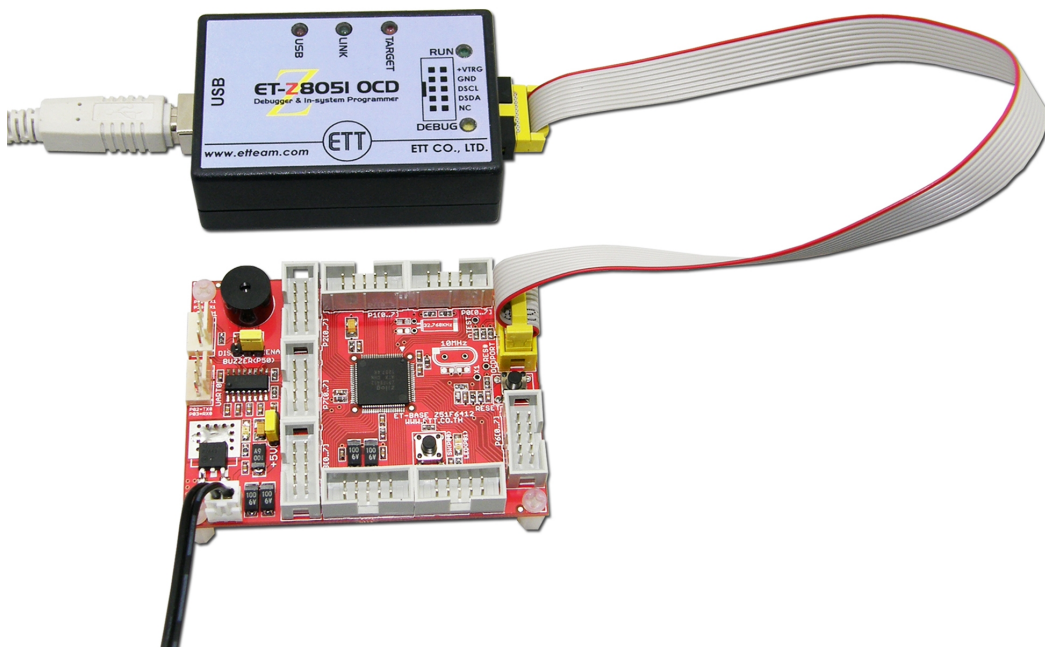


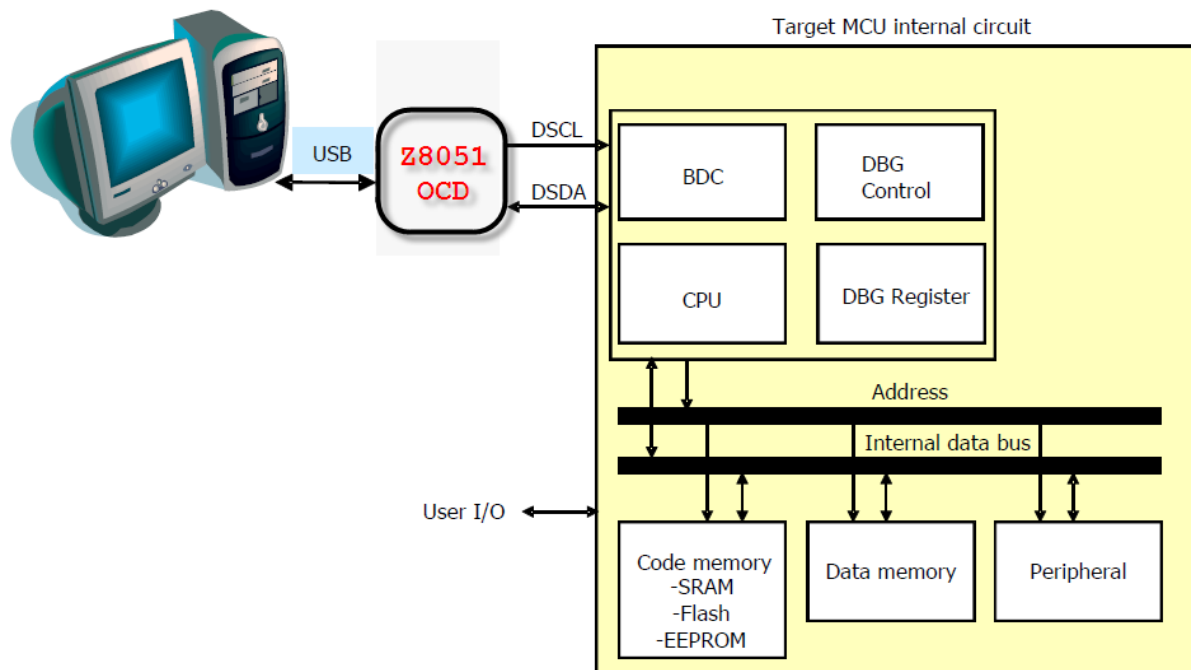
ET-Z8051 OCD



"ET-Z8051 OCD" is the device that is designed for developing Program MCU in a series of Z8051 from Zilog Inc; it is the intermediate between computer PC and Target Board that use MCU Z8051. In this case, user can command, check, test to see the value of Register or value of data in memory or value of variable of MCU while it is actually running. Function of this device can be both Debugger and In-System Programming (ISP).



ET-Z8051 OCD connects with computer PC through USB Port and it connects with Target Board of MCU through Connector IDE 10Pin by 10Pin Pair Cable. It is compatible with program that runs on computer PC; it supports the Operating System of Windows XP, Windows Vista 32Bit/64Bit and Window-7 32Bit/64Bit.



