HI7000/4 series

Supplementary Information

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This document explains the specification change and the manual correction caused after the “HI7000/4 series User's manual (REJ10B0060-0600)” is issued.

Contents

1. The Kernel Reserved Vectors to Return from Direct Interrupt handler (only in HI7000/4)

1.1 Summary

In the past version, interrupt handler for vector #25 and #26 are used to return from direct interrupt handler. In V.2.02 Release 05 or later, you can select “#25 and #26” or “#62 and #63” for the vectors to return from direct interrupt handler.

The reason for this change is that there is a possibility that new interrupt factors are assigned to vector #25 and #26.

Related pages in the user’s manual:

- “4.4.2 Reserved TRAP (Only in HI7000/4)”

Therefore, the following specifications are changed.

1.2 def_inh, idef_inh, def_exc, idef_exc, vdef_trp, ivdef_trp Service Calls

In the past version, these service calls return error E_PAR when vector #25 or #26 is required. In V.2.02 Release 05 or later, interrupt handlers for vector #25 and #26 can be defined by using these service calls.

Related pages in the user’s manual:

- “3.20.1 Define Interrupt Handler (def_inh, idef_inh)”
- “3.22.1 Define CPU Exception Handler (def_exc, idef_exc)”
- “3.22.2 Define CPU Exception (TRAPA Instruction Exception) Handler (vdef_trp, ivdef_trp)”

The large memory pool function is the implementation to improve the processing time of the variable-size memory pool function.

1.3 The Configurator

In the past version, interrupt handler for vector #25 and #26 cannot be defined by using the configurator. In V.2.02 Release 05 or later, interrupt handlers for vector #25 and #26 can be defined by using the Configurator.

1.4 Direct Interrupt Handler

In the past version, the “tn=25” or “tn=26” is required for “#pragma interrupt” when the interrupt level is less than or equal to the kernel interrupt mask level. In V.2.02 Release 05 or later, these are changed to “tn=TRAP_RET_INT_BANK” and “tn=TRAP_RET_INT”. The TRAP_RET_INT_BANK and TRAP_RET_INT are macros which are added in the “kernel.h” file.

Related pages in the user’s manual:

- “4.8.2 Direct Interrupt Handler (HI7000/4)”

1.5 Select Kernel Reserved Vector

The kernel reserved vector can be selected by compiler option "-def=NEW_RET_INT" for direct interrupt handler source files and "kernel_def.c".

Item	Use "-def=NEW_RET_INT"	Not use "-def=NEW_RET_INT"
Vectors used to return from direct interrupt handler	#62 and #63	#25 and #26
Definition of TRAP_RET_INT_BANK	62	25
Definition of TRAP_RET_INT	63	26

1.6 Notes when SH-2A is used

When either of following SH-2A or SH2A-FPU MCU is used, it is required to select "62 and 63" as kernel reserved vectors.

- MCUs from which interrupt factors are assigned in vector #20 - #31
- SH725xx such as SH7250 series

2. Enabled the VTA_REGBANK Attribute for Vector #20 to #31 (only in HI7000/4)

In the past version, the VTA_REGBANK attribute for interrupt handler can be specified only for vector #14 and #64 or more. In V.2.02 Release 05 or later, the VTA_REGBANK attribute can be specified for vector #20 to #31 in addition to the past.

3. Large Memory Pool

Refer to "HI7000/4, HI7700/4, HI7750/4, HI7200/MP Large Memory Pool" (R20UT0476EJ0200, Rev.2.00).

4. Various Area Sizes Specified by Configurator

This chapter explains the following area sizes.

1. CFG_TSKSTKSZ : Total size of dynamic stack area
2. CFG_DTQSZ : Total size of data queue area
3. CFG_MBFSZ : Total size of message buffer area
4. CFG_MPFSZ : Total size of fixed-size memory pool area
5. CFG_MPLSZ : Total size of variable-size memory pool area

4.1 CFG_TSKSTKSZ : Total Size of Dynamic Stack Area

Please specify as CFG_TSKSTKSZ the value calculated by the following formula, or more. If not, the operation which creates task may fail.

$$\sum (stksz + 16) + 28$$

(1) **Tasks created by configurator**

Please calculate as "*stksz*" the value specified as [Stack Size] edit box in [Creation of Task] dialog box.

