

USB Power Delivery Controller

ICTS2-ISG-16-5007

Rev. 0.10

Flash memory image data generator software (PDC-IMGGEN)

June 16, 2016

Target Device

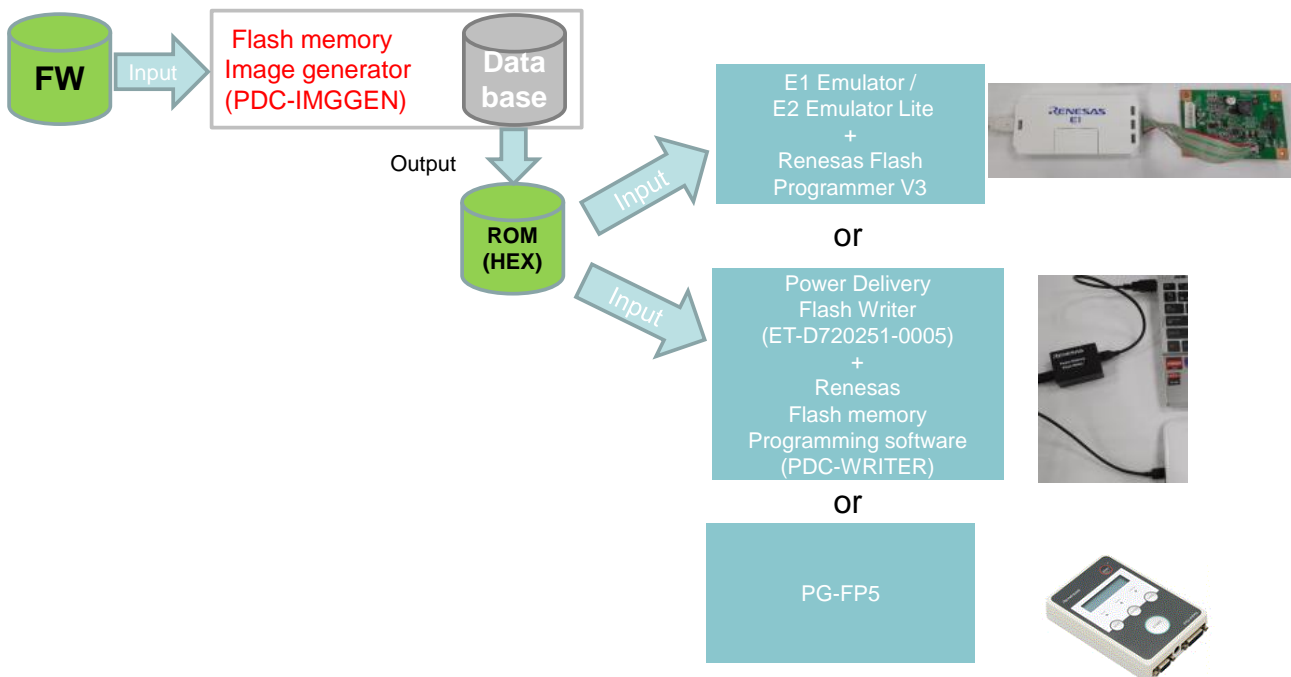
USB Power Delivery Controller R9A02G011

Contents

| | |
|--|-----------|
| 1. Overview | 2 |
| 1.1 Features | 2 |
| 1.2 Related Documents..... | 2 |
| 1.3 Operating environment..... | 3 |
| 1.3.1 Hardware environment | 3 |
| 1.3.2 Software environment | 3 |
| 2. Generating Flash memory image data | 4 |
| 3. Parameter settings | 9 |
| 3.1 General tab..... | 9 |
| 3.2 Source Capability tab | 12 |
| 3.3 Sink Capability tab | 13 |
| 3.4 Timer setting tab | 14 |

1. Overview

The Flash memory image data generator (hereafter PDC-IMGGEN) is a software tool that produces Flash memory image data for the Renesas USB Power Delivery Controller (R9A02G011).



1.1 Features

- Customize several parameters for your system.
- Generate Flash memory image data

1.2 Related Documents

Use this document in combination with the following documents.

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

- Universal Serial Bus Power Delivery Specification Revision 3.0
- R9A02G011 Data Sheet: R19DS0088EJ
- R9A02G011 User's Manual- : TBD
- R9A02G011 Application Note, Flash memory Programming Guide: TBD
- Renesas USB Power Delivery Controller Flash memory image data programming software User's Manual: TBD
- Renesas Flash Programmer V3.01: R20UT3766E
- E1/E20 Emulator User's Manual: R20UT0398E
- E2 Emulator Lite RTE0T0002LKECE00000R User's Manual: R20UT3240E

1.3 Operating environment

1.3.1 Hardware environment

(1) Host PC

- Processor: 1GHz or faster
- Main memory: At least 1 Gbyte
- Display: Resolution of 1,024 x 768 or higher and 65,536 or more colors
- Interface: USB 2.0

