N4D3E16 16CH RS485 IO controller commamd

MODBUS Command (function code 06 is Control command,03 is Read status command 0x0001-0x0010 registers support 16 (0X10) Command)

Note :

1 MODBUS command must be HEX

2 Slave ID (device address) must be consistent with the DIP switches (A0-A5)

9600 Band ,8 Data bits,None Parity,1 Stop Bit

Function code

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16 (2)
	03 Read			
	06 Write			
	16(0x10) Write multiple registers			

Function code	Register address	Register contents	Number of bytes	Register value	Remarks
03 06 16(0X10)	0x0001-0x0010 (1-32)	Output port status	2	0X0000 0X0001	0X0000 No output 0X0001 Has output
03 06	0X0070 (112)	Output port status(bit)	2	0 1	0X0070:1-16 Output channels Only support open and close commands. 1 open 0 close
03	0x0081-0x0090 (129-144)	Input port status	2	0X0000 0X0001	NPN Input 0X0000　No input 0X0001　Has input
03	0X00C0 (192)	Input port status (bit)	2	0　No input 1　Has input	0X00C0:1-16 Input channels
03 06	0x00F9 (249)	Remote IO Sender	2	0.2 seconds	0 Disabled(default) 1-255: 0.2-51 seconds to send once
03 06	0x00FA (250)	Remote IO Receiver	2		0 Disabled(default) 1 Enable
03 06	0x00FC	automati	2		0: Select automatic report

	(252)		c reporting selection			register: 0x0081-0x090 1: Select automatic report register: 0X00C0
03 06	0x00FD (253)	Input port status automatic reporting function	2	secondS	0: Query function(default) 1-255: Automatically report, the unit is second. 1: Report every 1 second 2: Report every 2 seconds 10: Report every 10 seconds Maximum interval of 255 seconds	
03	0x00FE (254)	485 address	2		DIP switch settings Read only	
03 06	0x00FF (255)	Baud rate	2	0x0000-0x0005	0~5　　0:1200 1:2400　2:4800 3:9600（default） 4:19200 5: Factory reset	

MODBUS 06 Command (**Control command** ,HEX):

Bytes Number	1	2	3	4	5	6	7	8
MODBUS Definitions	Slave ID	Function	Address		Data		CRC Check	
Function	Device Address	Function	Channel number		Command	Delay time	CRC Check	
Open	0x00-0x2F	0x06	0x0001-0x0008		0x01	0x00	2Bytes CRC	
Close	0x00-0x2F	0x06	0x0001-0x0008		0x02	0x00	2Bytes CRC	
Toggle (Self-locking)	0x00-0x2F	0x06	0x0001-0x0008		0x03	0x00	2Bytes CRC	
Latch Inter-locking)	0x00-0x2F	0x06	0x0001-0x0008		0x04	0x00	2Bytes CRC	
Momentary (Non-locking)	0x00-0x2F	0x06	0x0001-0x0008		0x05	0x00	2Bytes CRC	
Delay	0x00-0x2F	0x06	0x0001-0x0008		0x06	0x00-0xff	2Bytes CRC	
Open all	0x00-0xFE	0x06	0x0000		0x07	0x00	2Bytes CRC	
Close all	0x00-0xFE	0x06	0x0000		0x08	0x00	2Bytes CRC	

Remarks:

1 Momentary mode, delay time is 1 seconds

2 Delay mode, delay time is 1-255 seconds

3 0x0001-0x0010 registers not only support 06 function code, but also support 16 (0X10) function code

Return command：

Command is active, return to send commands; instruction is invalid no return.

MODBUS 03 Command (**Read status command** ,HEX):

Bytes Number	1	2	3	4	5	6	7	8
MODBUS Definitions	Slave ID	Function	Address		Data		CRC Check	
Function	Device Address	Function	Starting register address		Register length		CRC Check	
Read Channel 1 State	0x00-0x2F	0x03	0x0001		0x0001			
Read Channel 2 State	0x00-0x2F	0x03	0x0002		0x0001			
Read 2 consecutive channels status	0x00-0x2F	0x03	0x0001-0x0003		0x0002			
Read 3 consecutive channels status	0x00-0x2F	0x03	0x0001-0x0002		0x0003			
Read all 8 channels status	0x00-0x2F	0x03	0x0001		0x0008			
Read input1 status	0x00-0xFE	0x03	0x0081		0x0001			
Read input2 status	0x00-0xFE	0x03	0x0082		0x0001			
Read input3 status	0x00-0xFE	0x03	0x0083		0x0001			
Read input4 status	0x00-0xFE	0x03	0x0084		0x0001			
Read the status of 2 consecutive input ports	0x00-0xFE	0x03	0x0081-0x0087		0x0002			
Read the status of 3 consecutive input ports	0x00-0xFE	0x03	0x0081-0x0086		0x0003			
Read 8 input port status	0x00-0xFE	0x03	0x0081		0x0008			