Specifications

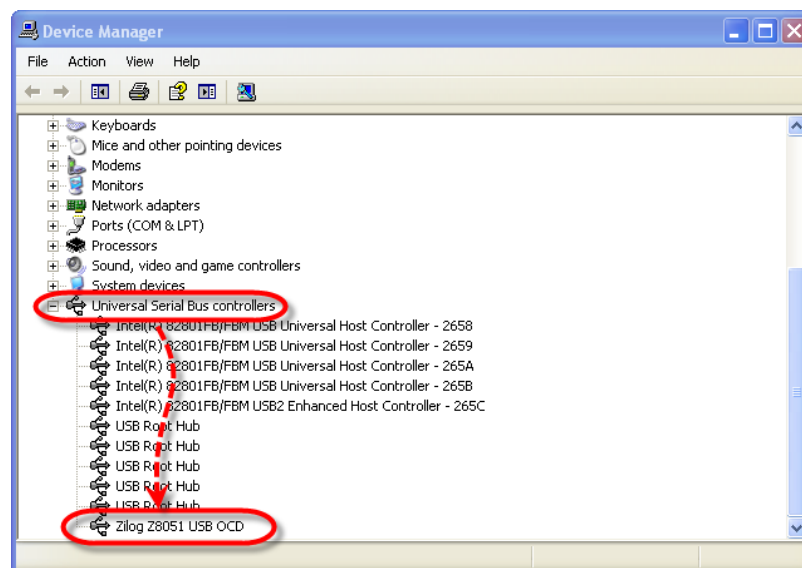
- Support the application with MCU Z8051 of Zilog Inc.
- Support File HEX and map/symbol File
- Debug by displaying value as variable in the program
- Access Code in MCU
- Support application of In-System Programming (ISP)
- Display Code and Disassembler
- Set value of PC (Program Counter) and Break Point
- Display and edit value of variable, memory, and Registers
- Display Code and value in Memory XDATA
- Auto Detect MCU number and automatically adjust Parameters by self
- Support application with MCU throughout the standard voltage level (2V-5.5V)
- Support applications with MCU that are both Internal Clock and External Crystal Clock
- Run, Step, Auto Step, Break, ...

How to connect MCU with ET-Z8051 OCD in Debug Mode

This operation mode is suitable for application in the process of developing program because user can command MCU as required; it controls, tests, stops, including checks and adjusts Registers while MCU is actually running. So, user does not erase and program MCU frequently. This operation mode is compatible with Program '**Zilog Z8051 OCD**'; nowadays (August, 2012), this program is updated to '**Zilog Z8051 OCD Version1.147**'. This is brief procedures for using program as follows;

1. Install Program "**Zilog Z8051 OCD**" completely, and Run File name "**Z8051_1.1.exe**".
2. Interface Cable USB of ET-Z8051 OCD with computer PC and install Driver of the device completely; user does this process only one time. ET-Z8051 OCD of ETT uses the Driver as same as Zilog Z8051 OCD of Zilog Inc.; normally, this Driver is installed with Program called "**Z8051_1.1.exe**" in step No.1. If user installs the Program according to the Default value, this Driver is in the Location "**\\device drivers\\OCD USB**" under Directory of the program installation. Nowadays, the Driver can support the application with the Operating System of Windows for computer that is both 32Bit and 64Bit as follows;
 - a. **32Bit:** "C:\\Program Files\\Zilog\\Z8051_1.1\\device drivers\\OCD USB\\x32"
 - b. **64Bit:** "C:\\Program Files\\Zilog\\Z8051_1.1\\device drivers\\OCD USB\\x64"

If everything is correct, red LED USB on ET-Z8051 OCD is lit up (ON); when enter **Device Manager**, it found USB Device in **Tab Universal Serial USB Controller** called "**Zilog Z8051 USB OCD**" as shown in the example below;

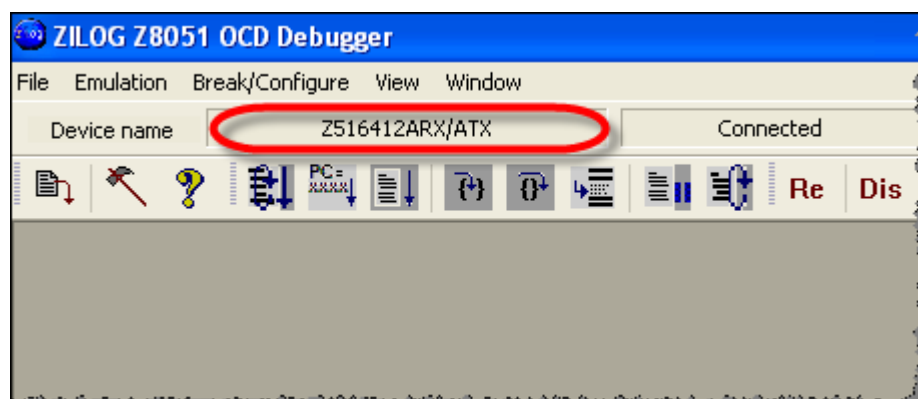
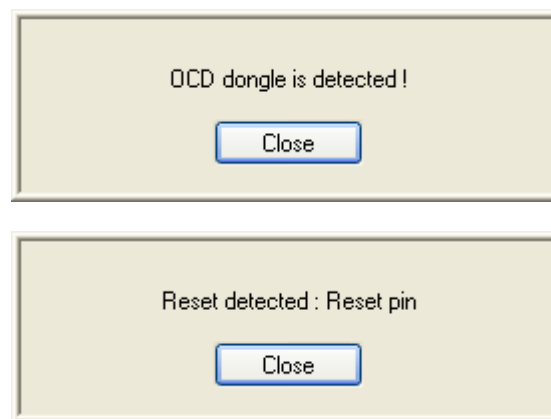


3. Run Program "**Zilog Z8051 OCD V1.147**". When the Program first starts running, it shows message Dialog to notify user to know that it found the Z8051 OCD Device completely as shown in the example below. Moreover, green LED LINK on OCD Device of ET-

