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RemoDAQ-8317 Module User's Manual



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Chapter 1 Introduction

RemoDAQ-8300 Ethernet-based data acquisition and control modules provide I/O, data acquisitions, and networking in one module to build a cost effective, distributed monitoring and control solution for a wide variety of applications. Through standard Ethernet networking, RemoDAQ-8300 retrieves I/O values from sensors, and can publish them as a real-time I/O values to networking nodes via LAN, Intranet, or Internet. With Ethernet-enabled technology, RemoDAQ-8300 series modules build up a cost-effective DA&C system for Building Automation, Environmental Monitoring, and Facility Management and Manufacturing applications.

The RemoDAQ-8317 is 8-ch Analog Input with 2-ch Digital Output Module.

The RemoDAQ-8317 is a 16-bit, 8-channel analog input module that provides programmable input ranges on all channels. It accepts millivoltage inputs ($\pm 150\text{mV}$, $\pm 500\text{mV}$), voltage inputs ($\pm 1\text{V}$, $\pm 5\text{V}$ and $\pm 10\text{V}$) and current input ($\pm 20\text{ mA}$) and provides data to the host computer in engineering units (mV, V or mA). In order to satisfy all plant needs in one module, RemoDAQ-8317 has been designed with 8 analog inputs and 2 digital outputs.

1.1 Pin Assignment

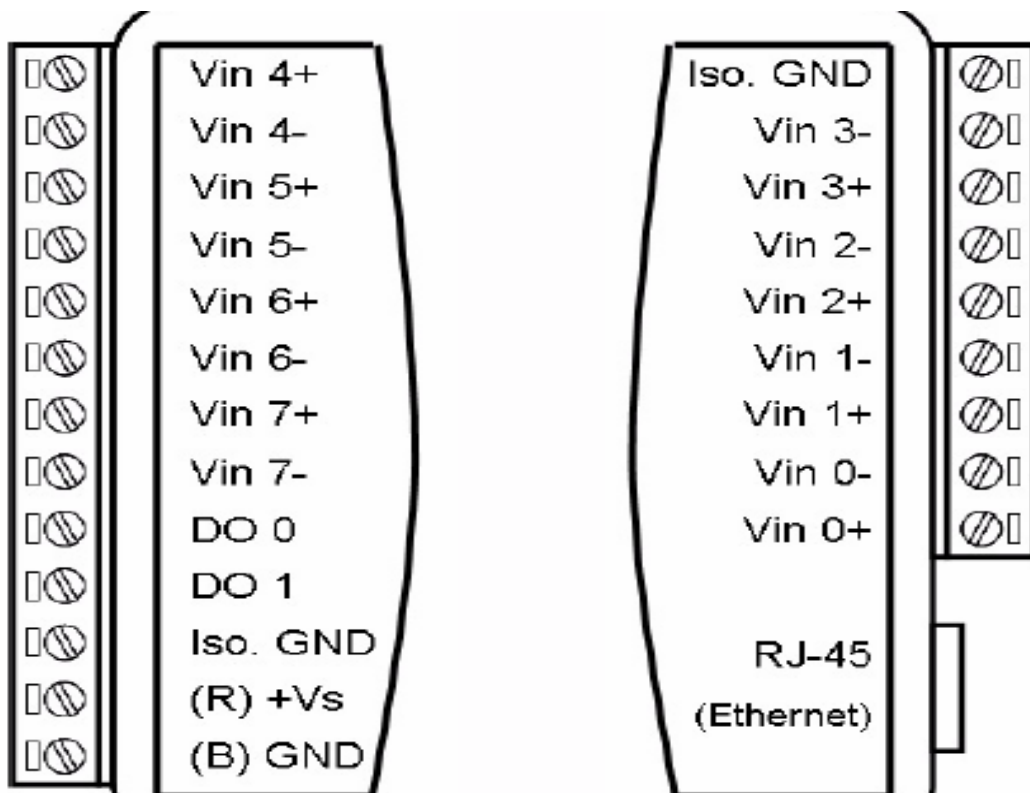


Figure 1.1: RemoDAQ-8317 Pin assignment

1.2 Specifications

- Communication: 10/100 Base-T Ethernet
- Supports Protocol: Modbus/TCP
- Built-in Watchdog Timer
- Isolation Protection: 2000 VDC
- Power Input: Unregulated 10 ~ 30 VDC
- Power Consumption: 1.5 W @ 24 VDC
- Power Reversal Protection
- Operating Humidity: 20 ~ 95 % RH (non-condensing)
- Storage Humidity: 0 ~ 95 % RH (non-condensing)
- Operating Temperature: -10 ~ 70° C
- Storage Temperature: -20 ~ 80° C

