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H8/300H Tiny Series

Branching Directed by a Table (CCASE)

Introduction

Searches for the start address of the routine for processing of an input command. This function is useful and convenient for decoding commands input from the keyboard and for the processing of input commands.

Target Device

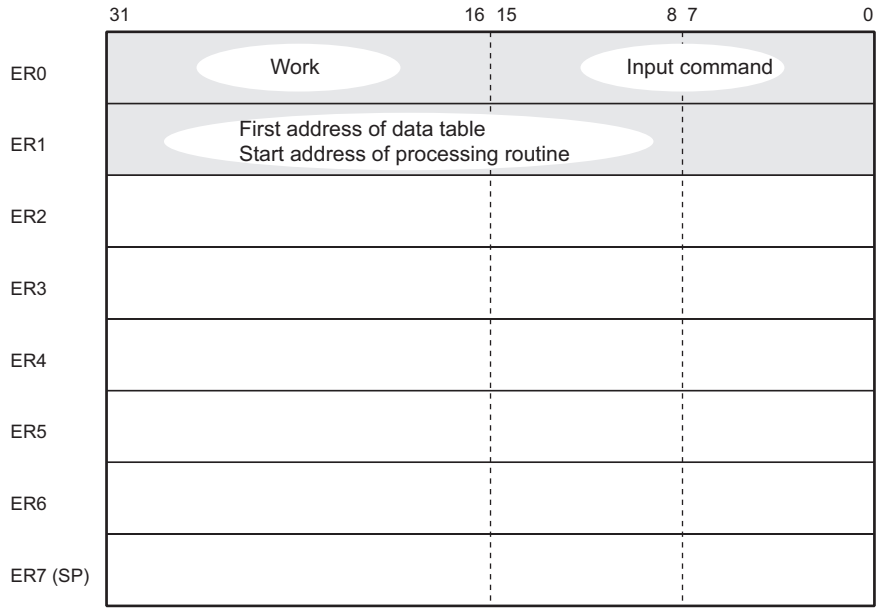
H8/300H Tiny Series

Contents

1. Arguments

Description		Storage Location	Data Length (Bytes)
Input	Input command	R0	2
	First address of the data table	ER1	4
Output	Start address of processing routine	ER1	4
	Existence of a processing routine for the input command (yes = 0, no = 1)	Z flag (CCR)	—

2. Changes to Internal Registers and Flags



I	UI	H	U	N	Z	V	C
–	–	↕	–	↕	↕	0	↕

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

3. Programming Specifications

Program memory (bytes)
26
Data memory (bytes)
0
Stack (bytes)
0
Number of cycles
156
Re-entrant
Yes
Relocatable
Yes
Interrupts during execution
Yes

4. Note

The number of cycles given in the programming specifications is the value when the last of 6 groups of data is detected.

5. Description

5.1 Description of Functions

1. The arguments are as follows:
   R0: Set a command in 16 bits as an input argument.
   ER1: Set the first address of the data table as an input argument. The start address of the processing routine for the command is set as an output argument.
   Z flag (CCR): After execution of CCASE, indicates whether there were any errors.
   Z flag = 0: Indicates that the command specified in R0 was found in the data table.
   Z flag = 1: Indicates that the command specified in R0 was not found in the data table.

2. The following figure illustrates the execution of the CCASE subroutine.
   When the input arguments are set as shown the figure below, the data table is checked and the start address of the processing routine is set in ER1.