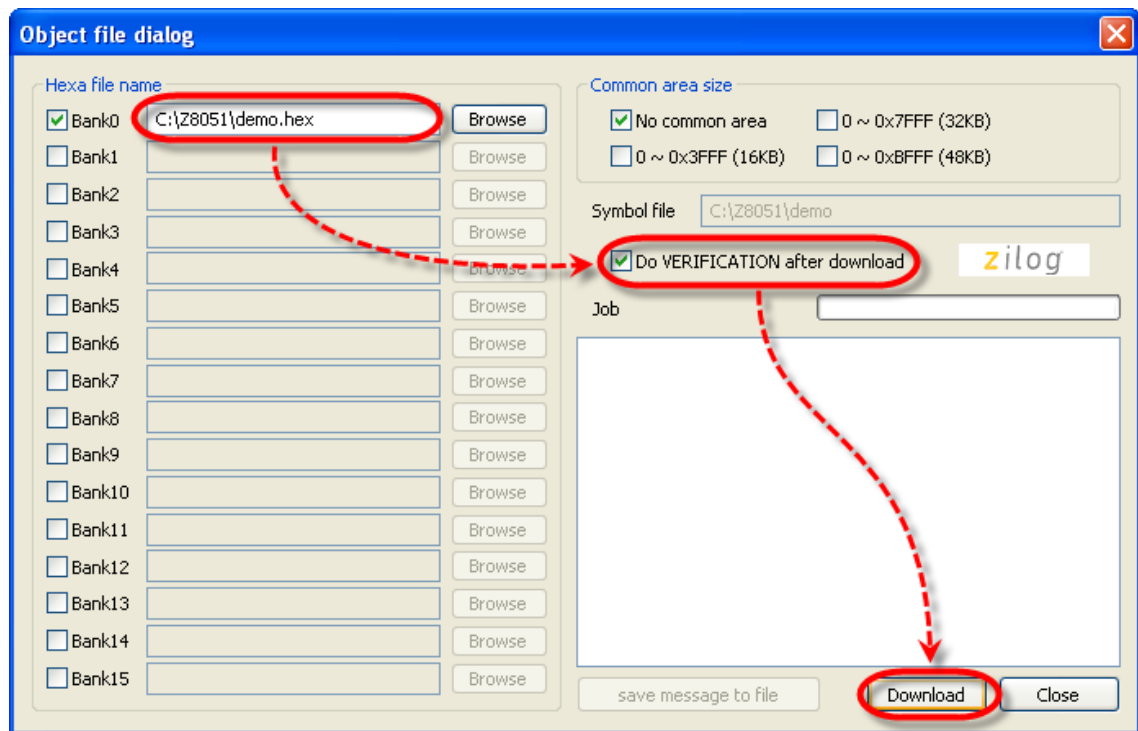
Z8051 OCD is lit up (ON), it means that the OCD Device is ready to run.



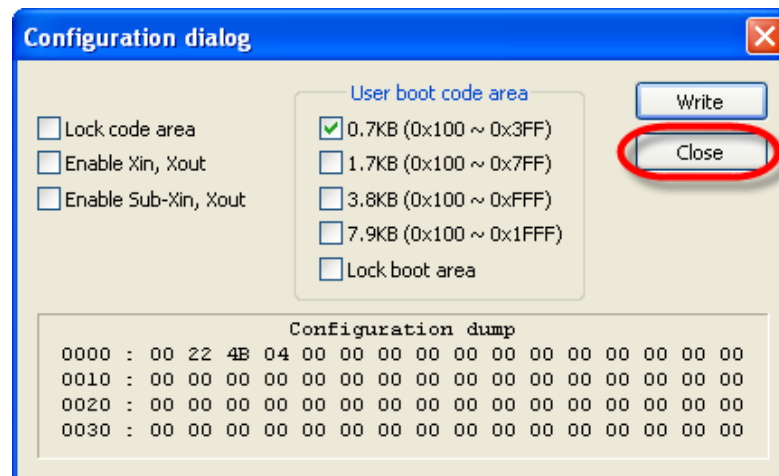
4. If it has already provided Power Supply for Board ET-BASE Z51F6412, it should remove Cable Power Supply of Board ET-BASE Z51F6412 from board first. Next, it should interface 10Pin Pair Cable between ET-Z8051 OCD with yellow Connector IDE 10Pin (PORT-OCD) of Board ET-BASE Z51F6412 completely; and finally, it provides Power Supply into Board ET-BASE Z51F6412. If everything is correct, all 3 LEDs of ET-Z8051 OCD are lit up (ON) that are USB LINK and TARGET; moreover, 2 message Dialogs appear on the screen of program respectively, including the number "**Z516412ARX/ATX**" in the box of **Device name** as shown in the example below;



5. Now, it shows that the connection between MCU on Board ET-BASE Z51F6412 and OCD Device of ET-Z8051 OCD is correct; and now user can command Program Zilog Z8051 OCD to run as required. Next, it has to choose the Program HEX File to download into MCU on board; click Menu **File** → **Load HEX**, specifying the preferable file name, and finally, click **Download** as shown in the example;

