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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 Uppercase Alphabet to Lowercase Alphabet

1.0 Abstract

This program converts an uppercase English alphabet in ASCII code into a lowercase English alphabet in ASCII code.

2.0 Introduction

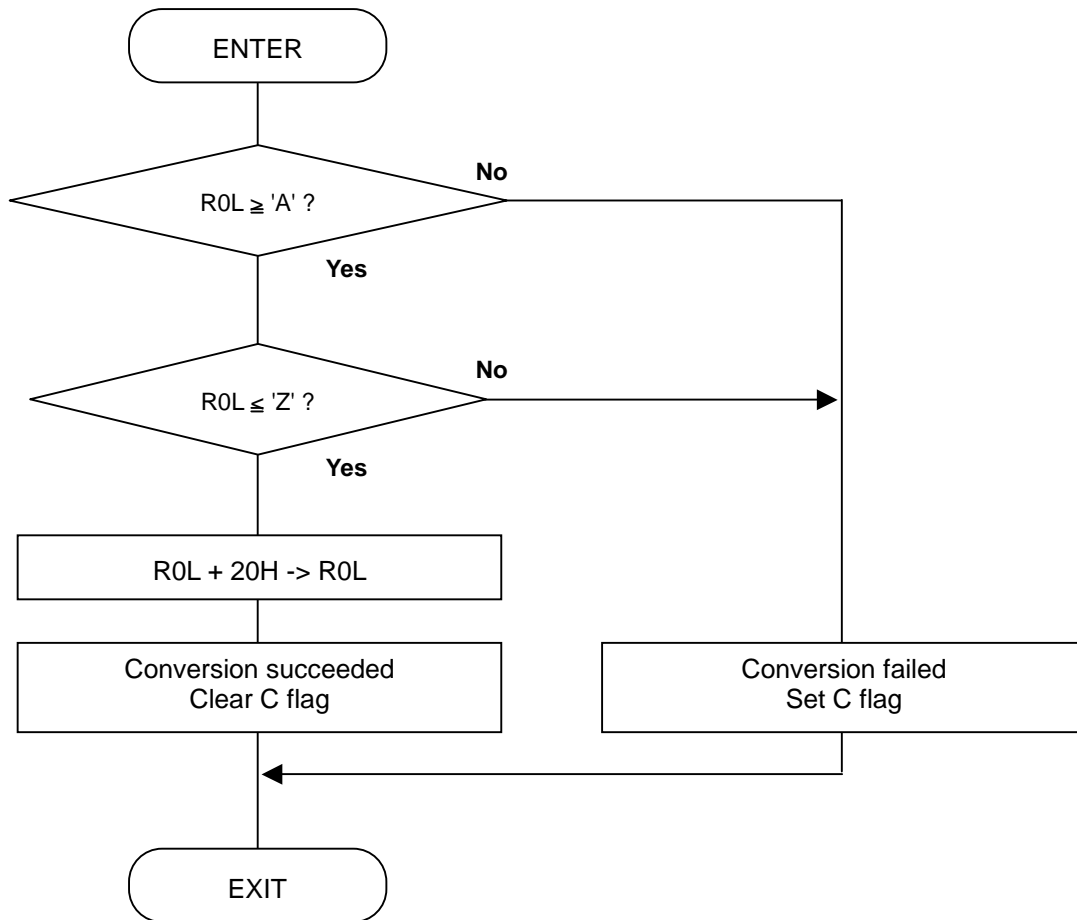
This program converts an uppercase English alphabet in ASCII code into a lowercase English alphabet in ASCII code. Set the uppercase English alphabet in ASCII code in R0L. The converted lowercase English alphabet in ASCII code is output to R0L. Conversion information is output to the C flag.

C	Meaning
0	Uppercase alphabet converted into lowercase alphabet
1	No converted because inconvertible code was input

Subroutine name : TOLOWER	ROM capacity : 16 bytes
Interrupt during execution:Accepted	Number of stacks used : None

Register/memory	Input	Output	Usage condition
R0L	Uppercase alphabet (ASCII)	Lowercase alphabet (ASCII)	←
R0H	-	-	Unused
R1	-	-	Unused
R2	-	-	Unused
R3	-	-	Unused
A0	-	-	Unused
A1	-	-	Unused
C flag	-	Conversion information	←
Usage precautions			

3.0 Flowchart



4.0 Programming Code

```

*****
;
;   M16C Program Collection
;   CPU : M16C/80 series
*****
VromTOP      .EQU          0FE000H          ; Declares start address of ROM
;=====
;   Title: Converting ASCII code uppercase alphabet into lowercase alphabet
;   Contents of processing:
;           The ASCII code input in R0L is converted from an uppercase English alphabet into
;           a lowercase English alphabet and the result is returned to R0L. No conversion is
;           performed if any code is input in R0L that is not an uppercase English alphabet.
;   Procedure: (1) Input ASCII code in R0L.
;              (2) Call the subroutine.
;              (3) Converted ASCII code is loaded into R0L.
;   Result:   The C flag is cleared to 0 when the code was converted from a uppercase alphabet
;             into an lowercase alphabet. The C flag is set to 1 when the code was not
;   Input:   ----->                               Output:
;   R0L(ASCII code)                                R0L(ASCII code)
;   R0H()                                           R0H(Unused)
;   R1()                                             R1(Unused)
;   R2()                                             R2(Unused)
;   R3()                                             R3(Unused)
;   A0()                                             A0(Unused)
;   A1()                                             A1(Unused)
;   Stack amount used: None
;=====
;
;   .SECTION          PROGRAM, CODE
;   .ORG              VromTOP          ; ROM area
;
; TOLOWER:
;   CMP.B            #'A',R0L          ; Uppercase alphabet 'A' or above?
;   JLTU             TOLOWNON          ; --> no (not converted)
;   CMP.B            #'Z',R0L          ; Uppercase alphabet 'Z' or below?
;   JGTU             TOLOWNON          ; --> no (not converted)
;   ADD.B            #20H,R0L          ; Converts from uppercase alphabet
;                                     ; into lowercase alphabet
;   FCLR             C                 ; Sets "converted" information
;   RTS
; TOLOWNON:
;   FSET             C                 ; Sets "not-converted" information
;   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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