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H8/300L Series

Comparison of 32-Bit Binary Numbers (COMP)

Introduction

1. The software COMP compares two 32-bit binary numbers and indicates the result (>, =, <) through the C and Z flags (CCR).
2. All arguments are unsigned integers.

Target Device

H8/300L Series

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1. Arguments

Description		Memory area	Data length (bytes)
Input	Comparand	R0, R1	4
	Number to be compared	R2, R3	4
Output	Result of comparison	C flag, Z flag (CCR)	

2. Changes to Internal Registers and Flags

R0	R1	R2	R3	R4	R5	R6	R7
•	•	•	•	•	•	•	•

I	U	H	U	N	Z	V	C
•	•	×	•	×	↕	×	↕

• : No change
× : Undefined
↕ : Result

3. Specifications

Program memory (bytes)
8
Data memory (bytes)
0
Stack (bytes)
0
Clock cycle count
16
Reentrant
Possible
Relocation
Possible
Interrupt
Possible

4. Description

4.1 Details of functions

1. The following arguments are used with the software COMP:
   R0, R1: Sets a 32-bit binary comparand as an input argument (see figure 4.1).
   R2, R3: Sets a 32-bit binary number that is to be compared with the comparand as an input argument (see figure 4.1).

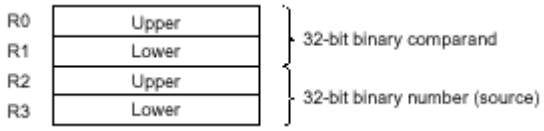


Figure 4.1 Input Argument Setting

2. The following table illustrates the execution of the software COMP.
   The C and Z flags are set according to the relation between the input arguments.

Table 4.1 Example of Software COMP Execution

Input arguments					**Output arguments**	
Comparand		Relation	Data to be compared		CCR	
R0	R1		R2	R3	C flag	Z flag
F67D	2001	<	2200	4001	0	0
2010	2020	=	2010	2020	0	1
4001	F000	>	A000	BB00	1	0

3. The input arguments are retained even after execution of the software COMP.

4.2 Note on usage

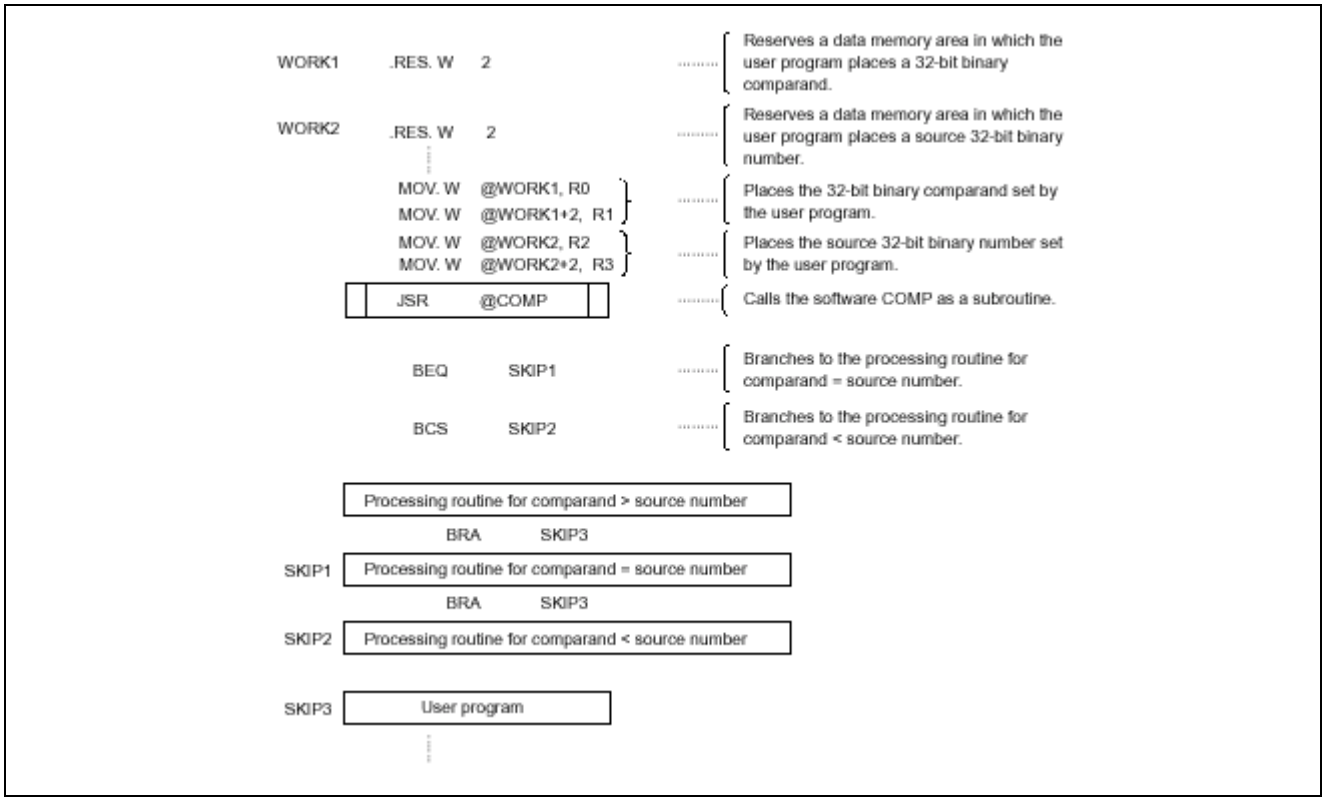
When not using the upper bits, set them to 0; otherwise, a correct result of comparison cannot be obtained because the comparison is made on the numbers including indeterminate data set in the upper bits.

