To our customers,

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

April 1\textsuperscript{st}, 2010
Renesas Electronics Corporation

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M16C/60 Series and M16C/20 Series

General-purpose Program for Converting from Hexadecimal Data to ASCII Code

1. Abstract

This program converts hexadecimal data into ASCII code.

2. Introduction

This program converts hexadecimal data into ASCII code. The hexadecimal data that can be converted are from “00H” to “0FH.” The converted ASCII code are numbers from ‘0’ to ‘9’ and alphabets from ‘A’ to ‘F’. Set the hexadecimal data in R0L. The converted ASCII code is output to R0L. Conversion information is output to the C flag.

<table>
<thead>
<tr>
<th>C</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Hexadecimal converted into ASCII code</td>
</tr>
<tr>
<td>1</td>
<td>Not converted because inconvertible code was input</td>
</tr>
</tbody>
</table>

Subroutine name : HTOA

ROM capacity : 21 bytes

Interrupt during execution : Accepted

Number of stacks used : None

<table>
<thead>
<tr>
<th>Register/memory</th>
<th>Input</th>
<th>Output</th>
<th>Usage condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0L</td>
<td>Hexadecimal</td>
<td>ASCII code</td>
<td>←</td>
</tr>
<tr>
<td>R0H</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>R1</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>R2</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>R3</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>A0</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>A1</td>
<td>-</td>
<td>-</td>
<td>Unused</td>
</tr>
<tr>
<td>C flag</td>
<td>-</td>
<td>Converted or not</td>
<td>←</td>
</tr>
</tbody>
</table>

Usage precautions
3. Flowchart

```
ENTER

R0L ≤ 0FH ?
  Yes
  R0L + 'A' - 10 → R0L
  Conversion succeeded
  Clear C flag

No

R0L ≥ 0AH ?
  Yes
  R0L + '0' → R0L
  Conversion failed
  Set C flag

No

EXIT
```
4. The example of a reference program

;*****************************************************************************
; Title : Converting hexadecimal into ASCII code
; Contents of processing:
; The hexadecimal data input in ROL is converted into ASCII code, which
; is returned to ROL. The valid hexadecimal data are 00 to 0F. 0A to 0F
; are converted into 'A' to 'F.' No conversion is performed if invalid code
; is input.
; Procedure: (1) Input hexadecimal data in ROL.
; (2) Call the subroutine.
; (3) The converted hexadecimal data is loaded into ROL.
; Result: When converted into ASCII code, the C flag is cleared to 0. If not converted
; into ASCII code, i.e., if any hexadecimal data other than 00 to 0F was
; input, the C flag is set to 1.
; Input : ------------------------------> Output:
; ROL (Hexadecimal) ROL (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
HTOA:
    CMP.B #0FH,R0L ; 0F or below?
    JGTU HTOA_ERR ; --> No(not converted)
    CMP.B #0AH,R0L ; 0A or above?
    JGEU HTOA10 ; --> Yes (A to F set)
    OR.B #'0',R0L ;
    FCLR C ; Sets “converted” information
    RTS ;
HTOA10:
    ADD.B #(41H-10),R0L ; ADD.B #'A'-10,R0L
    FCLR C ; Sets “converted” information
    RTS ;
HTOA_ERR:
    FSET C ; Sets “not-converted” information
    RTS ;
;
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

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1.00</td>
<td>Jul 08, 2002</td>
<td>- First edition issued</td>
</tr>
</tbody>
</table>
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