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April 1st, 2010
Renesas Electronics Corporation

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H8/300H Tiny Series

Block Transfer (MOVE)

Introduction

Transfers a block of data (up to 65535 bytes) to any even-numbered address.

Target Device

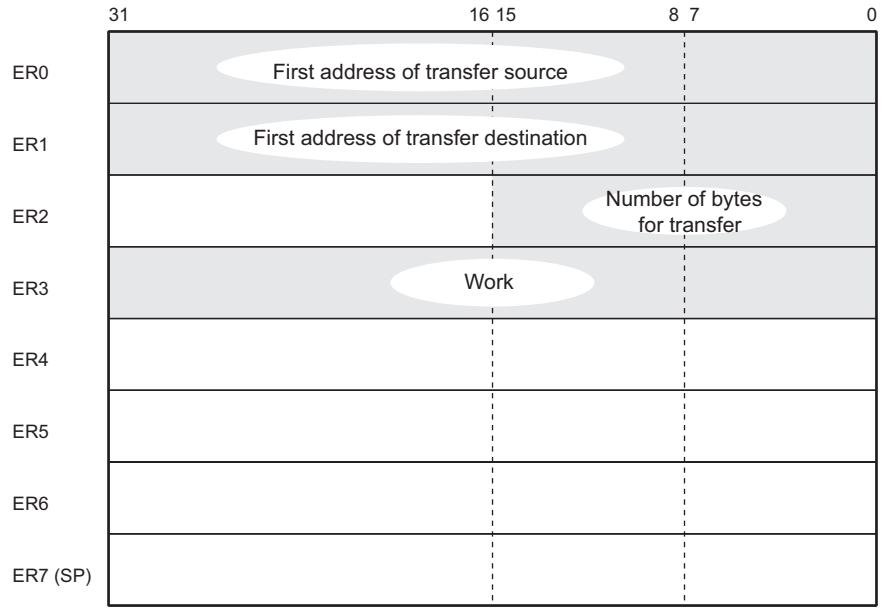
H8/300H Tiny Series

Contents

1. Arguments

Description		Storage Location	Data Length (Bytes)
Input	First address of the transfer source	ER0	4
	First address of the transfer destination	ER1	4
	Number of bytes to be transferred	R2	2
Output	—	—	—

2. Changes to Internal Registers and Flags



I	UI	H	U	N	Z	V	C
–	–	1	–	1	0	0	1

– : No change
↕ : Varies
0 : Fixed to 0
1 : Fixed to 1

3. Programming Specifications

Program memory (bytes)
38
Data memory (bytes)
0
Stack (bytes)
0
Number of cycles
491580
Re-entrant
Yes
Relocatable
Yes
Interrupts during execution
Yes

4. Note

The number of cycles given in the programming specifications is the value when H'FFFF bytes are transferred.

5. Description

5.1 Description of Functions

1. The arguments are as follows:
   ER0: Set the first address of the transfer source as an input argument.
   ER1: Set the first address of the transfer destination as an input argument.
   R2: Set the number of bytes to be transferred as an input argument.
2. The following figure illustrates the execution of a MOVE subroutine.
   When the input arguments are set as shown, the data at the transfer source is transferred, as a block, to the transfer destination.

