

M16C/60 Series and M16C/20 Series

General-purpose Program for Converting from Uppercase Alphabet to Lowercase Alphabet

1. Abstract

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

2. Introduction

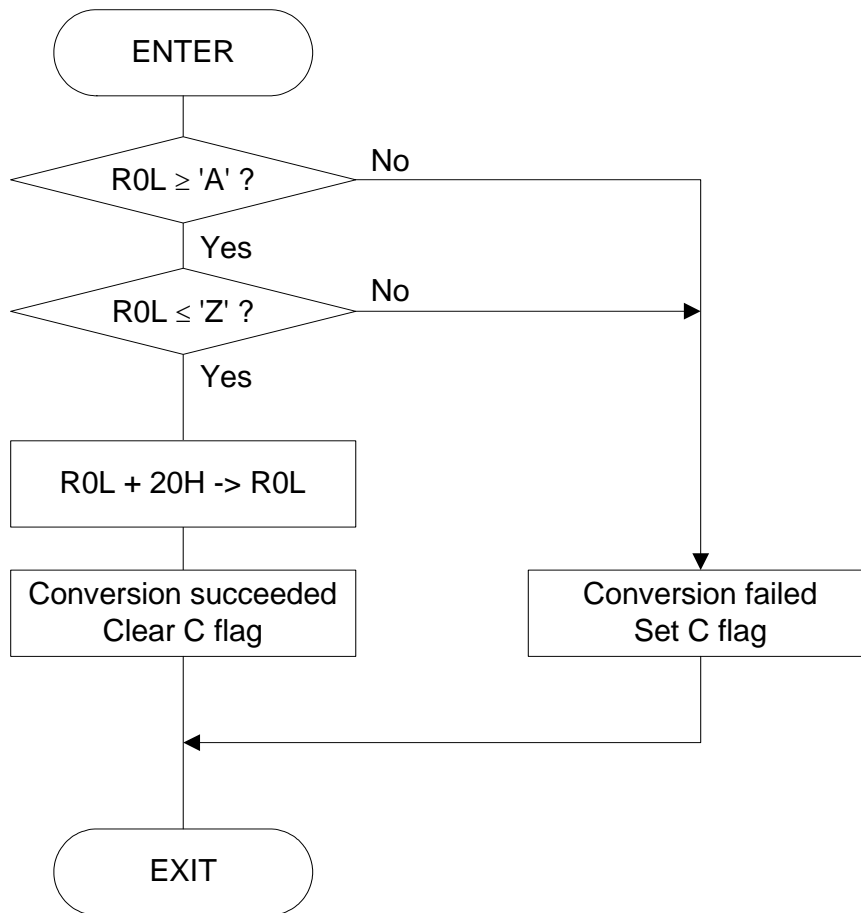
This program converts an uppercase English alphabet in ASCII code into a lowercase English alphabet in ASCII code. Set the uppercase English alphabet in ASCII code in R0L. The converted lowercase English alphabet in ASCII code is output to R0L. Conversion information is output to the C flag.

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

Subroutine name : TOWER	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. Flowchart



4. The example of a reference program

```

;*****
; *
; M16C General-purpose Programs *
; CPU : M16C *
; *
;*****
VromTOP    .EQU    0F0000H        ; 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 an uppercase
;         alphabet into a lowercase alphabet. The C flag is set to 1 when the code
;         was not converted.
; 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. Reference

SOFTWARE MANUAL

M16C/60 M16C/20 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

Rev.	Date	Description	
		Page	Summary
1.00	Jul 08, 2002	-	First edition issued

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corporation product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation or a third party.
2. Renesas Technology Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor for the latest product information before purchasing a product listed herein.
The information described here may contain technical inaccuracies or typographical errors. Renesas Technology Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
Please also pay attention to information published by Renesas Technology Corporation by various means, including the Renesas Technology Corporation Semiconductor home page (<http://www.renesas.com>).
4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
6. The prior written approval of Renesas Technology Corporation is necessary to reprint or reproduce in whole or in part these materials.
7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
8. Please contact Renesas Technology Corporation for further details on these materials or the products contained therein.