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# H8/300L Super Low Power Series

## Block Transfer 2: Example Usage of the EEPMOV Instruction (MOVE2)

### Introduction

The software MOVE2 moves a block of data from one data memory area to another. Data can be moved even where the source data memory area overlaps the destination data memory area. This is an example of the application software EEPMOV (move block instruction).

### Target Device

H8/38024

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## 1. Arguments

Description	Memory area	Data length (bytes)
Input	Byte count (number of bytes)	R4L
	Start address of source area	R5
	Start address of destination area	R6
Output	Error	C flag (CCR)

## 2. Changes to Internal Registers and Flags

R0	R1	R2	R3	R4H	R4L	R5	R6	R7
x	—	x	x	x	x	x	x	—
<b>I</b>	<b>U</b>	<b>H</b>	<b>U</b>	<b>N</b>	<b>Z</b>	<b>V</b>	<b>C</b>	
—	—	x	—	x	x	x	x	o

### Legend

- : No change
- x: Undefined
- o: Result

### 3. Specifications

	Program memory (bytes)	
	58	
	Data memory (bytes)	
	0	
	Stack (bytes)	
	0	
	Clock cycle count	
	1083	
	Reentrant	
	Possible	
	Relocation	
	Possible	
	Interrupt	
	Possible	

### 4. Note

The clock cycle count in the specifications (1083) is for 255 bytes of block data.

### 5. Description

#### 5.1 Details of functions

1. The following arguments are used with the software MOVE2:

R4L: Sets the number of bytes of block data as an input argument.

R5: Sets the start address of the source data memory area as an input argument.

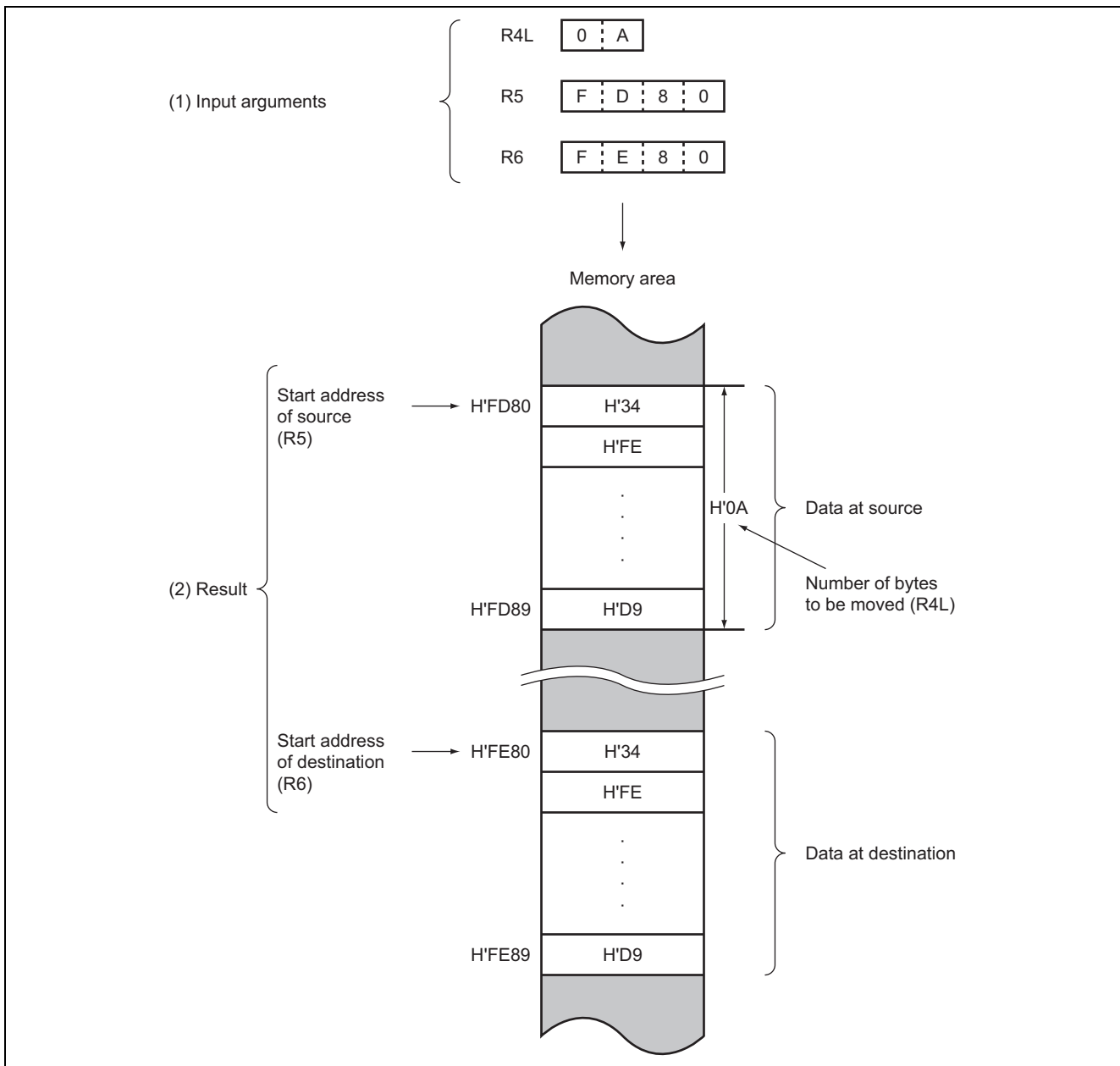
R6: Sets the start address of the destination data memory area as an input argument.