However, it is outside the object of calculation when [Specify Address] radio button is chosen.

(2) **Tasks created by cre_tsk, acre_tsk, icre_tsk or iacre_tsk service call**

Please calculate as "*stksz*" the value specified as T_CTSK.stksz.

However, it is outside the object of calculation when specified except NULL as T_CTSK.stk.

4.2 CFG_DTQSZ : Total Size of Data Queue Area

Please specify as CFG_DTQSZ the value calculated by the following formula, or more. If not, the operation which creates data queue may fail.

$$\sum (dtqcnt \times 4 + 16) + 28$$

(1) **Data queues created by configurator**

Please calculate as "*dtqcnt*" the value specified as [Number of Data] edit box in [Creation of Data Queue] dialog box.

However, it is outside the object of calculation when zero is specified as [Number of Data] edit box.

(2) **Data queues created by cre_dtq, acre_dtq, icre_dtq or iacre_dtq service call**

Please calculate as "*dtqcnt*" the value specified as T_CDTQ.dtqcnt.

However, it is outside the object of calculation when specified zero as T_CDTQ.dtqcnt.

4.3 CFG_MBFSZ : Total Size of Message Buffer Area

Please specify as CFG_MBFSZSZ the value calculated by the following formula, or more. If not, the operation which creates message buffer may fail.

$$\sum (mbfsz + 16) + 28$$

(1) **Message buffers created by configurator**

Please calculate as "*mbfsz*" the value specified as [Size] edit box in [Creation of Message Buffer] dialog box.

However, it is outside the object of calculation when zero is specified as [Size] edit box.

(2) **Message buffers created by cre_mbf, acre_mbf, icre_mbf or iacre_mbf service call**

Please calculate as "*mbfsz*" the value specified as T_CMBF,mbfsz.

However, it is outside the object of calculation when specified zero as T_CMBF,mbfsz.

4.4 CFG_MPFSZ : Total Size of Fixed-size Memory Pool Area

Please specify as CFG_MPFSZ the value calculated by the following formula, or more. If not, the operation which creates fixed-size memory pool may fail.

$$\sum (blksz \times blkcnt + 16) + 28$$

(1) **Fixed-size memory pools created by configurator**

Please calculate as "*blksz*" the value specified as [Size] edit box in [Creation of Fixed-size Memory pool] dialog box, and as "*blkcnt*" the value specified as [Number of Blocks] edit box in that dialog box.

However, it is outside the object of calculation when [Specify Address] radio button is chosen.

(2) **Fixed-size memory pools created by cre_mpf, acre_mpf, icre_mpf or iacre_mpf service call**

Please calculate as "*blksz*" the value specified as T_CMPF.blksz, and as "*blkcnt*" the value specified as T_CMPF.blkcnt.

However, it is outside the object of calculation when specified except NULL as T_CMPF.mpf.

4.5 CFG_MPLSZ : Total Size of Variable-size Memory Pool Area

Please specify as CFG_MPFSZ the value calculated by the following formula, or more. If not, the operation which creates variable-size memory pool may fail.

$$\sum (mplsz + 16) + 28$$

(1) **Variable-size memory pools created by configurator**

Please calculate as "*mplsz*" the value specified as [Size] edit box in [Creation of Variable-size Memory pool] dialog box.

However, it is outside the object of calculation when [Specify Address] radio button is chosen.

(2) **Variable-size memory pools created by cre_mpl, acre_mpl, icre_mpl or iacre_mp service call**

Please calculate as "*mplsz*" the value specified as T_CMPL.mplsz.

However, it is outside the object of calculation when specified except NULL as T_CMPL.mpl.

5. Manual Correction

This chapter explains correction of “HI7000/4 series User's Manual (REJ10B0060-0600)”.

5.1 “2.3 Processing Units and Precedence”

Corresponding section: Page 6

Content of correction:

Add following description.

When a service call is called from a task, all tasks are not executed until the service call is completed.

5.2 “2.4.1 Task Context State and Non-Task Context State”

Corresponding section: Page 8, next to Table 2.1

Content of correction:

Correct as follows.

