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H8/300L Series

Branching Directed by a Table (CCASE)

Introduction

1. The software CCASE sets the start address of a processing routine for a 1-word (2-byte) command.
2. This function is useful in decoding data input from the keyboard or performing a process according to the input data.

Target Device

H8/300L Series

Contents

1. Arguments

Description		Memory area	Data length (bytes)
Input	Command	R0	2
	Start address of data table	R1	2
Output	Start address of processing routine	R4	2
	Command	C 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)
28
Data memory (bytes)
0
Stack (bytes)
0
Clock cycle count
74
Reentrant
Possible
Relocation
Possible
Interrupt
Possible

4. Note

The clock cycle count in the specifications (74) is for the example of figure 5.1 being executed.

5. Description

5.1 Details of functions

1. The following arguments are used with the software CCASE:
   R0: Sets a 2-byte command as an input argument.
   R1: Sets, as an input argument, the first address of the data table storing commands, including the one set in R0, and the start addresses of their processing routines.
   R4: The start address (2 bytes) of the processing routine for the command set in R0 is set here as an output argument.
   C flag (CCR): Indicates the state after execution of software CCASE.
   C flag = 1: The data matching the command set in R0 was found in the data table.
   C flag = 0: The data matching the command set in R0 was not found in the data table.
2. The following figure illustrates the execution of the software CCASE.
   When the input arguments are set as shown in (1), the program refers to the data table (see figure 5.1 and places the start address of the processing routine in R4 as shown in (2).
3. When the software CCASE is executed, a data table as shown in figure 5.1 is required. The data table should be as follows:
   A. The table contains groups of data, each consisting of 4 bytes (2 words), beginning with the address H'FD80 and the delimiting data H'0000 indicating the end of the table.
   B. The first word of each data group (2 words) contains a command and the second word contains the start address of the processing routine in the order of the upper byte followed by the lower byte.