C flag (CCR): Determines the presence or absence of an error in the data length or address of the software MOVE2.

C = 0: All data has been moved.

C = 1: An input argument has an error.

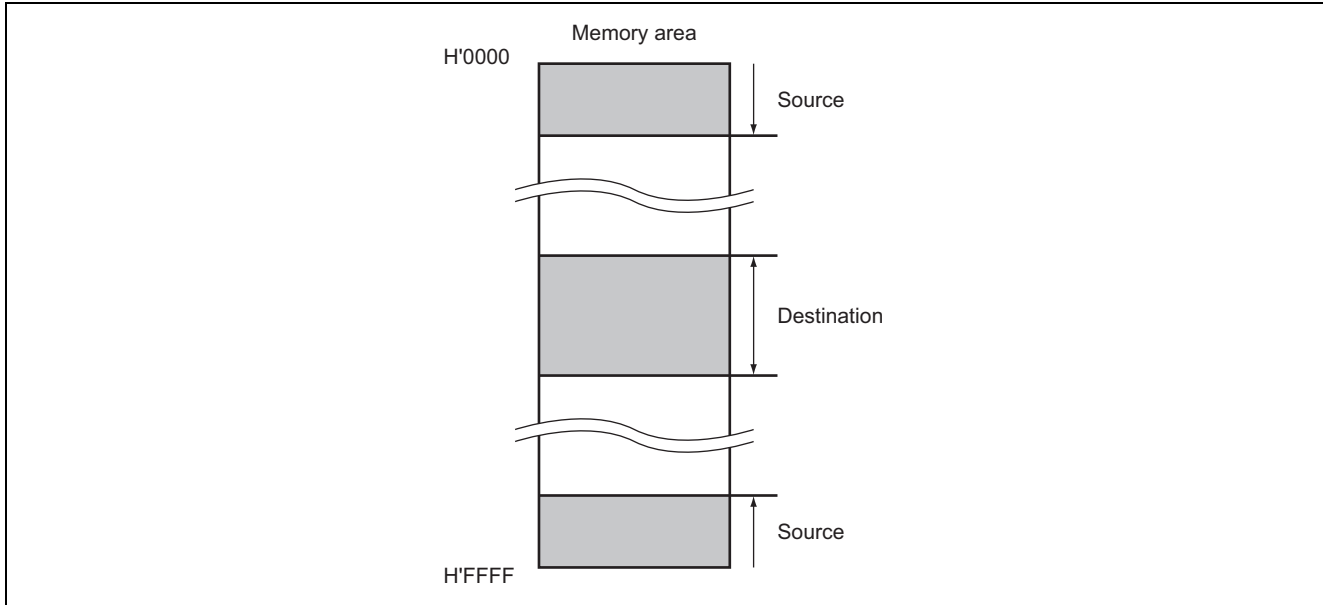
2. The following figure illustrates the execution of the software MOVE2.  
When the input arguments are set as shown in (1), the data is moved as a block from the source (H'FD80 to H'FD89) to the destination (H'FE80 to H'FE89) as shown in (2).



