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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 Converting from 1-byte BCD Code to HEX Code

1. Abstract
This program converts 1-byte BCD code into 1-byte HEX code.

2. Introduction
This program converts 1-byte BCD code into 1-byte HEX code. Set the BCD code in R0H. The HEX code is output to R0L.
In this program, the BCD code is divided by 2 (shifted right) and the remainder is loaded into the register as HEX code. If a significant bit is transferred from the BCD’s high-order digit to the low-order digit, numeric correction is applied.

<table>
<thead>
<tr>
<th>Subroutine name : BCDtoHEX_1byte</th>
<th>ROM capacity : 19 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>HEX code</td>
<td>←</td>
</tr>
<tr>
<td>R0H</td>
<td>BCD code</td>
<td>Indeterminate</td>
<td>←</td>
</tr>
<tr>
<td>R1L</td>
<td>-</td>
<td>00₁₆</td>
<td>Loop count</td>
</tr>
<tr>
<td>R1H</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>-</td>
<td>Unused</td>
</tr>
<tr>
<td>A1</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
</tbody>
</table>

Usage precautions
The BCD code is destroyed as a result of program execution.
3. Flowchart

```
ENTER

Initialize HEX area

Set loop count

Set remainder of BCD code vid. 2 to MSB of HEX data

Correct BCD code

Loop count finished?

Yes

EXIT

No
```
4. The example of a reference program

;************************************************************************
; * 
; M16C General-purpose Programs * 
; CPU : M16C * 
; * 
;************************************************************************

VromTOP EQU 0F0000H ; Declares start address of ROM

;==============================================================
; Title : Converting from BCD code to HEX code
; Outline : Converts 1-byte BCD code into 1-byte HEX code
; Input : ------------------------------> Output:
; R0L ( ) R0L (HEX code)
; R0H (BCD code) R0H (Indeterminate)
; R1L ( ) R1L (Indeterminate)
; R1H ( ) R1H (Unused)
; R2 ( ) R2 (Unused)
; R3 ( ) R3 (Unused)
; A0 ( ) A0 (Unused)
; A1 ( ) A1 (Unused)
; Stack amount used: None
; Notes:
;==============================================================

.SECTION PROGRAM,CODE
.ORG VromTOP; ROM area

BCDtoHEX_1byte:
; MOV.B #0,R0L ; Initializes HEX area
MOV.B #8,R1L ; Sets loop count

BCDtoHEX_1byte_10:
; SHL.B #-1,R0H ; Shifts most significant bit
RORC.B R0H ;
BTST 3+8,R0 ;
JEQ BCDtoHEX_1byte_20 ;
SUB.B #3,R0H ;

BCDtoHEX_1byte_20:
; ADJNZ.B #-1,R1L,BCDtoHEX_1byte_10 ; --> Executes next BCD digit
RTS ;

.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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<tr>
<td>1.00</td>
<td>Jul 08, 2002</td>
<td>First edition issued</td>
</tr>
</tbody>
</table>
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