To our customers,

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Renesas Electronics website: [http://www.renesas.com](http://www.renesas.com)

April 1st, 2010
Renesas Electronics Corporation

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R8C/Tiny Series
General-purpose Program for Sorting

1. Abstract

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

2. 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.

<table>
<thead>
<tr>
<th>Z</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Sorting succeeded</td>
</tr>
<tr>
<td>1</td>
<td>Sorting failed</td>
</tr>
</tbody>
</table>

Subroutine name : SORT
ROM capacity : 28 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>Number of compare bytes - 1</td>
<td>Indeterminate</td>
<td>Compare bytes counter</td>
</tr>
<tr>
<td>R0H</td>
<td>-</td>
<td>Indeterminate</td>
<td>Compare bytes counter</td>
</tr>
<tr>
<td>R1L</td>
<td>-</td>
<td>Indeterminate</td>
<td>Register used for change</td>
</tr>
<tr>
<td>R1H</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>Start address</td>
<td>Indeterminate</td>
<td>Compared address</td>
</tr>
<tr>
<td>A1</td>
<td>-</td>
<td>Indeterminate</td>
<td>Compare address</td>
</tr>
<tr>
<td>Z flag</td>
<td>-</td>
<td>Sorting succeeded/failed</td>
<td>←</td>
</tr>
</tbody>
</table>

Usage precautions
The number of bytes that can be specified is 2 to 256 bytes.
3. Flowchart

ENTER

Number of bytes to be sorted = 0 ?

No

Set compare address and number of compare bytes

Change compare address

Compare data compare data ?

No

Change compared data and compare data for each other

Number of bytes of compare data?

Yes

Change compared address

Number of bytes of compared data?

No

Yes
4. The example of a reference program

```assembly
.include apl.inc ; special page include file

R8C Program Collection No. 24
CPU : R8C/Tiny

VromTOP .EQU 00D000H ; 12Kbyte Flash version

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 (Start address)        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:  ;
INC.W A1 ; Changes compare address
CMP.B [A0],[A1] ; Compare data to see if large or small
JEU 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 ; --> Loop for compare data
INC.W A0 ; Changes compared address
ADJNZ.B #-1,R0L,SORT_10 ; --> Loop for compared data
FCLR Z ; Sorting completed

SORT_EXIT: ;
RTS ;

.END ;
```
5. Reference

SOFTWARE MANUAL
R8C/Tiny 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
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## REVISION HISTORY

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>Dec 24, 2003</td>
<td>First edition issued</td>
</tr>
</tbody>
</table>
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