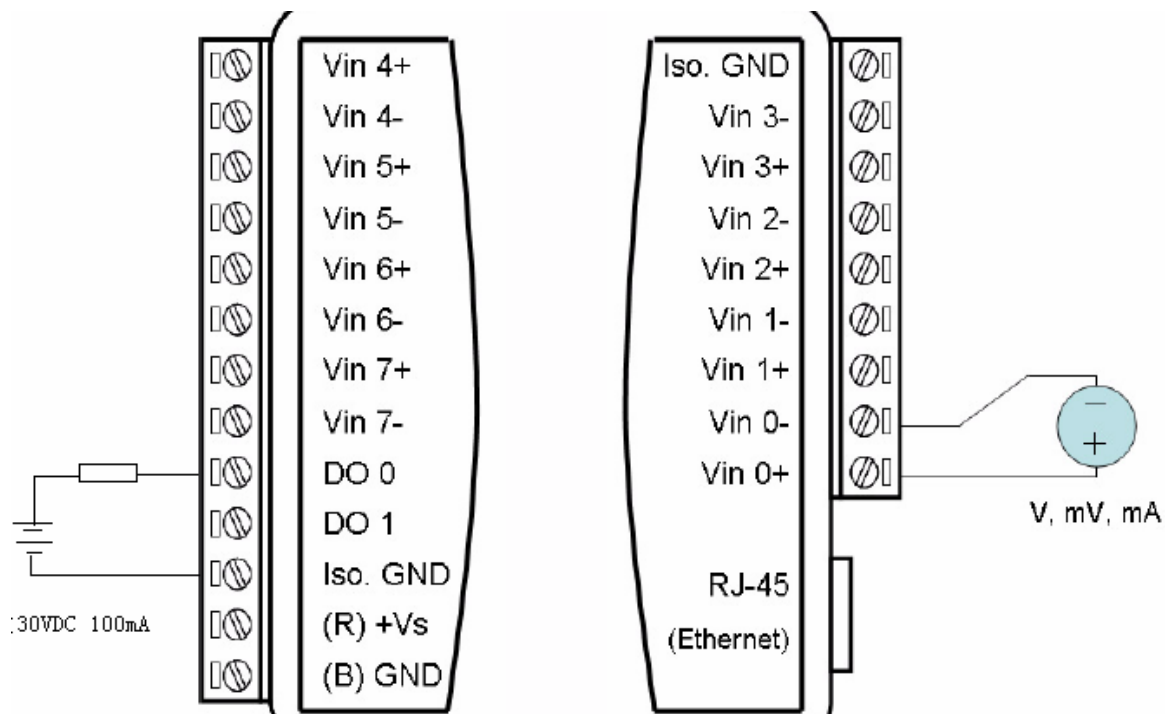
1.3 Analog Input

- Channels: 8
- Input Type: mV, V, mA
- Input Range: $\pm 150\text{mV}$, $\pm 500\text{mV}$, $\pm 1\text{ V}$, $\pm 5\text{V}$, $\pm 10\text{V}$, $\pm 20\text{ mA}$, $4\sim 20\text{mA}$
- Accuracy: $\pm 0.1\%$ or Better
- Span Drift: $\pm 25\text{ ppm}/^\circ\text{ C}$
- Zero Drift: $\pm 6\text{ }\mu\text{V}/^\circ\text{ C}$
- Resolution: 16-bit
- Sampling Rate: 10 sample/second
- CMR @ 50/60 Hz: 90 dB
- NMR @ 50/60 Hz: 60 dB
- Over Voltage Protection: $\pm 35\text{ VDC}$
- Built-in TVS/ESD Protection

1.4 Digital Output

- Channels: 2
- Sink type: Open Collector to 30 V, 100 mA (maximum load)

1.5 Application Wiring



Chapter 2 Command Data Formats

RemoDAQ-8300 systems accept a command/response form from the host computer. When systems are not transmitting or they are in listen mode. The host computer issues a command to the system with a specified address and waits a certain amount of time for the system to respond. If no response arrives, a time-out aborts the sequence and returns control to the host. This chapter explains the structure of the commands with Modbus/TCP protocol.

2.1 Command Structure

It is important to understand the encapsulation of a Modbus request or response carried on the Modbus/TCP network. A complete command consist of command head and command body. The command head is prefixed by six bytes and responds to pack Modbus format; the command body defines target device and requested action. Following example will help you to realize this structure quickly.