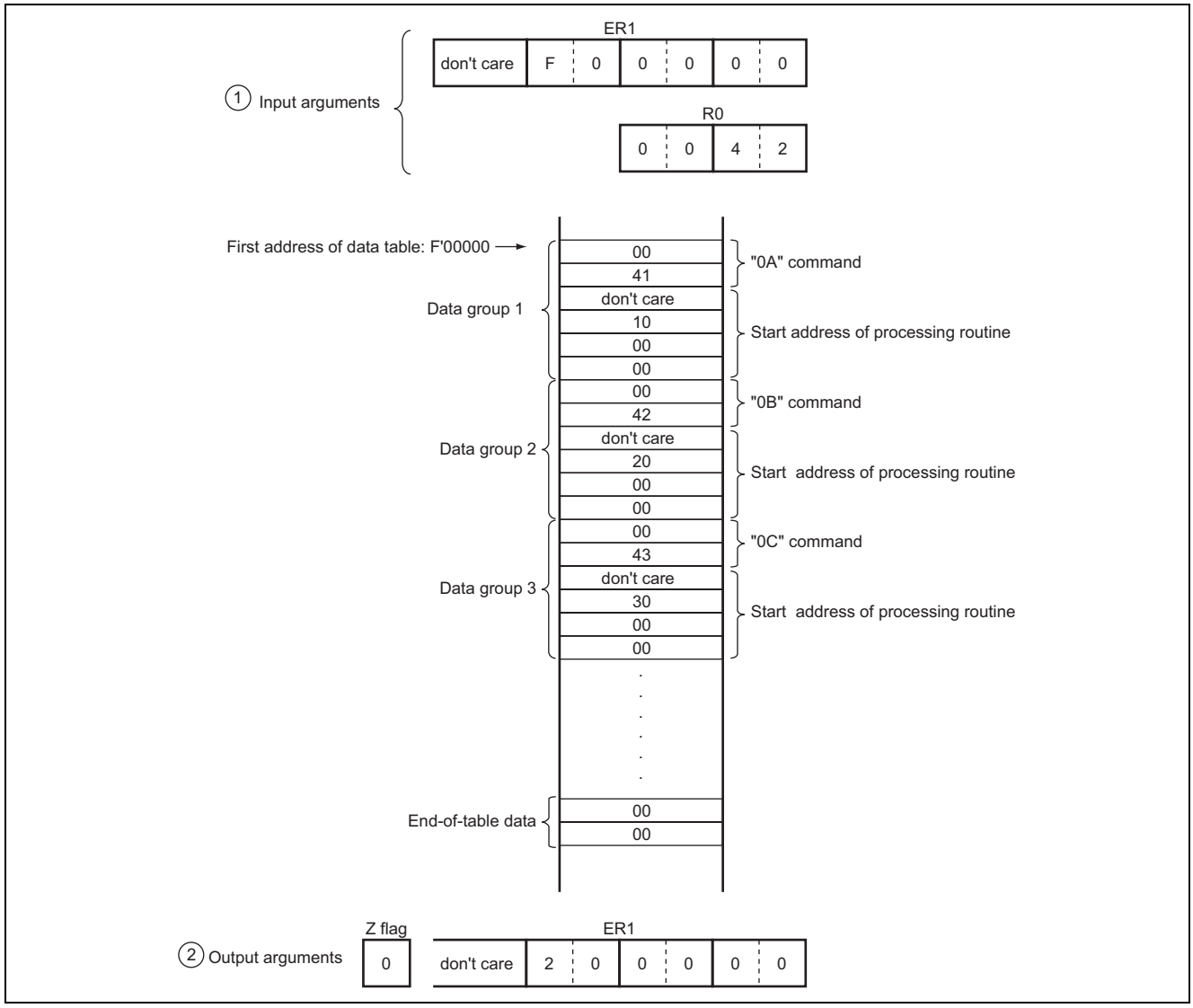


Figure 1 Example of CCASE Execution

5.2 Usage Note

Since H'0000 indicates the end of the data table, do not use H'0000 as a command code in the table.

5.3 Description of Data Memory

No data memory is used by CCASE.

