

**NEC**

# **78K0R/Kx3 Microcontroller Sample Program Operation Manual (One-Shot Pulse Output (Timer Array Unit), C Source)**

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Thoroughly evaluate this software on your set prior to use.

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Microcomputer Operations Unit  
NEC Electronics Corporation

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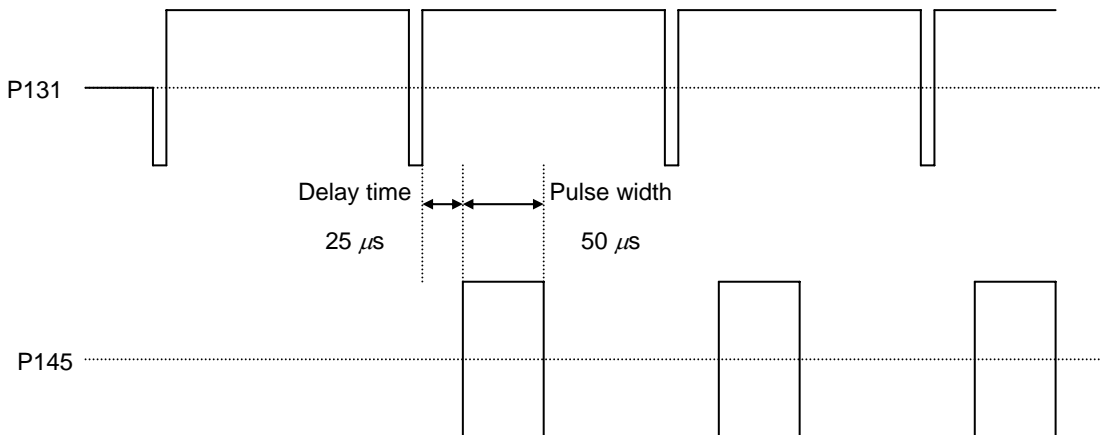
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## 1. OVERVIEW

This manual explains the sample program functions of one-shot pulse output for the 78K0R/Kx3 microcontroller.

In this sample program, timer channel 6 is used as the master and timer channel 7 is used as the slave, and a one-shot pulse is output.

The one-shot pulse is output to output pin TO07 (P145) with an output delay time of  $25\ \mu\text{s}$  and a pulse width of  $50\ \mu\text{s}$ , triggered by detection of the rising edge of input TIO6 (P131).



2. RESOURCES USED

Resource	Description	Remark
Main clock specification	Internal high-speed oscillator used (8 MHz (TYP.))	Supplied to CPU and peripheral hardware
	High-speed system clock used (20 MHz)	Oscillated by initial processing
Subclock	XT1 (32.768 kHz)	Oscillated by initial processing
Related hardware	Peripheral enable register 0 (PER0)	Controls the input clock of the timer array unit.
	Timer clock select register 0 (TPS0)	Operation clock: CK01 (1/2), 4 MHz (0.25 $\mu$ s)
	Timer mode register 06 (TMR06)	Operation clock: CK01, 8 MHz Master channel
	Timer mode register 07 (TMR07)	Operation clock: CK01, 8 MHz Slave channel
	Timer data register 06 (TDR06)	Output delay time: 25 $\mu$ s
	Timer data register 07 (TDR07)	Pulse width: 50 $\mu$ s
	Timer output mode register 0 (TOM0)	Channel 6: Toggle mode Channel 7: Combination operation mode with channel 6
	Timer output level register 0 (TOL0)	Slave channel: Positive logic output Master channel: Toggle mode
	Timer output register 0 (TO0)	Channels 6 and 7 timer output value is "0".
	Timer output enable register 0 (TOE0)	Enables TO07 output operation by counting operation.
	Timer channel start register 0 (TS00)	
	Timer channel stop register 0 (TT0)	
	Port mode register (P13)	
	Port register (P13)	
	Port mode register (P14)	
Port register (P14)		
I/O	Input: TIO6 (P131) Output: TO07 (P145)	
Interrupt	Timer channels 6, 7	
Others	Not used	

### 3. SOFTWARE CONFIGURATION

#### Files

File Name	Processing Outline
K0R_def.h	Definition file
K0R_init.c	Initialization processing
K0R_ext.h	External declaration
K0R_main.c	Main processing
K0R_sfr_set.c	One-shot pulse output

## 4. FUNCTION EXPLANATIONS

[File name]

K0R\_main.c

Function

Function Name	Processing Outline	Argument	Return Value
main	One-shot pulse output main processing	None	None

Function explanations

Function name	main
Processing	One-shot pulse output main processing
Argument	–
Return value	–
Description	Executes initialization processing and then starts one-shot pulse output main processing.
Remark	–

[File name]

K0R\_sfr\_set.c

Functions

Function Name	Processing Outline	Argument	Return Value
STM_OINI	Initializes one-shot pulse output.	None	None
STM_OSTT	Starts one-shot pulse output operation.	None	None
STM_OSTP	Stops one-shot pulse output operation.	None	None

