USB Power Delivery Controller

Flash memory image data generator software (PDC-IMGGEN)

ICTS2-ISG-16-5007
Rev. 0.10
June 16, 2016

Target Device

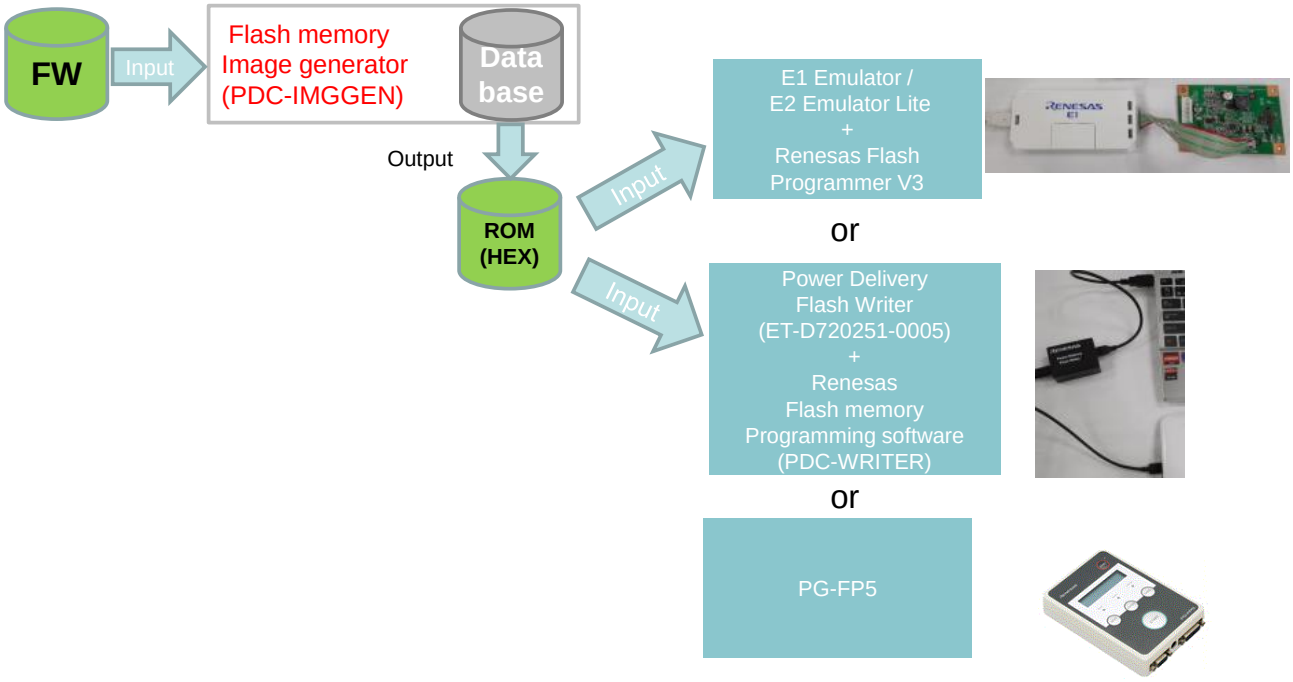
USB Power Delivery Controller R9A02G011

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)