1.3.2 Software environment

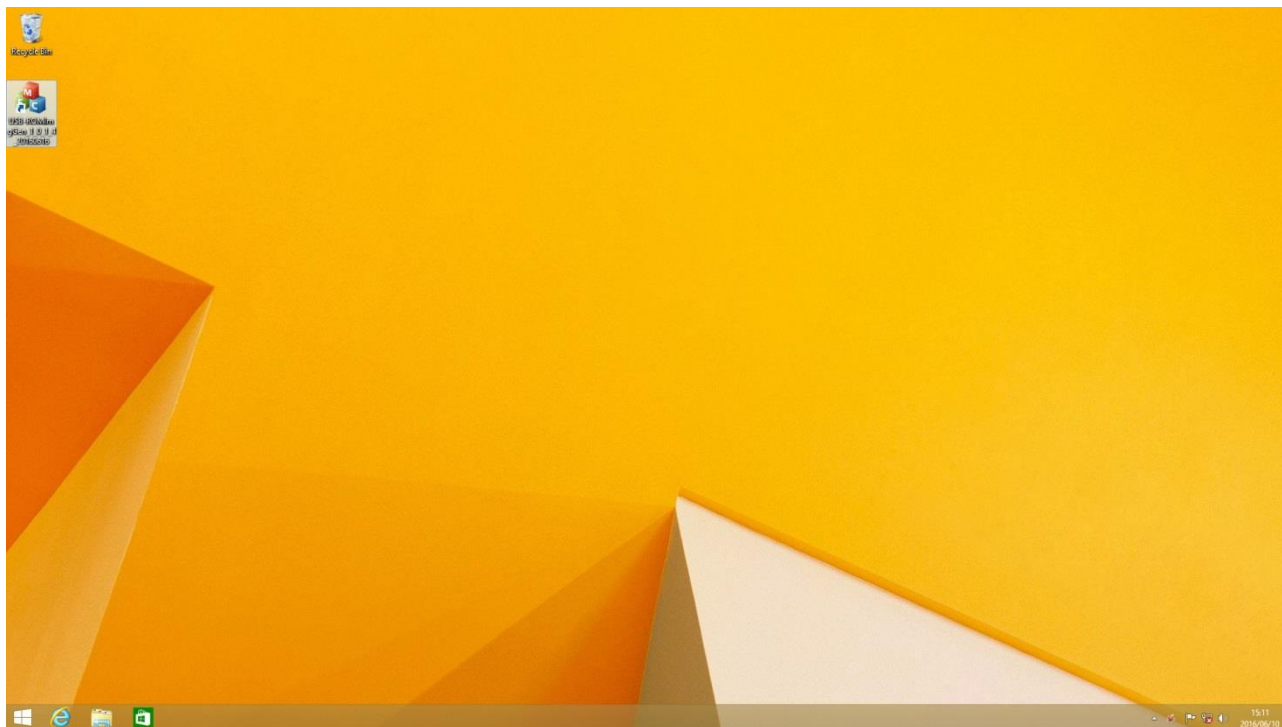
(1) OSs supported

- Windows 7 (32-bit and 64-bit)
- Windows 8.1 (32-bit and 64-bit)
- Windows 10 (32-bit and 64-bit)

2. Generating Flash memory image data

- 1) Install by using installation program which is provided from Renesas Web site.
- 2) Download firmware data from Renesas website, then copy it to your folder.
- 3) Execute ROMImgeGen.

A shortcut icon is available after the program is installed.



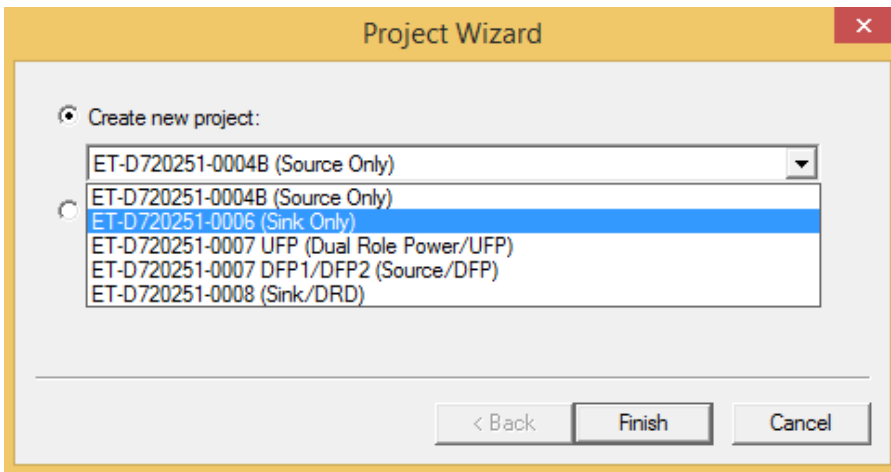
- 4) The “Project Wizard” is opened. If you select “Create new project”, several projects will be available. Please select a suitable project for your system.

Following are the guidelines to select a project, in accordance with the user’s manual.

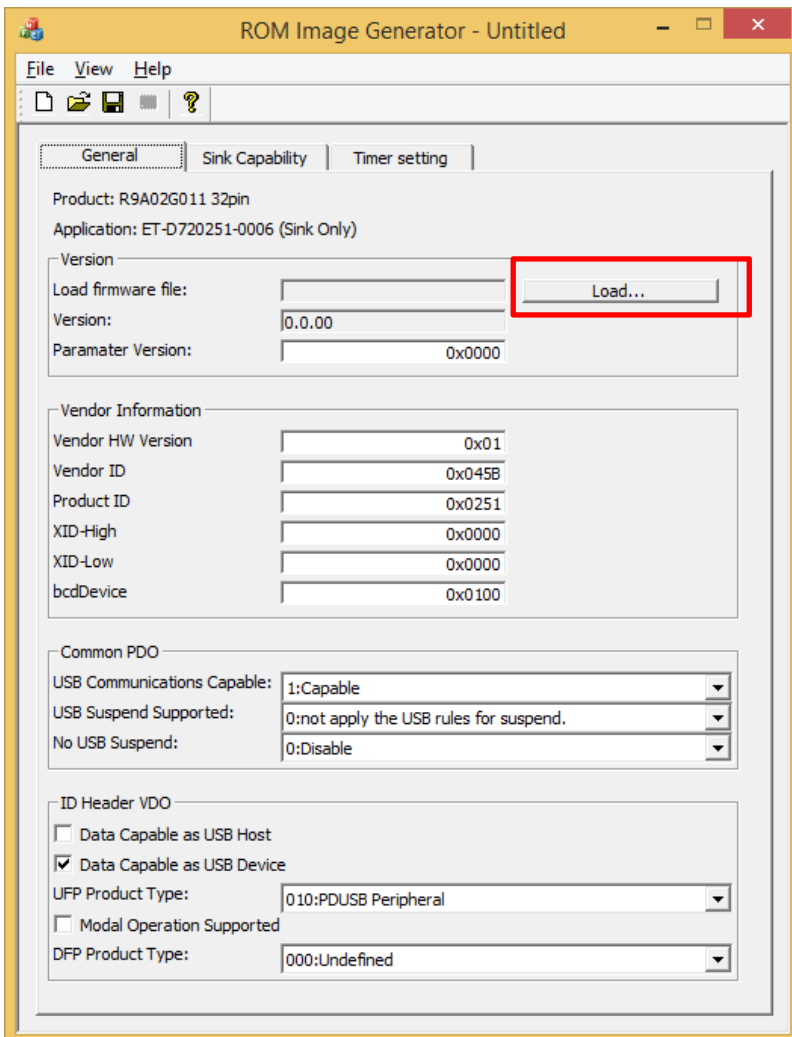
Section 4.1 (Source only) -> ET-D720251-0004B (Source Only)

