
H8S/2200 Series

Output of Count-specified Pulses

Introduction

Outputs as many 50% duty pulses as required (1 to 256).

Target Device

H8S/2215

Contents

1. Specifications	2
2. Description of Functions	3
3. Principles of Operation.....	4
4. Description of Software.....	5
5. PAD.....	6

1. Specifications

1. As shown in figure 1, this sample task outputs as many 50% duty pulses as required.
2. The pulse cycle can be set to 1.5 μs to 127.5 μs in increments of 0.5 μs in 16-MHz operation.
The number of pulses to be output can set from 1 to 256.

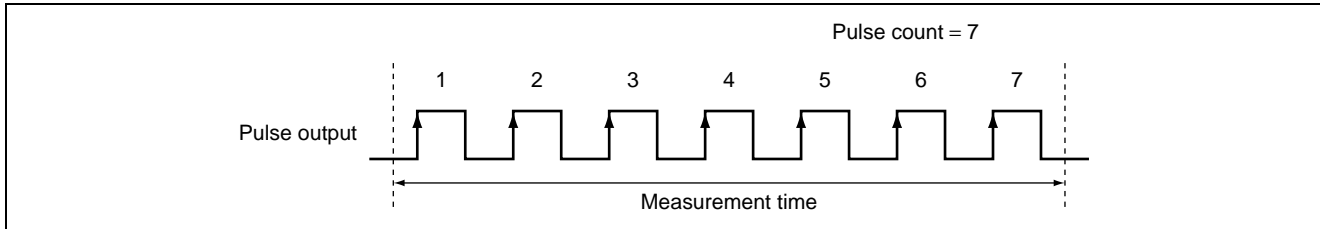


Figure 1 Pulse Output Timing

2. Description of Functions

1. The block diagram of the 8-bit timer to be used by this sample task is shown in figure 2. This sample task uses the following functions:
 - A. Function that cascade connects the 2-channel 8-bit timer and counts channel-0 compare match according to the channel-1 timer (compare match count mode)
 - B. Function that generates an interrupt to the set count.
- This sample task uses the functions as shown in figure 2 to count pulse rising edges.

