QB-MINI2

Release Note

R20UT0710EJ0200
Rev.2.00
Apr. 20, 2012

Thank you for purchasing On-Chip Debugging Emulator with Programming Function QB-MINI2.

This document describes the items below. See the user's manual of the QB-MINI2 (hereafter referred to as MINICUBE2) for cautions on using MINICUBE2.

- Restrictions not applicable to the target device but applicable to MINICUBE2
- Restrictions applicable to both the target device and MINICUBE2, but for which correction is planned only for MINICUBE2
- Devices supported by MINICUBE2

See the following documents for the restrictions related to the target device.

- User's manual of target device
- Restrictions notification document for target device

Chapter 1. Product Version

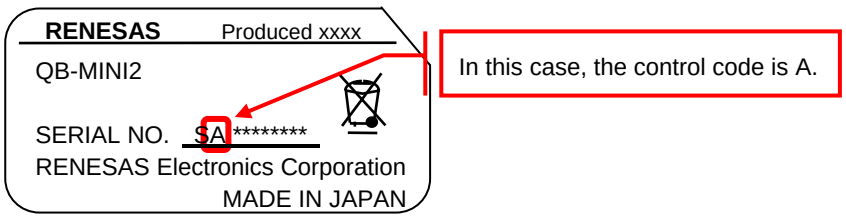
The product version is indicated by the following two items.

- Control code

  The control code is an alphabetic code used to identify the hardware of MINICUBE2. It is the second digit from the left in the 10-digit serial number printed on the label on the bottom of MINICUBE2, if it has not been upgraded. (See Figure 1-1 below.)

  If the product has been upgraded, the control code can be checked by using the MINICUBE2 diagnostic tool (see Figure 1-2 below).

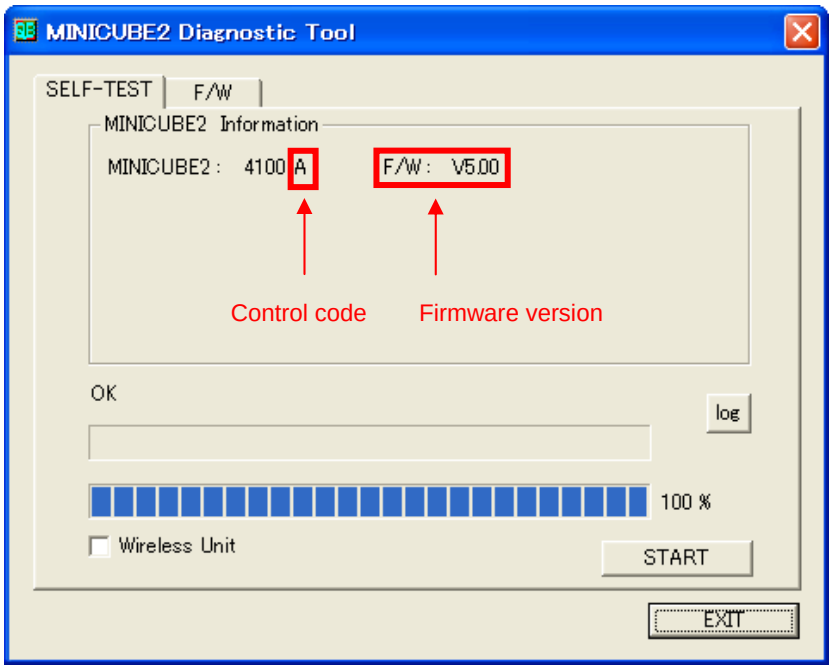
Figure 1-1. Checking the Control Code



- Firmware version

  Firmware (F/W) is a program embedded in MINICUBE2 to control its internal operations. The F/W version is shown as Vx.xx. The version can be checked by using the MINICUBE2 diagnostic tool (see Figure 1-2 below).

Figure 1-2. Checking the Control Code and Firmware Version



Chapter 2. Product History

Table 2-1 lists the restrictions and the specifications that have been changed in or added to MINICUBE2.