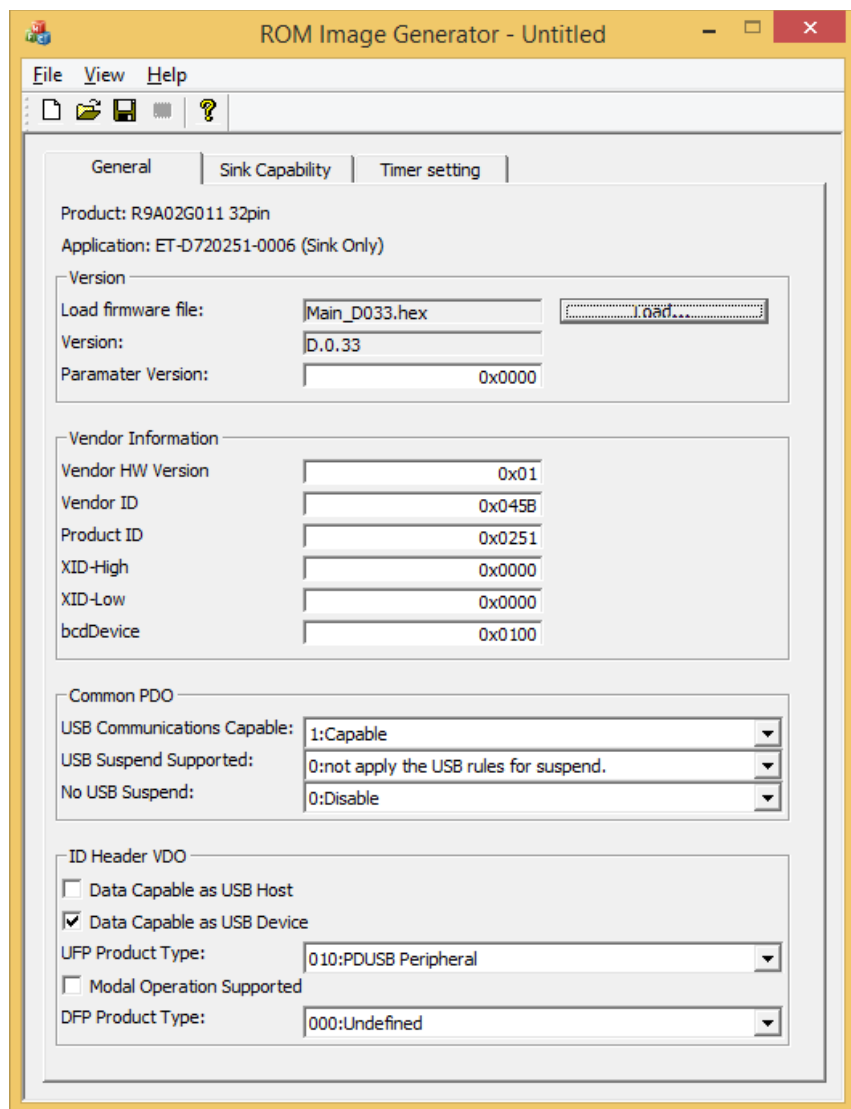
Section 4.2 (DRP) -> ET-D720251-0007 UFP (Dual Role Power/UFP)

Section 4.3 (Slink only) -> ET-D720251-0006 (Sink Only)

