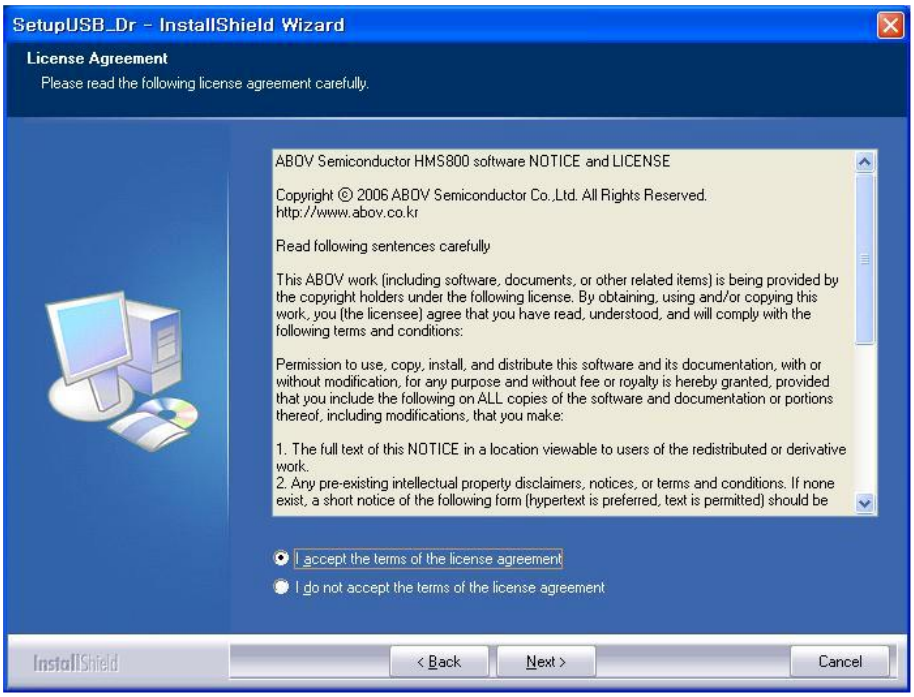


Figure 1-4 License Agreement

5) Enter the 'User Name' and 'Company Name' and click 'Next'.

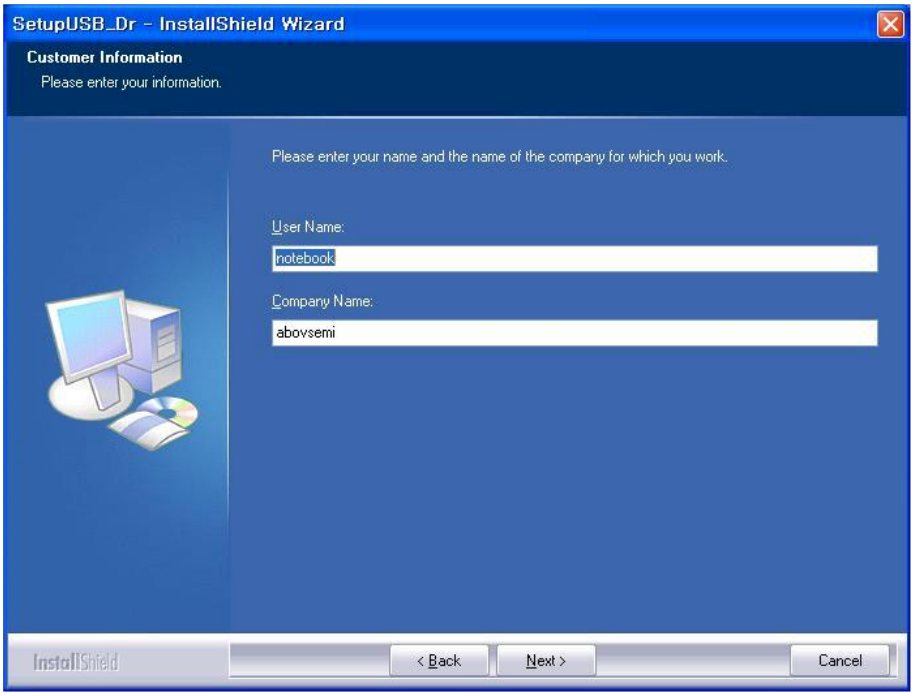


Figure 1-5 Enter the User Name and Company Name

6) Select 'Complete' and click 'Next'.

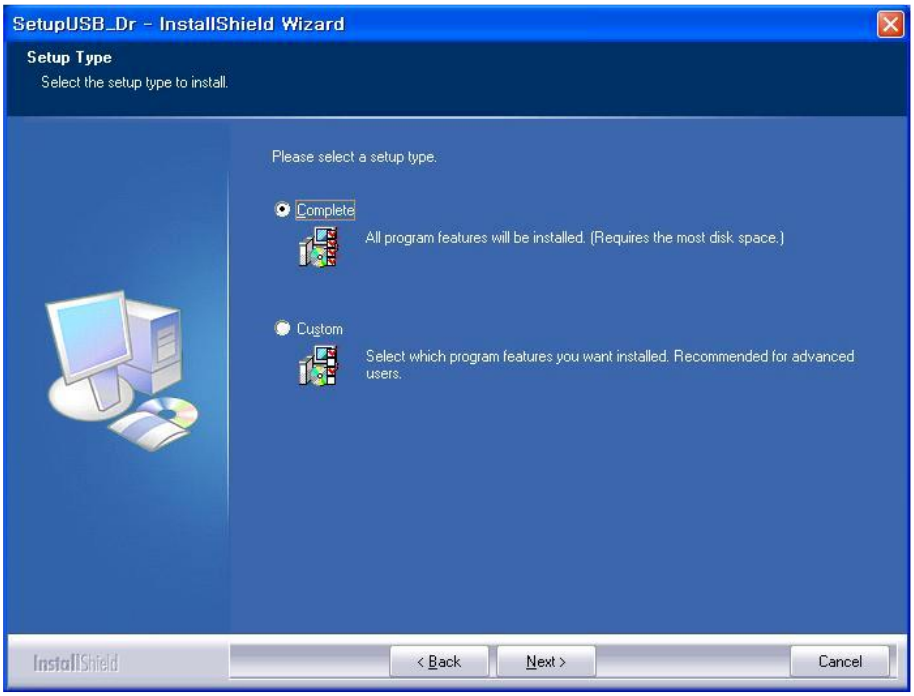


Figure 1-6 Select a Setup Type

7) Click 'Install'.

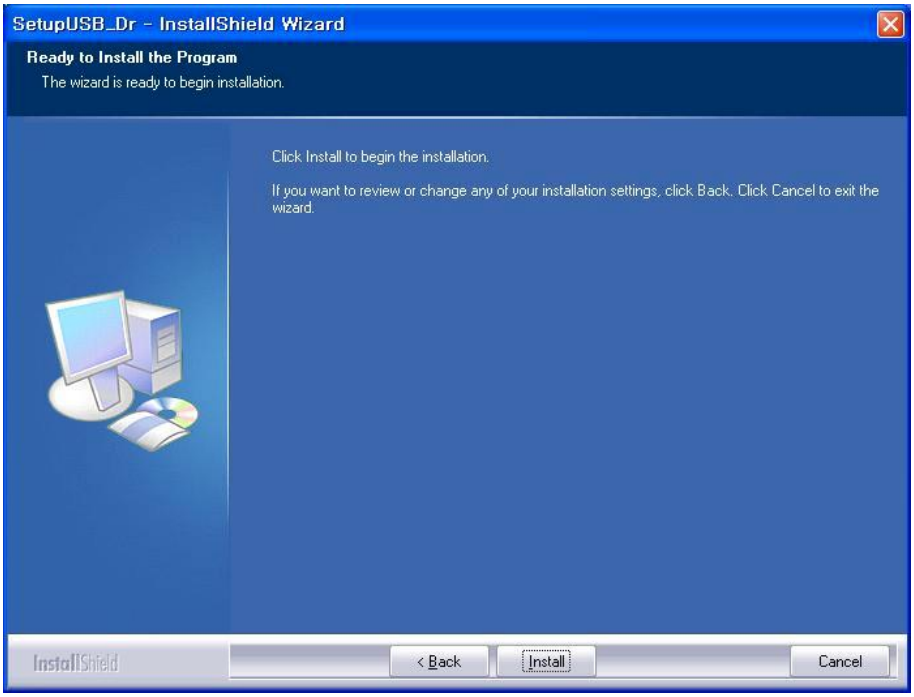


Figure 1-7 Begin the Installation

8) Wait until all the application components are installed.

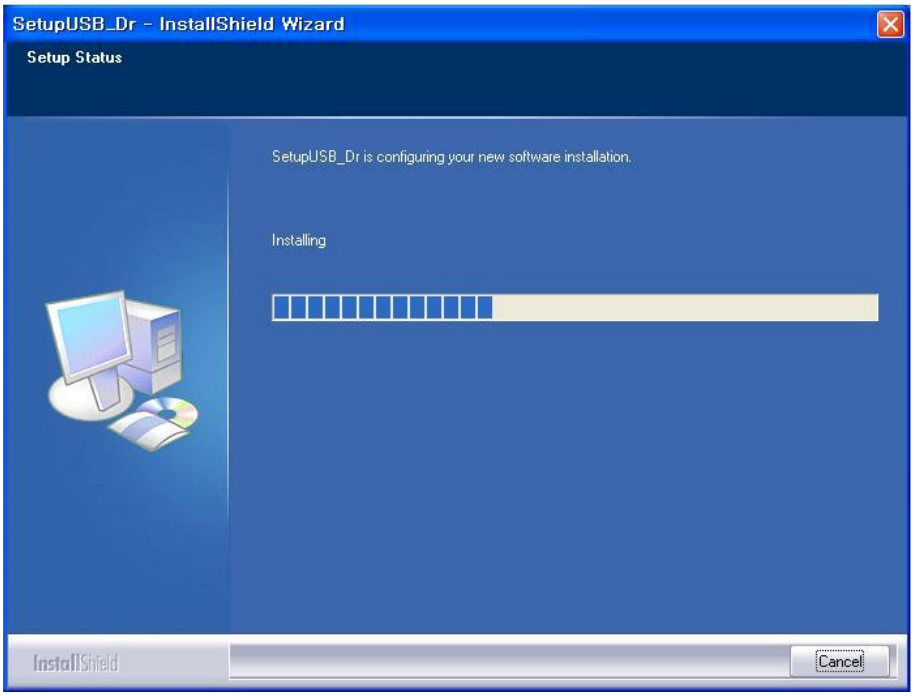


Figure 1-8 Installing

9) Click Finish to complete the installation.

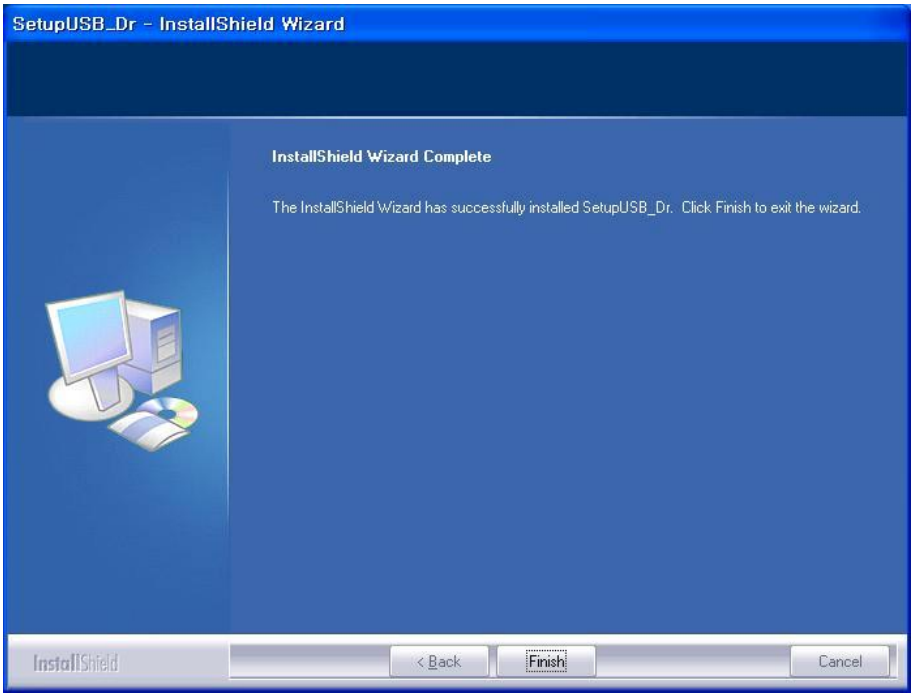


Figure 1-9 InstallShield Wizard Complete

Note the installation folder path. This information is needed when you install the hardware driver.

- 32-bit: C:\Program Files\ABOV Semiconductor\OCD II_debugger32
- 64-bit: C:\Program Files (x86)\ABOV Semiconductor\OCD II_debugger64

1.3 Hardware Driver Detection

1.3.1 Human Interface Devices

E-OCD II USB type is HID (Human Interface Devices). Windows of Microsoft support HID USB Driver. So when E-OCD II debugger is connected to computer, HID USB Driver is installed to the computer and user can use E-OCD II debugger automatically.

To check E-OCD II connection, follow the procedure:

1) Go to Device Manager to check HID connection.

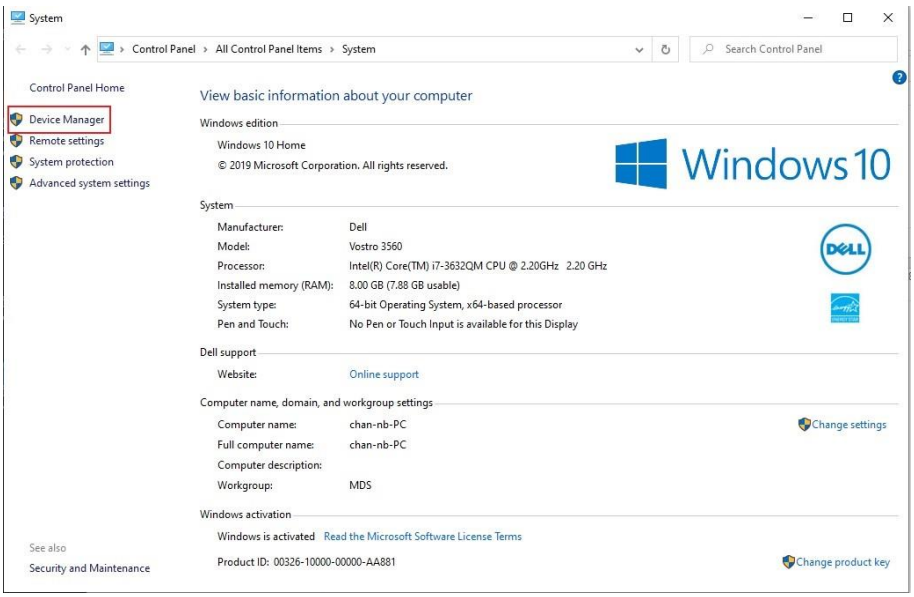


Figure 1-10 System Information

2) Find Human Interface Devices in list.

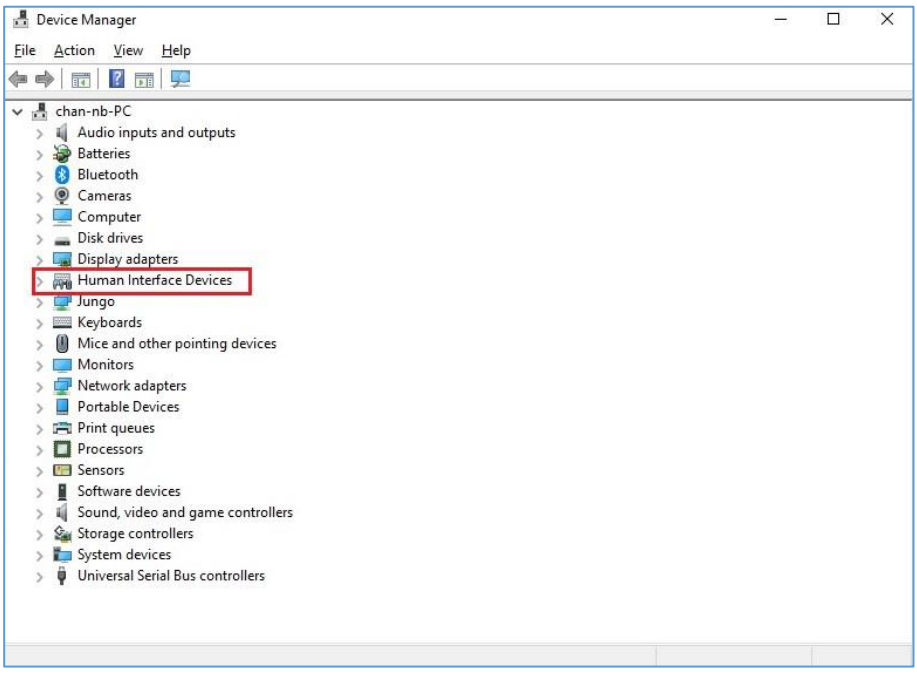


Figure 1-11 Device Manager : HID

3) Check HID properties to confirm E-OCD II Hardware Vendor ID

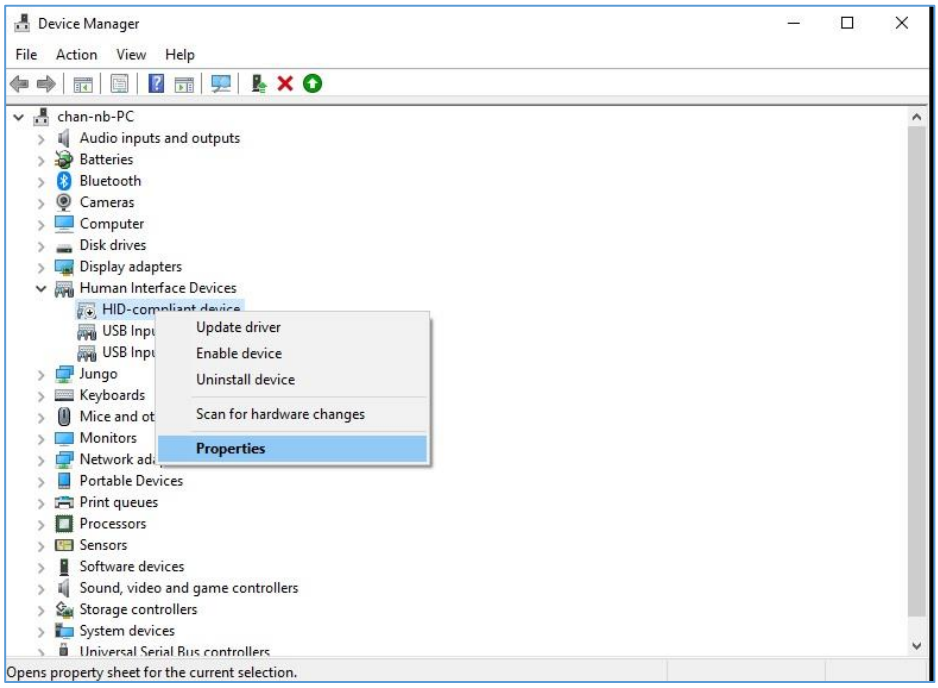


Figure 1-12 Device Manager : HID Properties

4) Select Hardware Ids in Detail Tap of HID properties.