Example:

If you want to read the first two values of RemoDAQ-8317 (address: 40001~40002), the request command should be:

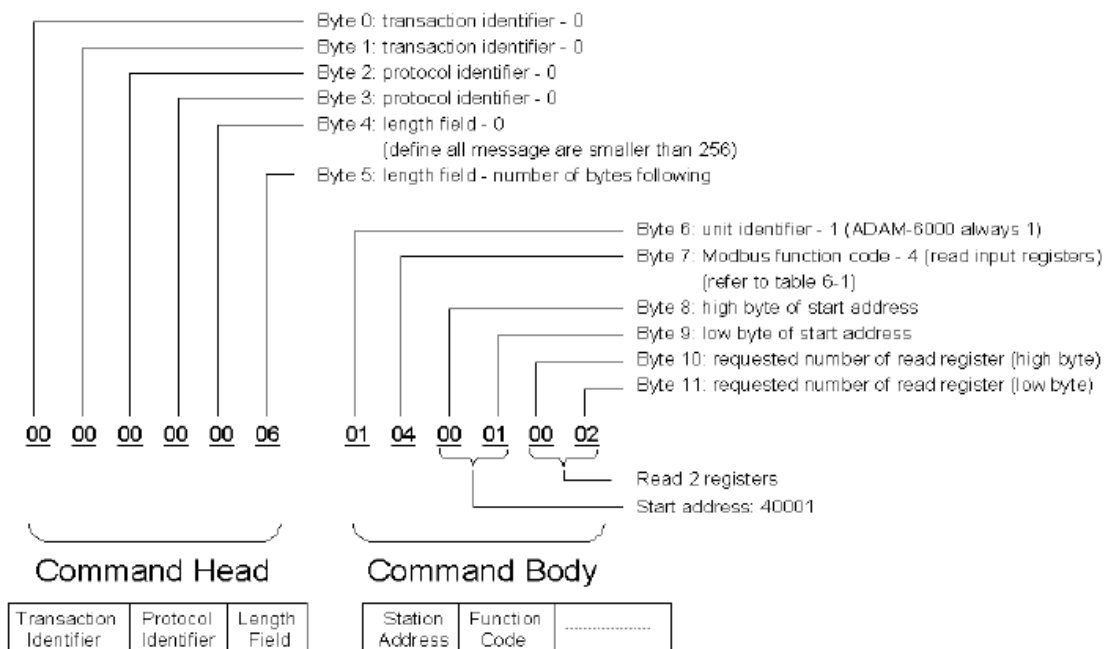


Figure2.1 Request Comment Structure

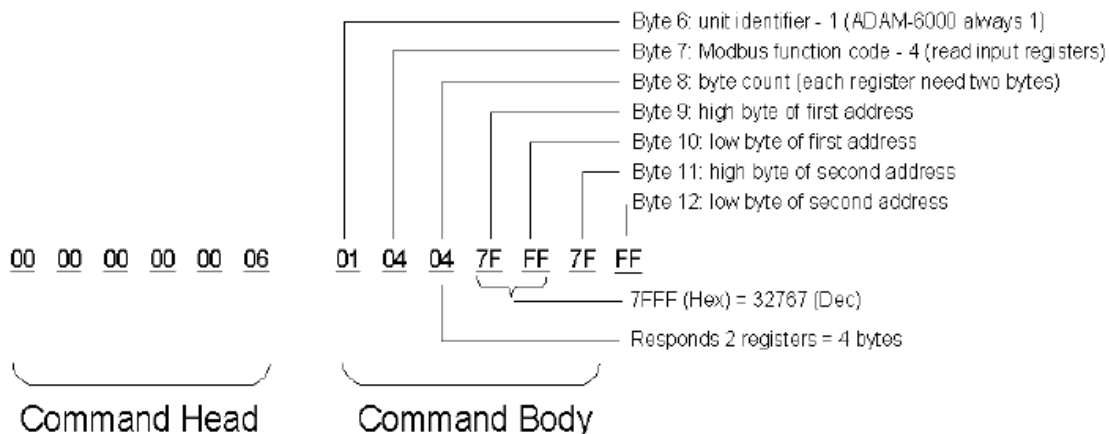


Figure2.2 Response Comment Structure

2.2 Modbus Function Code Introductions

To full-fill the programming requirement, there is a series of function code standards for user’s reference...

Function Code 01

The function code 01 is used to read the discrete output’s ON/OFF status of RemoDAQ-8300 modules in a binary data format.

Request message format for function code 01:

Command Body					
Station Address	Function Code	Start Address High Byte	Start address Low Byte	Requested Number of Coil High Byte	Requested Number of Coil Low Byte

Example: Read coil number 1 to 8 (address number 00017 to 00024) from RemoDAQ-8300 Modules

01 01 00 10 00 08

Response message format for function code 01:

Command Body					
Station Address	Function Code	Byte Count	Data	Data	...

Example: Coils number 2 and 7 are on, all others are off.

01 01 01 42

In the response the status of coils 1 to 8 is shown as the byte value 42 hex, equal to 0100 0010 binary.

Function Code 02

The function code 02 is used to read the discrete input's ON/OFF status of RemoDAQ-8300 in a binary data format.