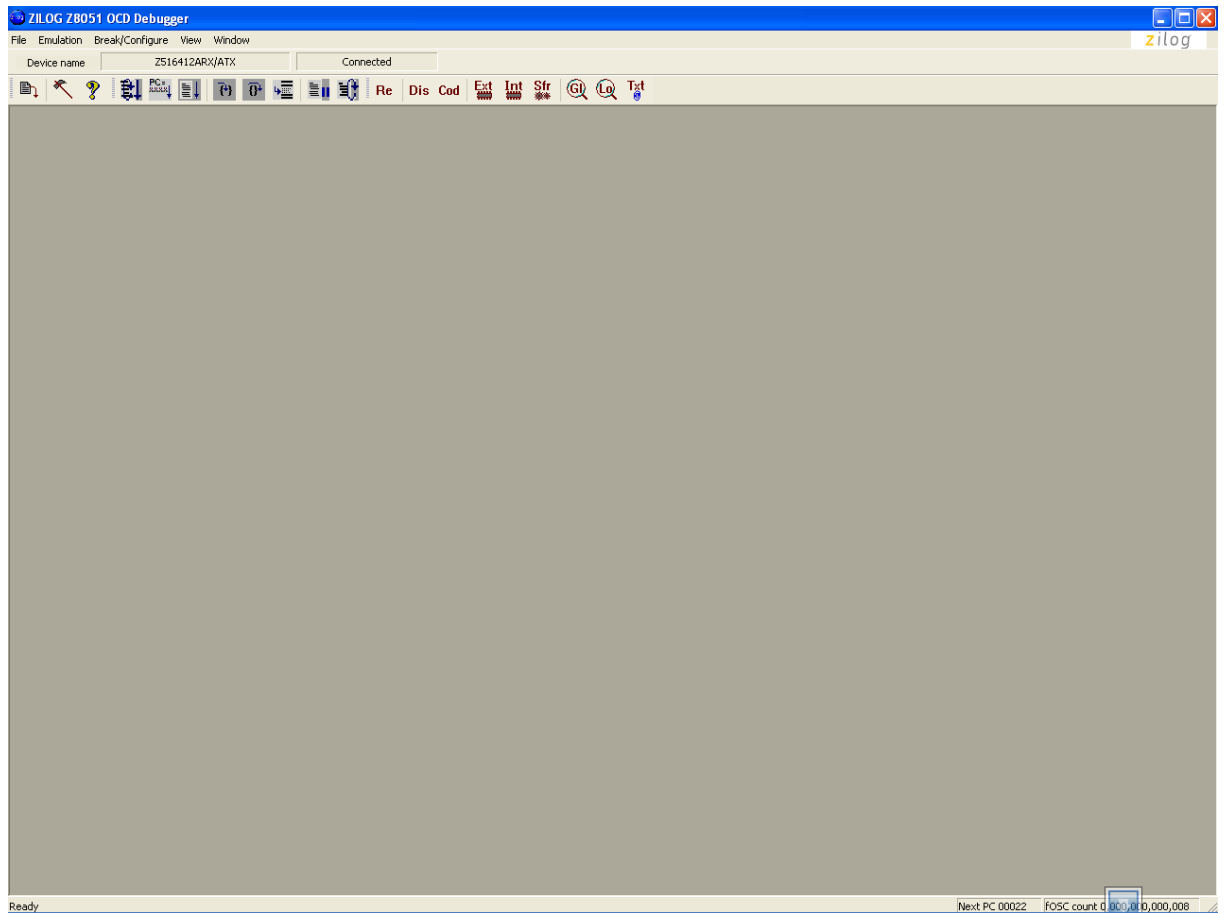


In the part of **Configuration**, user can click **Close** instantly if user does not edit or change any value of this **Configuration**; but, if user edits or changes any value of this **Configuration**, user has to choose **Write** after user has setup the preferable value completely. In this case, click **Chose** because it sets this **Configuration** according to the Default value from factory as shown in the example below;



- After downloaded HEX File into MCU completely, user can command MCU to run as desired instantly; in this case, it may run (GO) to see the actual operational results, or it may set position to stop (BREAK), or it may run command by command (STEP) to check if the operational result of program is correct according to the designed program. At first the program displays the

blank screen of program because user has not set any value for displaying result of program yet as shown in the picture below;



User can setup values for screen of program to show values of Code Program or Variable and Registers of MCU as required. User can adjust the screen size of parts suitably; click Menu **View**, choose the preferable thing that user requires displaying, or choose the preferable menu symbol in the part of **Window Open Bar** as shown in the example below;



How to Display Command Code



If user requires displaying Code Command of program, click Menu **View → Text file**, choose the preferable File Source Code to see the value; in this case, it chooses **main.c**. The program shows line of the Code Command and Address position of command that is from compiling command as shown in the example below;

```

main.c
Goto line Find Up Down
7 #define LED_OFF() LED_PORT_DATA &= ~(LED_PIN)
8 #define LED_ON() LED_PORT_DATA |= (LED_PIN)
9 #define LED_TOGGLE() LED_PORT_DATA ^= (LED_PIN)
10
11 void delay(unsigned int i)
12 {
0_0022 while(i > 0) {i--;}
14 return;
0_0032 }
16
17 void main(void)
18 {
0_0003 PLLCR = 0x00;
0_0006 SCCR = 0x24;
0_0009 LED_PORT_INIT();
22
23 while(1)
24 {
0_000C LED_OFF();
0_000F delay(20000);
0_0016 LED_ON();
0_0019 delay(20000);
0_0020 }
30 }
31

```

How to display value of Register and SFR Register



If user requires displaying the value of Special Function Register, click Menu **View → SFR dump**; the program shows window that displays value of SFR Register with value in Registers as shown in the example below;

Pattern	Refresh	Save	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0080			08	07	00	00	00	00	D1	00	00	00	24	85	8C	00	00	FF
0090			01	00	00	00	00	00	00	00	00	00	8F	01	E0	00	00	00
00A0			80	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00B0			01	00	00	00	00	00	00	00	00	00	00	00	00	00	FF	FF
00C0			0C	00	00	00	00	00	00	FF	FF	00	00	00	00	00	FF	FF
00D0			00	00	00	00	00	00	00	00	00	00	00	00	3F	3F	01	FF
00E0			00	00	00	00	00	00	80	FF	00	00	00	00	80	00	00	01
00F0			00	00	00	00	00	00	00	03	02	00	00	00	00	00	80	FF

How to display value of Internal RAM



If user requires displaying value of Internal RAM, click Menu **View** → **IRAM dump**; the program shows window that displays value of Internal RAM with value in the memory as shown in the example below;

IRAM : 000

Pattern

Save

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	00	00	00	00	00	00	4E	1F	16	00	00	00	00	00	00	00
0010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0080	A1	DB	92	5B	ED	35	B9	09	52	87	E8	C7	AC	F2	57	E1
0090	C8	13	75	71	DA	49	5D	47	3B	94	65	78	62	36	49	6C
00A0	50	1A	6E	1C	00	F4	4C	B1	9C	0A	64	72	FD	BD	31	98
00B0	29	51	B6	B3	0F	12	54	41	8A	8A	94	88	09	52	62	CB
00C0	F8	FC	3F	94	A5	EF	CF	D8	72	C8	91	82	8A	32	CC	B6
00D0	92	AD	94	86	2C	F2	EC	54	D7	9F	79	33	00	1D	D2	3E
00E0	44	FC	A4	31	D2	40	B7	E2	D6	CA	82	8C	97	2D	EC	D4
00F0	E3	22	E8	43	99	7F	BA	D8	55	7D	09	C9	D5	85	3D	D1

