

To our customers,

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

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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

M16C/80 Series

Converting from 4-byte HEX Code to BCD Code

1.0 Abstract

This program converts 4-byte HEX code into 5-byte BCD code.

2.0 Introduction

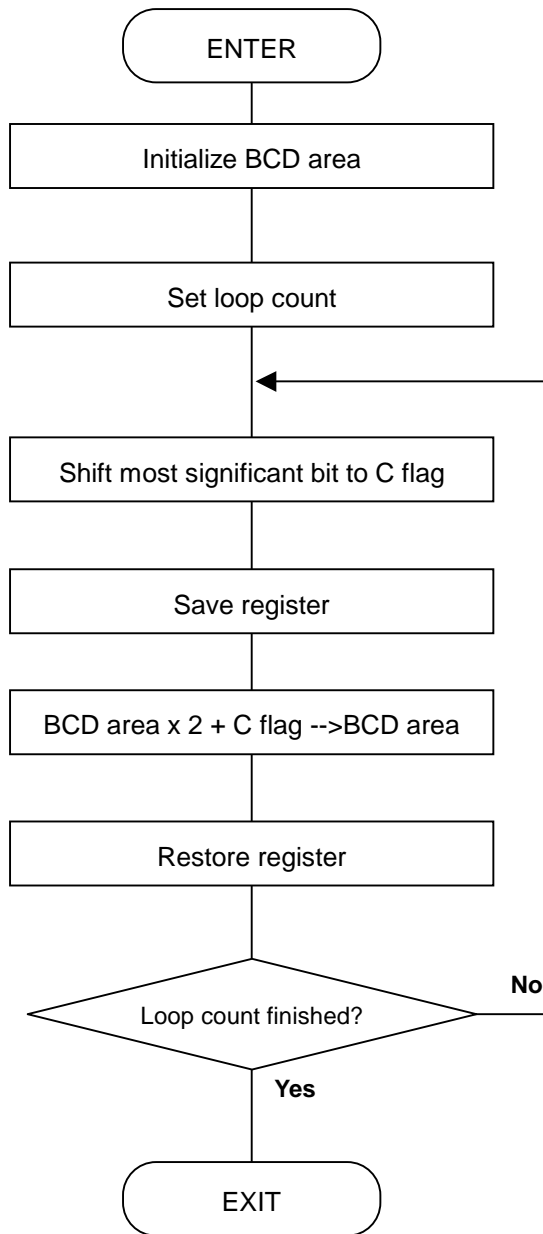
This program converts 4-byte HEX code into 5-byte BCD code. Set the HEX code in R3 and R1 beginning with the upper half. The BCD code is output to A1, R2, and R0 beginning with the most significant part.

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_4byte	ROM capacity : 39byte
Interrupt during execution:Accepted	Number of stacks used : 2 bytes

Register/memory	Input	Output	Usage condition
R0	-	Lower part of BCD code	←
R1	Lower half of HEX code	Indeterminate	←
R2	-	Middle part of BCD code	←
R3	Upper half of HEX code	Indeterminate	←
A0	-	" 0000 ₁₆ "	Number of digits counter
A1	-	Upper part of BCD code	←
Usage precautions	The HEX code is destroyed as a result of program execution.		

3.0 Flowchart



4.0 Programming Code

```

*****
;
; *
;   M16C Program Collection
;   CPU : M16C/80 series
; *
;
*****
VromTOP      .EQU          0FE0000H          ; Declares start address of ROM
;=====
;   Title: Converting from HEX code to BCD code
;   Outline: Converts 4-byte HEX code into 5-byte BCD code
;   Input:   ----->                Output:
;   R0()                    R0(Lower part of BCD)
;   R1(Lower half of HEX code) R1(Indeterminate)
;   R2()                    R2(Middle part of BCD)
;   R3(Upper half of HEX code) R3(Indeterminate)
;   A0()                    A0(Indeterminate)
;   A1()                    A1(Upper part of BCD)
;   Stack amount used: 2byte
;   Notes:
;=====
;
;   .SECTION          PROGRAM, CODE
;   .ORG              VromTOP          ; ROM area
HEXtoBCD_4byte:
;
MOV.L    #0,R2R0      ; Initializes BCD area
MOV.W    #0,A1
MOV.B    #32,A0       ; Sets loop count
HEXtoBCD_4byte_10:
;
SHL.L    #1,R3R1      ; Shifts most significant bit to C flag
PUSH.W   R1           ; Saves register
MOV.W    R0,R1
DADC.W   R1,R0        ; Doubled by decimal calculation + C flag
XCHG.W   R2,R0
MOV.W    R0,R1
DADC.W   R1,R0        ; Doubled by decimal calculation + carry
XCHG.W   R0,A1
MOV.W    R0,R1
DADC.W   R1,R0        ; Doubled by decimal calculation + carry
XCHG.W   R0,A1
XCHG.W   R2,R0
POP.W    R1           ; Restores register
ADJNZ.W  #-1,A0,HEXtoBCD_4byte_10 ; --> Executes next digit
RTS
;
;
;   .END ;

```

5.0 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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