Request message format for function code 02:

Command Body					
Station Address	Function Code	Start Address High Byte	Start address Low Byte	Requested Number of Coil High Byte	Requested Number of Coil Low Byte

Example: Read coil number 1 to 8 (address number 00001 to 00008) from RemoDAQ-8300 modules

01 01 00 01 00 08

Response message format for function code 01:

Command Body					
Station Address	Function Code	Byte Count	Data	Data	...

Example: input number 2 and 3 are on, all others are off.

01 01 01 60

In the response the status of input 1 to 8 is shown as the byte value 60 hex, equal to 0110 0000 binary.

Function Code 03/04

The function code 03 or 04 is used to read the binary contents of input registers.

Request message format for function code 03 or 04:

Command Body					
Station Address	Function Code	Start Address High Byte	Start address Low Byte	Requested Number of Register High Byte	Requested Number of Register Low Byte

Example: Read register 40002 to 40003 hex in RemoDAQ-8300 module

01 04 00 01 00 02

Response message format for function code 03 or 04:

Command Body					
Station Address	Function Code	Byte Count	Data	Data	...

Example: Values where register 40002= 0043H and register 40003= 21H
01 04 04 00 43 00 21

Function Code 05

Force a single coil to either ON or OFF. The requested ON/OFF state is specified by a constant in the query data field. A value of FF 00 hex requests it to be ON. A value of 00 00 hex requests it to be OFF. And a value of FF FF hex requests it to release the force.

Request message format for function code 05:

Command Body					
Station Address	Function Code	Coil Address High Byte	Coil address Low Byte	Force Data High Byte	Force Data Low Byte

Example: Force coil 3 (address 00003) ON in RemoDAQ-8300 module

01 05 00 03 FF 00

Response message format for function code 05:

The normal response is an echo of the query, returned after the coil state has been forced.

Command Body					
Station Address	Function Code	Coil Address High Byte	Coil address Low Byte	Force Data High Byte	Force Data Low Byte

Function Code 06

Preset integer value into a single register.

Request message format for function code 06:

Command Body					
Station Address	Function Code	Register Address High Byte	Register address Low Byte	Preset Data High Byte	Preset Data Low Byte

Example: Preset register 40002 to 00 04 hex in RemoDAQ-8300 module

01 06 00 02 00 04

Response message format for function code 06:

The normal response is an echo of the query, returned after the coil state has been preset.

Function Code 15 (0F hex)

Forces each coil in a sequence of coils to either ON or OFF.

Request message format for function code 15:

Command Body								
Station Address	Function Code	Start Address High Byte	Start Address Low Byte	Requested Number of Coil High Byte	Requested Number of Coil Low Byte	Byte Count	Force Data High Byte	Force Data Low Byte

Example: Request to force a series of 10 coils starting at address 00017 (11 hex) in RemoDAQ-8300 module.

01 0F 00 11 00 0A 02 CD 01

The query data contents are two bytes: CD 01 hex, equal to 1100 1101 0000 0001 binary. The binary bits are mapped to the addresses in the following way.

Bit: 1 1 0 0 1 1 0 1 0 0 0 0 0 0 0 1

Address (000XX): 24 23 22 21 20 19 18 17 - - - - - 26 25

Response message format for function code 15:

The normal responses return the station address, function code, start address, and requested number of coil forced.

Command Body					
Station Address	Function Code	Start Address High Byte	Start Address Low Byte	Requested Number of Coil High Byte	Requested Number of Coil Low Byte

Example: 01 0F 00 11 00 0A

Function Code 16 (10 hex)

Preset values into a sequence of holding registers.

Request message format for function code 16:

Command Body							
Station Address	Function Code	Start Address High Byte	Start Address Low Byte	Requested Number of Register High Byte	Requested Number of Register Low Byte	Byte Count	Data

Example: Preset Address 40001 to 1234H and address 40002 to 5678H in RemoDAQ-8300 module.

01 10 00 00 00 02 04 12 34 56 78

Response message format for function code 08:

The normal responses return the station address, the function code, start address, and requested number of registers preset.

Command Body					
Station Address	Function Code	Start Address High Byte	Start Address Low Byte	Requested Number of Register High Byte	Requested Number of Register Low Byte

Example: 01 10 00 00 00 02

2.3 RemoDAQ-8317 MODBUS Mapping Table

Address 0X (Decimal)	Address (Hex)	Ch	Description	Attribute	Notes
00017	10H	0	Current value	R/W	DO0
00018	11H	1		R/W	DO1
Address 4X (Decimal)	Address (Hex)	Ch	Description	Attribute	Notes
40001	0H	0	Current value	Read	0000H~FFFFH 2's Complement HEX
40002	1H	1	Current value	Read	0000H~FFFFH 2's Complement HEX
...
40008	7H	7	Current value	Read	0000H~FFFFH 2's Complement HEX
40201	C8H		Range	R/W	
40211	D2H		Module Name	Read	83H, 17H
40213	D4H		Version	Read	A1H, 00H