Table 2-1. Restrictions and Changed or Added Specifications

No.	Target Device	D/P[Note]	Changed or Added Specifications and Restrictions	Control Code A F/W Version 2.00	3.00	4.00	4.01	4.03	4.04	4.05	4.07	5.00	7.01	7.07
1	78K0	D	Internal high-speed RAM values become invalid after reset	×	×	×	×	×	×	×	×	×	×	×
2	V850	D	Restriction regarding watchdog timer	×	×	×	×	×	×	×	×	×	×	×
3	V850	D	Restriction on break during subclock operation	×	×	×	×	×	○	○	○	○	○	○
4	V850	D	Restriction regarding break during flash macro servicing	×	×	×	×	×	×	×	×	×	×	×
5	V850	D	Restriction regarding reset vector handling	×	×	×	×	×	×	×	×	×	×	×
6	V850	D	Restriction on rewriting registers that require a specific sequence	×	×	×	×	×	×	×	×	×	×	×
7	V850	D	Restriction when a reset occurs	×	×	×	×	×	×	×	×	×	×	×
8	78K0S	D	Restriction on debugging with operating clock of 6 MHz or lower	–	×	○	○	○	○	○	○	○	○	○
9	78K0S	D	Restriction on downloading when operating clock is 10 MHz	–	×	×	○	○	○	○	○	○	○	○
10	78K0S	D	Restriction on display of register values	–	×	○	○	○	○	○	○	○	○	○
11	78K0R	D	Restriction on breakpoint for a CPU clock lower than 2 MHz	–	–	×	×	Δ	Δ	Δ	Δ	Δ	Δ	Δ
12	78K0R	D	Restriction on debugging of time measurement in 1-wire mode	–	–	×	×	○	○	○	○	○	○	○
13	78K0R	D	Restriction regarding invalid operation after program download	–	–	×	×	○	○	○	○	○	○	○
14	78K0R	D	Restriction on using MINICUBE2 with USB 1.1	–	–	×	×	○	○	○	○	○	○	○
15	78K0	D	Restriction on operation at 20 MHz or higher	×	×	×	×	○	○	○	○	○	○	○
16	78K0R	D	Restriction on general-purpose registers after reset	–	–	×	×	×	×	×	×	×	×	×
17	78K0R	D	Specifications changed/added in conjunction with firmware optimization	–	–	×	×	○	○	○	○ ○			
18	78K0R	D	Restriction on hardware breaks	–	–	×	×	×	×	×	×	×	×	×
19	V850	D	Improvement of downloading speed when target is connected via CSI	–	–	–	–	–	○	○	○	○	○	○
20	V850	D	Change of specification for reserved area when target is connected via CSI	–	–	–	–	–	○	○	○	○	○	○
21	V850	D	Restriction on operation at low voltage	–	–	–	–	–	×	×	×	×	×	×
22	78K0R	D	Addition of specifications on RRM and DMM	–	–	–	–	–	–	○	○	○	○	○
23	78K0	D/P	On-chip debugging and flash programming of devices that have TOOLCx and TOOLDx pins	–	–	–	–	–	–	–	○	○	○	○
24	All	D/P	Addition of specification for supporting MINICUBE2 wireless unit	–	–	–	–	–	–	–	–	○	○	○
25	78K0 78K0R V850	P	Support of Renesas Flash Programmer	–	–	–	–	–	–	–	–	–	○	○
26	V850	D	Addition of specification for supporting V850E2	–	–	–	–	–	–	–	–	–	–	○

○: Restriction is not applicable or has already been corrected. Changed or added specifications apply.

Δ: Restriction has been partially corrected.

×: Restriction is applicable. Changed or added specifications do not apply.

–: Not relevant or the target device is not supported

Note D: Applicable during debugging, P: Applicable during programming.

Remark A permanent restriction means a restriction that will not be corrected.

Chapter 3. Details of Restrictions and Added Specifications

No. 1 Internal high-speed RAM values become invalid after reset

[Target device] 78K0

[Description]

If a reset signal is input via the RESET pin during program execution, the internal high-speed RAM areas shown below become invalid. This does not occur when a reset is triggered by a source such as the watchdog timer or LVI.

- 5 bytes from FECBh to FECFh

  (When **Permit** is selected for **Target Power OFF** in the **Configuration** dialog box)

- 10 bytes from FEC9h to FECFh and FEDDh to FEDFh

  (When **Not Permit** is selected for **Target Power OFF** in the **Configuration** dialog box)

[Workaround]

There is no workaround.

No. 2 Restriction regarding watchdog timer

[Target device] V850

[Description]

The watchdog timer is forcibly stopped by the debug monitor program. Therefore, do not use the option byte to specify that the watchdog timer cannot be stopped. For details about the option byte settings, see the user's manual of the target device.

