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April 1st, 2010
Renesas Electronics Corporation

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78K0R/Kx3 Microcontroller
Sample Program
Operation Manual
(Clock Setting (Clock Generator),
C Source)

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

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1st Product Solution Group, Multipurpose Microcomputer Systems Division,
Microcomputer Operations Unit
NEC Electronics Corporation

CONTENTS

1. OVERVIEW

This manual explains sample program functions of the clock generator for the 78K0R/Kx3.

In this sample program, the clock of the clock generator is switched.

An internal high-speed oscillation clock (8 MHz), X1 clock (20 MHz), or XT1 clock (32.768 kHz) is used as the clock.

A clock output/buzzer output controller is used to check the operation of the clock output.

The clock output is not described in detail in this manual. Please refer to the user's manual of 78K0R/Kx3 device.

The operations of this software are as follows.

(1) Main system clock switching

(Internal high-speed oscillation clock → X1 clock)

(2) Main system clock switching

(X1 clock → Internal high-speed oscillation clock)

(3) CPU clock switching

(Internal high-speed oscillation clock → XT1 clock)

(4) CPU clock switching

(XT1 clock → Internal high-speed oscillation clock)

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
XT1 clock	XT1 (32.768 kHz)	Oscillated by initial processing
Related hardware	Clock operation mode control register (CMC)	
	Clock operation status control register (CSC)	
	Oscillation stabilization time counter status register (OSTC)	
	Oscillation stabilization time select register (OSTS)	
	System clock control register (CKC)	
	Peripheral enable registers 0 and 1 (PER0 and PER1)	
	Operation speed mode control register (OSMC)	
	Internal high-speed oscillator trimming register (HIOTRM)	
	Port mode register 14 (PM14)	
	Port register 14 (P14)	
I/O	Clock output: PCLBUZ0 (P140)	
Interrupt	Not used	
Others	Refer to clock output/buzzer output controller	

3. SOFTWARE CONFIGURATION

Files

File Name	Processing Outline	Remark
K0R_def.h[Note]	Definition file	
K0R_init.c	Initialization processing	
K0R_ext.h	External declaration	
K0R_main.c	Main processing	
K0R_sfr_set.c	Clock generator	
K0R_clk_out.c	Clock output/buzzer output controller processing	Please refer to the user's manual of 78K0R/Kx3 device.

Note This file is 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	Performs processing to switch the clock.
Remark	–

[File name]

K0R_sfr_set.c

Functions

Function Name	Processing Outline	Argument	Return Value
SCK_MITX	Switches the main system clock (internal high-speed oscillation clock → X1 clock)	None	None
SCK_MXTI	Switches the main system clock (X1 clock → internal high-speed oscillation clock)	None	None
SCK_CITS	Internal high-speed oscillation CPU clock → XT1 clock	None	None
SCK_CSTI	XT1 clock → internal high-speed oscillation CPU clock	None	None

Function explanations

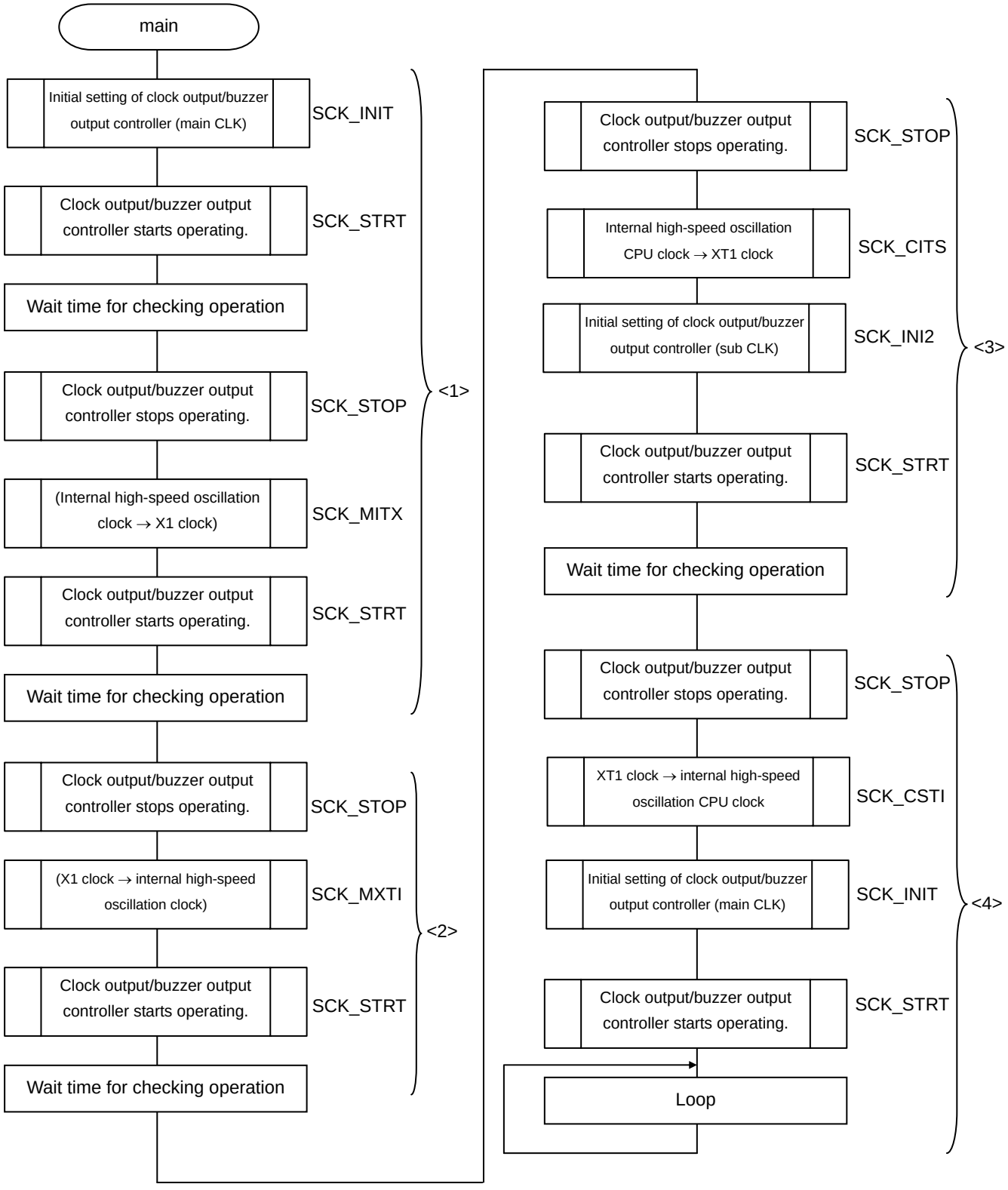
Function name	SCK_MITX
Processing	Switches the clock.
Argument	–
Return value	–
Description	(Internal high-speed oscillation clock → X1 clock)
Remark	–