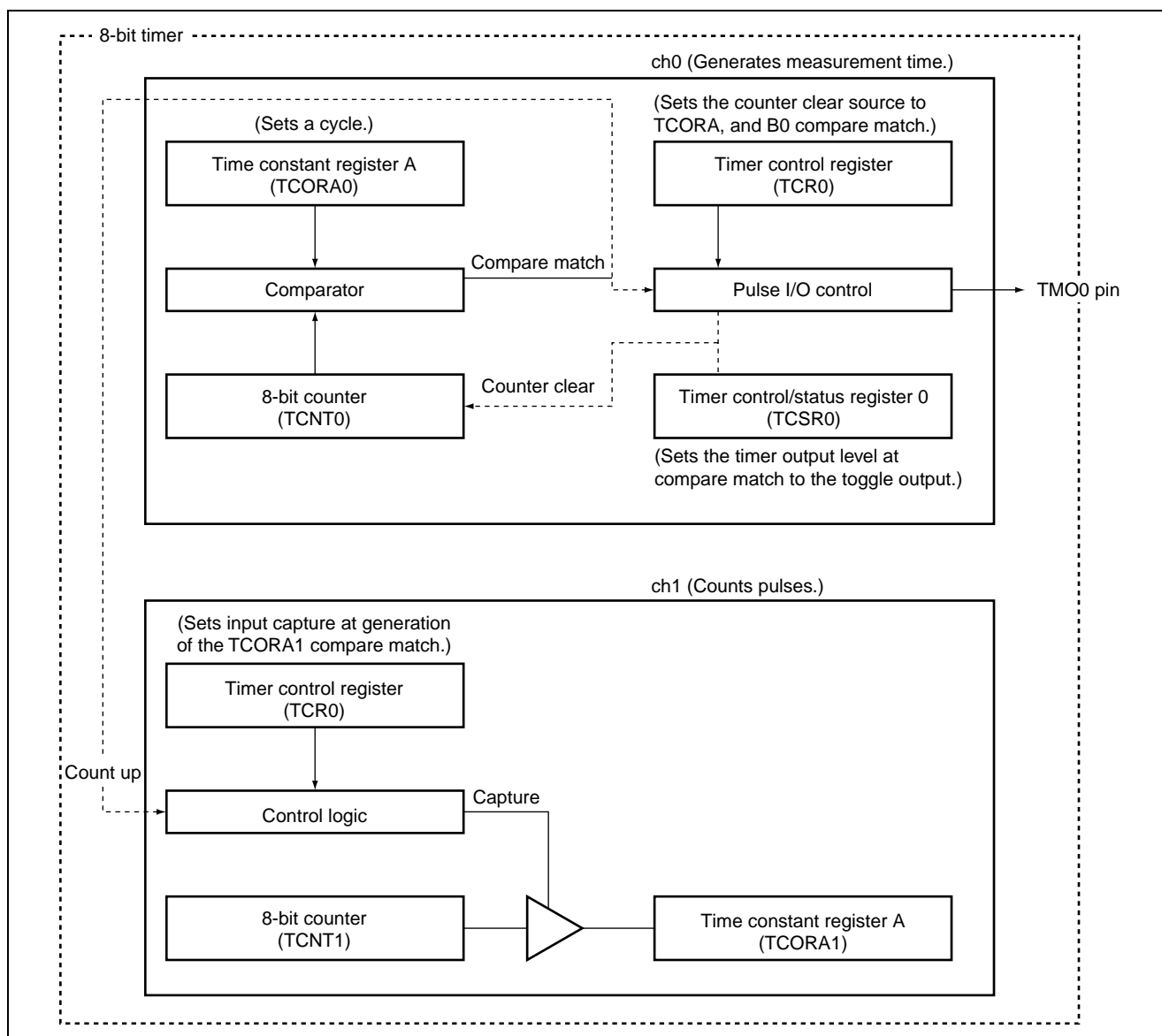


Figure 2 Output Pulse Count Block Diagram

2. Function allocation of this sample task is shown in table 1. This sample task allocates the H8S/2215 functions as shown in table 1 to measure the number of pulses.

Table 1 Assignment of Functions

Elements	Description
TCNT0	Generates compare match A/B
TCORA0	Generates compare match A.
TCORB0	Generates compare match B.
TCSR0	Outputs 1 for each compare match A and outputs 0 for each compare match B.
TMO0	Timer output pin (compare match output)
TCR0	Clears the counter at compare match A and selects the input clock ($\phi/8$)
TCNT1	Counts generation of compare match A of channel 0.
TCORA1	Generates compare match A.
TCR1	Clears the counter at compare match A and enables compare match (A) interrupt.

3. Principles of Operation

The principles of operations used are shown in figure 3. This sample task performs H8S/2215 hardware processing and software processing as shown in figure 3 to measure the number of pulses.

