RENESAS Tool News

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The C/C++ Compiler Packages for the SuperH RISC engine family CPUs Upgraded to Their V.9.00 Release 00

We have upgraded the C/C++ compiler packages for the SuperH RISC engine family of CPUs, from V.8.00 Release 04 to V.9.00 Release 00.

1. Descriptions of Upgrade

1.1 Functions Introduced and Improved

A. In Compiler

(1) The new-come CPUs SH-2A and SH2A-FPU supported. In addition, the functions of utilizing the TBR register in these CPUs introduced (option tbr and directive #pragma tbr).

(2) The following items interpreted in conformance with ANSI:

(a) Indexing in arrays

Example:

```
--------------------------------------
int iarray[10], i=3;
i[iarray] = 0;  /* Interpreted as iarray[i] = 0; */

--------------------------------------
```

(b) Specifying bit fields in unions

Example:

```
--------------------------------------
union u {
  int a:3;
};
--------------------------------------
```

(c) Operations between constants

Example:

```
    ---------------------------------------
    static int i=1||2/0;  /* A zero division issues a
warning */
    ---------------------------------------
```

(3) Library function strtoul and macro FOPEN_MAX in conformance with ANSI introduced.

(4) The following options introduced:

(a) strict_ansi: Allows the compiler to interpret the following items in conformance with ANSI:
* Operations between an unsigned int type and a long one
* The associative law in floating-point operations
Consequently, the results of operations may differ from those obtained in Ver.8.00 and earlier.

(b) enable_register: Assigns variables specified by the register storage-class specifier to registers, with the highest priority.

(c) smap: Performs access optimization for the external variables defined within files to be compiled. However, re-compilation is not needed as in the "map" option.

(5) The following instructions specific to the SH-2A and SH2A-FPU CPUs introduced as built-in functions:
Saturation operation, TBR setting, and TBR reference

(6) The following instructions that cannot be written in C language introduced as built-in functions:
T bit rference, T bit setting, Midsection extract from combined registers, Add with carry, Subtract with borrow, negation, 1-bit division, Rotation, and Sift

(7) How to allocate memory to the following options and pragma directives specified:

(a) Options abs20, abs28, and abs32

(b) Directives #pragma abs20, #pragma abs28, and #pragma abs32

(8) Directive #pragma address introduced, which places a variable at an absolute address.

(9) The maximum values of seven items enlarged as follows:

   (a) The nesting level in the combination of the iterationstatements (while, do, and if) and the selection statements (if and switch): from 32 to 4096

   (b) The number of goto labels usable in a function: from 511 to 2147483646

   (c) The nesting level in a switch statement: from 16 to 2048

   (d) The number of case labels usable in a switch statement:from 511 to 2147483646

   (e) The number of arguments in function definitions and function calls: from 63 to 2147483646

   (f) The number of bytes in a section name: from 31 to 8192

   (g) The number of sections that can be specified in a file by the #pragma section directive: from 64 to 2045

(10) Improved the precision of operations when libraries of the mathematical functions used.

B. In Assembler

(1) The new-come CPUs SH-2A and SH2A-FPU supported.

(2) Controlling assembler directive command ".STACK" introduced: This command, when put in an assembler source file to declare a stack size, allows the stack-analyzing tool to reads the size automatically.

(3) The maximum value of the characters in the define option and the .DEFINE assembler directive command, hitherto limited to 32, raised unlimited.

C. In Optimizing Linkage Editor

(1) Boundary-adjusting numbers can be set for the sections selected by the binary option.

(2) The xreference parameter (show=xreference) introduced to the show option: By using this parameter, cross-reference information that informs from where variables and functions are referred to can be output to a linkage list.

(3) Option msg_unused introduced: This option is used to send an error message if

any externally defined symbols that have not yet been referred to exist.

D. In Simulator Debugger (Windows Version Only)
The compiler is supported by the following simulators (Windows Version Only):

(1) The Cycle Base simulator for the SH-4A

(2) The Cycle Base simulator for the SH4AL-DSP

(3) The functional simulator for the SH2A-FPU

(4) The Cycle Base simulator for the SH2A-FPU

1.2 Problems Fixed

The following problems have been fixed:
A. High-performance Embedded Workshop (Windows Version Only)

(1) If the last label in ASCII order is searched for using the search function in the Label window, the error message "LABEL NOT FOUND" appears.

(2) If multiple-step execution is discontinued and then the program is executed in the usual way, the STOP button on the toolbar for manually stopping the program stays not illuminated, which may disable the manual stopping of the program.
At the same time, such operations of the High-performance Embedded Workshop may not be managed as closing the workspace by selecting the File -> Close Workspace command or ending the application by selecting the File -> Exit command.
For details, see RENESAS TOOL NEWS "A Note on Using Integrated Development Environment High-performance Embedded Workshop--On Discontinuing Multiple-Step Execution" issued on August 16, 2004.

(3) Using the Open Workspace command in the interface of the High-performance Embedded Workshop's server function may cause an application error to arise.

(4) If load modules written in the ELF/DWARF2 format are downloaded and the source file containing them is displayed in the Source window, the addresses of the source lines in which no program statements are written may incorrectly be provided.
For details, see RENESAS TOOL NEWS "A Note on Using Integrated Development Environment High-performance Embedded Workshop--On Debugging Load Modules

Written in ELF/DWARF2 Format" issued on August 16, 2004.

(5) Context-sensitive helps may be unavailable when the following tabs are selected in their respective dialog boxes:

(a) The Build and Editor tabs in the Options dialog box

(b) The Tool Bar, Place Holder, Debuggers, Logs, and Help tabs in the Customize dialog box

(c) The Options tab in the Debug Settings dialog box

2. How to Purchase the Upgraded Products

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When you place an order for it, provide the product name, version, and OS for your local Renesas Technology sales office or distributor:

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