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R8C/2D Group

Timer RF in Input Capture Mode

1. Abstract

This document describes a program for timer RF in input capture mode.

2. Introduction

The application example described in this document applies to the following MCU and parameter(s):

- MCU : R8C/2D Group

This program can be used with other R8C/Tiny Series MCUs which have the same special function registers (SFRs) as the R8C/2D Group. Check the manual for any additions and modifications to functions. Careful evaluation is recommended before using this application note.

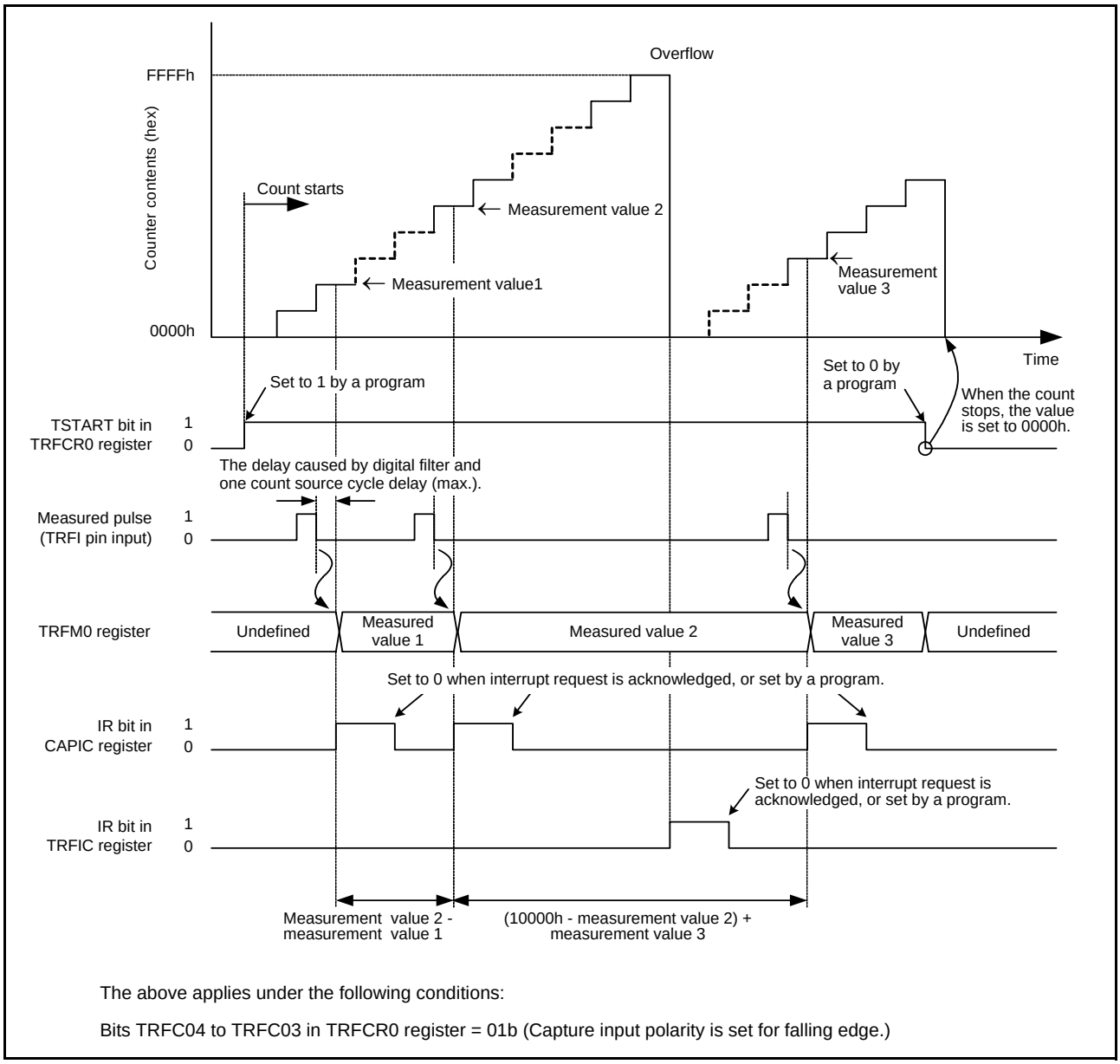
3. Application Example Description

In input capture mode, the edge of the TRFI pin input signal is used as a trigger to latch the timer value and the width or period of an external signal is measured. The TRFI input is provided with a digital filter, which prevents errors caused by noise.

