

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

M16C/80 Series

Calculating Sum-of-Products

1.0 Abstract

This program calculates a sum of products using a sum-of-products calculating instruction (RMPA).

2.0 Introduction

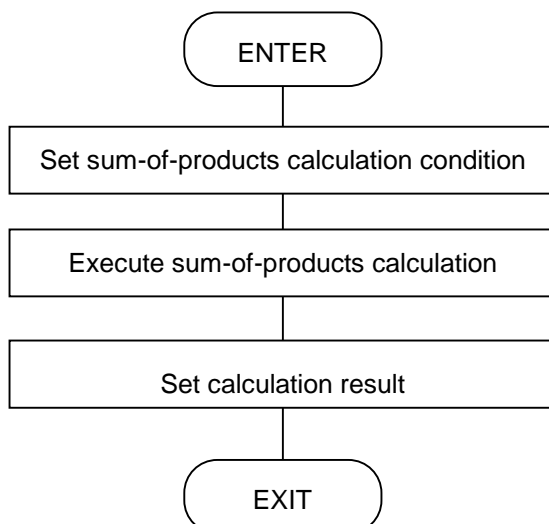
This program calculates a sum of products using a sum-of-products calculating instruction (RMPA). Set the multiplier in a variable area (DATA11-13) and the multiplicand in a variable area (DATA21-23). The result of sum-of-products calculation is output to a variable area (ANS).

The program sets the number of sum-of-products in R3, the multiplicand address in A0, and the multiplier address in A1 before executing the RMPA instruction.

Subroutine name :	-	ROM capacity : 23byte
Interrupt during execution:	Accepted	Number of stacks used : None

Register/memory	Input	Output	Usage condition
R0	-	Result of sum-of-products calculation	Used for calculation
R1	-	Result of sum-of-products calculation	Used for calculation
R2	-	Result of sum-of-products calculation	Used for calculation
R3	-	"0000 ₁₆ "	Number of some-of-products
A0	-	Last address of multiplicand	Multiplicand address
A1	-	Last address of multiplier	Multiplier address
DATA11 to 13	Multiplicand	Does not change	←
DATA21 to 23	Multiplier	Does not change	←
ANS	-	Result of sum-of-products calculation	←
Usage precautions			

3.0 Flowchart



4.0 Programming Code

```

*****
;
; *
;   M16C Program Collection
;   CPU : M16C/80 series
; *
;
*****
VramTOP    .EQU    0000400H           ; Declares start address of RAM
VromTOP    .EQU    0FE0000H           ; Declares start address of ROM
Vsb        .EQU    0400H              ; Sets SB
          .SECTION    RAM,DATA
          .ORG        VramTOP         ; RAM area
DATA11:    .BLKB    1                 ; Multiplicand 1
DATA12:    .BLKB    1                 ; Multiplicand 2
DATA13:    .BLKB    1                 ; Multiplicand 3
DATA21:    .BLKB    1                 ; Multiplier 1
DATA22:    .BLKB    1                 ; Multiplier 2
DATA23:    .BLKB    1                 ; Multiplier 3
ANS:       .BLKB    6                 ; Result of sum-of-products calculation
;
;
=====
;   Title: Calculating sum-of-products
;   Outline: Calculates a sum of products.
;   Input:  ----->
;           R0()
;           R1()
;           R2()
;           R3()
;           A0()
;           A1()
;   Output:
;           R0(Calculation result)
;           R1(Calculation result)
;           R2(Calculation result)
;           R3(Indeterminate)
;           A0(Indeterminate)
;           A1(Indeterminate)
;   Stack amount used: None
;   Notes:
;
=====
          .SECTION    PROGRAM,CODE
          .ORG        VromTOP         ; ROM area
          .SB        Vsb              ; Declares SB register value
          .SBSYM     ANS
MOV.L      #0,R2R0                    ; Initializes calculation area
MOV.W     #0,R1
MOV.W     #3,R3                        ; Sets number of sum-of-products
MOV.L     #DATA11,A0                   ; Multiplicand address
MOV.L     #DATA21,A1                   ; Multiplier address
RMPA.B    ; Executes sum-of-products calculation
MOV.L     R2R0,ANS                     ; Sets calculation result
MOV.W     R3,ANS+4
;
;
          .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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