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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# **78K0R/Kx3 Microcontroller Sample Program Operation Manual (Watch Counter/Alarm Interrupt (Real-Time Counter), C Source)**

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This software is for reference only and NEC Electronics does not guarantee its operation.  
Thoroughly evaluate this software on your set prior to use.

ZUD-CC-07-0221-E  
January, 2008

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## **1. OVERVIEW**

This manual explains the sample program functions of real-time counter processing for the 78K0R/Kx3.

In this sample program, years, months, weeks, days, hours, minutes, and seconds are counted by using the watch counter, and an interrupt is generated at a specified time as an alarm function.

The operation conditions are as follows.

- 24-hour system
- RTCCL pin output (32 kHz) is disabled.
- RCLOE1 pin output (1 Hz) is disabled.
- Counts once every second (simultaneously with second count-up).
- Time is initialized to 2007/01/01/00:00:00.
- Time is rewritten to 2007/4/10 15:59:30.
- Alarm is set at 16:00 every day.
- Time is read when the alarm is detected.

## 2. RESOURCES USED

Resource	Description	Remark
Main clock specification	Internal high-speed oscillator used (8 MHz (TYP.))	Always oscillated
	High-speed system clock used (20 MHz)	Oscillated by initial processing. Supplied to CPU and peripheral hardware
Subclock	XT1 (32.768 kHz)	Oscillated by initial processing
Related hardware	Clock output select register 0 (CKS0)	
	Real-time counter control register 0 (RTCC0)	Generates an interrupt once every second. 24-hour system
	Second count register (SEC)	
	Minute count register (MIN)	
	Hour count register (HOUR)	
	Day count register (DAY)	
	Week count register (WEEK)	
	Month count register (MONTH)	
	Year count register (YEAR)	
	Alarm minute register (ALARMWM)	
	Alarm hour register (ALARMWH)	
	Alarm week register (ALARMWW)	
I/O	Not used	
Interrupt	Real-time counter constant-period signal/alarm match detection interrupt (INTRTC)	
Others	Not used	

### 3. SOFTWARE CONFIGURATION

#### Files

File Name	Processing Outline	Remark
K0R_def.h <sup>Note</sup>	Definition file	
K0R_init.c <sup>Note</sup>	Initialization processing	
K0R_ext.h	External declaration	
K0R_main.c	Main processing	
K0R_sfr_set.c	Real-time counter processing	

**Note** These files are commonly used by the sample programs.

## 4. FUNCTION EXPLANATIONS

[File name]

K0R\_main.c

Function

Function Name	Processing Outline	Argument	Return Value
main	Main routine	None	None

Function explanations

Function name	main
Processing	Main routine
Argument	–
Return value	–
Description	Executes initialization processing, and then starts and writes the real-time counter operation, and sets the alarm.
Remark	–

[File name]

K0R\_sfr\_set.c

Functions

Function Name	Processing Outline	Argument	Return Value
SRT_STRT	Starts real-time counter operation.	None	None
SRT_WRIT	Writes the real-time counter.	None	None
SRT_READ	Reads the real-time counter.	None	None
SRT_ARMS	Sets the alarm of the real-time counter.	None	None
SRT_INTB	Judges if alarm interrupt or constant-period interrupt of the real-time counter.	None	None

## Function explanations

Function name	SRT_STRT
Processing	Starts real-time counter operation.
Argument	–
Return value	–
Description	Starts the real-time counter operation.
Remark	–

Function name	SRT_WRIT
Processing	Writes the real-time counter.
Argument	–
Return value	–
Description	Writes the real-time counter.
Remark	–

Function name	SRT_READ
Processing	Reads the real-time counter.
Argument	–
Return value	–
Description	Reads the real-time counter.
Remark	In this sample program, this function is called when an alarm is detected.

Function name	SRT_ARMS
Processing	Sets the alarm of the real-time counter.
Argument	–
Return value	–
Description	Sets the alarm of the real-time counter.
Remark	–

Function name	SRT_INTB
Processing	Judges if alarm interrupt or constant-period interrupt of the real-time counter.
Argument	–
Return value	–
Description	Judges if alarm interrupt or constant-period interrupt of the real-time counter.
Remark	–

5. FLOWCHARTS