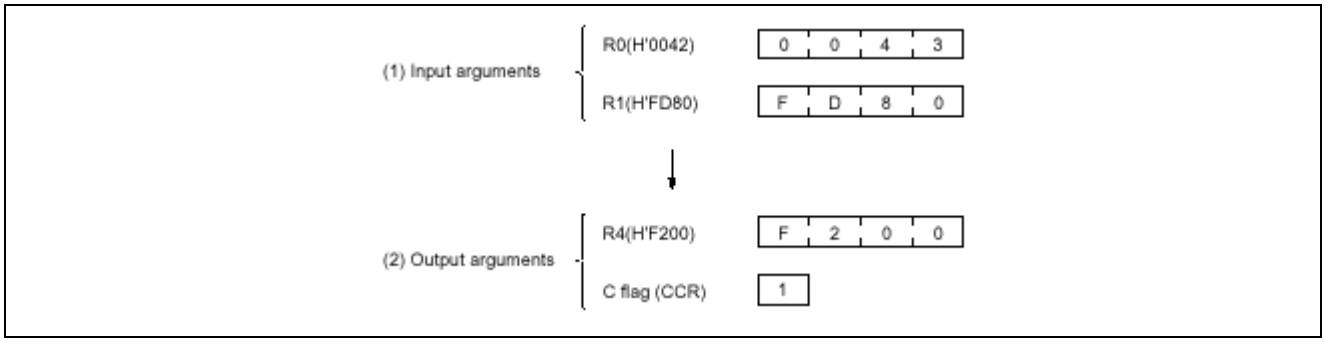


Figure 5.1 Example of Software CCASE Execution

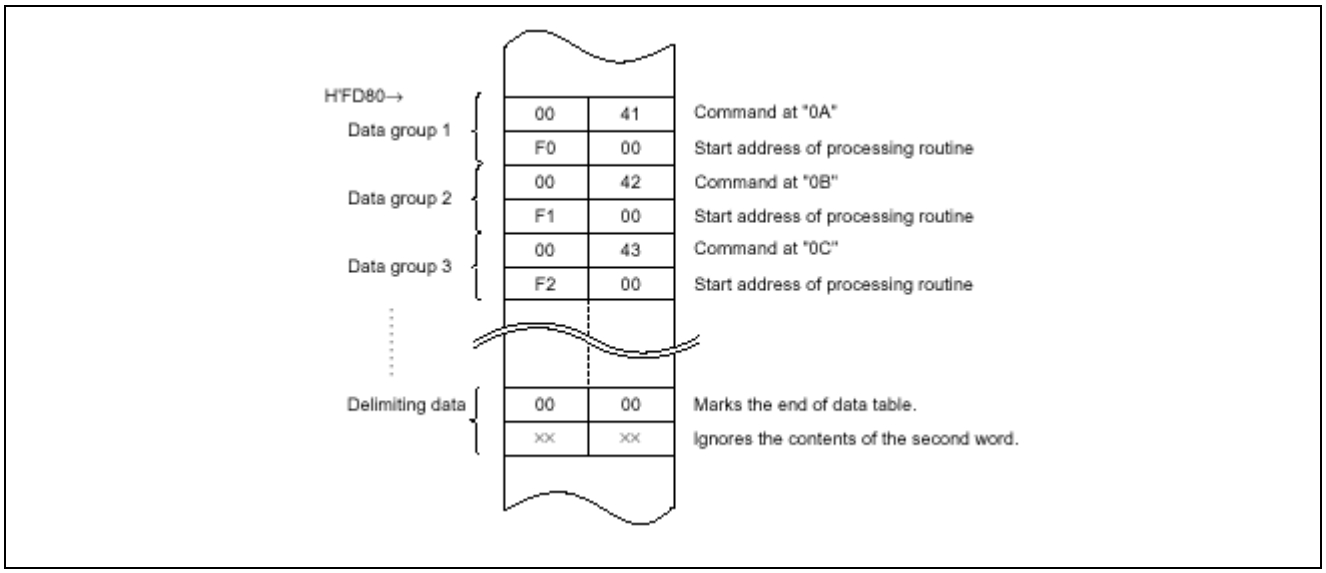


Figure 5.2 Example of Data Table

5.2 Notes on usage

Do not use H'0000 as a command in the data table because H'0000 is used as delimiting data.

5.3 Data memory

The software CCASE uses no data memory.

5.4 Example of use

Set commands and the start address of the data table in the arguments and call the software CCASE as a subroutine.

```
WORK1    .RES.B   1          ..... Reserves a data memory area in which the user program places a command.

         MOV. W   #DTABLE, R1 ..... Places in the input argument the start address of the data table set by the user program.

         MOV. B   @WORK1, R0L ..... Places in the argument the command stored by the user program.

         JSR      @CCASE      ..... Calls the software CCASE as a subroutine.

         Bcc      ERROR       ..... Branches when there is no data that matches the command on the data table.

         Program to be branched to processing routine

ERROR    Error program        ..... Executes error program.

         .SECTION D-TABLE, DATA, ALIGN=2
DTABLE   .DATA.W  H'0041      Command at "0A"
         .DATA.W  H'F000      Start address of processing routine for command at "0A"
         .DATA.W  H'0042      Command at "0B"
         .DATA.W  H'F100      Start address of processing routine for command at "0B"
         .DATA.W  H'0043      Command at "0C"
         .DATA.W  H'F200      Start address of processing routine for command at "0C2"

         .DATA.W  H'0000      Delimiting data
```

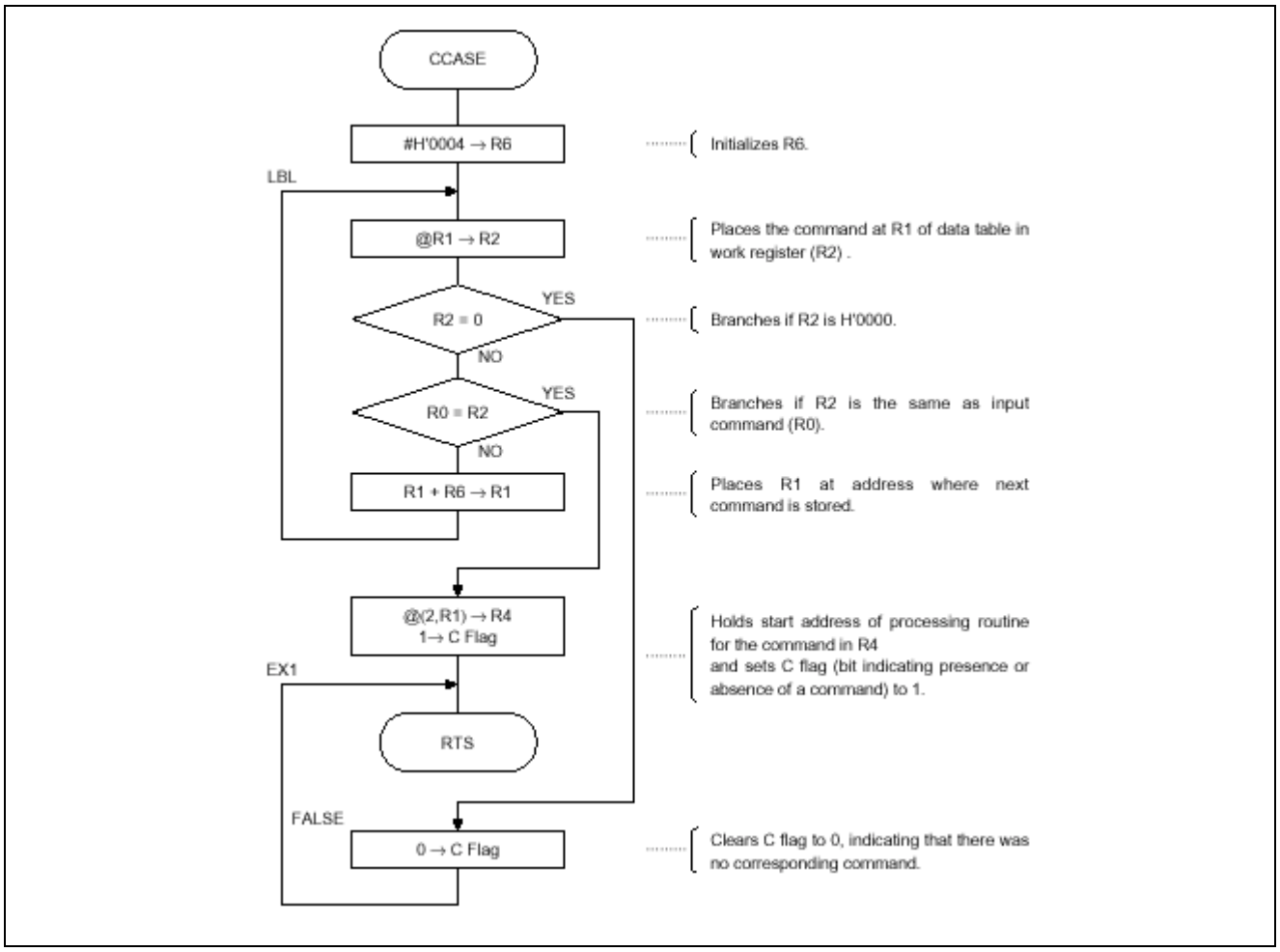
Note: Example of program to be branched to processing routine
Because the software CCASE merely places the start address of a processing routine in R4, branching to a processing routine requires a program as shown below:

```
         JSR      @CCASE      ..... Calls CCASE as a subroutine.

         Bcc      ERROR       ..... If the C flag is 0, operation branches to an error program.

Branching to processing routine
         JSR      @R4         ..... Calls the processing program as a subroutine.

ERROR    Error program
```