The setting conditions of this program are as follows:

- Timer RF count source : f1
- Capture polarity : Both edges
- TRFI filter : Enabled, f1 sampling

Figure 3.1 shows the Operating Example in Input Capture Mode.



The above applies under the following conditions:

Bits TRFC04 to TRFC03 in TRFCR0 register = 01b (Capture input polarity is set for falling edge.)

Figure 3.1 Operating Example in Input Capture Mode

This sample program may include operations of unused bit functions for the SFR bit layout. Set these values according to the operating conditions of the user system.

3.1 Pin Usage

Table 3.1 Pin Usage and Function

Pin	I/O	Function
P8_3/TRFO10/TRF1	Input	Input capture input pin

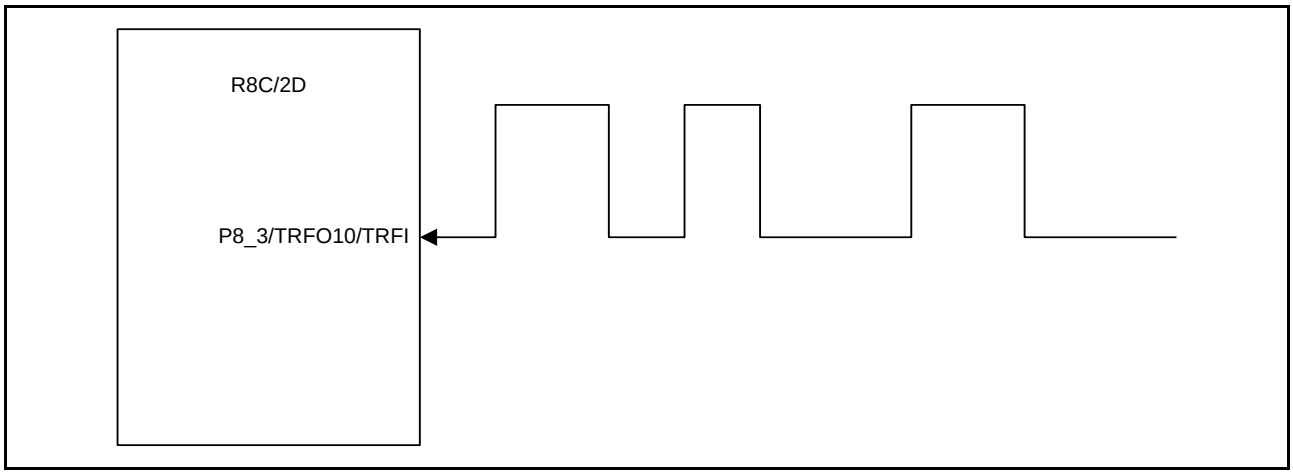


Figure 3.2 Input Capture Input

3.2 Memory Usage

Table 3.2 Memory Usage

Memory Usage	Size	Remark
ROM	195 bytes	In main.c module
RAM	11 bytes	In main.c module
Maximum user stack usage	10 bytes	main function: 7 bytes timer_rf_init function: 3 bytes
Maximum interrupt stack usage	36 bytes	TRF_init function: 18 bytes CAP_init function: 18 bytes

Memory usage varies depending on the C compiler version and the compile option.
The above applies under the following conditions:

