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 BCD Code to HEX Code

1.0 Abstract

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

2.0 Introduction

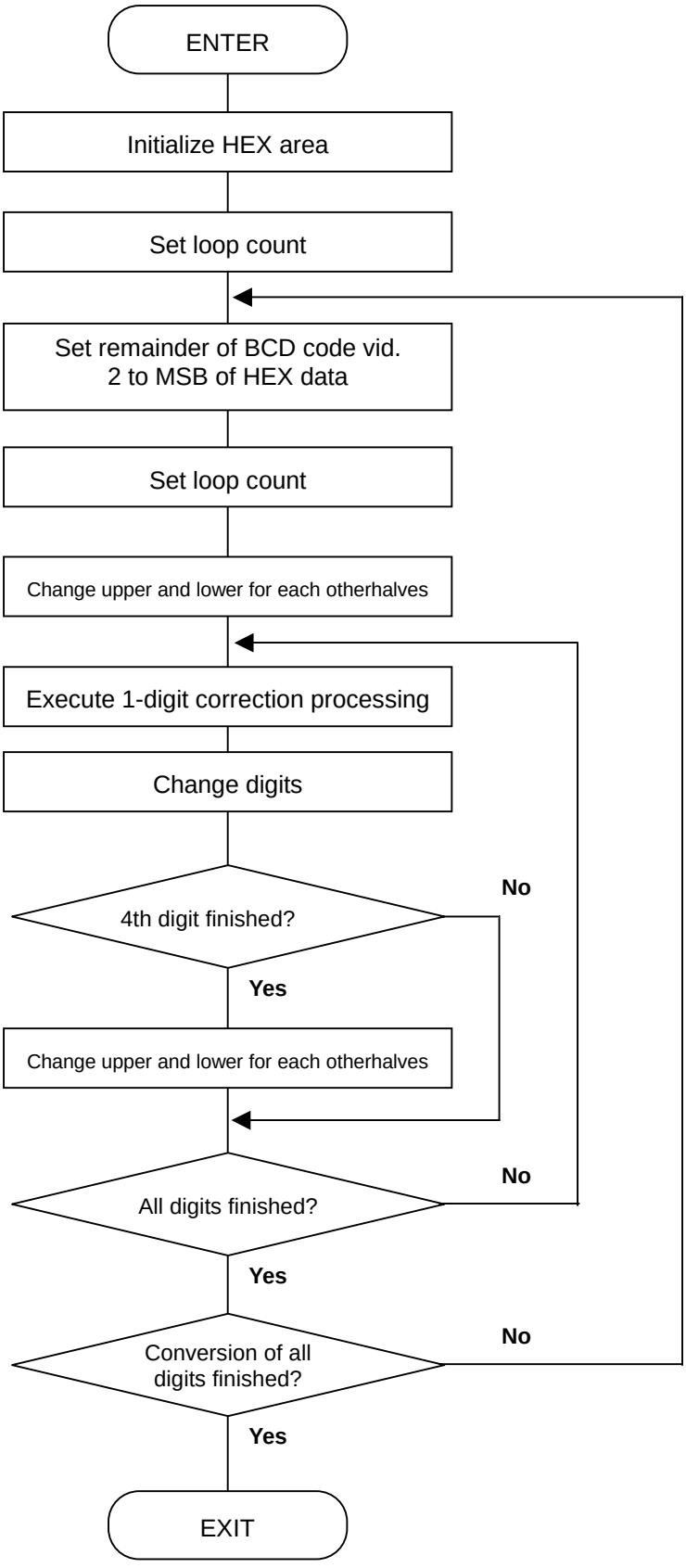
This program converts 4-byte BCD code into 4-byte HEX code. Set the BCD code in R2 and R0 beginning with the upper half. The HEX code is output to R3 and R1 beginning with the upper half.

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.

Subroutine name : BCDtoHEX_4byte	ROM capacity : 41byte
Interrupt during execution:Accepted	Number of stacks used : None

Register/memory	Input	Output	Usage condition
R0	Lower half of BCD code	Indeterminate	←
R1	-	Lower part of HEX code	←
R2	Upper half of BCD code	Indeterminate	←
R3		Upper part of HEX code	←
A0	-	" 0000_{16} "	Loop count
A1	-	" 0000_{16} "	Number of digits counter
Usage precautions	The BCD 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 BCD code to HEX code
;   Outline: Converts 4-byte BCD code into 4-byte HEX code
;   Input:      ----------------------------->      Output:
;   R0(Lower half of BCD code)          R0(Indeterminate)
;   R1()                                R1(Lower part of HEX)
;   R2(Upper half of HEX code)          R2 (Indeterminate)
;   R3()                                R3(Upper part of HEX)
;   A0()                                A0(Indeterminate)
;   A1()                                A1(Indeterminate)
;   Stack amount used: None
;   Notes:
;===================================================================
            .SECTION    PROGRAM,CODE
            .ORG        VromTOP                 ; ROM area
BCDtoHEX_4byte:                                 ;
  MOV.L     #0,R3R1                             ; Initializes HEX area
  MOV.B     #32,A0                              ; Sets loop count
BCDtoHEX_4byte_10:                              ;
  SHL.W     #-1,R2                              ; Shifts most significant bit
  RORC.W    R0                                  ;
  RORC.W    R3                                  ;
  RORC.W    R1                                  ;
  MOV.B     #8,A1                               ; Sets loop count
  XCHG.W    R2,R0                               ; Changes upper/lower halves for each other
BCDtoHEX_4byte_20:                              ;
  BTST      3,R0L                               ;
  JEQ       BCDtoHEX_4byte_30                   ; --> Correction not required
  SUB.W     #3,R0                               ; Executes correction
BCDtoHEX_4byte_30:                              ;
  ROT.W     #-4,R0                              ; Changes digits
  CMP.B     #5,A1                               ; Determines whether high-order correction is completed
  JNE       BCDtoHEX_4byte_40                   ; --> Change of upper/lower halves not required
  XCHG.W    R2,R0                               ; Changes upper/lower halves for each other
BCDtoHEX_4byte_40:                              ;
  ADJNZ.W   #-1,A1,BCDtoHEX_4byte_20            ; --> Processes next digit correction
  ADJNZ.W   #-1,A0,BCDtoHEX_4byte_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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