RX Family RXv2 CPU

Benchmark Data of Mathematical Library Functions

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Introduction

This application note lists the number of execution cycles of mathematical library functions for RX Family RXv2 CPU and CC-RX Compiler V2.06.00.

Target Device

RX Family RXv2 CPU

Contents

1. Measurement Condition

Microcontroller:	RX64M group
Allocation of Instruction Codes:	Code Flash memory (No wait access)
Compiler:	RX Family C/C++Compiler V2.06.00
Compiler Options:	Table 1.1 shows details of compiler option settings. Options not listed on the table are set to default settings.

Table 1.1 Compiler option setting

Setting	Compiler Option				
	endian	round	isa	fpu/nofpu	dbl_size
Single Precision Operation	little	zero	rxv2	fpu	4
Double Precision Operation					8

2. The Number of Execution Cycles

Table 2.1 shows the geometric mean value of the number of execution cycles of mathematical library functions.

The number of execution cycles may change depending on the series of RX Family (RX200 / RX600 / RX700), allocation of instruction codes, number of access wait cycles of code flash memory, compiler option settings, and arguments.

Table 2.1 The geometric mean value of the number of execution cycles of mathematical library functions

Single Precision Operation	
acosf	71
asinf	63
atanf	75
atan2f	299
cosf	67
sinf	69
tanf	91
coshf	75
sinhf	77
tanhf	83
expf	65
frexpf	14
ldexpf	30
logf	81
log10f	87
modff	30
powf	373
sqrtf	19
ceilf	28
fabsf	1
floorf	28
fmodf	94

Double Precision Operation	
acos	2152
asin	2701
atan	2250
atan2	3973
cos	1719
sin	1759
tan	2515
cosh	2186
sinh	2217
tanh	1772
exp	1643
frexp	42
ldexp	31
log	2335
log10	2345
modf	159
pow	4501
sqrt	213
ceil	104
fabs	4
floor	105
fmod	626

3. Related Application Note

Also, see the related application note below for your reference.

- RX Family C/C++ Compiler Package APPLICATION NOTE: <Reference> Data of Library Rev.1.00 (REJ06J0083-0100)

4. Reference Document

User's Manual: Environment Development

RX Family CC-RX Compiler User's Manual (R20UT3248)

(The latest version can be downloaded from the Renesas Electronics website.)

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Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
1.00	May 29, 2017	-	First edition issued

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, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. 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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