4.3 Data memory

The software COMP uses no data memory.

4.4 Example of use

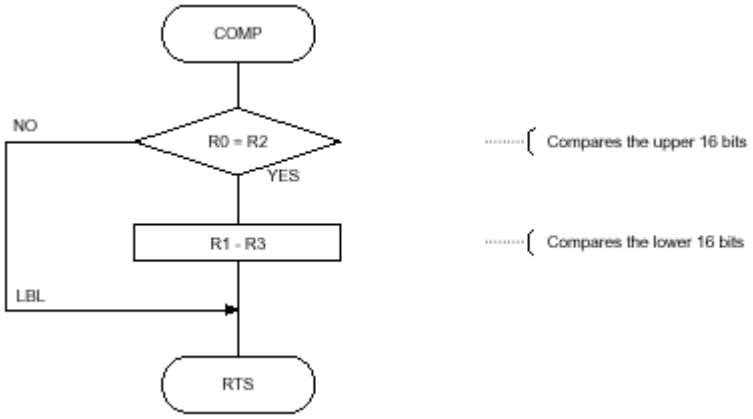
Set a source binary number and a comparand in the input arguments and call the software COMP as a subroutine.



4.5 Operation

1. Comparison of two or more words of data can be done by performing a series of 1-word comparisons.
2. The output arguments are the C and Z flags after execution of the compare instruction (CMP.W).
3. The upper words are compared by using the word compare instruction (CMP.W). If the upper words are not equal, the software COMP ends. If the upper words are equal, then the lower words are compared.

5. Flowchart


COMP
NO
R0 = R2
YES
R1 - R3
LBL
RTS
Compares the upper 16 bits
Compares the lower 16 bits

6. Program List

```
*** H8/300 ASSEMBLER VER 1.0B ** 08/18/92 09:52:34
PROGRAM NAME =
 1                                          ;*******************************************************************************
 2                                          ;*
 3                                          ;*      00 - NAME               :32 BIT COMPARISON (COMP)
 4                                          ;*
 5                                          ;*******************************************************************************
 6                                          ;*
 7                                          ;*      ENTRY                   :R0 (COMPARAND DATA HIGH)
 8                                          ;*                               R1 (COMPARAND DATA LOW)
 9                                          ;*                               R2 (COMPARATIVE DATA HIGH)
10                                          ;*                               R3 (COMPARATIVE DATA LOW)
11                                          ;*
12                                          ;*      RETURNS                 :C flag & Z flag (COMPARISON RESULT)
13                                          ;*
14                                          ;*******************************************************************************
15                                          ;
16       COMP_cod C        0000                     .SECTION                COMP_code,CODE,ALIGN=2
17                                                  .EXPORT                 COMP
18                                          ;
19       COMP_cod C                00000000   COMP   .EQU $                  ;Entry point
20       COMP_cod C        0000    1D20             CMP.W   R2,R0
21       COMP_cod C        0002    4602             BNE     LBL             ;Branch if Z=0
22       COMP_cod C        0004    1D31             CMP.W   R3,R1
23       COMP_cod C        0006               LBL
24       COMP_cod C        0006    5470             RTS
25                                          ;
26                                                  .END
*****TOTAL ERRORS 0
*****TOTAL WARNINGS 0
```

Revision Record

		Description	
Rev.	Date	Page	Summary
1.00	Sep.18.03	—	First edition issued

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