E2 emulator [RTE0T00020KCE00000R]

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.

Topics

- The E2 emulator newly supports the RL78/G23 group.
  See here for details of the RL78/G23 group >>
- The E2 emulator supports the RE01B group and the RA6M5 group.

Features

- **High-speed download up to twice as fast as E1**
  The download speed is up to twice as fast as the E1 emulator. This substantially reduces waiting time for downloading the control programs to one-half at a maximum.
- **CAN Communications Time Measurement Solution (for RH850 Family)**
  The following CAN-related tasks are possible in conjunction with the CS+ integrated development environment or the MULTI® integrated development environment (GHS MULTI) from Green Hills Software. This eases 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
- **Current Consumption Tuning Solution (for RL78 and RX Families)**
  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
- **Support for the input and output of external triggers (For RH850 Family)** [Learn More: ToolNews]
  For example, you can set up the stopping of programs or of the measurement of waveforms by simply using the test lead which comes with the E2 emulator to connect the emulator to an external measuring instrument with the CS+ integrated development environment or the MULTI® integrated development environment (GHS MULTI) from Green Hills Software.
- **Hot plug-in function available without an optional adapter**
  Although the E1 emulator required an optional hot plug adapter sold separately to use the hot plug-in function, the E2 emulator does not need it.
- **Board interface compatible with that of E1**
  he E2 emulator can be connected to the user system that was designed for the E1 emulator because the pin arrangement to be connected to the user system has compatibility with the E1 emulator. [Learn More : the optional products for E2]
- **Support for new MCUs with next-generation cores**
  MCUs that have next-generation cores, such as those of the RH850/E2x series (which incorporate the G4MH core) or the RX66T group (which incorporate the new RXv3 core for the RX family) can be debugged.
- **Software Trace Function (For RH850 Family)**[Learn More: ToolNews]
  The function enables users to view the execution history of the programs such as the values of the program counter (PC) and the register values together with the debug instructions of MCUs for RH850 family with the CS+ integrated development environment or the MULTI® integrated development environment (GHS MULTI) from Green Hills Software. Using this feature, unlike the conventional method of "tracing data with the settings of events and conditions," users can generate the execution history data such as the PC values and register values simply by inserting the debug instructions to the location where you like to check in the program.his feature is available in all RH850 family MCUs, including the ones do not have internal trace memory when debugging.
- Learn More

Release Information

Purpose of use	Software to be used	Target devices	Latest Version	Released	Operating Environment
On-chip Debugging	CS+ (CS+ for CC) *Evaluation Software Download	RH850, RL78, RX [More details] Functions Supported by CS+ (PDF | English, 日本語)	V8.05.00	Jan. 20, 2021	Operating Environment
	e² studio *Download	RA, RE, RH850 Note2, RL78, RX [More details] *See "Release notes".	(64-bit version) 2021-04	Apr. 13, 2021	
			(32-bit	Apr. 20,	

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Release Information
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Support

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Images

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			version) V7.8.0	2020	
	IAR Embedded Workbench Note1	RH850, RL78, RX	For the details of support for E2, contact IAR Systems.		
	Green Hills Multi Note1	RH850, R-Car D1	For the details of support for E2, contact Green Hills Software.		
Flash Programming	Renesas Flash Programmer V3 *Evaluation Software Download	RA, RE, RH850, RL78, RX [More details] List of MCUs supported by Renesas Flash Programmer V3 (PDF | English, 日本語)	V3.08.02	Apr. 13, 2021	Operating Environment

Notes:
1. As for tools produced by partners, Contact each company directly.
2. The e² studio does not support RH850-family MCUs with the next-generation G4MH core, such as those of the RH850/E2x series.