40221	DCH		Channel Enable	R/W	00H, FFH
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2.4 Analog Input Type Setting(TT)

Type	07	08	09	0A	0B	0C	0D
Min	4mA	-10V	-5V	-1V	-500mV	-150mV	-20mA
Max	20mA	+10V	+5V	+1V	+500mV	+150mV	+20mA

2.5 Analog Input Type and Data Format Table

Code	Input span	Data Format	+F.S.	Zero	-F.S.
07	4~20mA	Project Unit	20.000	+00.000	4.000
		2's Complement HEX	7FFF	0000	8000
08	-10V~+10V	Project Unit	+10.000	+00.000	-10.000
		2's Complement HEX	7FFF	0000	8000
09	-5V~+5V	Project Unit	+5.000	+00.000	-5.000
		2's Complement HEX	7FFF	0000	8000
0A	-1V~+1V	Project Unit	+1.000	+00.000	-1.000
		2's Complement HEX	7FFF	0000	8000
0B	-500mV~+500mV	Project Unit	+500.000	+00.000	-500.000
		2's Complement HEX	7FFF	0000	8000
0C	-150mV~+150mV	Project Unit	+150.000	+00.000	-150.000
		2's Complement HEX	7FFF	0000	8000
0D	-20mA~+20mA	Project Unit	+20.000	+00.000	-20.000
		2's Complement HEX	7FFF	0000	8000

Chapter 3 Software Instructions

1, Click RemoDAQ-8300 Series Ethernet IO Module Utility.exe install the tools.

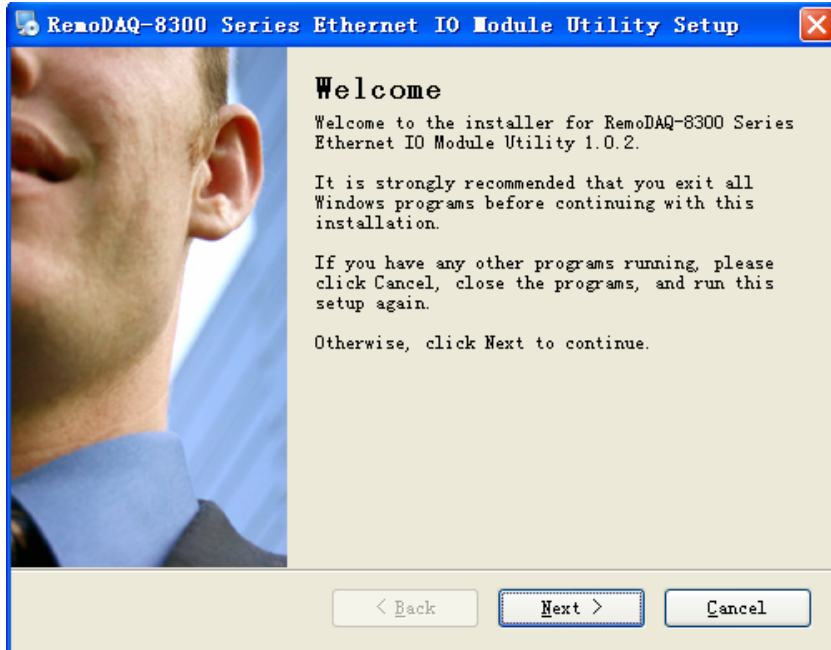


Figure 3.1

2, Click "Next", under the silent installation.

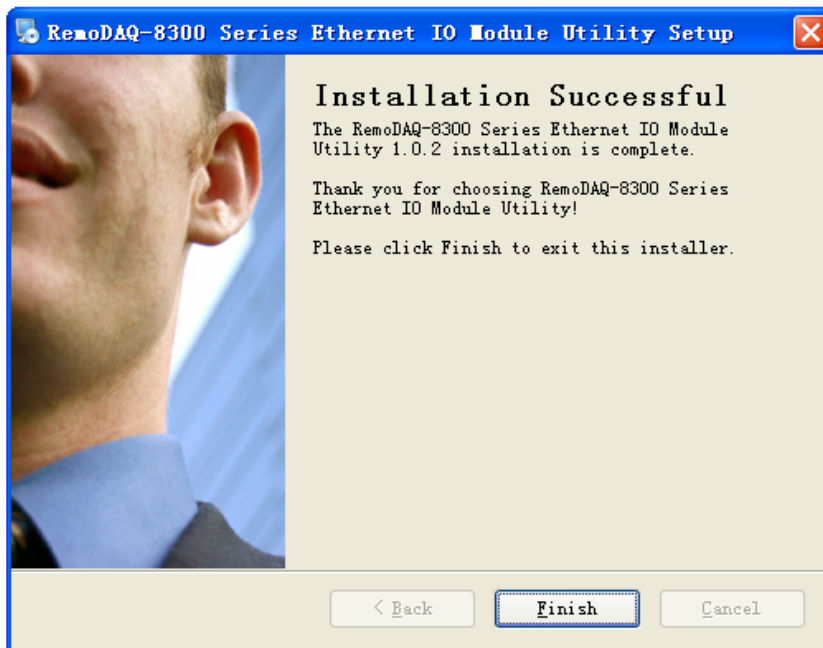


Figure 3.2

- 3, Click “Finish”. The installation is completed.
- 4, There will be one shortcut icon on the desktop.

