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Renesas Electronics Corporation

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NOTICE:
There are additions on page 3 in this document.

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RX Family C/C++ Compiler Package

APPLICATION NOTE : < Reference> Data of Library

This document publishes the number of execution cycles of mathematical function library and runtime routine(runtime library) , for the C/C++ Compiler V.1.00 for the RX family

1. Mathematical Function Library

1.1 Condition of measurement

Compiler : C/C++ Compiler V.1.00.00 for the RX family

Build Condition : A standard library is created with the condition of showing in Table 1.1.

Table 1.1 The Conditions for Creating a Standard Library

Condition	Options for Creating Library					
	cpu	endian	denormalize	round	fpu/nofpu	dbl_size
1	RX600	little	off	zero	nofpu	4
2	RX600	little	off	zero	nofpu	8
3	RX600	little	off	zero	fpu	4
4	RX600	little	off	zero	fpu	8

1.2 Number of Execution Cycles

Table 1.2 Execution Speed of Floating Point Library Functions (RX600)

CPU		RX600	RX600	RX600	RX600
Conditions for Creating Library		**1**	**2**	**3**	**4**
Single-precision	sinf	236	233	122	120
	cosf	246	242	118	117
	tanf	556	551	185	185
	asinf	1,330	1,324	186	186
	acosf	1,683	1,670	197	197
	atanf	230	229	154	153
	logf	249	242	168	168
	sqrtf	107	105	106	107
	expf	223	218	138	137
	powf	5,018	4,928	619	620
Double-precision	sin	236	3,008	122	3,009
	cos	246	2,977	117	2,979
	tan	556	4,410	186	4,408
	asin	1,472	5,091	185	5,089
	acos	1,683	4,526	198	4,525
	atan	231	3,972	154	3,971
	log	248	3,958	167	3,958
	sqrt	107	1,943	107	1,943
	exp	223	3,107	138	3,108
	pow	5,018	8,098	620	8,105

Note: Cycle units. The error margin is included in measurements.

2. Runtime Routine(Runtime Library)

2.1 Condition of measurement

Compiler : C/C++ Compiler V.1.00.00 for the RX family

Build Condition : A runtime library is created with the condition of showing in Table 2.1.

Table 2.1 Library Creation Options

	cpu	endian	denormalize	round	fpu	dbl_size
RX	RX600	little	off	zero	nofpu	4

2.2 Number of Execution Cycles

Table 2.2 List of Runtime Routine Speeds/FPL Speeds (1)

No.	Type		Function Name	Stack Size	Number of Execution Cycles
					RX600
1.1	Floating point operations	Add	__COM_ADDf	4	58/74
2.1		Substract	__COM_SUBf	4	60/76
3.1		Multiply	__COM_MULf	4	52
4.1		Divide	__COM_DIVf	4	478
5.1		Convert	__COM_CONVf32s	4	31
5.2			__COM_CONVf32u	4	32
5.3			__COM_CONV32sf	4	14/48
5.4			__COM_CONV32uf	4	10/44
6.1		Compare	__COM_CMPLTf	4	17
6.2			__COM_CMPGTf	4	17
6.3			__COM_CMPLEf	4	17
6.4			__COM_CMPGEf	4	17
6.5			__COM_CMPEQf	4	9
6.6			__COM_CMPNEf	4	10

Note: Cycle units. The error margin is included in measurements.
The routine that number of execution cycles is greatly different depending on the input value publishes each of the minimum pattern and the maximum pattern. [minimum/maximum]

About dbl_size 4 in Table 2.1 Library Creation Options
From 1.1 to 6.6
This result is the speed of the runtime library generated when -dbl_size=4 is specified and float type and double type are used.
From 7.1 to 7.16
This result is the speed of the runtime library generated when -dbl_size=8 is specified and double type is used.

Table 2.2 List of Runtime Routine Speeds/FPL Speeds (2)

No.	Type	Function Name	Stack Size	Number of Execution Cycles RX600
7.1	Floating point operations long double	__COM_ADDd	12	87/118
7.2		__COM_SUBd	12	89/120
7.3		__COM_MULd	12	99
7.4		__COM_DIVd	12	628/681
7.5		__COM_CONVd32s	4	28
7.6		__COM_CONVd32u	4	30
7.7		__COM_CONV32sd	4	8/135
7.8		__COM_CONV32ud	4	8/129
7.9		__COM_CONVfd	4	19
7.10		__COM_CONVdf	4	39/50
7.11		__COM_CMPLTd	12	26
7.12		__COM_CMPGTd	12	26
7.13		__COM_CMPLEd	12	27
7.14		__COM_CMPGEd	12	26
7.15		__COM_CMPEQd	12	25
7.16		__COM_CMPNEd	12	25

Note: Cycle units. The error margin is included in measurements.
The routine that number of execution cycles is greatly different depending on the input value publishes each of the minimum pattern and the maximum pattern. [minimum/maximum]

Table 2.2 List of Runtime Routine Speeds/FPL Speeds (3)

No.	Type	Function Name	Stack Size	Number of Execution Cycles RX600
8.1		__COM_MUL64	4	9
8.2		__COM_DIV64s	8	47/593
8.3		__COM_DIV64u	4	25/579
8.4		__COM_SHLL64	4	14
8.5		__COM_SHLR64	4	15
8.6		__COM_SHAR64	4	15
8.7		__COM_CONVf64s	4	19/35
8.8		__COM_CONVf64u	4	20/35
8.9	long long	__COM_CONVd64s	4	21/45
8.10		__COM_CONVd64u	4	22/46
8.11		__COM_CONV64sf	4	16/175
8.12		__COM_CONV64uf	4	13/172
8.13		__COM_CONV64sd	4	15/174
8.14		__COM_CONV64ud	4	12/170
8.15		__COM_MOD64s	4	38/522
8.16		__COM_MOD64u	4	19/511
8.17		__COM_CMPLT64s	4	7
8.18		__COM_CMPLT64u	3	4
8.19		__COM_CMPGT64s	3	4
8.20		__COM_CMPGT64u	3	4
8.21		__COM_CMPLE64s	3	4
8.22		__COM_CMPLE64u	3	4
8.23		__COM_CMPGE64s	3	4
8.24		__COM_CMPGE64u	3	4
8.25		__COM_CMPEQ64	3	4
8.26		__COM_CMPNE64	3	4
8.27		__COM_BFSET64s	3	8
8.28		__COM_BFSET64u	3	8
8.29		__COM_BFGET64s	3	4
8.30		__COM_BFGET64u	3	4

Note: Cycle units. The error margin is included in measurements.
The routine that number of execution cycles is greatly different depending on the input value publishes each of the minimum pattern and the maximum pattern. [minimum/maximum]

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Rev.	**Date**	**Page**	**Summary**
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