

To our customers,

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Renesas Electronics Corporation

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# **78K0R/Kx3 Microcontroller**

## **Sample Program**

### **Operation Manual**

#### **(Simplified I<sup>2</sup>C Data Transmission (Serial Array Unit), ASM 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.

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Microcomputer Operations Unit  
NEC Electronics Corporation

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## **1. OVERVIEW**

This manual explains the sample program functions of simplified I<sup>2</sup>C (transmission (address field transmission/data transmission)) for the 78K0R/Kx3.

In this sample program, a simplified I<sup>2</sup>C (transmission (address field transmission/data transmission)) operation is performed.

The communication conditions are as follows.

- f<sub>CLK</sub> = 20 MHz
- IIC10 (unit 0, channel 2) is used.
- Transfer rate: 100 kHz
- 8-bit data
- Stop bit: 1 (for ACK reception timing)
- MSB first
- Number of transmit data: 10
- WRITE mode
- Address field value: A0H
- IIC10 transfer end interrupt servicing is used.

## 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	Peripheral enable register 0 (PER0)	
	Serial clock select register 0 (SPS0)	Clock used: CK00 ( $1/2^2$ of main clock), 5 MHz (0.2 $\mu$ s)
	Serial mode register 02 (SMR02)	
	Serial communication operation setting register 02 (SCR02)	Transmission only, data length: 8 bits
	Serial data register 02 (SDR02)	Transfer rate: 100 kHz
	Serial channel start register 0 (SS0)	
	Serial channel stop register 0 (ST0)	
	Serial output register 0 (SO0)	
	Serial output enable register 0 (SOE0)	
	Port output mode register 0 (POM0)	
	Port mode register 0 (PM0)	
	Port register 0 (P0)	
	SIO10 register (SIO10)	
I/O	Data I/O: SDA10 (P03)	
	Clock output: SCL10 (P04)	
Interrupt	INTIIC10 transfer end interrupt	
Others	Not used	

### 3. SOFTWARE CONFIGURATION

Files

File Name	Processing Outline	Remark
K0R_vct.asm	Vector processing	
K0R_init.asm <sup>Note</sup>	Initialization processing	
K0R_main.asm	Main processing	
K0R_sfr_set.asm	Simplified I <sup>2</sup> C processing (transmission)	

**Note** This file is commonly used by the sample programs.



#### 4. FUNCTION EXPLANATIONS

[File name]

K0R\_main.asm

Function

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

Function explanations

Function name	MMA_STRT
Processing	Main routine
Argument	—
Return value	—
Description	Executes initialization processing and then performs address field transmission and starts data transmission operation.
Remark	—

[File name]

K0R\_sfr\_set.asm

Functions

Function Name	Processing Outline	Argument	Return Value
SER_SICIN	Initializes simplified I <sup>2</sup> C processing (transmission).	None	None
SER_SICAD	Simplified I <sup>2</sup> C processing (transmission) address transmission	None	None
SER_SICDT	Simplified I <sup>2</sup> C processing (transmission) data transmission	None	None
SER_SICSP	Simplified I <sup>2</sup> C processing (transmission) stop condition	None	None
SER_SICIT	Simplified I <sup>2</sup> C processing (transmission) data transmission processing	None	None

## Function explanations

Function name	SER_SICIN
Processing	Initializes simplified I <sup>2</sup> C processing (transmission).
Argument	–
Return value	–
Description	Executes initialization.
Remark	–

Function name	SER_SICAD
Processing	Simplified I <sup>2</sup> C processing (transmission) address transmission
Argument	–
Return value	–
Description	Starts address field transmission.
Remark	–

Function name	SER_SICDT
Processing	Simplified I <sup>2</sup> C processing (transmission) data transmission
Argument	–
Return value	–
Description	Starts data transmission.
Remark	–

Function name	SER_SICSP
Processing	Simplified I <sup>2</sup> C processing (transmission) stop condition
Argument	–
Return value	–
Description	Generates a stop condition.
Remark	–

Function name	SER_SICIT
Processing	Simplified I <sup>2</sup> C processing (transmission) data transmission processing
Argument	–
Return value	–
Description	<p>INTIIC10 transfer end interrupt servicing</p> <p>An interrupt is generated when transmission has been completed.</p> <p>When this interrupt is generated, the next 1-byte data is transmitted.</p> <p>The transmission interrupt ends when processing of the transmit data has been completed.</p>
Remark	–

## 5. FLOWCHARTS







