MODBUS TABLE ORGANIZATION

Starting Address of the Group Registers (Dec)	Starting Address of the Group Registers (Hex)	System Version (Release)	System Version (Build)	Group Name (Text)	Group Code (Hex)	Group Complexity (Hex)	Group Version (Hex)
4097	1001			Read Digital Input status			
16385	4001			Read/Write Output Status			
20496	5010			Outputs Events counter			
24592	6010			Output configuration			
32769	8001			Read Analogue Input status			

MODBUS PROTOCOL DETAILS

Function Code (Dec)	Exception Codes (Dec)	Data Encoding
3	1, 2, 3	"Big Endian" (most significant byte first)
16	1, 2, 3	

MODBUS OVER SERIAL DETAILS

Physical Layer	Trasmission Modes	Device Addressing	Baud Rates (bit/s)	Data Bits	Data bits trasmission sequence	Parity	Stop Bits
standard EIA/TIA 485 (RS-485) two-wire configuration	RTU	1÷247	programmable	8	Least significant bit first	none	1

MASTER/SLAVE COMMUNICATION TIMING

Timer Descrtiption	Timer Value (msec)
Inter-character time-out	Max. 20
Response delay (from master request)	20÷300
Delay Time (between two master trasmissions)	< 10

REFER ALSO TO: www.modbus.org - MODBUS over serial line specification and implementation guide V1.02
- MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1b

NOTE: File and printed copies of this document are not subject to document change control.

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note	Read Function Codes (Dec)	Data Storing (2)
				(no DISCRETE INPUTS availables)			

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [bit]	Description	Note	Read Function Codes (Dec)	Write Function Codes (Dec)	Data Storing (2)
				(no COILS availables)				

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Code (Dec)	Data Storing (2)
4098	4097	1001	2		Read Digital Input status							
4098	4097	1001	1		State of Group 1 inputs (Inputs 1 ÷ 16)	unsigned integer	-	-		*See Note 1*	3	
4099	4098	1002	1		State of Group 2 inputs (Inputs 17 ÷ 24)	unsigned integer	-	-		*See Note 2*	3	
4100	4099	1003	1		State of Group 3 inputs (through 1st M7TIC/RAV)	unsigned integer	-	-		*See Note 3*	3	
4101	4100	1004	1		State of Group 4 inputs (through 2nd M7TIC/RAV)	unsigned integer	-	-			3	
4102	4101	1005	1		State of Group 5 inputs (through 3rd M7TIC/RAV)	unsigned integer	-	-			3	
32770	32769	8001	4		Read Analogue Input status							
32770	32769	8001	1		Analog input (4-20 mA) 1	unsigned integer	1	%	0% (4 mA) ÷ 100% (20 mA)		3	
32771	32770	8002	1		Analog input (4-20 mA) 2	unsigned integer	1	%	0% (4 mA) ÷ 100% (20 mA)		3	
32772	32771	8003	1		Analog input (4-20 mA) 3	unsigned integer	1	%	0% (4 mA) ÷ 100% (20 mA)		3	
32773	32772	8004	1		Analog input (4-20 mA) 4	unsigned integer	1	%	0% (4 mA) ÷ 100% (20 mA)		3	

Note 1 - Read Digital Input status - Inputs 1÷16

To read the input status convert the answered word in bynary: b15|b14|b13|b12|b11|b10|b9|b8|b7|b6|b5|b4|b3|b2|b1|b0

b0 => Input 1
b1 => Input 2
...
b15 => Input 16

bit = 1 => input high
bit = 0 => input low

Note 2 - Read Input status - Inputs 17÷24

To read the input status convert the answered word in bynary: 0|0|0|0|0|0|0|0|b7|b6|b5|b4|b3|b2|b1|b0

b0 => Input 17
b1 => Input 18
...
b7 => Input 24
b8÷b15 => not significative

bit = 1 => input high
bit = 0 => input low

Note 3 - Read Input status from M7TIC/RAV

To read the voltage line status convert the answered word in bynary: 0|0|0|0|b11|b10|b9|b8|b7|b6|b5|b4|b3|b2|b1|b0

b0 => V1, line 1
b1 => V2, line 1
b2 => V3, line 1
b3 => V1, line 2
b4 => V2, line 2
b5 => V3, line 2
b6 => V1, line 3
b7 => V2, line 3
b8 => V3, line 3
b9 => V1, line 4
b10 => V2, line 4
b11 => V3, line 4