**Figure 1 Example of Software MOVE2 Execution**

**5.2 Notes on usage**

1. R4L is one byte long and set data within the range of  $H'01 \leq R4L \leq H'FF$ .
2. The source or destination data memory area must not extend over the end address ( $H'FFFF$ ) to the start address ( $H'0000$ ) as shown in figure 2; otherwise, the software MOVE2 will not operate normally.



**Figure 2 Moving Block Data with Data Memory Area Extending over the Highest to Lowest Addresses**

**5.3 Data memory**

The software MOVE2 does not use the data memory.

### 5.4 Example of usage

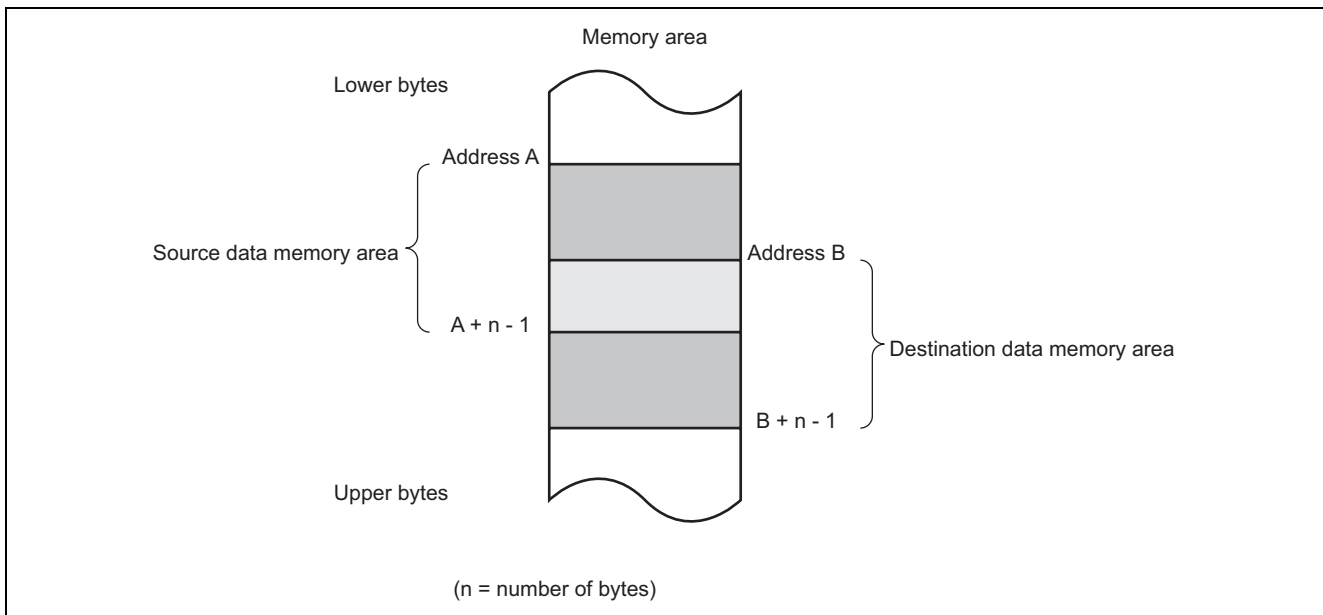
Set the start address of a source, the start address of a destination, and the number of bytes to be moved in the arguments and call the software MOVE2 as a subroutine.

WORK1	. DATA. B	10	-----	{ Reserve a data memory area (1 byte: contents = H'0A) in which the user program places the number of bytes to be moved.
	. ALIGN	2	-----	
WORK2	. DATA. W	0	-----	{ Reserve a data memory area (2 bytes: contents = H'0000) in which the user program places the start address of the source.
WORK3	. DATA. W	0	-----	
	.			
	.			
	MOV. B	@WORK1, R4L	-----	{ Place the number of bytes set by the user program in the R0L argument. { Place the start address of the source set by the user program. { Place the start address of the destination set by the user program.
	MOV. W	@WORK2, R5	-----	
	MOV. W	@WORK3, R6	-----	
	JSR	@MOVE2	-----	{ Call the software MOVE2 as a subroutine.
	.			
	.			