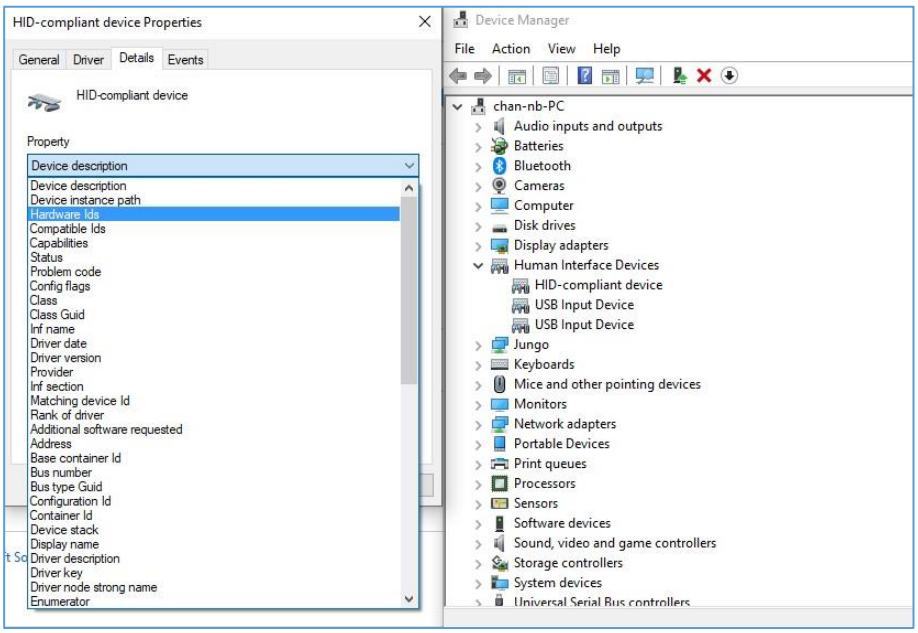


Figure 1-13 HID-compliant Device Properties

5) E-OCD II Hardware vendor ID is 0x1A29. If VID_1A29 is searched, E-OCD II is connected properly.

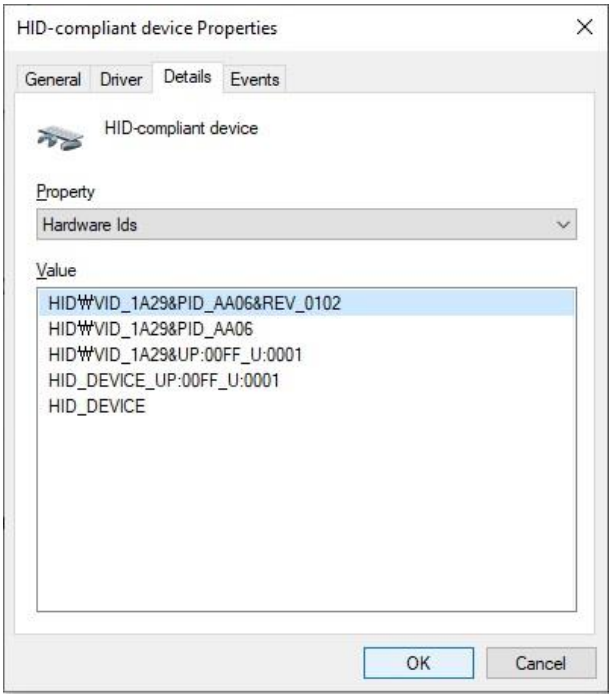


Figure 1-14 HID-compliant Device Properties : Hardware Ids

2 E-OCD II Interface Hardware

2.1 E-OCD II Interface

The E-OCD II interface supports ABOV 8-bit MCUs that use either the OCD or OCD II interface logic. So, the user can perform debugging for both OCD and OCD II-compatible MCU series using this hardware.

2.1.1 Features of E-OCD II H/W

The E-OCD II interface is the most cost-efficient debugging solution for the MCUs developed by ABOV

Semiconductor Co., Ltd. The E-OCD II interface is a sophisticated debugging tool. It is s more flexible and faster than the OCD interface with the following features:

- Support Devices for ABOV's 8bit MCUs
- Support MC95/96 and A95/96 series devices
- E-OCD II supports Debugging and on-board programming
- E-OCD II Serial supports ISP via serial interface (DSCL, DSDA)
- 10-pin external connector for Debugging and programming
- USB HID transmission is applied to Hardware of E-OCD II.
- Include two interface lines: SCLK and SDATA, and one option line: RTIME (run time measuring)
- Can measure the exact operating time of the target MCU down to the microsecond range - In this case, RTIME must be connected.
- Cover the full range of the target device's operating frequency
- Supply power to the target MCU available.
- Power out current consumption limit 50mA
- Target system operating voltage : 3V ~ 6V
- Low Level transmission 1.0V ~ 5.5V
- E-OCD II can debug full range of the target device's operating frequency.
- Enhanced protection circuitry for external I/O ports
- 512Byte expanded memory is added
- Level Shift IC is added at DSCL, DSDA port for Low Level transmission
- Support function for Power Out to Target B/D.
- ESD Protection is advanced(2000V Human-Body, 200V Machine, 1000V Charged Device)

- Two LEDs for 'Power' and 'Debug Run'
- Not support hot plugging

Note : The target system must not be powered during insertion or release of the OCD interface

2.1.2 E-OCD H/W Connection

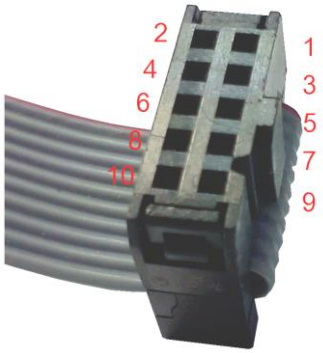


Figure 2-1 Cable Side View

Table 2-1 Pin Assignment

Pin No.	Name	Function
1	Not Used	-
2	VCC Detect	Detects the target system's power and interface voltage level.
3	Not Used	-
4	GND	System grounding
5	RunFlag	Connect RunFlag pin of 94/97series Device.
6	SCLK	Serial clock of the OCD interface.
7	Not Used	-
8	SDATA	Serial data of the OCD interface. If the target system's output is very noisy, it is recommended to add a small capacitance to this line.
9	Not Used	-
10	Not Used	-

Figure 2-2 E-OCD II Debugger

2.1.3 Hardware Connection/Disconnection Procedures

As mentioned before, the E-OCD II interface does not support hot plugging—which may damage the interface permanently.

What is hot plugging :

Hot plugging is plugging in or out a hardware device while the target system is powered.

2.1.4 E-OCD II Interface Connection

The E-OCD II interface supports both the OCD and OCD II interfaces. But since the OCD and OCD II interface protocols are not compatible with one another, the target protocol must be selected first. Even if the target MCU uses the OCD or OCD II interface, it does not enter debug mode if the procedure below is not correctly followed:

1) Power off the target system.
2) Connect the E-OCD II interface to the target system.
3) Connect the E-OCD II interface to PC.
4) Launch the debugger software.
5) Select the target Devices series in the debugger software.
6) Wait until initialization of the E-OCD II interface is complete.
7) Power on the target system

2.1.5 E-OCD II Interface Disconnection

The target system must be powered off before disconnecting the OCD interface to avoid damage to the interface module.

2.1.6 E-OCD II Power Out to Target System

E-OCD II can Power out to target system two types of voltages(3.3V, 5.0V). User can select the output voltage using a switch on E-OCD II. And then push the power button icon on OCD debugger program.

1) Select power voltage 3.3V or 5.0V on E-OCD II switch
2) Target Power OFF
3) Push the button icon on OCD Debugger program.

3 Debugger Software (for Microsoft Windows)

3.1 Debugger Software Features

The debugger supports both the OCD and OCD II interface. As the OCD and OCD II interface protocols differ from each other, you must first select the target MCU series. Debugger software support three kinds of ABOV debugger type(E-OCD II, OCD, OCD II debugger).

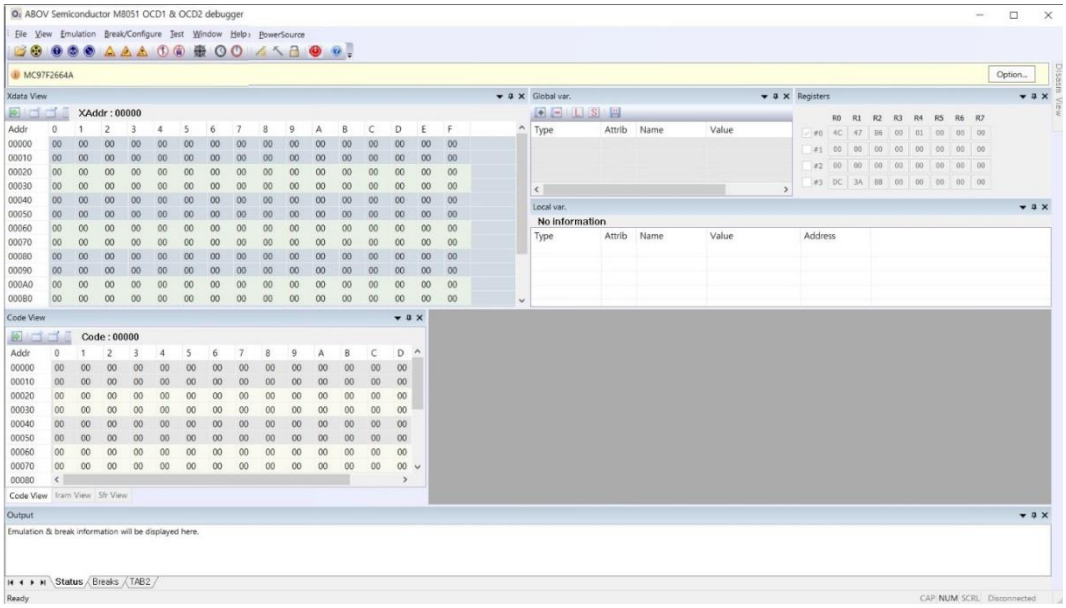


Figure 3-1 Debugger Program

1) The 'power icon' is black off when the E-OCD II is first connected to the PC

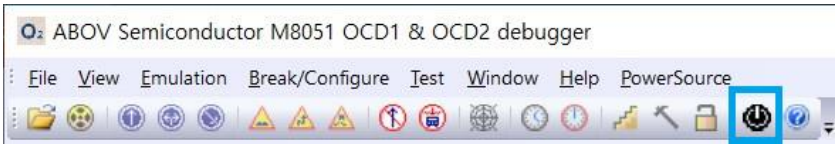


Figure 3-2 Toolbar : Power Icon

2) When the 'power icon' is selected, the icon color is changed and the power voltage is output
- The output voltage can be changed with E-OCD II switch (3.3V or 5.0V)

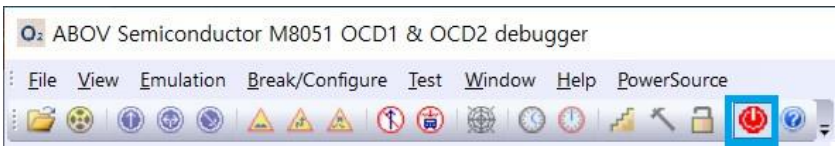


Figure 3-3 Toolbar : Power Icon

3) The dialog window for the warning about current is shown.

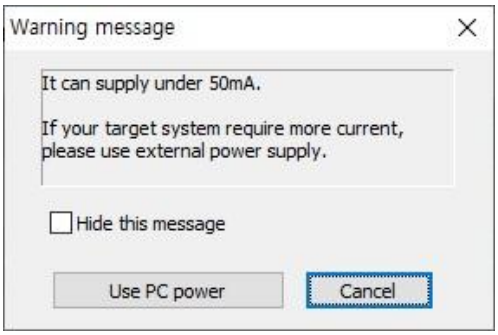


Figure 3-4 Warning Message

4) Device is recognized successfully if it has a good connection with target board.

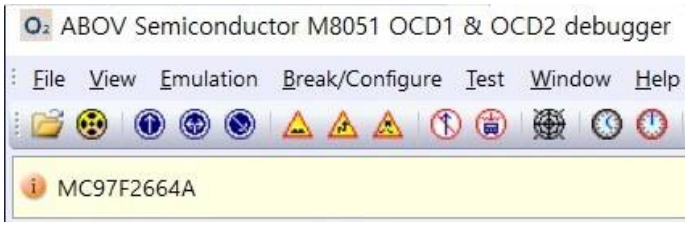


Figure 3-5 Device Recognition

3.2 Common Features

The debugger software supports the MC9x/A9x series developed by ABOV Semiconductor Co., Ltd. The following features are provided, regardless of whether the OCD or OCD II interface is used:

- Detect the target device automatically
- Use symbolic debugging
  - Source file view
  - Global/Local variables view
  - Each device's SFR (special function register) names
- Display various target memories
  - CODE, XDATA, IDATA, and SFR
  - Users can edit these data sets directly in the debugger
- Display code data in a disassembled format
- Support line assembly
- Support break toggling
- Calculate code checksum

- Support the following emulation methods :
  - Real-time emulation
  - Step emulation (source line level or code level)
  - Emulation abortion
- Save and load the most recent debugging environment automatically.
- Support all OCD device series
  - When connected with an OCD device, the OCD II interface functions in the same manner as the OCD interface.
- Support all OCD II device series—which support a maximum of 12 breaks
  - Four of them are fixed as program counter breaks.
  - The other eight breaks can be used either as program counter breaks or combined or individual event breaks:
    a. Signed and unsigned supported
    b. Big endian and little endian supported
- Support displaying run-time data monitoring. The values of a global variable are updated automatically during emulation.
- Support measuring the target device's operating frequency
- Support trimming the device's internal OSC frequency
- Support emulation time measurement

Note : The RTIME pin must be connected to measure the emulation time.

3.3 Menu Descriptions

This section introduces an overview of the menu items.

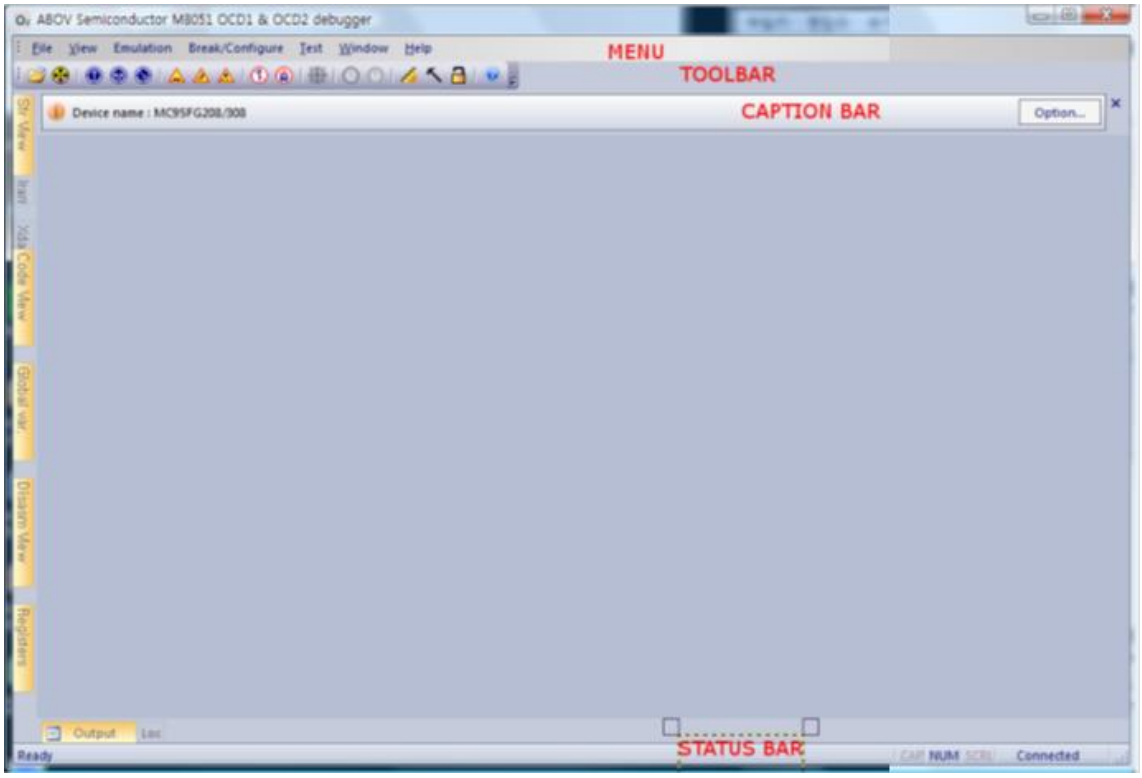


Figure 3-6 Debugger Program

3.3.1 File

The File menu includes the following items:

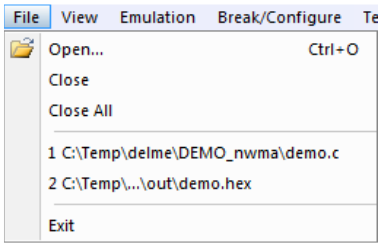


Figure 3-7 Menu 'File'

1) Open…

   : Open the selected local text file in a child text window. The shortcut key is Ctrl + O.

2) Close

   : Closes the top-most child text window.

3) Close All

   : Closes all child text windows.

4) Recent File List

   : Displays a list of the four most recently opened files.

5) Exit

   : Quits the debugger software.

3.3.2 View

The View menu controls the display of the debugger software frame and child windows.

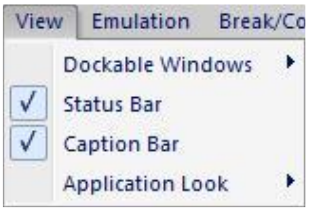


Figure 3-8 Menu : View

1) Dockable Windows

: Shows or hides a variety of child views. Only selected child views are opened.

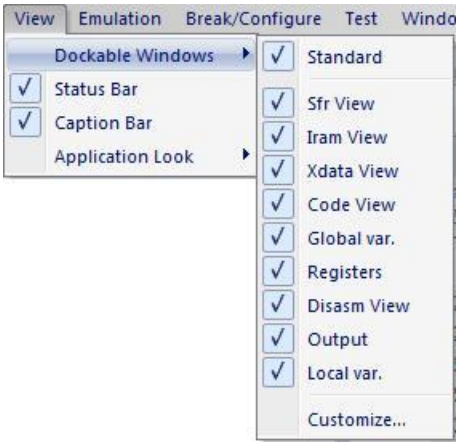


Figure 3-9 Dockable Windows

2) Dockable Windows / Customize

- The Customize dialog box enables modifications to the Command, Toolbar, Keyboard, Menu, and Options of the debugger software. Using this function, the user can set the debugger software's GUI environment according to their preferences.
- The Commands tab offers the sub-items to modify each menu.

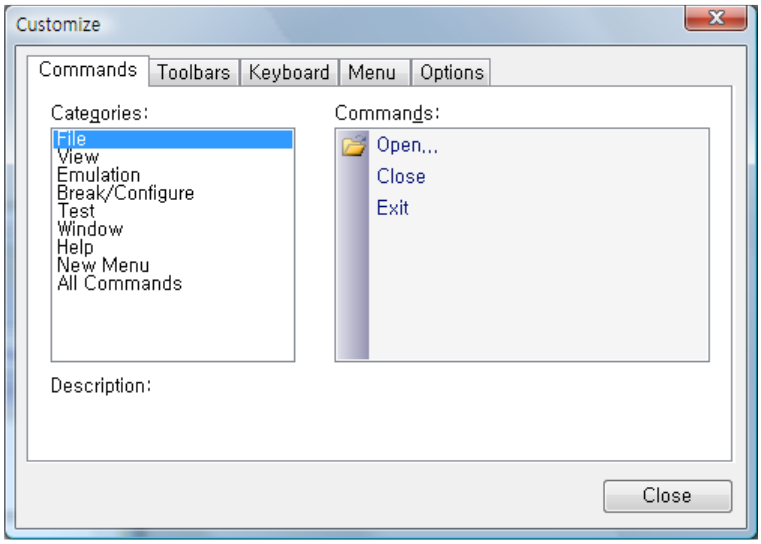


Figure 3-10 Customize : Commands

3) The Toolbars tab offers a Toolbar style.