5.4 Example of Usage

After setting the command and the first address of the data table, call the CCASE subroutine.

```
WORK1   .RES.W  1              ......... Reservation of the data memory area for setting of the command by the user program.
WORK2   .RES.L  1              ......... Reservation of the data memory area for setting of the first address of the data table by the
                                         user program.

        MOV.L   @WORK2, ER1    ......... Sets the first address of the data table specified in the user program as an input argument.
        MOV.w   @WORK1, R0     ......... Sets the command specified in the user program as an input argument.
          .
          .
          .
      | JSR     @CCASE |       ......... Subroutine call of CCASE
        BEQ     ERROR          ......... Branches to an error program if the command specified by the input argument is not found
                                         in the data table.

    [Program that branches to the processing routine]   * See the 'Note' below.
          .
          .
          .
ERROR   [Error program]
          .
          .
          .
        .ORG      H'F000       ......... First address of the data table
DTABLE  .DATA.W   H'0041       ......... "0A" command
        .DATA.W   H'F100       ......... Start address of the processing routine for command "0A"

        .DATA.W   H'0042       ......... "0B" command
        .DATA.W   H'0000       ......... Start address of the processing routine for command "0B"
          .
          .
        .DATA.W   H'0000       ......... End-of-table data
```

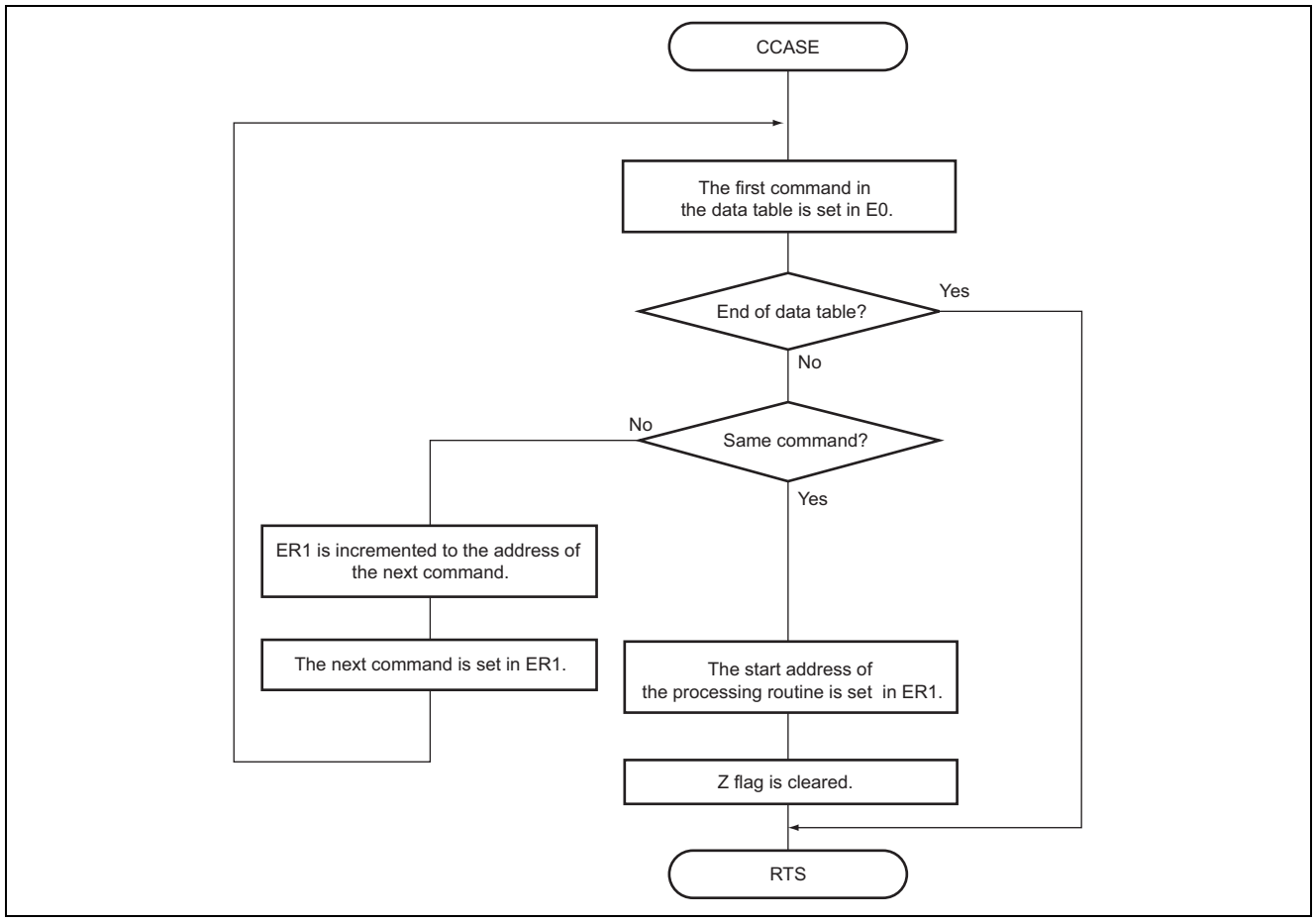
Note: * Example of program that branches to a processing routine: CCASE only sets the start address of the processing routine in ER1.
To branch to the processing routine, create a program like that shown below:

```
                          .
                          .
                          .
                      | JSR   @CCASE |   ......... Subroutine call of CCASE
                        BEQ   ERROR      ......... Branch to ERROR if the Z flag is set.
   ↑
   Branches to
   processing routine   JMP   @ER1       ......... Jump to the processing routine.
   ↓
                ERROR   [Error program]
                          .
                          .
                          .
```

