

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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# **78K0R/Kx3 Microcontroller**

## **Sample Program**

## **Operation Manual**

**(3-Wire Serial I/O (Master Transmission/Reception, Single  
Transmission/Reception Mode) (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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January, 2008

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

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## 1. OVERVIEW

This manual explains the sample program functions of 3-wire serial I/O processing (master transmission/reception (single transmission/reception mode)).

In this sample program, master transmission/reception (single transmission/reception mode) operation in 3-wire serial I/O communication is performed.

The communication conditions are as follows.

- $f_{CLK} = 8 \text{ MHz}$
- CSI00 (unit 0, channel 0) is used.
- 9,600 bps, 8-bit data
- LSB first
- Number of transmit data: 10
- Transmit data: 3A
- INTCSI00 transfer end interrupt servicing is used.

## 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)	
	Serial clock select register 0 (SPS0)	Clock used: CKm0 ( $1/2^4$ of main clock), 0.5 MHz (2 $\mu$ s)
	Serial mode register 00 (SMR00)	
	Serial communication operation setting register 00 (SCR00)	Executes transmission/reception. Data length: 8 bits
	Serial data register 00 (SDR00)	Transfer rate: 9,600 bps
	Serial flag clear trigger register 00 (SIR00)	Used to clear an error flag.
	Serial channel start register 0 (SS0)	
	Serial channel stop register 0 (ST0)	
	Serial output register 0 (SO0)	
	Serial output enable register 0 (SOE0)	
	Port mode register 1 (PM1)	
	Port register 1 (P1)	
	SIO00 register (SIO20)	
I/O	Input: P11 (data input) Output: P10 (clock output), P12 (data output)	
Interrupt	Not used	
Others	Not used	

### 3. SOFTWARE CONFIGURATION

#### Files

File Name	Processing Outline
K0R_vct.asm	Vector processing
K0R_init.asm	Initialization processing
K0R_main.asm	Main processing
K0R_sfr_set.asm	3-wire serial I/O processing Master transmission/reception (single transmission/reception mode)

#### 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 starts transmission/reception operation. Aborts the operation after reception completion and resumes the operation after a specific time has elapsed.
Remark	—

[File name]

K0R\_sfr\_set.asm

Functions

Function Name	Processing Outline	Argument	Return Value
SER_MTRIN	Initializes 3-wire serial I/O.	None	None
SER_MTRST	Starts 3-wire serial I/O operation.	None	None
SER_MTRBK	Aborts 3-wire serial I/O operation.	None	None
SER_MTRRE	Resumes 3-wire serial I/O operation.	None	None
SER_MTRSP	Stops 3-wire serial I/O operation.	None	None
SER_MTRIT	3-wire serial I/O transmission/reception	None	None

## Function explanations

Function name	SER_MTRIN
Processing	Initializes 3-wire serial I/O.
Argument	–
Return value	–
Description	Executes initialization.
Remark	–

Function name	SER_MTRST
Processing	Starts 3-wire serial I/O operation.
Argument	–
Return value	–
Description	Starts transmission/reception operation.
Remark	–