Function name	SCK_MXTI
Processing	Switches the clock.
Argument	–
Return value	–
Description	(X1 clock → internal high-speed oscillation clock)
Remark	–

Function name	SCK_CITS
Processing	Switches the clock.
Argument	–
Return value	–
Description	Internal high-speed oscillation CPU clock → XT1 clock
Remark	–

Function name	SCK_CSTI
Processing	Switches the clock.
Argument	–
Return value	–
Description	XT1 clock → internal high-speed oscillation CPU clock
Remark	–

5. FLOWCHARTS

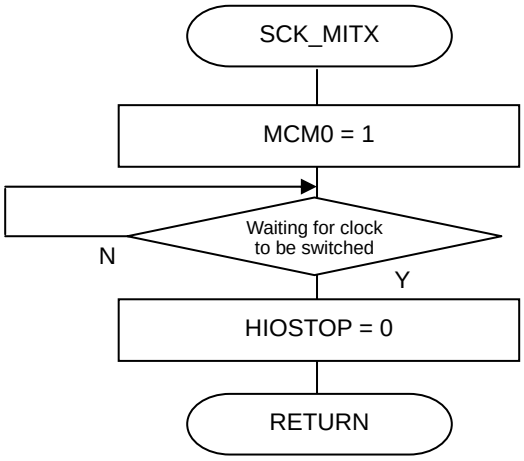


<1> Internal high-speed oscillation clock → X1 clock

<2> X1 clock → internal high-speed oscillation clock

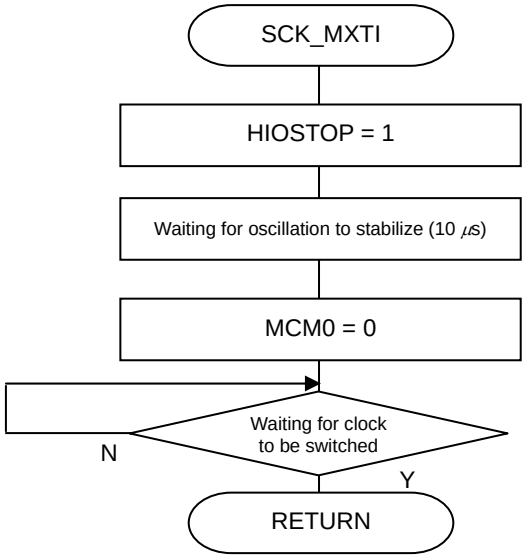
<3> Internal high-speed oscillation clock → XT1 clock

<4> XT1 clock → internal high-speed oscillation clock



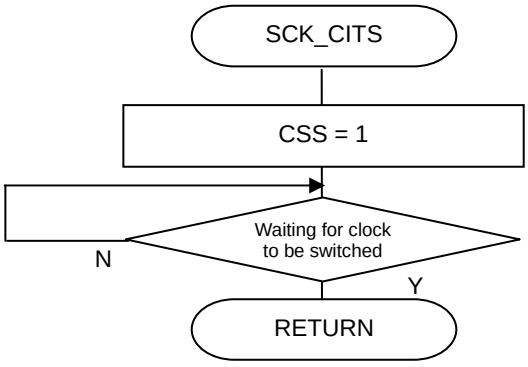
Selection of CPU/peripheral hardware clock (f_{CLK}) (CKC.4)
Internal high-speed oscillation clock (f_{IH}) → high-speed system clock (f_{MX})

Internal high-speed oscillator stops.

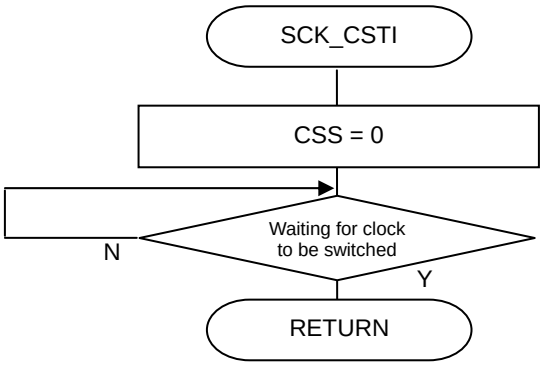


Internal high-speed oscillator operates.

Selection of CPU/peripheral hardware clock (f_{CLK}) (CKC.4)



Selection of CPU/peripheral hardware clock (f_{CLK}) (CKC.6)



Selection of CPU/peripheral hardware clock (f_{CLK}) (CKC.6)