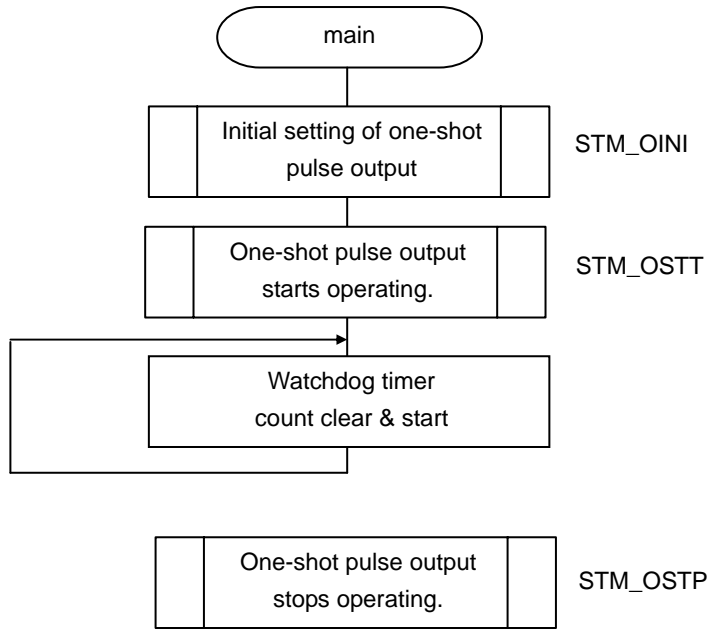
Function explanations

Function name	STM_OINI
Processing	Initializes one-shot pulse output.
Argument	–
Return value	–
Description	<p>Sets P131 to the input mode.</p> <p>Sets P145 to the output mode.</p> <p>Initializes the timer array unit.</p> <ul style="list-style-type: none"> <li>• Supplies a timer array unit input clock.</li> <li>• Sets the clock frequency to 0.25 <math>\mu\text{s}</math>.</li> </ul> <p>Initializes timer channel 6 (master).</p> <ul style="list-style-type: none"> <li>• Operation mode: Operation clock CK01, master channel, selection of the valid edge of the start trigger TI06 pin input, rising edge detection, one-count mode</li> <li>• Output mode: Toggle operation mode</li> <li>• Sets the output delay time to 25 <math>\mu\text{s}</math> (<math>100 \times 0.25 \mu\text{s}</math>).</li> </ul> <p>Initializes timer channel 7 (slave).</p> <ul style="list-style-type: none"> <li>• Operation mode: Operation clock CK01, slave channel, selection of INTTM07 of the start trigger master channel, one-count mode</li> <li>• Output mode: Combination operation mode</li> <li>• Sets the pulse width to 50 <math>\mu\text{s}</math> (<math>200 \times 0.25 \mu\text{s}</math>).</li> <li>• Enables output.</li> </ul> <p>Sets P145 to the output mode.</p>
Remark	–

