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Renesas Electronics Corporation

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R8C/Tiny Series

General-purpose Program for Saving and Restoring Context

1. Abstract

This program shows a usage example for saving context (STCTX instruction) and restoring context (LDCTX instruction).

2. Introduction

Tasks are executed in the main routine and context save and restore operations are performed within each task processing.

TASK contains a task's execution number. The content of the table equal to twice the content of TASK in the task execution table is executed (task execution processing). This program has three tasks to execute. Context save and restore operations are performed within each task processing.

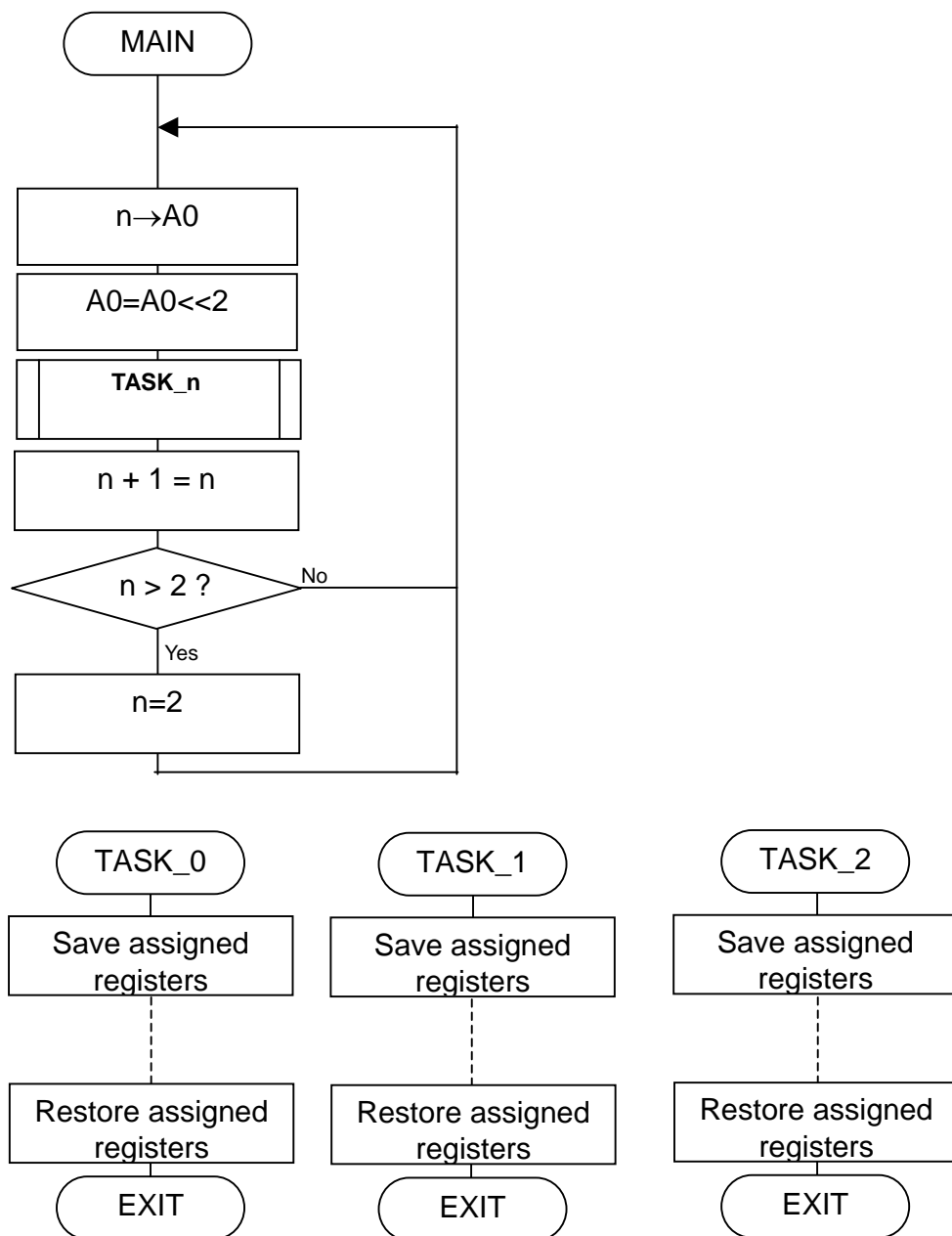
Vcontext indicates the table's base address. The data stored at an address apart from the base address by twice the content of TASK contains register information and the next address indicates a stack pointer's correction value.

