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RENESAS TECHNICAL UPDATE

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Product Category	System LSI		Document No.	TN-RIN-A005A/E	Rev.	1.00
Title	Hardware Real Time OS library issue (Mailbox queuing, timeout and wakeup request count)		Information Category	Technical Notification		
Applicable Product	See following	Lot No. All lots	Reference Document	R-IN32M3 Series User's Manual R-IN32M3-CL (R18UZ0007EJ0202) R-IN32M3 Series User's Manual R-IN32M3-EC (R18UZ0003EJ0301) R-IN32M3 Series User's Manual Peripheral Functions R-IN32M3-CL R-IN32M3-EC (R18UZ0005EJ0601) R-IN32M3 Series Programing Manual (OS edition) R-IN32M3-EC R-IN32M3-CL (R18UZ0011EJ0400)		

We would like to inform Hardware Real Time OS library issues as described below.

If you do not use Hardware Real Time OS feature, this notice can be ignored.

1. Applicable Product

Product Type	Model Marking	Product Code
R-IN32M3-EC	MC-10287F1	MC-10287F1-HN4-A
		MC-10287F1-HN4-M1-A
R-IN32M3-CL	D60510F1	UPD60510F1-HN4-A
		UPD60510F1-HN4-M1-A

The OS library is included in the following sample software.

R-IN32M3 sample software download site (English)

Japan: http://www.renesas.com/products/soc/fa_lsi/multi_protocol_communication/peer/sample_software.jsp

Europe:

http://www.renesas.eu/applications/industrial_equipment/industrial_communications/r-in/peer/sample_software.jsp

China: http://hk.renesas.com/products/soc/fa_lsi/multi_protocol_communication/peer/sample_software.jsp

Singapore: http://sg.renesas.com/products/soc/fa_lsi/multi_protocol_communication/peer/sample_software.jsp

India: http://in.renesas.com/products/soc/fa_lsi/multi_protocol_communication/peer/sample_software.jsp

Sample software related to this problem

Target	Issue Date	Data
Driver/Middleware Set for TESSERA Board	May 29, 2015	r-in32m3_samplesoft.zip
Driver/Middleware Set for IAR KickStart Kit	May 29, 2015	r-in32m3-iar_samplesoft.zip
TCP/IP, UDP/IP	May 29, 2015	r-in32m3_tcpip_evaluation.zip

Previous version also has the same problem.