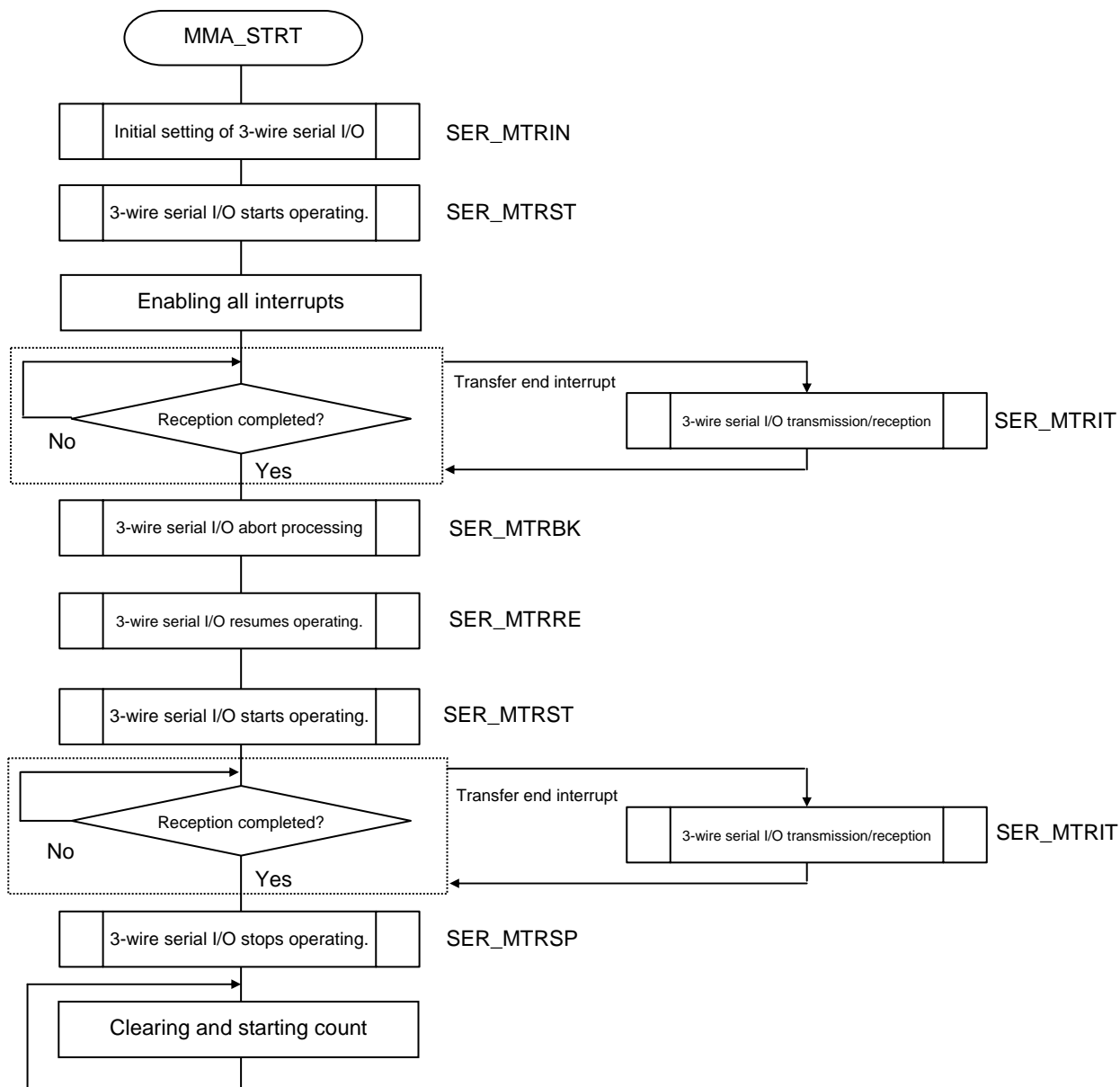
Function name	SER_MTRBK
Processing	Aborts 3-wire serial I/O operation.
Argument	–
Return value	–
Description	Transits to a communication operation stop state.
Remark	–

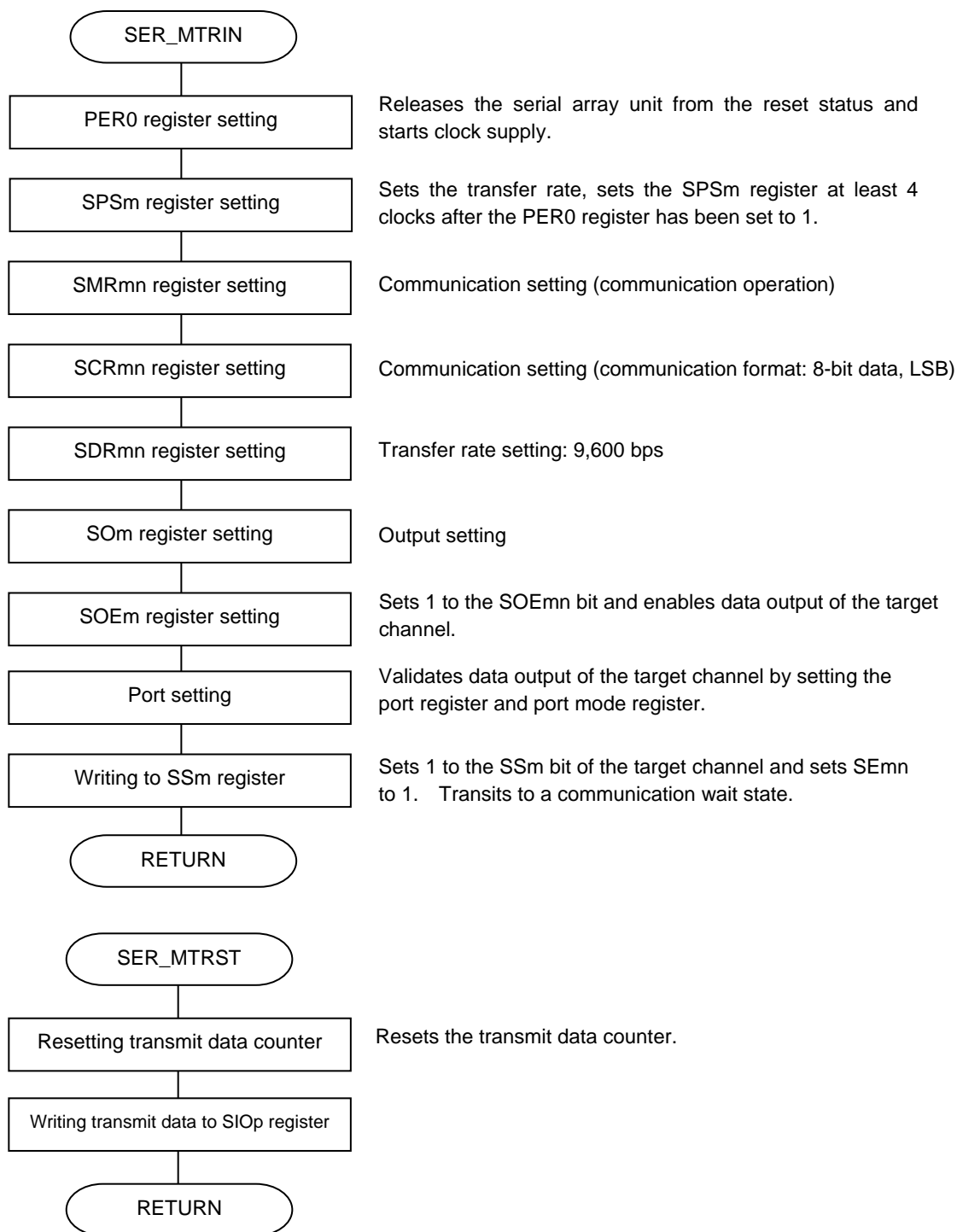
Function name	SER_MTRRE
Processing	Resumes 3-wire serial I/O operation.
Argument	–
Return value	–
Description	Resumes transmission/reception operation.
Remark	–

