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# **RemoDAQ-8352 Module User's Manual**



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## Contents

Chapter 1 Introduction .....	3
1.1 Pin Assignment .....	4
1.2 Specifications .....	4
1.3 Digital Input .....	5
1.4 Digital Output .....	5
1.5 Application Wiring .....	6
1.6 I/O Module Configuration .....	7
1.6.1 Power-on initialization .....	7
1.6.2 DI Mode .....	7
1.6.2 DO Mode .....	8
Chapter 2 Command Data Formats .....	9
2.1 Command Structure .....	9
2.2 Modbus Function Code Introductions .....	10
2.3 RemoDAQ-8352 MODBUS Mapping Table .....	15
Chapter 3 Software Instructions .....	19

# 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, Facility Management and eManufacturing applications.

The RemoDAQ-8352 is 16-ch Source Type Isolated Digital Input/Output Module.

The RemoDAQ-8352 is a high-density digital I/O module built-in a 10/100 based-T interface for seamless Ethernet connectivity. It provides 8 digital input, 8 digital output channels. All of the digital input channels support input latch function for important signal handling. The digital output channels support the source type output. Meanwhile, these DI channels allow to be used as 3 kHz counter and frequency input channels. Opposite to the intelligent DI functions, the digital output channels also support pulse output function.

## 1.1 Pin Assignment

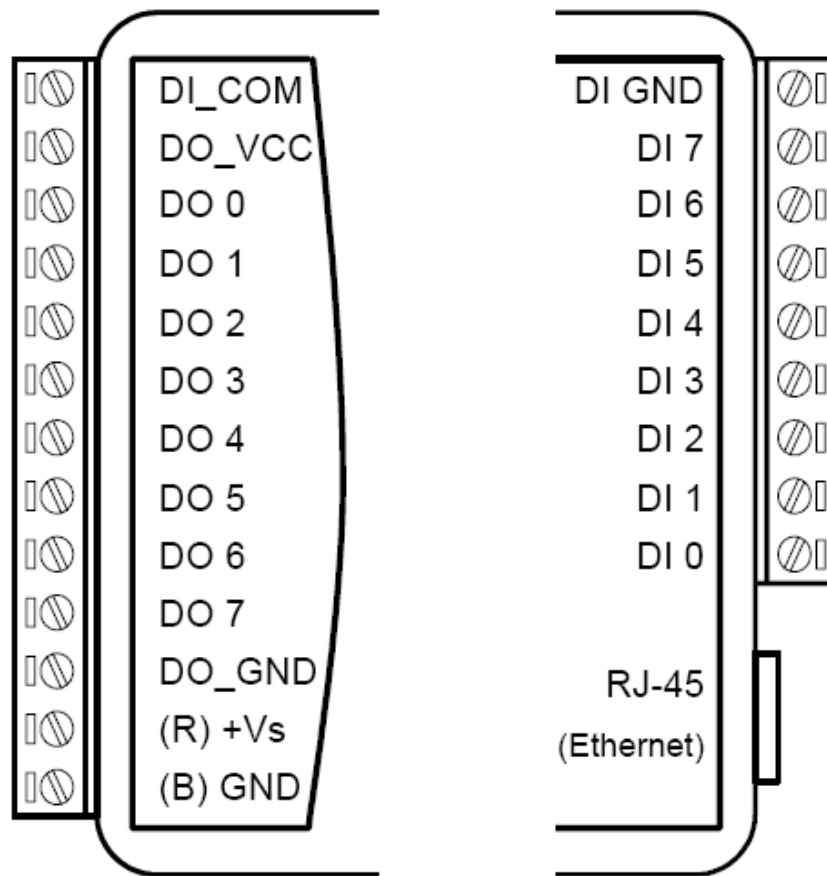


Figure 1.1: RemoDAQ-8352 Pin assignment

## 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 Digital Input

- Channels: 8
- Dry Contact:
  - Logic level 0: Close to Ground
  - Logic level 1: Open
- Wet Contact:
  - Logic level 0: 0 ~ 3 VDC
  - Logic level 1: 10 ~ 30 VDC
- Supports 3 kHz counter input (32-bit + 1-bit overflow)
- Supports 3 kHz frequency input
- Supports input status latch

## 1.4 Digital Output

- Channels: 8
- Source Type: 10 ~ 35 VDC, 1 A (per channel)
- Supports 5 kHz pulse output

