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Renesas Electronics Corporation

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M16C/60 Series and M16C/20 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. The example of a reference program

```

;*****
; *
; M16C General-purpose Programs *
; CPU : M16C *
; *
;*****
VramTOP    .EQU    000400H        ; Declares start address of RAM
VromTOP    .EQU    0F0000H        ; Declares start address of ROM
Vcontext   .EQU    0FF800H        ; Table's base address
Vsubtbl    .EQU    0FFA00H        ; 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                  ;

```

4. Reference

SOFTWARE MANUAL

M16C/60 M16C/20 Series SOFTWARE MANUAL

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

5. Web-site and contact for support

Renesas Web-site

<http://www.renesas.com>

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Mail to : support_apl@renesas.com

REVISION HISTORY

Rev.	Date	Description	
		Page	Summary
1.00	Jul 08, 2002	-	First edition issued

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