bit = 1 => Absence of voltage
bit = 0 => Presence of voltage

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Codes (Dec)	Write Function Codes (Hex)	Data Storing (2)
16386	16385	4001	1		Read/Write Output Status								
16386	16385	4001	1		State of Group 1 outputs (outputs 1 ÷ 6)	unsigned integer	-	-		*See Note 1*	3	5, 10	
20497	20496	5010	6		Outputs Events counter								
20497	20496	5010	1		Output 1 Events counter	unsigned integer	-	-		*To reset te counter write 0000*	3	5, 10	
20498	20497	5011	1		Output 2 Events counter	unsigned integer	-	-		*To reset te counter write 0000*			
20499	20498	5012	1		Output 3 Events counter	unsigned integer	-	-		*To reset te counter write 0000*			
20500	20499	5013	1		Output 4 Events counter	unsigned integer	-	-		*To reset te counter write 0000*			
20501	20500	5014	1		Output 5 Events counter	unsigned integer	-	-		*To reset te counter write 0000*			
20502	20501	5015	1		Output 6 Events counter	unsigned integer	-	-		*To reset te counter write 0000*			
24593	24592	6010	2		Output configuration								
24593	24592	6010	1		Output 1 configuration	unsigned integer	-	-		*See Note 2*	3	5, 10	
24594	24593	6011	1		Output 2 configuration	unsigned integer	-	-		*See Note 2*	3	5, 10	
24595	24594	6012	1		Output 3 configuration	unsigned integer	-	-		*See Note 2*	3	5, 10	
24596	24595	6013	1		Output 4 configuration	unsigned integer	-	-		*See Note 2*	3	5, 10	
24597	24596	6014	1		Output 5 configuration	unsigned integer	-	-		*See Note 2*	3	5, 10	
24598	24597	6015	1		Output 6 configuration	unsigned integer	-	-		*See Note 2*	3	5, 10	

Note 1 - Read/Write Output Status

To read the output status convert the answered word in bynary: b15|b14|b13|b12|b11|b10|b9|b8|b7|b6|b5|b4|b3|b2|b1|b0

b0 => Output 1
b1 => Output 1
...
b5 => Output 6
b6 ÷ b15 no meaninng

bit = 1 => Output high
bit = 0 => Output low

To write the status of a single output using the "05h" function

To switch from the "Normal" status
tx: ADDR 05 **000x** FF00
rx: ADDR 05 **000x** FF00

To return to the "Normal" status
tx: ADDR 05 **000x** 0000
rx: ADDR 05 **000x** 0000

000x => x is the number of the Output: 1 to 6

To write the status of multiple outputs using the "10h"
To write the output status convert the word in bynary: b15|b14|b13|b12|b11|b10|b9|b8|b7|b6|b5|b4|b3|b2|b1|b0

b0 => Output 1
b1 => Output 1
...
b5 => Output 6
b6 ÷ b15 no meaninng

bit = 1 => Output high
bit = 0 => Output low

tx: ADDR 10 4001 0001 02 00**xy**
rx: ADDR 10 4001 0001
xy: hexadecimal value of the binary combination of the outputs b15...b6|b5|b4|b3|b2|b1|b0 from b15...b6|0|0|0|0|0|0 to b15...b6|1|1|1|1|1|1

Note 2 - Output Configuration

Register Number	Register Address (Dec)	Register Address (Hex)	Dimension [word]	Bit Position	Description	Type	Scale	Unit	Range	Note	Read Function Codes (Dec)	Write Function Codes (Hex)	Data Storing (2)
	To read/write the output configuration convert the word in bynary: b15|b14|b13|b12|b11|b10|b9|b8|b7|b6|b5|b4|b3|b2|b1|b0 b0 ÷ b10 => Activation/blinking time, in step of 1 second b11 => Events counter reset b12 => No meaning b13 => Blilnking or Retain function of the output (bit = 1 => blinking; bit = 0 => retain/timed [timed if activation time is ≠ to 0]) b14 => Normal position of the out relay (bit = 1 => relay normally closed; bit = 0 => relay normally opened) b15 => No meaning **Default configuration: b15 ÷ b0 set = 0**												