How to display value of External RAM(XRAM)



If user requires displaying value of Internal RAM, click Menu **View** → **XDATA dump**; the program shows window that displaying value of XRAM with value in the memory as shown in the example below;

XDATA 0_0000 (-) Page CS 80A6

Bank #00

Goto

Pattern

Load

Save

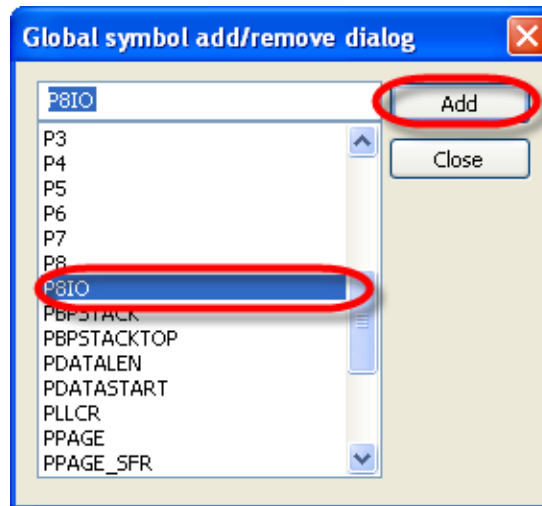
Fill

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0_0000	53	A8	61	D1	48	3E	7F	F6	72	B5	95	5E	0D	9E	17	03
0_0010	4A	15	BA	85	B0	67	9B	62	58	FD	2A	F6	EA	E5	2D	E2
0_0020	90	68	5C	A9	82	7F	48	4D	C0	B5	1D	75	B9	E6	95	DF
0_0030	94	27	2F	EA	81	72	BA	3E	FD	FF	A1	43	A4	7C	51	0E
0_0040	66	AB	0A	36	83	7C	19	1C	57	A4	F4	0F	BE	C2	56	28
0_0050	58	42	D4	A0	B2	10	D0	24	5A	84	BD	65	30	70	62	55
0_0060	21	41	7D	2D	F6	54	35	2C	2D	CE	29	44	EC	83	1A	89
0_0070	FA	8D	72	AA	6B	17	A6	D4	0D	77	66	09	31	D6	AE	36
0_0080	FA	6E	7A	95	6F	A2	74	15	7B	CE	A1	DE	F2	F3	15	C6
0_0090	6C	DC	8B	CC	93	DC	29	92	14	7F	9C	EF	BC	06	28	7E
0_00A0	B8	5B	4B	B4	C1	2E	F1	B7	92	FD	92	4F	94	AF	29	FE
0_00B0	8C	EA	C6	8D	A4	89	A6	CA	85	6D	D1	82	94	70	A4	0B
0_00C0	91	30	CF	BC	4F	E0	F0	99	3C	C9	18	A5	EA	1B	16	FE
0_00D0	8A	7F	64	19	7A	C5	C5	4A	F7	76	8C	39	D0	E8	ED	92
0_00E0	E0	17	03	55	0E	59	24	46	32	05	F8	15	45	DC	57	DE
0_00F0	04	D0	B3	CA	2E	35	11	63	13	CE	B8	4A	91	DC	A8	C6

How to display value of Variable Global



If user requires displaying value of Variable Global; click Menu **View** → **Watch Global**, choose Tab **Add Symbol**, and choose the preferable variable name or Register that user requires checking the value, and finally click **Add**. If user requires disabling the display of any Register, user only clicks Remove symbol to cancel as shown in the example below;

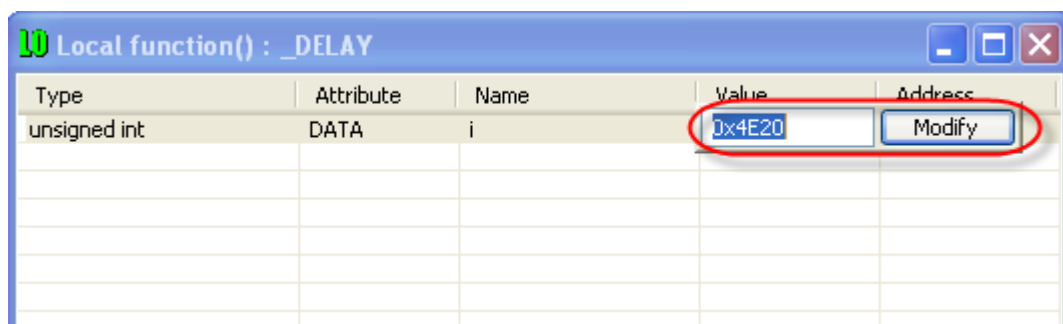
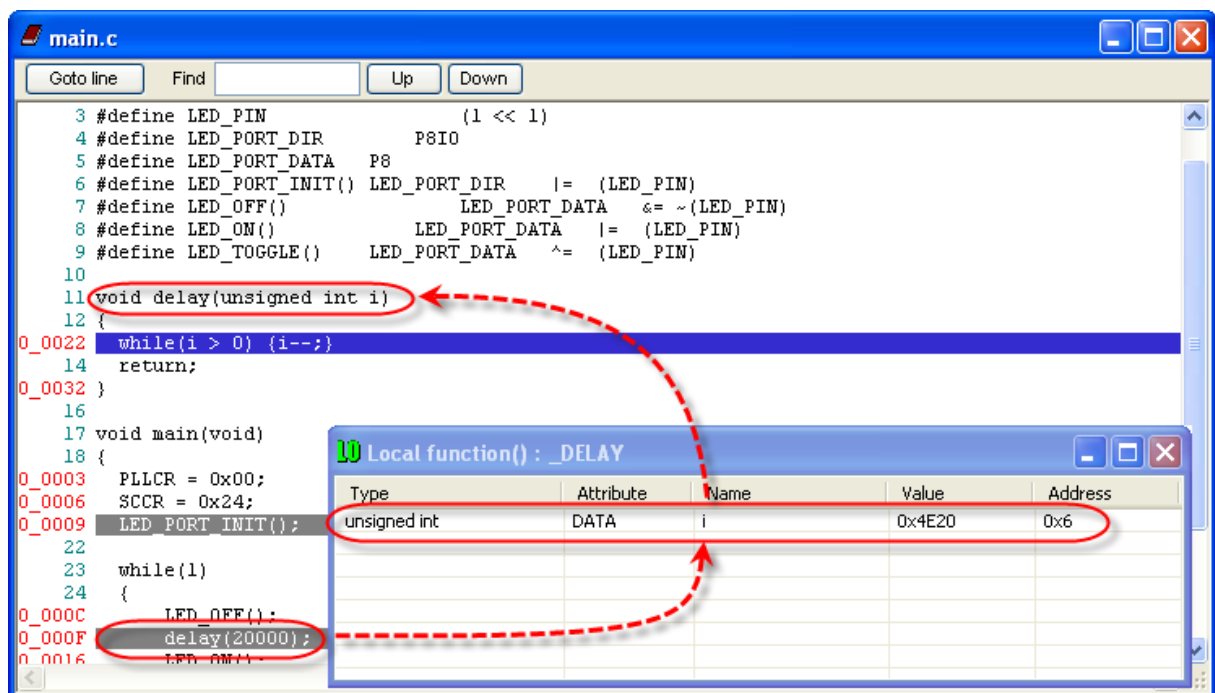