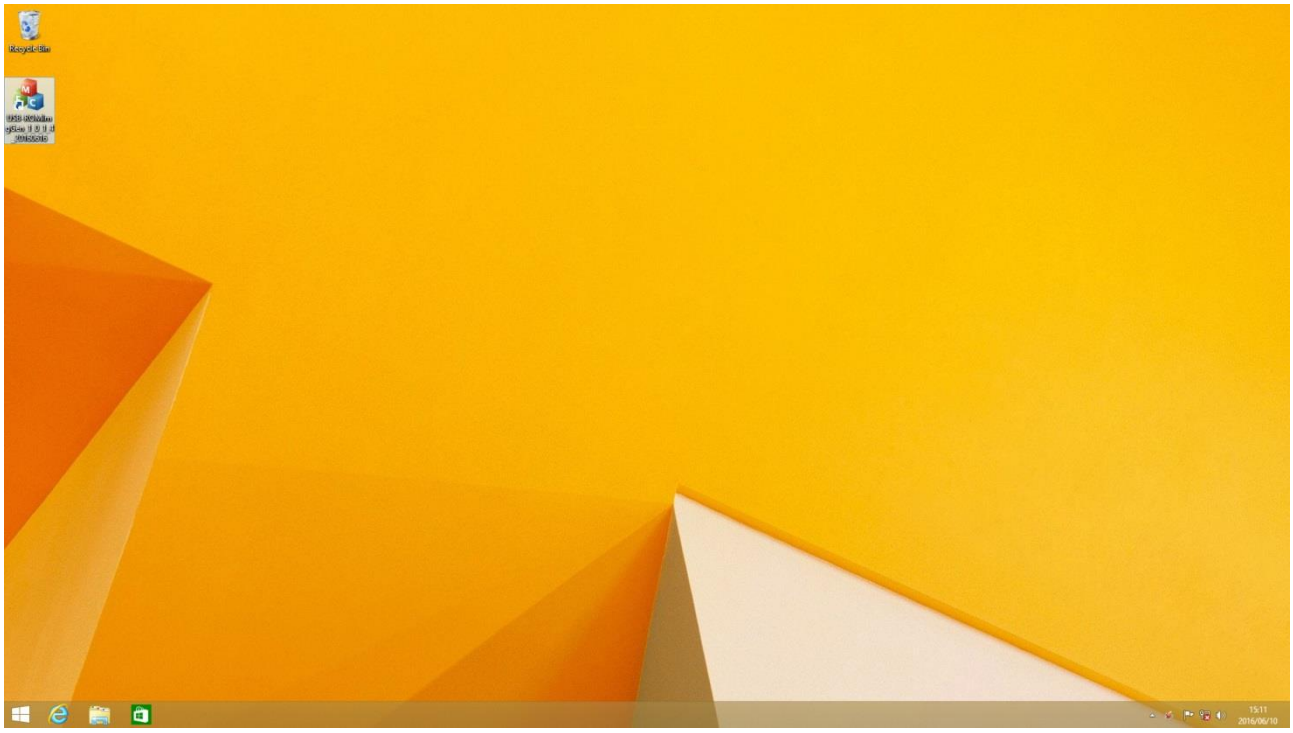
2. Generating Flash memory image data

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.



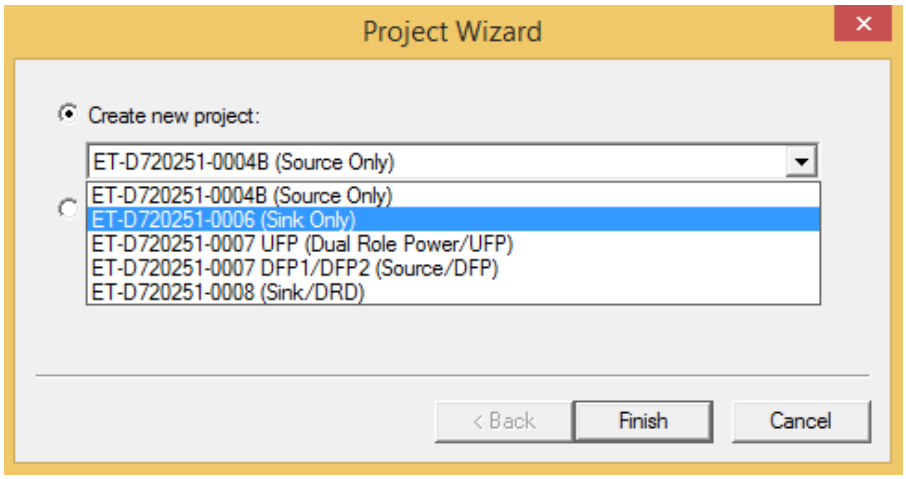
4) The “Project Wizard” is opened. If you select “Create new project”, several projects will be available. Please select a suitable project for your system.

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

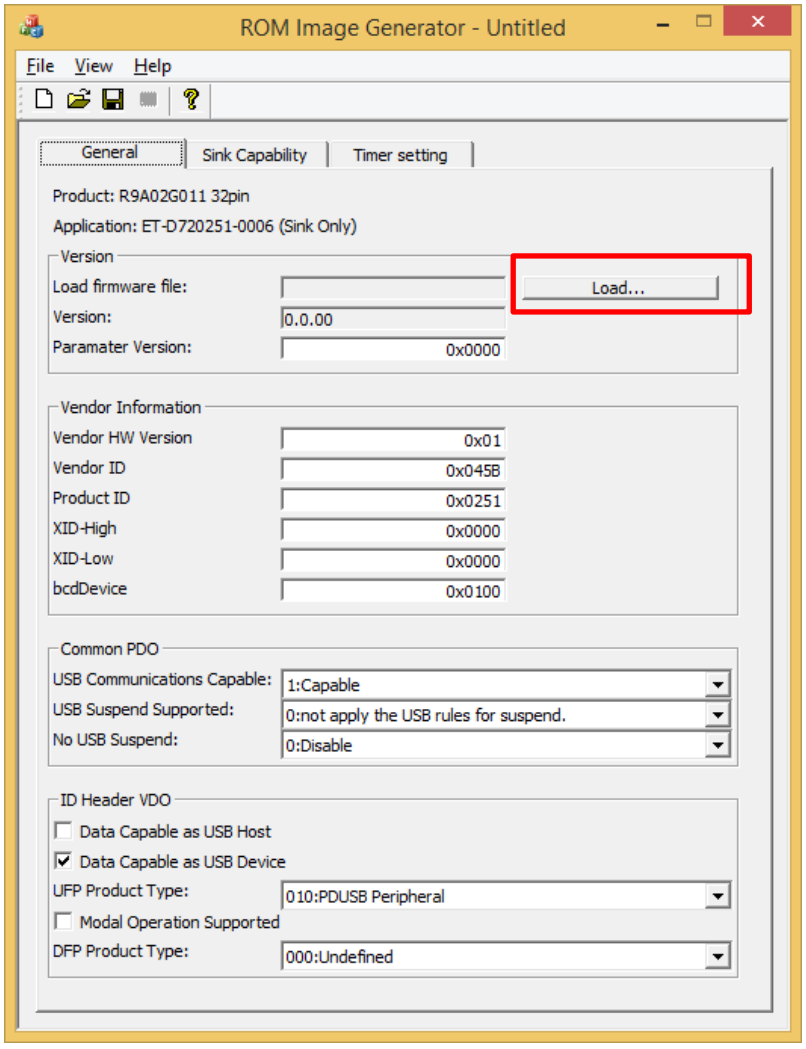
Section 4.1 (Source only) -> ET-D720251-0004B (Source Only)

