

Function Block



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Reference	MRTU_NJ_Master
Revision	1.2
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+ Support	http://support-omron.fr/

Modbus RTU Master for serial port of SCU unit 42 dedicated to NJ

Function	Modbus RTU master for SCU unit on NJ controller																					
Symbol																						
File	MRTU_NJ_Master.slr																					
Device	Serial port of CJ1W-SCU42																					
Condition of use	The MRTU_NJ_Master function block is offered 'as is' and may serve as a basis for development. Users should previously test its adequacy to the final application. Omron could not be held responsible in case of malfunction.																					
Principle	<p>The SCU serial port should be set to 'Serial Gateway' mode and 8 data bits.</p> <p>List of implemented function code:</p> <table border="1"> <thead> <tr> <th>Code</th> <th>Modbus Function</th> <th>Function Block</th> </tr> </thead> <tbody> <tr> <td>0x01</td> <td>Read Coils</td> <td>MRTU_NJ_Fn01</td> </tr> <tr> <td>0x02</td> <td>Read Discrete Inputs</td> <td>MRTU_NJ_Fn02</td> </tr> <tr> <td>0x03</td> <td>Read Holding Registers</td> <td>MRTU_NJ_Fn03</td> </tr> <tr> <td>0x05</td> <td>Write Single Coil</td> <td>MRTU_NJ_Fn05</td> </tr> <tr> <td>0x06</td> <td>Write Single Register</td> <td>MRTU_NJ_Fn06</td> </tr> <tr> <td>0x10</td> <td>Write Multiple Registers</td> <td>MRTU_NJ_Fn10</td> </tr> </tbody> </table>	Code	Modbus Function	Function Block	0x01	Read Coils	MRTU_NJ_Fn01	0x02	Read Discrete Inputs	MRTU_NJ_Fn02	0x03	Read Holding Registers	MRTU_NJ_Fn03	0x05	Write Single Coil	MRTU_NJ_Fn05	0x06	Write Single Register	MRTU_NJ_Fn06	0x10	Write Multiple Registers	MRTU_NJ_Fn10
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Remark: Modbus frames could be checked using the utility software [Multiway](#)

1- Input Variables of function block MRTU_NJ_Fn03

Input	type	range	Description
Execute	Bool	OFF, ON	FB Activation
MRTU_Target	Structure MRTU_Slave		All parameters to reach the slave are defined only once with the structure.
Unit_No	UINT	0 to F	Unit number set on front switch of SCU
Port_No	UINT	1 or 2	Serial port 1 or 2 of the SCU unit
Slave_ID	BYTE	0 to 247	Modbus slave number
TimeOut	UINT	x 0.1s	The Serial Gateway Response timeout should always be lower than TimeOut input value.
NetAddress	_sDNET_ADR	NetNo:=0 NodeNo:=0 UnitNo:= SEE →	= 80h + 4 x Unit No + Port No - 1 Ex: SCU 1 Port 2 -> 85h See SendCmd from W502-E1-05
inOption	_sRESPONSE	IsNonResp:=False Timeout := 0 RetryCount:= 0	Response required Timeout delay 0.1s -> 0 = 2s (default) No retry
Reg_Address	WORD	0-FFFF	First register Address
Reg_Qty	WORD	0-00FF	Number of registers to read
Cmd_Read	Bool	OFF, ON	Start to read

2- Input Variables of function block MRTU_NJ_Fn05

Input	type	range	Description
Execute	Bool	OFF, ON	FB Activation
MRTU_Target	MRTU_Slave	structure	Slave destination through SCU (see Fn03)
Coil_Address	WORD	0-FFFF	Coil Address
SetValue	Bool	OFF, ON	Value to write
Cmd_Write	Bool	OFF, ON	Start to write

3- Input Variables of function block MRTU_NJ_Fn06

Input	type	range	Description
Execute	Bool	OFF, ON	FB Activation
MRTU_Target	MRTU_Slave	structure	Slave destination through SCU (see Fn03)
Reg_Address	WORD	0-FFFF	Register Address
Reg_Value	WORD	OFF, ON	Value to write
Cmd_Write	Bool	OFF, ON	Start to write

4- Input Variables of function block MRTU_NJ_Fn10

Input	type	range	Description
Execute	Bool	OFF, ON	FB Activation
MRTU_Target	MRTU_Slave	structure	Slave destination through SCU (see Fn03)
Reg_Address	WORD	0-FFFF	Register Address
Reg_Qty	WORD	0-125	Number of registers to write
Cmd_Write	Bool	OFF, ON	Start to write

Output Variables of function block MRTU_NJ_FN03, FN05, Fn06 and Fn10

Output	type	Range	Description
SCU0_Ready	Bool	OFF, ON	Check if the Serial port of SCU No 0 is set to Serial Gateway Mode.
Err	Bool	OFF, ON	Error flag
ErrID	UINT	0-FFFF	Error code of SCU or Modbus exception (see below)
ResDat	ARRAY WORD	0-FFFF	Fn03 only
Cmd_Ok	BOOL	BOOL	Command executed with success

Error code ErrId

The FB will report error occurring with the SendCmd first and then Modbus Exception error.