GL Global variables				
Add symbol		Remove symbol		
Type	Attribute	Name	Value	Address
unsigned char	DATA	SCCR	0x24	0x8A
unsigned char	DATA	PLLCR	0x0	0xD9
unsigned char	DATA	P8IO	0x2	0xD1
unsigned char	DATA	P8	0x0	0xD8

How to display value of Variable Local



If user requires displaying value of Variable Local; click Menu **View** → **Watch Local**, the program displays window to display the Variable Local that is used in the program. In this case, it displays variable type, variable name, memory location that is used to create variable, and value in the variable to notify user to know; these variables show the value to user to know when the program runs and reaches the Command Line that has already been passed the value to the variable only. For example, when it calls Function Time Delay, it passes variable to the variable `i` that is announced as unsigned int and it shows details of this variable to user. User can stop or edit any value for the variable to test the operation of this variable. For example, user tries to adjust any value for the variable `i` to test the suitable value for Time Delay; in this case, click the box of Value to edit the value as required, and finally click **Modify** as shown in the example below;



How to set Break Position

It sets Break position to stop the operation of program in the Command line that user requires considering if the value of Register and Variables is correct when MCU runs and reaches the identified Line Command. In this case, user can set the Break position from the window Text File that shows the value of Source Code. If user requires setting Break position at any Command Line, user can click that line instantly; but, if user requires cancelling, it only clicks the old position. If user has commanded to show value of Code disassembler, the colored tab also appeared on the Window Code Disable to show the Command Line of Assembler Language; it is the same Address position as the identified Command Line of Break as shown in the example below;

```

main.c
Goto line Find Up Down

7 #define LED_OFF()          LED_PORT_DATA  &= ~(LED_PIN)
8 #define LED_ON()           LED_PORT_DATA  |= (LED_PIN)
9 #define LED_TOGGLE()       LED_PORT_DATA  ^= (LED_PIN)
10
11 void delay(unsigned int i)
12 {
0_0022 while(i > 0) {i--;}
14 return;
0_0032 }
16
17 void main(void)
18 {
0_0003 PLLCR = 0x00;
0_0006 SCCR = 0x24;
0_0009 LED_PORT_INIT();
22
23 while(1)
24 {
0_000C LED_OFF();
0_000F delay(20000);
0_0016 LED_ON();
0_0019 delay(20000);
0_0020 }
30 }
31
  
```



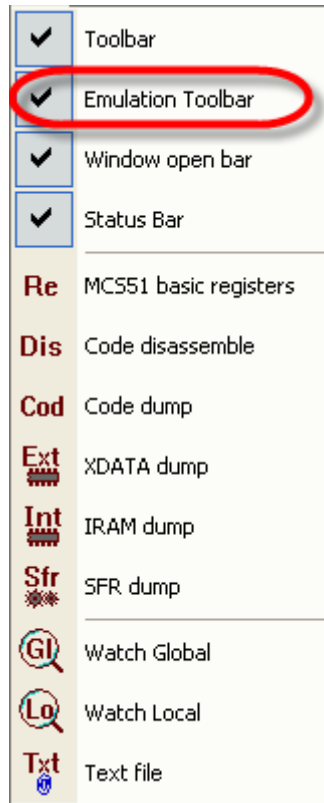
```

Code disassembler
Bank # 00 Goto PC 00000 Change

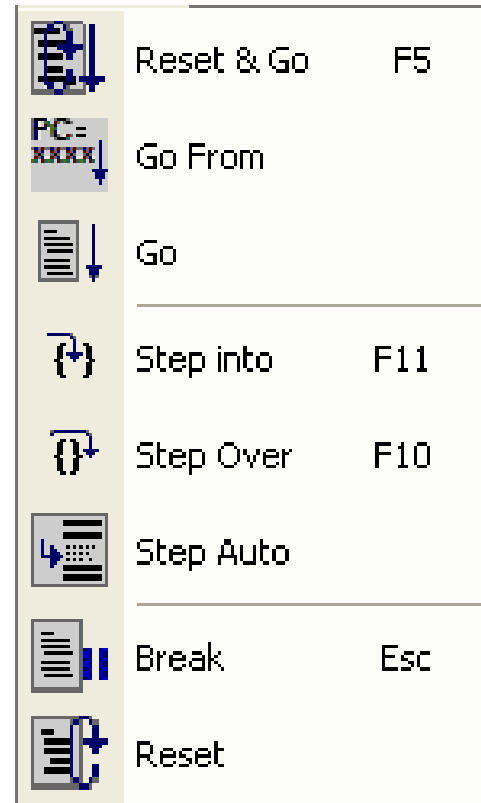
0_0006 758A24 MOV 08A, #024
0_0009 43D102 ORL 0D1, #002
0_000C 53D8FD ANL 0D8, #0FD
0_000F 7F20 MOV R7, #020
0_0011 7E4E MOV R6, #04E
0_0013 120022 LCALL 00022
0_0016 43D802 ORL 0D8, #002
0_0019 7F20 MOV R7, #020
0_001B 7E4E MOV R6, #04E
0_001D 120022 LCALL 00022
0_0020 80EA SJMP 0000C
0_0022 D3 SETB C
0_0023 EF MOV A, R7
0_0024 9400 SUBB A, #000
0_0026 EE MOV A, R6
0_0027 9400 SUBB A, #000
0_0029 4007 JC 00032
0_002B EF MOV A, R7
0_002C 1F DEC R7
0_002D 70F3 JNZ 00022
0_002F 1E DEC R6
0_0030 80F0 SJMP 00022
0_0032 22 RET
  