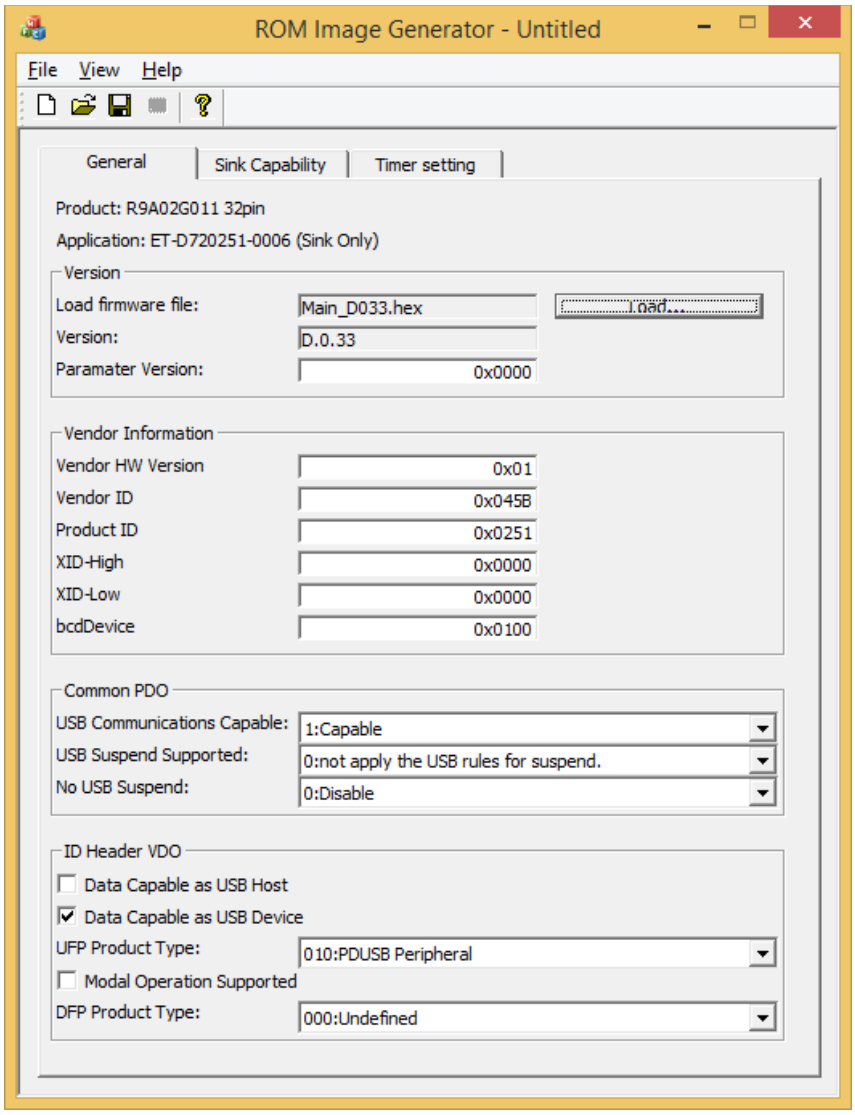
Section 4.2 (DRP) -> ET-D720251-0007 UFP (Dual Role Power/UFP)

