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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

M16C/80 Series

Saving and Restoring Context

1.0 Abstract

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

2.0 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.

3.0 Programming Code

```

*****
;
;   M16C Program Collection
;   CPU : M16C/80 series
;
*****
VramTOP    .EQU    000400H           ; Declares start address of RAM
VromTOP    .EQU    0FE0000H        ; Declares start address of ROM
Vcontext   .EQU    0FFF800H        ; Table's base address
Vsubtbl    .EQU    0FFFA00H        ; 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
;
;   (Processing)
;
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
;
;   (Processing)
;
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

  (Processing)

  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

```

4.0 Reference

MCU Technical Information Homepage

<http://www.infocom.maec.co.jp/indexe.htm>

(or <http://www.mdece.com/> , <http://www.mitsubishichips.com/products/mcu/index.html> or your local Web Site.)

Technical Support

E-mail: support@apl.maec.co.jp

(or your local support E-mail address. A private e-mail address should NOT be used.)

Data Sheet

M16C/80 group

(Use the latest version on the Homepage: <http://www.infocom.maec.co.jp/indexe.htm>)

User's Manual

M16C/80 group

(Use the latest version on the Homepage: <http://www.infocom.maec.co.jp/indexe.htm>)

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