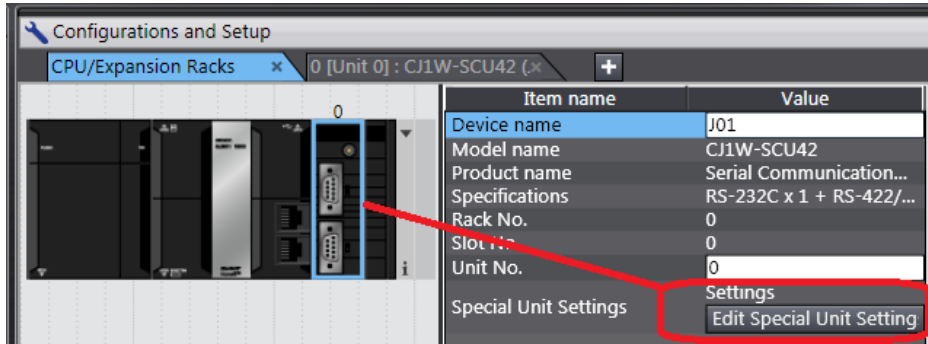
Value	Error	Correction
16#00000101	The local node is not part of the network.	Make the local node part of the network.
16#00000105	The IP address of the local node is out of range.	Set the rotary switches on the Serial Communications Unit correctly.
16#00000106	The IP address of the local node is also used by another node in the network.	Change one of the node addresses that are duplicated.
16#00000202	A Unit with the specified unit address does not exist at the destination.	Correctly set the unit address for the destination network address.
16#00000205	A response timeout occurred.	Check the settings of the communications parameters.
16#00000301	A Communications Controller Error occurred	Refer to the operation manual for the relevant Unit and make suitable corrections.
16#00000304	The unit number setting is not correct.	Set the rotary switches on the Serial Communications Unit correctly.
16#00000401	The command that was sent is not supported.	Set the command string correctly.
16#00000402	The Unit model or version is not supported.	Check the Unit model and version.
16#00001001	The command is too long.	Set the command string correctly.
16#00001002	The command is too short.	Set the command string correctly.
16#00001003	The number of write elements that is specified in the command does not agree with the number of write data.	Specify the same number of write elements and write data.
16#00001004	The command format is incorrect.	Set the command string correctly.
16#0000110B	The response is too long.	Set the number of elements in the command string correctly.
16#0000110C	This is another parameter error.	Set the command string correctly.
16#00002202	The operating mode is wrong.	Check the operating mode.
16#00002502	There is an error in the part of memory for processing.	Transfer the correct data to memory.
16#00002503	The registered I/O Unit configuration does not agree with the physical Unit configuration.	Check the I/O Unit configuration.
16#00002504	There are too many local or remote I/O points.	Set the number of local and remote I/O points correctly.
16#00002505	An error occurred in a data transmission between the CPU Unit and a CPU Bus Unit.	Check the Unit and the Connecting Cable. After removing the error, execute a command to reset the error.
16#00002506	The same rack number, unit number, or I/O address is set more than once.	Correct the settings so that each number is unique.
16#00002507	An error occurred in a data transmission between the CPU Unit and an I/O Unit.	Check the Unit and the Connecting Cable. After removing the error, execute a command to reset the error.
16#00002509	There is an error in SYSMAC BUS/2 data transmission.	Check the Unit and the Connecting Cable. After removing the error, execute a command to reset the error.
16#0000250A	An error occurred in a CPU Bus Unit data transmission.	Check the Unit and the Connecting Cable. After removing the error, execute a command to reset the error.
16#0000250D	The same word setting is used more than once.	Set the I/O words correctly.
16#00002510	The end station setting is wrong.	Set the end station correctly.