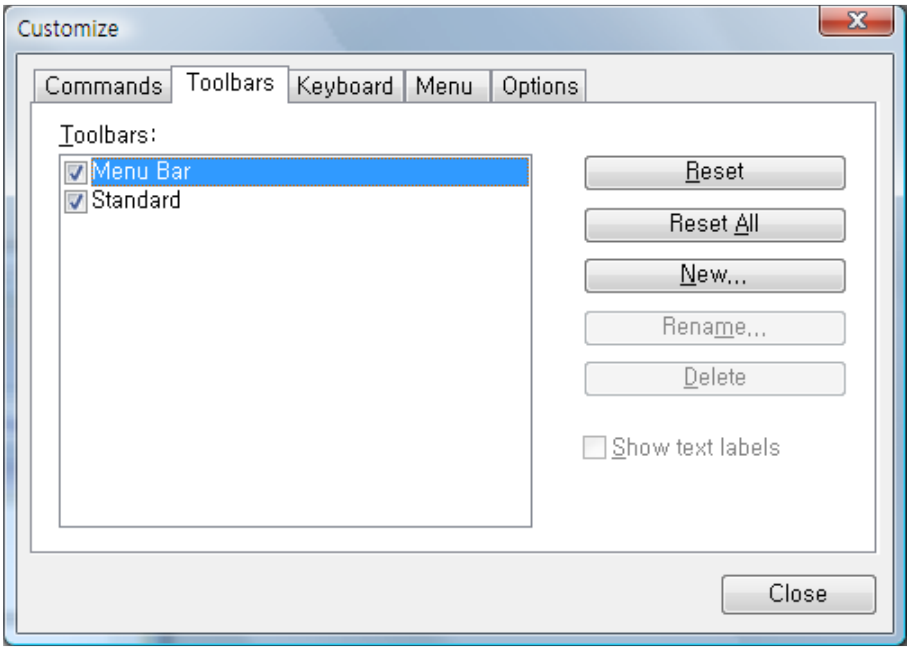


Figure 3-11 Customize : Toolbars

4) The Keyboard tab allows the user to define a shortcut key for each command or reset it to the default setting.

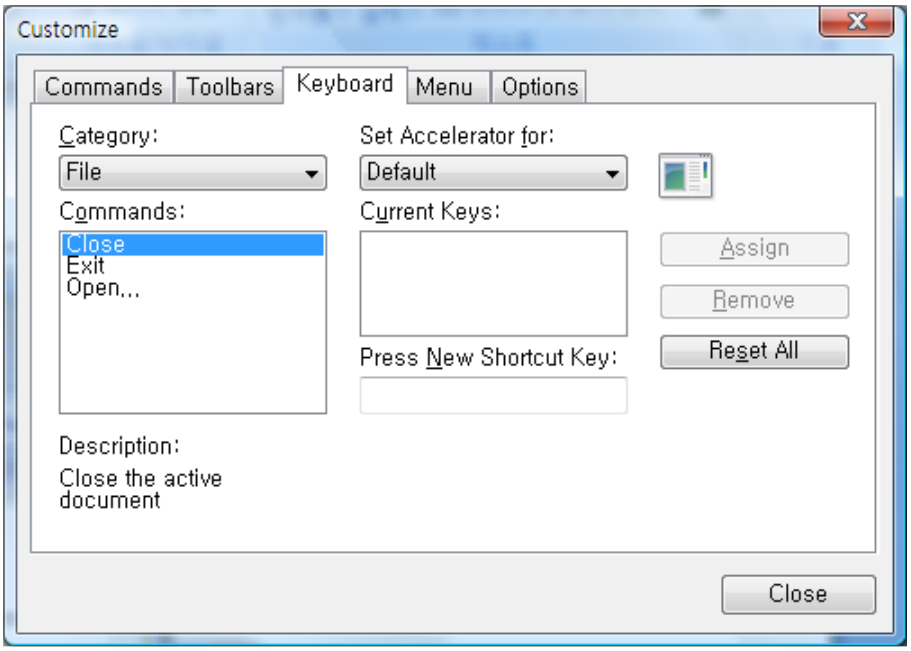


Figure 3-12 Customize : Keyboard

5) In the Menu tab, the user can change the Menu style.

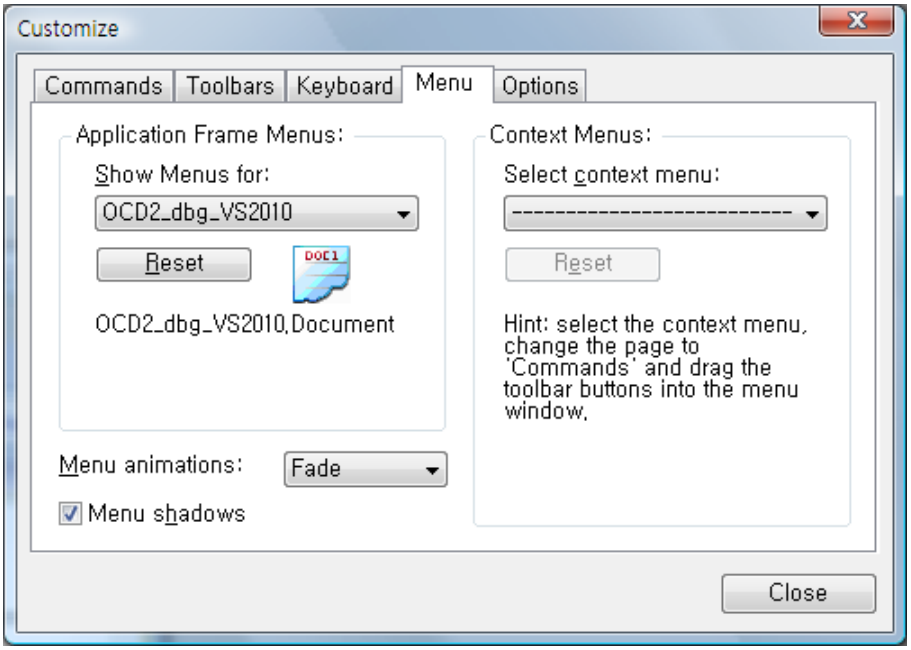


Figure 3-13 Customize : Menu

6) In the Options tab, the user can change toolbar tip display, icon size, and so on.

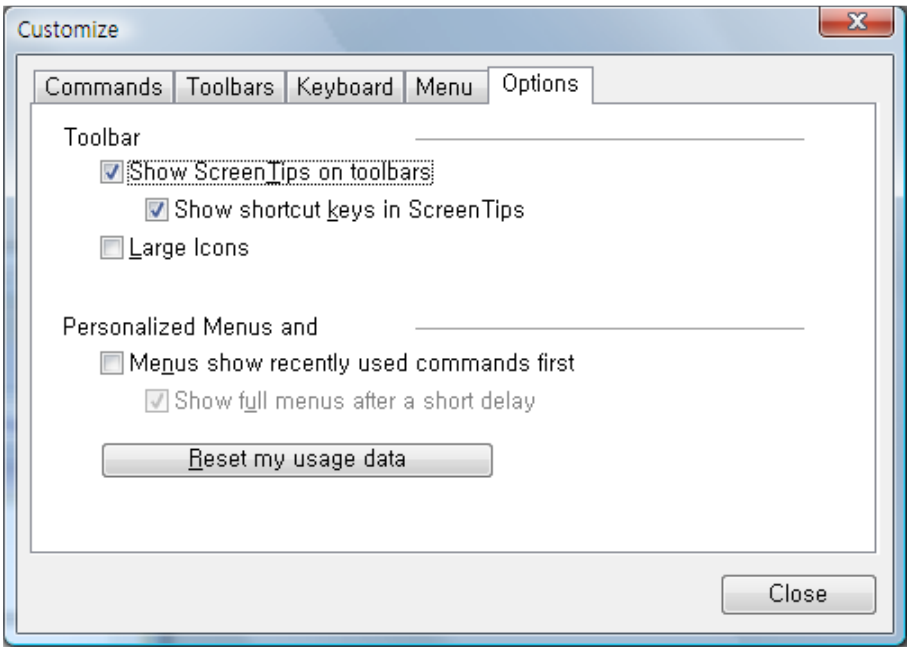


Figure 3-14 Customize : Options

7) Status Bar

: It turns the status bar on or off. The Status bar displays information on the current state of debugger.

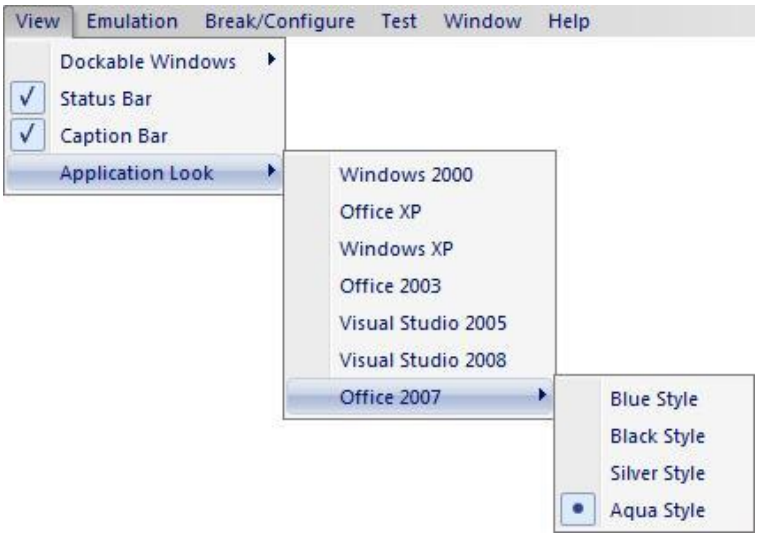


Figure 3-15 Application Look

8) Caption Bar

: It turns the Caption bar on or off. The Caption bar displays the device name and what device is connected to the OCD or OCD II interface.

9) Application Look

: This menu item allows the user to change the debugger software's GUI style.

3.3.3 Emulation

This menu is to control the start and stop of the code.

Figure 3-16 Menu : Emulation

3.3.4 Emulation : Load Hex

It displays a dialog box to enter the hex file name. The target device is programmed with this hex file.

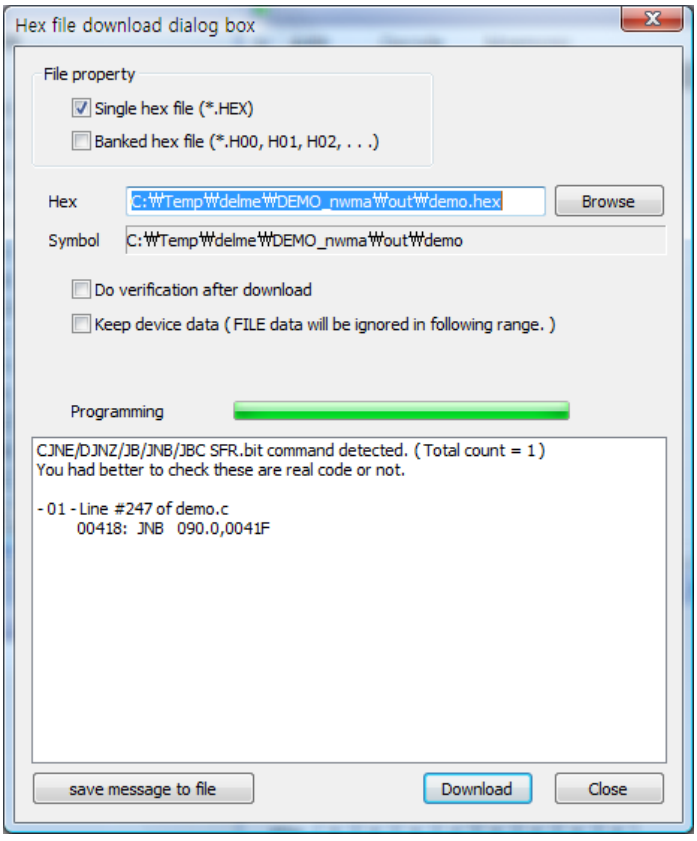


Figure 3-17 Hex File Download Dialog

1) File property

: If the target device size is no bigger than 64 KB, the compiler only generates a single hex file. If the target device's code area is larger than 64 KB, the hex file property must be selected from among :

- Single hex file : Single hex file (linear addressing)
- Banked hex file: Multiple hex files (banked addressing)

2) Hex

Hex file name to download.

3) Symbol

: Symbol file name to be used by the debugger software. It depends on the hex file name selected

4) Do verification after download

: With this option checked, the debugger verifies the code memory after downloading the hex file.

5) Keep device data (FILE data will be ignored following range.)

: With this option checked, the user can keep the device data, not the hex file data, within the specified address range. To use this option the user needs to input the address range.

6) CJNE/DJNZ/JB/JNB/JBC SFR.bit command detection (message line)

: **This is an important notification**. The instructions listed in the message are regarding comparison or branching that are not supported by some old ABOV devices. Although the debugger detects these instructions while downloading the hex file, it cannot determine whether they are instructions or data patterns. In this case, you should check if each detected part is a real instruction.

7) Save message to file

: Saves the displayed message as a file. This information can be used when the source code is modified.

8) Download

: Downloads the selected hex file to the target device and starts programming its flash memory.

9) Close

: Closes the dialog box. If the target device has configurations, the Configuration dialog box below is opened.

10) Configurations

: To activate the device configuration :

a. Write the configuration.

b. Power off the target system.

c. Power on the target system, and the device will catch the configuration data while the power applied to it is rising to the operating voltage.

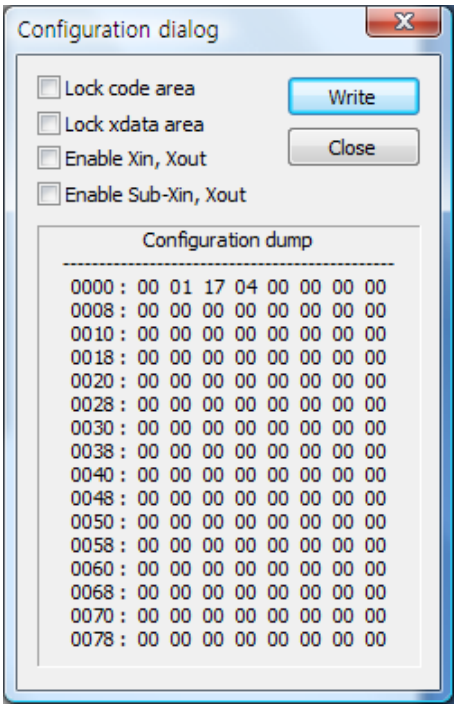


Figure 3-18 Configuration Dialog Window

3.3.5 Emulation : Reset and Run

It begins emulation from the address 0000h after resetting the target device. Its action is the same as that of a real situation. Emulation continues until a break occurs or the developer stops the emulation.

3.3.6 Emulation : Run from

It starts emulation from a user specified address. This helps users debug a specific module of the software. Selecting this prompts you to enter a 20-bit address to start emulation as shown below:

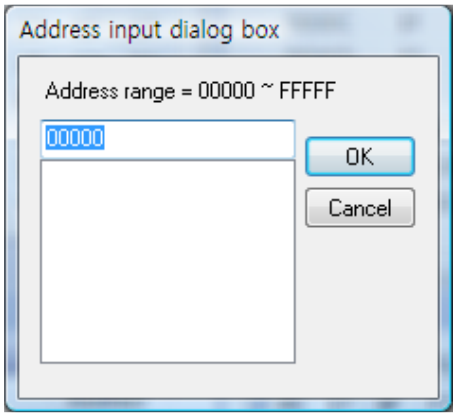


Figure 3-19 Address Input Dialog Window

3.3.7 Emulation : Run Continue

It starts emulation from the device's current address. Current address means:

- The address where the previous emulation has stopped.
- If the target device is reset, it is 0000h.

3.3.8 Emulation : Step

If you want to follow your code's execution more closely, use this to step through the code. Any interrupts are ignored during step run, and the emulation pauses either at the next line of source code or at the next mnemonic code according to the user choice.

When source line-based step run is selected, tens of mnemonic codes are gone through per each run. Therefore, source line-based step run is slower than assembly language-based step run. You can switch between these options in **Step run** option under the **Break / Configure** menu.

3.3.9 Emulation : Step Over

The emulation pauses at the next line of code or the next mnemonic code.

3.3.10 Emulation : Step Auto

: It executes a step run every 100ms. You can halt it by clicking the Stop button.

3.3.11 Emulation : Stop

It halts the current emulation or step run immediately.

3.3.12 Emulation : Apply Reset

Target OCD devices have a variety of reset options, as given below:

- Power-ON reset
- External reset pin input
- Watch-dog timer reset
- OCD debugger's command reset

The results of these operations are basically the same: They initialize the target device. This menu acts as the OCD debugger's command reset.

3.3.13 Break/Configure

This menu is to control the break settings, emulation options, device configurations, and so on. You can emulate your program with more options by using these controls.

Some items under this menu do not apply to the OCD device series because these functions are not supported by the OCD interface specifications.

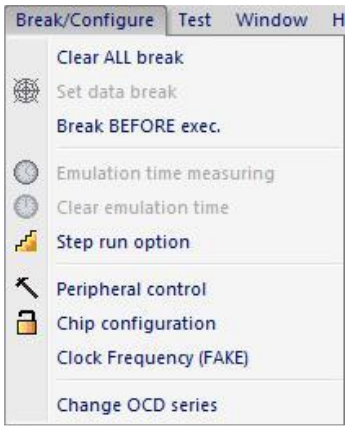


Figure 3-20 for OCD Device Series

Figure 3-21 for OCD II Device Series

3.3.14 Break/Configure : Clear All Break

It clears all program counter breaks and data breaks (OCD II devices only).

3.3.15 Break/Configure : Set Data Break

It is available only to OCD II devices. OCD II devices can be debugged with more powerful and flexible break functions.

For OCD II devices, a total of 12 break event triggers are supported.

- Four of them are program counter breaks.
- The other eight breaks can be used as program counter breaks or as combined or individual event triggers.
  - Individual event triggers: Program counter breaks, byte breaks, and bit breaks
  - Combined event triggers: 2-byte breaks (int or short type) and 4-byte breaks (long type)

Selecting this menu item pops up the following dialog box displaying current break conditions. You can add, remove, or change data breaks here.

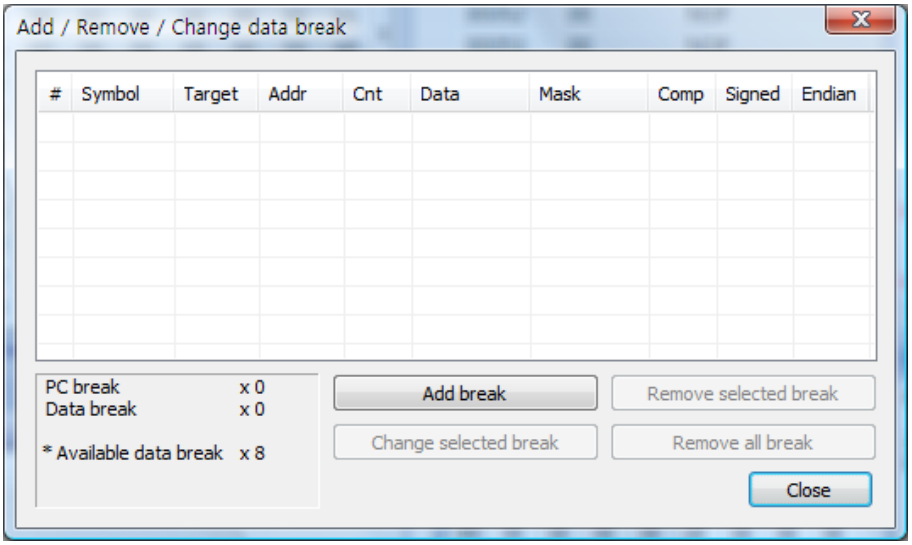


Figure 3-22 Add / Remove / Change Data Break

Clicking 'Add break' opens the following dialog box to help set a data break condition:

On this dialog box, you can set the target memory (CODE, XDATA, IRAM, or SFR) and its address by using either of the following options:

- **Use global symbol** : Select the symbol that represents your desired target memory and its address.
- **Use direct symbol** : Select your desired target memory and enter its address directly.

