

# Function Bloc



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Reference	MRTU_CPU_Master
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+ Support	<a href="http://support-omron.fr/">http://support-omron.fr/</a>

## Function Bloc Modbus RTU Master serial port Hostlink

Function	Modbus RTU master on serial port Hostlink																								
Symbols																									
File	<a href="#">MRTU_CPU_Master.zip</a>																								
PLC	<ul style="list-style-type: none"> <li>- serial port of CJ1/CS1 et CJ2H/M</li> <li>- serial port of CP1L-L14/L20</li> <li>- Right serial port of CP1H-X/XA/Y</li> <li>- Right serial port of CP1L/M20/M40/M60</li> </ul>																								
Condition of use	<p>The Modbus RTU CPU 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.</p>																								
Principe	<p>The serial port should be setup to RS232C mode using 8 data bits Front switch related to serial port should be on « Setup » on User configuration (see <a href="#">FQ switch</a>).</p> <p>List of Read/write command implemented</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 Coil</td> <td>MRTU_CPU_Fn01</td> </tr> <tr> <td>0x02</td> <td>Read Discret Input</td> <td>MRTU_CPU_Fn02</td> </tr> <tr> <td>0x03</td> <td>Read Holding Registers</td> <td>MRTU_CPU_Fn03</td> </tr> <tr> <td>0x05</td> <td>Write Single Coil</td> <td>MRTU_CPU_Fn05</td> </tr> <tr> <td>0x06</td> <td>Write Single Register</td> <td>MRTU_CPU_Fn06</td> </tr> <tr> <td>0x10</td> <td>Write Multiple Registers</td> <td>MRTU_CPU_Fn10</td> </tr> <tr> <td>0x17</td> <td>Read Write Multiple Registers</td> <td>MRTU_CPU_Fn17</td> </tr> </tbody> </table>	Code	Modbus Function	Function block	0x01	Read Coil	MRTU_CPU_Fn01	0x02	Read Discret Input	MRTU_CPU_Fn02	0x03	Read Holding Registers	MRTU_CPU_Fn03	0x05	Write Single Coil	MRTU_CPU_Fn05	0x06	Write Single Register	MRTU_CPU_Fn06	0x10	Write Multiple Registers	MRTU_CPU_Fn10	0x17	Read Write Multiple Registers	MRTU_CPU_Fn17
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0x17	Read Write Multiple Registers	MRTU_CPU_Fn17																							

Note: Modbus frames could be checked using the utility software [Multiway](#)

## 1- Input variables of function block MRTU\_CPU\_Fn01/Fn02

Name	type	range	Description
EN	Bool	OFF, ON	FB Activation
Slave_No	UINT	0-00FF	Slave number
Coil_Address	UINT	0-FFFF	Address of 1rst coil/discret input
Coil_Qty	UINT	0-00FF	Number of coils/discret inputs
RespData_CIO	UINT	0-FFFF	Address of received read data (CIO)
Cmd_Read	Bool	OFF, ON	Execute the read command

## 2- Input variables of function block MRTU\_CPU\_Fn03

Name	type	range	Description
EN	Bool	OFF, ON	FB Activation
Slave_No	UINT	0-00FF	Slave number
Register_Address	UINT	0-FFFF	Address of 1rst register
Register_Qty	UINT	0-00FF	Number of registers
RespData_DM	UINT	0-FFFF	Address of received read data (DM)
Cmd_Read	Bool	OFF, ON	Execute the read command

## 3- Input variables of function block MRTU\_CPU\_Fn05

Name	type	range	Description
EN	Bool	OFF, ON	FB Activation
Slave_No	UINT	0-00FF	Slave number
Coil_Address	UINT	0-FFFF	Coil Address
Value	Bool	OFF, ON	Value to write
Cmd_Write	Bool	OFF, ON	Execute the write command

## 4- Input variables of function block MRTU\_CPU\_Fn06

Name	type	range	Description
EN	Bool	OFF, ON	FB Activation
Slave_No	UINT	0-00FF	Slave number
Register_Address	UINT	0-FFFF	Address of the register
Value	UINT	0-FFFF	Value to write
Cmd_Write	Bool	OFF, ON	Execute the write command