The following items of processing are executed in non-task context. - Interrupt handler - Time event handlers (cyclic handler, alarm handler, and overrun handler) - The processing executed by changing the interrupt mask to a value other than 0 using the chg_ims service call Note that extended service calls initiated in the above processing states are also executed in non-task context, and that the CPU exception handler is executed in the same context as before any CPU exception occurs.

5.3 “3.10.3 Send Message to Mailbox”

Corresponding section: Page 150, Error Code

Content of correction:

Description for E_ID is corrected as follows.

E_ID [p] Invalid ID number (mbxid ≤ 0, or mbxid > CFG_MAXMBXID)

5.4 “3.14.1 Create Variable-Size Memory Pool”

Corresponding section: Page 187, Error Code

Content of correction:

Following description is added to explanation of E_PAR.

pk_cmpl->minblksz is other than a multiple of four.

5.5 “3.20.1 Define Interrupt Handler”

Corresponding section: Page 237, Packet Structure of T_DINH

Content of correction:

Correct as follows.

```
 typedef struct t_dinh
    ATR   inhatr;   0  4  Handler attribute
    FP    inthdr;  +4  4  Handler address
    UINT  inhsr;   +8  4  SR at initiation (ignored in the HI7000/4)
}T_DINH;
```

5.6 “3.20.2 Change Interrupt Mask”

Corresponding section: Page 240, Error Code

Content of correction:

Following description is added .

5.7 “3.26.1 Initialize Cache”

Corresponding section: Page 280, Table 3.81, “CCR and RAMCR setting” for “TCAC_IC_WPD”

Content of correction:

Correct as follows.

Attribute	Value	Description		CCR and RAMCR setting
TCAC_IC_WPD	H'00200000	When specify	Does not predict the instruction cache way	RAMCR.ICWPD = 1
		When not specify	Predicts the instruction cache way	RAMCR.ICWPD = 0

5.8 “Figure 4.4 Example of a C Language Normal Interrupt Handler “

Corresponding section: Page 307, Figure 4.4

Content of correction:

Correct as follows.

```
#include “kernel.h”
#pragma noregsave(Inh)   ←Only when interrupts using register bank is serviced
                           in SH-2A or SH2A-FPU, this statement can be used
                           because interrupt handler does not have to guarantee
                           general purpose registers.
void Inh(void)           ←An interrupt handler is defined as void.
{
  /* Interrupt handler processing */
}
```

5.9 “Table 4.9 Rules on Using Registers in a Normal Interrupt Handler (HI7000/4)”

Corresponding section: Page 309, Figure 4.4, Note 4

Content of correction:

Correct as follows.

Only when the interrupts using the register bank is serviced in the SH-2A or SH2A-FPU, the end condition is not required.

5.10 Contents of Stack at Initiation of CPU Exception Handler

Corresponding section: Page 327 - 328,

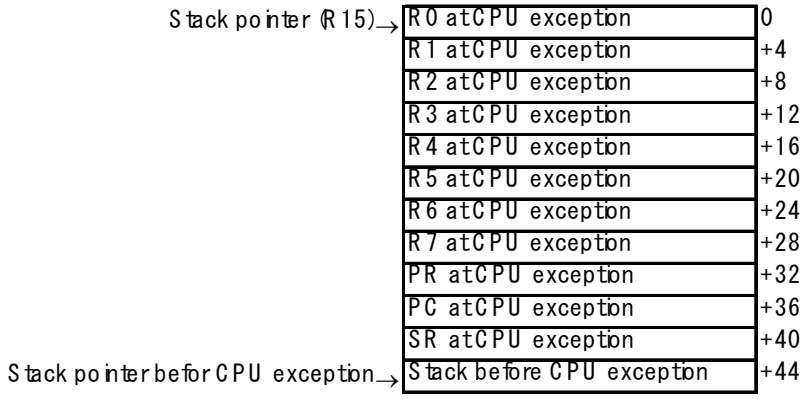
Content of correction:

Correct as follows.