Read status command returns (function code 03, HEX format):

Bytes length	1	1	1		2
MODBUS Definitions	Slave ID	Function	data length	data	CRC16 Check
Function	Device Address	Function	data length	Relay state 0x0001 open 0x0000 close	CRC16 Check
Channel 1 open	0x00-0x1F	0x03	0x02	0x0001	
Channel 1 close	0x00-0x1F	0x03	0x02	0x0000	
Channel 2 open	0x00-0x1F	0x03	0x02	0x0001	
Channel 2 close	0x00-0x1F	0x03	0x02	0x0000	
Channel 1 open Channel 2 open	0x00-0x1F	0x03	0x04	0x0001 0x0001	
Channel 1 open Channel 2 close	0x00-0x1F	0x03	0x04	0x0001 0x0000	
Channel 1 close Channel 2 open	0x00-0x1F	0x03	0x04	0x0000 0x0001	
Channel 1 close Channel 2 close	0x00-0x1F	0x03	0x04	0x0000 0x0000	
Input 1 On	0x00-0xFE	0x03	0x02	0x0001	
Input 1 Off	0x00-0xFE	0x03	0x02	0x0000	
Input 2 On	0x00-0xFE	0x03	0x02	0x0001	
Input 2 Off	0x00-0xFE	0x03	0x02	0x0000	
Input 1 On Input 2 On	0x00-0xFE	0x03	0x04	0x0001 0x0001	
Input 1 On Input 2 Off	0x00-0xFE	0x03	0x04	0x0001 0x0000	
Input 1 Off Input 2 On	0x00-0xFE	0x03	0x04	0x0000 0x0001	
Input 1 Off Input 2 Off	0x00-0xFE	0x03	0x04	0x0000 0x0000	

MODBUS commands you can use "Modbus Poll" input, as shown below

（CRC check generated automatically）
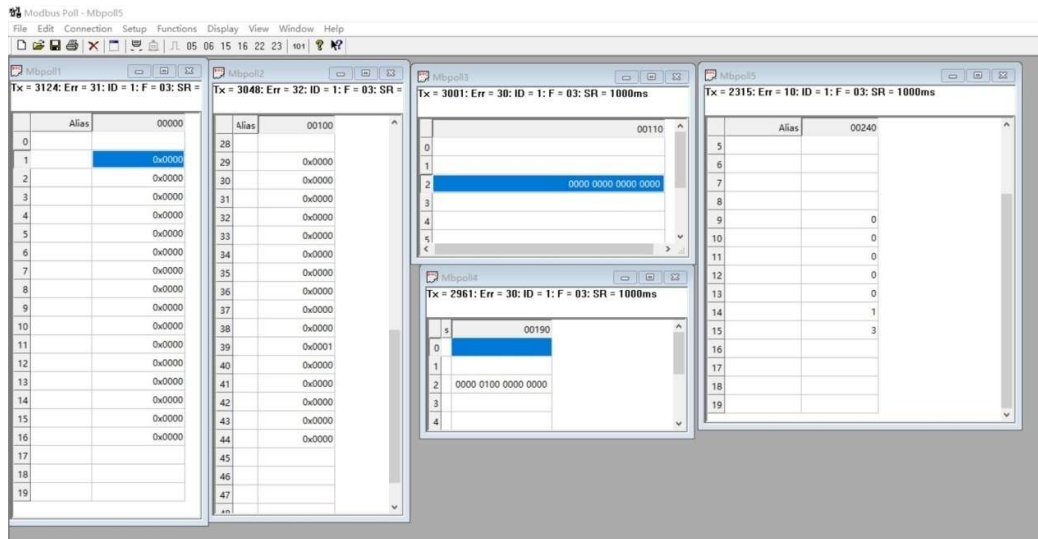
You can also use HyperTerminal serial input, as shown below
（Manually add CRC check）

Examples (Slave ID is 1,DIP switch state)
Channel 1 Open ： 01 06 00 01 01 00 D9 9A
Channel 1 Close ： 01 06 00 01 02 00 D9 6A
Channel 1 Toggle：01 06 00 01 03 00 D8 FA
Channel 1 Latch：01 06 00 01 04 00 DA CA
Channel 1 Momentary: 01 06 00 01 05 00 DB 5A