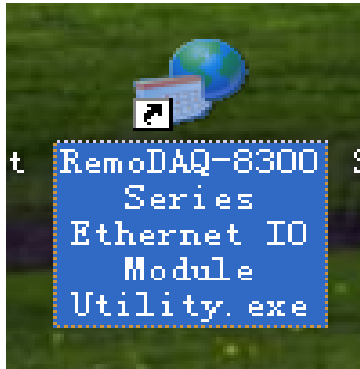


Figure 3.3

- 5, Double click the shortcut icon into the interface so that you should be able to see the operation window as Figure 3.4.

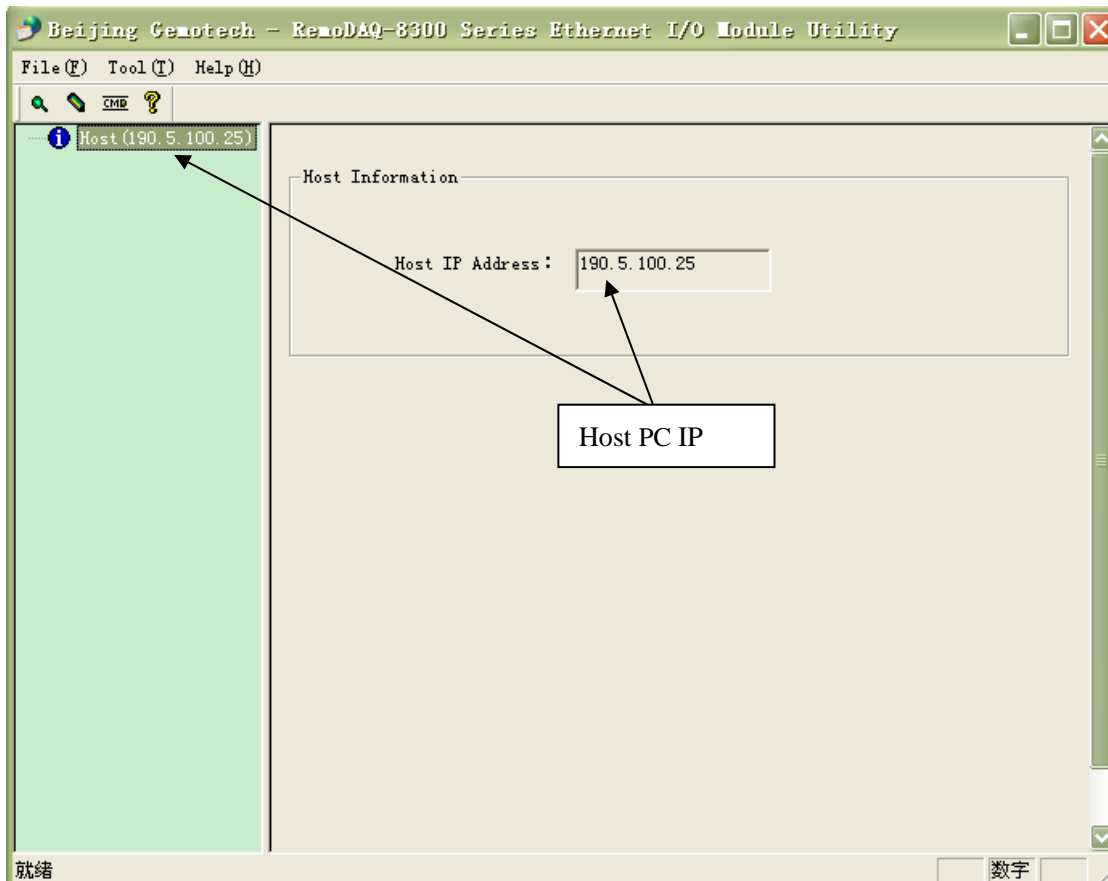


Figure 3.4

- 6, Click the magnifying glass icon, RemoDAQ-8300 Series Ethernet IO Module Utility will then search all RemoDAQ-8300 modules on the Ethernet network. If your RemoDAQ-8300 modules are used for the first time, its IP will be 192.168.0.1 by default.