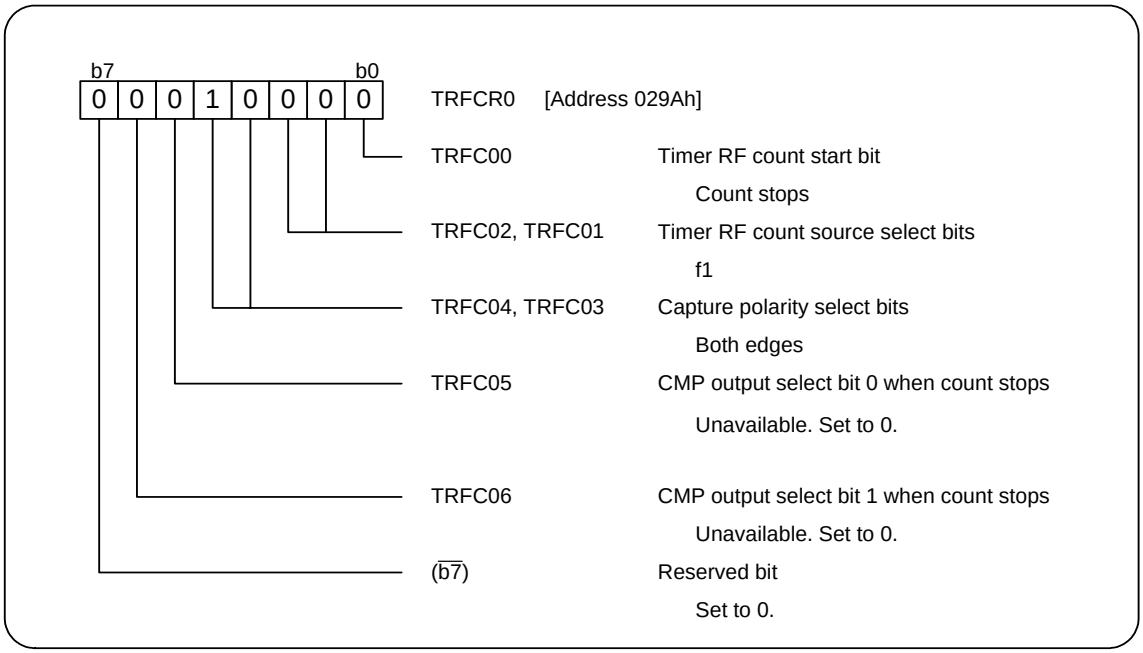
- C compiler: M16C/60, 30, 20, 10, Tiny, R8C/Tiny Series Compiler V.5.40 Release 00
- Compile option: -c -finfo; NOTE: -dir “$(CONFIGDIR)” -R8C

NOTE: Unavailable in the R8C/Tiny-exclusive free version.

