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H8/300L

Debugging using HDC File (HDC)

Introduction

Execution of HDC commands in the HDI/HEW Command Line Window to initialise the on-chip peripherals and to automate the debugging steps.

HDC (Debugger Command) file is a batch file contains a collection of HDI/HEW sequentially executed commands. The execution of HDC file in the Command Line Window helps to expedite testing in an automated mode. This application note emphasizes on two examples: the initialization steps to activate the on-chip modules of the H8/38024F series SLP (Super Low Power) micon and the automated debugging steps. The key advantage to execute initialization by HDC files during debugging, user is not required to modify, re-assemble and re-compile the user program.

Target Device

H8/300L Super Low Power (SLP) Series – H8/38024F

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1. Overview of HDC Files

Debugger Command (HDC) is a specific command set being used in the command line window during debugging via Simulator/Debugger. Table 1 shows a list of 12 commonly used commands.

No	Command		
1	!		
	Abbreviation:	-	
	Description:	Comment	
	Syntax:	! <text>	
	Example:	! constant	
2	ASSERT		
	Abbreviation:	-	
	Description:	Checks if an expression is true or false.	
	Syntax:	Assert <expression>	
	Example:	Assert #R0 == 0x100 Returns an error if R0 does not contain 0x100.	
3	BREAKPOINT		
	Abbreviation:	Bp	
	Description:	Sets a breakpoint at an instruction address.	
	Syntax:	Bp <address> [<count>] [<Action>]	No of times the instruction at the specified address is to be fetched (1 to 16383, default = 1).
		<count>	
		<Action> [default = Stop] Stop (P) Input (I) <filename> <addr> <size> <count> Output (O) <filename> <addr> <size> <count> Interrupt (T) <interrupt type 1> [<priority>]	
Example:		Bp 0 2	
	Bp C0 Input in.dat 100 2 8	8 2-byte data are written from file "in.dat" to H'100 when try to execute.	
4	BREAK_CLEAR		
	Abbreviation:	Bc	
	Description:	Deletes breakpoint.	
	Syntax:	Bc <index>	
Example:	Bc 0	First breakpoint is deleted.	
	Bc	All breakpoints are deleted.	

No	Command		
5	BREAK_ENABLE		
	Abbreviation:	Be	
	Description:	Enables or disables a breakpoint.	
	Syntax:	Be <flag> [<index>]	
		<flag> E D	Enable Disable
		<Index>	Index of the breakpoint to be cancelled. If omitted, all the breakpoints are deleted.
Example:	Be D 0	First breakpoint is disabled.	
	Be E	All breakpoints are enabled.	
6	BREAK_REGISTER		
	Abbreviation:	Br	
	Description:	Specifies a register data as a break condition.	
	Syntax:	Br <register name> [<data> <size>] [<option>] [<Action>]	
		<size> Byte (B) Word (W) Longword (L) Single (S) Double (D)	Byte size. Word size. Longword size. Single-precision floating-point size. Double-precision floating-point size.
		<option> EQ NE	Break occurs when data matches. Break occurs when data does not match.
		<Action> Stop (P) Input (I) <filename> <addr> <size> <count> Output (O) <filename> <addr> <size> <count> Interrupt (I) <interrupt type 1> [<priority>]	Halts execution of user program. Inputs data to a file. Outputs data from a file. Initiates an interruption.
		Example:	Br R0 FFFF W EQ
	Br R10	Break occurs when R10 register is written to.	

No	Command	
7	FILE_LOAD	
	Abbreviation:	Fl
	Description:	Loads an object (program) file.
	Syntax:	Fl <filename> [<offset>] [<state>] [<format>]
		<state> [default = V] V N
	<Format> [default = DEFAULT_OBJECT_FORMAT setting] Binary Elf/Dwarf2 Intel-Hex S-Record	Binary type. Elf/Dwarf2 type. Intel-Hex type. S type.
Example:	Fl a:\binary\testfile.a22	Loads S-Record file "testfile.a22".
	Fl ANOTHER.MOT H'200	Loads S-Record file "ANOTER.MOT" with an offset of H'200
8	GO	
	Abbreviation:	Go
	Description:	Executes user program
	Syntax:	Go [<state>] [<address>]
		<state> [default = wait] wait continue
Example:	Go	Executes user program at the current PC location. Command processing cannot be continued.
	Go Continue H'1000	Executes user program from H'1000. Command processing can be continued.
9	MAP_SET	
	Abbreviation:	Ms
	Description:	Allocates a memory area.
	Syntax:	Ms <Start Address> [<End Address>] [<mode>]
		<mode> [default = RW] R W RW
Example:	Ms 0000 3FFF RW	Allocate a read/write-enabled area to addresses H'0000 to H'3FFF.
	Ms 5000	Allocate a read /write-enabled area to address H'5000.