[Workaround]

There is no workaround.

No. 3 Restriction on break during subclock operation

[Target device] V850

[Description]

When the mode for communication between MINICUBE2 and the target device is UART, and if a break occurs during subclock operation while the main clock is stopped, the debug monitor program forcibly switches the operating clock to the main clock. The device continues operating on the main clock, even after execution resumes. Whether the operating clock during a break is switched from the subclock to the main clock depends on the **Monitor Clock** setting in the **Configuration** dialog box of the debugger.

[Workaround]

There is no workaround.

This issue has been corrected in firmware V4.04. If you are using the Renesas Electronics debugger ID850QB, please switch to ID850QB V3.40 or later.

No. 4 Restriction regarding break during flash macro servicing

[Target device] V850

[Description]

If a break occurs during flash macro servicing, it occurs at an unexpected address. This also applies if a break occurs in the debugger, such as when using pseudo RRM.

[Workaround]

There is no workaround. Reset the device and re-execute the program.

No. 5 Restriction regarding reset vector handling

[Target device] V850

[Description]

Reset vector handling is not supported.

[Workaround]

There is no workaround.

No. 6 Restriction on rewriting registers that require a specific sequence

[Target device] V850

[Description]

Peripheral I/O registers (other than PCC and CKC) that require a specific sequence cannot be rewritten in debugger windows such as the I/O register window.

[Workaround]

There is no workaround.

No. 7 Restriction when a reset occurs

[Target device] V850

[Description]

A break occurs when an external reset occurs (except when resets are masked) or an internal reset occurs.

[Workaround]

There is no workaround.

No. 8 Restriction on debugging with operating clock of 6 MHz or lower

[Target device] 78K0S

[Description]

The debugger does not start when the target device operating frequency is 6 MHz or lower.

[Workaround]

There is no workaround. This issue has been corrected in firmware V4.00.

No. 9 Restriction on downloading when operating clock is 10 MHz

[Target device] 78K0S

[Description]

When the target device operating frequency is 10 MHz, an error will occur when a program is being downloaded and downloading cannot be completed.

[Workaround]

There is no workaround. This issue has been corrected in firmware V4.01. If you are using the Renesas Electronics debugger ID78K0S-QB, please switch to ID78K0S-QB V2.90 or later.

No. 10 Restriction on display of register values

[Target device] 78K0S

[Description]

The register values might be displayed incorrectly in the debugger when a break occurs.

[Workaround]

There is no workaround. This issue has been corrected in firmware V4.00.

No. 11 Restriction on breakpoint for a CPU clock lower than 2 MHz

[Target device] 78K0R

[Description]

If a break occurs when the CPU is operating on a clock (f_{CLK}) with a frequency lower than 2 MHz while the PER0 and PER1 registers are set to 0, the internal flash memory cannot be rewritten. Consequently, the following operations cannot be performed:

<1> Writing to internal flash memory

<2> Setting or canceling software breakpoints

<3> Starting execution at the specified software breakpoint

<4> Stepping through code at the specified software breakpoint

<5> Stepping through code, executing Return Out

<6> Executing Come Here

<7> If **Permit** is selected in the **Flash Programming** area in the **Configuration** dialog box, the following operations cannot be performed:

(a) Setting, changing, or canceling hardware breakpoints

(b) Masking and unmasking internal resets

(c) Switching peripheral breakpoints

[Workaround]

There is no workaround. To specify a breakpoint for an operation performed on a CPU clock lower than 2 MHz, use a hardware breakpoint, not a software breakpoint.

This restriction is partially corrected in firmware V4.03, as shown below. To apply this correction, please use the Renesas Electronics debugger ID78K0R-QB V3.30 or later.

[Correction]

To avoid the CPU operating on a clock with a frequency at which the flash memory cannot be written, the specifications will be changed so that a frequency that enables flash memory rewriting is selected automatically, and the register settings are restored after flash memory rewriting is completed. To prevent the frequency from being switched automatically, select **User** in the **Monitor Clock** area and **Not Permit** in the **Flash Programming** area in the ID78K0R-QB **Configuration** dialog box. Note, however, that specifying this setting means that the operations <1> to <7> above can no longer be performed.

