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

Adding 32 Bits

1.0 Abstract

This program performs a 32-bit addition using registers.
This program performs a 32-bit addition between memory locations.

2.0 Introduction

This program performs a 32-bit addition using registers. Set the augend in R2 and R0 and the addend in R3 and R1 beginning with the upper half, respectively. The addition result is output to R2 and R0 beginning with the upper half and carry information to the C flag, respectively..

This program performs a 32-bit addition between memory locations. Set the least significant memory address of the augend and that of the addend in the address registers. The addition result is output to the augend's memory location and carry information to the C flag, respectively.

C	Meaning
1	Without carry
0	With carry

(1) 32-bit addition (register)

Subroutine name : ADDITION32	ROM capacity : 3byte
Interrupt during execution:Accepted	Number of stacks used : None

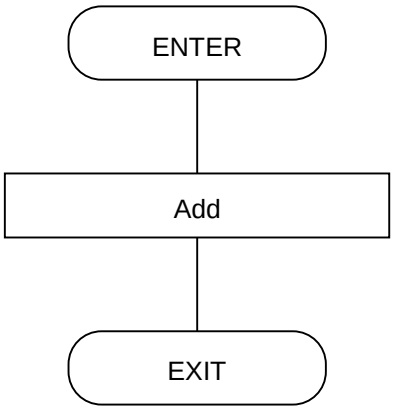
Register/memory	Input	Output	Usage condition
R0	Lower half of augend	Lower half of addition result	←
R1	Lower half of addend	Does not change	←
R2	Upper half of augend	Upper half of addition result	←
R3	Lower half of addend	Does not change	←
A0	-	-	Unused
A1	-	-	Unused
C flag	-	Carry information	←
Usage precautions	The augend is destroyed as a result of program execution.		

(2) 32-bit addition (memory)

Subroutine name : ADDITIONmemory32	ROM capacity : 3byte
Interrupt during execution:Accepted	Number of stacks used : None

Register/memory	Input	Output	Usage condition
R0	-	-	Unused
R1	-	-	Unused
R2	-	-	Unused
R3	-	-	Unused
A0	Augend address	Does not change	←
A1	Addend address	Does not change	←
Memory indicated by A0	Augend	Does not change	←
Memory indicated by A1	Addend	Result of addition	←
C flag	-	Carry information	←
Usage precautions	The augend is destroyed as a result of program execution.		

3.0 Flowchart



4.0 Programming Code

```
;*****************************************************************
; *
;       M16C Program Collection
;       CPU : M16C/80 series
; *
;*****************************************************************
VromTOP         .EQU    0FE0000H                ; Declares start address of ROM
;                                               ;
;===============================================================================
;    Title: Adding 32 bits
;    Outline: Adds 32-bit data using registers.
;    Input:         ------------------------------>          Output:
;    R0(Lower half of augend)                    R0(Lower half of addition result)
;    R1(Lower half of addend)                    R1(Does not change)
;    R2(Upper half of augend)                    R2(Upper half of addition result)
;    R3(Upper half of addend)                    R3(Does not change)
;    A0( )                                       A0(Unused)
;    A1( )                                       A1(Unused)
;    Stack amount used: None
;    Notes: Carry information in C flag
;    R2R0 + R3R1
;===============================================================================
                .SECTION        PROGRAM,CODE
                .ORG            VromTOP                 ; ROM area
ADDITION32:                                             ;
  ADD.L         R3R1,R2R0                               ; Adds
  RTS                                                   ;
;                                               ;
;===============================================================================
;    Title: Adding 32 bits
;    Outline: Adds 32-bit data between memory locations
;    Input:         ------------------------------>          Output:
;    R0()                                        R0(Unused)
;    R1()                                        R1(Unused)
;    R2()                                        R2(Unused)
;    R3()                                        R3(Unused)
;    A0(Augend address)                          A0(Does not change)
;    A1(Addend address)                          A1(Does not change)
;    Stack amount used: None
;    Notes: Carry information in C flag
;    (A0) + (A1)
;===============================================================================
ADDITIONmemory32:                                       ;
  ADD.L         [A1],[A0]                               ; Adds
  RTS                                                   ;
  ;                                                     ;
                .END ;
```

5.0 Reference

MCU Technical Information Homepage

http://www.infomicom.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.infomicom.maec.co.jp/indexe.htm)

User's Manual

M16C/80 group
(Use the latest version on the Homepage: http://www.infomicom.maec.co.jp/indexe.htm)

RENESAS
Renesas Technology Corp.

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