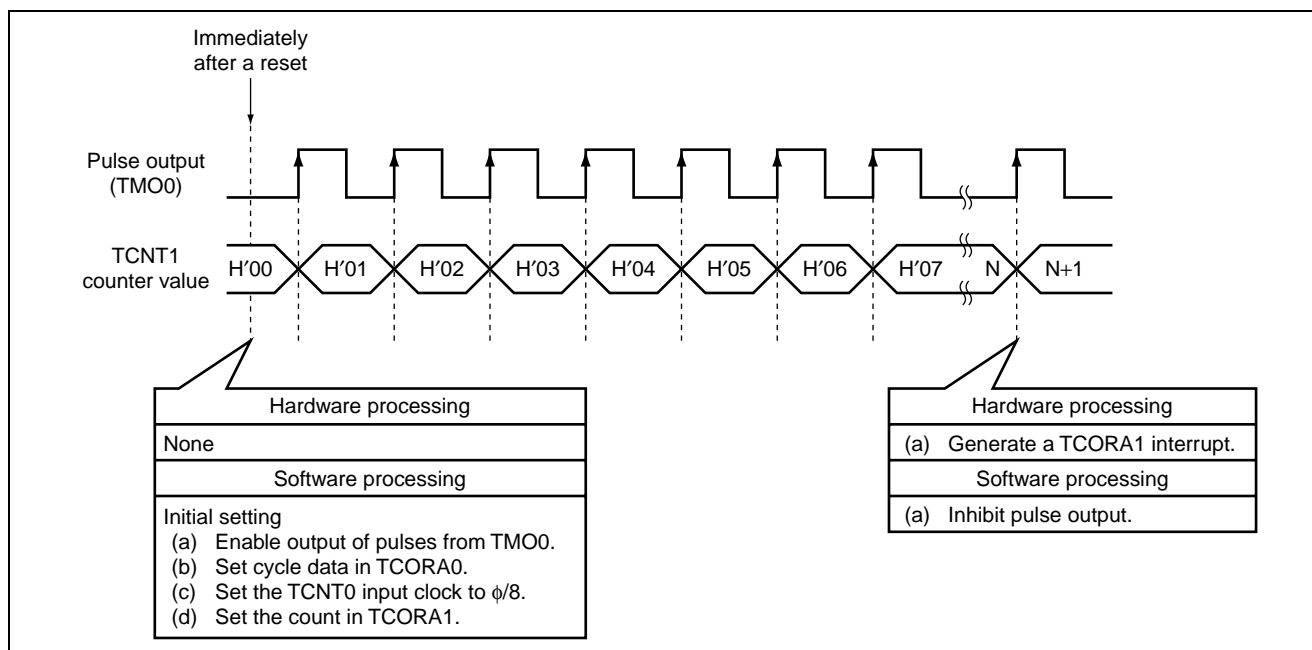


Figure 3 Principles of Operations Used for Measurement of the Number of Pulses

4. Description of Software

1. Description of Modules

Module Name	Label Name	Function
Main routine	pulsemn	Performs initial setting for the 8-bit timer.
Pulse output stop	pulend	Starts up by a TCORA1 interrupt and sets the number of pulses set in TCNT1 for an output argument.

2. Description of Arguments

Elements	Function	Data Length	Used in	I/O
pulse_cycle	Sets a pulse cycle.	1 byte	Main routine	Input
pulse_count	Sets the number of counted pulses.	1 byte	Main routine	Input