No. 12 Restriction on debugging of time measurement in 1-wire mode

[Target device] 78K0R

[Description]

When debugging is performed in 1-wire mode (selected by choosing **TOOL0** in the **Target Device Connection** area in the **Configuration** dialog box of the debugger), the Run-Break execution time is measured with an accuracy of roughly 10 ms order. The prescribed accuracy is 100 μs.

[Workaround]

Perform debugging in 2-wire mode (TOOL0 + TOOL1).

This issue has been corrected in firmware V4.03. If you are using the Renesas Electronics debugger ID78K0R-QB, please switch to ID78K0R-QB V3.30 or later.

No. 13 Restriction regarding invalid operation after program download

[Target device] 78K0R

[Description]

When the reset vector (addresses 0 and 1) is assigned to an address lower than 0x0100, the debugger malfunctions after a program is downloaded. Specifically, illegal breaks occur immediately after execution, the **Source** window cannot be opened.

[Workaround]

Assign the reset vector for the user program to an address of 0x0100 or higher.

This issue has been corrected in firmware V4.03. If you are using the Renesas Electronics debugger ID78K0R-QB, please switch to ID78K0R-QB V3.30 or later.

No. 14 Restriction on using MINICUBE2 with USB 1.1

[Target device] 78K0R

[Description]

The debugger might malfunction if MINICUBE2 is connected via a USB 1.1 interface.

[Workaround]

There is no workaround. This issue has been corrected in firmware V4.03.

No. 15 Restriction on operation at 20 MHz or higher

[Target device] 78K0R

[Description]

When MINICUBE2 operates on a frequency of 20 MHz or higher, downloading or changing the memory contents might fail.

[Workaround]

Download or change the memory contents at a frequency lower than 20 MHz.

This issue has been corrected in firmware V4.03.

No. 16 Restriction on general-purpose registers after reset

[Target device] 78K0R

[Description]

The general-purpose register contents are not retained after a reset in standby mode.

[Workaround]

There is no workaround.

No. 17 Specifications changed/added in conjunction with firmware optimization

[Target device] 78K0R

[Description]

The specifications below have been changed or added in conjunction with firmware optimization. These changes apply from the 2nd edition of the MINICUBE2 user's manual.

The optimized firmware is V4.03. If you are using the Renesas Electronics debugger ID78K0R-QB, please switch to V3.30 or later.

<1> The debugger operating speed has been raised by improving the MINICUBE2 firmware processing.
<2> The operating speed in 1-wire mode has been raised to the level of 2-wire mode.
<3> When pseudo real-time monitoring (RRM) is not used during debugging in 2-wire mode, the size of the debug monitor program allocated to the last block in the internal ROM is reduced from 1 KB to 88 bytes.
<4> Instructions that execute two instructions while stepping through code have been modified so as to execute only one instruction.
<5> The option byte setting (C1H) for the LVI default start function is now the same regardless of whether MINICUBE2 is connected.

<6> Debugger operations for rewriting the flash memory (such as downloading memory data and setting software breaks), which were not possible when the target microcontroller could not rewrite the flash memory due to the CPU clock or the regulator mode can now be executed because the specification has been changed so that the debugger automatically changes the SFR contents so as to enable rewriting of the flash memory. (Correction of restriction No. 11 is also included in this change.) After the flash memory is rewritten, the SFR contents will be restored. The debugger will output the errors below if the operation voltage is lower than the voltage at which flash memory rewriting is disabled (1), or if flash memory rewriting is prohibited by the debugger configuration (2). (This applies when using the ID78K0R-QB.)

- For (1): F0C37: The voltage is too low to operate flash programming.
- For (2): F0C48: Flash programming is disabled in the debugger.
- For (1) or (2) and when setting or cancelling software breakpoints:
  W401C: Software break can not be set on this area.

<7> The break that was generated if STOP mode was entered when pseudo RRM was used is now prevented by cancelling the STOP mode.

No. 18 Restriction on hardware breaks

[Target device] 78K0R

[Description]

A hardware break occurs at an address several instructions after the specified point. This applies to both instruction fetch and data access. If any of the debugger operations <1> to <3> below is executed while rewriting the flash memory is disabled, a hardware break occurs at an address several instructions after the specified point.

<1> Stepping through code

<2> Return Out

<3> Come Here

[Workaround]

There is no workaround.

No. 19 Improvement of downloading speed when target is connected via CSI interface

[Target device] V850

[Description]

The downloading speed when connecting MINICUBE2 to the target system via the CSI interface has been approximately doubled.

