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April 1\textsuperscript{st}, 2010
Renesas Electronics Corporation

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1. Abstract

This mode decrements a counter value using an internally generated count source. An interrupt request is generated when the counter value underflows.

Timer period = (timer Bi register (i = 0 to 5) +1) × timer count source period

f1 = 25 MHz, fC = 32.768 kHz

<table>
<thead>
<tr>
<th>Count Source</th>
<th>Count Source Period</th>
<th>Maximum Period (Timer Value = 0xFFFF)</th>
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<tbody>
<tr>
<td>f1</td>
<td>40 ns</td>
<td>2.621 ms</td>
</tr>
<tr>
<td>f8</td>
<td>320 ns</td>
<td>20.972 ms</td>
</tr>
<tr>
<td>f2n (n = 15)</td>
<td>1200 ns</td>
<td>78.64 ms</td>
</tr>
<tr>
<td>fC32</td>
<td>Approx. 0.977 ms</td>
<td>64 s</td>
</tr>
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2. Introduction

The application described in this document applies to the following MCU:

• MCU: R32C/118 Group

This program can be used with other R32C/100 Series MCUs which have the same special function registers (SFRs) as the R32C/118 Group. Check the manual for any additions or modifications to functions. Careful evaluation is recommended before using this application note.
3. Application Example

This section describes how to generate a timer interrupt request with a 1 ms period using the count source f8.

3.1 Explanation

(1) After setting the TBiS bit (i = 0 to 5) in the TABSR or TBSR register to 1 (count started), the counter decrements the count source.

(2) When the counter underflows, the value from the reload register is reloaded, and the count continues.

(3) After setting the TBiS bit to 0 (counter stopped), the counter holds the count value and stops.

The diagram below shows operation timing.

![Figure 3.1 Operation in Timer Mode](image-url)
3.2 Setting

This section shows the procedures and values to set the example shown in section 3.1 “Explanation”. Refer to individual MCU hardware manuals for details on individual registers.

(1) Set the timer Bi mode register (i = 0 to 5).

![Timer Bi Mode Register (TBiMR)](image)

(2) Set the timer Bi register.

![Timer Bi Register (TBi)](image)

(3) Set the count start register.

![Count Start Register (TABS R)](image)
4. Sample Program
A sample program can be downloaded from the Renesas Technology website.

5. Reference Documents
Hardware Manual
R32C/118 Group Hardware Manual Rev.1.00
The latest version can be downloaded from the Renesas Technology website.

Technical Update/Technical News
The latest information can be downloaded from the Renesas Technology website.

C Compiler Manual
R32C/100 Series C Compiler Package Ver. 1.02 Compiler User’s Manual Rev. 1.00
The latest version can be downloaded from the Renesas Technology website.
Website and Support

Renesas Technology Website
http://www.renesas.com/

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http://www.renesas.com/inquiry
csc@renesas.com

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