

C-SPY ICE2000 quick reference

This document gives information about the C-SPY options that apply to the ICE2000 emulator. Refer to the C-SPY documentation and to Microchip Technology Inc.'s *MPLAB®-ICE User's Guide* for detailed reference information.

Installation

When installing the IAR Embedded Workbench on Microsoft Windows NT or Windows 2000, Microchip MPLAB must also be installed since MPLAB uses its own parallel port device driver. The latest version of MPLAB may be found on www.microchip.com. On Windows NT4, service pack 4 or later must be installed for the parallel port to function properly.

Specifying the ICE2000 emulator in the IAR Embedded Workbench

To use the ICE2000 emulator, select **Project>Options** in the IAR Embedded Workbench. On the **C-SPY Settings** page in the **C-SPY** category, select the **ICE2000 Emulator** in the **Driver** list. Then select the **ICE settings** page:

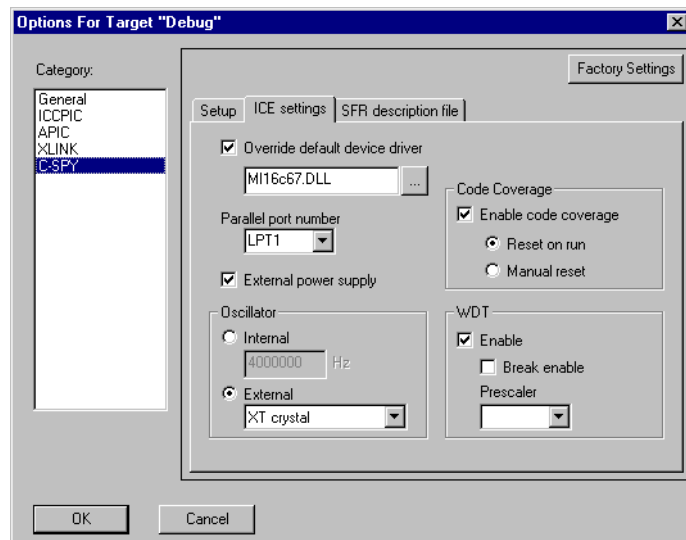


Figure 1: ICE settings in the C-SPY category in the IAR Embedded Workbench

OVERRIDE DEFAULT DEVICE DRIVER

If C-SPY fails to find a driver DLL, use this option to select a driver manually. A browse button is available for your convenience.

EXTERNAL POWER SUPPLY

By default, ICE2000 will run using an internal power supply. Select this option to use target board power instead. Refer to Microchip's *MPLAB®-ICE User's Guide* for the current ratings.

OSCILLATOR

Select **Internal** or **External** oscillator source using the radio buttons. Note that ICE2000 must have external power to run with an external oscillator.

- When using the internal oscillator (default), enter the clock frequency in Hertz.
- When using the external oscillator, select the oscillator driver type from the drop-down list.

WDT - WATCHDOG TIMER

Enable the watchdog timer reset by checking the **Enable** box. To enable a break on watchdog timer overflow, check the **Break enable** box. If the target is high-end, select the prescale value from the **Prescaler** drop-down list.

The IAR C-SPY Emulator menu

The C-SPY **Emulator** menu is used for controlling the ICE2000 emulator. The menu commands are mainly concerned with complex triggers. For information about complex triggers and the available options, please see Microchip's *MPLAB®-ICE User's Guide*, available at www.microchip.com.

CODE COVERAGE SETTINGS

To use complex triggers and the Trace window with ICE2000, code coverage must be disabled. When you no longer need complex triggers, you can enable code coverage once more.

Note: Disabling code coverage speeds up emulation considerably, and may be attractive even when you are not using complex triggers.

TRIGGER IN/OUT SETTINGS

Use this command to adjust the logic probe trigger settings. See Microchip's *MPLAB®-ICE User's Guide* for information.

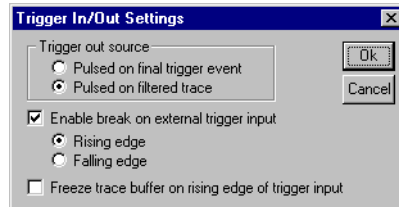


Figure 2: Trigger In/Out Settings dialog box

COMPLEX TRIGGER SETTINGS

Select this command to set up the four complex triggers of the ICE2000 emulator. Each event may be set to instruction fetch, data read/write, logic probe, and with or without pass counter.

These four events may be combined in four ways: **All**, **Any**, **Sequential** or **Time Between Events**. You can also choose to filter the trace on for example fetch intervals. That means that you can remove any cycles in a specific function from the trace buffer.

In the figure below, a trigger has been set to halt execution when data on address 0x21 is read:

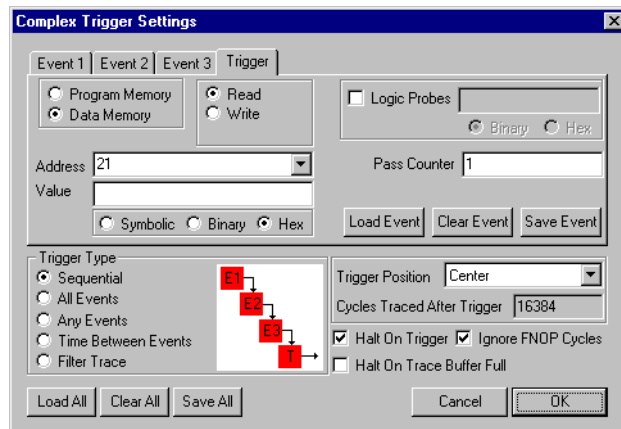


Figure 3: Example of setting complex triggers

Note: You do not have to set all four events to make the trigger work; just leave the ones you do not need empty.