```

How to program

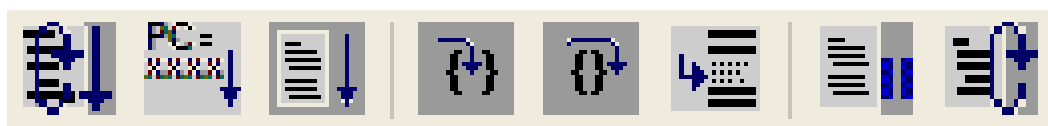
If user requires commanding Program Z8051 OCD, click Menu **Emulation** and choose the preferable tab command, or user can choose Menu Symbol of Emulation Toolbar directly. In this case, user has to command to display result of Emulation Toolbar in Menu **View** as shown in the example below;



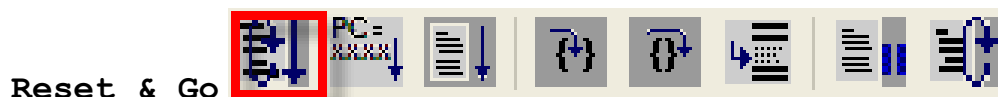
Emulation Toolbar in Menu View



Menu Command in Emulation

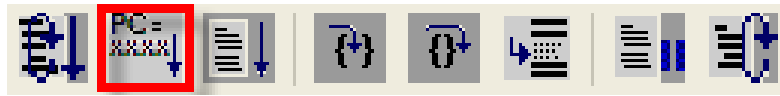


Emulation Toolbar



Reset & Go

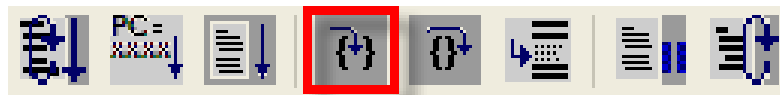
This command is used to Reset and Run by actual speed. Program resets the operation of MCU and it commands MCU to restart at Address position 0x0000.

Go Form

This command is used to run by the actual speed, but user can set any initial Address position of program to run as preferred.

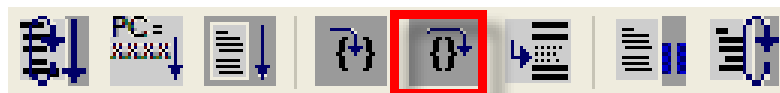
Go

This command is used to run by the actual speed, the Program starts running after the Address position that is currently pointed by PC.

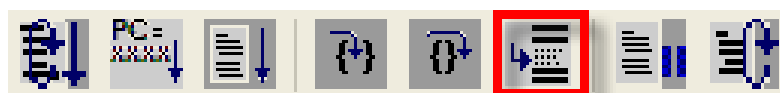
Step into

This command is used to run program command by command to check the operation of program elaborately. When MCU runs completely according to each command, it stops running instantly in order to check the operational result; in this case, it shows the operational result through Hardware and Software. In the part of Hardware, it occurs because of the change in the actual situation; and, in the part of Software, it also occurs because of the change in Register and memory.

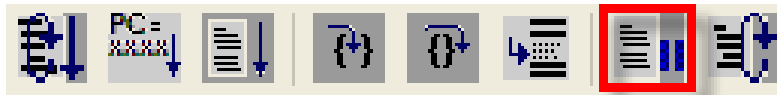
This Command is suitable for checking perfection of running sub-program or sub-function of the written program, it tests program separately.

Step Over

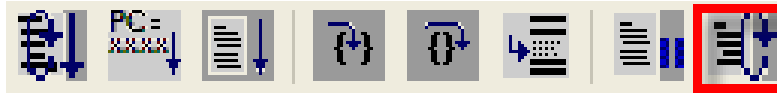
This Command is used to run program command by command; it tests the operation of Main Program to check if the cycle of program is correct. It is suitable for checking the operational result of Program Main after tested the operation of each sub-function completely.

