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

April 1st, 2010
Renesas Electronics Corporation

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M16C/60 Series and M16C/20 Series
General-purpose Program for Changing Blocks

1. Abstract
This program changes memory contents consisting of the same number of bytes with each other memory location.

2. Introduction
This program changes memory contents consisting of the same number of bytes with each other memory location. An add and conditional branch instruction (ADJNZ) is used to count the number of transfers performed. In this program, memory contents basically are changed in bytes. However, if the memory contents to be changed consist of even bytes, they can be changed in words for increased speed of processing.

<table>
<thead>
<tr>
<th>Subroutine name</th>
<th>ROM capacity : 17 bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrupt during execution : Accepted</td>
<td>Number of stacks used : None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Register/memory</th>
<th>Input</th>
<th>Output</th>
<th>Usage condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0L</td>
<td>-</td>
<td>Last data of BLOCK2</td>
<td>Register used for change</td>
</tr>
<tr>
<td>R0H</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>R1</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>R2</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>R3</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>A0</td>
<td>-</td>
<td>0000_{16}</td>
<td>Number of transfers performed</td>
</tr>
<tr>
<td>A1</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>BLOCK1</td>
<td>Content of BLOCK1</td>
<td>Content of BLOCK2</td>
<td>←</td>
</tr>
<tr>
<td>BLOCK2</td>
<td>Content of BLOCK2</td>
<td>Content of BLOCK1</td>
<td>←</td>
</tr>
</tbody>
</table>

Usage precautions

Memory contents are changed in bytes.
3. Flowchart

- ENTER
- Set the number of transfers performed
- Change data
- Number of transfers set completed?
  - No
  - Yes
  - EXIT
4. The example of a reference program

```plaintext
;********************************************************************************
; * M16C General-purpose Programs *
; CPU : M16C *
; *;
;********************************************************************************
VramTOP .EQU 000400H ; Declares start address of RAM
VromTOP .EQU 0F0000H ; Declares start address of ROM

; SECTION RAM,DATA
.ORG VramTOP ; RAM area
LENGTH .EQU 10 ; Length of area
BLOCK1: .BLKB LENGTH ; Area 1
BLOCK2: .BLKB LENGTH ; Area 2

;********************************************************************************
; Title : Changing blocks
; Outline : Changes data in units of blocks.
; Input : ------------------------------> Output:
; R0L ( ) R0L (Indeterminate)
; R0H ( ) R0H (Unused)
; R1L ( ) R1L (Unused)
; R1H ( ) R1H (Unused)
; R2 ( ) R2 (Unused)
; R3 ( ) R3 (Unused)
; A0 ( ) A0 (Indeterminate)
; A1 ( ) A1 (Unused)
; Stack amount used: None
; Notes:
;********************************************************************************

.SECTION PROGRAM, CODE
.ORG VromTOP ; ROM area
MOV.B #LENGTH,A0 ; Sets number of transfers performed

LOOP:
MOV.B BLOCK1-1[A0],R0L ;
XCHG.B R0L,BLOCK2-1[A0] ; Changes data
MOV.B R0L,BLOCK1-1[A0] ;
ADJNZ.W #-1,A0,LOOP ; --> Looped for the number of transfers performed

.END
```
5. Reference

SOFTWARE MANUAL
M16C/60 M16C/20 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 Renesas technical support

Mail to: support_apl@renesas.com
## REVISION HISTORY

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1.00</td>
<td>Jul 08, 2002</td>
<td>First edition issued</td>
</tr>
</tbody>
</table>
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