

To our customers,

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

M16C/80 Series

Searching Array

1.0 Abstract

This program searches for specified data from a two-dimensional array of a given size (maximum 255 x 255 bytes).

2.0 Introduction

This program searches for specified data from a two-dimensional array of a given size (maximum 255 x 255 bytes). Set the start address of the array in A0, the row size of the array in R0L, the column size of the array in R0H, and the search data in R1L. The address, the row element, and the column element of the coincidence data are output to A0, R0L, and R0H, respectively. Information on whether the search has succeeded or failed is output to the Z flag.

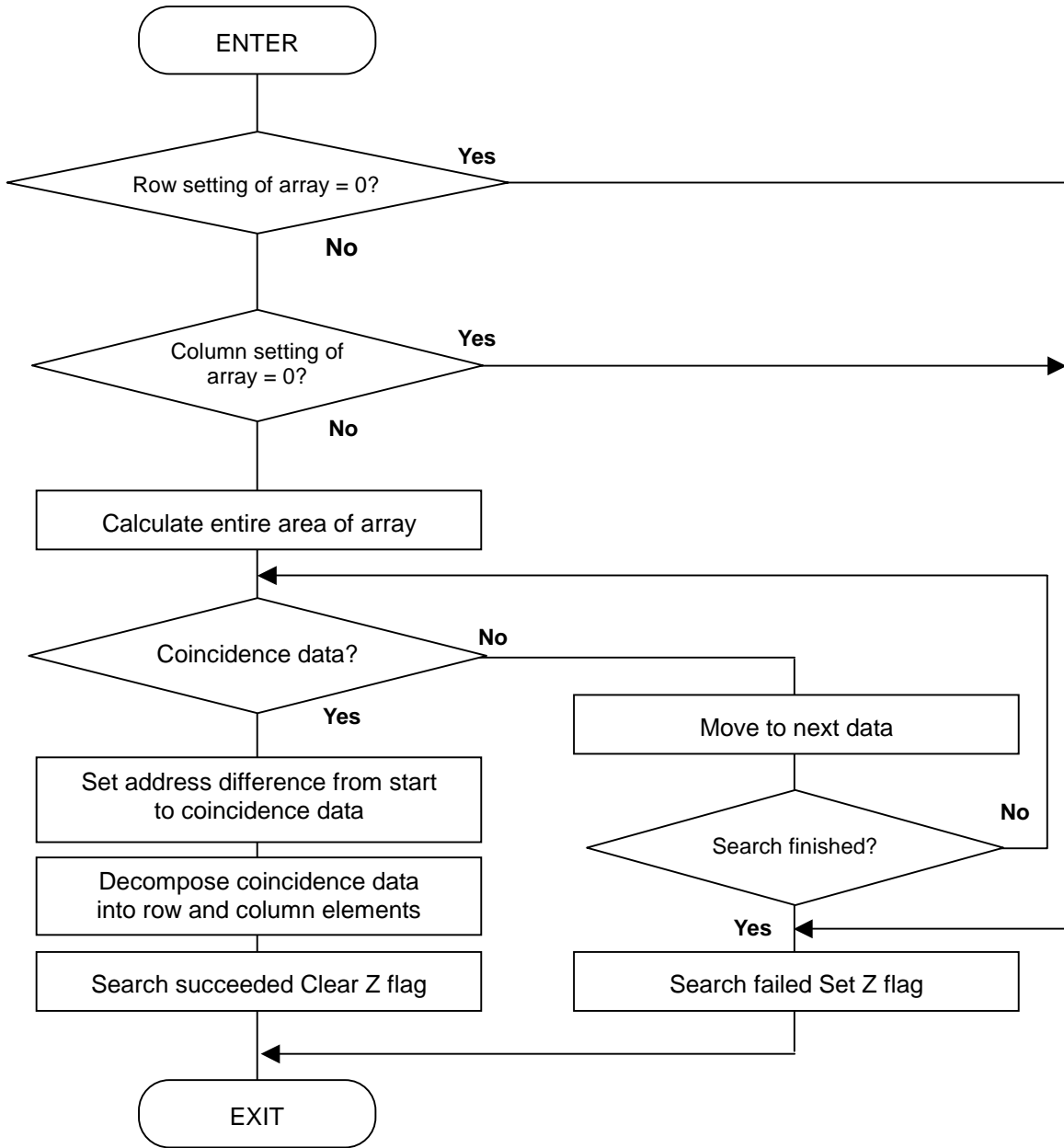
In this program, the overall size of the array is calculated, the specified data is searched from the entire array region, and a difference from the start address to the search address is obtained before decomposing the coincidence data into row and column elements.

