RENESAS Tool News

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Notes on Using the Real-Time OS HI7200/MP, Which Is Used for the SH2A-DUAL-Cored Devices

Please take note of the following problems in using the real-time OS HI7200/MP, which is used for the SH2A-DUAL-Cored Devices:

1. With clearing an event flag waited for by two or more tasks
2. With issuing the irel_mpl service call with or without rel_mpl when specifing NEW to system.newmpl
3. With using Workspace Files for sample programs

1. Problem with Clearing an Event Flag Waited for by Two or More Tasks

1.1 Product and Versions Concerned

HI7200/MP V.1.00 Release 02 and earlier versions

1.2 Description

Any of the two or more tasks that are waiting for an event flag (consisting of 32 bits) to be set may not be released from their WAITING states even if the conditions for canceling these WAITING states are satisfied.
However, the unreleased tasks will exit from their WAITING states if other conditions for canceling them that are independent of the conditions described in Section 1.3 below are fulfilled.

1.3 Conditions

If the following conditions are all satisfied, the tasks that would be released from their WAITING states by the issuance of the set_flg or iset_flg service call in (3) below will not be done so in some cases:

(1) In the program exists an event flag having the TA_WMUL attribute (allows two or more tasks to enter the WAITING states). This event flag is hereafter called F.

(2) Two or more tasks are waiting for F to be set to the value represented by the bit pattern that satisfies the conditions for canceling their WAITING states.

(3) The set_flg or iset_flg service call is issued to set F to the value represented by the bit pattern that satisfy the conditions for canceling the WAITING states of any of tasks in (2)

a. The service call set_flg or iset_flg is issued from the application program
b. The service call set_flg is issued to the own CPU from another (remote service call)

(4) While the kernel is handling set_flg or iset_flg in (3), an interrupt is requested.

(5) The interrupt in (4) invokes the interrupt handler or time-event handler, which performs any of the following processing:

a. Issues iset_flg to set F to the value represented by the bit pattern in (2). Here F has the TA_CLR attribute (clears all the F's bits to 0s if the WAITING states are canceled) as well as TA_WMUL.

b. Issues the ipol_flg service call that takes F as a parameter and then ends it properly. Here F has the TA_CLR attribute as well as TA_WMUL.

c. Issues the iclr_flg service call to clear the bits in F that are included in those set in (3) and satisfy the condition for canceling the WAITING states of the tasks in (2).

1.4 Workarounds

1.4.1 For the set_flg or iset_flg Service Call Issued from the Application Program (Condition (3)-a Satisfied)

Before and after issuing set_flg or iset_flg in Condition (3)-a, change the level of the interrupt mask to that of the kernel interrupt mask as follows:

(1) If set_flg issued

```
#include <machine.h>
int old_imask;
```

```
old_imask = get_imask();
chg_ims(15);  /* Interrupt mask level changed to kernel interrupt
              mask level (15 in this example) */
iset_flg(...);  /* As context is interpreted as non-task one while
                interrupt is masked in product specifications,
                set_flg is changed to iset_flg */
ichg_ims((IMASK)old_imask);  /* Interrupt mask level resumed */
```

(2) If iset_flg issued

```
 #include <machine.h>
int old_imask;
old_imask = get_imask();
set_imask(15);  /* Interrupt mask level changed to kernel interrupt
                mask level (15 in this example) */
iset_flg(...);
set_imask(old_imask);  /* Interrupt mask level resumed */
```

1.4.2 For the set_flg Service call Issued to the Own CPU from Another (Condition (3)-b Satisfied)

Do not issue set_flg from a CPU to another.

2. Problem with Issuing the irel_mpl Service Call with or without rel_mpl When specifing NEW to system.newmpl

2.1 Product and Versions Concerned

HI7200/MP V.1.00 Release 02 and earlier versions

2.2 Description

If the irel_mpl service call has been issued with or without rel_mpl, contradictions will arise in the kernel controlling data, and your system may not operate properly. Note, however, that this problem does not occur if only rel_mpl is issued with irel_mpl not used since this does not satisfy Condition (4) below.

2.3 Conditions

This problem may occur if the following conditions are all satisfied:

(1) The statement "system.newmpl=NEW" exists in the configuration file. Or, in the Modification of Variable-Size Memory Pool Information dialog box, the CFG_NEWMPL check box is checked when the GUI configurator used.

(2) While any tasks are waiting for a variable-sized memory

pool (hereafter called M) to offer the memory blocks they require, either of the following is satisfied:

a. The irel_mpl service call is issued with or without rel_mpl from the application program
b. The service call rel_mpl is issued to the own CPU from another (remote service call)

(3) While the kernel is handling the service call in (2), an interrupt is requested.

(4) The interrupt in (3) invokes the interrupt handler or time-event handler, which issues irel_mpl.

(5) The issuance of irel_mpl with or without irel_mpl in (2) and (4) makes the maximum size of the unoccupied continuous areas in M larger than the size of the memory block required by the task in front of the queue for memory blocks to be offered by M; that is, the condition for canceling the WAITING state of the task in front of the queue is satisfied.

2.4 Workarounds

2.4.1 For the irel_mpl Service Call Issued with or without rel_mpl from the Application Program (Condition (2)-a Satisfied)

Before and after issuing irel_mpl with or without rel_mpl in Condition (2), change the level of the interrupt mask to that of the kernel interrupt mask as follows:

(1) If rel_mpl issued

```
#include <machine.h>
int old_imask;
old_imask = get_imask();
chg_ims(15);  /* Interrupt mask level changed to kernel interrupt
                 mask level (15 in this example) */
irel_mpl(...);  /* As context is interpreted as non-task one while
                   interrupt is masked in product specifications,
                   set_flg is changed to iset_flg */
ichg_ims((IMASK)old_imask);  /* Interrupt mask level resumed */
```

(2) If irel_mpl issued

```
#include <machine.h>
int old_imask;
old_imask = get_imask();
```

```
set_imask(15);  /* Interrupt mask level changed to kernel interrupt
                   mask level (15 in this example) */
irel_mpl(...);
set_imask(old_imask);  /* Interrupt mask level resumed */
```

2.4.2 For the set_flg Service call Issued to the Own CPU from Another (Condition (2)-b Satisfied)

Do not issue rel_mpl from a CPU to another.

3. Problem with Using Workspace Files for Sample Programs

3.1 Product and Versions Concerned

HI7200/MP V.1.00 Release 02 and earlier versions

3.2 Description

When blank characters exist in the path name of the directory of the workspace for sample programs,* the configurator cfg72mp may dispatch Error 0002 if a build is performed using any Workspace Files.

*The workspace for sample programs is installed when setupsample.exe included in the product CD is executed.

3.3 Workaround

Perform the following procedure:

(1) In the High-performance Embedded Workshop, open [cfg72mp Options] dialog box by selecting the [Build->cfg72mp] menu.

(2) Modify the content of the [Options] edit box in the [Options] tab as follows:

```
Before:   $(FULLFILE)
After:    "$(FULLFILE)"
```

4. Schedule of Fixing the Problems

These problems have been resolved in HI7200/MP V.1.00 Release 03, which will be opened on the download site at

http://www.renesas.com/hi7200_mp_download

from June 5 on. So update yours to it.

Free-of-charge online update is available. For details see RENESAS TOOL NEWS Document No. 080601/tn5, "Five Real-Time OSes for the SuperH MCU Family Revised," on the Web page at

http://tool-support.renesas.com/eng/toolnews/080601/tn5.htm

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