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Renesas Electronics Corporation

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78K0R/Kx3 Microcontroller

Sample Program

Operation Manual

**(3-Wire Serial I/O Processing (Master Transmission/Reception,
Continuous Transmission/Reception Mode) (Serial Array Unit), 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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Microcomputer Operations Unit
NEC Electronics Corporation

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 - "Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots.
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1. OVERVIEW

This manual explains the sample program functions of 3-wire serial I/O processing (master transmission/reception (continuous transmission/reception mode)) for the 78K0R/Kx3.

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

The communication conditions are as follows.

- $f_{CLK} = 20 \text{ MHz}$
- CSI00 (unit 0, channel 0) is used.
- 9,600 bps, 8-bit data
- Data phase: Normal
- Clock phase: Normal
- LSB first
- Transmit data: 3AH (10 bytes)
- Receive data: 10 bytes
- INTCSI00 buffer empty 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 ($1/2^4$ of main clock), 1.25 MHz (0.8 μ s)
	Serial mode register 00 (SMR00)	
	Serial communication operation setting register 00 (SCR00)	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 (SIO00)	Used to write transmit data.
I/O	Data input: SI00 (P11) Data output: SO00 (P12) Clock output: SCK00 (P10)	
Interrupt	Transfer end interrupt (INTCSI00) of CSI00	
Others	Not used	

3. SOFTWARE CONFIGURATION

Files

File Name	Processing Outline	Remark
K0R_def.h	Definition file	
K0R_init.c ^{Note}	Initialization processing	
K0R_ext.h	External declaration	
K0R_main.c	Main processing	
K0R_sfr_set.c	3-wire serial I/O processing Master transmission/reception (continuous transmission/reception mode)	

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	Executes initialization processing and then starts transmission/reception operation. Aborts the operation after reception completion and then resumes the operation.
Remark	—

[File name]

K0R_sfr_set.c

Functions

Function Name	Processing Outline	Argument	Return Value
SER_MTRCIN	Initializes 3-wire serial I/O.	None	None
SER_MTRCST	Starts 3-wire serial I/O operation.	None	None
SER_MTRCBK	Aborts 3-wire serial I/O operation.	None	None
SER_MTRCRE	Resumes 3-wire serial I/O operation.	None	None
SER_MTRCSP	Stops 3-wire serial I/O operation.	None	None
SER_MTRCIT	INTCSI00 buffer empty interrupt/transfer end interrupt servicing	None	None

Function explanations

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

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

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

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

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

Function name	SER_MTRCIT
Processing	3-wire serial I/O transmission/reception
Argument	–
Return value	–
Description	<p>INTCSI00 buffer empty interrupt/transfer end interrupt servicing</p> <p>An interrupt is generated when a buffer empty interrupt is generated.</p> <p>When this interrupt is generated, the receive data is read and transmit data is set.</p> <p>When reception is completed, transfer is completed and processing is terminated.</p>
Remark	–

5. FLOWCHARTS