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

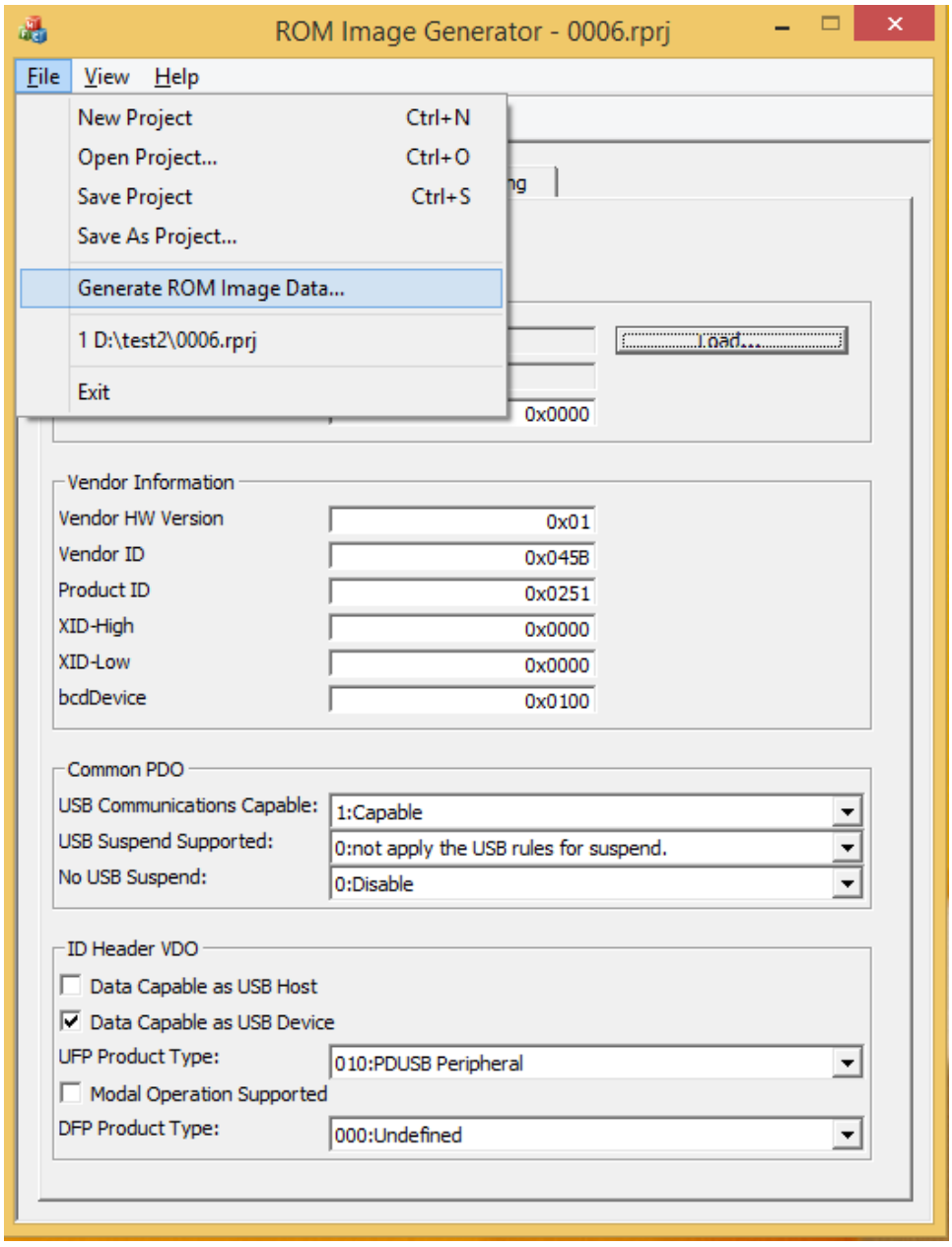


5) After a new window appears, specify firmware by the “load” button. Edit parameters, then save your project.

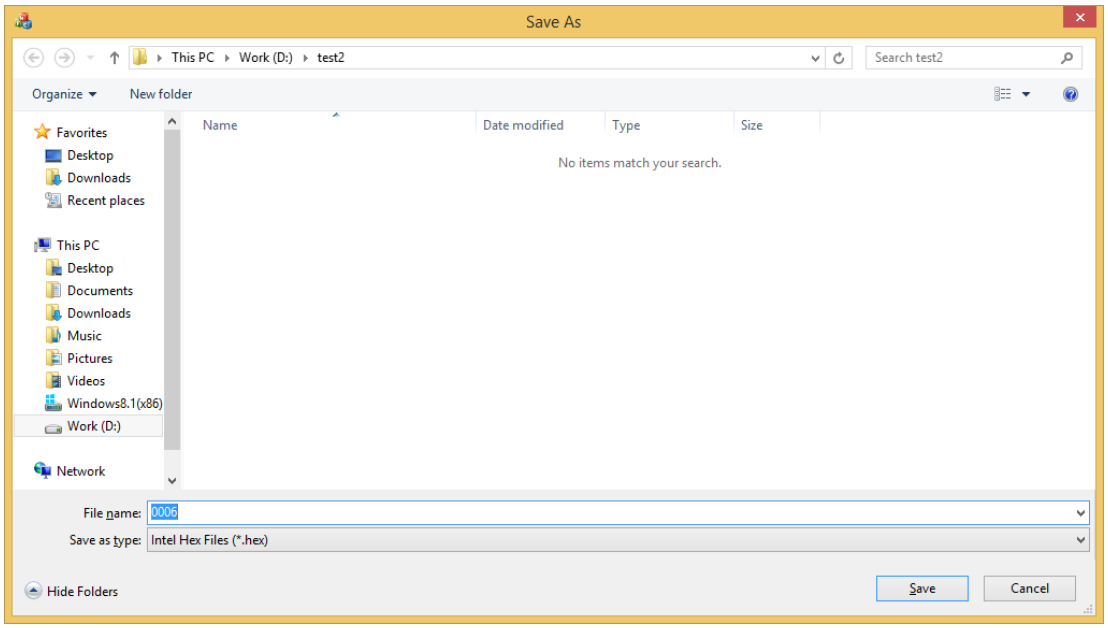



ROM Image Generator - Untitled
File View Help
General
Sink Capability
Timer setting
Product: R9A02G011 32pin
Application: ET-D720251-0006 (Sink Only)
Version
Load firmware file:
Main_D033.hex
Load...
Version:
D.0.33
Paramater Version:
0x0000
Vendor Information
Vendor HW Version
0x01
Vendor ID
0x045B
Product ID
0x0251
XID-High
0x0000
XID-Low
0x0000
bcdDevice
0x0100
Common PDO
USB Communications Capable:
1:Capable
USB Suspend Supported:
0:not apply the USB rules for suspend.
No USB Suspend:
0:Disable
ID Header VDO
Data Capable as USB Host
Data Capable as USB Device
UFP Product Type:
010:PDUSB Peripheral
Modal Operation Supported
DFP Product Type:
000:Undefined

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).