Z	Meaning
0	Search succeeded
1	Search failed (no coincidence data found, row setting of array = 0, or column setting of array = 0)

Subroutine name : ARRANGE	ROM capacity : 41byte
Interrupt during execution:Accepted	Number of stacks used : 2byte

Register/memory	Input	Output	Usage condition
R0L	Row size of array	Row element of coincidence data	←
R0H	Column size of array	Column element of coincidence data	←
R1L	Search data	Does not change	←
R1H	-	Indeterminate	Used to save column size
R2	-	-	Unused
R3	-	-	Unused
A0	Start address of array	Address of coincidence data	←
A1	-	Indeterminate	Used to save start address
Z flag	-	Search succeeded/failed	←
Usage precautions			

3.0 Flowchart



4.0 Programming Code

```

*****
;
;   M16C Program Collection
;   CPU : M16C/80 series
*****
VromTOP      .EQU          0FE0000H          ; Declares start address of ROM
;=====
;   Title: Searching array
;   Outline: Searches for data from two-dimensional array of given size (within 255 x 255 bytes)
;   Input:  ----->
;           R0L(Row size of array)           R0L(Row element of coincidence data)
;           R0H(Column size of array)       R0H(Column element of coincidence data)
;           R1L(Search data)                R1L(Does not change)
;           R1H()                            R1H(Indeterminate)
;           R2()                            R2(Unused)
;           R3()                            R3(Unused)
;           A0(Start address of array)      A0(Address of coincidence data)
;           A1()                            A1(Indeterminate)
;   Stack amount used: 2 bytes
;   Notes: Success or failure of search is returned by Z flag
;=====
;
;           .SECTION      PROGRAM, CODE
;           .ORG          VromTOP          ; ROM area
ARRANGE:
  CMP.B      #0,R0L
  JEQ        ARRANGE_NG          ; --> No rows of array are set
  MOV.B      R0H,R1H            ; Saves columns
  JEQ        ARRANGE_NG          ; --> No columns of array are set
  MOV.W      A0,A1
  MULU.B     R0H,R0L            ; Calculates array size
ARRANGE_10:
  CMP.B      R1L,[A0]
  JEQ        ARRANGE_20          ; --> Coincidence data found
  ADD.L:S    #1,A0
  ADJNZ.W    #-1,R0,ARRANGE_10  ; --> Checks next data
ARRANGE_NG:
  FSET      Z                    ; Search failed
  JMP        ARRANGE_EXIT
ARRANGE_20:
  PUSH.W     A0                  ; Saves address of coincidence data
  SUB.W      A1,A0              ; Creates address difference from start
  ;                               ; to coincidence data
  MOV.W      A0,R0
  DIVU.B     R1H                ; Decomposes coincidence data into
  ;                               ; row and column elements
  INC.B      R0L                ; Corrects rows
  INC.B      R0H                ; Corrects columns
  POP.W      A0                 ; Restores address of coincidence data
  FCLR      Z                    ; Search succeeded
ARRANGE_EXIT:
  RTS
;
;           .END ;

```

5.0 Reference

MCU Technical Information Homepage

<http://www.infocom.maec.co.jp/indexe.htm>

(or <http://www.mdece.com/> , <http://www.mitsubishichips.com/products/mcu/index.html> or your local Web Site.)

Technical Support

E-mail: support@apl.maec.co.jp

(or your local support E-mail address. A private e-mail address should NOT be used.)

Data Sheet

M16C/80 group

(Use the latest version on the Homepage: <http://www.infocom.maec.co.jp/indexe.htm>)

User's Manual

M16C/80 group

(Use the latest version on the Homepage: <http://www.infocom.maec.co.jp/indexe.htm>)

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