This specification change applies from firmware V4.04. If you are using the Renesas Electronics debugger ID850QB, please switch to ID850QB V3.40 or later.

[Caution]

When the ID850QB is upgraded to V3.40, it does not start if firmware is V4.03 or earlier. Be sure to upgrade the firmware to V4.04 or later when upgrading the ID850QB to V3.40 and when connecting MINICUBE2 to the target system via UART, even though the new specification does not apply to this case.

No. 20 Change of specification for reserved area when target is connected via CSI

[Target device] V850ES/IE2

[Description]

The reception error interrupt can now be used when MINICUBE2 is connected to the target system via the CSI interface. This is implemented to prevent the debugger hanging up when a reception error occurs.

This specification change applies from firmware V4.04. If you are using the Renesas Electronics debugger ID850QB, please switch to ID850QB V3.40 or later.

[Caution]

When the ID850QB is upgraded to V3.40, it does not start if firmware is V4.03 or earlier. Be sure to upgrade the firmware to V4.04 or later when upgrading the ID850QB to V3.40 and connecting MINICUBE2 to the target system via UART, even though the new specification does not apply to this case.

No. 21 Restriction on operation at low voltage

[Target device] V850ES/JF3-L, V850ES/JG3-L

[Description]

When debugging on a voltage of less than 2.7 V, MINICUBE2 and the target device cannot communicate correctly, causing a malfunction. Be sure to debug on a voltage of at least 2.7 V.

[Workaround]

There is no workaround.

No. 22 Addition of specifications on RRM and DMM

[Target device] 78K0R

[Description]

The specifications <1> to <3> below have been added. These specifications are added in firmware V4.05 and later. If you are using the Renesas Electronics debugger ID78K0R-QB, please switch to ID78K0R-QB V3.50 or later.

<1> Pseudo RRM is now supported in 1-wire mode. (This was supported only in 2-wire mode in older versions.)

<2> The entire memory space can now be monitored when using pseudo RRM. (This was available only for a 16-byte space in older versions.) Note that if the targets to be monitored are too numerous, the operability of the debugger might be affected because the monitoring speed is slow when using pseudo RRM in 1-wire mode. When using the ID78K0R-QB, therefore, monitoring by using the **Watch** window, rather than the **Memory** window, is recommended.

<3> Direct memory modification (DMM) can now be used and the contents in the RAM can now be changed during program execution. When using DMM, program execution stops. Consequently, the memory contents are not changed in real time.

No. 23 On-chip debugging and flash programming of devices that have TOOLCx and TOOLDx pins

[Target device] 78K0

[Description]

On-chip debugging and flash programming of devices that have the TOOLCx and TOOLDx pins can now be executed. This specification is added in firmware V4.07 and later. If you are using the Renesas Electronics debugger ID78K0-QB, please switch to ID78K0-QB V3.10 or later.

[Caution]

When the ID78K0-QB is upgraded to V3.10, be sure to upgrade the firmware to V4.07 or later.

No. 24 Addition of specification for supporting MINICUBE2 wireless unit

[Target device] 78K0S, 78K0, 78K0R, V850

[Description]

A wireless unit for MINICUBE2 (sold separately) is now available. This specification is added to firmware V5.00 or later.

[Caution]

This unit can be used for all 78K0S, 78K0, 78K0R, and V850 microcontrollers, but whether a microcontroller is supported varies depending on the version of the debugger used. For details about the supported devices, see the Web page for the wireless unit, which is linked to the MINICUBE2 information site.

No. 25 Support of Renesas Flash Programmer

[Target device] 78K0, 78K0R, V850

[Description]

Flash programming software Renesas Flash Programmer was supported. This specification is added to firmware V7.01 or later.

No. 26 Addition of specification for supporting V850E2

[Target device] V850

[Description]

V850E2 was supported. This specification is added to firmware V7.07 or later.

Chapter 4. Supported Devices

Information on the supported devices is also available on the following CubeSuite+ website and Renesas Flash Programmer website.

CubeSuite+ website: http://www.renesas.com/cubesuite+

Renesas Flash Programmer website: http://www.renesas.com/rfp

Chapter 5. Supplements

5.1 Supplement for RRM Executed for 78K0 Microcontrollers

This section provides supplementary information on specifying the ROM area (debug monitoring area + pseudo RRM area) used for CubeSuite+ when executing pseudo real-time RAM monitoring (RRM) for 78K0 microcontrollers.