2. Issues

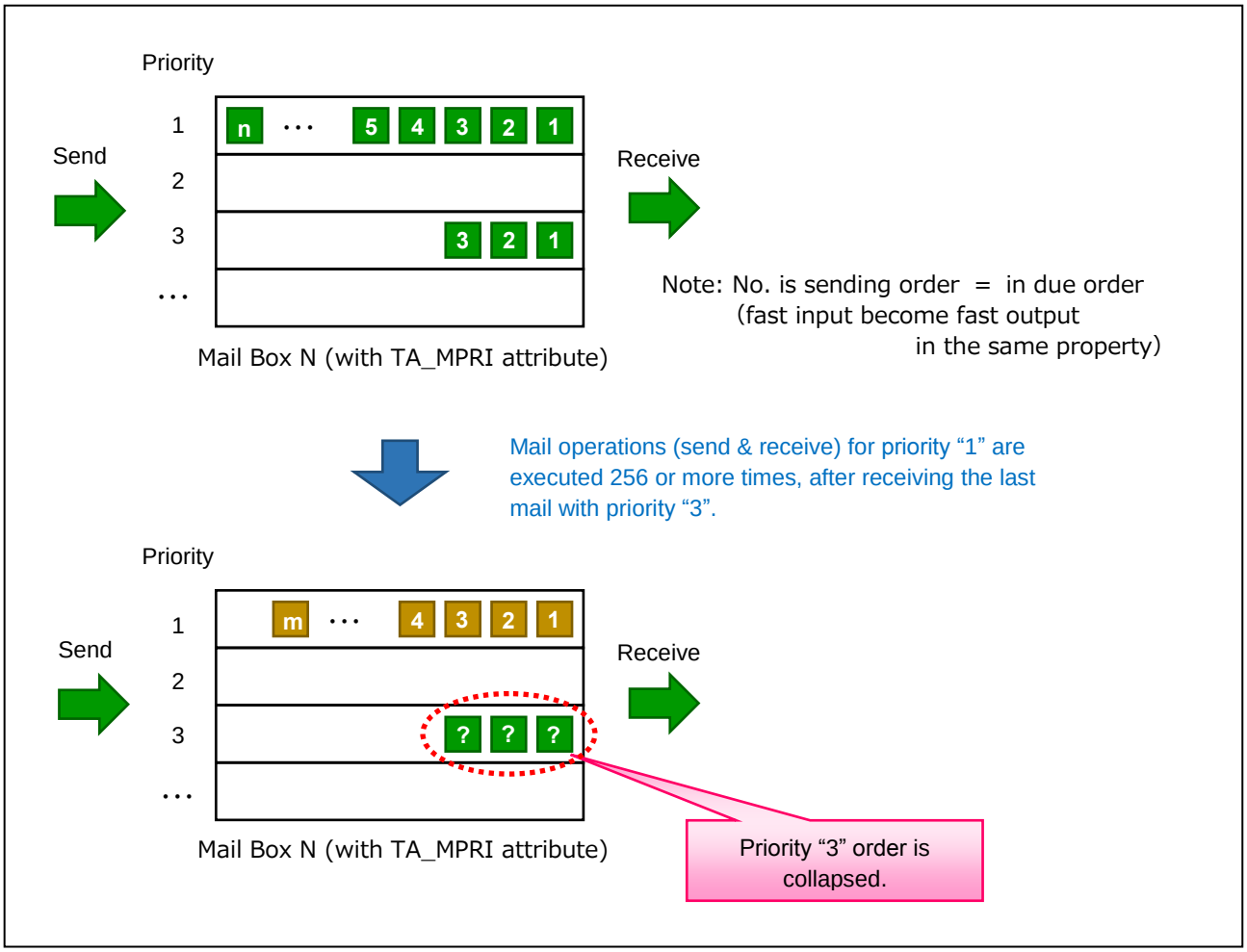
2.1. Issue 1 (Mailbox queuing)

When using synchronization and communication function (mailbox) with TA_MPRI attribute that specifies queuing of messages in priority order, message queue ordering might not be kept in the same priority queue.

[Condition]

The issue will happen if both conditions below are applied for the system operation.

- Mailbox ID with TA_MPRI attribute is used.
- After multiple low priority messages are stored into the mailbox, high priority messages are sent and received 256 and more times without receiving the low priority messages.



2.2. Issue 2 (Timeout)

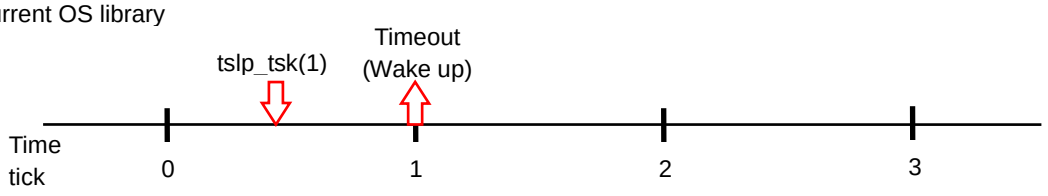
For service calls with timeout, Timeout action occurs 1ms earlier than specified time. When the following service calls are used and specified timeout is set to 1 or more, the issue will happen.