Modbus exception response code

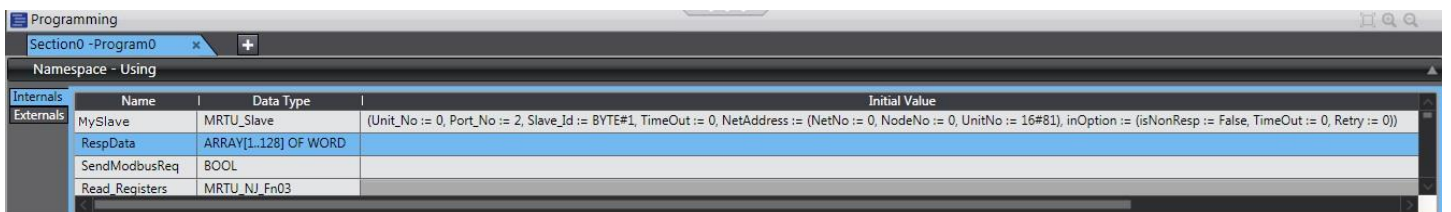
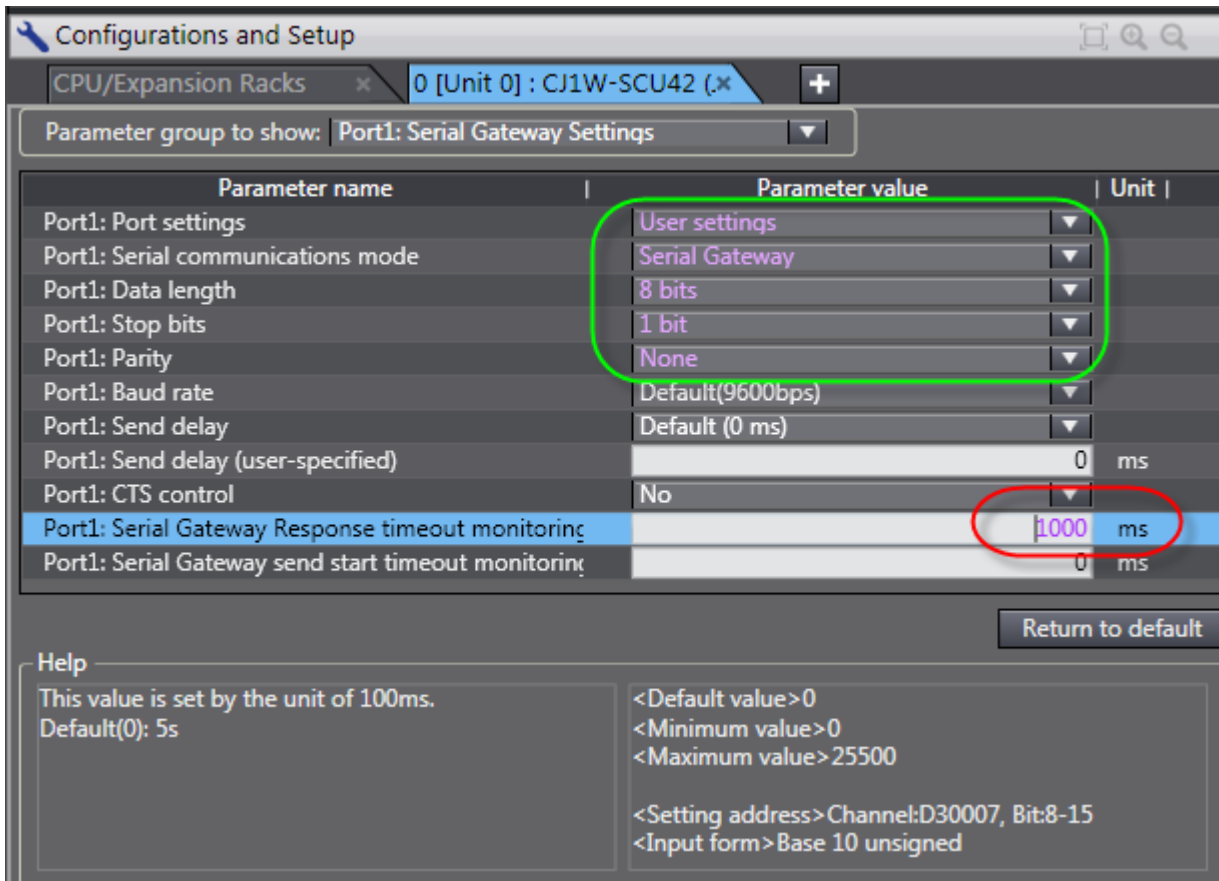
Code	Description
0001	ILLEGAL FUNCTION
0002	ILLEGAL DATA ADDRESS
0003	ILLEGAL DATA VALUE

SCU configuration

SCU unit parameter can be edited using the CPU/Expansion editor and button 'Edit Special Unit Setting'



Set the communication parameters according to the slave(s) and then download to the Controller. Serial Gateway Response Timeout monitoring is set to zero by default which gives 5s. This delay could be reduced to 1s for instance but should always be lower than the MRTU_Target.Timeout input parameter set in the function block MRTU_NJ_Master (default = 2s)



(Unit_No := 0, Port_No := 2, Slave_Id := BYTE#1, TimeOut := 1000, NetAddress := (NetNo := 0, NodeNo := 0, UnitNo := 16#81), inOption := (isNonResp := False, TimeOut := 0, Retry := 0))