Then, set the break condition in detail either in the Multi-byte break section or in the bit break section.

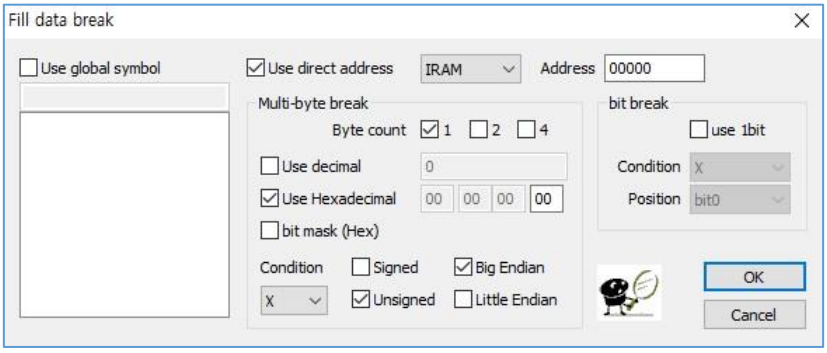


Figure 3-23 Fill Data Break

1) Multi-byte break section
: This section supports byte count comparison.

- **Byte count** : Choose the number of bytes of the data to compare with.
- **Use decimal / Use Hexadecimal** : Enter the number to compare with either as a decimal or hexadecimal number.
- **bit mask (Hexa)** : It is used to compare data with the specified bits only. If bit 7 of the bit mask value is 1, then bit 7 will be ignored during the comparison. By default, the value is set to 0x00. The bit masking size is in bytes.
- **Condition**: Set the comparing condition:

  X : Do not care
  != : Not equal
  == : Equal
  > : Great than
  >= : Great or equal
  < : Less than
  <= : Less or equal

If you select **<=** and the input number is 56 (decimal), the following data break condition will be set.

```
if (target device's value <= 56) BREAK occur;
```

- **Signed** / **Unsigned :** A signed variable uses the variable's MSB (most significant bit) as + or –. An unsigned variable uses the variable's MSB as a number. The following is an example for signed/unsigned variables' value ranges:

Table 3-1 Variable Value Ranges

Byte Count	Signed value		Unsigned value	
	Min.	Max.	Min.	Max.
1	-128	127	0	255
2	-32,768	32,767	0	65,535
4	-2,147,483,648	2,147,483,647	0	4,294,967,295

- **Big Endian** / **Little Endian :** Endianness determines the sequential order of bytes in the given number, e.g., in a single 16-, 32-, or 64-bit word.
  - Big Endian: Stores the most significant byte first.
  - Little Endian: Stores the least significant byte first.

2) bit break section

: Select the use 1bit checkbox and perform settings as follows:

- **Condition :** Set the comparing condition:

  X : Do not care

  0 : 0

  1 : 1

- **Position :** Change the bit position.

3.3.16 Break/Configure : Break BEFORE/AFTER exec

Select this to toggle between the following two modes regarding the timing of break event detection.

3) Break BEFORE exec.
: When the OCD logic detects a break event, the target device is stopped before the OPCODE of the program counter break is executed.

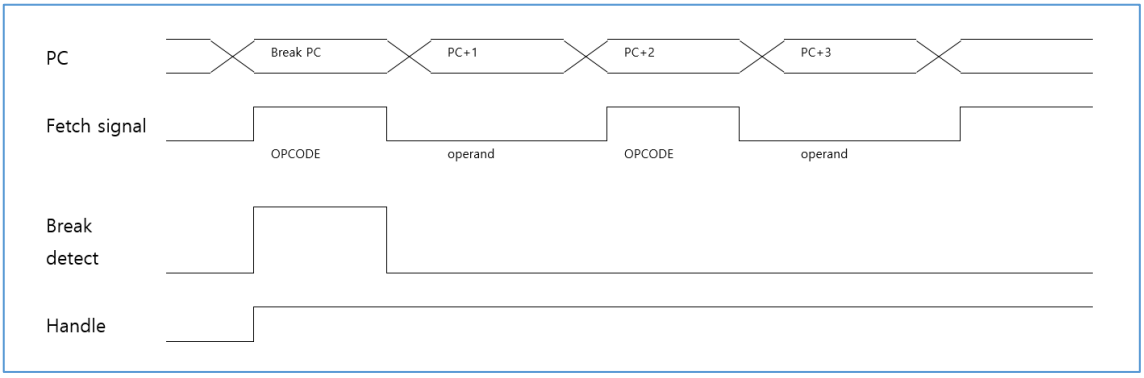


Figure 3-24 Timing Diagram

4) Break AFTER exec.
: When the OCD logic detects a break event, the target device is stopped after the OPCODE of the program counter break is executed.

3.3.17 Break/Configure : Emulation Time Measuring

This menu item is enabled only for OCD II devices with RTIME pin connection. It shows and allows to change the emulation time measuring option.

1) Accumulate emulation time
: It does not clear the last emulation time and execution clock information when emulation begins.
OCD devices do not support this function.

2) Not accumulate
: It clears the last emulation time and execution clock information whenever emulation begins.

3.3.18 Break/Configure : Clear Emulation Time

This menu item is enabled only for OCD II devices. It clears the last emulation time and execution clock information.

3.3.19 Break/Configure : Step Run Option

You can select the unit of step runs between the source-line level and OPCODE level.

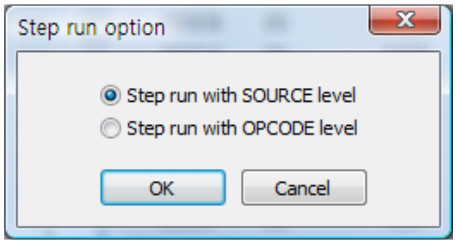


Figure 3-25 Step Run Option Dialog

3.3.20 Break/Configure : Peripheral Control

Selecting this prompts you to select how the target device's peripherals work when in idle mode. This mode selection is usually used in measuring the timing of a timer interrupt.

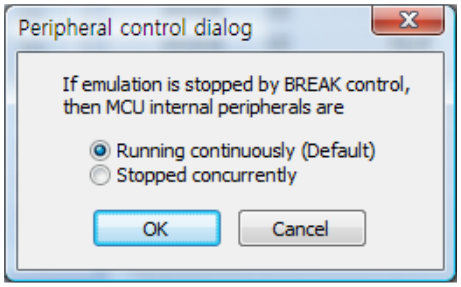


Figure 3-26 Peripheral Control Dialog

You cannot control each peripheral's operation individually. This has to be done manually.

3.3.21 Break/Configure : Chip Configuration

This is to configure the target device's hardware configuration, including code protection, oscillation control, and I/O port option. Each device series has a different configuration.

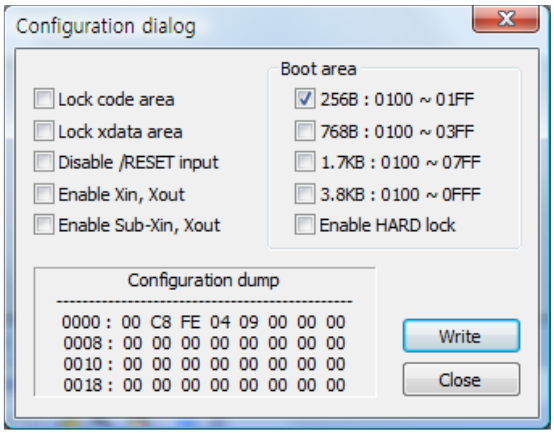


Figure 3-27 Configuration Dialog

If you attempt to unlock a locked device, then all data in the device will be erased. This is an important device specification that protects data from being hacked.

If the target device configuration does not exist, the following dialog box appears:

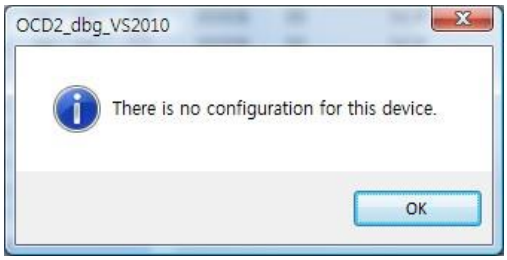


Figure 3-28 Message Box

3.3.22 Break/Configure : Clock Frequency (Pseudo-Clock)

The OCD interface does not support the measurement of emulation time. The OCD II interface supports it; however, the RTIME pin must be connected.

As an alternative, this dialog box is given where you can enter a virtual clock frequency to calculate emulation time from the device's internal clock counter.

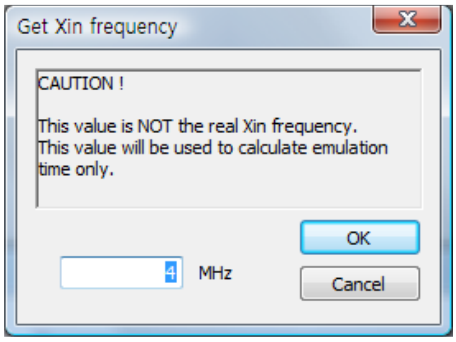


Figure 3-29 Get Xin Frequency Dialog

Note : The value entered here is not of the real emulation clock, but a fake frequency.

If you have connected the OCD II and the RTIME pin, this value is ignored because the debugger can get real emulation time.

3.3.23 Break/Configure : Change OCD Series

The OCD interface can detect most of its compatible devices automatically. But as some devices have a slightly different interface algorithm, the OCD interface must be re-configured to interact with those devices.

To change the target OCD series, perform the following:

1) Select the target device series in the dialog box and click OK.

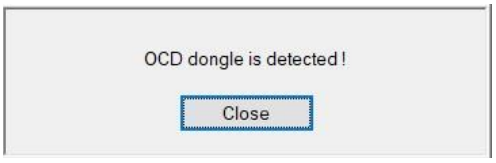


Figure 3-30 Message Box for OCD Interface

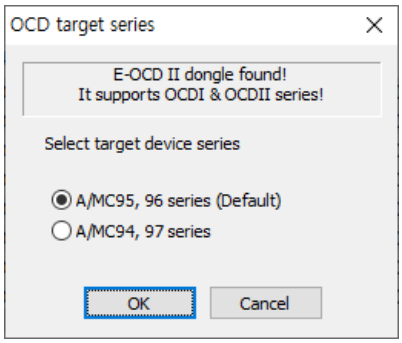


Figure 3-31 Dialog for E-OCD II Interface

Note : No device series will be selected by default. You must select one of the listed series; else, this dialog box will not close

2) Turn off the target system and click Yes.

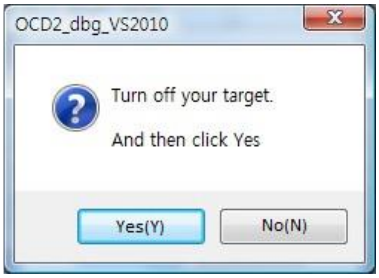


Figure 3-32 Message Box

3) Wait for a few seconds until the OCD interface re-configuration is completed.

4) Turn on the target system once the following message pops up.

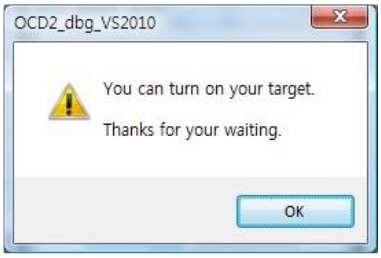


Figure 3-33 Message Box

3.3.24 Power Out (3.3V or 5.0V)

E-OCD II has two types of voltage output : 3.3V, 5.0V

User can select the power output voltage with a switch on the side of the E-OCD II

When Pressing the power icon in the PC program – as shown below picture, The E-OCD II can be selected voltage switch out is on and the voltage selected by switch is output.

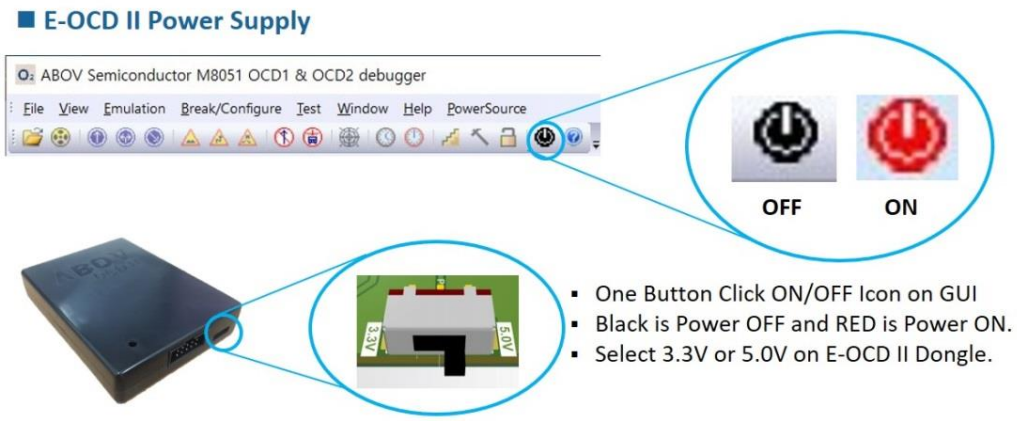


Figure 3-34 E-OCD Power Supply

1) The 'power icon' is black off when the E-OCD II is first connected to the PC
2) When the 'power icon' is selected the icon color is changed and the power voltage is output. The output voltage can be changed from E-OCD II switch (3.3V or 5.0V)
3) The dialog window for the warning about current
4) Device is recognized successfully if it has a good connection with target board.

Precautions for E-OCD II debugger

1) E-OCD II has two power outputs. 3.3V and 5.0V
2) The power voltage is selected with the side switch.
3) When pressing the power icon in the PC program, the power is on.
4) The power output current can only be up to 100mA, but may be lower than that, depending on the circumstances.

5) When the device is not recognized by the own power of E-OCD II, the user must use an external power.

6) Connecting target board with the power of E-OCD II is on, it may cause breakage of the target board.

7) Connecting E-OCD II with the power of target board is on, it may cause breakage of E-OCD II.

8) User must connect the E-OCD II to target board with both power off.

9) E-OCD II support USB HID so it does not require a dedicated USB driver.

10) The PC program of the E-OCD II is same as current OCD program.

3.3.25 Test

This menu is to examine the interface or device. Some functions under this menu are designed to for maker test purpose and not for end users.

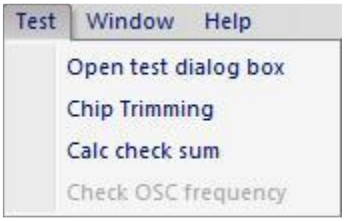


Figure 3-35 Menu 'Test' for OCD Device Series

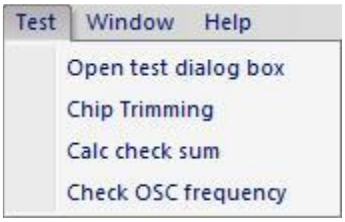


Figure 3-36 Menu 'Test' for OCD-II Device Series

1) Open test dialog box

: This function is not for end users. It is designed to test or repair the OCD or OCD II interface. A password is required to access this function.

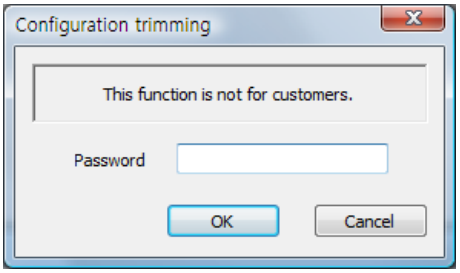


Figure 3-37 Open Test Dialog

2) Chip Trimming

: This function is not for end users. It is designed to change device configurations, including user configuration and trimming values. A password is required to access this function.

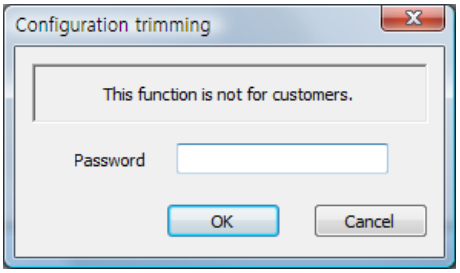


Figure 3-38 nor for End Users

3) Calc checksum

: It reads the target device's code memory and displays the checksum. If you attempt to read a protected device, the operation might not be performed correctly.

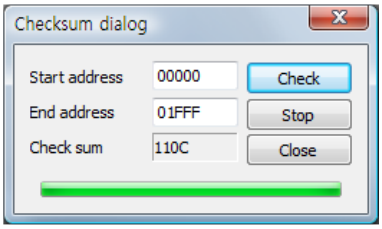


Figure 3-39 Calc Checksum

4) Check OSC frequency

: This menu item is enabled only for OCD II devices. It shows the target device's oscillation frequency.

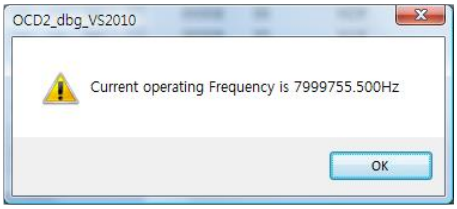


Figure 3-40 Check OSC Frequency

3.3.26 Window

This menu is to control the text file window's view.

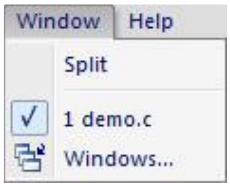


Figure 3-41 Menu 'Window'

1) Split

: You can split the text file window's view as shown in two as shown below. You can move or remove the splitter by dragging the mouse.

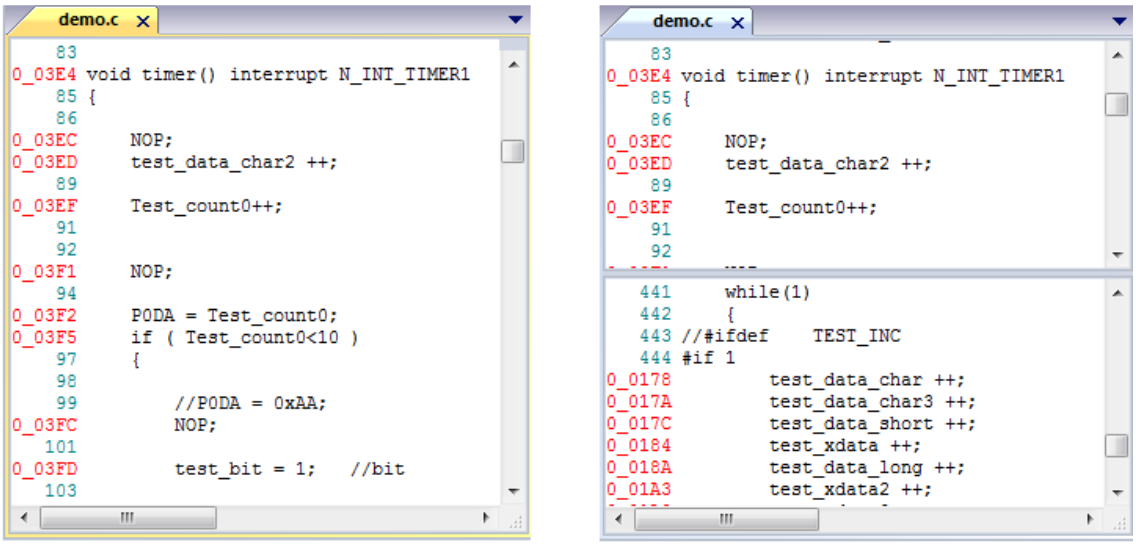


Figure 3-42 Example : Original View / Split View

2) Window number + file name

: The debugger assigns numbers, e.g., 1, 2, or 3, to each text window based on the order that they are opened. You can select the opened child window using the assigned number.