### 5.5 Operation

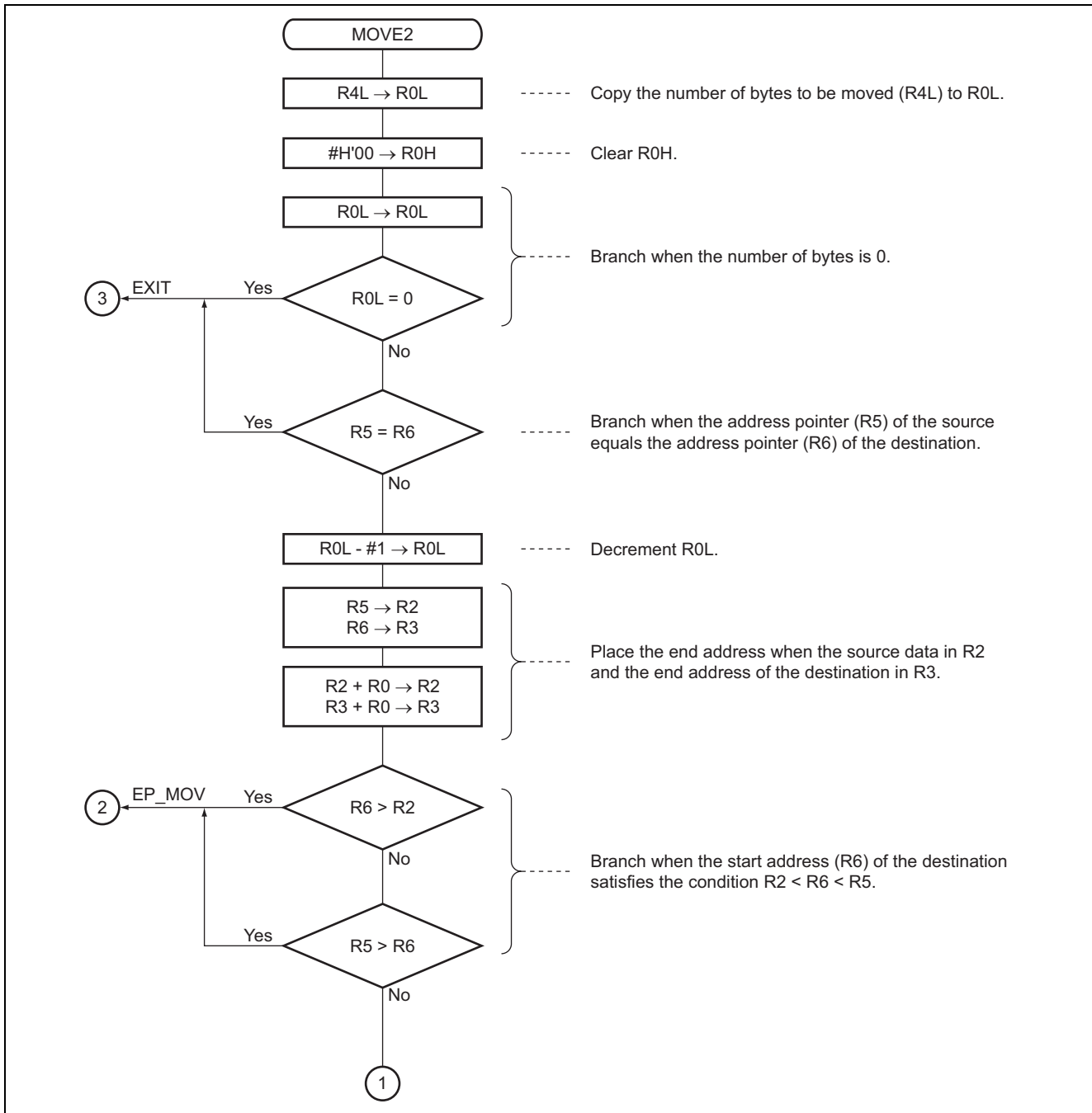
1. R5 is used as the pointer that indicates the address of the source and R6 the pointer that indicates the address of the destination.
2. R4L is used as the counter that indicates the number of bytes moved. It is decremented each time 1-byte data is moved until it reaches 0.
3. When the input argument R4L is 0 or the start address of the source equals that of the destination, the C flag is set to 1 (error indicator) and the software MOVE2 ends.
4. When the start address (B) of the destination data memory area is between the start address (A) and the end address (A + n - 1) of the source data memory area ( $A < B < A + n - 1$ ; see figure 3), the data is moved sequentially from the highest address of the source area in 16-bit absolute addressing mode.