## 1.5 Application Wiring

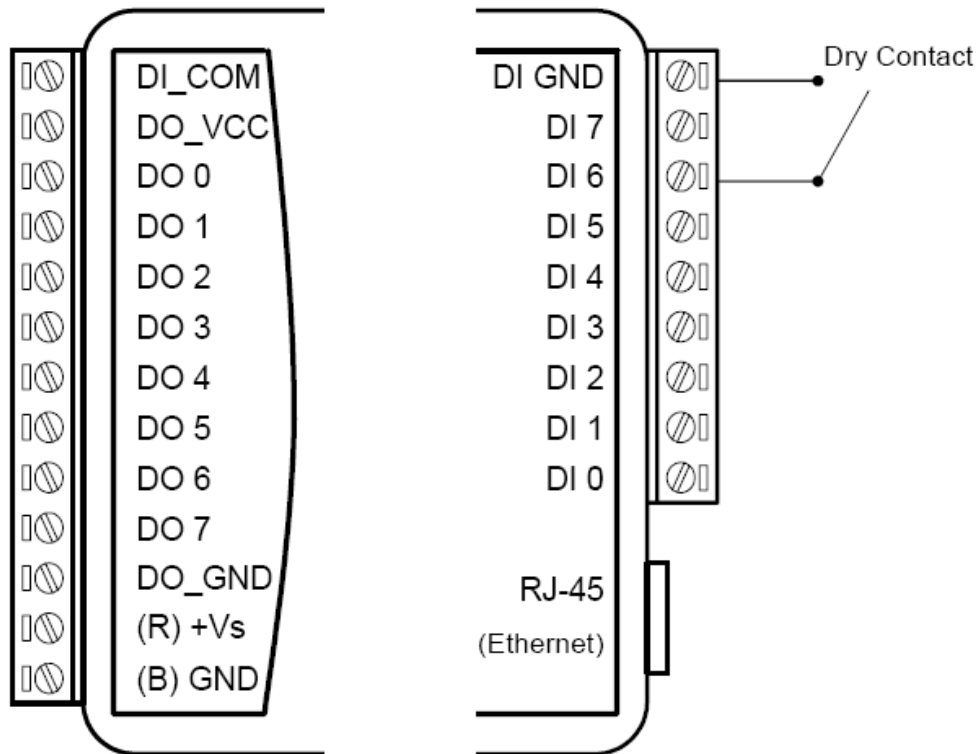


Figure 1.2: RemoDAQ-8352 DI (Dry Contact) Wiring

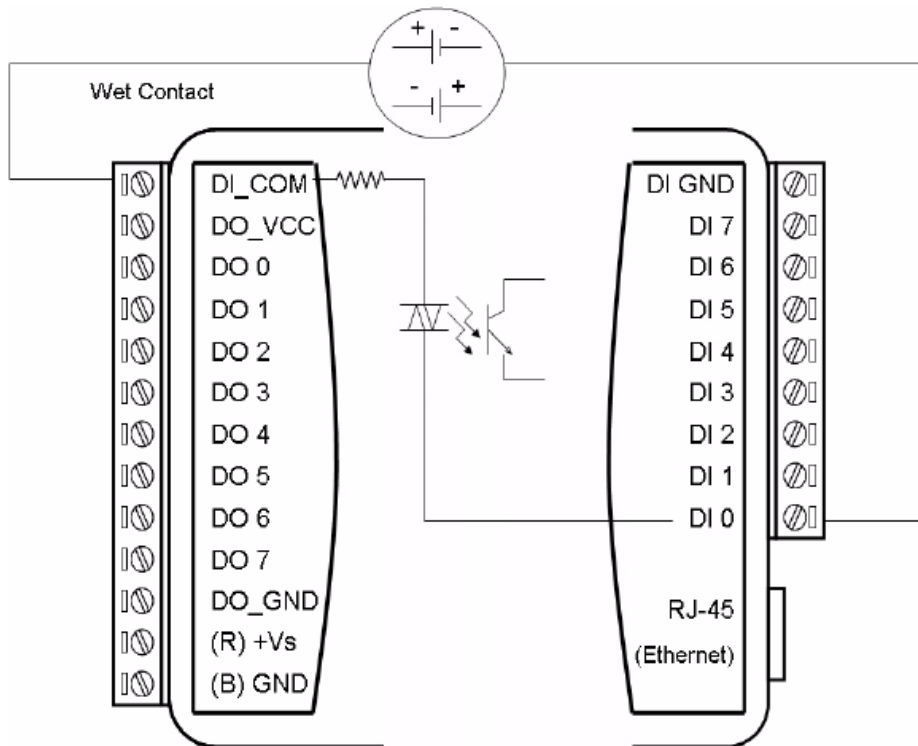


Figure 1.3: RemoDAQ-8352 DI (Wet Contact) Wiring

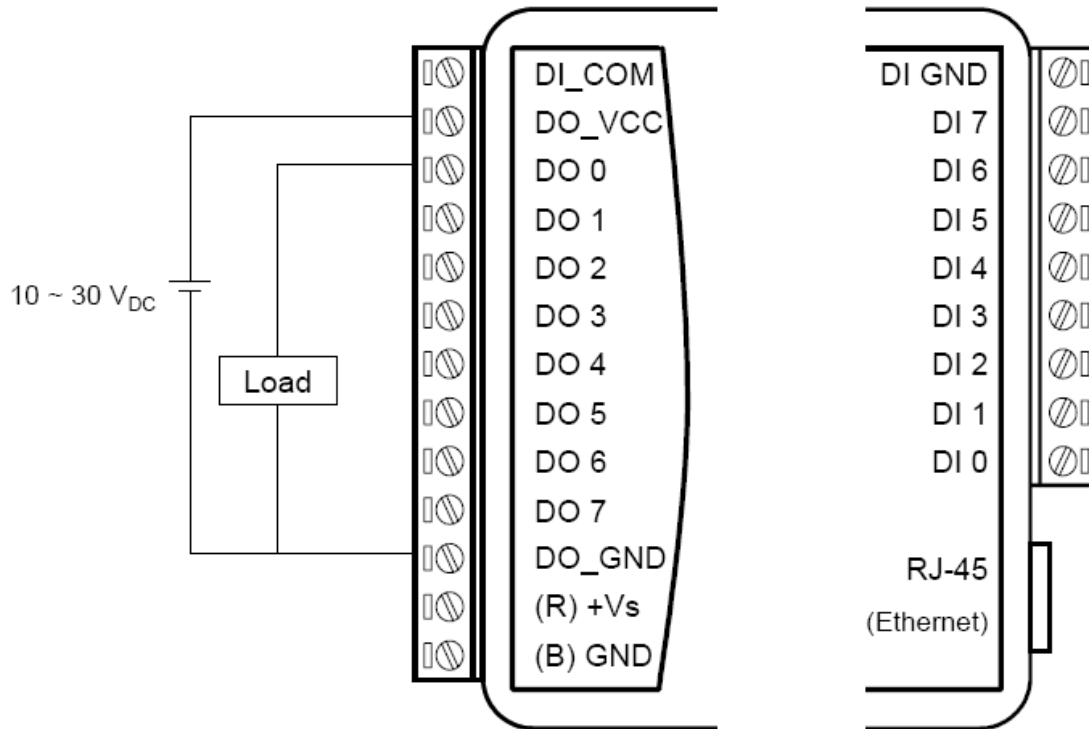


Figure 1.4: RemoDAQ-8352 Digital Output Wiring

## 1.6 I/O Module Configuration

### 1.6.1 Power-on initialization

After power-on, the module will read out the data EEPROM, configuration-related registers, such as: pulse output width, absolute pulse, incremental pulse, module's name, module's version register, DI mode and DO Mode. Each of these registers the user is configured correctly, the module will write this configuration information once the corresponding EEPROM address.

### 1.6.2 DI Mode

#### 1. DI (default)

When a DI channel Mode Register set to 00 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel is in Normal DI Mode. In this mode, the channel is only collected the current state of the DI.

#### 2. Counter

When a DI channel Mode Register set to 01 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel is in Counter Mode. In this mode, when "Counter Start(1)/Stop(0)" bit is 1, the counter will start

counting, counts need to read the corresponding register. Users can set the "Clear Counters (1)" bit to 1, clear the current count.

### **3. Low to High Latch**

When a DI channel mode register set to 02 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel is in the Low - High Latch Mode. In this model, once the digital input channel detects logic level changes from low to high, the "DI Latch State" bit will remain the logic high. "DI Latch State" bit value will remain unchanged until the user to read this one before they are automatically cleared.