3) Windows…

: This helps select the desired text window.

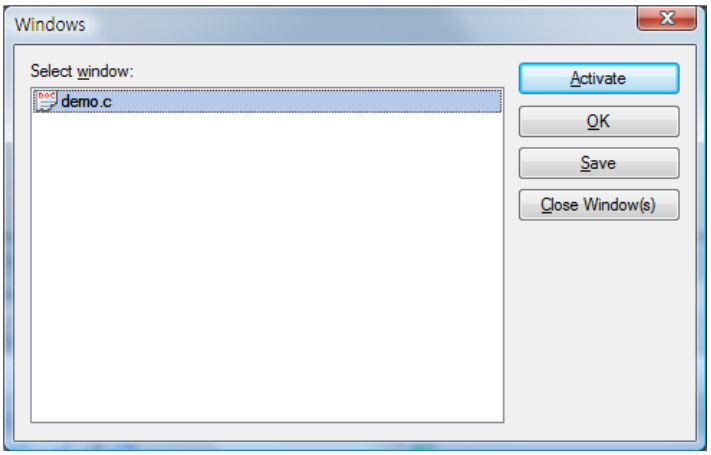


Figure 3-43 Windows Dialog

3.3.27 Help

This menu supports to check the debugger version.

Figure 3-44 Menu 'Help'

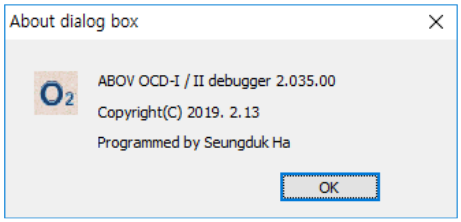


Figure 3-45 Program Information

3.3.28 Toolbar

The toolbar provides easy, one-click access to the most-used commands. There are a variety of buttons that control hex file download, emulation, device configurations, and other actions.

Figure 3-46 Toolbar

3.4 Child Windows

The MCS51 CPU architecture is given below. Each child window provides editing functionality and displays its data.

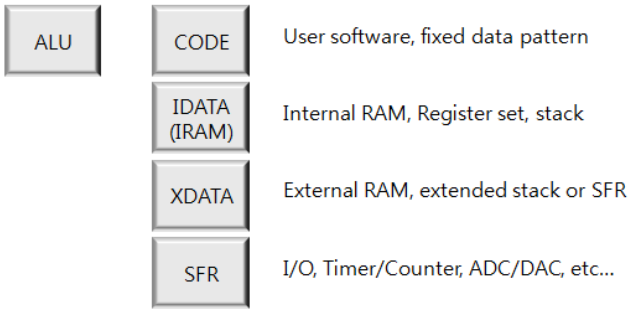


Figure 3-47 MCS51 CPU Architecture

The debugger shows the target device's all internal data and status in a convenient manner. The debugger provides a dumped format view, disassembled format view, and various information that are very helpful to debugging your application program code.

3.4.1 Child Window Alignment

You can re-size, move, dock, and hide each child window and perform various other actions for them. All windows are dockable, except for the text window.

What is docking :

Docking is manipulating a window to align with the edge of another window or to move it into another window

The figure below shows an example for moving a docked child window. The red-colored boxes may vary slightly by application look.

1) Place the mouse pointer on the border of the selected window (the mouse pointer will change to a drag icon when placed over the window border).
2) Hold down the left mouse button while dragging the window to its new location.
3) Release the mouse button.

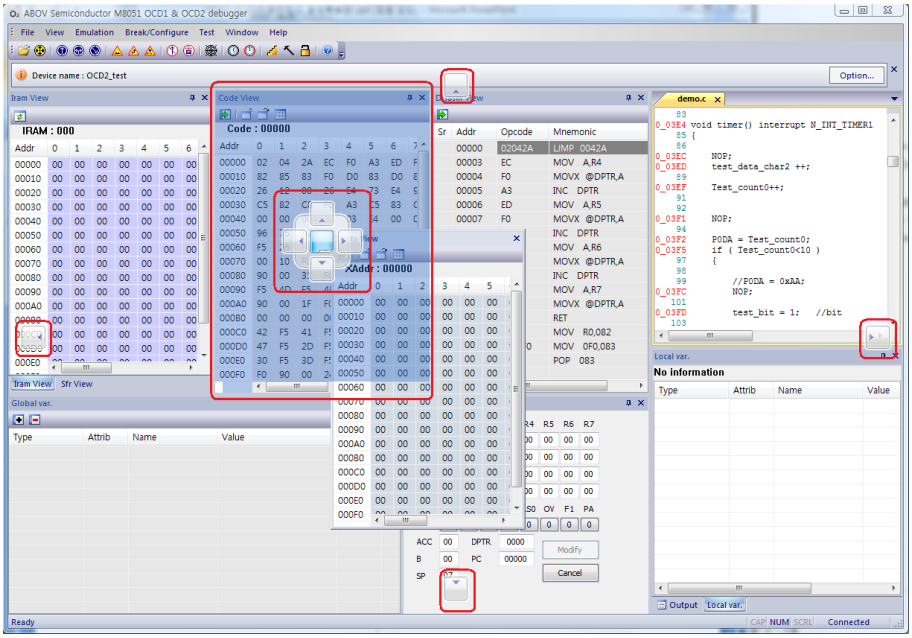


Figure 3-48 Example : Moving Cocked Child View in the Debugger

All dockable windows can be moved out of the debugger frame as shown below:

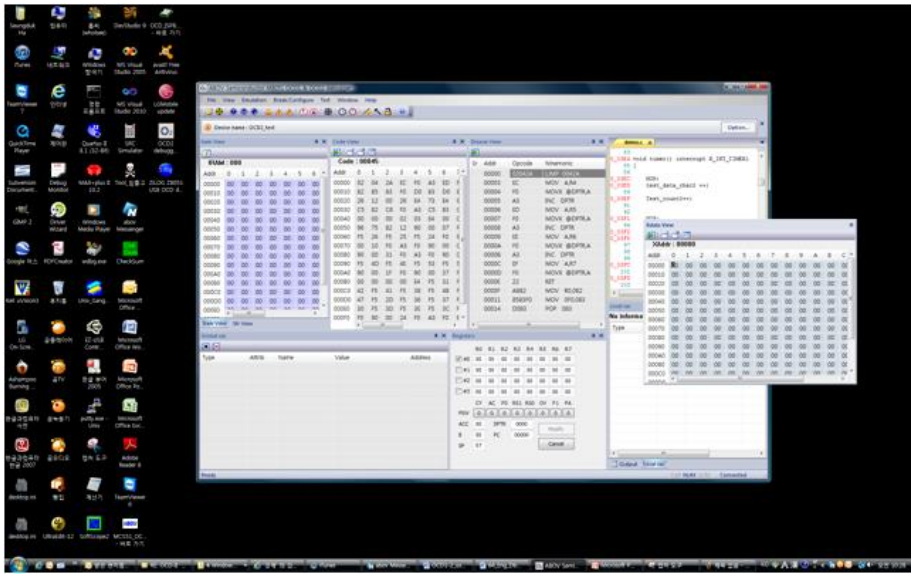


Figure 3-49 XDATA Window Out of the Debugger Frame

All dockable windows have Hide and Close buttons. The Hide button moves the child window aside in the debugger frame, but does not close it. The Close button closes the child window.

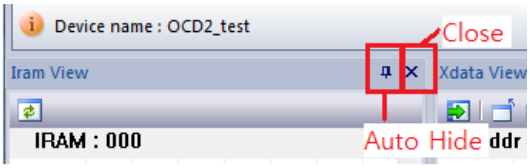


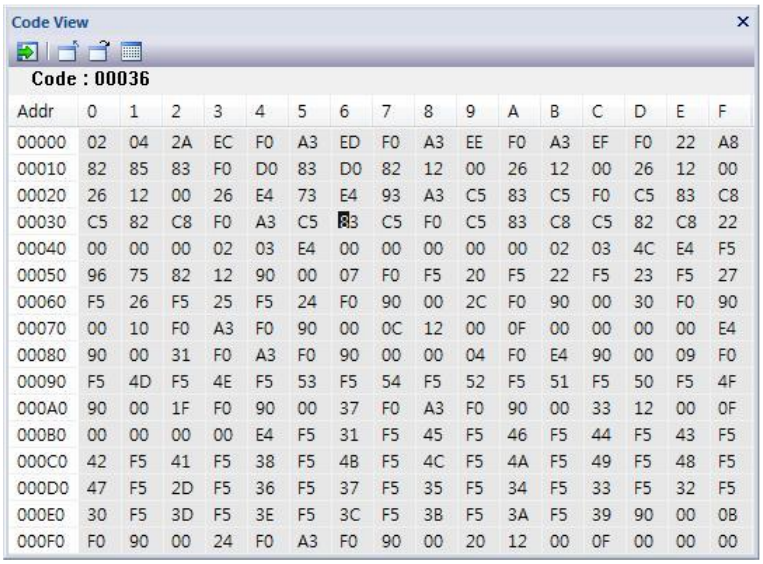
Figure 3-50 Hide and Close Buttons

3.4.2 Code Dump View

This view shows the target device's code memory in the hex dumped format. It displays data page by page (hexadecimal addresses range from 0xXX00 to 0xXXFF). You can use the Page Up or Page Down keys to move to the previous or next page. The upper side of this widow displays the address of the current caret position.

1) Edit

: You can edit data here directly by typing. Note that data changes made in this editor are not transmitted to the target device until you press Enter.



Addr	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00000	02	04	2A	EC	F0	A3	ED	F0	A3	EE	F0	A3	EF	F0	22	A8
00010	82	85	83	F0	D0	83	D0	82	12	00	26	12	00	26	12	00
00020	26	12	00	26	E4	73	E4	93	A3	C5	83	C5	F0	C5	83	C8
00030	C5	82	C8	F0	A3	C5	83	C5	F0	C5	83	C8	C5	82	C8	22
00040	00	00	00	02	03	E4	00	00	00	00	00	02	03	4C	E4	F5
00050	96	75	82	12	90	00	07	F0	F5	20	F5	22	F5	23	F5	27
00060	F5	26	F5	25	F5	24	F0	90	00	2C	F0	90	00	30	F0	90
00070	00	10	F0	A3	F0	90	00	0C	12	00	0F	00	00	00	00	E4
00080	90	00	31	F0	A3	F0	90	00	00	04	F0	E4	90	00	09	F0
00090	F5	4D	F5	4E	F5	53	F5	54	F5	52	F5	51	F5	50	F5	4F
000A0	90	00	1F	F0	90	00	37	F0	A3	F0	90	00	33	12	00	0F
000B0	00	00	00	00	E4	F5	31	F5	45	F5	46	F5	44	F5	43	F5
000C0	42	F5	41	F5	38	F5	4B	F5	4C	F5	4A	F5	49	F5	48	F5
000D0	47	F5	2D	F5	36	F5	37	F5	35	F5	34	F5	33	F5	32	F5
000E0	30	F5	3D	F5	3E	F5	3C	F5	3B	F5	3A	F5	39	90	00	0B
000F0	F0	90	00	24	F0	A3	F0	90	00	20	12	00	0F	00	00	00

Figure 3-51 Code View

2) Move button ( )

: Move the display address and caret position by typing. Address range is 0x00000 through 0xFFFFF (1 MB).

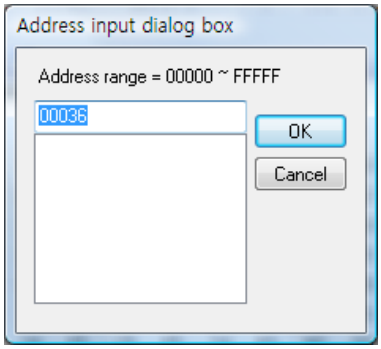


Figure 3-52 Address Input Dialog

4) Load pattern ( )

: Fill a code area with a hex file. The only available format is the Intel-Hex format.

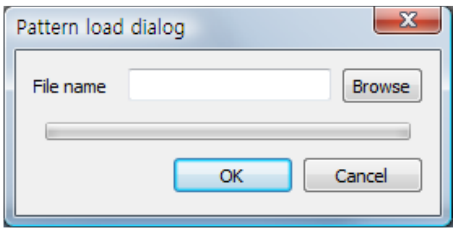


Figure 3-53 Pattern Load Dialog

5) Save pattern ( )

: Save a code area as a hex file. The code area is specified by entering its start and end addresses.

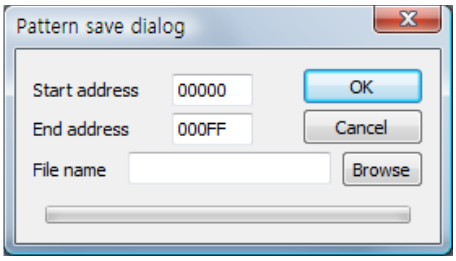


Figure 3-54 Pattern Save Dialog

6) Fill pattern ( )

: Fill a code area with a specified pattern. The code area is specified by entering its start and end addresses.

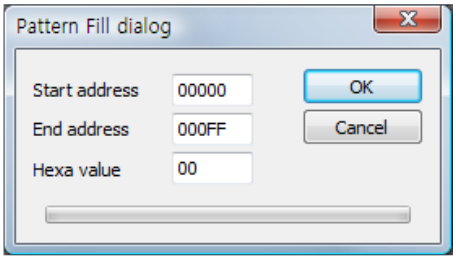


Figure 3-55 Pattern Fill Dialog

7) Set data break

: This function is available only to OCD II devices. Double-click on data in the window to set or remove a data break. Double-clicking on an already set data break will pop up the dialog box shown below.

Once a data break is set, its address field is colored in blue. Refer to the Set data break section for details.

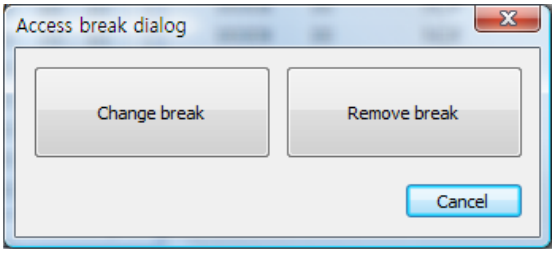


Figure 3-56 Access Break Dialog

3.4.3 Code Disassemble View

This view shows the target device's code memory in the disassembled format.

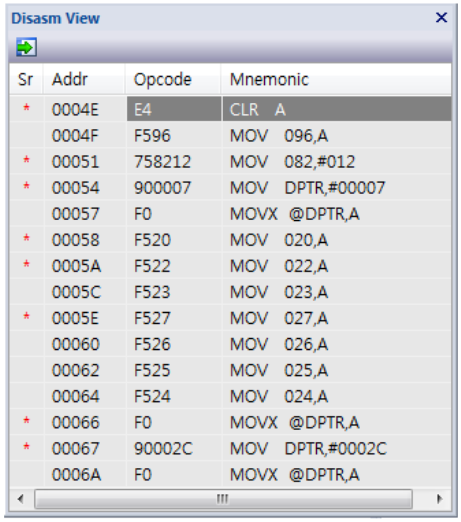


Figure 3-57 Disassemble View Window

- All operands are displayed as hexadecimal numbers.
- The current device program counter is colored in dark gray.
- Lines having source file information are marked with a red asterisk (*). Double-click on this mark to open the source file and move to the text line corresponding to that address.

Double-clicking on the Address area of a line toggles between setting and removing a program counter break at that address. Break-set lines are displayed in blue-colored boxes.

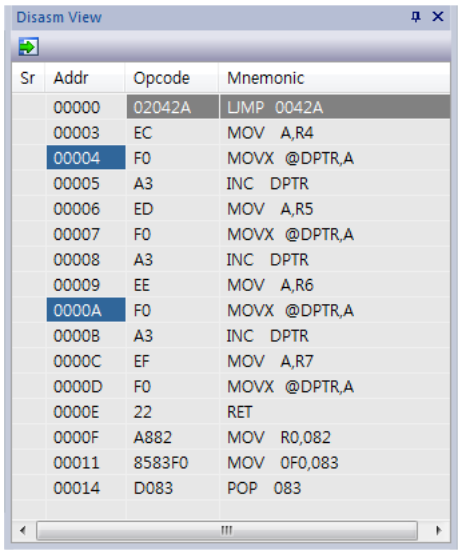


Figure 3-58 Setting and Removing Counter Break

Double-clicking on the Mnemonic area of a line allows you to modify the assembly code. Once you modify the code, click Modify.

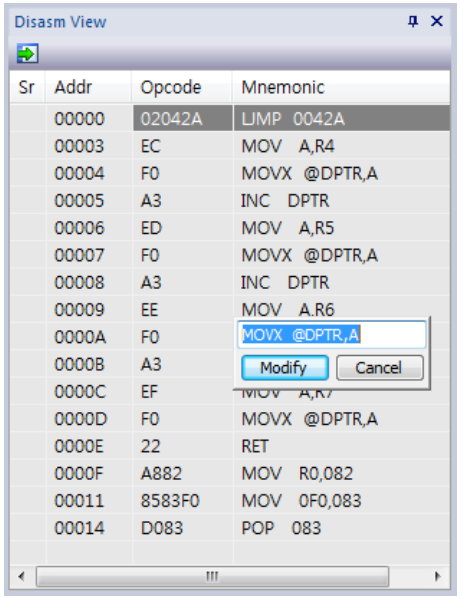


Figure 3-59 Modifying the Assembly Code

1) Move button ( )

: Move the display address and caret position by typing. Address range is 0x00000 through 0xFFFFF (1 MB).

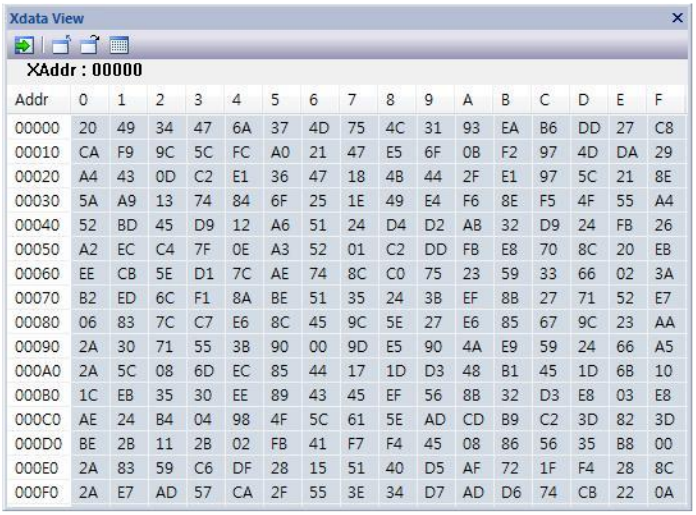
Figure 3-60 Address Input Dialog

3.4.4 XDATA Dump View

This view shows the target device's XDATA memory in the hex dumped format. It displays data page by page (hexadecimal addresses range from 0xXX00 to 0xXXFF). You can use the Page Up or Page Down keys to move to the previous or next page. The upper side of this widow displays the address of the current caret position.

1) Edit

: You can edit data here directly by typing. Note that data changes made in this editor are not transmitted to the target device until you press Enter.