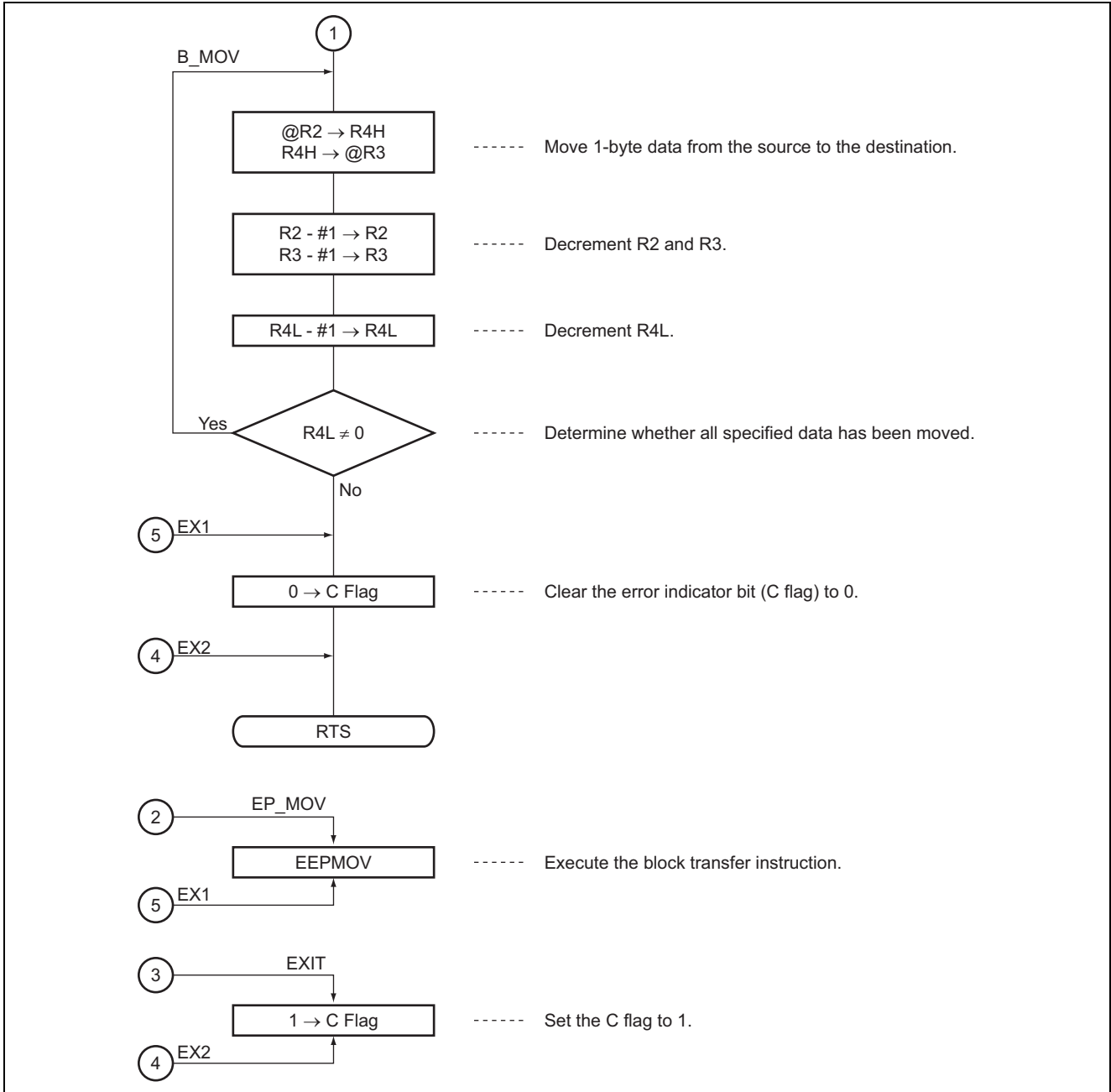


**Figure 3 Moving Data with Overlapping Data Memory Areas**

5. Except in the case of step 4, the EEPMOV instruction is used to move the data sequentially from the lowest address.

6. Flowchart





## 7. Program List

```

*** H8/300 ASSEMBLER VER 1.0B ** 08/18/92 09:46:07
PROGRAM NAME =
1          ;*****
2          ;*
3          ;*      00 - NAME      :BLOCK DATA TRANSFER (MOVE2)
4          ;*
5          ;*****
6          ;*
7          ;*      ENTRY      :R4L (Byte counter)
8          ;*
9          ;*      R5 (Source data start address)
10         ;*
11         ;*      R6 (Destination data start address)
12         ;*
13         ;*****
14         ;
15 MOVE2_co C    0000          .SECTION MOVE2_code, CODE, ALIGN=2
16                                     .EXPORT MOVE2
17         ;
18 MOVE2_co C    00000000 MOVE2      .EQU $          ;Entry point
19 MOVE2_co C    0000 0CC8      MOV.B    R4L,R0L
20 MOVE2_co C    0002 F000      MOV.B    #H'00,R0H
21 MOVE2_co C    0004 0C88      MOV.B    R0L,R0L
22 MOVE2_co C    0006 472E      BEQ     EXIT          ;If byte counter="0" then exit
23 MOVE2_co C    0008 1D56      CMP.W   R5,R6
24 MOVE2_co C    000A 472A      BEQ     EXIT          ;If R5=R6 then exit
25 MOVE2_co C    000C 1A08      DEC.B   R0L
26 MOVE2_co C    000E 0D52      MOV.W   R5,R2
27 MOVE2_co C    0010 0D63      MOV.W   R6,R3
28 MOVE2_co C    0012 0902      ADD.W   R0,R2          ;Set end address of source data
