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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Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

# M16C/80 Series

## Sorting

## 1.0 Abstract

This program sorts data consisting of a specified number of bytes (sizes in bytes) in ascending order.

## 2.0 Introduction

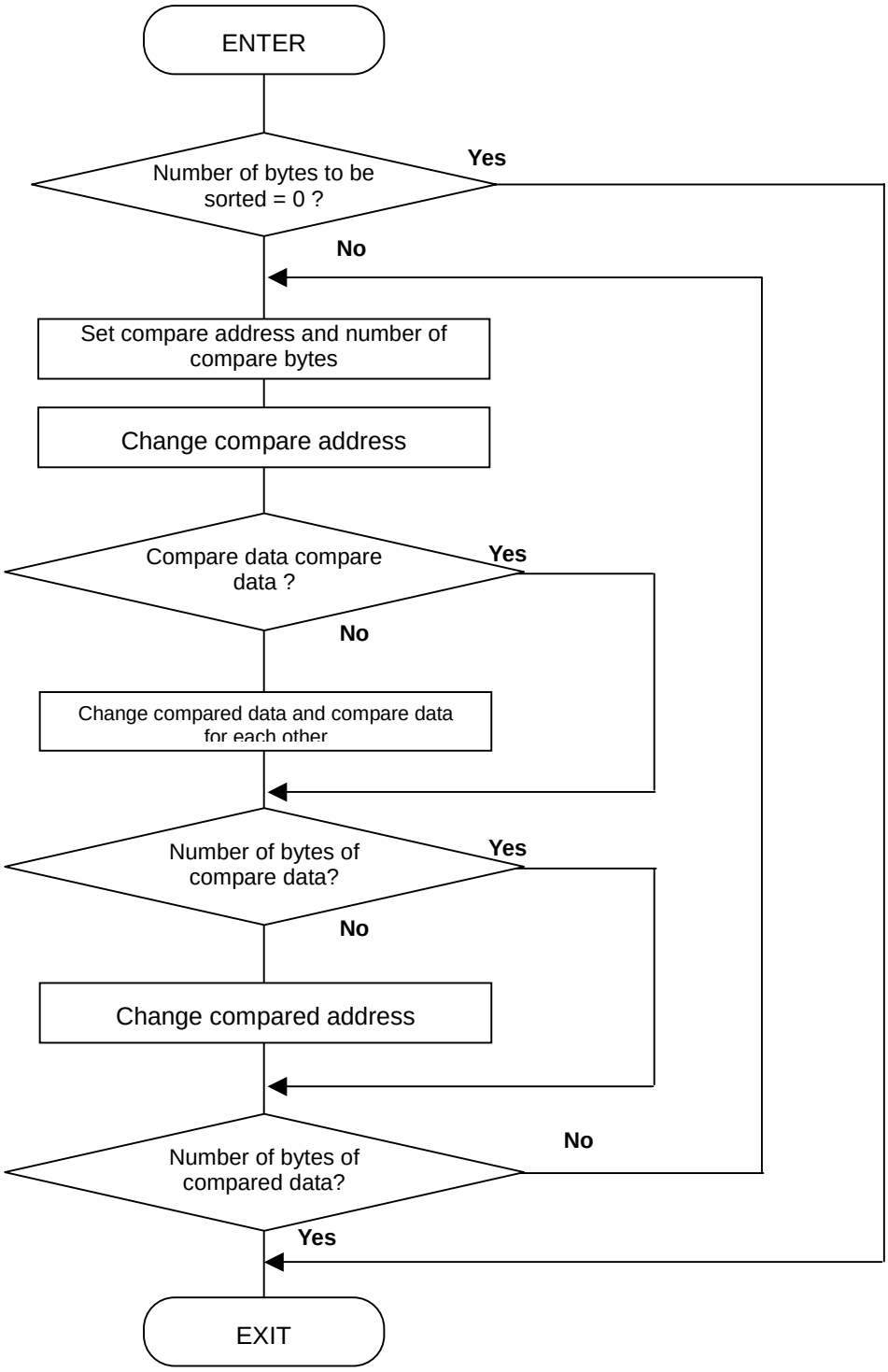
This program sorts data consisting of a specified number of bytes (sizes in bytes) in ascending order beginning with a specified address. Set the “number of bytes to be compared - 1” in R0L and the start address of the data in A0.

| Z | Meaning |
|---|---|
| 0 | Sorting succeeded |
| 1 | Sorting failed |

| | |
|---|---|
| Subroutine name : SORT | ROM capacity : 29byte |
| Interrupt during execution:Accepted | Number of stacks used : None |

| Register/memory | Input | Output | Usage condition |
|---|---|---|---|
| R0L | Number of compare bytes - 1 | Indeterminate | Compare bytes counter |
| R0H | - | Indeterminate | Compare bytes counter |
| R1L | - | Indeterminate | Register used for change |
| R1H | - | - | Unused |
| R2 | - | - | Unused |
| R3 | - | - | Unused |
| A0 | Start address | Indeterminate | Compared address |
| A1 | - | Indeterminate | Compare address |
| Z flag | - | Sorting succeeded/failed | ← |
| | | | |
| Usage precautions | The number of bytes that can be specified is 2 to 256 bytes. | | |

## 3.0 Flowchart



## 4.0 Programming Code

```
;*****************************************************************
;       M16C Program Collection
;       CPU : M16C/80 series
;*****************************************************************
VromTOP     .EQU            0FE0000H                ; Declares start address of ROM
;===================================================================
;   Title: Sorting
;   Outline: Sorts given data (2 to 256 bytes) in ascending order
;   Input:      ------------------------------>      Output:
;   R0L(Compare bytes - 1)                  R0L(Indeterminate)
;   R0H()                                   R0H(Indeterminate)
;   R1L()                                   R1L(Indeterminate)
;   R1H()                                   R1H(Unused)
;   R2()                                    R2(Unused)
;   R3()                                    R3(Unused)
;   A0()                                    A0(Indeterminate)
;   A1()                                    A1(Indeterminate)
;   Stack amount used: None
;   Notes: Success or failure of sorting is returned by Z flag
;===================================================================
            .SECTION    PROGRAM,CODE
            .ORG        VromTOP                 ; ROM area
SORT:                                           ;
  CMP.B     #0,R0L                              ;
  JEQ       SORT_EXIT                           ; --> Number of compare bytes not set
SORT_10:                                        ;
  MOV.B     R0L,R0H                             ; Sets number of compare bytes
  MOV.W     A0,A1                               ; Sets compare address
SORT_20:                                        ;
  ADD.L:S   #1,A1                               ; Changes compare address
  CMP.B     [A0],[A1]                           ; Compare data to see if large or small
  JGEU      SORT_30                             ; --> Sorting unnecessary
  MOV.B     [A0],R1L                            ; Changes compared and compare data for each other
  XCHG.B    R1L,[A1]                            ;
  MOV.B     R1L,[A0]                            ;
SORT_30:                                        ;
  ADJNZ.B   #-1,R0H,SORT_20                     ; --> Looped for compare data
  ADD.L:S   #1,A0                               ; Changes compared address
  ADJNZ.B   #-1,R0L,SORT_10                     ; --> Looped for compared data
  FCLR      Z                                   ; Sorting completed
SORT_EXIT:                                      ;
  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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