For detailed information and tutorials, please see Microchip’s *MPLAB®-ICE User’s Guide*.

OPEN TRACE WINDOW

The Trace Memory window shows the contents of the trace memory buffer:

Trace Memory Window										
Cycle	Addr	Opcode	Label	Instruction	Source Addr	Source Data	Dest. Addr	Dest. Data	Ext.	Time
-24	0067	03A0		(Forced NOP)	_A_STATUS	1B	_A_STATUS	---	00...	0000018644
-23	0068	0820		MOVWF s,0	---	---	---	---	00...	0000018645
-22	0069	0421		IORWF 0x21,0	s	00	s	00	00...	0000018646
-21	006A	1903		BTFSC _A_STATUS...	021	01	WREG	01	00...	0000018647
-20	006B	286D		(Forced NOP)	_A_STATUS	1B	_A_STATUS	---	00...	0000018648
-19	006C	2864		GOTO 0x64	---	---	---	---	00...	0000018649
-18	006D	0008		(Forced NOP)	---	---	---	---	00...	000001864A
-17	0064	30FF		MOVLW 0xFF	---	---	---	---	00...	000001864B
-16	0065	07A1		ADDWF 0x21,1	---	---	WREG	FF	00...	000001864C
-15	0066	1C03		BTFSS _A_STATUS...	021	01	021	00	00...	000001864D
-14	0067	03A0		(Forced NOP)	_A_STATUS	1F	_A_STATUS	---	00...	000001864E
-13	0068	0820		MOVWF s,0	---	---	---	---	00...	000001864F
-12	0069	0421		IORWF 0x21,0	s	00	s	00	00...	0000018650
-11	006A	1903		BTFSC _A_STATUS...	021	00	WREG	00	00...	0000018651
-10	006B	286D		GOTO 0x6d	_A_STATUS	1F	_A_STATUS	---	00...	0000018652
-9	006C	2864		(Forced NOP)	---	---	---	---	00...	0000018653
-8	006D	0008		RETURN	---	---	---	---	00...	0000018654
-7	006E	3000	main	(Forced NOP)	---	---	---	---	00...	0000018655
-6	0075	3055		MOVLW 0x55	---	---	---	---	00...	0000018656
-5	0076	1283		BCF _A_STATUS,5...	---	---	WREG	55	00...	0000018657
-4	0077	1303		BCF _A_STATUS,6...	_A_STATUS	1F	_A_STATUS	1F	00...	0000018658
-3	0078	0086		MOVWF _A_PORTB...	_A_STATUS	1F	_A_STATUS	1F	00...	0000018659
-2	0079	120A		BCF PCLATH,4	_A_PORTB	00	_A_PORTB	55	00...	000001865A
-1	007A	118A		BCF PCLATH,3	PCLATH	00	PCLATH	00	00...	000001865B
0	007B	2060		CALL delay	PCLATH	00	PCLATH	00	00...	000001865C

Figure 4: Trace Memory window

Typically it shows the most recently executed instructions, but you may also filter some instructions when you set up the trigger. If you right click in the window, a pop-up menu with trace window settings and an option for reloading the trace window contents becomes available. For details about the contents of this window, please see Microchip’s *MPLAB®-ICE User’s Guide*.

Specifying the ICE2000 emulator from the command line

This is a summary of C-SPY options that apply to the ICE2000 emulator. Refer to the C-SPY documentation for detailed reference information.

Option	Description
-d	Selects the C-SPY driver.
-ecn	Controls code coverage.
-ed	Overrides the default MPLAB driver.
-ef	Sets the internal clock frequency.
-eon	Specifies the external clock oscillator mode.
-ep	Specifies external power.
-ewb	Enables break on watchdog overflow.
-ewe	Enables the watchdog timer.
-ewpn	Specifies watchdog timer prescaler.

Table 1: Summary of C-SPY ICE2000 command line options

-d Select the C-SPY driver. The available drivers are:

Driver	Description
IPIC16	ICE2000 emulator for PIC16
IPIC17	ICE2000 emulator for PIC17
SPIC16	C-SPY simulator for PIC16
SPIC17	C-SPY simulator for PIC17

Table 2: C-SPY drivers

Example

To specify the ICE2000 emulator for the PIC17 family:

-d IPIC17

-ecn Controls code coverage. The possible values for *n* are:

Value	Code coverage
0	Off
1	Enabled with reset on run

Table 3: Code coverage options

Value	Code coverage
2	Enabled with manual reset (processor reset)

Table 3: Code coverage options (Continued)

The code coverage setting may also be changed from the C-SPY graphic user interface.

Note: Code coverage and complex triggers may not be used simultaneously because of hardware limitations. However, running with code coverage disabled also substantially increases emulation speed.

-ed Specifies the device driver by overriding the default MPLAB driver.

Example

-ed MI17C42A.DLL

-ef *n* Specifies the internal clock frequency where *n* is the frequency in Hz. This option cannot be combined with the -eo option.

Example

To set a 16MHz clock:

-ef 16000000

-eon Specifies the oscillator mode of the external clock, where *n* is the decimal value of the binary representation of the oscillator mode in the chip configuration word. See the *MPLAB®-ICE User's Guide*.

This option must be combined with the -ep option; it cannot be combined with -ef.

Example

To set the HS oscillator:

-eo2

-ep Specifies that the emulator uses external power from the target board.

-ewb Enables a break on watchdog overflow.

-ewe Enables a watchdog timer.

-ewpn Specifies a watchdog timer prescaler, where the value *n* is 0–8:

Value	Prescaler
0	Off
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

Table 4: Watchdog timer prescaler values

Example

To set the prescaler to 16:

-ewp5

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