[Featured Tools]

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Quickly Resolve Problems by Collecting Execution History Easily in GHS MULTI

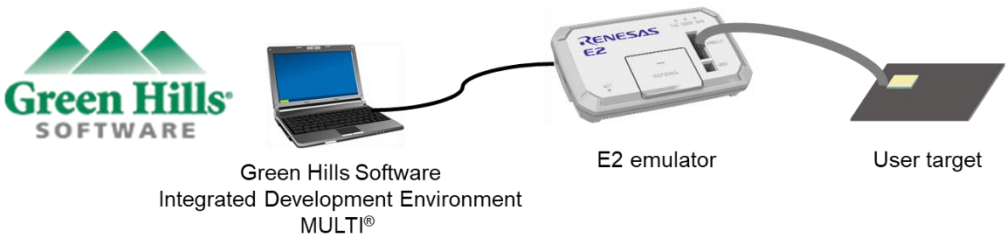
E2 Emulator Software Trace Function

Outline

We would like to introduce the “software trace” function of the E2 emulator that helps quickly resolve issues in your program.

The software trace function enables users to view execution history of a program such as program counter (PC) values and register values, simply by inserting the debugging instructions at the location where you want to check.

This solution is implemented by the combination of the E2 emulator and the MULTI® integrated development environment (GHS MULTI) from Green Hills Software.



For details about GHS MULTI, visit the Green Hills Software, LLC. website.
https://www.ghs.com/

This solution can also be used in combination with the CS+ integrated development environment.

1. Features

The E2 emulator software trace function (supported by GHS MULTI) works with the debug instructions for the RH850 family microcontrollers to check execution history, such as program counter (PC) values and register values.

The trace function includes the following features for easily acquiring execution history:

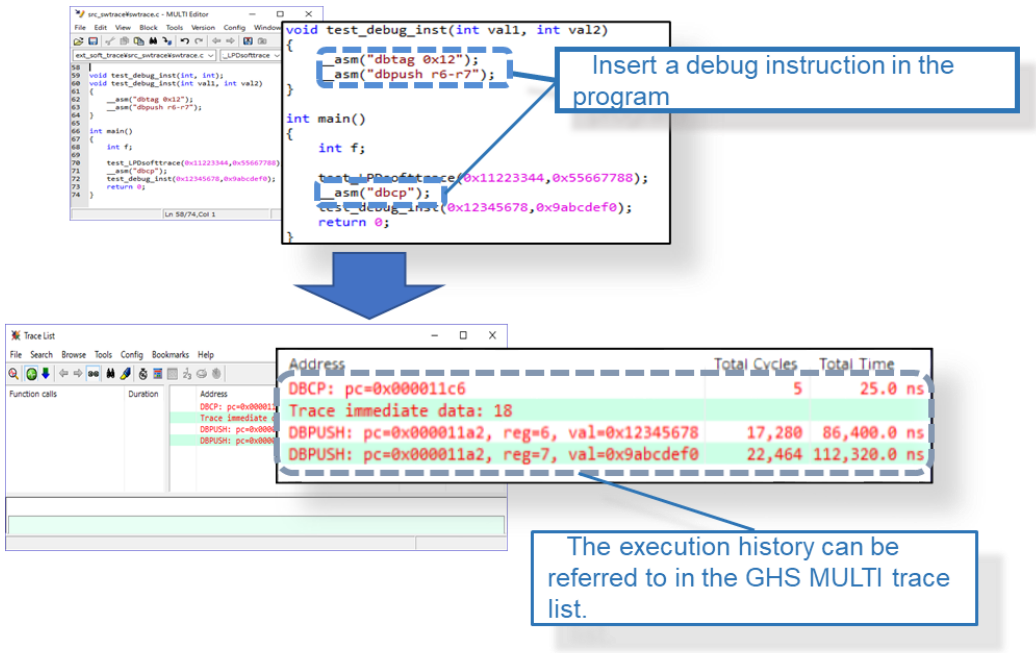
- You can acquire execution history simply by inserting a debug instruction into the program.
- Execution history can be acquired even from MCUs of the RH850 family with no trace memory.

The debug instructions are listed below. Using these debug instructions, you can check execution history without using any compiler standard output function that may affect CPU internal operations.
For details about the debug instructions, see the descriptions of the debug instructions for each RH850 core.