Addr	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00000	20	49	34	47	6A	37	4D	75	4C	31	93	EA	B6	DD	27	C8
00010	CA	F9	9C	5C	FC	A0	21	47	E5	6F	0B	F2	97	4D	DA	29
00020	A4	43	0D	C2	E1	36	47	18	4B	44	2F	E1	97	5C	21	8E
00030	5A	A9	13	74	84	6F	25	1E	49	E4	F6	8E	F5	4F	55	A4
00040	52	BD	45	D9	12	A6	51	24	D4	D2	AB	32	D9	24	FB	26
00050	A2	EC	C4	7F	0E	A3	52	01	C2	DD	FB	E8	70	8C	20	EB
00060	EE	CB	5E	D1	7C	AE	74	8C	C0	75	23	59	33	66	02	3A
00070	B2	ED	6C	F1	8A	BE	51	35	24	3B	EF	8B	27	71	52	E7
00080	06	83	7C	C7	E6	8C	45	9C	5E	27	E6	85	67	9C	23	AA
00090	2A	30	71	55	3B	90	00	9D	E5	90	4A	E9	59	24	66	A5
000A0	2A	5C	08	6D	EC	85	44	17	1D	D3	48	B1	45	1D	68	10
000B0	1C	EB	35	30	EE	89	43	45	EF	56	8B	32	D3	E8	03	E8
000C0	AE	24	B4	04	98	4F	5C	61	5E	AD	CD	B9	C2	3D	82	3D
000D0	BE	2B	11	2B	02	FB	41	F7	F4	45	08	86	56	35	B8	00
000E0	2A	83	59	C6	DF	28	15	51	40	D5	AF	72	1F	F4	28	8C
000F0	2A	E7	AD	57	CA	2F	55	3E	34	D7	AD	D6	74	CB	22	0A

Figure 3-61 XDATA View Window

2) Move button ( )

: Move the display address and caret position by typing. Address range is 0x00000 through 0xFFFFF (1 MB).

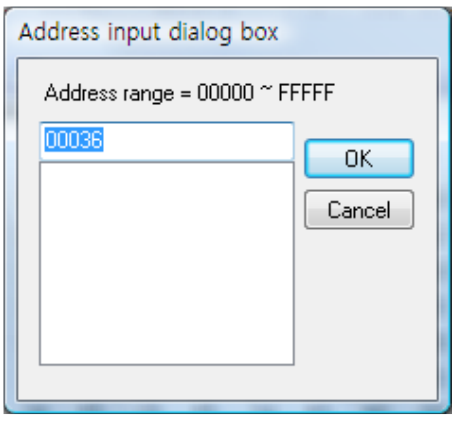


Figure 3-62 Address Input Dialog

3) Load pattern ( )

: Fill a code area with a hex file. The only available format is the Intel-Hex format.

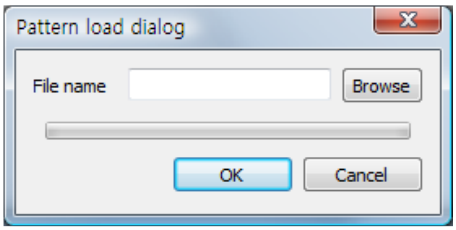


Figure 3-63 Pattern Load Dialog

4) Save pattern ( )

: Save a code area as a hex file. The code area is specified by entering its start and end addresses. The only available format is the Intel-Hex format.

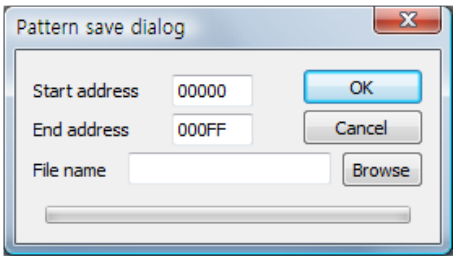


Figure 3-64 Pattern Save Dialog

5) Fill pattern ( )

: Fill a code area with a specified pattern. The code area is specified by entering its start and end addresses.

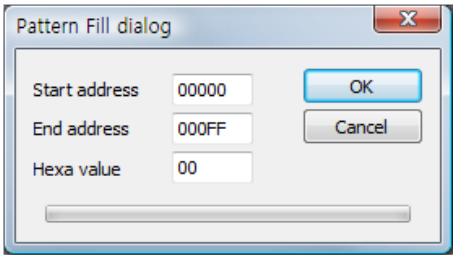


Figure 3-65 Pattern Fill Dialog

7) Set data break

: This function is available only to OCD II devices. Double-click on data in the window to set or remove a data break. Double-clicking on an already set data break will pop up the dialog box shown below.

Once a data break is set, its address field is colored in blue. Refer to the Set data break section for details.

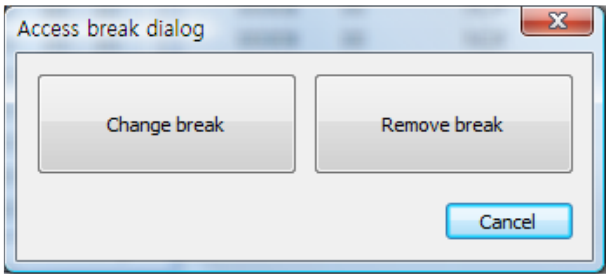


Figure 3-66 Access Break Dialog

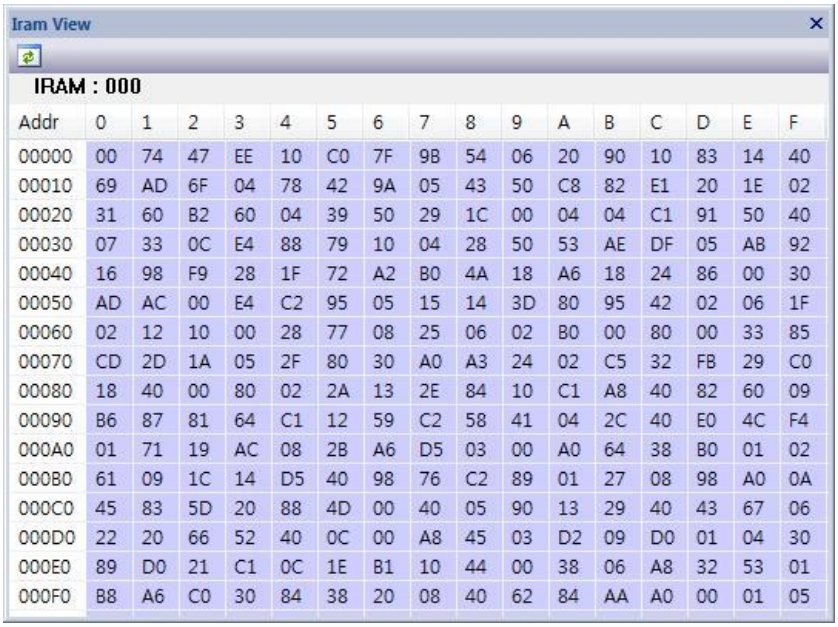
3.4.5 IDATA (IRAM) Dump View

This view shows the target device's IDATA (IRAM) memory in the hex dumped format. It displays data page by page (hexadecimal addresses range from 0x0000 to 0x00FF). The upper side of this widow displays the address of the current caret position.

1) Edit

: You can edit data here directly by typing. Note that data changes made in this editor are not transmitted to the target device until you press Enter.

Addresses 0x00–0x7F are the direct addressing area (128 bytes). Addresses 0x80–0xFF are the indirect addressing area (128 bytes).



Addr	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00000	00	74	47	EE	10	C0	7F	9B	54	06	20	90	10	83	14	40
00010	69	AD	6F	04	78	42	9A	05	43	50	C8	82	E1	20	1E	02
00020	31	60	B2	60	04	39	50	29	1C	00	04	04	C1	91	50	40
00030	07	33	0C	E4	88	79	10	04	28	50	53	AE	DF	05	AB	92
00040	16	98	F9	28	1F	72	A2	B0	4A	18	A6	18	24	86	00	30
00050	AD	AC	00	E4	C2	95	05	15	14	3D	80	95	42	02	06	1F
00060	02	12	10	00	28	77	08	25	06	02	B0	00	80	00	33	85
00070	CD	2D	1A	05	2F	80	30	A0	A3	24	02	C5	32	FB	29	C0
00080	18	40	00	80	02	2A	13	2E	84	10	C1	A8	40	82	60	09
00090	B6	87	81	64	C1	12	59	C2	58	41	04	2C	40	E0	4C	F4
000A0	01	71	19	AC	08	2B	A6	D5	03	00	A0	64	38	B0	01	02
000B0	61	09	1C	14	D5	40	98	76	C2	89	01	27	08	98	A0	0A
000C0	45	83	5D	20	88	4D	00	40	05	90	13	29	40	43	67	06
000D0	22	20	66	52	40	0C	00	A8	45	03	D2	09	D0	01	04	30
000E0	89	D0	21	C1	0C	1E	B1	10	44	00	38	06	A8	32	53	01
000F0	B8	A6	C0	30	84	38	20	08	40	62	84	AA	A0	00	01	05

Figure 3-67 IDATA (IRAM) View Window

2) Refresh button ( )

: Reload data from the target device and re-new the current display.

3) Set data break

: This function is available only to OCD II devices. Double-click on data in the window to set or remove a data break. Double-clicking on an already set data break will pop up the dialog box shown below.

Once a data break is set, its address field is colored in blue. Refer to the Set data break section for details.

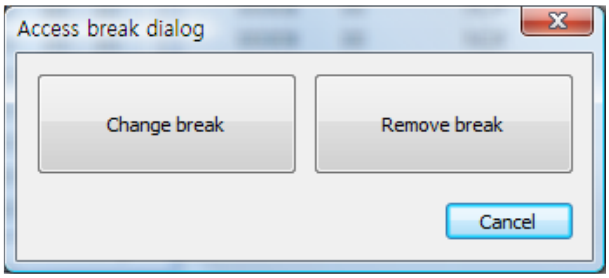
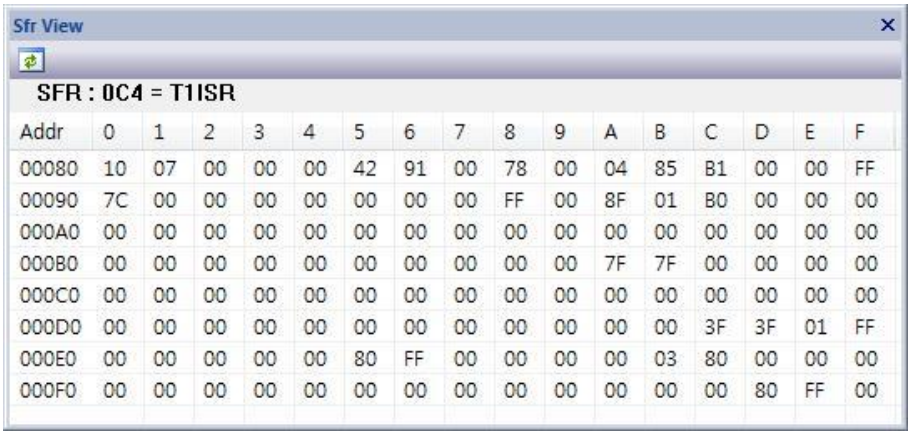


Figure 3-68 Access Break Dialog

3.4.6 SFR Dump View

This view shows the target device's SFRs (special function registers) in the hex dumped format. It displays 128 bytes (hexadecimal addresses range from 0x0080 to 0x00FF). The upper side of this widow displays the address and the SFR name of the current caret position.

1) Edit
: You can edit data here directly by typing. Note that data changes made in this editor are not transmitted to the target device until you press Enter.
Addresses 0x80–0xFF are the direct addressing area.



Addr	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00080	10	07	00	00	00	42	91	00	78	00	04	85	B1	00	00	FF
00090	7C	00	00	00	00	00	00	00	FF	00	8F	01	B0	00	00	00
000A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
000B0	00	00	00	00	00	00	00	00	00	00	7F	7F	00	00	00	00
000C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
000D0	00	00	00	00	00	00	00	00	00	00	00	00	3F	3F	01	FF
000E0	00	00	00	00	00	80	FF	00	00	00	00	03	80	00	00	00
000F0	00	00	00	00	00	00	00	00	00	00	00	00	00	80	FF	00

Figure 3-69 SFR View Window

2) Refresh button ( )
: Reload data from the target device and re-new the current display. The SFRs include a control register, timer/counter, UART, and I/O ports, meaning that SFR values are not fixed. Using this button, you can check the timer counting up, I/O port values changing, and other variable data.

3) Set data break
: This function is available only to OCD II devices. Double-click on data in the window to set or remove a data break. Double-clicking on an already set data break will pop up the dialog box shown below.
Once a data break is set, its address field is colored in blue. Refer to the Set data break section for details.

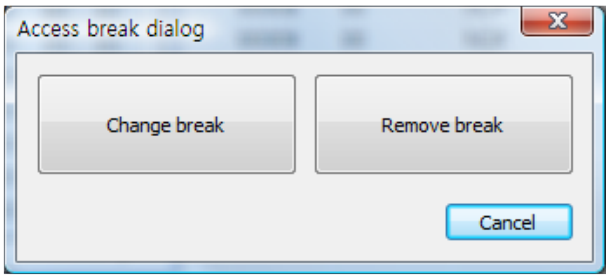


Figure 3-70 Access Break Dialog

3.4.7 Registers View

This view shows the target device's registers in the hex dumped format. PSWs (program status words) use a binary format.

1) Edit

: You can edit data here directly by typing. Note that data changes made in this editor are not transmitted to the target device until you click the Modify button.

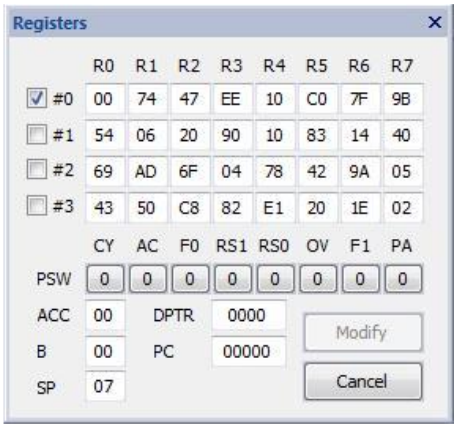


Figure 3-71 Registers View Window

3.4.8 Output View

This view uses a tabbed window. Each window tab shows different information.

1) Status tab

: This tab lists breaks that have occurred.

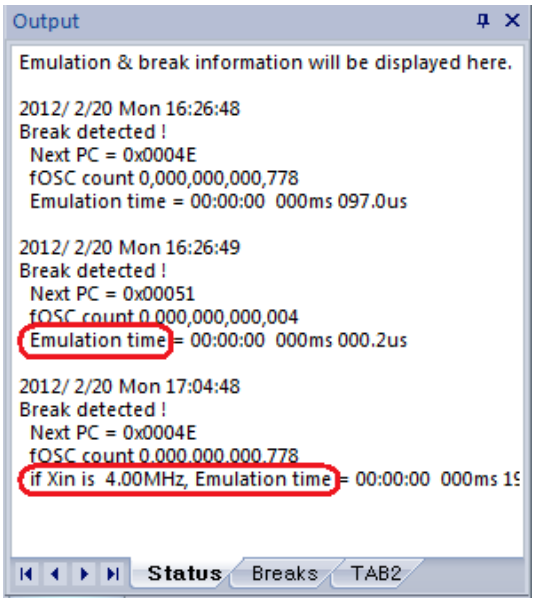


Figure 3-72 Output Window : Status Tab

The information of each occurrence includes:

- When the break occurred
- Next program counter
- Target device's clock count
- Emulation time

  - If you are using an OCD II device and the RTIME pin is connected, it shows real emulation. It will be displayed as Emulation time.

  - If you are using an OCD device or an OCD II device without the RTIME pin connected, then the emulation time calculation uses the FAKE clock input value. In this case, the message is shown as 'If Xin is x.xxMHz, Emulation time =.'

2) Breaks tab

: This tab lists the set breaks. If you are using an OCD II device, refer to Set data break too.

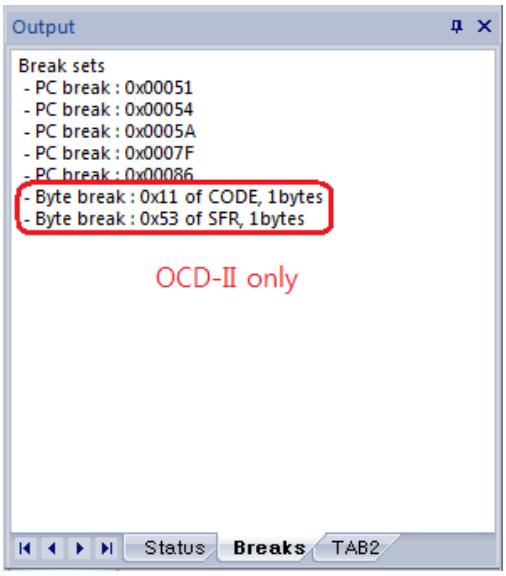


Figure 3-73 Output Window : Breaks Tab

3.4.9 Source View

This view shows a text file or source code file with each line numbered. The data displayed in the view is not editable, and each tab shown is sized as four spaces.

If the Symbol file has already been loaded, the Source file will display the line numbers and real addresses combined as shown in the screenshot below.

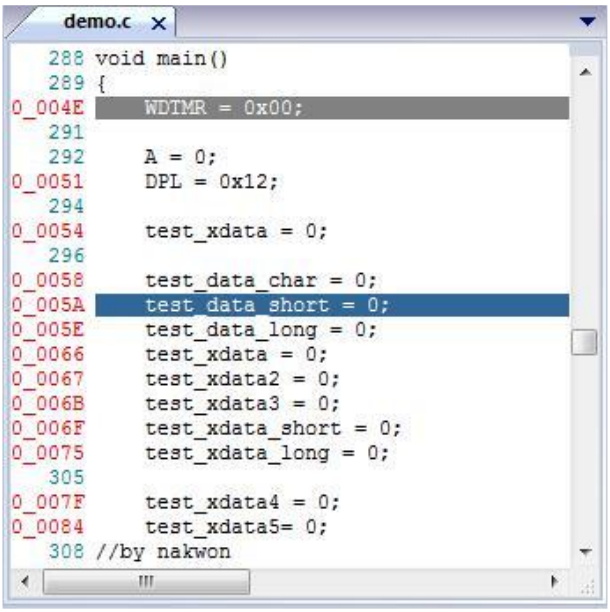


Figure 3-74 Source View Window

- If you double click the left mouse button on an address, the disassemble view is refreshed to show data in that address.
- Lines assigned a program counter break are highlighted in blue.
- Right-clicking opens a sub-menu shown below:

Figure 3-75 Sub Menu

The shortcut keys are T, N, and G.

1) Find Text (T)

: This finds your specified text in the file and colors the result.

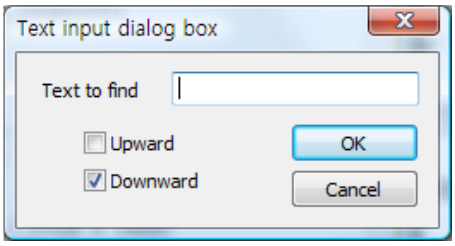


Figure 3-76 Find

2) The following example shows that all occurrences of the search text are colored in red:

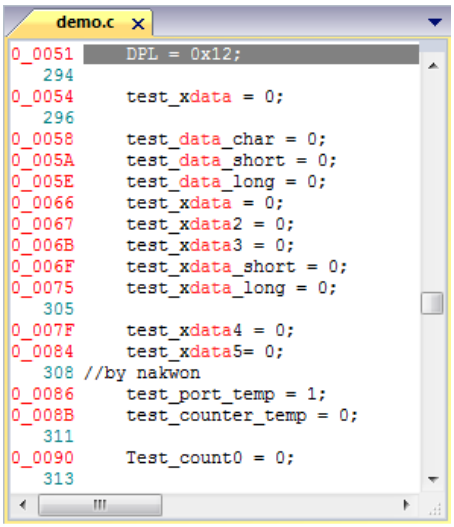


Figure 3-77 Searched Text

3) Find Next… (N)

: This finds the next occurrence of the search text downwards (or upwards). If the debugger could not find the text, it shows the following message box:

Figure 3-78 Message Box

4) Goto line # (G)

: This takes you to your desired line in the text file. Selecting this will prompt you to type in a decimal line number.