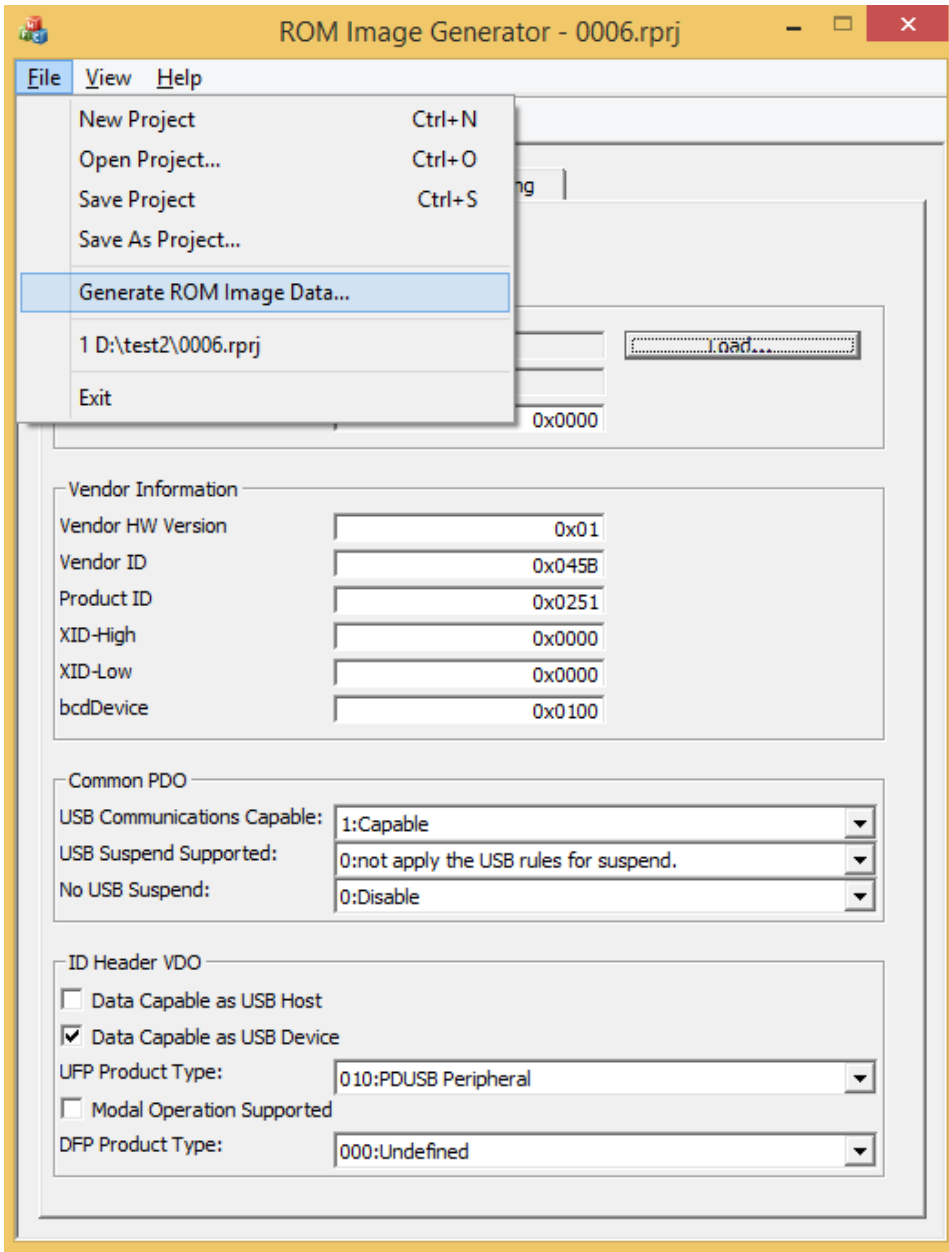


5) After a new window appears, specify firmware by the “load” button. Edit parameters, then save your project.

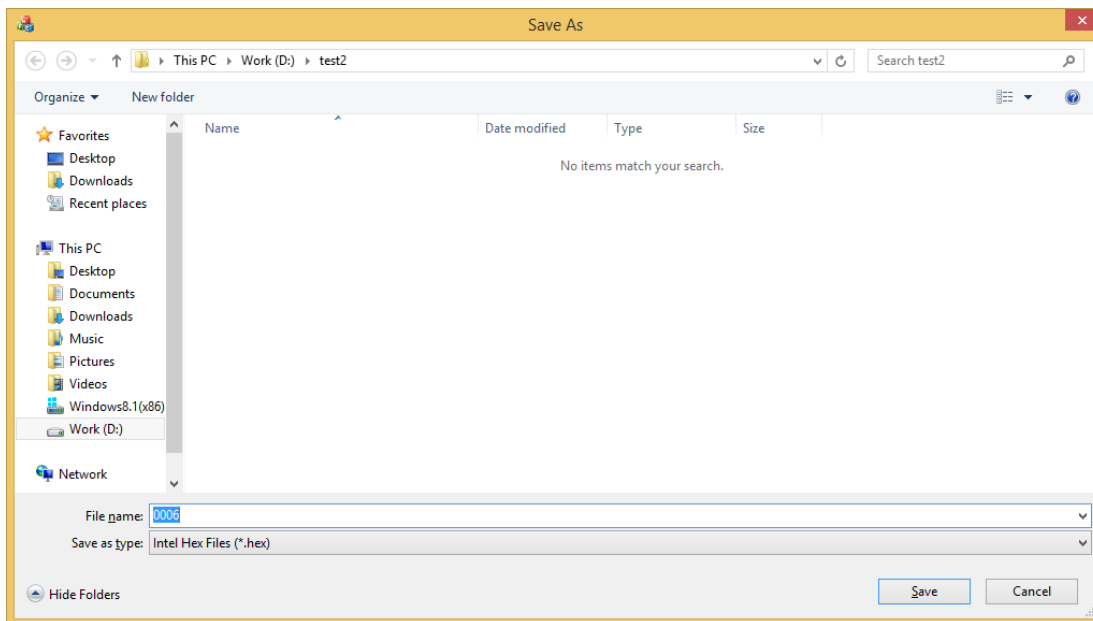




6) After you have saved the project, you can generate Flash memory image data.



The data type should be specified by Intel Hex files normally. Save the file, and write it to R9A02G011 with Flash writer (Renesas E1 Emulator, E2 Emulator Lite or Power Delivery Flash Writer).

