RENESAS Tool News

Note on Using Real-Time OSes RI78V4 and RX78K0R

When using the real-time OSes RI78V4 and RX78K0R for the 78K0R MCUs and RL78 family MCUs, take note of the following problem:

- With interrupts being enabled after the iunl_cpu or unl_cpu service calls issued

1. Products and Versions Concerned
(1) RI78V4 V1.00.00 through V1.00.01
(2) RX78K0R V4.30 package (V4.30 kernel) and earlier

2. Description
If the interrupt handler issues the iloc_cpu or loc_cpu service calls to lock the CPU and afterward issues the iunl_cpu or unl_cpu service calls to unlock it, all the requested interrupts will be enabled after the iunl_cpu or unl_cpu call is serviced.
As a result, if any interrupt in the same priority level as or a lower one than the currently handled interrupt is requested after the iunl_cpu or unl_cpu call is serviced, the interrupt may be handled as a member of multiple interrupts.

3. Conditions
This problem arises if the following conditions are all satisfied:
(1) The interrupt handler, including a cyclic handler, issues the iloc_cpu or loc_cpu service calls and afterward issues the iunl_cpu or unl_cpu service calls.
(2) In addition to the interrupt handler in (1), another interrupt handler, including a timer handler and a cyclic handler, is used.

Note, however, that even if all the above conditions have been satisfied, this problem may not arise depending on the timing of interrupt requests.

4. Workarounds
To avoid this problem, do either of the following in the interrupt

handler (including a cyclic handler):
  (1) Replace iloc_cpu and loc_cpu with the Interrupt Disable DI().
  (2) Replace iunl_cpu and unl_cpu with the Interrupt Enable EI().

Note that because all the interrupts are disabled during the period
from the issue of DI() to that of EI(), neither of the above methods
can be used if any interrupt with a higher priority than the currently
handled one should be acknowledged.

5. Schedule of Fixing Problem
As to RI78V4, we plan to fix this problem in its next version, but as to
RX78K0R, we have no plan to fix the problem.