Step Auto

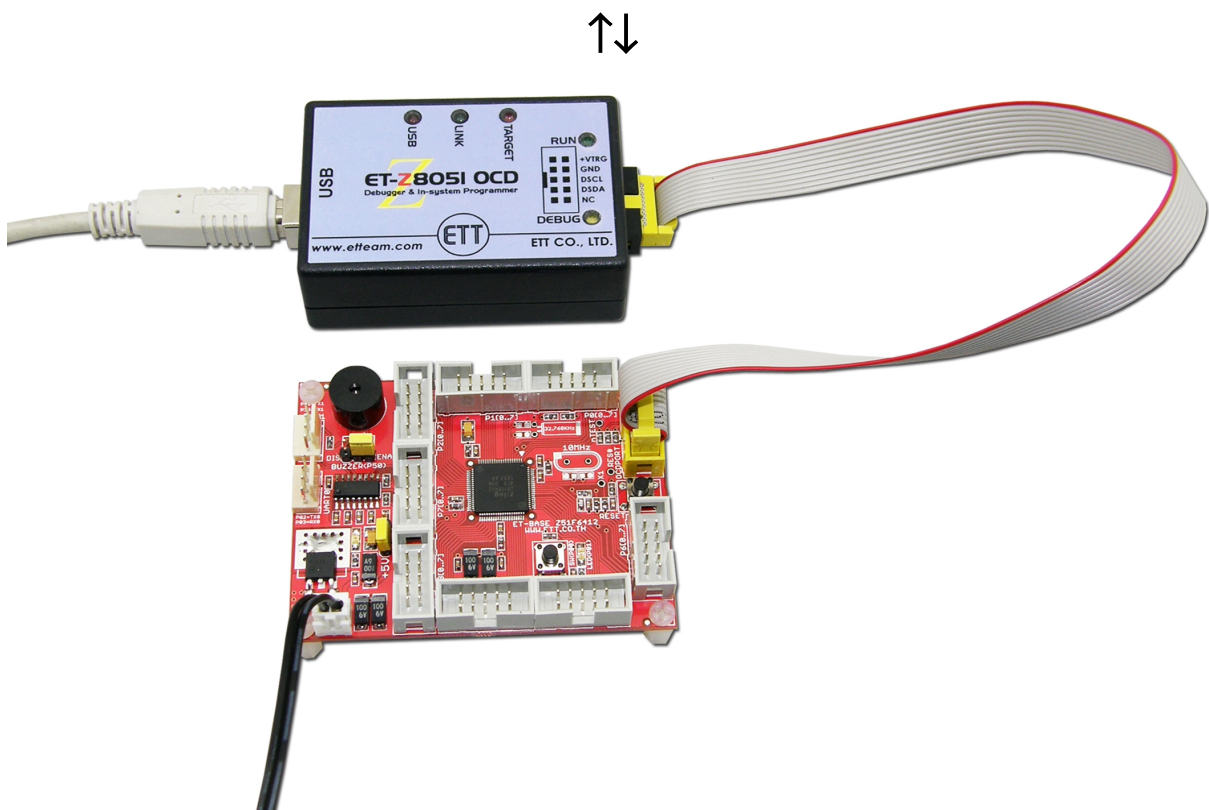
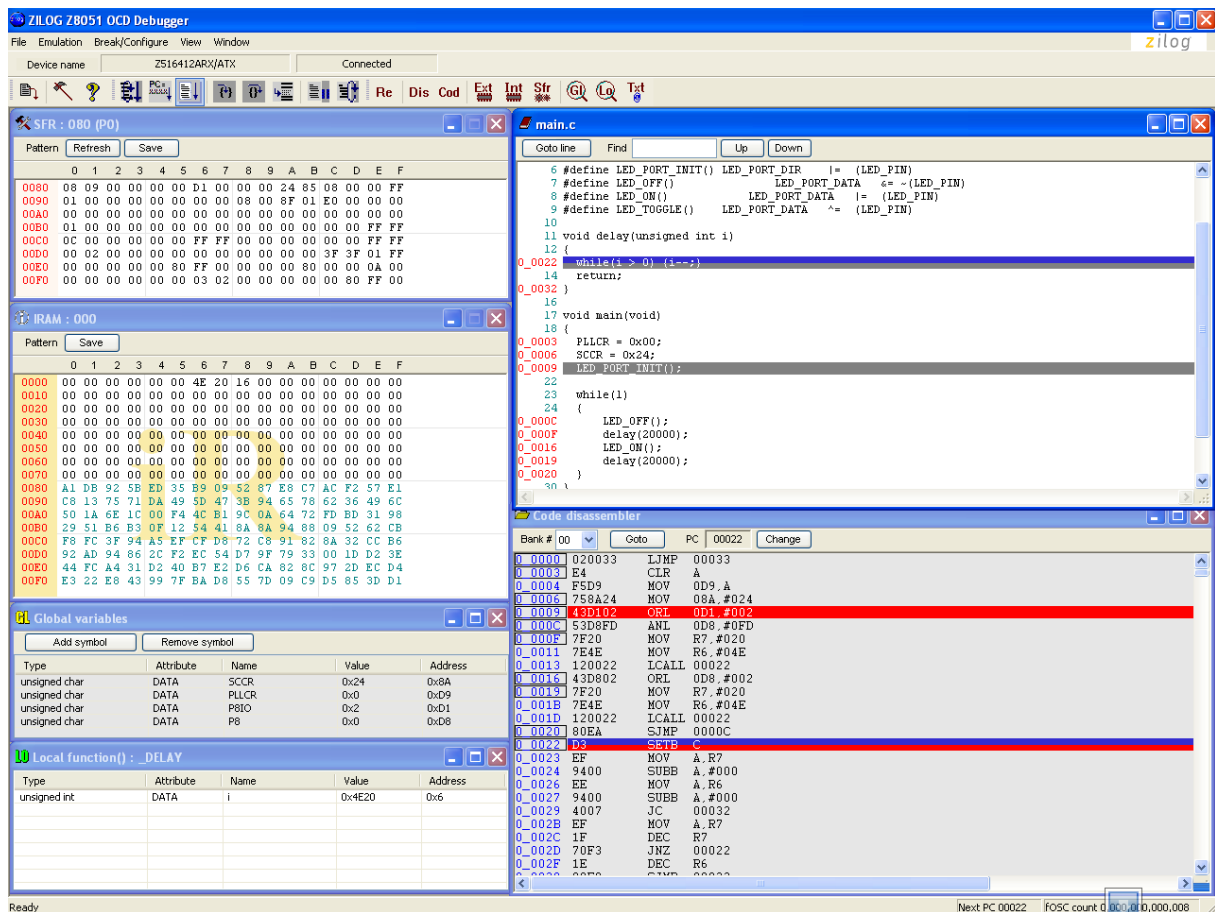
This command is used to run program step by step consecutively; it shows the change of Register Variable and memory according to running commands all the time. The operation of program is run in the format of Step that periodically pauses, so the speed of operation is not smooth. The operation of program is slower than normal Run.

Break

This Command is used to stop the operation of the program is currently running. It is used to stop the operation of program to check the value of Register, Variable and memory that has been edited or changed.

Reset

This Command is used to reset the operation of MCU and it setup value for PC to restart and return to Address position 0x0000.



Picture shows an example of Debug for the operation of MCU through Program Zilog OCD v1.147.