Function name	SER_MTRSP
Processing	Stops 3-wire serial I/O operation.
Argument	–
Return value	–
Description	Stops clock supply.
Remark	–

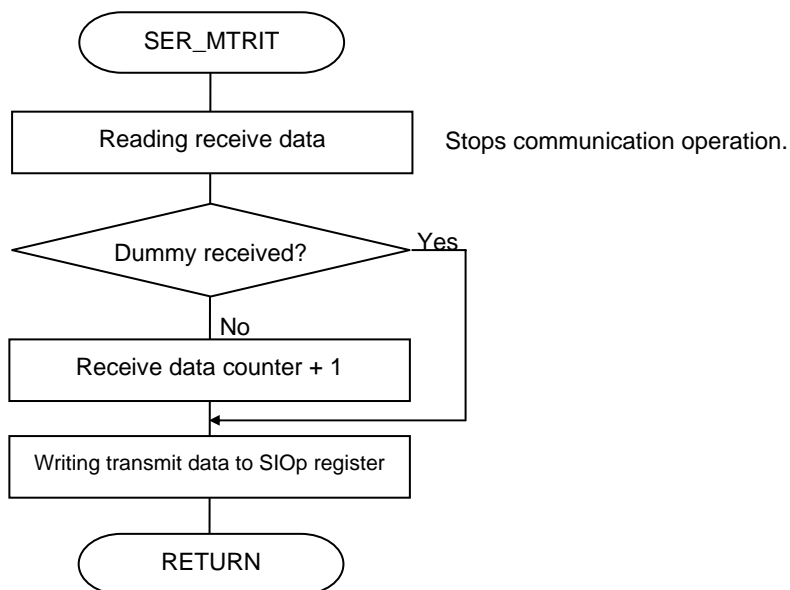
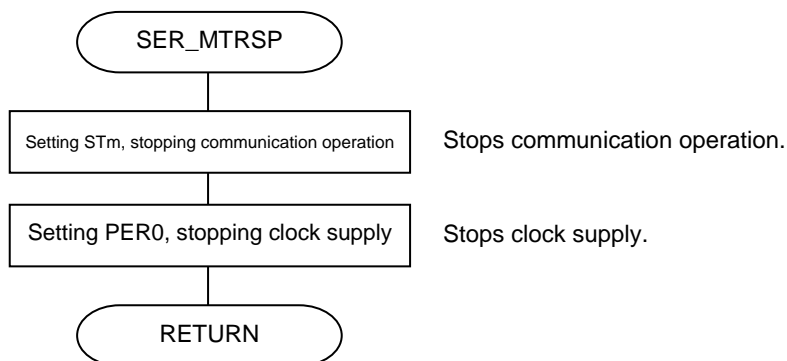
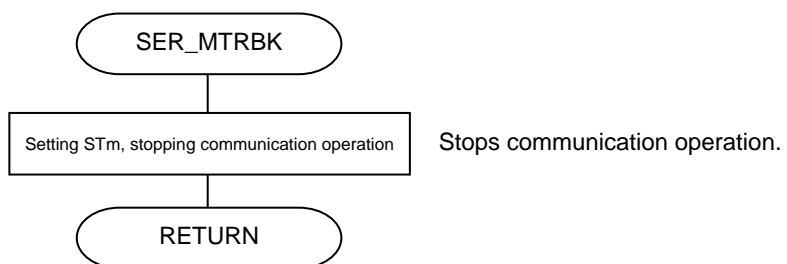
Function name	SER_MTRIT
Processing	3-wire serial I/O transmission/reception
Argument	–
Return value	–
Description	INTCSI00 transfer end interrupt servicing  An interrupt is generated when transfer has been completed.  When this interrupt is generated, the receive data is read and transmit data is set.
Remark	–

