

To our customers,

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## M16C/60, M16C/30, M16C/Tiny Series

### The Program Transmission Method to RAM

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#### 1. Abstract

This application note describes a procedure for the program transmission to RAM, using in-line assemble. A sample example is followed.

#### 2. Introduction

The explanation of this issue is applied to the following condition:

Applicable MCU: M16C/60 Series (Products with CPU core)

### 3. Description of the Application Example

This chapter describes the procedures for transmitting the program to RAM using in-line assembler and executing the transmitted program.

#### 3.1 Setup Procedures

The setup procedures for **3. Description of the application example** is shown.

(1) Make sure for the program transmission on RAM.

```
int ram_program_area[1024/2];
```

(2) Set the program transmission source address, the destination address, and the transmission size using in-line assembler.

```
asm("pushm R0,R1,R2,R3,A0,A1");           ←Save the content of the register.
asm(" mov.b #(_RAM_PRG_START &0f0000H)>>16,R1H "); ←Set the 4 high-order bits of a transmit source
                                                address to R1H register.
asm("mov.w #(_RAM_PRG_START & 0FFFFH),A0"); ←Set the 16 low-order bits of a transmit
                                                source address the A0 register
asm("mov.w #_ram_prog_area,A1");           ←Set the transmit destination address to A1
                                                register.
asm("mov.w #(_RAM_PRG_END - _RAM_PRG_START)/2,R3");←Set the transmit count to R3 register.
```

(Note) Define the program area to transmit in advance as shown in the following.

```
.
.
extern RAM_PRG_START;
extern RAM_PRG_END;
.
.
void xxxx_sub(void)
{
asm(" .glb _RAM_PRG_START ");
asm("_RAM_PRG_START:");           ←Define in the lead of the program to transmit
.
.
}
asm(" .glb _RAM_PRG_END ");
asm("_RAM_PRG_END:");           ←Define at the last of the program to transmit.
.
.
```

(3) Transmit the program to RAM.

Transmit the program using SMOVF instruction written by in-line assembler.

```
asm(" smovf.w");
asm(" popm R0,R1,R2,R3,A0,A1");           ←Restore the contents of the register saved in (2)
```

(4) Execute the program transmitted to RAM.

```
asm(" jmp.a _ram_prog_area");
```

#### 4. Reference Program

Please find the reference program from the Renesas Technology Web site.

Click Application Note in the left menu of the M16C/60 Series top page.

The following shows the sample task to execute the program on ROM or on RAM alternately every time a timer counts 256 of TA1 interrupts after the transmission to RAM.

#### 5. Reference Documents

Hardware manual

M16C/62P Group (M16C/62P, M16C/62PT) Hardware Manual

(Use the most recent version of the document on the Renesas Technology Web site.)

Technical news/Technical update

(Use the most recent version of the document on the Renesas Technology Web site.)

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<http://www.renesas.com/>

Inquiries

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