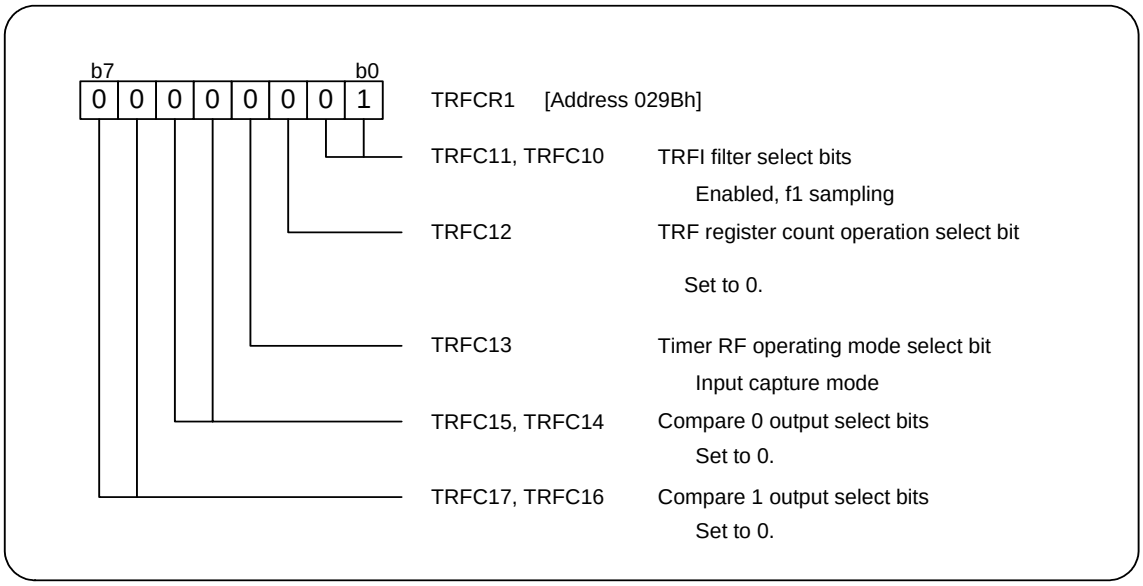
4. Setup

This section shows the initial setting procedures and values to perform the example described in **3. Application Example Description**. Refer to the **R8C/2D Group Hardware Manual** for details on individual registers.