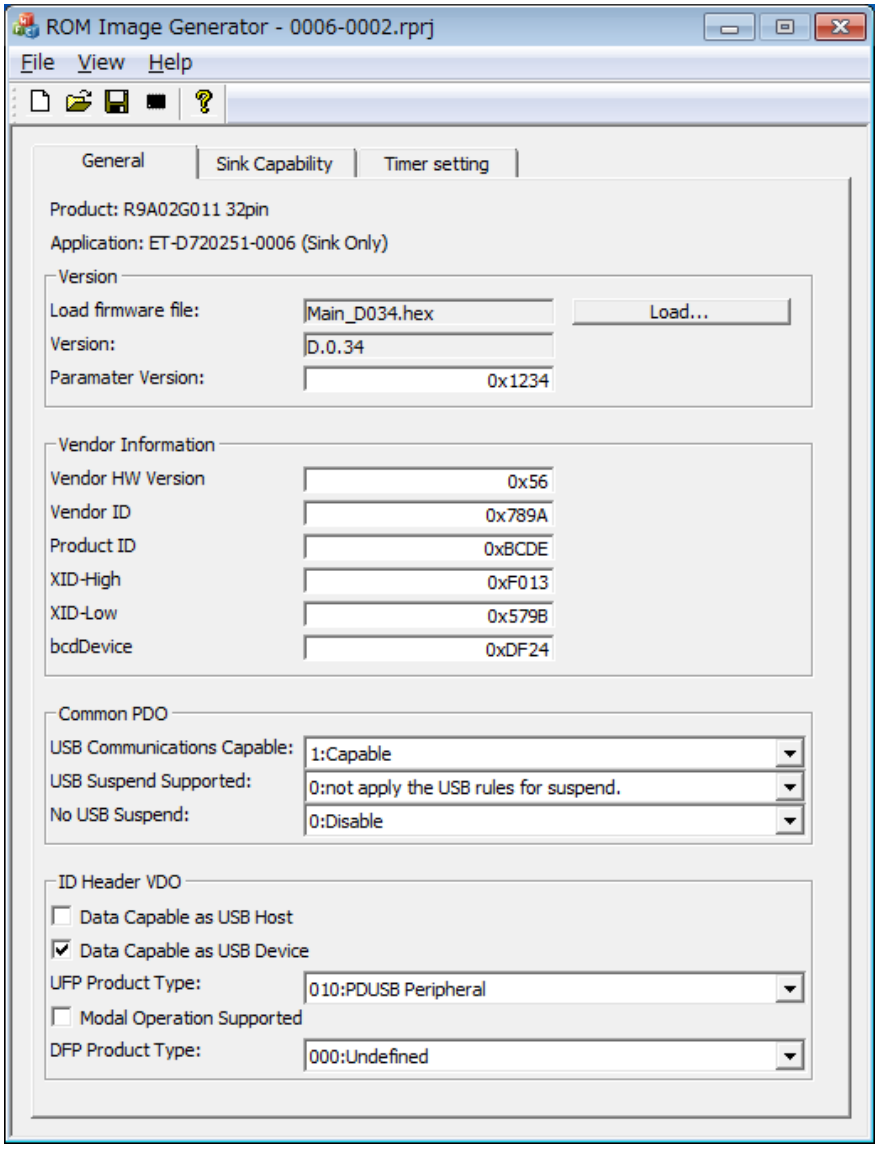


3. Parameter settings

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

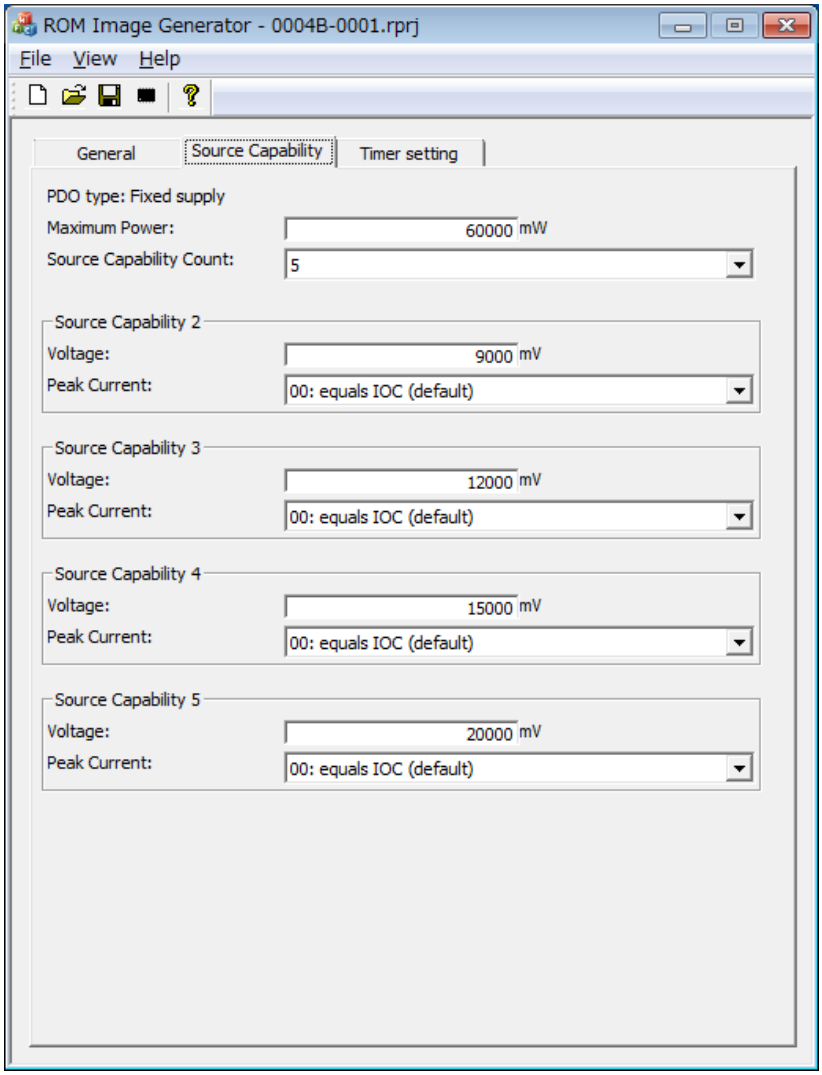
010b – PDUSB Host

011b – Power Brick