No	Command	
10	REGISTER_SET	
	Abbreviation:	Rs
	Description:	Changes CPU register contents.
	Syntax:	Rs <register> <value> <mode> <mode> [default = Corresponding register size] Byte Word Long Single Double
	Example:	Rs PC_StartUp Rs R0 H'1234 WORD
		Byte Word Long Single Double
		Set program counter at _StartUp. Sets word data H'1234 to R0.
11	SUBMIT	
	Abbreviation:	Submit
	Description:	Executes a command file.
	Syntax:	Su <filename>
	Example:	Su Command.hdc Su A:SETUP.TXT
		Processes the file Command.hdc. Processes the file SETUP.TXT on drive A:.
12	SYMBOL_LOAD	
	Abbreviation:	Sl
	Description:	Loads a symbol information file.
	Syntax:	Ms <filename>
	Example:	Sl TEST.SYM Sl MY_CODE.SYM
		Loads the file TEST.SYM. Loads the file MY_CODE.SYM.

For the details of other commands, please refer to the user's manuals [reference documents no. 2, 3 and 4, page 13] under the section of Command-line Functions.

2. Command Line Window

In HDI emulator or HEW simulator, the Command Line Window provides user with the interface access to the HDI or HEW commands.

Click onto [**View -> Command Line**] or press **Ctrl+L** to activate Command Line Window dialog box.

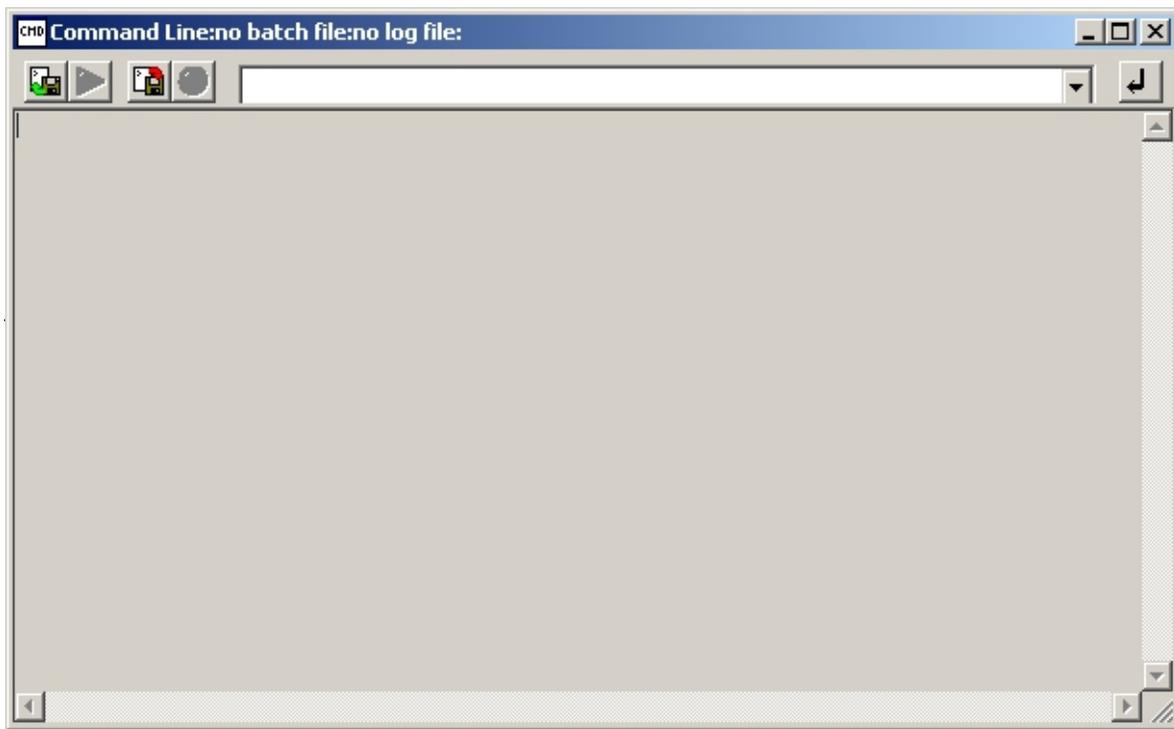


Figure 2.1 Command Line Window dialog box

Key in the `hdc` command into the combo box and press **Enter**.