The following shows the function of register information.

b7	b6	b5	b4	b3	b2	b1	b0
FB	SB	A1	A0	R3	R2	R1	R0

The content of the register whose bit is set (= 1) is saved to or restored from a stack. The stack pointer's correction value is twice the number of registers to be saved and restored.

3. Flowchart



4. The example of a reference program

```

        .include apl.inc                ; special page include file
;*****
;
;
; R8C Program Collection No. 34        *
; CPU      : R8C/Tiny                 *
;
;                                     *
;*****
VramTOP   .EQU      000400H            ; Declares start address of RAM
VromTOP   .EQU      00D000H            ; Declares start address of ROM
Vcontext .EQU      00F600H            ; Table's base address
Vsubtbl   .EQU      00D400H            ; Declares start address of subroutine table
;
;                                     ;
;       .SECTION   RAM,DATA            ;
;       .ORG       VramTOP              ; RAM area
TASK:     .BLKB    1                    ; Task number
;
;                                     ;
;=====
; Title: Saving/restoring context
; Outline: Example for using STCTX/LDCTX instructions
; Notes:
;=====
;
;       .SECTION   PROGRAM,CODE        ;
;       .ORG       VromTOP              ; ROM area
MAIN:
    MOV.B   TASK,A0                    ;
    SHL.W   #2,A0                       ; Subroutine pointer
;
;
    JSRI.A  Vsubtbl[A0]                 ; Executes task
;
;
    INC.B   TASK                        ; Task + 1
    CMP.B   #2,TASK                     ; Greater than number of tasks?
    JLEU    L_1                          ; --> No
    MOV.B   #0,TASK                     ; Sets task = 0
L_1:
    JMP     MAIN                          ;
;
;                                     ;
;=====
; Processing of task 0
;=====
TASK_0:
    STCTX   TASK,Vcontext                ; Saves registers in order of R0, R1, R2, R3, SB, and FB
;
;       (Here is your program.)
;
    LDCTX   TASK,Vcontext                ; Restores registers in order of FB, SB, R3, R2, R1, and R0
    RTS
;
;                                     ;
;=====

```

```

; Processing of task 1
;
=====;
TASK_1:
    STCTX    TASK,Vcontext    ; Saves registers in order of R0, R2, SB, and FB

;
    (Here is your program.)

    LDCTX    TASK,Vcontext    ; Restores registers in order of FB, SB, R2, and R0
    RTS
;
;
=====;
; Processing of task 2
;
=====;
TASK_2:
    STCTX    TASK,Vcontext    ; Saves registers in order of R1, R3, A1, and SB

;
    (Here is your program.)

    LDCTX    TASK,Vcontext    ; Restores registers in order of SB, A1, R3, and R1
    RTS
;
;
    .SECTION  BASE,ROMDATA
    .ORG     Vcontext        ; Context save/restore table area
;
-----;
; Context information table
;
-----;
    .BYTE    11001111B      ; TASK = 0   Register information
    .BYTE    12             ;           SP correction value
;
;
    .BYTE    10000101B     ; TASK = 1   Register information
    .BYTE    6             ;           SP correction value
;
;
    .BYTE    01101010B    ; TASK = 2   Register information
    .BYTE    8             ;           SP correction value
;
;
    .SECTION  TABLE,ROMDATA
    .ORG     Vsubtbl       ; Subroutine table area
;
-----;
; Subroutine table
;
-----;
    .LWORD   TASK_0        ; TASK = 0   Subroutine
    .LWORD   TASK_1        ; TASK = 1   Subroutine
    .LWORD   TASK_2        ; TASK = 2   Subroutine
;
;
    .END
;

```

5. Reference

SOFTWARE MANUAL

R8C/Tiny Series SOFTWARE MANUAL

(Acquire the most current version from Renesas web-site)

6. Web-site and contact for support

Renesas Web-site

<http://www.renesas.com>

Contact for M16C family microcomputer technical support

Mail to : support_apl@renesas.com

REVISION HISTORY

Rev.	Date	Description	
		Page	Summary
1.00	Dec 29, 2003	-	First edition issued

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