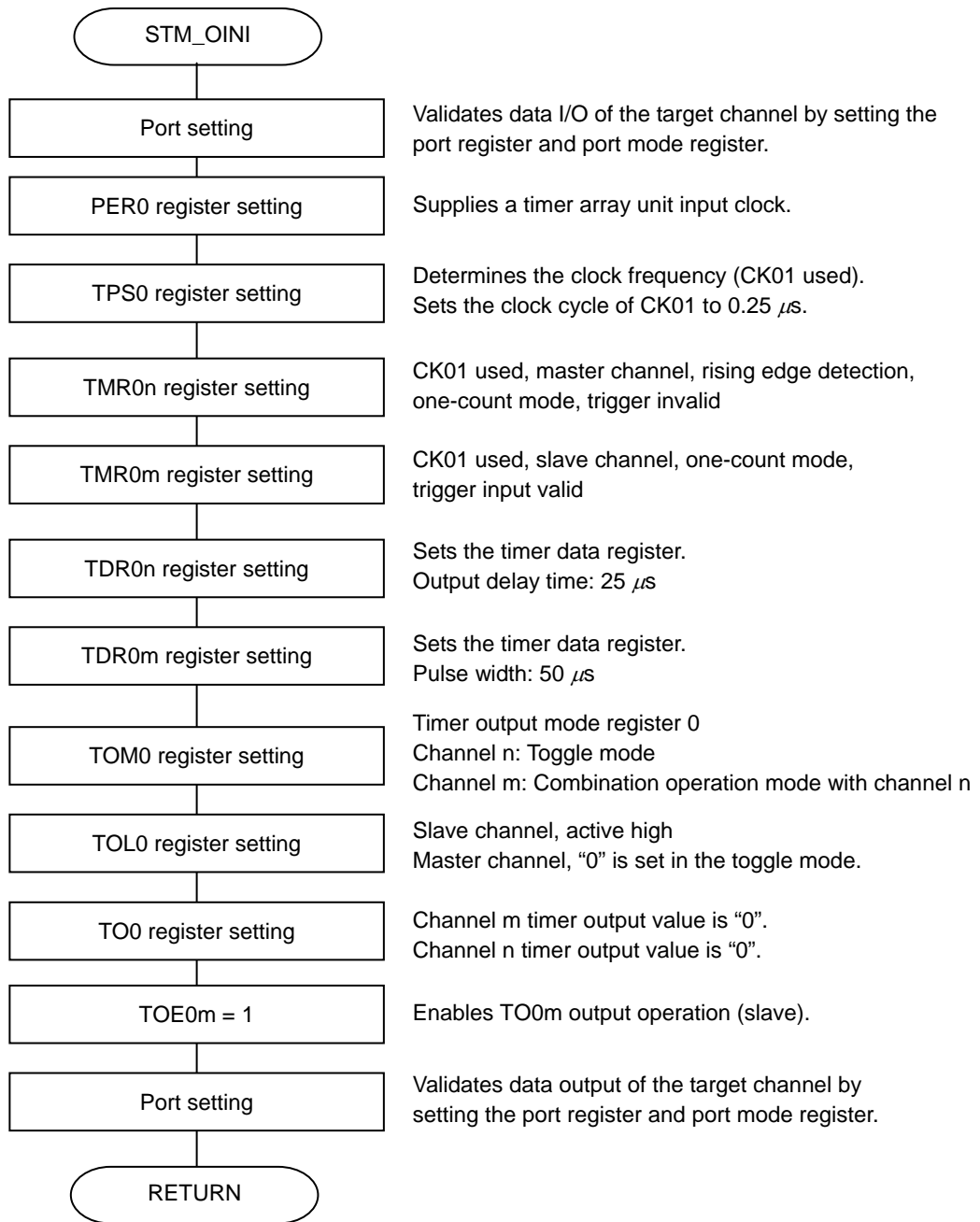
Function name	STM_OSTT
Processing	Starts one-shot pulse output operation.
Argument	–
Return value	–
Description	<p>Enables the output operation of timer channel 7 (slave).</p> <p>Starts operation of timer channels 6 and 7.</p>
Remark	–

Function name	STM_OSTP
Processing	Stops one-shot pulse output operation.
Argument	–
Return value	–
Description	<p>Stops operation of timer channels 6 and 7.</p> <p>Disables the output operation of timer channel 7 (slave).</p>
Remark	–

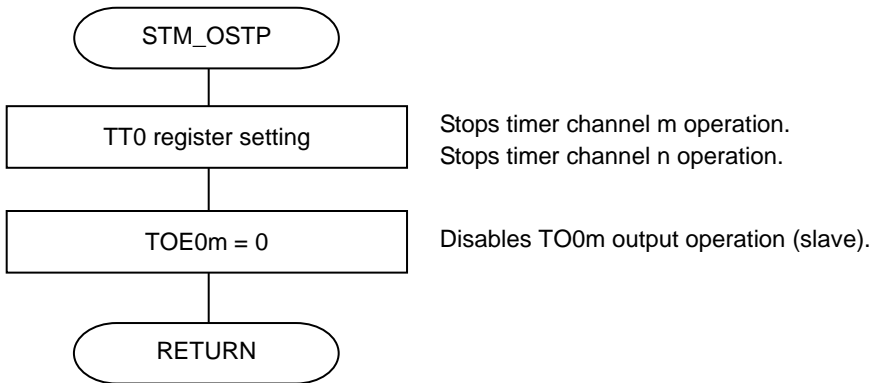
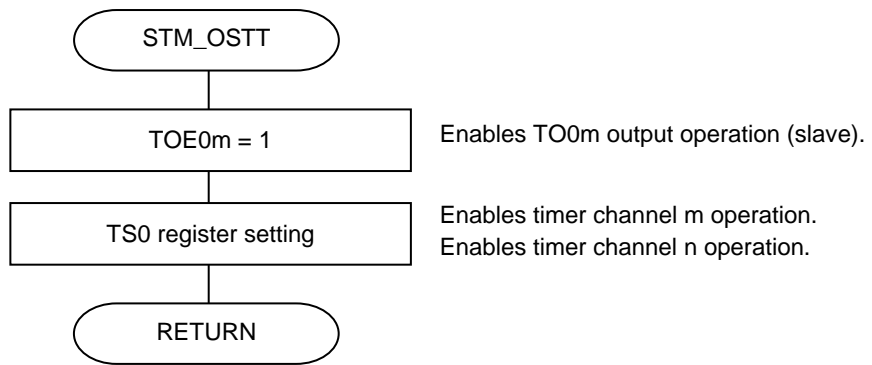
5. FLOWCHARTS



**Remark** n = 0, 2, 4, 6 can be set.  
 m = n + 1  
 n = 6, m = 7 for this sample program.



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