29 MOVE2_co C    0014 0903      ADD.W   R0,R3          ;Set end address of destination data
30 MOVE2_co C    0016 1D26      CMP.W   R2,R6
31 MOVE2_co C    0018 4214      BHI     EP_MOV        ;Branch if R6>R2
32 MOVE2_co C    001A 1D65      CMP.W   R6,R5
33 MOVE2_co C    001C 4210      BHI     EP_MOV        ;Branch if R5>R6
34 MOVE2_co C    001E          B_MOV
35 MOVE2_co C    001E 6824      MOV.B   @R2,R4H        ;Load source data to R4H
36 MOVE2_co C    0020 68B4      MOV.B   R4H,@R3        ;Store R4H to destination
37 MOVE2_co C    0022 1B02      SUBS.W  #1,R2          ;Decrement source data pointer
38 MOVE2_co C    0024 1B03      SUBS.W  #1,R3          ;Decrement destination data pointer
39 MOVE2_co C    0026 1A0C      DEC.B   R4L
40 MOVE2_co C    0028 46F4      BNE    B_MOV          ;Branch if R4L=0
41 MOVE2_co C    002A          EX1
42 MOVE2_co C    002A 06FE      ANDC.B  #H'FE,CCR      ;Clear C flag of CCR
43 MOVE2_co C    002C          EX2
44 MOVE2_co C    002C 5470      RTS
45 MOVE2_co C    002E          EP_MOV
46 MOVE2_co C    002E 7B5C598F  EEPMOV
47 MOVE2_co C    0032 06FE      ANDC.B  #H'FE,CCR      ;Clear C flag of CCR
48 MOVE2_co C    0034 40F4      BRA    EX1

```

```
49MOVE2_co C 0036 EXIT
50MOVE2_co C 0036 0401 ORC.B #H'01,CCR ;Set c flag for false
51MOVE2_co C 0038 40F2 BRA EX2
52 ;
53 .END
****TOTAL ERRORS 0
****TOTAL WARNINGS 0
```

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