## 5- Input variables of function block MRTU\_CPU\_Fn10

Name	type	range	Description
EN	Bool	OFF, ON	FB Activation
Slave_No	UINT	0-00FF	Slave number
Register_Address	UINT	0-FFFF	Address of 1rst register
Register_Qty	UINT	0-00FF	Number of registers
DataAddress_DM	UINT	0-FFFF	Data Source address in the DM area
Cmd_Write	Bool	OFF, ON	Execute the write command

## 6- Input variables of function block MRTU\_CPU\_Fn17

Name	type	range	Description
EN	Bool	OFF, ON	FB Activation
Slave_No	UINT	0-00FF	Slave number
Reg_Address_Read	UINT	0-FFFF	Address of 1rst register to read
Reg_Qty_Read	UINT	0-00FF	Number of registers
RespData_DM	UINT	0-FFFF	Address of received read data (DM)
Reg_Address_Write	UINT	0-FFFF	Address of 1rst register to write
Register_Qty_Write	UINT	0-00FF	Number of registers
Data_Address_DM	UINT	0-FFFF	Data Source address in the DM area
Cmd_Send	Bool	OFF, ON	Execute the command

## Output variables of function block MRTU\_CPU\_Fn01, Fn02,Fn03, Fn05, Fn06, Fn10 and Fn17

Name	type	Range	Description
ENO	Bool	OFF, ON	ON : Hostlink port available
Busy	Bool	OFF, ON	Executing
Error	Bool	OFF, ON	Error flag
Done	Bool	OFF, ON	Operation completed (check the Error Flag for success)

## ANNEXE

## Modbus protocol

## I/O memory area (CIO) Read Multiple Coils

Example: read 19 bits (CIO 0001.04 to 0002.06)

Request		Response	
	Data		Data
Function Code	0x01	Function Code	0x01
Starting Address(H)	0x00	Byte Count	0x03
Starting Address(L)	<b>0x14</b>	Coil Status 27-20	<b>0xCD</b>
Quantity of Coils(H)	0x00	Coil Status 35-28	<b>0x6B</b>
Quantity of Coils(L)	0x13	Coil Status 38-36	<b>0x05</b>

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0CH	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1CH	<b>31<sub>1</sub></b>	<b>30<sub>0</sub></b>	<b>29<sub>1</sub></b>	<b>28<sub>1</sub></b>	<b>27<sub>1</sub></b>	<b>26<sub>1</sub></b>	<b>25<sub>0</sub></b>	<b>24<sub>0</sub></b>	<b>23<sub>1</sub></b>	<b>22<sub>1</sub></b>	<b>21<sub>0</sub></b>	<b>20<sub>1</sub></b>	19	18	17	16
2CH	47	46	45	44	43	42	41	40	39	<b>38<sub>1</sub></b>	<b>37<sub>0</sub></b>	<b>36<sub>1</sub></b>	<b>35<sub>0</sub></b>	<b>34<sub>1</sub></b>	<b>33<sub>1</sub></b>	<b>32<sub>0</sub></b>
3CH	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48

*Italic characters show the ON/OFF(1/0) status of its bit condition.*

## Reads registers in I/O memory area

Example: read 3 words (DM 1000 to DM 1002)

Request		Response	
	Data		Data
Function Code	0x03	Function Code	0x03
Starting Address(H)	0x03	Byte Count	0x06
Starting Address(L)	0xE8	Register Value(H)DM1000	<b>0xAB</b>
Quantity of Registers(H)	0x00	Register Value(L) DM1000	<b>0x12</b>
Quantity of Registers(L)	0x03	Register Value(H)DM1001	<b>0x56</b>
		Register Value(L) DM1001	<b>0x78</b>
		Register Value(H)DM1002	<b>0x97</b>
		Register Value(L) DM1002	<b>0x13</b>

DM	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1000	<b>A</b>				<b>B</b>				<b>1</b>				<b>2</b>			
1001	5				6				7				8			
1002	9				7				1				3			

## Writes single coil.

Example: write 1 coil. (CIO 0002.02 ON)

Request		Response	
	Data		Data
Function Code	0x05	Function Code	0x05
Output Address(H)	0x00	Output Address(H)	0x00
Output Address(L)	0x22	Output Address(L)	0x22
Output Value(H)	<b>0xFF</b>	Output Value(H)	0xFF
Output Value(L)	<b>0x00</b>	Output Value(L)	0x00