010b – 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.

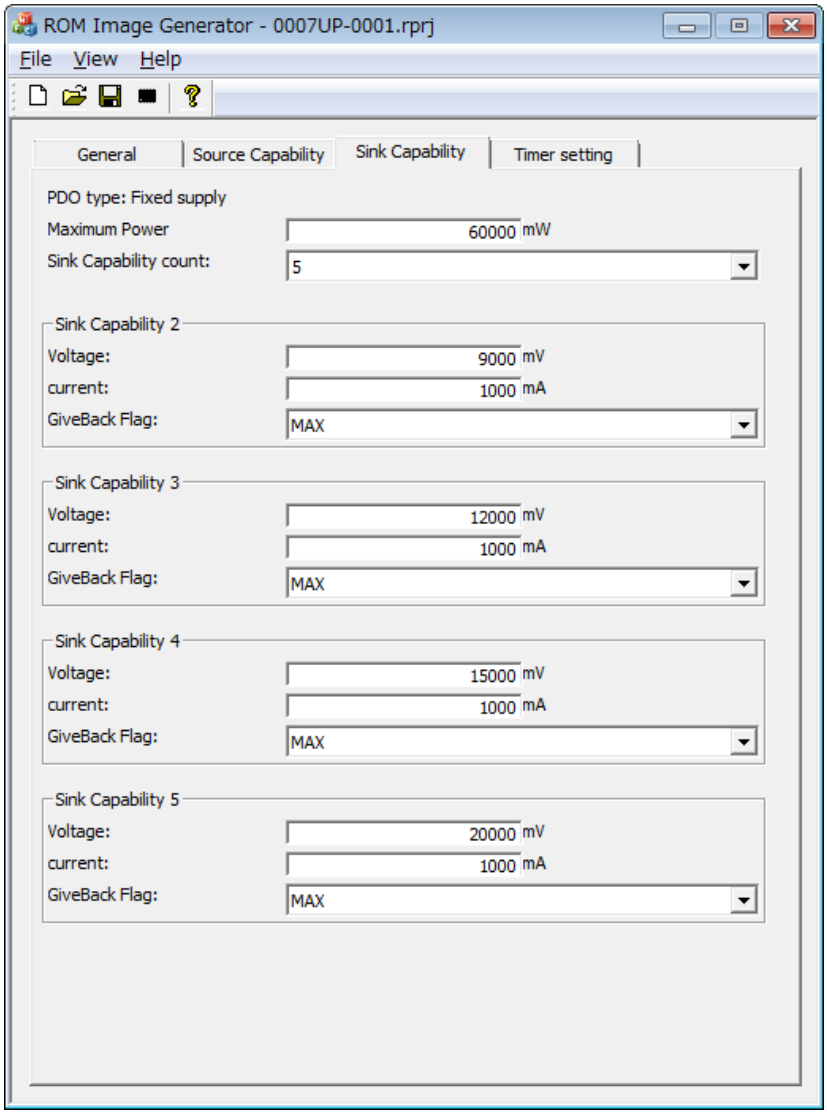
(3) Source Capability n (n=2,3,--5)

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.