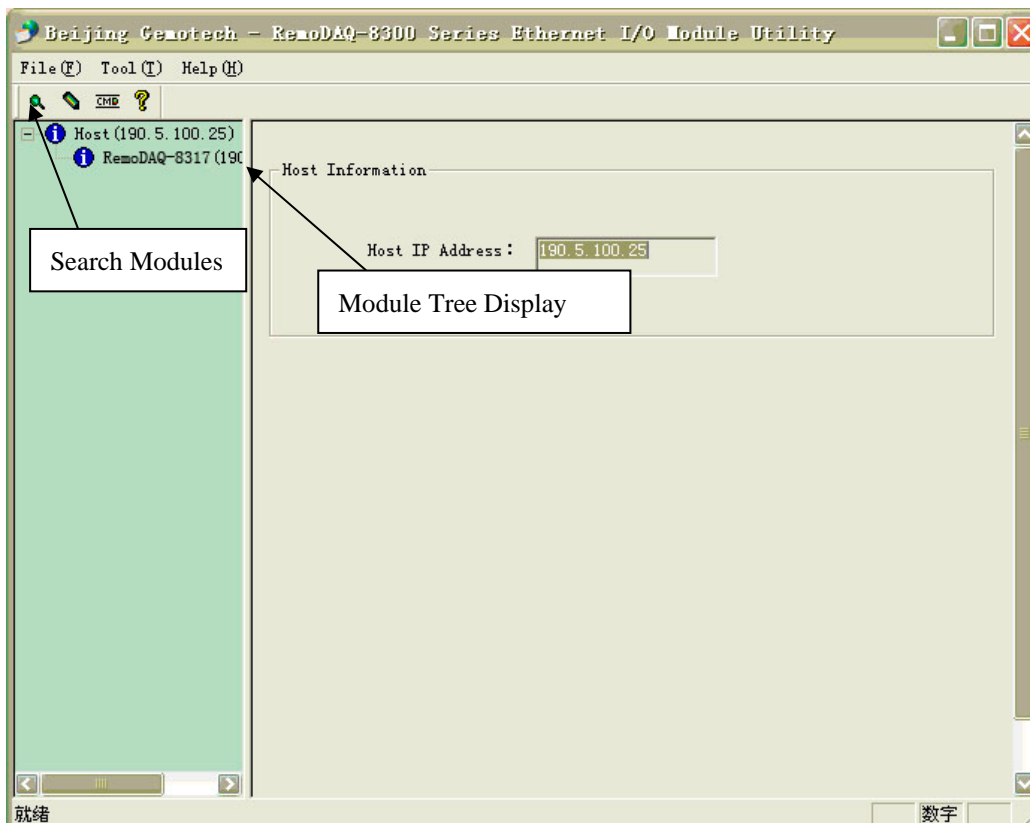


Figure 3.5

7, Click Network Setting.