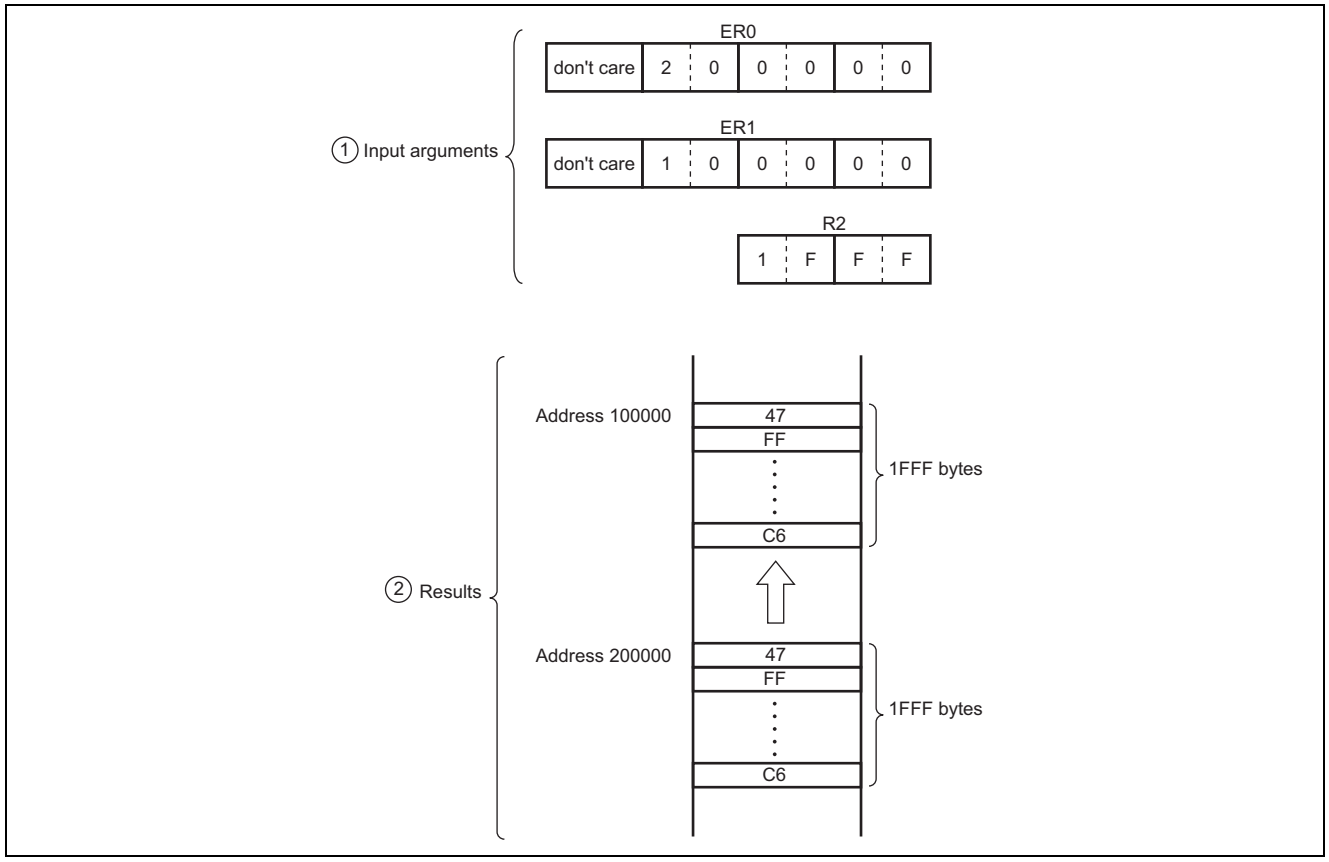


Figure 1 Example of MOVE Execution

5.2 Usage Notes

1. Since R2 is 2 bytes, set data within the range H'0001 ≤ R2 ≤ H'FFFF.
2. Set the input arguments so that the block of data at the transfer source (area A in the figure) and the block of data at the transfer destination (area B) do not overlap. When there is an overlap as shown in the figure, the source data for transfer in the area of overlap (area C) will be lost.

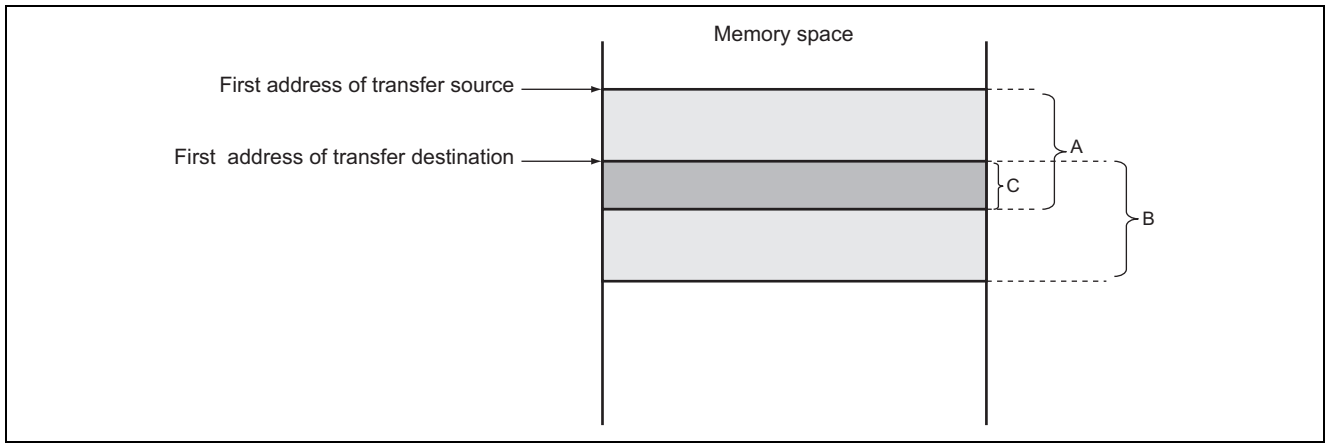


Figure 2 Block Transfer with Overlapping Data

5.3 Description of Data Memory

MOVE does not use data memory.

