To our customers,

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April 1\(^{st}\), 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation ([http://www.renesas.com](http://www.renesas.com))

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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.

<table>
<thead>
<tr>
<th>b7</th>
<th>b6</th>
<th>b5</th>
<th>b4</th>
<th>b3</th>
<th>b2</th>
<th>b1</th>
<th>b0</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB</td>
<td>SB</td>
<td>A1</td>
<td>A0</td>
<td>R3</td>
<td>R2</td>
<td>R1</td>
<td>R0</td>
</tr>
</tbody>
</table>

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

;************************************************************************
; Title: Saving/restoring context
; Outline: Example for using STCTX/LDCTX instructions
; Notes: 
;************************************************************************

VramTOP .EQU 000400H ; Declares start address of RAM
VromTOP .EQU 0F0000H ; Declares start address of ROM
Vcontext .EQU OFF800H ; Table’s base address
Vsubtbl .EQU OFFA00H ; Declares start address of subroutine table

.SECTION RAM,DATA
.ORG VramTOP ; RAM area

TASK: .BLKB 1 ; Task number

;==============================================================

.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.)
    LDCX 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

Contact for Renesas technical support

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## REVISION HISTORY

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<th>Date</th>
<th>Description</th>
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<tr>
<td>1.00</td>
<td>Jul 08, 2002</td>
<td>- First edition issued</td>
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Page Summary
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