Channel 1 Delay 10 seconds : 01 06 00 01 06 0A 5B AD

Channel 1 Delay 100 seconds: 01 06 00 01 06 64 DA 41

Channel 2 Open ： 01 06 00 02 01 00 29 9A

Channel 2 Close ： 01 06 00 02 02 00 29 6A

Channel 2 Toggle ： 01 06 00 02 03 00 28 FA

Channel 2 Latch ： 01 06 00 02 04 00 2A CA

Channel 2 Momentary : 01 06 00 02 05 00 2B 5A

Channel 2 Delay 10 seconds ： 01 06 00 02 06 0A AB AD

Channel 2 Delay 100 seconds : 01 06 00 02 06 64 2A 41

Open all：01 06 00 00 07 00 8B FA

Close all：01 06 00 00 08 00 8E 0A

16 (0X10) function code (only supports 0x0001-0x0010 registers)

Open all：01 10 00 01 00 10 20 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01 00 01
00 01 00 01 00 01 00 01 00 01 00 F5 B0

Close Channels1-4：01 10 00 01 00 04 08 02 00 02 00 02 00 02 00 CB 5A

Close Channels 5-8：01 10 00 05 00 04 08 02 00 02 00 02 00 02 00 3A 95

Read state (assuming that the channel 1 is open, the channel 2 is close).

Read channel 1 state ： 01 03 00 01 00 01 D5 CA

Return open：01 03 02 00 01 79 84

Read channel 2 state ： 01 03 00 02 00 01 25 CA

Return close：01 03 02 00 00 B8 44

Read channel 1 and channel 2 state ： 01 03 00 01 00 02 95 CB

Return channel open and channel 2 close ： 01 03 04 00 01 00 00 AB F3

Read 1-8 channel input status：01 03 00 81 00 08 14 24

Return all input channels OFF：01 03 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E4 59

Return input channel 1 ON：01 03 10 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 25 59

1. Read Output port status(One bit, one channel)

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Functio n (1)	Number of bytes (1)	data (n)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0x03

Register address：0x0070 corresponds to channel 1-16 output port status

Read number：0x0001

For example: Read 1-16 channel output port status:

Send data(RS485 address is 1)：01 03 00 70 00 01 85 D1

Returns data：01 03 02 02 02 38 E5

01 RS485 address，03 Function，02 length，38 E5 crc16

0202 refers to the status of the output port, the second and tenth bits are 1, and the other bits are 0. So channels 2 and 10 are open, and the other channels are closed.

2. Write Output port status(One bit, one channel)

Send data

RS485 address (Station address) (1)	Functio n (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Functio n (1)	Number of bytes (1)	data (n)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0x06

Register address：0x0070 corresponds to channel 1-16 output port status

Read number：0x0001

For example: Open channel 1/2/3, other channels close:

Send data(RS485 address is 1)：01 06 00 70 00 07 C9 D3

Returns data：01 06 00 70 00 07 C9 D3

01 RS485 address，06 Function，C9 D3 crc16

00 70 refers to the registers of 1-16 channels; 0007 refers to 1-3 channels open and 4-16 channels closed.

3. Read input port status(One register, one channel)

Send data

RS485 address (Station address)	Functio n (1)	Register address (2)	Read number (2)	CRC16(2)

(1)				

Returns data

RS485 address (Station address) (1)	Functio n (1)	Number of bytes (1)	data (n)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0x03

Register address：0x0081-0x0090　IN1-IN16 channels input port status

Read number：0x0001-0x0010

0X000 No input, NPN input, the port is high or floating;

0X0001 has input, NPN input, the port is low level;

For example: Read channel IN1 port value:

Send data(RS485 address is 1)：01 03 00 81 00 01 D4 22

Returns data：01 03 02 00 01 79 84

01 RS485 address，03 Function，02 length，79 84 crc16

00 01 means there is input. NPN input, then port IN1 is low level

For example: Read channel IN2 port value:

Send data(RS485 address is 1)：01 03 00 82 00 01 24 22

Returns data：01 03 02 00 00 B8 44

01 RS485 address，03 Function，02 length，B8 44 crc16

00 00 means no input. NPN input, then port IN2 is floating or high level.

