

MODBUS RTU for 4AI module

A basic MODBUS command always takes two main parameters :

1. ID Address : Designated to receive this Command ID address ◦
2. Function Code : This Command function ◦

The reception to the Command element will return a Response inform the completion of action in response to the remote or the value returned by the read, Response Command format in the format is basically the same, but also have ID Address and Function code in order to master identification, the following table for common Function code order.

1. MODBUS RTU Protocol

The following MODBUS functions are supported.

Function code	Description
0x03	Read Holding Registers
0x06	Write Single Register

MODBUS Protocol Address Map

MODBUS Register	HEX	Function	Description	Action
0000	0106	Read/Write Modbus device Address And Baud Rate Setting	High byte: Modbus device Address The rage is 1~247 Low byte: Baud Rate Setting 1: 2400 2: 4800 3: 9600 4: 14400 5: 19200 6: 38400 7: 115200	R/W
0001	0600	Data length , Parity, and stop bits Setting	High byte: Data length , Parity, and stop bits. Valid values are : SERIAL_8N1 0x06(default)	

			SERIAL_8N2 0x0E SERIAL_8E1 0x26 SERIAL_8E2 0x2E SERIAL_8O1 0x36 SERIAL_8O2 0x3E Low byte: Reserved	
0004	0018	Read AI0 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
0005	0030	Read AI0 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R
0008	0018	Read AI1 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
0009	0030	Read AI1 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R
000c	0018	Read AI2 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
000d	0030	Read AI2 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R
0010	0018	Read AI3 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
0011	0030	Read AI3 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R
0030	8 bytes	Read AI_0~3 voltage	Ex: 0x2710 = 10000 in decimal. It means 10.000V	R
0034	8 bytes	Read AI_0~3 current	Ex: 0x4E20 = 20000 in decimal. It means 20.000mA	R

Example for read Modbus Address and Baud Rate :

Request		Response	
Field Name	(Hex)	Field Name	(Hex)

MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	00	High Byte Data	01
Quantity of Outputs Hi	00	Low Byte Data	06
Quantity of Outputs Lo	01	High Byte CRC	39
High Byte CRC	84	Low Byte CRC	D6
Low Byte CRC	0A		

Ex: High Byte Data 0x01 means Modbus Address = 01. The available range is 1~247.

Low Byte Data 0x06 means Baud Rate = 38400

For 1 means baud rate is 2400

2 means baud rate is 4800

3 means baud rate is 9600

4 means baud rate is 14400

5 means baud rate is 19200

6 means baud rate is 38400

7 means baud rate is 115200

Example for read AI0 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	04	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	18
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	C5	Low Byte CRC	4E
Low Byte CRC	CB		

Ex: Data 0x0018 = 24 in decimal. It means 0.024V

Example for read AI0 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03

Starting Address Hi	00	Byte Count	02
Starting Address Lo	05	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	30
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	94	Low Byte CRC	50
Low Byte CRC	0B		

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for read AI1 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	08	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	18
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	05	Low Byte CRC	4E
Low Byte CRC	C8		

Ex: Data 0x0018 = 24 in decimal. It means 0.024V

Example for read AI1 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03

Starting Address Hi	00	Byte Count	02
Starting Address Lo	09	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	30
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	54	Low Byte CRC	50
Low Byte CRC	08		

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for read AI2 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	0C	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	18
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	44	Low Byte CRC	4E
Low Byte CRC	09		

Ex: Data 0x0018 = 24 in decimal. It means 0.024V

Example for read AI2 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	0D	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	30
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	15	Low Byte CRC	50
Low Byte CRC	C9		

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for read AI3 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	10	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	18
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	85	Low Byte CRC	4E
Low Byte CRC	CF		

Ex: Data 0x0018 = 24 in decimal. It means 0.024V

Example for read AI3 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	02
Starting Address Lo	11	High Byte Data	00
Quantity of Outputs Hi	00	Low Byte Data	30
Quantity of Outputs Lo	01	High Byte CRC	B8
High Byte CRC	D4	Low Byte CRC	50
Low Byte CRC	0F		

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for read AI_0~3 voltage input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	08
Starting Address Lo	30	AI_0 High Byte Data	27
Quantity of Outputs Hi	00	AI_0 Low Byte Data	21
Quantity of Outputs Lo	04	AI_1 High Byte Data	27
High Byte CRC	44	AI_1 Low Byte Data	0B
Low Byte CRC	06	AI_2 High Byte Data	0B
		AI_2 Low Byte Data	A2
		AI_3 High Byte Data	0B
		AI_3 Low Byte Data	A1
		High Byte CRC	21
		Low Byte CRC	73

Ex: Data 0x0018 = 24 in decimal. It means 0.024V

Example for read AI_0~3 current input

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	03	Function	03
Starting Address Hi	00	Byte Count	08
Starting Address Lo	34	AI_0 High Byte Data	4E
Quantity of Outputs Hi	00	AI_0 Low Byte Data	5E
Quantity of Outputs Lo	04	AI_1 High Byte Data	4E
High Byte CRC	05	AI_1 Low Byte Data	33
Low Byte CRC	C7	AI_2 High Byte Data	17
		AI_2 Low Byte Data	63
		AI_3 High Byte Data	17
		AI_3 Low Byte Data	61
		High Byte CRC	9F
		Low Byte CRC	F6

Ex: Data 0x0030 = 48 in decimal. It means 0.048mA

Example for set Modbus Address and Baud Rate :

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
MODBUS Address	01	MODBUS Address	01
Function	06	Function	06
Data Address Hi	00	Data Address Hi	00
Address Lo	00	Data Address Lo	00
High Byte Data	02	High Byte Data	02
Low Byte Data	06	Low Byte Data	06
High Byte CRC	08	High Byte CRC	08
Low Byte CRC	A8	Low Byte CRC	A8

Ex: High Byte Data 0x02 set Modbus Address as 02. The available rage is 1~247.

Low Byte Data 0x06 set Baud Rate as 38400

For 1 set baud rate as 2400

2 set baud rate as 4800

3 set baud rate as 9600

4 set baud rate as 14400

5 set baud rate as 19200

6 set baud rate as 38400

7 set baud rate as 115200