Target Devices

RA2A1, RA2E1, RA2L1, RA4M1, RA4M2, RA4M3, RA4W1, RA6M1, RA6M2, RA6M3, RA6M4, RA6M5, RA6T1, RE01-1500KB, RE01-256KB, RE01B, RH850/C1H, RH850/C1M, RH850/C1M-Ax, RH850/D1L, RH850/D1M, RH850/D1S, RH850/E1L, RH850/E1M-S2, RH850/E2H, RH850/E2M, RH850/E2UH, RH850/F1H, RH850/F1L, RH850/P1H-C, RH850/P1L-C, RH850/P1M, RH850/P1M-C, RH850/P1M-E, RH850/U2A16, RL78/D1A, RL78/F12, RL78/G10, RL78/G11, RL78/G12, RL78/G13, RL78/G13A, RL78/G14, RL78/G1A, RL78/G1C, RL78/G1D, RL78/G1E, RL78/G1F, RL78/G1G, RL78/G1H, RL78/G1P, RL78/G23, RL78/H1D, RL78/I1A, RL78/I1B, RL78/I1C, RL78/I1D, RL78/I1E, RL78/L12, RL78/L13, RL78/L1A, RL78/L1C, RX110, RX111, RX113, RX130, RX13T, RX210, RX21A, RX220, RX230, RX231, RX23E-A, RX23T, RX23W, RX24T, RX24U, RX610, RX62G, RX62N, RX62T, RX630, RX634, RX63N, RX63T, RX64M, RX65N, RX66N, RX66T, RX71M, RX72M, RX72N, RX72T

Product Options

Part Number	Description	Buy Sample
RTE0T00020KCE00000R	E2 Emulator	Buy / Quote

Documentation & Downloads

Title		Type	Format	File Size	Date
User Guides & Manuals					
On-chip Debuggers Performance Property	日本語	Manual	PDF	213 KB	Apr 13, 2021
E1/E20/E2 Emulator, E2 Emulator Lite Additional Document for User's Manual (Notes on Connection of RL78)	日本語	Manual	PDF	695 KB	Mar 16, 2021
E1/E20 Emulator, E2 Emulator Additional Document for User's Manual (Notes on Connection of RH850/P1M-C and RH850/P1H-C)	日本語	Manual	PDF	932 KB	Oct 9, 2020
E1/E20 Emulator, E2 Emulator Additional Document for User's Manual (Notes on Connection of RH850/P1L-C)	日本語	Manual	PDF	918 KB	Oct 9, 2020
E1/E20 Emulator, E2 Emulator Additional Document for User's Manual (Notes on Connection of RH850/P1M-E)	日本語	Manual	PDF	951 KB	Oct 9, 2020
E1/E20 Emulator, E2 Emulator Additional Document for User's Manual (Notes on Connection of RH850/E1M-S2)	日本語	Manual	PDF	902 KB	Oct 9, 2020
E1/E20 Emulator, E2 Emulator Additional Document for User's Manual (Notes on Connection of RH850/D1L and RH850/D1M)	日本語	Manual	PDF	1.07 MB	Oct 9, 2020
E1/E20 Emulator, E2 Emulator Additional Document for User's Manual (Notes on Connection of RH850/F1K)	日本語	Manual	PDF	1003 KB	Oct 9, 2020
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Application Notes & White Papers					
Security-Conscious Debugging Methods for RH850 Devices (Main-Core Debugging)	日本語	Application Note	PDF	1.17 MB	Mar 17, 2020
RH850 Introducing Methods of Debugging Devices Incorporating an Initially Stopped Core and Devices in Standby Mode	日本語	Application Note	PDF	1.17 MB	Jan 7, 2020

