To our customers,

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Renesas Electronics website: [http://www.renesas.com](http://www.renesas.com)

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

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R8C/Tiny Series

General-purpose Program for Converting from 1-byte HEX Code to BCD Code

1. Abstract

This program converts 1-byte HEX code into 2-byte BCD code.

2. Introduction

This program converts 1-byte HEX code into 2-byte BCD code. Set the HEX code in R1L. The BCD code is output to R0.

In this program, the HEX code is doubled by decimal calculation sequentially beginning with the most significant bit and the results are added. This operation is repeated by a specified number of bits as the HEX code is converted into BCD code.

Subroutine name : HEXtoBCD_1byte  
ROM capacity : 19 bytes
Interrupt during execution : Accepted  
Number of stacks used : None

<table>
<thead>
<tr>
<th>Register/memory</th>
<th>Input</th>
<th>Output</th>
<th>Usage condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0</td>
<td>-</td>
<td>BCD code</td>
<td>←</td>
</tr>
<tr>
<td>R1H</td>
<td>-</td>
<td>00₁₆</td>
<td>Loop count</td>
</tr>
<tr>
<td>R1L</td>
<td>HEX code</td>
<td>Indeterminate</td>
<td>←</td>
</tr>
<tr>
<td>R2</td>
<td>-</td>
<td>Indeterminate</td>
<td>Used to save data</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: HEX code is destroyed as a result of program execution.
3. Flowchart

ENTER

Initialize BCD area

Set loop count

Shift most significant bit to C flag

Save register

BCD area x 2 + C flag
--> BCD area

Restore register

Loop count finished? Yes

EXIT

No
4. The example of a reference program

.include apl.inc ; special page include file

R8C Program Collection No. 18
CPU : R8C/Tiny

VromTOP .EQU 00D000H ; 12Kbyte Flash version

Title: Converting from HEX code to BCD code
Outline: Converts 1-byte HEX code into 2-byte BCD code
Input: --------------------------------> Output:
R0L ( ) R0 (BCD code)
R0H ( )
R1L (HEX code) R1L (Indeterminate)
R1H ( ) R1H (Indeterminate)
R2 ( ) R2 (Indeterminate)
R3 ( ) R3 (Unused)
A0 ( ) A0 (Unused)
A1 ( ) A1 (Unused)

Stack amount used: None
Notes:

.SECTION PROGRAM, CODE ;
.ORG VromTOP ; ROM area
HEXtoBCD_1byte:
    MOV.W #0,R0 ; Initializes BCD area
MOV.B #8,R1H ; Sets loop count
HEXtoBCD_1byte_10:
    SHL.B #1,R1L ; Shifts most significant bit to C flag
XCHG.W R1,R2 ; Saves register
MOV.W R0,R1
    DADC.W R1,R0 ; Doubled by decimal calculation + C flag
XCHG.W R1,R2 ; Restores register
ADJNZ.B #-1,R1H,HEXtoBCD_1byte_10 ; --> Executes next digit
RTS

.END
5. Reference

SOFTWARE MANUAL
R8C/Tiny 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>
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<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>
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