5.4 Example of Usage

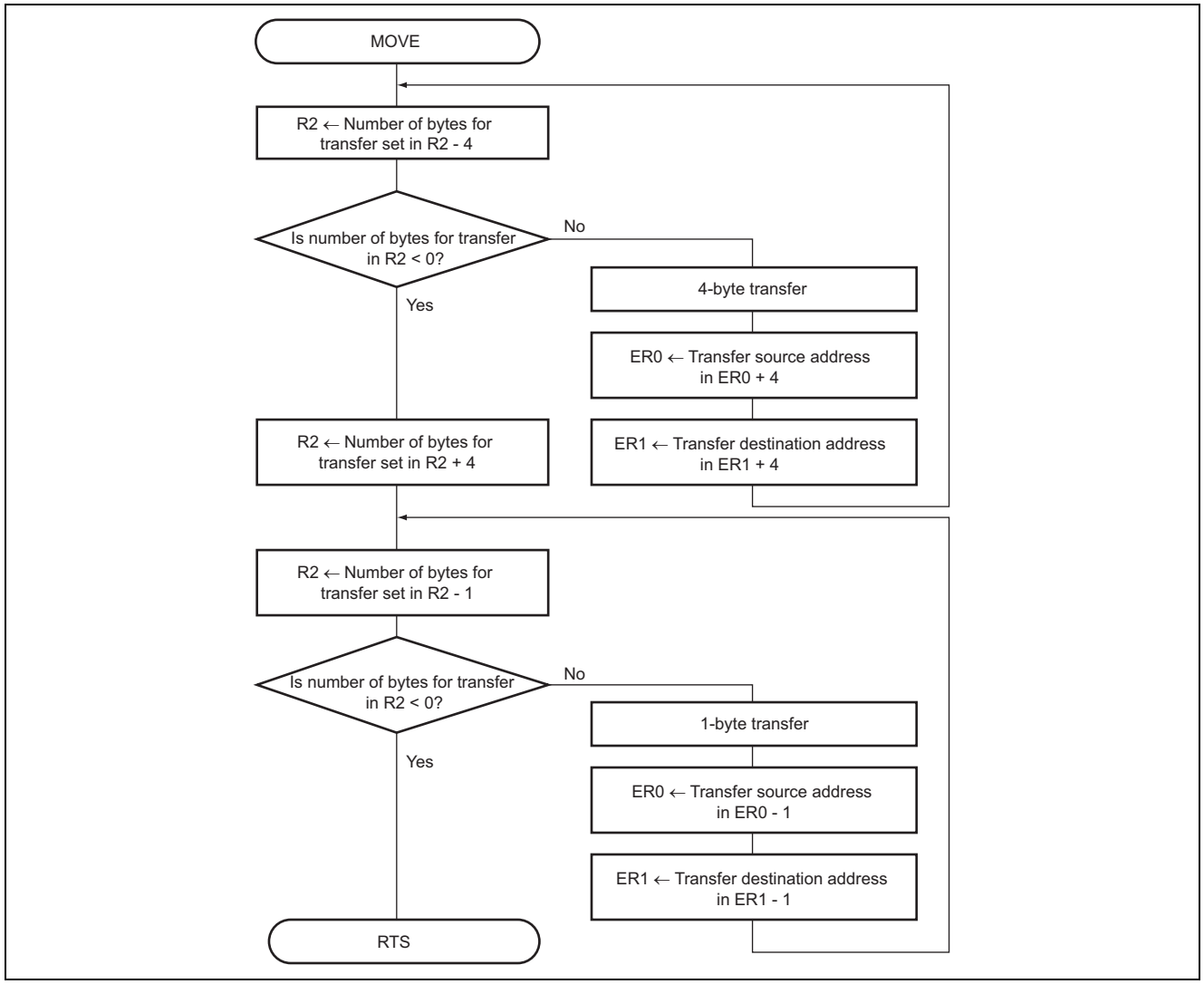
After setting the first address of the transfer source, the first address of the transfer destination and the number of bytes to be transferred, call the MOVE subroutine.

```
WORK1   . RES. L 1          ..... Reservation of the data memory area for setting of the first address of the transfer source by the
                                  user program.
WORK2   . RES. L 1          ..... Reservation of the data memory area for setting of the first address of the transfer destination by
                                  the user program.
WORK3   . RES. W 1          ..... Reservation of the data memory area for setting of the number of bytes to be transferred by the
                                  user program.

        MOV. L @WORK1, ER0  ..... Sets the first address of the transfer source specified in the user program as an input argument.

        MOV. L @WORK2, ER1  ..... Sets the first address of the transfer destination specified in the user program as an input
                                  argument.
        MOV. W @WORK3, R2   ..... Sets the number of bytes to be transferred specified in the user program as an input argument.
          .
          .
          .
        JSR    @MOVE        ..... Subroutine call of MOVE
```