3. Description of Internal Registers Used

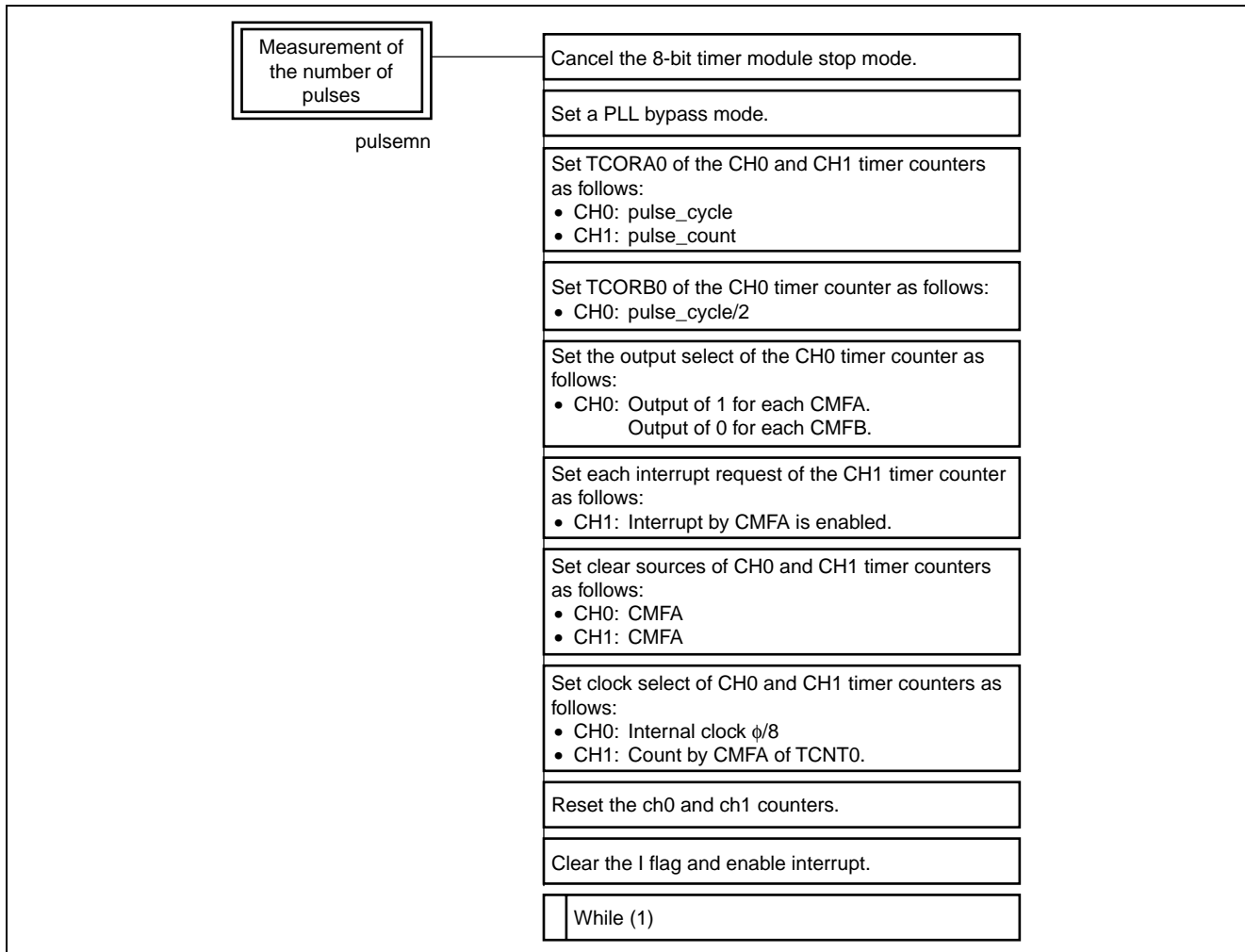
Register Name	Function	Used in
TCORA0	Generates compare match A.	Main routine
TCORB0	Generates compare match B.	Main routine
TCSR0	Outputs 1 for each compare match A and outputs 0 for each compare match B.	Main routine
TCR0	Clears the counter at compare match A. Selects the input clock ($\phi/8$).	Main routine
TCR1	Counts generation of the compare match A of channel 0. Clears the counter at compare match A. Enables a compare match (A) interrupt.	Main routine
TCORA1	Generates compare match A.	Main routine, measurement end
MSTPCR	Cancel the 8-bit timer module stop mode.	Main routine

4. RAM Usage

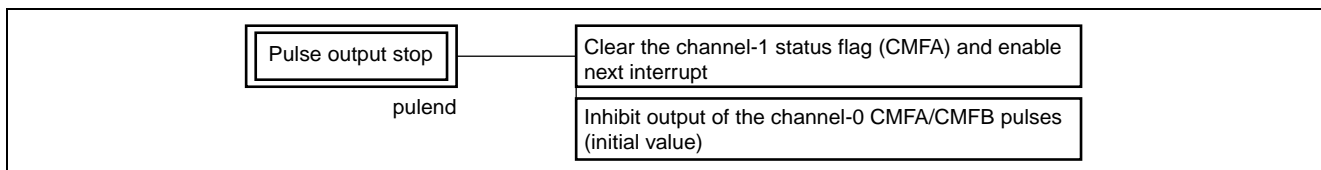
This sample task uses only arguments.

5. PAD

1. Main Routine



2. Pulse Output Stop



Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Mar.16.04	—	First edition issued

Keep safety first in your circuit designs!

1. Renesas Technology Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.
Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corp. product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corp. or a third party.
2. Renesas Technology Corp. assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corp. without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corp. or an authorized Renesas Technology Corp. product distributor for the latest product information before purchasing a product listed herein.
The information described here may contain technical inaccuracies or typographical errors.
Renesas Technology Corp. assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.
Please also pay attention to information published by Renesas Technology Corp. by various means, including the Renesas Technology Corp. Semiconductor home page (<http://www.renesas.com>).
4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corp. assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corp. semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corp. or an authorized Renesas Technology Corp. product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
6. The prior written approval of Renesas Technology Corp. is necessary to reprint or reproduce in whole or in part these materials.
7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
8. Please contact Renesas Technology Corp. for further details on these materials or the products contained therein.