Quickly Resolve the Reception Processing Time Problem in CAN Communications in GHS MULTI

CAN Communication Time Measurement Solution in the E2 Emulator

Outline
Renesas recommends to use the CAN communication time measurement solution which uses the E2 emulator to improve problems with the speed performance of CAN communication applications.

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

The following figure shows a connection example when using GHS MULTI.

Renesas also recommends developers who use GHS MULTI to use this solution. For details on GHS MULTI, refer to the web page of Green Hills Software, LLC. https://www.ghs.com/

1. Solution Overview
This solution significantly reduces the time required for identifying the cause when a problem occurs in CAN communication.

Before measuring the reception processing time, conventional CAN communication debugging required preparation of measuring instruments and adding a measuring code program. In addition, if there is a problem with the measurement results, modification of measurement code and remeasurement should be repeated many times to identify the cause. This solution does not require measuring instruments or measurement code for more efficient analysis, allowing you to determine communication time immediately and pinpoint problems and their causes.

Without the solution

Inefficiency due to applying the Cut & Try approach many times until the goal is achieved

Need to prepare measuring instruments, modify code, etc.

With the solution

Time measurement can soon be started, and repetitive steps are also eliminated.
2. Features

This solution has three keywords “Easy measurement” “No missing data”, and “Quick identification” for more efficient analysis regarding CAN communication reception processing time in a system in which RH850 is installed.

- **Easy measurement**: Reception processing time can be measured easily with the E2 emulator only. The reception processing time in CAN communication can be measured just by connecting the RX signal of the RH850 family MCU to the E2 emulator by a test lead (included with the E2 emulator). An expensive CAN analyzer is not required.

- **No missing data**: The program stops if the reception processing time exceeds a design value. You can set “CAN frame detection/software trace detection” as the “start/end condition of the reception processing time measurement. If the CAN communication reception processing time specified by the user exceeds a design value, the E2 emulator can stop the program and obtain information (minimum time, maximum time, average time, and number of measurements) about the CAN communication time during the measurement interval.
Quick identification: Trace data can be verified from the measurement end point and the problem location can be identified.

CAN frames and trace data can be obtained as a chronological CAN communication log. The obtained record can be output as a CSV file.

You can quickly locate a problem in the program by finding the measurement end point of the reception processing measurement time from the CAN communication log and checking trace data from the measurement end point.

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.

The maximum download speed is twice that of the E1 emulator. The E2 emulator shares the same pin-out convention as E1, and can therefore be connected to a user system designed for the E1 emulator.

For details about the E2 emulator, refer to the URL below.

https://www.renesas.com/e2

3.2 Purchasing the Product

For ordering of the E2 emulator products, contact your local Renesas Electronics marketing office or distributor with the following information. For product pricing, make inquiries in the same manner.

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Revision History

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