5.5 Principles of Operation

1. While there are 4 or more bytes of data to be transferred, the software repeatedly transfers 4-byte units by using the MOV.L instruction.
2. When less than 4 bytes remain to be transferred is, the software uses the MOV.B instruction to perform the transfers in byte units.

6. Flowchart


MOVE
R2 ← Number of bytes for transfer set in R2 - 4
Is number of bytes for transfer in R2 < 0?
No
Yes
4-byte transfer
ER0 ← Transfer source address in ER0 + 4
ER1 ← Transfer destination address in ER1 + 4
R2 ← Number of bytes for transfer set in R2 + 4
R2 ← Number of bytes for transfer set in R2 - 1
Is number of bytes for transfer in R2 < 0?
No
Yes
1-byte transfer
ER0 ← Transfer source address in ER0 - 1
ER1 ← Transfer destination address in ER1 - 1
RTS

7. Program Listing

```
1                                1  ;*********************************************************************
2                                2  ;*                                                                   *
3                                3  ;*       NAME  :    MOVING MEMORY BLOCKS             (MOVE)        *
4                                4  ;*                                                                   *
5                                5  ;*********************************************************************
6                                6  ;*                                                                   *
7                                7  ;*       ENTRY  :   ER0       (SOURCE ADDRESS)                     *
8                                8  ;*                  ER1       (DESTINATION ADDRESS)                *
9                                9  ;*                  R2        (TRANSFER COUNTER)                   *
10                              10  ;*       RETURNS  :              NOTHING                            *
11                              11  ;*                                                                   *
12                              12  ;*********************************************************************
13                              13  ;
14                              14           .CPU     300HA
15  001000                      15           .SECTION A,CODE,LOCATE=H'001000
16           00001000           16  MOVE     .EQU     $           ;Entry point
17  001000   79320004          17           SUB.W    #4,R2       ;Decrement  transfer  counter
18  001004   5850000C          18           BCS      MOVE1       ;
19  001008   01006D03          19           MOV.L    @ER0+,ER3   ;Load  transfer  data
20  00100C   01006993          20           MOV.L    ER3,@ER1    ;Store  transfer  data
21  001010   0B91              21           ADDS     #4,ER1      ;Increment  destination  address
22  001012   40EC              22           BRA      MOVE        ;
23  001014   79120004          23  MOVE1    ADD.W    #4,R2       ;
24  001018   79320001          24  MOVE2    SUB.W    #1,R2       ;
25  00101C   58500008          25           BCS      MOVE3       ;
26  001020   6C0B              26           MOV.B    @ER0+R3L    ;Load  transfer  data
27  001022   689B              27           MOV.B    R3L,@ER1    ;Store  transfer  data
28  001024   0B01              28           ADDS     #1,ER1      ;Increment  destination  address
29  001026   40F0              29           BRA      MOVE2       ;Loop  until  transfer  counter  =  0
30  001028   5470              30  MOVE3    RTS
31                              31           .END
*****        TOTALERRORS    0
*****        TOTALWARNINGS  0
```

Note: The program listing included in this application note assumes compilation under the option for the advanced mode of H8/300H CPU. If you use this sample program with an H8/300H Tiny Series product, make the following change to the program code:
.CPU 300HA → .CPU 300HN

Revision Record

Rev.	Date	Description	
		Page	Summary
2.00	Feb.28.06	—	Format has been changed from Hitachi version to Renesas version.

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