Current Consumption Tuning Solution for RX Family (E2 Emulator, CS+)	日本語	Application Note	PDF	2.25 MB	Jan 16, 2018
Current Consumption Tuning Solution for RX Family (E2 Emulator, e² studio)	日本語	Application Note	PDF	1.82 MB	Jan 16, 2018
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e² studio 2021-04 installer for Windows	日本語	Upgrade - IDE	ZIP	1,816.26 MB	Apr 13, 2021
E2 emulator Self Check Program V.1.02.00	日本語	Software	ZIP	3.47 MB	Feb 5, 2021
e² studio 2021-01 installer for Windows	日本語	Upgrade - IDE	EXE	1,637.73 MB	Jan 20, 2021
[Evaluation Software] CS+ for CC V8.05.00 (Single Download)	日本語	Evaluation Software	ZIP	719.07 MB	Jan 20, 2021
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Tool News					
[Notes] On-chip Debugging Emulators E2 Emulator, E2 Emulator Lite (when connected with RA)	日本語	Tool News - Note	PDF	142 KB	Apr 16, 2021
[Notes] E20 Emulator, E1 Emulator, E2 Emulator, E2 Emulator Lite	日本語	Tool News - Note	PDF	183 KB	Mar 25, 2021
[Upgrade to revision] E2 emulator Self Check Program V.1.02.00	日本語	Tool News - Release	PDF	176 KB	Feb 1, 2021
[Featured Tool] Introducing Renesas Flash Programmer Supporting TrustZone® in RA Family	日本語	Tool News - Featured Tool	PDF	193 KB	Dec 16, 2020
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[Flyer] E2Emulator[RTE0T00020KCE00000R]	日本語, 简体中文	Flyer	PDF	381 KB	Apr 2, 2020

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Specifications

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

- **Method of connection**
- **Break function**
- **Tracing**
- **Reference to and changing memory contents while a program runs**
- **Performance measurement**
- **Hot plug-in**

Since the method of connection and the functions may differ with the device you are using, refer to On-chip Debuggers Performance Property (PDF | English, 日本語).

On-board programming	Supported
User interfaces	14pin 2.54mm pitch connector (7614-6002: from 3M Japan, 2514-6002: from 3M Limited) 20pin 1.27mm pitch connector (FTSH-110-01-L-DV-K: from Samtec) 10pin 1.27mm pitch connector (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).

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 US FCC Standard: FCC part 15 Class A

Components

- E2 Emulator main unit
- USB cable
- User's system I/F cable [RTE0T00020KCAC0000J]*Available for purchase in single unit.
- Conversion adapter [RTE0T00020KCA00000R]
- Converts from 20-pin for E2 to 14-pin for E1.*Available for purchase in single unit.
- Test lead

System Configuration

Note 1. To use the E2 emulator with boards designed for the E1, use the E2's accompanying conversion adaptor.

>> Refer to the system configuration in case of using the E2 emulator as a flash programmer

Optional Products

The following optional products are provided to facilitate the use of the E2 emulator in various ways. They are only for certain ranges of products, so take care to select products that work with the MCU you are using.

Note: Please read references to "E1 emulator" in the manuals for optional products as also meaning "E2 emulator".

User-system Interface Cable
This cable is used to connect the E2 emulator. It can also be used for the E2 emulator Lite and PG-FP6.

Read More ▼

Conversion Adapter
Converts the number and pitch of pins of the connector for connecting the emulator.

Read More ▼

Isolator
Enables debugging in environments where the grounds of the user system and the host PC are not the same.

Read More ▼

Low voltage OCD Board
Enables debugging of an MCU with a power-supply voltage such that the on-chip flash ROM cannot be reprogrammed.This product is used between the emulator and a user's system, and is united by the in-circuit connection with the user's system.

Read More ▼

Debug MCU Board / Emulation Adapter
Enables the incircuit connection of the emulator with the user's system. Enables the use of enhanced debugging functions. The applicable debugging function varies depending on the MCU type.

Read More

Design Support

E2 emulator [RTE0T00020KCE00000R] Information for Users

Target Devices

- RA Family
- RE Family
- RH850 Family
- R-Car D1
- RL78 Family
- RX Family

Since the supported devices differ with the software you are using, confirm details in the "Target devices" column of Release information.

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