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0CH	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

1CH	31 <sub>1</sub>	30 <sub>0</sub>	29 <sub>1</sub>	28 <sub>1</sub>	27 <sub>1</sub>	26 <sub>1</sub>	25 <sub>0</sub>	24 <sub>0</sub>	23 <sub>1</sub>	22 <sub>1</sub>	21 <sub>0</sub>	20 <sub>1</sub>	19	18	17	16
2CH	47	46	45	44	43	42	41	40	39	38 <sub>1</sub>	37 <sub>0</sub>	36 <sub>1</sub>	35 <sub>0</sub>	34 <sub>1</sub>	33 <sub>1</sub>	32 <sub>0</sub>
3CH	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48

*Italic characters show the ON/OFF(1/0) status of its bit condition.*

**Writes single register.**

Example: write &h3AC5 to DM 2000.

Request		Response	
	Data		Data
Function Code	0x06	Function Code	0x06
Register Address(H)	0x07	Register Address(H)	0x07
Register Address(L)	0xD0	Register Address(L)	0xD0
Register Value(H)	0x3A	Register Value(H)	0x3A
Register Value(L)	0xC5	Register Value(L)	0xC5

DM	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2000	3			A				C			5					
2001																
2002																

**Writes registers.**

Example: write 2 words into DM1000-1001.

Request		Response	
	Data		Data
Function Code	0x10	Function Code	0x10
Starting Address(H)	0x03	Starting Address(H)	0x03
Starting Address(L)	0xE8	Starting Address(L)	0xE8
Quantity of Registers(H)	0x00	Quantity of Registers(H)	0x00
Quantity of Registers(L)	0x02	Quantity of Registers(L)	0x02
Byte Count	0x04		
Registers Value(H)	0x3A		
Registers Value(L)	0xC5		
Registers Value(H)	0x97		
Registers Value(L)	0x13		

DM	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1000	3			A				C			5					
1001	9			7				1			3					

**Writes Multiple coils.**

Example: In the case of writing 10 bits ( xxxx xx11 1100 1101) to CIO 0001.04.

(X = ignored.)

Request		Response	
	Data		Data
Function Code	0x0F	Function Code	0x0F
Starting Address(H)	0x00	Starting Address(H)	0x00

Starting Address(L)	0x13	Starting Address(L)	0x13
Quantity of Outputs(H)	0x00	Quantity of Outputs(H)	0x00
Quantity of Outputs(L)	0x0A	Quantity of Outputs(L)	0x0A
Byte Count	0x02		
Output Value(H)	0x3A		
Output Value(L)	0x01		

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0CH	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1CH	31 <sub>0</sub>	30 <sub>0</sub>	29 <sub>0</sub>	28 <sub>1</sub>	27 <sub>0</sub>	26 <sub>0</sub>	25 <sub>1</sub>	24 <sub>1</sub>	23 <sub>1</sub>	22 <sub>0</sub>	21 <sub>1</sub>	20 <sub>0</sub>	19 <sub>0</sub>	18 <sub>0</sub>	17 <sub>0</sub>	16 <sub>0</sub>

*Italic characters show the ON/OFF(1/0) status of its bit condition.*

**Read and Write multiple registers Fn17**

Example: read registers 1 & 2 (1001-2002) and write CAFE into register 0003.

Requête		Réponse	
	Donnée		Donnée
Function Code	0x17	Fonction Code	0x17
Starting Address(H) to read	0x00	Nbre of byte	0x04
Starting Address(L) to read	0x01	Valeur du registre 1 (poids faible)	0x10
Quantity of Registers(H) to read	0x00	Valeur du registre 1 (poids fort)	0x01
Quantity of Registers(L) to read	0x02	Valeur du registre 2 (poids faible)	0x20
Starting Address(H) to write	0x00	Valeur du registre 2 (poids fort)	0x02
Starting Address(L) to write	0x03		
Nbre of registers (H) to write	0x00		
Nbre of registers (L) to write	0x01		
Nbre of byted'octets à écrire	0x02		
1ère valeur (poids fort)	0xCA		
1ère valeur (poids faible)	0xFE		

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0000			3				A				C				5	
0001			1				0				0				1	
0002			2				0				0				2	
0003			C				A				F				E	