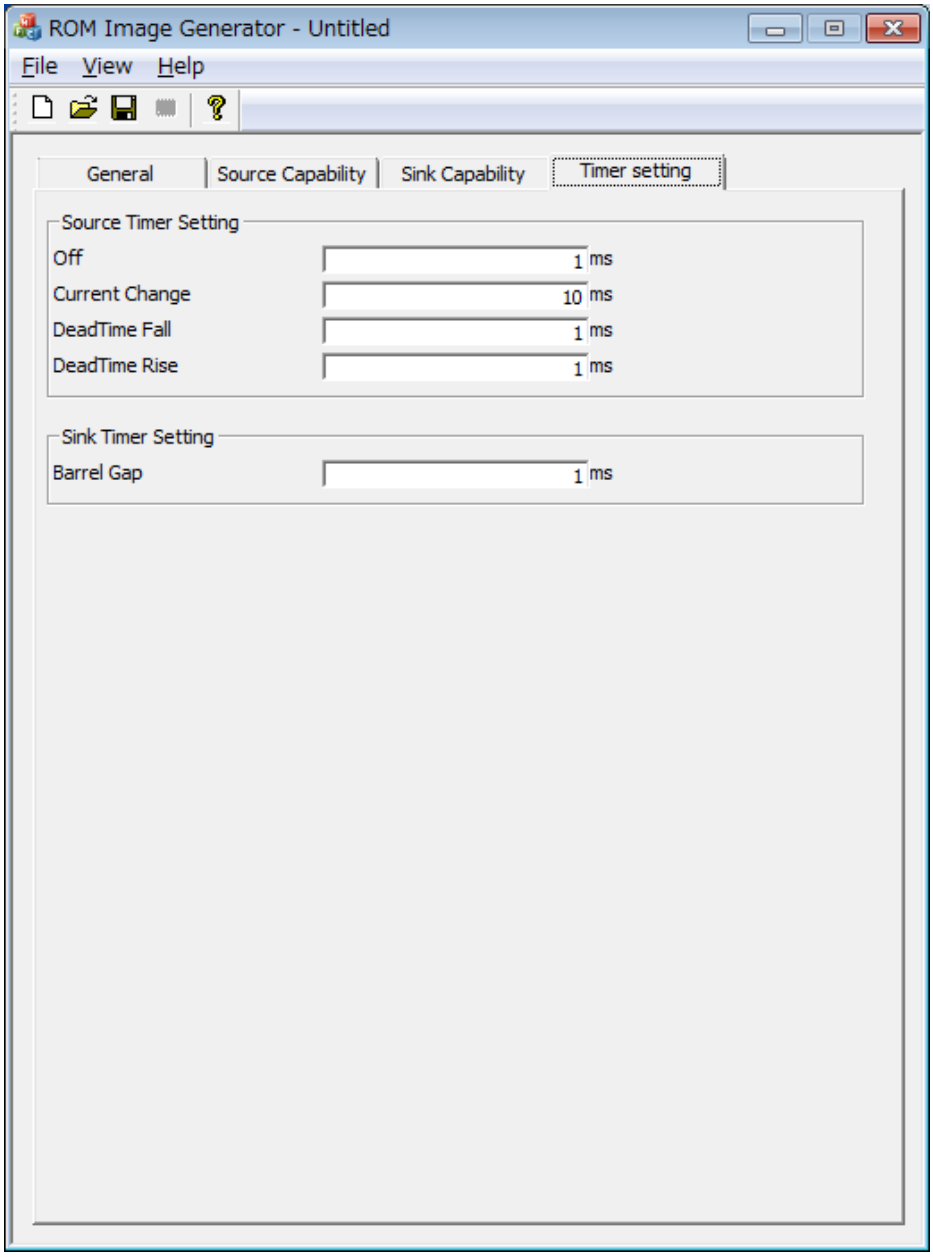
i) Voltage (Decimal)

ii) current (Decimal)

iii) GiveBack Flag (Select MAX or MIN)