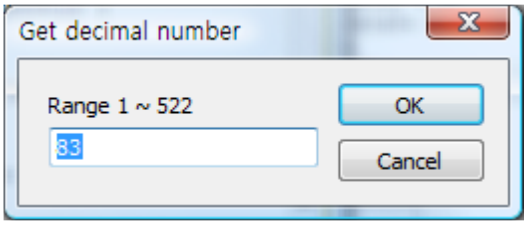


Figure 3-79 Get Decimal Number Dialog

3.4.10 Global Variable View

This view shows and allows editing global variables of the source code.

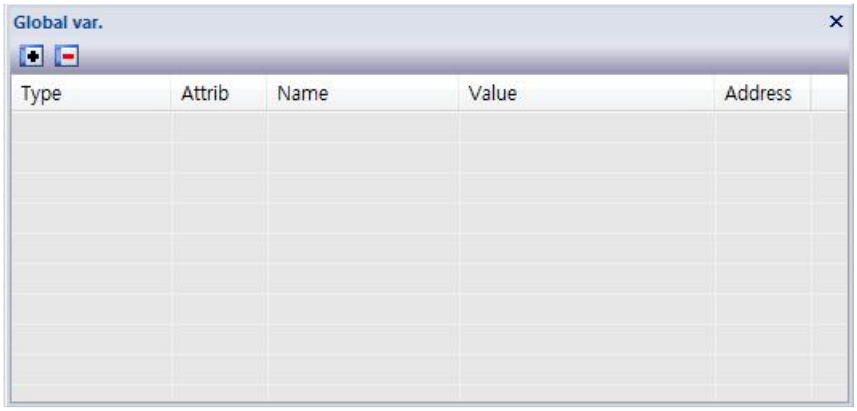


Figure 3-80 Global Variable View

1) Add global variable ( )

: Add global symbols to this view. This button is disabled when the symbol information is empty.

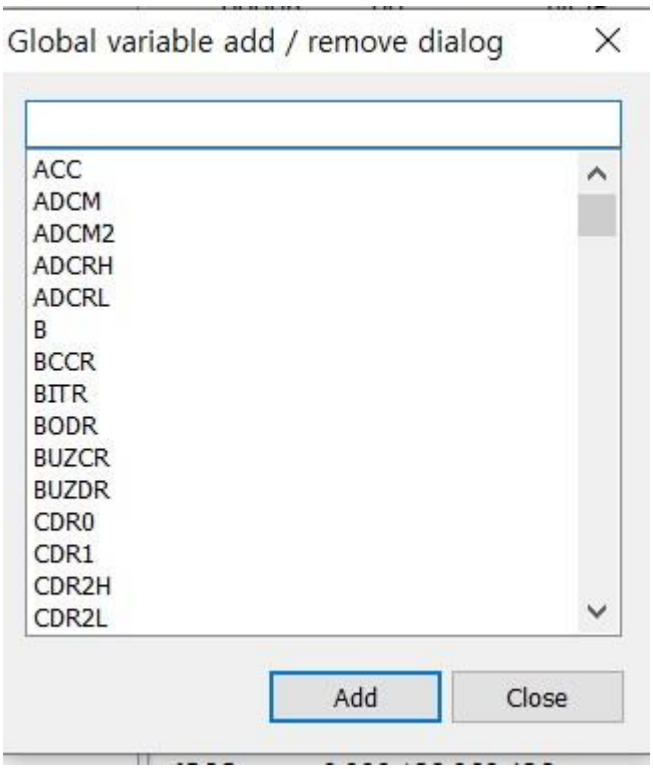


Figure 3-81 Global Variable Add Dialog

You can add a global symbol in one of the following ways:

- Double-click on the symbol name you want to add.
- Select the variable and click Add.
- Type in the symbol name and click Add.

2) Remove global variable ( )

: Remove global symbols from this view. This button is disabled when the symbol information is empty.

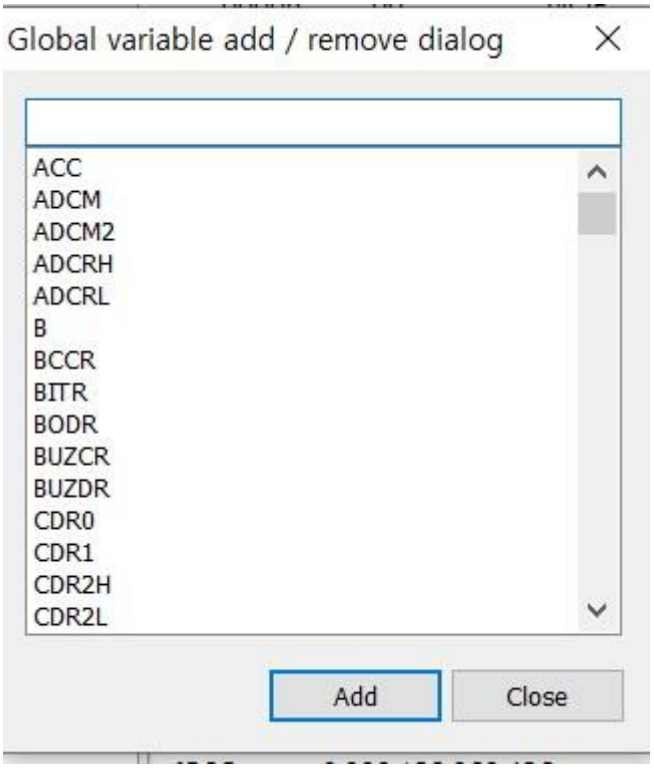


Figure 3-82 Global Variable Remove Dialog

You can remove a global symbol in one of the following ways:

- Double-click on the symbol name you want to remove.
- Select the variable and click Remove.
- Type in the symbol name and click the Remove.

3) Values

: In this view, values are displayed as hexadecimal, decimal, or binary numbers.

- Bit variables: 0 or 1
- 1-byte variables: Hexadecimal, decimal, or binary numbers
- 2- or 4-byte variables: Hexadecimal or decimal numbers
- Arrays/pointers/structures: 2-byte values. These are pointer values and not data.

Note: Array data is not supported: If you want to use array data, you will need to use a Keil plug-in.

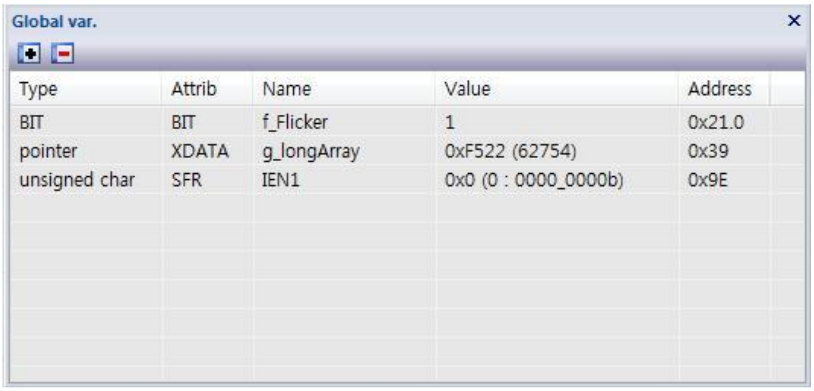


Figure 3-83 Global Variable View

4) Edit

: Double-click on the data area that you wish to edit, and the following dialog box will open.

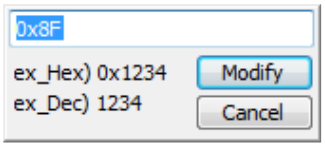


Figure 3-84 Edit Dialog

Available data formats include:

- Binary: Bit variable only. The input value is 0 or 1.
- Decimal: Decimal number (ex: 12345)
- Hexadecimal: Hexadecimal number (ex: 0x1234)

5) Set break

: This function is available only to OCD II devices. Double-click on data in the window to set or remove a data break. Double-clicking on an already set data break will pop up the dialog box shown below.

Once a data break is set, its address field is colored in blue. Refer to the Set data break section for details.

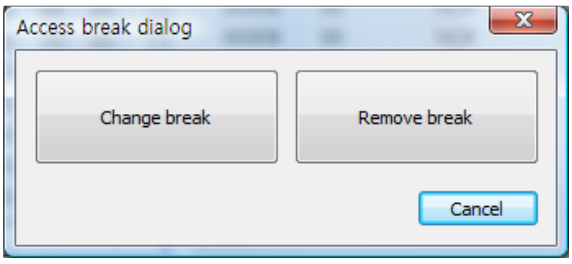


Figure 3-85 Access Break Dialog

6) Real time monitoring

: This function is available only to OCD II devices. In general, a developer cannot see the target device's internal data. But, the OCD II interface supports data monitoring even while the CPU is operating.

Real-time monitoring of global variables Is possible because global variables occupy fixed addresses. For the same reason, local variables cannot be monitored in real-time as they use stack or volatile addresses.

3.4.11 Local Variable View

This view shows and allows editing local variables of the source code.

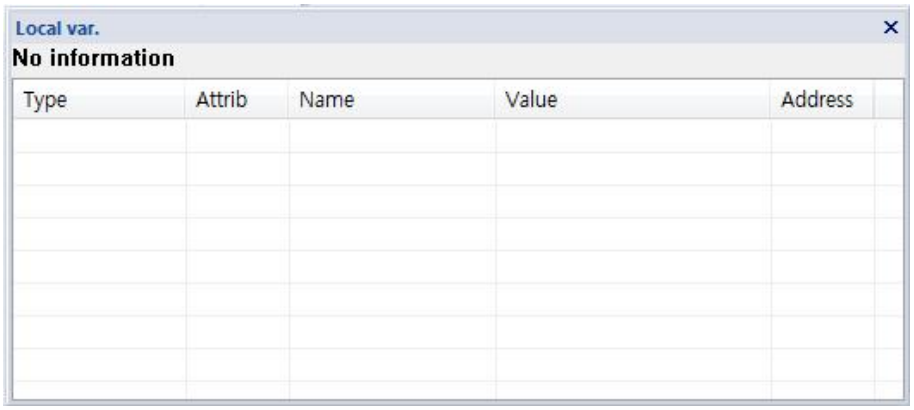


Figure 3-86 Local Variable View

1) Add/remove local variable

: Adding or removing local variables in this view is processed automatically by the debugger. If the program counter value is in a local function, the view shows the local function's name and its variables.

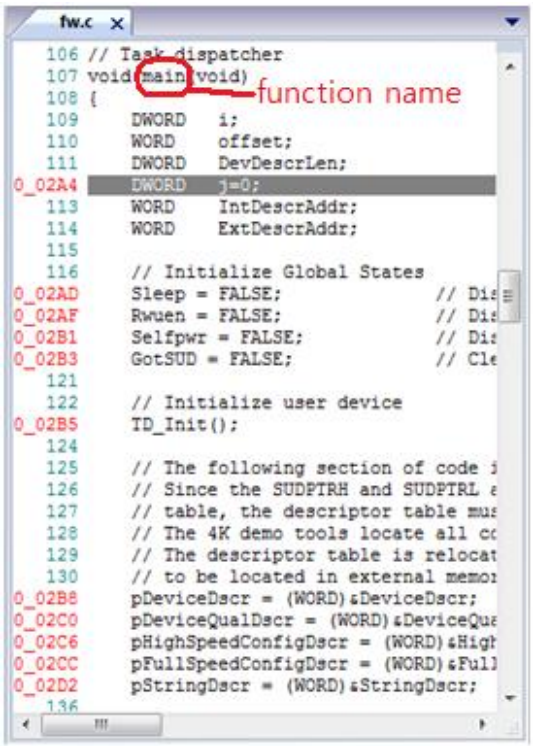


Figure 3-87 Example : Program counter is located at 0_02A4 of main (void)

The view, in this example, then shows function : MAIN and its local variables as shown below:

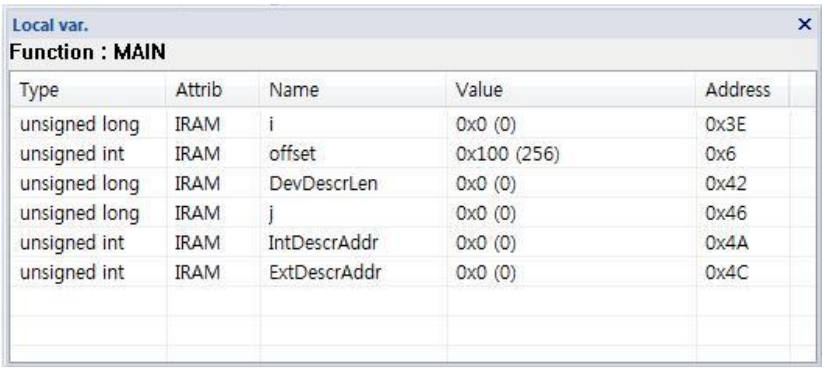


Figure 3-88 Example : Function main

2) Values

: In this view, values are displayed as hexadecimal, decimal, or binary numbers.

- Bit variables: 0 or 1
- 1-byte variables: Hexadecimal, decimal, or binary numbers
- 2- or 4-byte variables: Hexadecimal or decimal numbers
- Arrays/pointers/structures: 2-byte values. These are pointer values and not data.

Note: Array data is not supported: If you want to use array data, you will need to use a Keil plug-in.

3) Edit

: Double-click on the data area that you wish to edit, and the following dialog box will open.

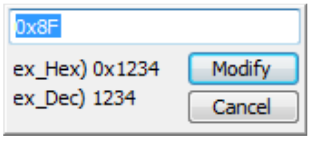


Figure 3-89 Edit Dialog

Available data formats include:

- Binary: Bit variable only. The input value is 0 or 1.
- Decimal: Decimal number (ex: 12345)
- Hexadecimal: Hexadecimal number (ex: 0x1234)

4 Keil Plug-in

4.1 Basic Features

Keil PK51 (Professional Developer kit) includes the µVision debugger.

The µVision Debugger from Keil supports simulation using only the user's PC or laptop, and debugging using the target system and a debugger interface. µVision includes traditional features such as simple and complex breakpoints, watch windows, and execution control as well as sophisticated features such as trace capture, execution profiler, code coverage, and logic analyzer.

Using the Keil plug-in, you can work with the ABOV E-OCD II interface on the µVision Debugger. The ABOV E-OCD II interface fully supports the Keil Vision IDE. ABOV's target driver is seamlessly integrated with the Keil debugger, allowing Keil C51 users to work in the Vision environment without switching between the Keil compiler and ABOV's external OCD software.

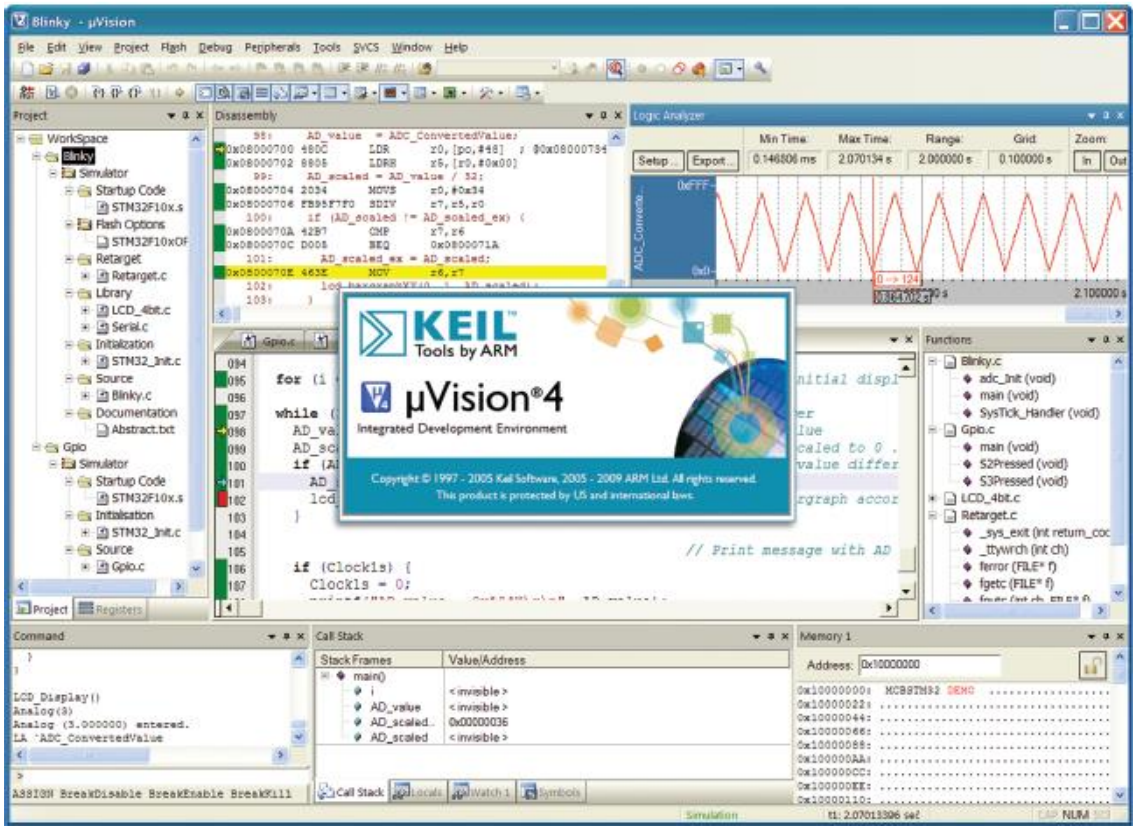


Figure 4-1 Example : µVision4 Program

4.1.1 Getting Started

The µVision Debugger provides two ways to debug your embedded applications:

1) Simulator
   : µVision provides everything you need to quickly develop high-fidelity simulations that help you test, debug, and prove the stability and quality of your software design. Before starting the µVision Debugger, select Use Simulator from Project Options>Debug Tab to simulate programs in the debugger.

2) Debugger
   : µVision provides several interfaces to target hardware debugging interface (such as ULINK and a variety of target monitors provided by Keil). Additional hardware drivers are provided by target debugger hardware providers (emulator companies). Before starting the µVision Debugger, select the target driver from the Project Options>Debug Tab to specify which target interface to use.

3) Starting µVision Debugger ( )
   : When you click the Start Debug Session button on the toolbar, µVision starts the debugger using the appropriate simulation or target debug driver.

4.1.2 User Guide

You can download the µVision manual from the Keil website.

4.2 Keil Plug-in Setup

Setting up the Keil plug-in is easy; however, each step must be followed carefully.

4.2.1 Bind PK51

ABOV provides the Keil plug-in together with its debugging software installer package. The only thing you need to do is editing the Keil PK51 configuration file.

1) The file is named Tools.ini and located in the Keil folder, for example, C:\Keil.

2) You have to modify it with your editor application.

3) Find the word 'TDRV' and add as follows. Add TDRV and its number, file path, etc.

```
[C51]
PATH="C:\Keil\C51\"
BOOK0=HLP\Release_Notes.htm("Release Notes",GEN)
BOOK1=HLP\C51TOOLS.chm("Complete User's Guide Selection",C)
TDRV0=BIN\MON51.DLL ("Keil Monitor-51 Driver")
TDRV1=BIN\ISD51.DLL ("Keil ISD51 In-System Debugger")
TDRV2=BIN\MON390.DLL ("MON390: Dallas Contiguous Mode")
TDRV3=BIN\LPC2EMP.DLL ("LPC900 EPM Emulator/Programmer")
TDRV4=BIN\UL2UPSD.DLL ("ST-uPSD ULINK Driver")
TDRV5=BIN\UL2XC800.DLL ("Infineon XC800 ULINK Driver")
TDRV6=BIN\MONADI.DLL ("ADI Monitor Driver")
TDRV7="C:\Program Files (x86)\ABOV Semiconductor\OCD II_
,→debugger64\ABOV_OCD.DLL" ("ABOV E-OCD II dongle")
TDRV8="C:\Program Files (x86)\ABOV Semiconductor\OCD II_
,→debugger64\ABOV_OCD_BANK.DLL" ("ABOV E-OCD II banked")
```

Note :

If you are not using code banking, use DLL '**ABOV E-OCD II dongle**.'