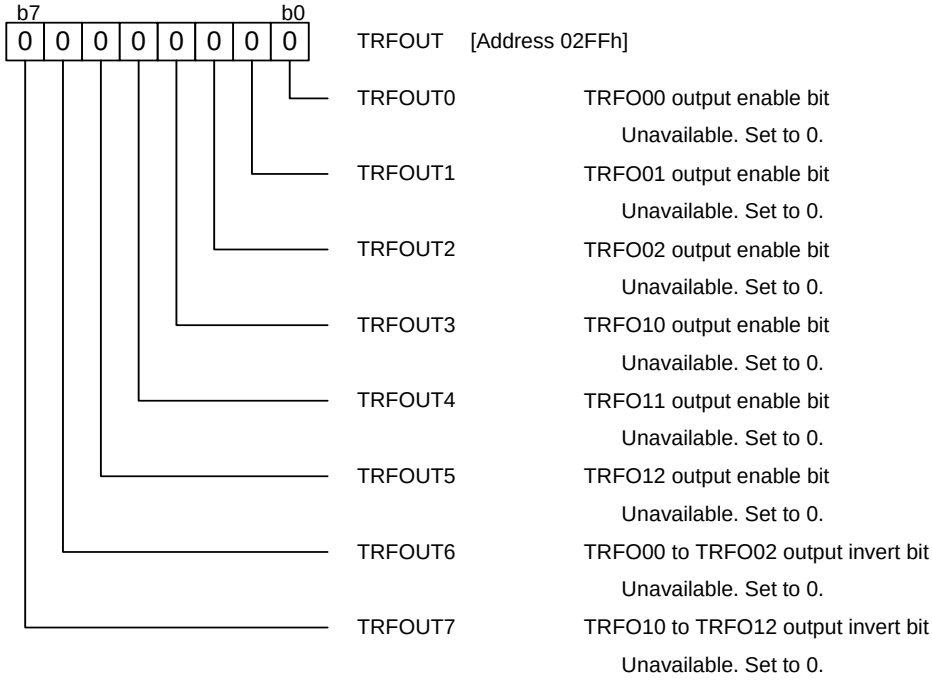
(1) Set the timer RF control register 0



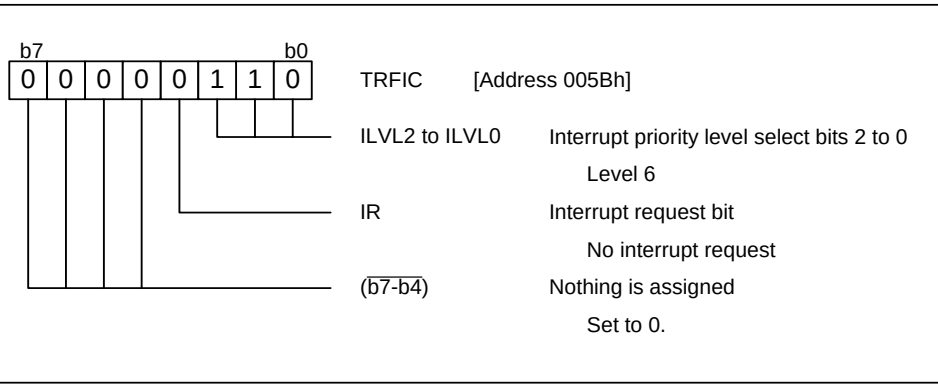
(2) Set the timer RF control register 1



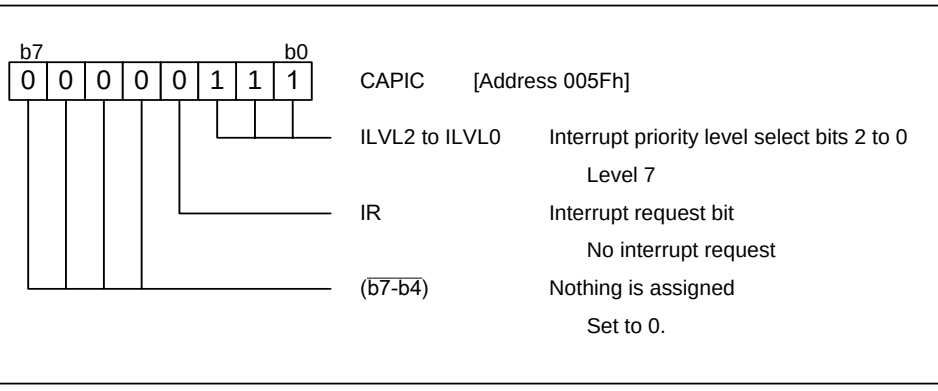
(3) Set the timer RF output control register



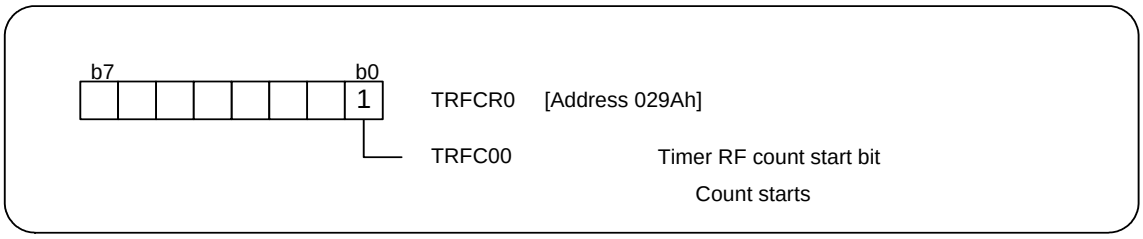
(4) Set the timer RF interrupt control register



