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Contributing To More Efficient Embedded System Development

# E2 Emulator

**RTE0T00020KCE00000R**

https://www.renesas.com/e2

## Overview

The E2 emulator is an advanced on-chip debugging emulator and flash programmer developed with the concept of greater efficiency in development. The combination of its high-speed downloading and various software and hardware solutions will contribute to reducing development times.
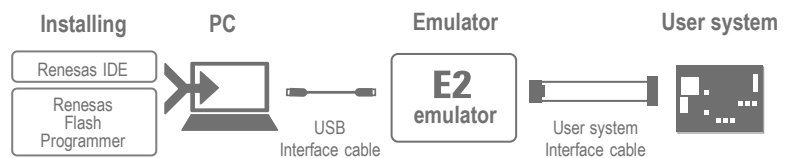
**Package components**

- E2 emulator main unit
- Conversion adapter
- User system interface cable
- USB interface cable
- Test lead

**System configuration**

| Installing | PC | Emulator | User system |
|---|---|---|---|
| Renesas IDE | | **E2 emulator** | |
| Renesas Flash Programmer | | | |

USB Interface cable

User system Interface cable

### for RL78 and RX Families
## Current Consumption Tuning Solution

In conjunction with the QE for Current Consumption, a dedicated tool for measuring current drawn, the E2 emulator is capable of the following items. These shorten the time taken to tune currents.

✔ Measuring current with the E2 emulator alone

✔ Stopping a program when an excessive current is detected

✔ Visualizing the relationship between program operations and current

https://www.renesas.com/qe-current-consumption

**No need for an ammeter**
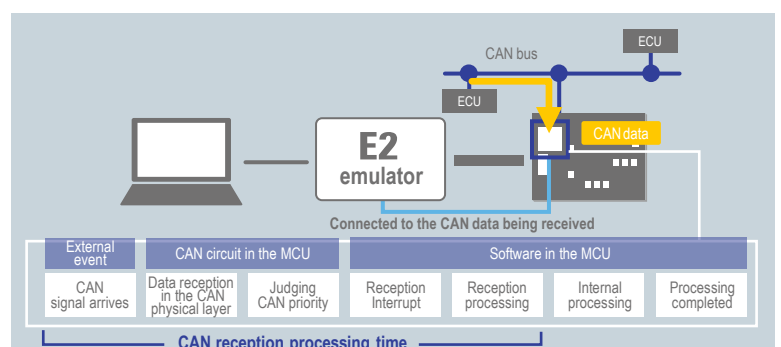
**No need to remodel**

E2 emulator
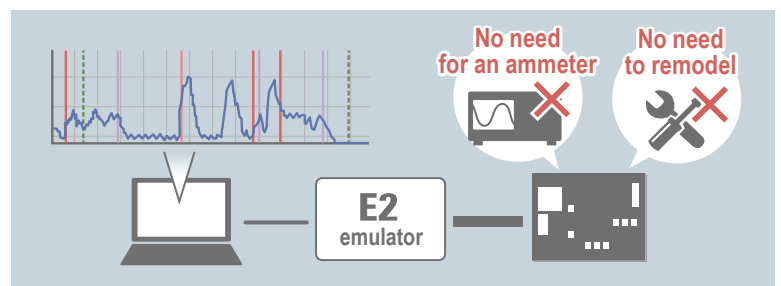
### for RH850 Family
## CAN Communications Time Measurement Solution

The following CAN-related tasks ease verifying the speed of CAN communications in terms of system requirements.

✔ Measuring the reception processing time in CAN communications with the E2 emulator alone

✔ Stopping a program when the reception processing time exceeds the design value

✔ Visualizing the history of CAN communications

https://www.renesas.com/e2-solution-can

ECU

CAN bus

ECU

CAN data

E2 emulator

Connected to the CAN data being received

| External event | CAN circuit in the MCU | | Software in the MCU | | | |
|---|---|---|---|---|---|---|
| CAN signal arrives | Data reception in the CAN physical layer | Judging CAN priority | Reception Interrupt | Reception processing | Internal processing | Processing completed |

**CAN reception processing time**

## Target Devices

- ✔ RA family
- ✔ RE family
- ✔ RL78 family
- ✔ RX family
- ✔ RH850 family
- ✔ R-Car D1

Since the supported devices differ with the software you are using, confirm details in the [Target devices] column of [Release Information] under [Product Info] on the Web page of the E2 emulator. https://www.renesas.com/e2

## Product Specifications

| Item | Description |
|---|---|
| Method of connection<br>Break function<br>Tracing<br>Reference to and changing memory contents while a program runs<br>Performance measurement<br>Hot-plug-in | Since the method of connection and the functions may differ with the device you are using, refer to ⧉ Onchip Debuggers Performance Property   Search keyword : R20UT0616 |
| On-board programming | Supported |
| User interfaces | 14pin 2.54mm pitch connector<br>(7614-6002: from 3M Japan, 2514-6002：from 3M Limited)<br>20pin 1.27mm pitch connector<br>(FTSH-110-01-L-DV-K：from Samtec)<br>10pin 1.27mm pitch connector<br>(FTSH-105-01-L-DV-K：from Samtec) |
| PC interface | USB 2.0, full speed and high speed |
| Connection to the system | Connection to the system is via the user system interface cable which comes with the product (signals for connection vary with the type of the target MCU).<br>*To connect E2 emulator to the 10pin 1.27mm pitch connector using an RA or RE family MCU, purchase and use the 20-10-pin cable [RTE0T00020KCAC0000J] or the 20-10-pin cable [RTE0T00020KCAC1000J]. |
| Facility to supply power to the user system from the E2 emulator | 200 mA max. (1.8 V to 5.0 V) |
| Power-supply voltage | The range of operating voltage for the target MCU (1.8 V to 5.5 V) |
| External dimensions (except for the protruding parts) | 105.9 mm × 64.0 mm × 19.5 mm |
| Compliance with overseas standards | European Standards: EN 55022 Class A, EN 55024<br>US FCC Standard: FCC part 15 Class A |

The supported facilities differ with the integrated development environment you are using.

## Optional Products

The following optional products are provided to facilitate the use of the E2 emulator in various ways.

Supported MCUs vary depending on the products.

Please refer to "Optional Products for E2, E2 emulator Lite, E1, E20, and E8a emulators" www.renesas.com/ocd-options .

| | |
|---|---|
| Conversion adapter | Converts the number and pitch of pins of the connector for connecting the emulator. |
| Isolator | Enables debugging in environments where the grounds of the user system and the host PC are not the same. |
| Low-voltage OCD board | Enables debugging of an MCU with a power-supply voltage such that the onchip flash ROM cannot be reprogrammed. |
| Debugging MCU board | Enables the use of enhanced debugging functions. |