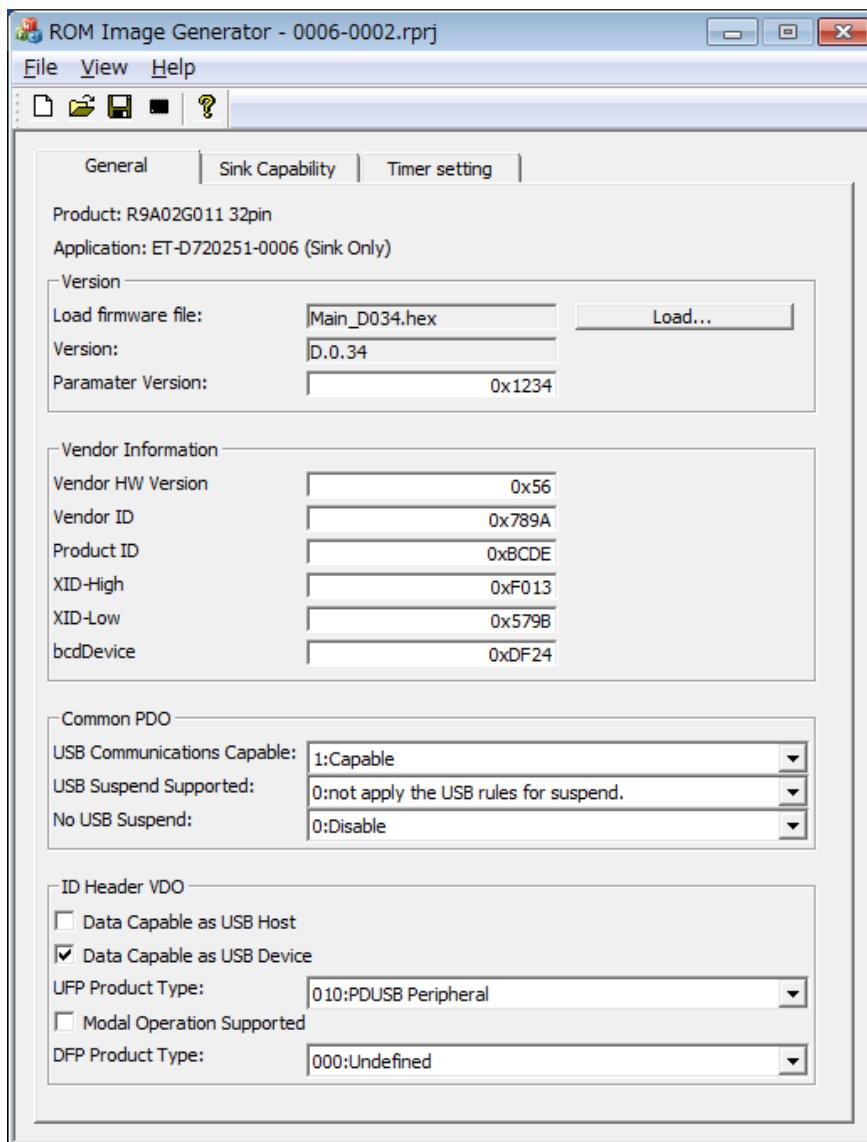


3. Parameter settings

Several parameters can be changed for your system.

3.1 General tab

Three VDO's (ID Header VDO, Cert Stat VDO and Product VDO) which are returned for the "Discover Identity" command can be changed with "General" tab.



(1) Version

It is necessary to load firmware.

Please select a firmware program file by clicking Load button. After it is loaded successfully, its version is shown on the utility.

Parameter version can be specified to maintain your parameter's revision.

(2) Vendor Information

i) Vendor HW Version (Hexadecimal)

HW version can be specified to maintain your parameter's revision.

ii) Vendor ID (Hexadecimal)

Set value for "ID Header VDO[15:0]".

The Vendor ID field shall contain the 16-bit Vendor ID value assigned to the vendor by USB-IF.

iii) Product ID (Hexadecimal)

Set value for "Product VDO[31:16]".

iv) XID-high (Hexadecimal)

Set value for "Cert Stat VDO[31:16]".

v) XID-low (Hexadecimal)

Set value for "Cert Stat VDO[15:0]".

vi) bcdDevice (Hexadecimal)

Set value for "Product VDO[15:0]".

(3) Common PDO (Binary)

i) USB communication capable

Set value for "fixed PDO[26]".

ii) USB suspend support (Binary)

Set value for "fixed PDO[28]".

iii) No USB suspend (Binary)

Set value for "RDO[24]".

(4) ID Header VDO

i) Data Capable as USB Host (Binary)

Set value for "ID Header VDO[31]".

Set to one if the product is capable of enumerating USB Devices. Set to zero otherwise.

ii) Data Capable as USB Device (Binary)

Set value for "ID Header VDO[30]".

Set to one if the product is capable of enumerated as USB Devices. Set to zero otherwise.

iii) UFP Product Type (Binary)

Set value for "ID Header VDO[29:27]".

000b – Undefined

001b – PDUSB hub

010b – PDUSB peripheral

011b .. 100b – Reserved, shall not be used

101b – Alternate Mode Adapter (AMA)

110b .. 111b – Reserved shall not be used.

iv) Modal Operation Supported (Binary)

Set value for "ID Header VDO[26]".

Set to one if the product supports Modal Operation.

Set to zero otherwise.

v) DFP Product Type (Binary)

Set value for "ID Header VDO[25:23]".