<table>
<tr><th rowspan="2">Microcontrollers</th><th colspan="2">Debug monitoring area (include RRM area) size that must be allocated</th></tr>
<tr><th>In case of not using RRM function (Byte)</th><th>In case of using RRM function (Byte)</th></tr>
<tr><td>78K0/Kx2-L</td><td rowspan="3">256</td><td rowspan="3">384</td></tr>
<tr><td>78K0/Fx2-L</td></tr>
<tr><td>78K0/Ix2</td></tr>
<tr><td>78K0/Kx2</td><td colspan="2" rowspan="10">256</td></tr>
<tr><td>78K0/Kx2-A</td></tr>
<tr><td>78K0/Kx2-C</td></tr>
<tr><td>78K0/Lx3</td></tr>
<tr><td>78K0/Lx3-M</td></tr>
<tr><td>78K0/Fx2</td></tr>
<tr><td>78K0/Dx2</td></tr>
<tr><td>µPD78F0730</td></tr>
<tr><td>µPD78F8039</td></tr>
</table>

5.2 Supplement for debugging interface for V850 Microcontrollers

The serial interface that can be used for the debugging interface of MINICUBE2 and the V850 Microcontrollers is supplemented.

Microcontrollers	Debugging interface
V850ES/HE2	UARTA0/CSIB0
V850ES/HF2	
V850ES/HG2	
V850ES/HJ2	
V850ES/HE3	UARTA0/CSIB0
V850ES/HF3	
V850ES/HG3	
V850ES/HJ3	
V850ES/IE2	UARTA0/CSIB0
V850ES/JG2	UARTA0/CSIB0/CSIB3
V850ES/JJ2	
V850ES/JG3	UARTA0/CSIB0/CSIB3
V850ES/JJ3	
V850ES/JC3-L	UARTA0/CSIB0
V850ES/JE3-L	UARTA0/CSIB0/CSIB3
V850ES/JF3-L	
V850ES/JG3-L	
V850ES/JC3-H	UARTC0/CSIF0/CSIF3
V850ES/JE3-H	
V850ES/JG3-H	
V850ES/JH3-H	
V850ES/JG3-U	
V850ES/JH3-U	
V850ES/JJ3-E	UARTC0/CSIF0/CSIF3
V850ES/JH3-E	
V850ES/KE2	UART0/CSI0
V850ES/KF2	
V850ES/KG2	
V850ES/KJ2	
V850ES/KE1[注1]	UART0/CSI0
V850ES/KF1[注1]	
V850ES/KG1[注1]	
V850ES/KJ1[注1]	
V850ES/KE1+	UART0/CSI0
V850ES/KF1+	
V850ES/KG1+	
V850ES/KJ1+	

Microcontrollers	Debugging interface
V850ES/FE2	UARTA0/CSIB0
V850ES/FF2	
V850ES/FG2	
V850ES/FJ2	
V850ES/FE3	UARTD0/CSIB0[注2]
V850ES/FF3	
V850ES/FG3	
V850ES/FJ3	
V850ES/FK3	
V850ES/FE3-L	UARTD0/CSIB0[注2]
V850ES/FF3-L	
V850ES/FG3-L	
V850E/IA3	UARTA0/CSIB0
V850E/IA4	
V850ES/IK1	UARTA0/CSIB0
V850ES/SG2	UARTA0/CSIB0/CSIB3
V850ES/SJ2	
V850ES/SG3	UARTA0/CSIB0/CSIB3
V850ES/SJ3	
V850ES/SJ3-H	UARTA0/CSIB0/CSIB3
V850ES/SK3-H	
V850E/DG3	UARTA0/CSIB0
V850E/DJ3	
V850ES/MA3	UARTA0/CSIB0
V850E/IF3	UARTA0/CSIB0
V850E/IG3	
V850E/IG4	UARTA0/CSIF0
V850E/IH4	
V850E/IG4-H	
V850E/IH4-H	
V850E2/FF4-M	UART
V850E2/FG4	
V850E2/FG4-L	
V850E2/FJ4	
V850E2/FK4	
V850E2/FK4-H	
V850E2/FL4	
V850E2/FL4-H	
V850E2/SK4-H	

Note1:Supported only in single-power-supply products (product name suffixed by H)
Note2:When using UARTD0, fRH cannot be used as the CPU clock.

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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