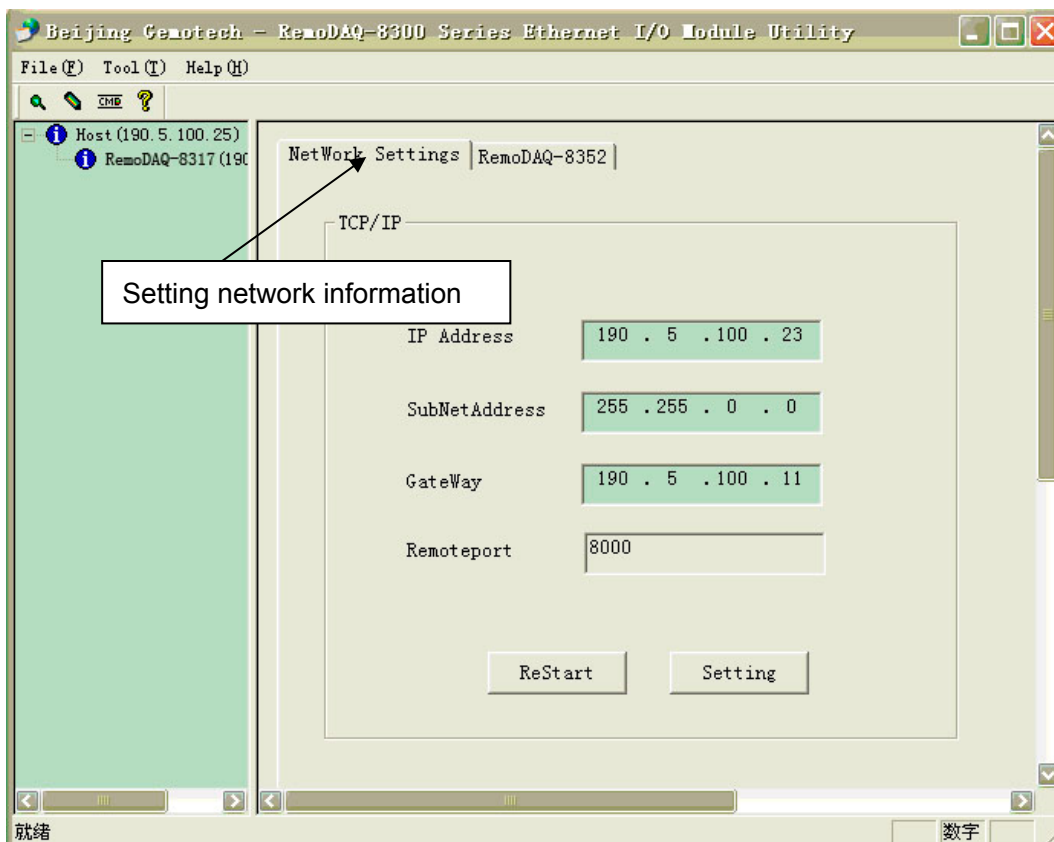


Figure 3.6

8. You need to change IP of the RemoDAQ-8300 modules the same subnet with the host PC. Type the correct **IP address**, **Subnet address**, and **Gateway** on the Status Display area. After complete setting, click the **Setting** button. When you finish the Network Settings, please click the **ReStart** Button to restart the module. After that, you must search for the module again. The port of RemoDAQ-8300 modules are 8000.

9. Click tab **RemoDAQ-8317** into the application interface.

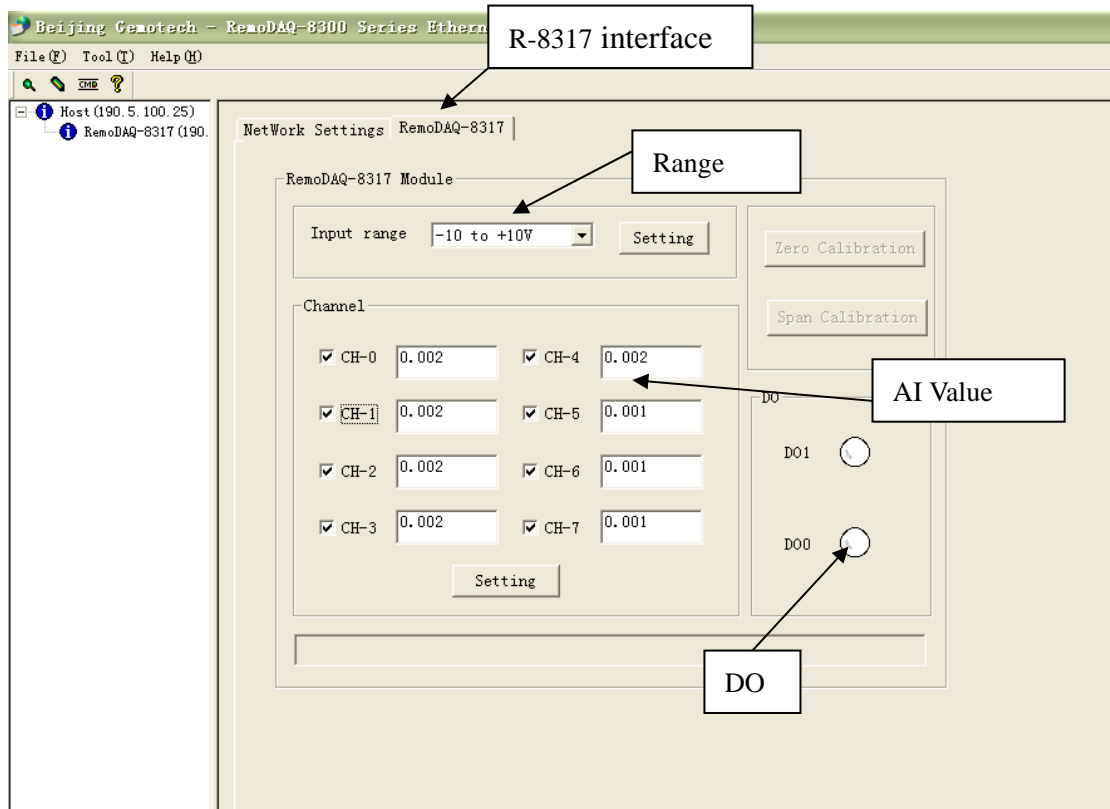


Figure 3.7

You can read analog input value or configure setting for all channels on the **RemoDAQ-8317** area. In the **Range** area, select the range in the **Input range** combo box. After selecting appropriate range, click the **Setting** button. In the **Channel** area, you can see the current value of analog input, simply choose the check box of the channels you want to monitor and click the **Setting** button. You can see and set the value of digital output in the **DO** area.