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 1-byte HEX Code to BCD Code

1.0 Abstract

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

2.0 Introduction

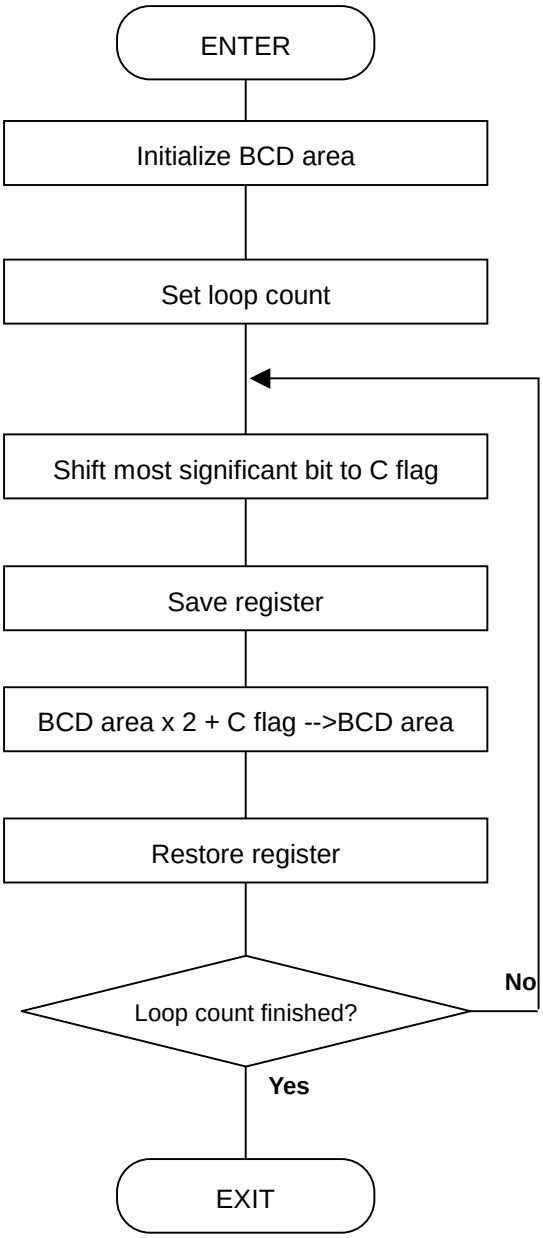
This program converts 1-byte HEX code into 2-byte BCD code. Set the HEX code in R1L. The BCD code is output to R0.

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 : 18byte
Interrupt during execution:Accepted	Number of stacks used : None

Register/memory	Input	Output	Usage condition
R0	-	BCD code	←
R1H	-	" 00_{16}"	Loop count
R1L	HEX code	Indeterminate	←
R2	-	Indeterminate	Used to save data
R3	-	-	Unused
A0	-	-	Unused
A1	-	-	Unused
Usage precautions	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 1-byte HEX code into 2-byte BCD code
;   Input:      ------------------------------>     Output:
;   R0()                                        R0(BCD code)
;   R1H()                                       R1H(Indeterminate)
;   R1L(HEX code)                               R1L(Indeterminate)
;   R2()                                        R2(Indeterminate)
;   R3()                                        R3(Unused)
;   A0()                                        A0(Unused)
;   A1()                                        A1(Unused)
;   Stack amount used: 3byte
;   Notes: A1A0 , R3R1
;           Zero division is returned by Z flag
;===================================================================
            .SECTION    PROGRAM,CODE
            .ORG        VromTOP                 ; ROM area
            .FB         FBcnst                  ; Sets provisional FB register value
HEXtoBCD_1byte:                                 ;
  MOV.W     #0,R0                               ; Initializes BCD area
  MOV.B     #8,R1H                              ; Sets loop count
HEXtoBCD_1byte_10:                              ;
  SHL.L     #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.W   #-1,R1H,HEXtoBCD_1byte_10           ; --> Executes next digit
  RTS                                           ;
  ;                                             ;
            .END ;
```

5.0 Reference

MCU Technical Information Homepage

http://www.infomicom.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.infomicom.maec.co.jp/indexe.htm)

User's Manual

M16C/80 group
(Use the latest version on the Homepage: http://www.infomicom.maec.co.jp/indexe.htm)

RENESAS
Renesas Technology Corp.

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