- tslp_tsk
- twai_sem
- twai_flg
- trcv_mbx
- tloc_mtx

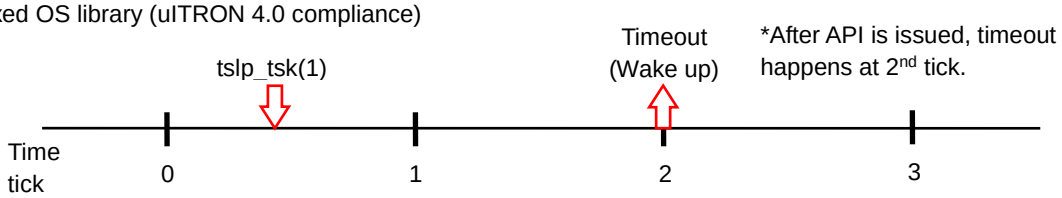
Note: There is no issue when TMO_POL(0) or TMO_FEVR(-1) is specified.

e.g.) tslp_tsk(1) operation

1) Current OS library



2) Fixed OS library (uITRON 4.0 compliance)



2.3. Issue 3 (Wakeup request count)

In case of “wup_tsk” or “iwup_tsk” service call, the following two issues may occur.

(1) Wakeup request count is not incremented.

(2) A type of return error is different from one of uITRON4.0 standard. (Current OS library returns an E_OBJ error but uTRON4.0 specification shows an E_QOVR)

[Condition]

For above issue (1), the condition is the below (1). For above issue (2), the below (2).

(1) “wup_tsk” or “iwup_tsk” service call is issued for a task in the READY or WAITING state when wakeup request count of a task in the RUNNING state is 63 (Maximum)

(2) “wup_tsk” or “iwup_tsk” service call is issued for a task in the WAITING state when wake up request count of a task in the WAITING state is 63 (Maximum)

3. Restriction

1) Mailbox queuing

Basically, forbids to use mailbox with TA_MPRI attribute. (TA_MFIFO, message queue is in FIFO order, can be used.)

2) Timeout

Timeout action occurs 1ms earlier than specified time.

3) Wakeup request count

Forbids to issue “wup_tsk” and “iwup_tsk” system call when wakeup request count is the maximum (63).

4. Update Plan

Renesas updates Hardware Real Time OS library and releases the update by the end of Aug, 2015 on Renesas website.

R-IN32M3 sample software download site (English)

Japan: http://www.renesas.com/products/soc/fa_lsi/multi_protocol_communication/peer/sample_software.jsp

Sample software related to this problem

Target	Issue Date	Data
Driver/Middleware Set for TESSERA Board	Aug 31, 2015	r-in32m3_samplesoft.zip
Driver/Middleware Set for IAR KickStart Kit	Aug 31, 2015	r-in32m3-iar_samplesoft.zip
TCP/IP, UDP/IP	Aug 31, 2015	r-in32m3_tcpip_evaluation.zip

Renesas updates the OS library as follows:

1) Mailbox queuing

- New service call supports enable/disable setting for mailbox with TA_MPRI attribute.
- Mailbox with TA_MPRI attribute is disabled as default.
- In the case of enabling mailbox with TA_MPRI attribute, specification of sending ASP is changed to return E_QOVR when one or more messages are left in the mailbox queue and sending APIs are issued 256 or more times. Same error will be returned until mailbox is empty. Thus, user has to receive the message until mailbox is empty.

Service call

Item	Description
Function name	viod hwos_set_mpri_operation (int32_t flag)
Argument	The following values selected, 1. HWOS_DISABLE_MPRI 2. HWOS_ENABLE_MPRI
Supplement	- This API must be called before executing send/receive. - If this API is not called, HWOS_DISABLE_MPRI setting is selected as default. - During operation this API called, the operation is not stable so do not call this API.

Operation in details

Item	HWOS_DISABLE_MPRI	HWOS_ENABLE_MPRI
Mailbox with TA_MPRI attribute creation	Success	Success
Send mail to mailbox with TA_MPRI attribute	Fail API return value: E_RSATR (-11)	There are one and more mails in mailbox, and mail is sent repeatedly, it become in Fail. API return value in 256 turns: E_QOVR (-43)
Receive mail from mailbox with TA_MPRI attribute	Fail API return value: E_RSATR (-11)	Success
Supplement	-	If API return E_QOVR, mail sending repeat fail (E_QOVR) until mailbox is empty.

2) Timeout

The updated API follows uITRON 4.0 specification for Timeout.

3) Wakeup request count

The updated API follows uITRON 4.0 specification for wakeup request count.