5.5 Operation

1. R1 is used as the pointer that indicates the address of the data table.
2. The commands are read sequentially from the start address of the data table in register indirect addressing mode. Each command read from the data table is compared with the input command (R0).
3. If a command in the table matches the content of R0, the start address of the processing routine, which is stored at the next address of the command, is set in R4. Then the C flag is set to 1, and the software CCASE ends.
4. If the command in the data table is H'0000, the C flag is cleared to 0 and the software CCASE ends.

6. Flowchart


CCASE
#H'0004 → R6
Initializes R6.
LBL
@R1 → R2
Places the command at R1 of data table in work register (R2) .
YES
R2 = 0
Branches if R2 is H'0000.
NO
YES
R0 = R2
Branches if R2 is the same as input command (R0).
NO
R1 + R6 → R1
Places R1 at address where next command is stored.
@(2,R1) → R4
1→ C Flag
Holds start address of processing routine for the command in R4
and sets C flag (bit indicating presence or absence of a command) to 1.
EX1
RTS
FALSE
0 → C Flag
Clears C flag to 0, indicating that there was no corresponding command.

7. Program List

```
*** H8/300 ASSEMBLER VER 1.0B ** 08/18/92 09:47:08
PROGRAM NAME =
 1                                          ;*******************************************************************************
 2                                          ;*
 3                                          ;*      00 - NAME               :TABLE BRANCH (CCASE)
 4                                          ;*
 5                                          ;*******************************************************************************
 6                                          ;*
 7                                          ;*      ENTRY   :R0 COMMAND
 8                                          ;*               R1 DATA TABLE START ADDRESS
 9                                          ;*
10                                          ;*      RETURN  :R4 MODULE START ADDRESS
11                                          ;*               C bit of CCR C = 1;TRUE , C = 0;FALSE
12                                          ;*
13                                          ;*******************************************************************************
14                                          ;
15      CCASE_co C      0000                        .SECTION                CCASE_code,CODE,ALIGN=2
16                                                  .EXPORT                 CCASE
17                                          ;
18      CCASE_co C              00000000    CCASE   .EQU $                  ;Entry point
19      CCASE_co C      0000    79060004            MOV.W   #H'0004,R6
20      CCASE_co C      0004                LBL
21      CCASE_co C      0004    6912                MOV.W   @R1,R2
22      CCASE_co C      0006    4710                BEQ     FALSE           ;If table "END" then exit
23      CCASE_co C      0008    1D02                CMP.W   R0,R2
24      CCASE_co C      000A    4704                BEQ     TRUE            ;Branch if command find
25      CCASE_co C      000C    0961                ADD.W   R6,R1           ;Increment table address
26      CCASE_co C      000E    40F4                BRA     LBL             ;Branch always
27      CCASE_co C      0010                TRUE
28      CCASE_co C      0010    6F140002            MOV.W   @(H'2,R1),R4    ;Load module start address
29      CCASE_co C      0014    0401                ORC     #H'01,CCR       ;Set C flag for true
30      CCASE_co C      0016                EX1
31      CCASE_co C      0016    5470                RTS
32      CCASE_co C      0018                FALSE
33      CCASE_co C      0018    06FE                ANDC    #H'FE,CCR       ;Clear C flag for false
34      CCASE_co C      001A    40FA                BRA     EX1
35                                          ;
36                                                  .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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