(5) Set the capture interrupt register



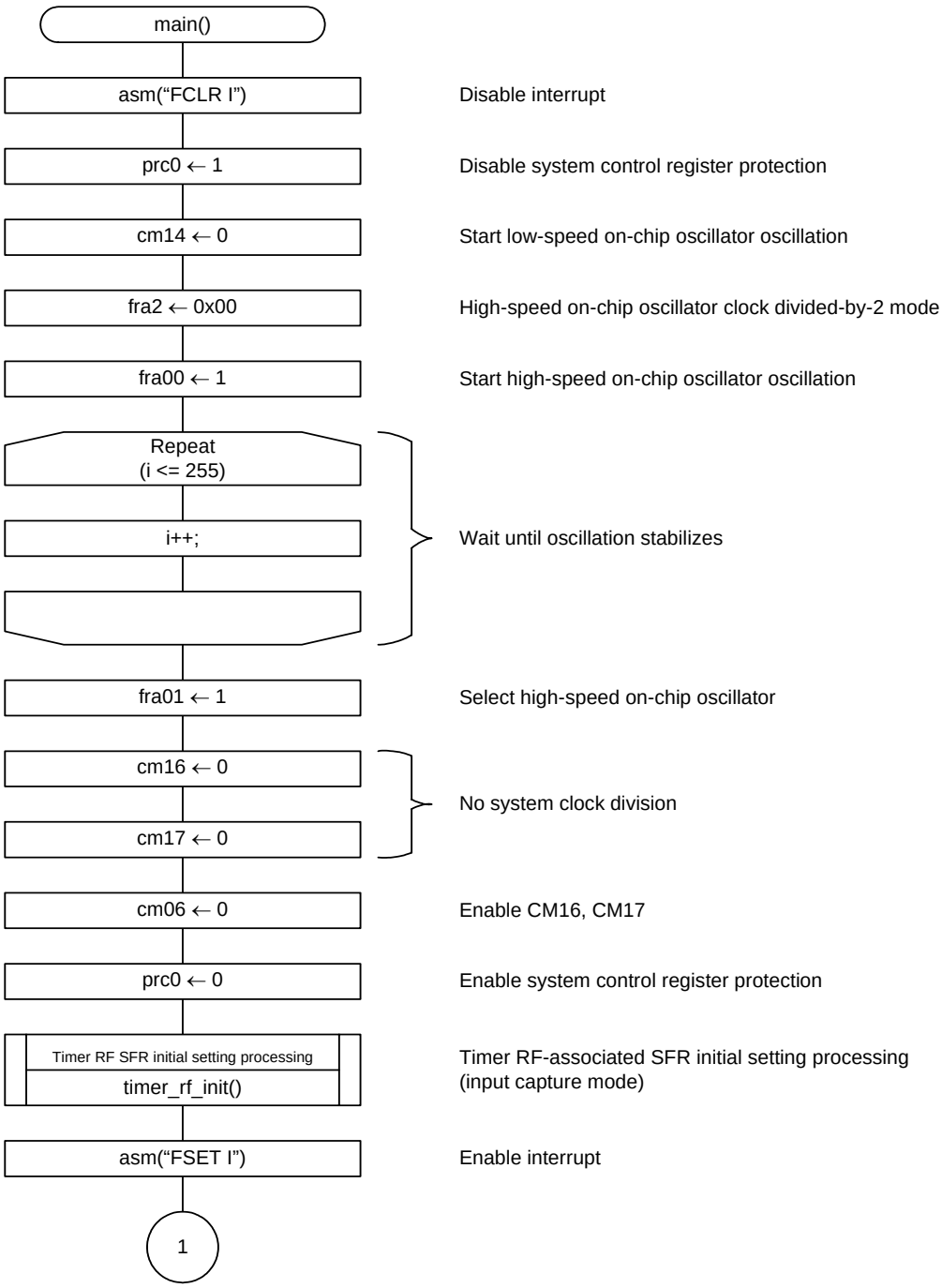
(6) Set the timer RF count start bit



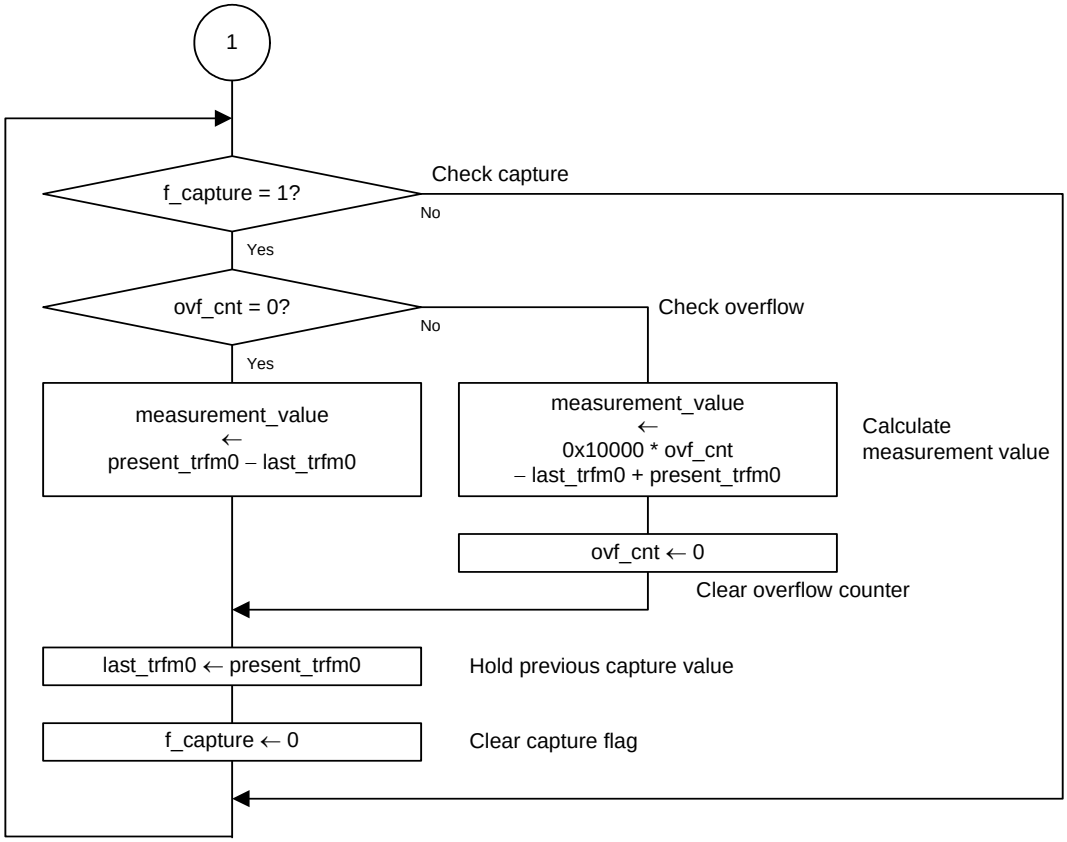
5. Flowchart

5.1 Main Function

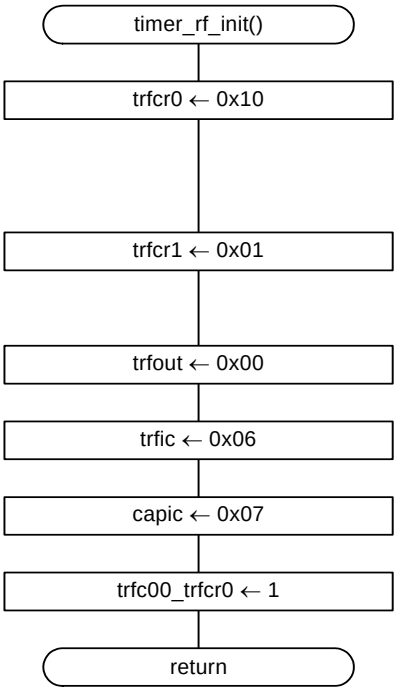
5.1.1 Main Function 1



5.1.2 Main Function 2



5.2 Timer RF-Associated SFR Initial Setting Processing



Stop timer RF counting
Timer RF count source: f1
Capture polarity: Both edges

Select TRFI filter: Enable filter, f1 sampling
Input capture mode

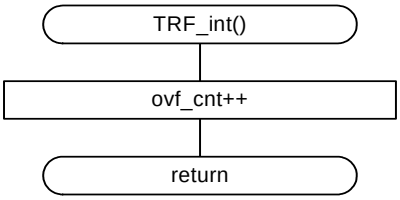
Unavailable in input capture mode.

Timer RF interrupt: Interrupt level 6

Capture interrupt: Interrupt level 7

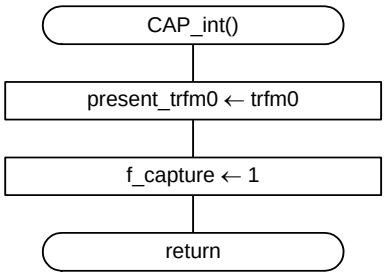
Start timer RF counting

5.3 Timer RF Interrupt Handling



Increment overflow counter

5.4 Capture Interrupt Handling



Read capture register

Set capture flag

6. Sample Programming Code

A sample program can be downloaded from the Renesas Technology website.
To download, click “Application Notes” in the left-hand side menu of the R8C/Tiny Series page.

7. Reference Documents

Hardware Manual
R8C/2D Group Hardware Manual
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.

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		Page	Summary
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