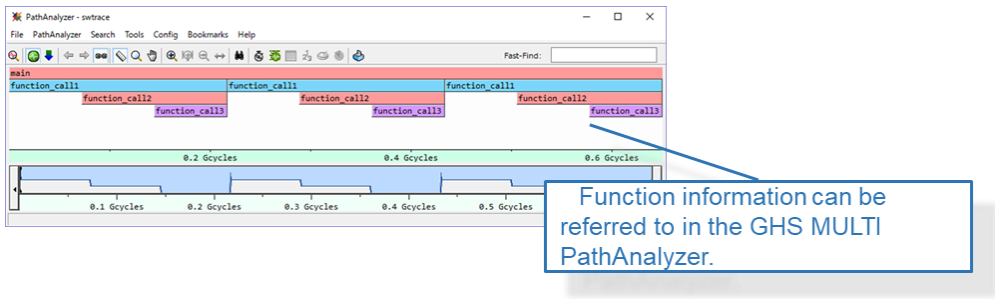
Table 1 List of debug instructions

Debug instruction	Format of instruction	Software trace output data
DBCP	DBCP	Program counter (PC) value
DBTAG	DBTAG imm10	Program counter (PC) value, 10-bit immediate (imm10) value
DBPUSH	DBPUSH rh-rt	Program counter (PC) value, The register numbers and values of general-purpose registers from rh to rt

By simply inserting a debug instruction into the part of the program you want to check, you can refer to the execution history including program counter (PC) values, register values (reg), and values (val) in the trace list.

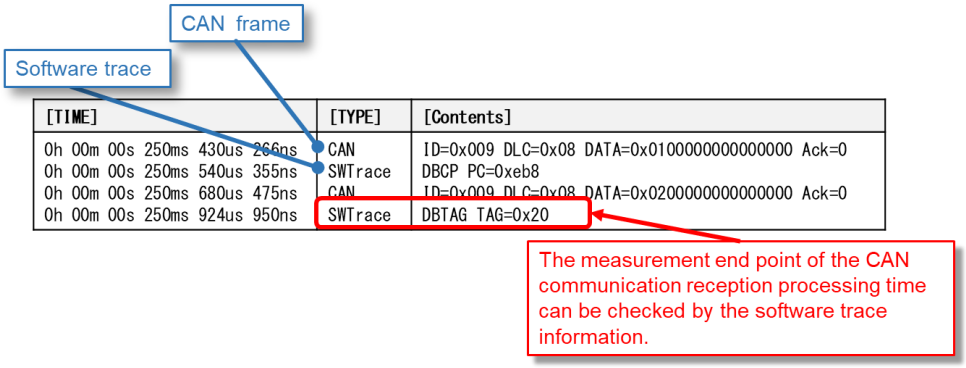


If you specify -gen_entry_exit_arg_history and -record_entry_exit_history in the build options, debug instructions are automatically inserted at the entry and exit of the functions of the program. The software trace result can be referred to as function information in the PathAnalyzer.



2. Combination with the CAN Communication Time Measurement Solution

By combining with an E2 emulator feature called CAN communication time measurement solution, CAN frame and software trace function trace data can be acquired simultaneously, facilitating debugging and performance verification.



Learn more about the CAN communication measurement solution in the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0504

[Notification]
Quickly Resolve the Reception Processing Time Problem in CAN Communications in GHS MULTI
CAN Communication Time Measurement Solution in the E2 Emulator

3. E2 Emulator

3.1 Product Overview

The E2 emulator is an advanced on-chip debugging emulator and flash programmer designed for the purpose of improving development efficiency.

For details about the E2 emulator, see the URL below.

https://www.renesas.com/e2

3.2 Purchasing the Product

For product ordering, contact your local Renesas Electronics sales office or distributor with the following information. For product pricing, make inquiries in the same manner.

Product name	E2 Emulator
Orderable part number	RTE0T00020KCE00000R

4. Reference

Learn more about the software trace function and its application examples in the tool news below.

https://www.renesas.com/search/keyword-search.html#genre=document&q=r20ts0345

[Notification]
Quickly Solve Problems from Your Customers! Using Trace Data of Program Execution History
Introducing E2 Emulator Software Trace Function

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	May.16.20	-	First edition issued

Corporate Headquarters

TOYOSU FORESIA, 3- 2- 24 Toyosu,
Koto-ku, Tokyo 135- 0061, Japan
www.renesas.com

Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
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