000b – Undefined

001b – PDUSB Hub

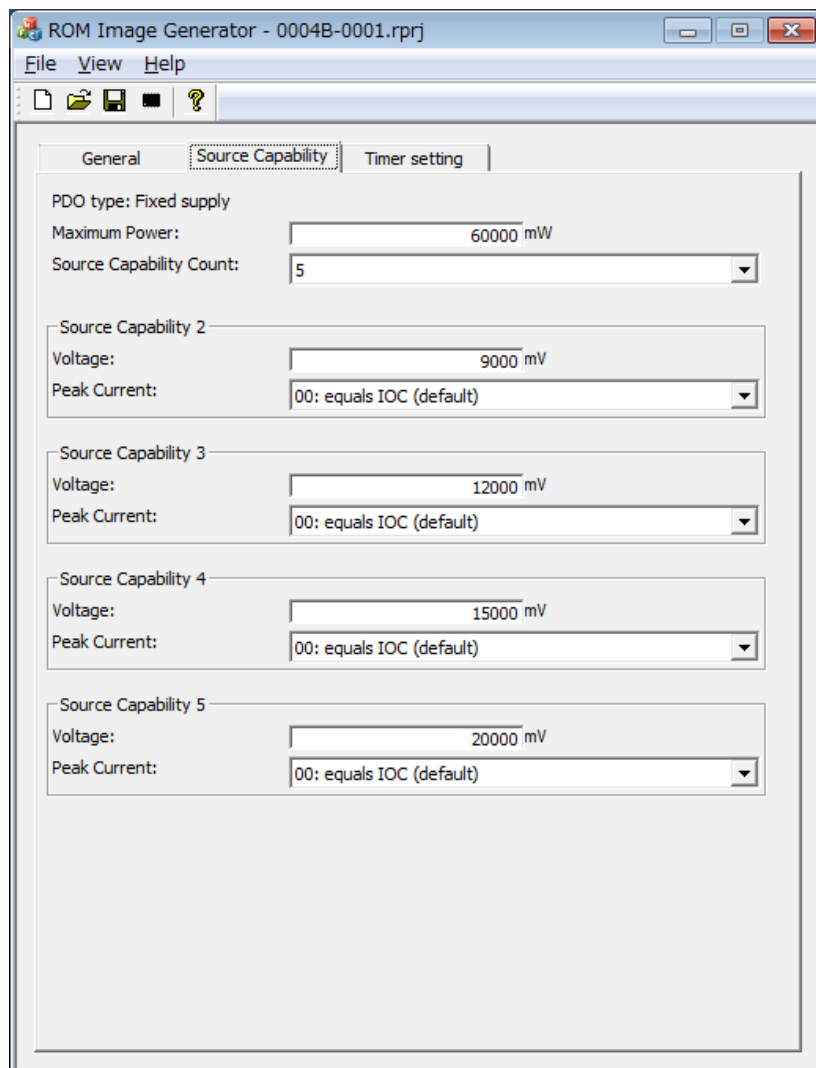
010b – PDUSB Host

011b – Power Brick

101b – Alternate Mode Controller (AMC)

101b .. 111b – Reserved, shall not be used.

3.2 Source Capability tab



(1) Maximum Power (Decimal)

Set value for source maximum power.

(2) Source Capability Count

Select "Source Capability" count.

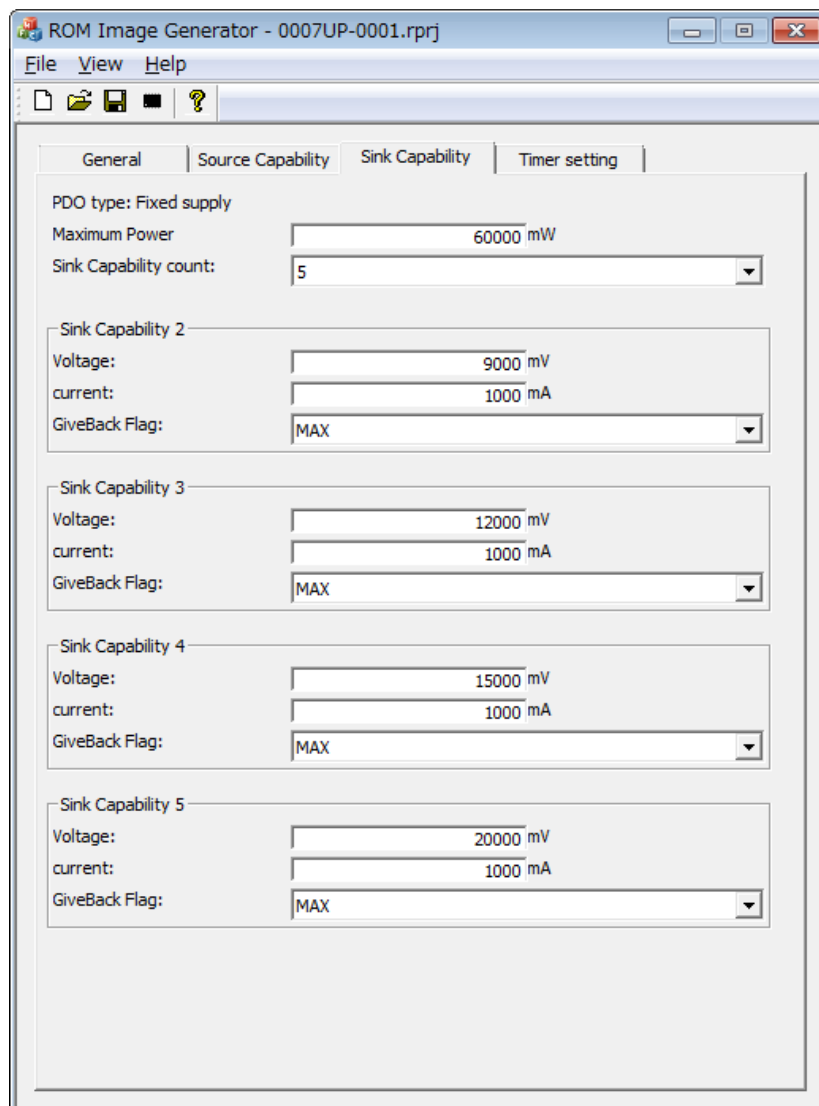
(3) Source Capability n (n=2,3,--5)

Set voltage and select peak current value.

i) Voltage (Decimal)

ii) Peak Current (Binary)

3.3 Sink Capability tab



(1) Maximum Power (Decimal)

Set value for sink maximum power.

(2) Sink Capability count

Select “Sink Capability” count.

(3) Sink Capability n (n=2,3,--5)

Set voltage, current and select peak current value.