Figure 2.2 Run `hdc` command in line mode

An alternative is to click onto the **Batch File** button and choose the `.hdc` file to run the HDI/HEW batch commands.

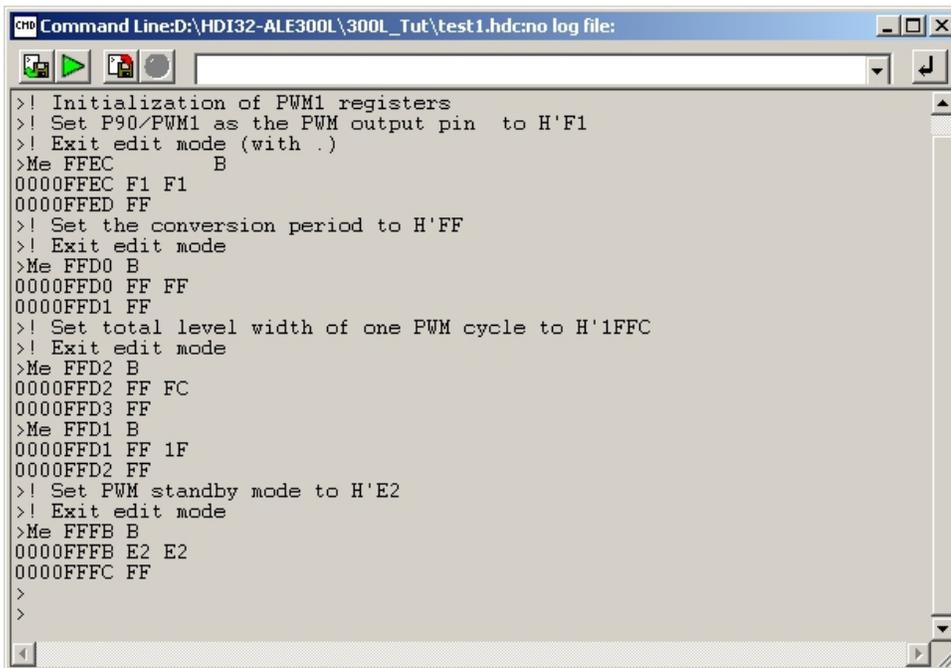


Figure 2.3 Run `hdc` commands in batch mode

3. Application Examples of HDC Files

The first example demonstrates the initialization settings for the on-chip Pulse Width Modulator, PWM1 in H8/38024 CPU. The following 5 registers are configured to activate the PWM1:

To designate P90/PWM1 as the PWM output pin,

Port Mode Register (PMR9) [H'FFEC] = H'F1

To select conversion period of $4096/\emptyset$ with modulation width $4/\emptyset$,

PWM1 Control Register (PWCR1) [H'FFD0] = H'FF

For instance, to obtain conversion period of 1024 us, \emptyset must be 4 MHz with 1us resolution.

To set the total high-level width of one PWM waveform cycle (50% duty cycle),

PWM1 Data Register L (PWDRL1) [H'FFD2] = H'FC

PWM1 Data Register U (PWDRU1) [H'FFD1] = H'1F

To set PWM module standby mode for PWM1,

Clock Stop Register 2 (CKSTPR2) [H'FFFB] = H'E2

Note:

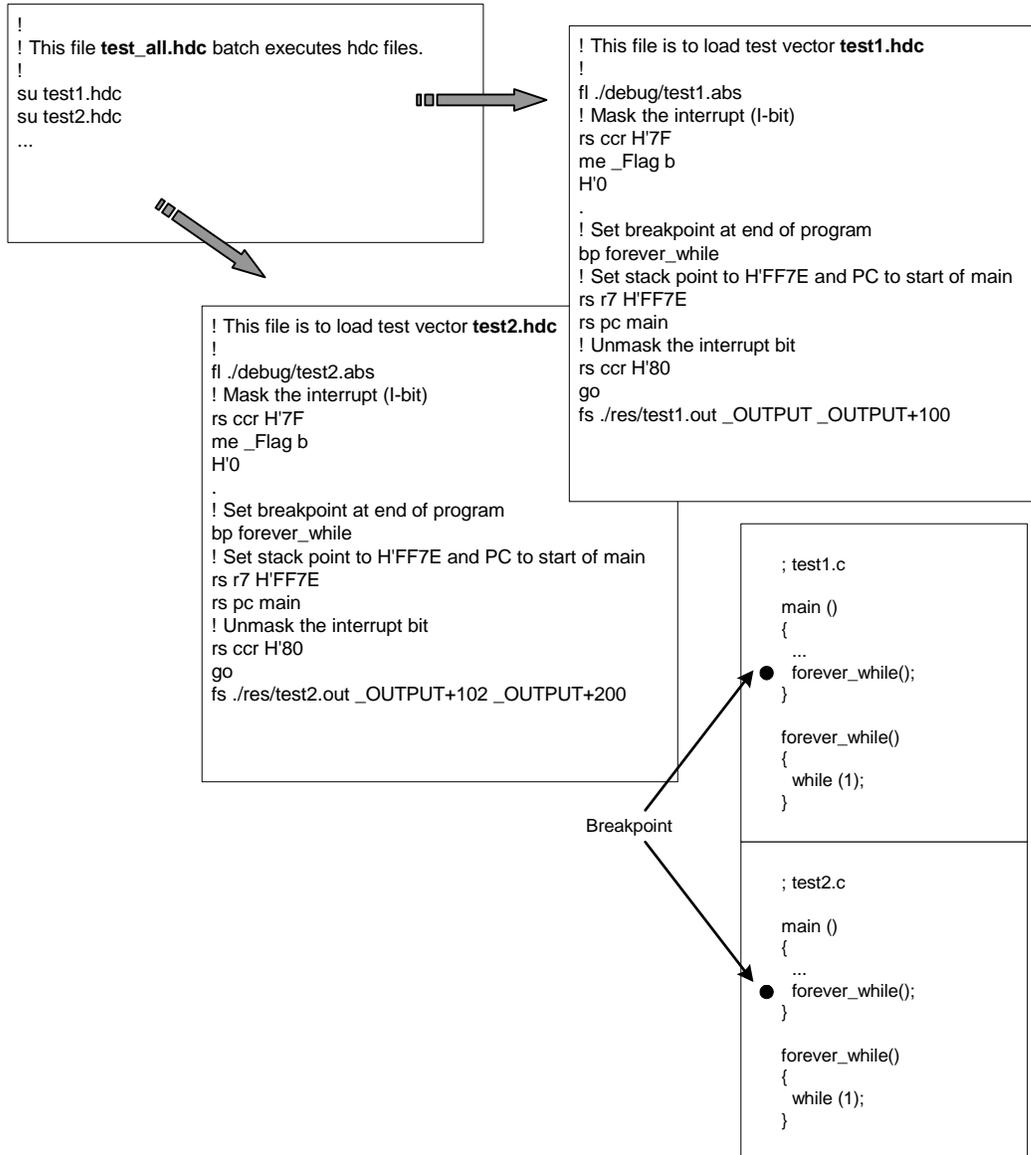
! : comment.

. : continuous edit mode.

The sample codes are as follows:

```
! Initialization of PWM1 registers
! Set P90/PWM1 as the PWM output pin to H'F1
! Exit edit mode (with .)
Me FFEC B
F1
.
! Set the conversion period to H'FF
! Exit edit mode
Me FFD0 B
FF
.
! Set total level width of one PWM cycle to H'1FFC
! Exit edit mode
Me FFD2 B
FC
.
Me FFD1 B
1F
.
! Set PWM standby mode to H'E2
! Exit edit mode
Me FFFB B
E2
.
```

The second example demonstrates some debugging features through hdc in an automated mode. The batch file test_all.hdc executes the command files, a1.hdc and a2.hdc. In test1.hdc, it first loads test1.abs (command fl), unmask the I-bit (command rs) and set the variable Flag to B'0 (command me). Next, set breakpoint at the end of program at forever_while (command bp), initialize the program counter to main and stack to H'FF7E (command rs). Unmask the I-bit (command rs) and set the user program to go (command go). The output results are stored as test1.out (command fs) and continue to execute the test2.hdc.



Related Information:

1. H8/38024 Series, H8/38024F-ZTAT™ Hardware Manual
2. H8/3802 and H8/38024 Series E6000: User's Manual
3. H8/38024F E10T Emulator: User's Manual
4. H8S, H8/300 Series Simulator/Debugger: User's Manual

Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Sep.03	-	First edition issued

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