4. Read input port status(One bit, one channel)

Send data

RS485 address (Station address) (1)	Functio n (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Functio n (1)	Number of bytes (1)	data (n)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0x03

Register address：0x00C0　IN1-IN16 channels input port status

Read number：0x0001

The 16-bit data of 0x00C0 Register indicates the input status of channels

IN1-IN16, 0 means no input, 1 means input

For example: Read channel IN1-IN16 port value:
Send data(RS485 address is 1)：01 03 00 C0 00 01 84 36
Returns data：01 03 02 00 80 B9 E4
01 RS485 address，03 Function，02 length，B9 E4 crc16
00 80 represents the input status of IN1-IN16, the eighth bit is 1, the other bits are
0; it means that IN8 has input, and other channels have no input

5. Remote IO Sender

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

RS485 address:0x01-0xFE
Function code 0X03 read / 0x06 write
Register address：0x00F9
Read number：0x0001
Configure this register, the N4D3E16 board will actively send IN1-IN16 input
status to control the output ports CH1-CH16 of another N4D3E16 board, and the
RS485 addresses of the two boards must be the same. The unit is 0.2 seconds. 0
prohibited 1-255 means sending once every 0.2-51 seconds

For example, if remote IO sending is currently prohibited, it should be changed to
allow remote IO sending:
0.2 seconds, send data(RS485 address is 1)： 01 06 00 F9 00 01 98 3B
0.4 seconds, send frame (address is 1) 01 06 00 F9 00 02 D8 3A
0.6 seconds, send frame (address is 1) 01 06 00 F9 00 03 19 FA
0.8 seconds, send frame (address is 1) 01 06 00 F9 00 04 58 38
1 second, send frame (address is 1) 01 06 00 F9 00 05 99 F8
Disable remote IO sending: send frame (address is 1) 01 06 00 F9 00 00 59 FB

6. Remote IO Receiver

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Functio n (1)	Number of bytes (1)	data (n)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0X03 read / 0x06 write

Register address：0x00FA

Read number：0x0001

When Remote IO Receiver is allowed, please configure this register to 1.

Note: When this register is configured as 1, register 0x0070 does not return 06 function code

If allow remote IO reception: send frame (address is 1) 01 06 00 FA 00 01 68 3B

If prohibit remote IO reception: send frame (address is 1) 01 06 00 FA 00 00 A9 FB

7. Automatic report selection register

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Setting Content (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Register value (2)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0X03 read / 0x06 write

Register address：0x00FC

Setting Content：1Bytes

For example :

1 Select register 0x0080-0x090 to report automatically:

Send data(RS485 address is 1)：01 06 00 FC 00 00 49 FA

2 Select register 0x00C0 to report automatically:

Send data(RS485 address is 1)：01 06 00 FC 00 01 88 3A

8. Set Input port status reporting function(316 channels set at the same time)

Send data

RS485 address (Station address)	Function (1)	Register address (2)	Setting Content (2)	CRC16(2)

(1)				

Returns data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Register value (2)	CRC16(2)

RS485 address:0x01-0xFE

Function code 0X03 read / 0x06 write

Register address：0x00FD

Setting Content：1Bytes

For example : For example, the current query function should be changed to automatic reporting:

Automatically report in 1 second, send frame (address is 1) 01 06 00 FD 00 01 D9 FA

Automatically report in 2 second, send frame (address is 1) 01 06 00 FD 00 02 99 FB

Automatically report in 3 second, send frame (address is 1) 01 06 00 FD 00 03 58 3B

Automatically report in 4 second, send frame (address is 1) 01 06 00 FD 00 04 19 F9

Automatically report in 5 second, send frame (address is 1) 01 06 00 FD 00 05 D8 39

Automatically report in 10 second, send frame (address is 1) 01 06 00 FD 00 0A 98 3D

Disable reporting function: send frame (address is 1) 01 06 00 FD 00 00 18 3A

9. Read baud rate

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Read number (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Number of bytes (1)	data (n)	CRC16(2)

Function code 0x03

Register address：0x00FF

Read number：0x0001

For example:

send data(RS485 address is 1)：01 03 00 FF 00 01 B4 3A

Returns data：01 03 02 00 03 F8 45

01 RS485 address，03 Function，02 length，F8 45 crc16

03 means the current baud rate is 9600bps

Baud rate corresponds to the number: 0: 1200   1: 2400   2: 4800   3: 9600   4: 19200

10. Write baud rate

Send data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Setting Content (2)	CRC16(2)

Returns data

RS485 address (Station address) (1)	Function (1)	Register address (2)	Register value (2)	CRC16(2)

Function code 0x06
Register address：0x00FF
Setting Content：2Bytes(0-4)

For example, Change the baud rate to 4800bps:
send data(RS485 address is 1)：01 06 00 FF 00 02 38 3B
Returns data：01 06 00 FF 00 02 38 3B
Baud rate corresponds to the number: 0: 1200   1: 2400   2: 4800   3: 9600   4: 19200
5: Factory reset
Note: 1 The baud rate will be updated when the module is powered up again!
       2 The factory setting can be restored when the baud rate corresponding to the number is 5.
For example: 01 06 00 FF 00 05 79 F9