5.5 Principles of Operation

1. ER1 is used as a pointer to the address of a command in the data table.
2. The command at the address indicated by ER1 is loaded to E0 and compared to the input command.
3. When the input command and data-table command match, the start address of the processing routine that follows the command code is set in ER1, the Z flag is cleared, and CCASE ends.
4. When H'0000 is detected (indicating the end of the data table), the Z flag is set and CCASE ends.

6. Flowchart


CCASE
The first command in the data table is set in E0.
End of data table?
Yes
No
Same command?
No
Yes
ER1 is incremented to the address of the next command.
The next command is set in ER1.
The start address of the processing routine is set in ER1.
Z flag is cleared.
RTS

7. Program Listing

```
  1                          1  ;*****************************************************************
  2                          2  ;*                                                               *
  3                          3  ;*      NAME  : TABLE  BRANCH   (CCASE)                          *
  4                          4  ;*                                                               *
  5                          5  ;*****************************************************************
  6                          6  ;*                                                               *
  7                          7  ;*      ENTRY : R0 (COMMAND)                                     *
  8                          8  ;*              ER1 (DATA  TABLE  START ADDRESS)                 *
  9                          9  ;*      RETURN :               ER1 (MODULE  START  ADDRESS)      *
 10                         10  ;*              CARRY (C = 1;TRUE,C = 0 ; FALSE)                 *
 11                         11  ;*                                                               *
 12                         12  ;*****************************************************************
 13                         13  ;
 14                         14          .CPU    300HA
 15   001000                15          .SECTION A,CODE,LOCATE=H'001000
 16            00001000     16  CCASE   .EQU    $               ;Entry point
 17   001000   6918         17          MOV.W   @ER1,E0         ;
 18   001002   58700016     18          BEQ     CCASE2          ;If  "END"  of  table  then  return
 19   001006   1D80         19          CMP.W   E0,R0           ;
 20   001008   58700008     20          BEQ     CCASE1          ;Branch  if  command  found
 21   00100C   7A1100000006 21          ADD.L   #6,ER1          ;Increment  table  address
 22   001012   40EC         22          BRA     CCASE           ;Branch  always
 23   001014   01006F110002 23  CCASE1  MOV.L   @(2,ER1),ER1    ;Load  module  start  address
 24   00101A   06FB         24          ANDC    #B'11111011,CCR ;Set  Z  FLAG  for  true
 25   00101C   5470         25  CCASE2  RTS
 26                         26          .END
***** TOTAL   ERRORS    0
***** TOTAL   WARNINGS  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.
3.00	Jun.12.06	4	Error correction

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