If you are using code banking, use DLL '**ABOV E-OCD II banked**.'

4.2.2 Add Flash Control to Your Project

Set your project options as shown in the following dialog box. Now, you can erase, read, or write the code to your target MCU.

If you are not using code banking, use 'ABOV E-OCD II Dongle.

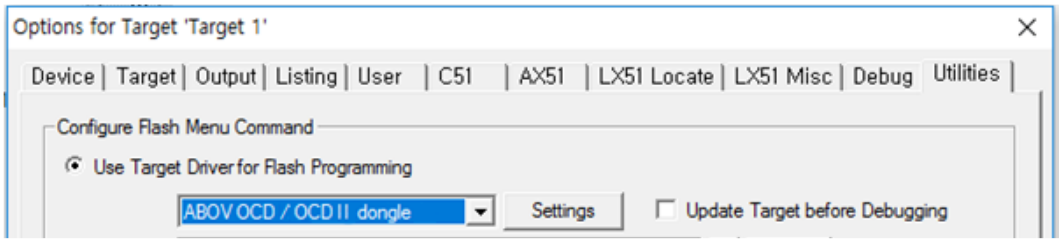


Figure 4-2 ABOV E-OCD II Dongle

If you are using code banking, use 'ABOV E-OCD II banked.

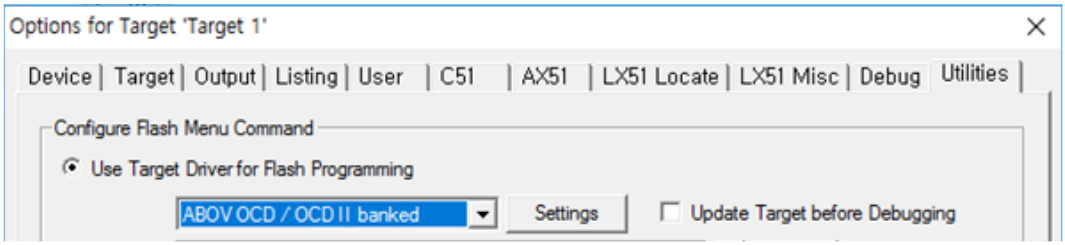


Figure 4-3 ABOV E-OCD II Banked

4.2.3 Add Debugger Control to Your Project

Set your project options as shown in the following dialog box. Now, you can emulate and debug your target MCU.

If you are not using code banking, use 'ABOV E-OCD II Dongle.'

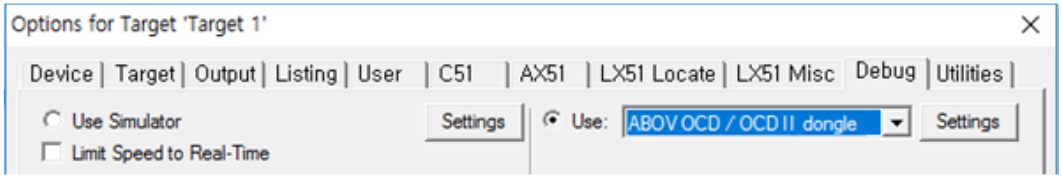


Figure 4-4 ABOV E-OCD II Dongle

If you are using code banking, use 'ABOV E-OCD II Banked.'

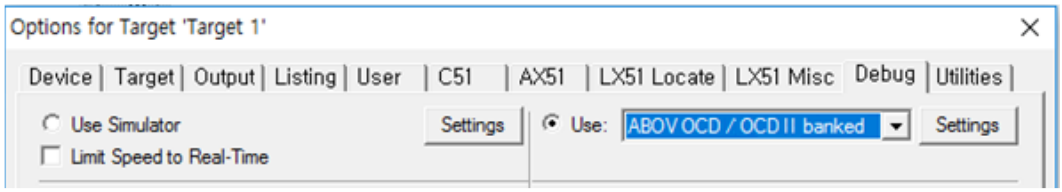


Figure 4-5 ABOV E-OCD II Banked

5 IAR 8051 GUI (Compiler and Debugger)

5.1 Basic Features

This user guide introduces a method to develop ABOV devices in the 8051 debugger of IAR (C-SPY) environment.

- How to connect and detect the OCD/ OCD II/ E-OCD II debugger.
- How to detect ABOV's 8051 device.
- How to debug ABOV's device.

This user guide describes restrictions under the 8051 debugger of IAR (C-SPY) environment.

- Compatibility according to IAR version
- Restrictions according to the number of Breakpoints that are built in ABOV's device.

5.2 USB Kernel Driver Installation

E-OCD II Debugger

- Since the built-in HID of Windows is used, additional driver doesn't need to be installed.
- Due to the use of the built-in HID, it can be used immediately after connecting to PC.

OCD/ OCD II debugger

- It requires an installation of Kernel Driver on a PC.
- While operating the OCD Debugger Setup Program that is provided by ABOV, necessary files are copied.
- You can refer to ABOV's OCD Debugger Manual for the information of the driver installation.
- You can check the HW connection through the Device Manager on your PC.

5.3 ABOV's SDK DLL Connections

1) SDK DLL

- SDK DLL is a Dynamic Link Library that is used for a development in the IAR Debugger (C-Spy) environment.
- SDK: Software Development Kit
- DLL: Dynamic Link Library
- IAR selectively provides basic DLL only for some companies such as TI, Infineon, and Segger.
- Products of other companies are connected by using Third Party Drivers.
- ABOV developed DLLs to support its debuggers and devices by using SDK sources of IAR.

2) SDK DLL compatibility between IAR versions

- It needs to remember that IAR SDK DLL is compatible according to IAR versions.
- Causes: Problem of IAR itself, compatibility problem
- When the version of IAR Embedded Workbench is 8.0, ABOV_OCD_IAR_1010.DLL must be used.
- When the version of IAR Embedded Workbench is 8.1, ABOV_OCD_IAR_1030.DLL must be used.
- ABOV is under development for DLL that is compatible with current version of IAR.
- It is expected that the DLL won't be compatible with new version of IAR.
- SDK DLL and IAR operate only when they are the same version.
- You should check whether the DLL operates when the version of the installed IAR becomes higher (or lower).

5.4 IAR Project Settings

5.4.1 IAR Project Settings

1) Select 'Options…', then select 'Debugger'.

2) Press 'OK' button to connect to 'the Third-Party Driver.'

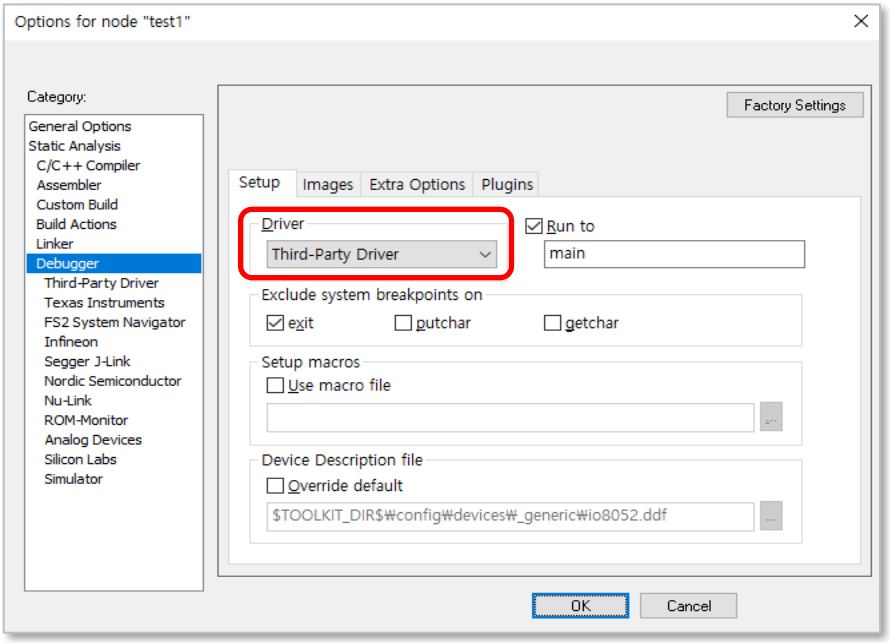


Figure 5-1 Debugger / Driver Setting

5.4.2 IAR Third-Party Driver Settings

1) Select 'Options…', then select 'Debugger'. Finally select 'Third-Party Driver.'

2) Press 'OK' button to connect to an SDK DLL file provided by ABOV (Check the IAR version for the compatibility of SDK DLL).

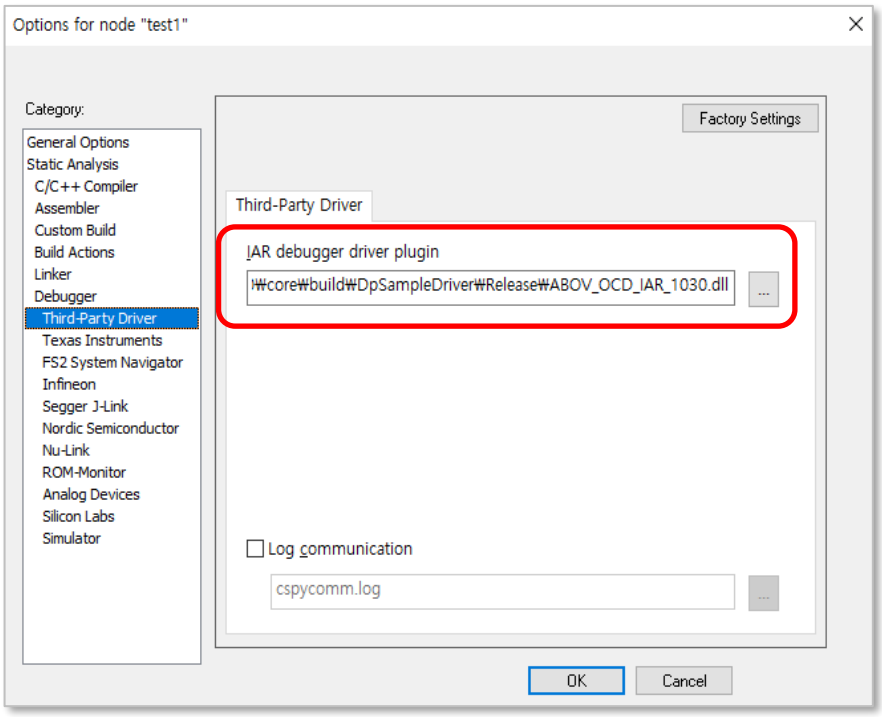


Figure 5-2 Third-Party Driver /Setting

5.5 Download Hex File

By pressing a debugging button ( ), you can proceed operations consecutively.

- Detect OCD/ OCD II/ E-OCD II debugger.
- For each debugger, select POR (Power-on Reset) for the series to which a target device belongs.

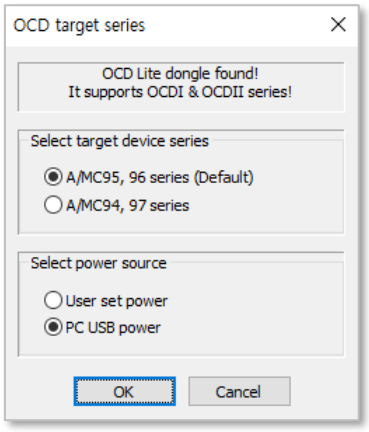


Figure 5-3 OCD Target Series

If the target is turned off, a message box is displayed as shown below:

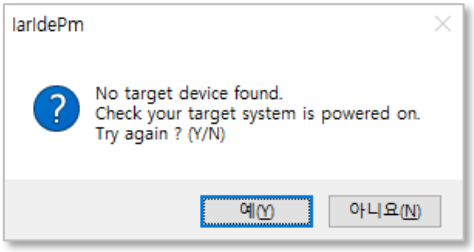


Figure 5-4 Message Box

If the target is turned on, but an unregistered product is detected, a message box is displayed as shown below:

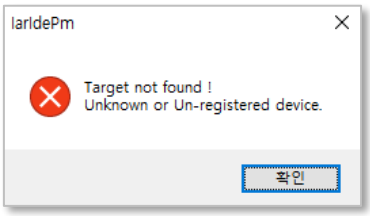


Figure 5-5 Message Box

When the target is detected normally, a Hex File is downloaded into the Flash of the target.

If a target device has options,

- After downloading a Hex file, the corresponding option dialog for the device is displayed.
- Example option dialog for MC96F8204 is shown below:
-

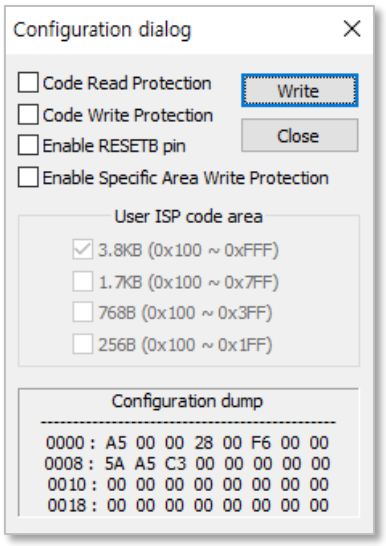


Figure 5-6 Configuration Dialog

5.6 Cautions for Debugging

Use the functions of IAR debugger without changes.

Remember only that the number of Breakpoints is limited.

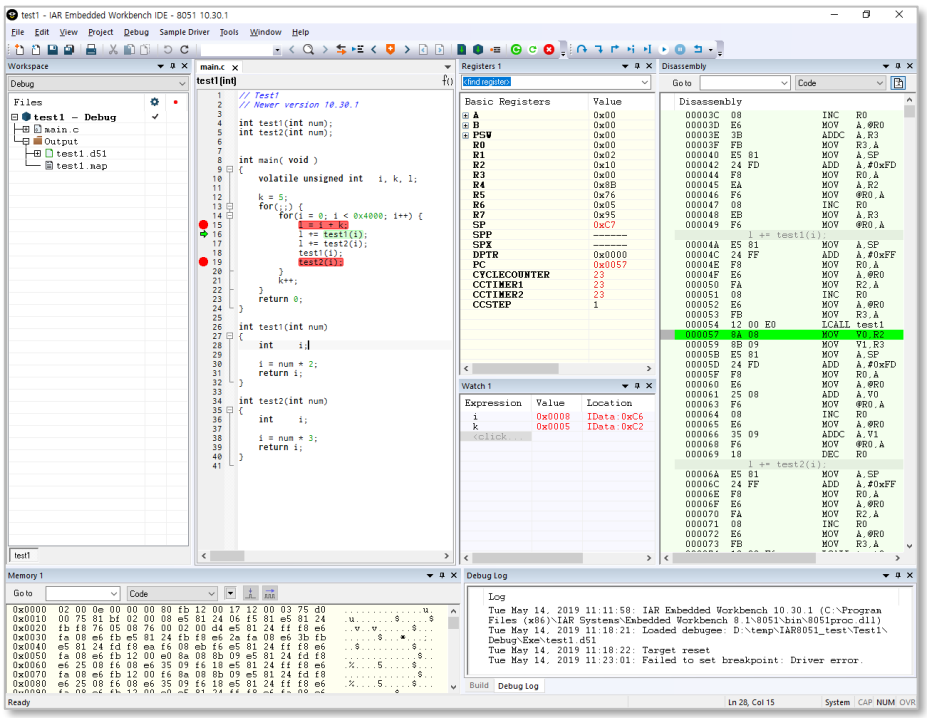


Figure 5-7 IAR Debugger

After downloading a Hex file, it displays the number limit of the Breakpoints.

1) ABOV's devices limit the number of built-in Breakpoints.

- The number of Breakpoints for each device is different.
- It displays the number of Breakpoints available for developers, except for Breakpoints used by IAR debugger.

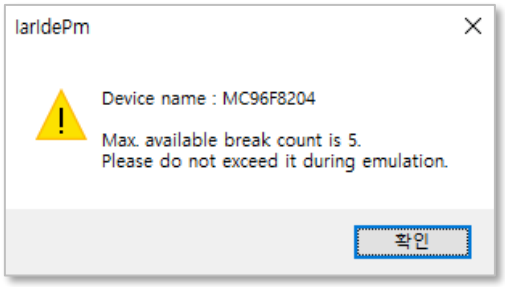


Figure 5-8 Message Box

2) It displays a warning message if a developer sets a larger number than the number of available Breakpoints on the device.

- Breakpoint settings made after the warning message are ignored.
- Only by reducing the set number of Breakpoints, you can set up with new number.

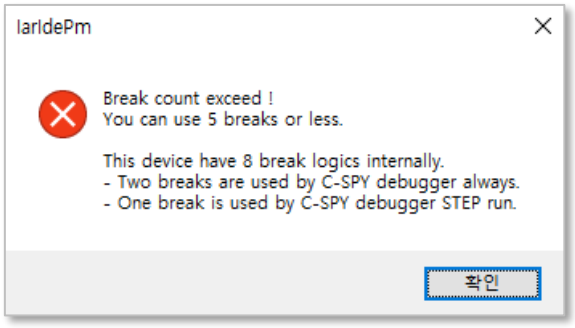


Figure 5-9 Message Box

5.7 SDK DLL Compatibility According to IAR Versions

Remember that SDK DLL compatibility is decided according to a version of IAR Embedded Workbench.

1) Some of SDK DLL are not compatible if their Embedded Workbenches have different versions.

2) As of 2019, ABOV supports the version 8.0 and 8.1 of Embedded Workbench.

3) Check the IAR version by following the procedure below:

   - Start the IAR.
   - Select 'Help', 'About', and 'Product Info …' in order from the menu.
   - You can check the two versions in a Product Info window as shown below:

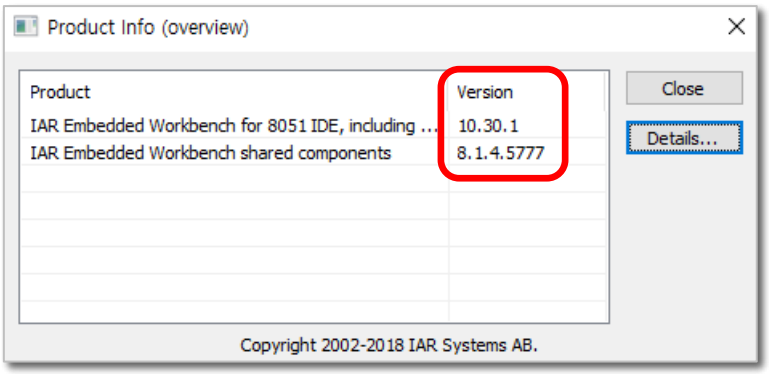


Figure 5-10 Version Check

6 Appendix: E-OCD II Isolator Interface

The E-OCD II isolator interface is designed to prevent power collision between the Host PC and target hardware:

- The operating voltage ranges between 2.8–5.5 V. This is slightly higher than the regular OCD/OCD II interfaces.
- The rest are the same as the OCD and OCD II interfaces.

Figure 6-1 E-OCD II Isolator

Caution : Be cautions when using a transformer-less target power supply

Revision history

Version	Date	Description
1.0.0	Jun. 28, 2019	Document created
1.0.1	Sep. 29, 2020	New Format Document created.
1.0.2	Oct. 20, 2020	Added contents of E-OCD II

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