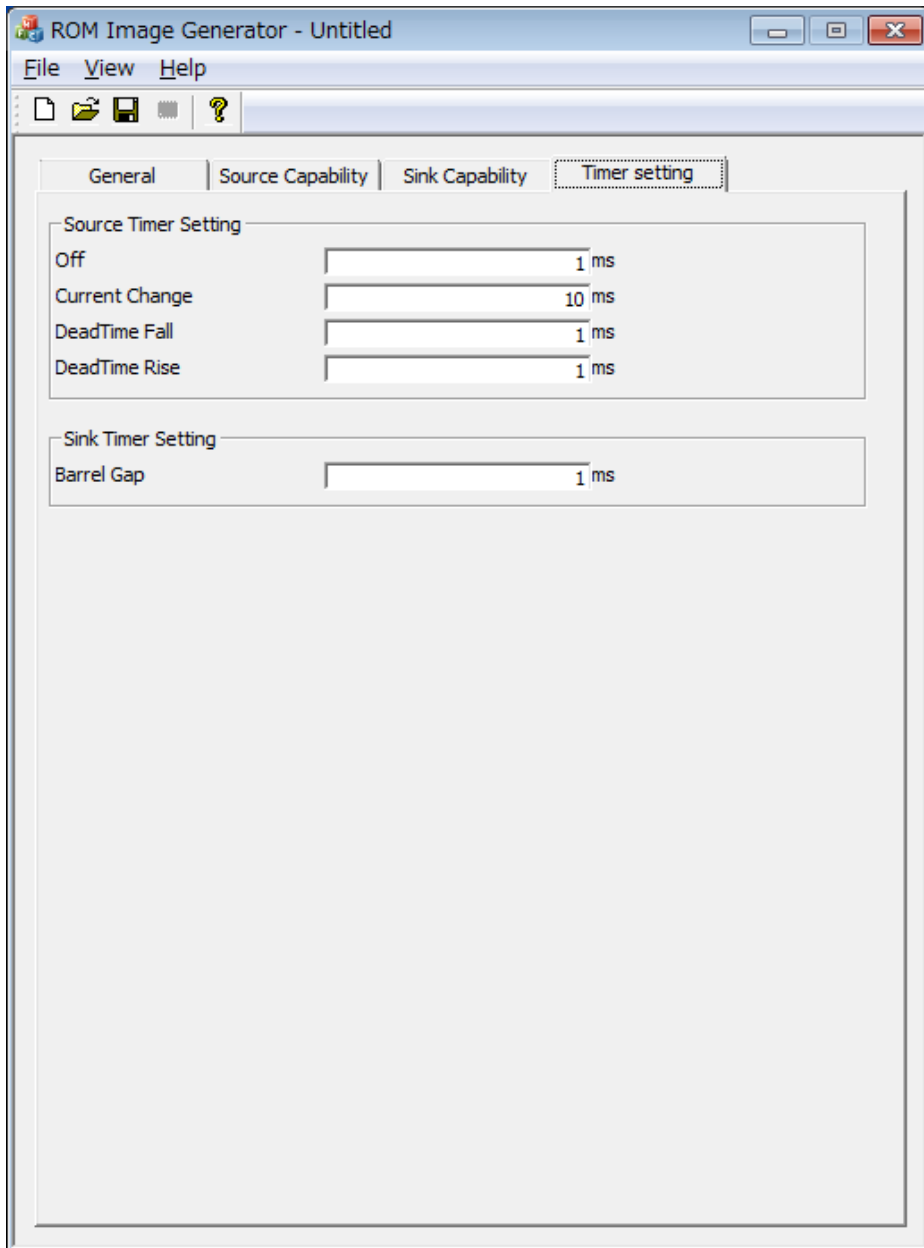
i) Voltage (Decimal)

ii) current (Decimal)

iii) GiveBack Flag (Select MAX or MIN)

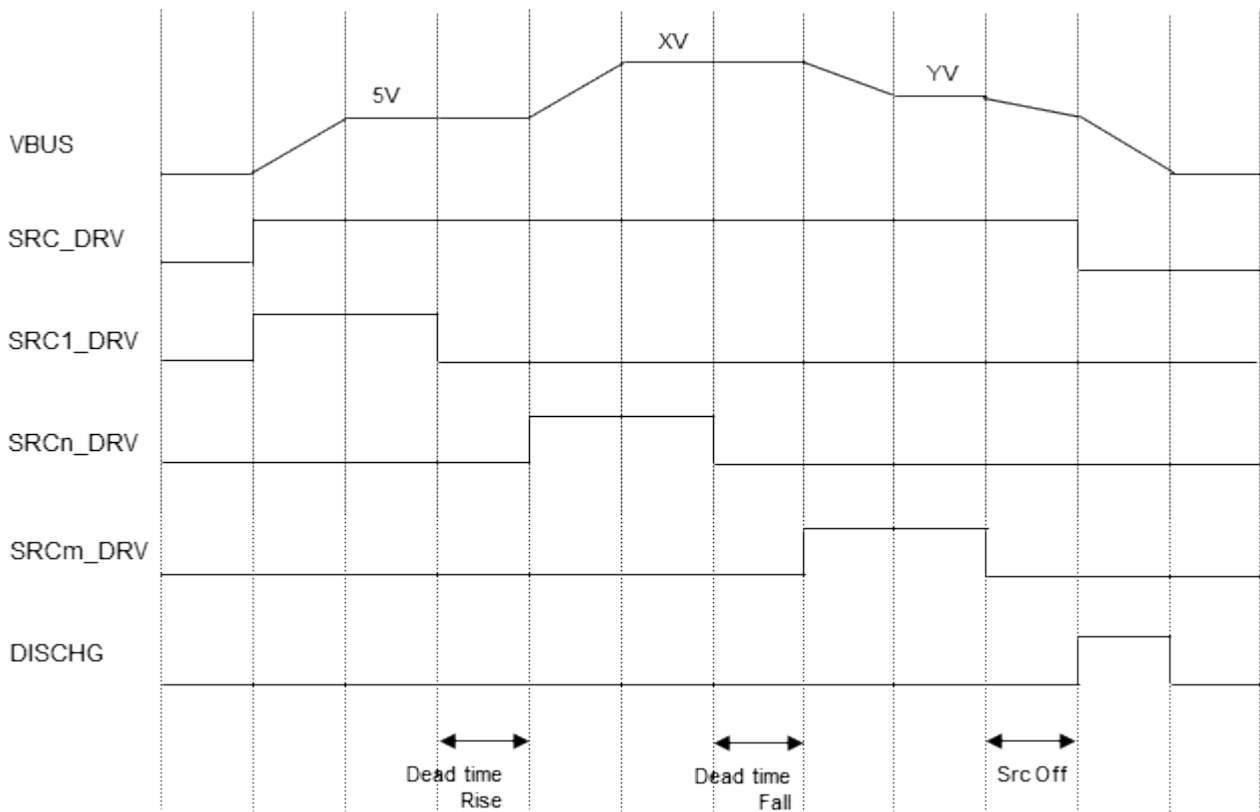
MAX: Flag=0, MIN: Flag=1

3.4 Timer setting tab



(1) Source Timer Setting

A power delivery controller which operates as a power source controls its GPIO pins to change VBUS voltage and current as in the below figure. Several timing parameters can be changed by this software.