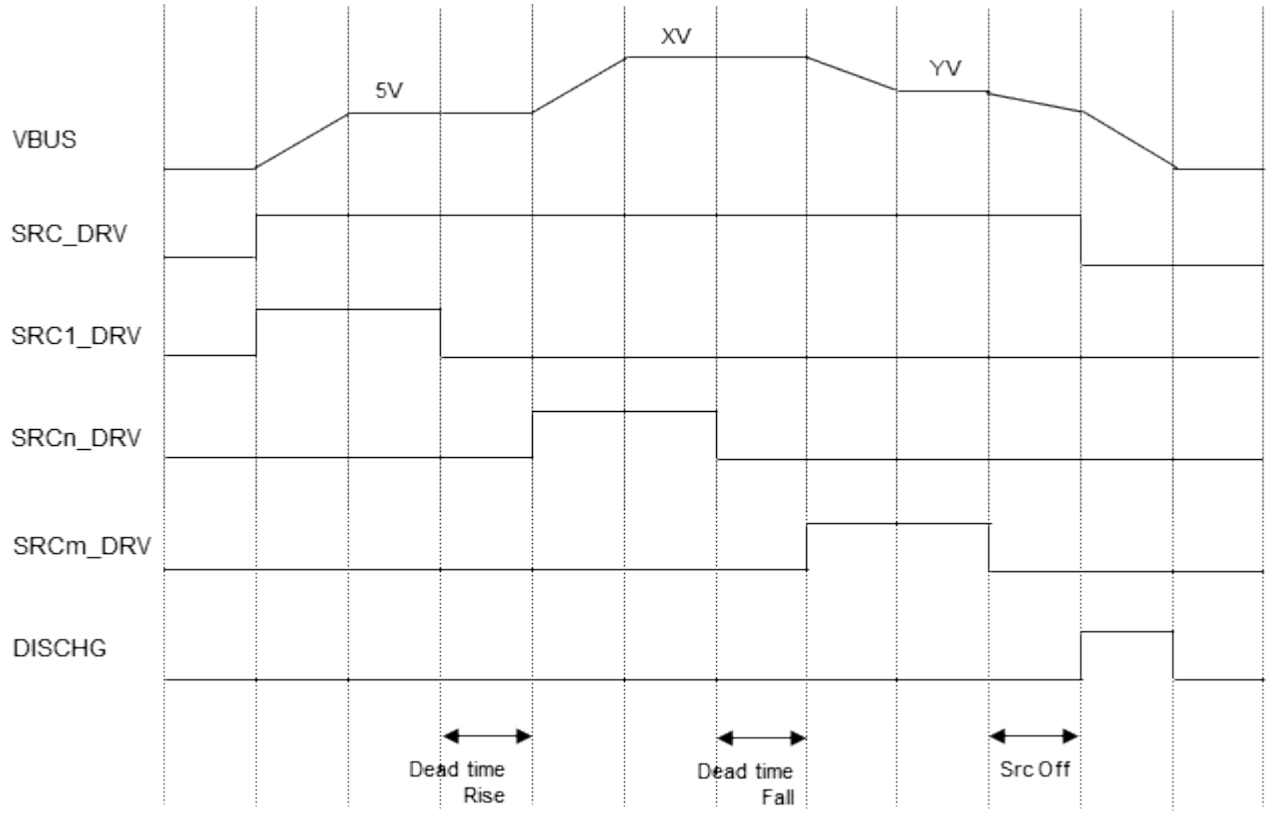
MAX: Flag=0, MIN: Flag=1

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)

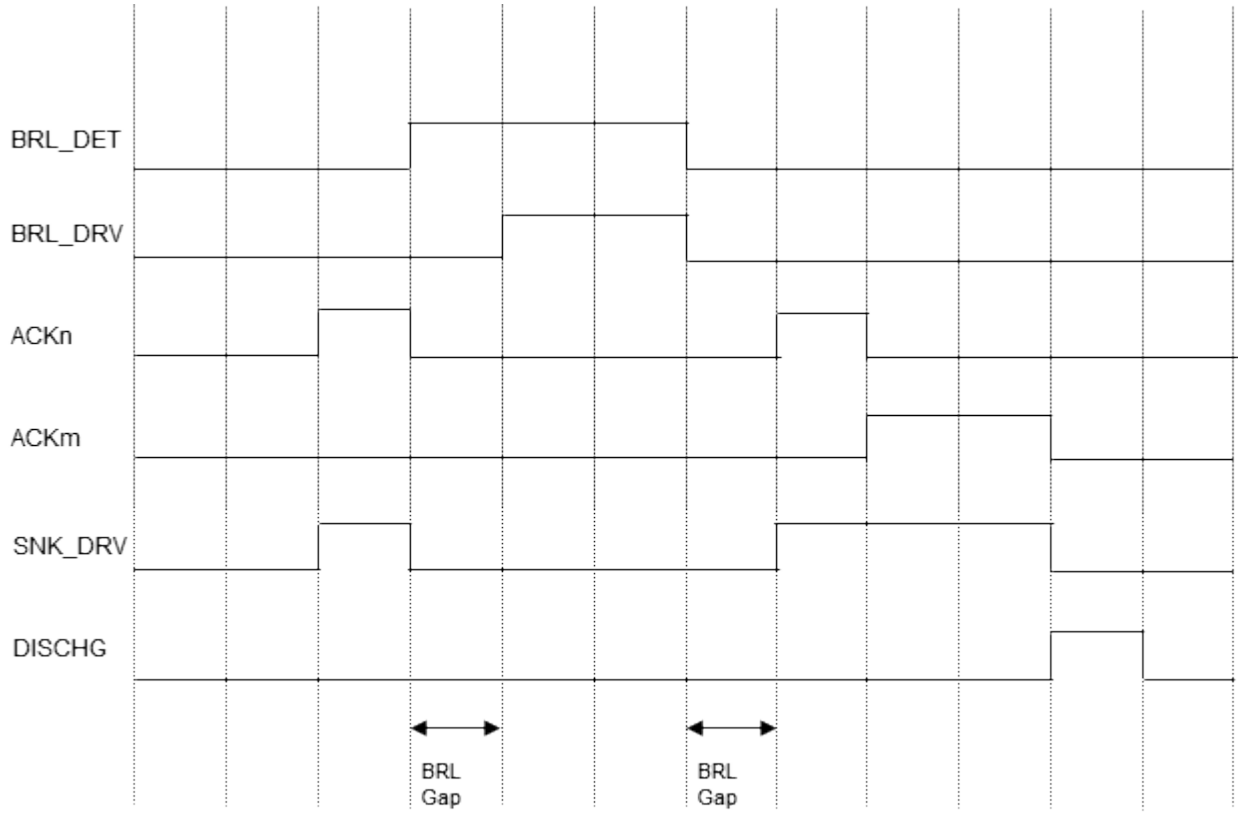
Duration time between disabling old voltage signal and enabling new voltage signal (new voltage < old voltage).

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.

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Revision History

		Description	
Rev.	**Date**	**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.

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