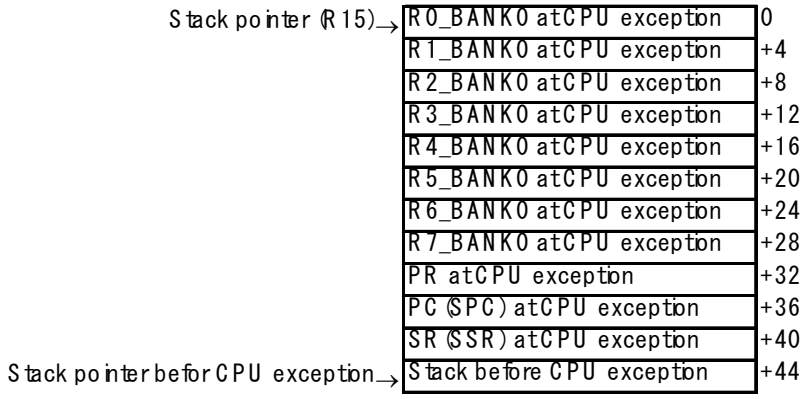
(3) Contents of Stack at Initiation

When a CPU exception occurs, the kernel saves the register contents in the stack. When execution is returned from a CPU exception handler, the kernel restores these register contents from the stack.

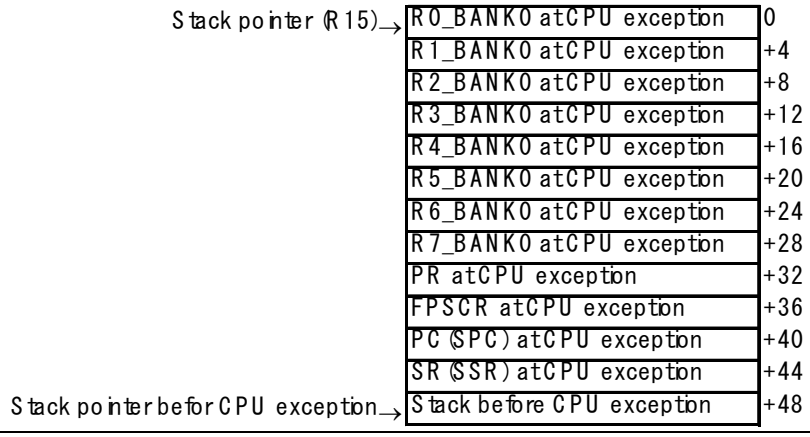
(a) HI7000/4



(b) HI7700/4



(c) HI7750/4



5.11 “Table C.2 Additional Stack Size of the Call Routine and the Handlers”

Corresponding section: Page 409

Content of correction:

The Item “Task exception processing routine” of Table C.2 is corrected below.

	Additional Size (Byte)		
Item	**HI7000/4**	**HI7700/4**	**HI7750/4**
Task exception processing routine	144	144 *2	152

5.12 “Table C.3 Stack Size of Each Function”

Corresponding section: Page 410

Content of correction:

The Item “texrtn” of Table C.3 is corrected below.

Function	Size (Byte)	Note
texrtn	144 + 16 = 160	Start function of task exception processing routine, No TA_COP0 attribute included, CFG_NEWMPL is not selected

5.13 “Table C.6 Interrupt Handler Stack Size”

Corresponding section: Page 413

Content of correction:

The Item “Calls service call” of Table C.6 is corrected below.

	Stack Size (Byte)			
	HI7000/4		HI7700/4	HI7750/4
Item	**Direct Interrupt Handler**	**Normal Interrupt Handler**		
Calls service call	140	140	140 *3	144

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Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Jan 15, 2011	-	First Edition issued
1.01	Oct 28, 2011	3	“Large Memory Pool” has been added.
		6	Manual correction “3.10.3 Send Message to Mailbox” has been added.
		6	Manual correction “3.14.1 Create Variable-Size Memory Pool” has been added.
		7	Manual correction “3.20.1 Define Interrupt Handler” has been added.
		7	Manual correction “3.20.2 Change Interrupt Mask” has been added.
		7	Manual correction “3.26.1 Initialize Cache” has been added.
1.02	Apr 1, 2012	4	“Various Area Sizes Specified by Configurator” has been added.
		10	Manual correction “Table C.2 Additional Stack Size of the Call Routine and the Handlers” has been added.
		10	Manual correction “Table C.3 Stack Size of Each Function” has been added.
		10	Manual correction “Table C.6 Interrupt Handler Stack Size” has been added.

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