The GPIOs to control power are assigned to each project. Please refer to document for each reference board.

i) Src Off (Decimal)

Duration time between disabling “SRC1_DRV” and enabling “SRCn_DRV”.

ii) Current change (Decimal)

Operation wait time after current capability was changed.

iii) Dead time fall (Decimal)

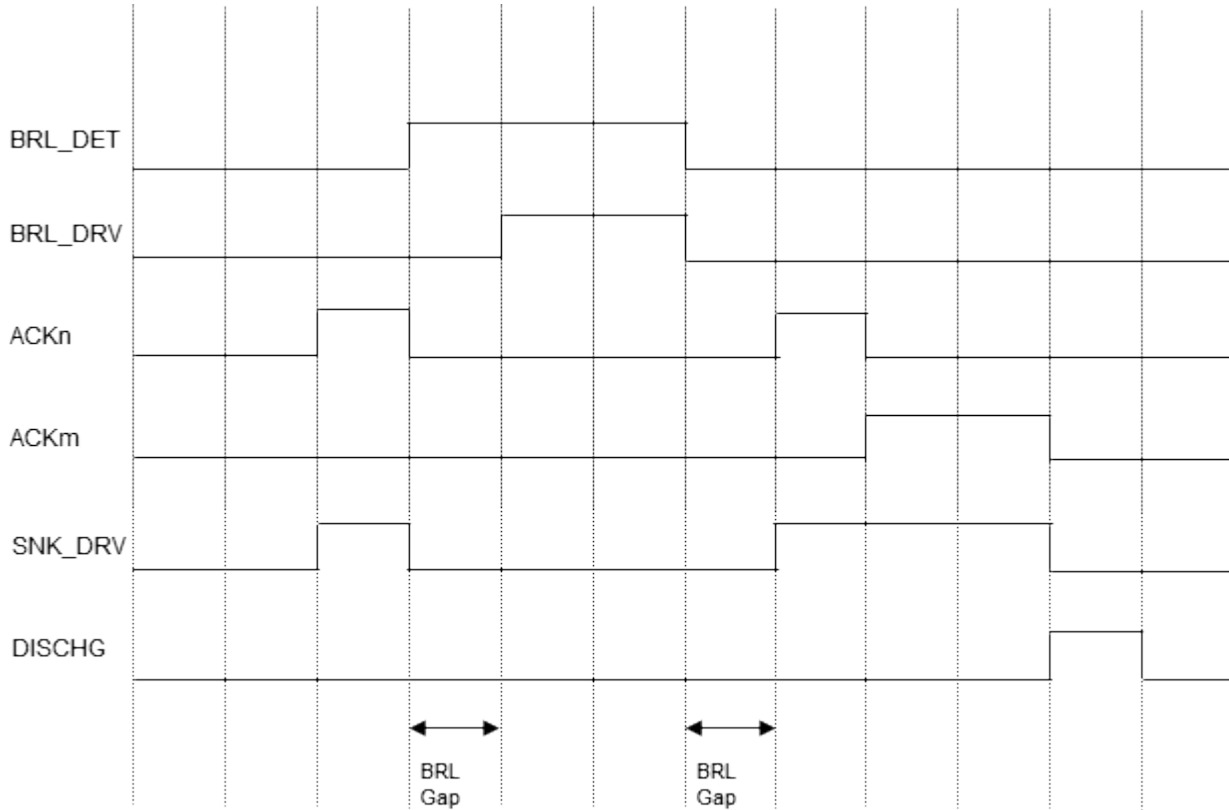
Duration time between disabling old voltage signal and enabling new voltage signal (new voltage < old voltage).

iv) Dead time rise (Decimal)

Duration time between disabling old voltage signal and enabling new voltage signal (new voltage > old voltage).

(2) Sink Timer Setting

A power delivery controller which operates as a power sink controls its GPIO pins to receive power from VBUS or other DC input (“barrel”). The waveform is described in the below figure . Several timing parameters can be changed by this software.



The GPIOs to control power are assigned to each project. Please refer to document for each reference board.

i) Barrel Gap (Decimal)

Duration time of enabling “BRL_DRV” signal after disabling “SNK_DRV” when “BRL_DET” is enabled, or enabling “SNK_DRV” after “BRL_DRV” when “BRL_DET” is disabled.

All trademarks and registered trademarks are the property of their respective owners.

Revision History

| Rev. | Date | Description | |
|------|---------------|-------------|-------------|
| | | Page | Summary |
| 0.10 | June 16, 2016 | - | 1st release |

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Handling of Unused Pins

Handle unused pins in accordance with the directions given under Handling of Unused Pins in the manual.

- The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, and an associated shoot-through current flows internally; malfunctions can occur due to the false recognition of the pin state as an input signal. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

The state of the product is undefined at the moment when power is supplied.

- The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.
In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

Access to reserved addresses is prohibited.

- The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

- When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

Before changing from one product to another, i.e. to a product with a different part number, confirm that the change will not lead to problems.

- The characteristics of Microprocessing unit or Microcontroller unit products in the same group but having a different part number may differ in terms of the internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
 2. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
 3. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
 4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
 5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc.
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc.
Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.
 6. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
 7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or systems manufactured by you.
 8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
 9. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.
 10. It is the responsibility of the buyer or distributor of Renesas Electronics products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, Renesas Electronics assumes no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
 11. This document may not be reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
 12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.
- (Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.



SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

Renesas Electronics America Inc.

2801 Scott Boulevard Santa Clara, CA 95050-2549, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

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: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

Room 1709, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100191, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, P. R. China 200333
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited

Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.

Unit 1207, 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 India Pvt. Ltd.

No.777C, 100 Feet Road, HALII Stage, Indiranagar, Bangalore, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.

12F., 234 Teheran-ro, Gangnam-Gu, Seoul, 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141