## 5. FLOWCHARTS

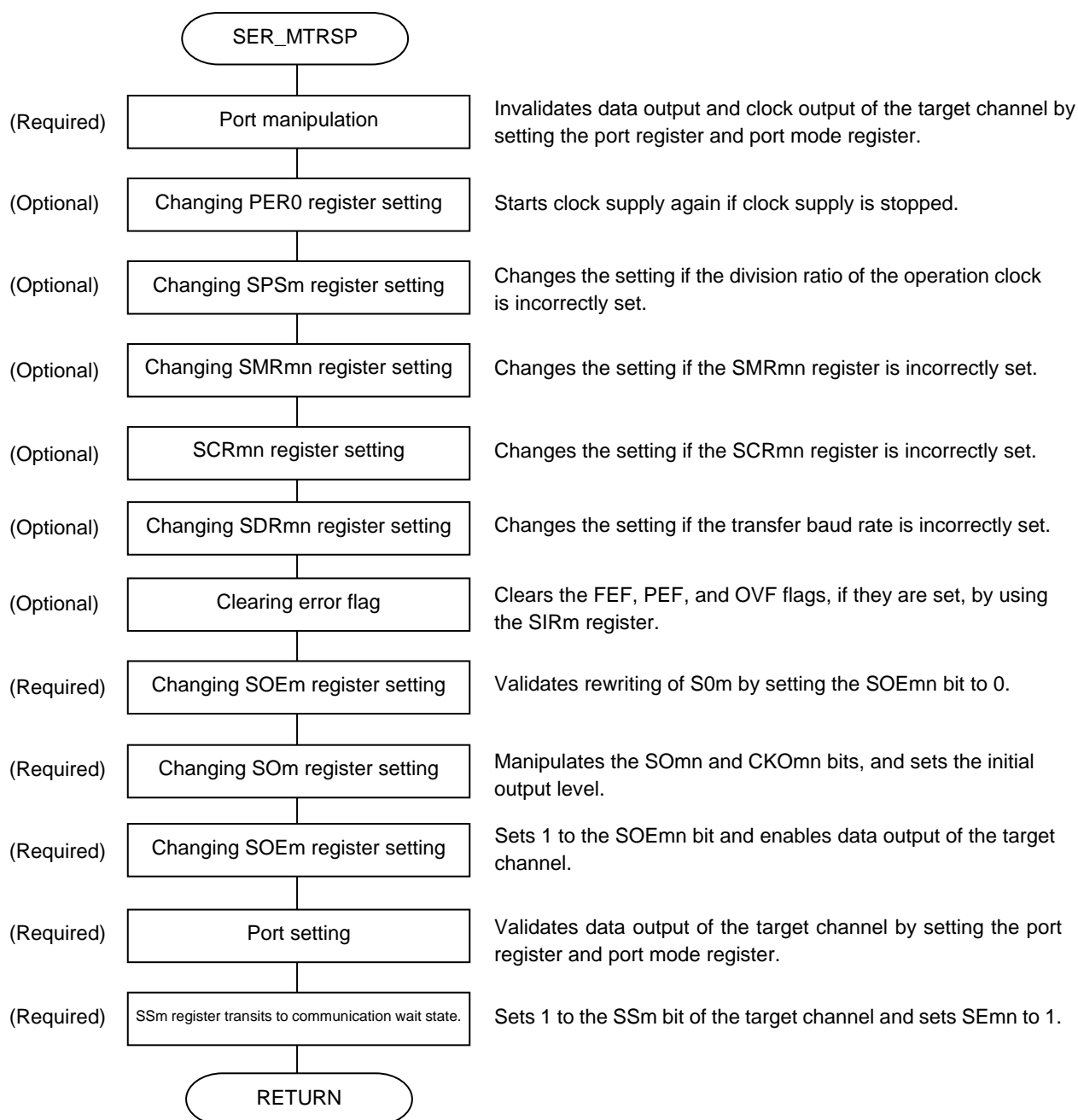




**Remark** m: Unit number (m = 0, 1), n: Channel number (n = 0 to 3), p: CSI number (p = 00, 01, 10, 20)  
m = 0, n = 0, p = 00 for this sample program.



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