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April 1st, 2010
Renesas Electronics Corporation

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M16C/60 Series and M16C/20 Series

General-purpose Program for Calculating Sum-of-Products

1. Abstract

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

2. Introduction

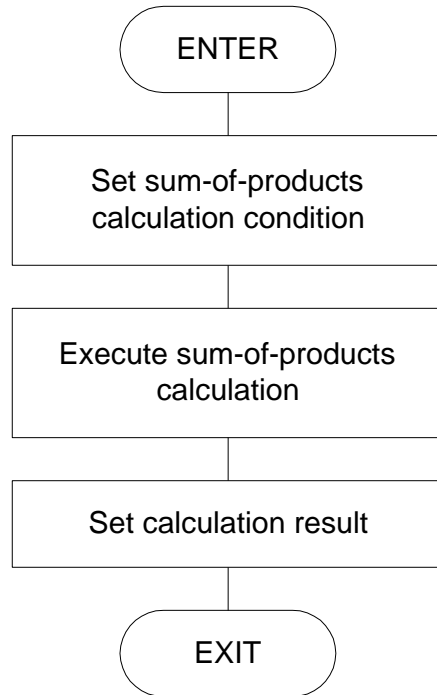
This program calculates a sum of products using a sum-of-products calculating instruction (RMPA). Set the multiplier in a variable area (DATA11-13) and the multiplicand in a variable area (DATA21-23). The result of sum-of-products calculation is output to a variable area (ANS).

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 : 15 bytes
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	-	-	Unused
R2	-	-	Unused
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. Flowchart



4. The example of a reference program

```

;*****
; *
; M16C General-purpose Programs *
; CPU : M16C *
; *
;*****
VramTOP   .EQU    000400H           ; Declares start address of RAM
VromTOP   .EQU    0F0000H           ; 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    2                ; Result of sum-of-products
;                                     ; calculation
;
;=====
; Title      : Calculating sum-of-products
; Outline    : Calculates a sum of products.
; Input      : -----> Output:
; R0 ( )      R0      (Calculation result)
; R1L ( )     R1L     (Unused)
; R1H ( )     R1H     (Unused)
; R2 ( )      R2      (Unused)
; R3 ( )      R3      (Indeterminate)
; A0 ( )      A0      (Indeterminate)
; A1 ( )      A1      (Indeterminate)
; Stack amount used: None
; Notes:
;=====
;          .SECTION    PROGRAM,CODE
;          .ORG      VromTOP         ; ROM area
;          .SB       Vsb             ; Declares SB register value
;          .SBSYM    ANS            ;
LDC        #Vsb,SB                 ; Sets initial values for SB register
MOV.W     #0,R0                    ; Initializes calculation area
MOV.W     #3,R3                    ; Sets number of sum-of-products
MOV.W     #DATA11,A0               ; Multiplicand address
MOV.W     #DATA21,A1               ; Multiplier address
RMPA.B    ; Executes sum-of-products calculation
MOV.W     R0,ANS                   ; Sets calculation result
;
;          .END
;

```

5. Reference

SOFTWARE MANUAL

M16C/60 M16C/20 Series SOFTWARE MANUAL

(Acquire the most current version from Renesas web-site)

6. Web-site and contact for support

Renesas Web-site

<http://www.renesas.com>

Contact for Renesas technical support

Mail to : support_apl@renesas.com

REVISION HISTORY

Rev.	Date	Description	
		Page	Summary
1.00	Jul 08, 2002	-	First edition issued

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