### **4. High to Low Latch**

When a DI channel mode register set to 03 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel is in the High - Low Latch Mode. In this model, once the digital input channel detects logic level changes from high to low, the "DI Latch State" bit will remain the logic high. "DI Latch State" bit value will remain unchanged until the user to read this one before they are automatically cleared.

### **5. Frequency**

When a DI channel mode register set to 04 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel in the Frequency mode. When you choose Frequency mode, RemoDAQ-8352 digital module will calculate the frequency value of the digital input signal from the selected channel. The frequency value (per second refresh) will be stored in the corresponding channel's Frequency Value Register.

## **1.6.2 DO Mode**

### **1. DO (default)**

When a DO channel mode register set to 00 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel is in DO mode. In this mode, the operation of that channel will be the corresponding digital output.

### **2. Pulse Output**

When a DO channel mode register set to 01 (see 2.8 RemoDAQ-8352 MODBUS RTU address of the image table), the channel is in Pulse Output mode. The pulse output is the same as PWR. After you choose the Pulse output mode, the selected digital output channel can generate continuous pulse train or finite pulses. The user can define the " Pulse Output Low Level Width," " Pulse Output High Level Width," " Set Absolute Pulse " and " Set Incremental Pulse," a corresponding pulse will generate.



## Chapter 2 Command Data Formats

RemoDAQ-8300 systems accept a command/response form with the host computer. When systems are not transmitting they are in listen mode. The host issues a command to a 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 is consisted of command head and command body. The command head is prefixed by six bytes and responded 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-8352 (address:40001~40002), the request command should be:

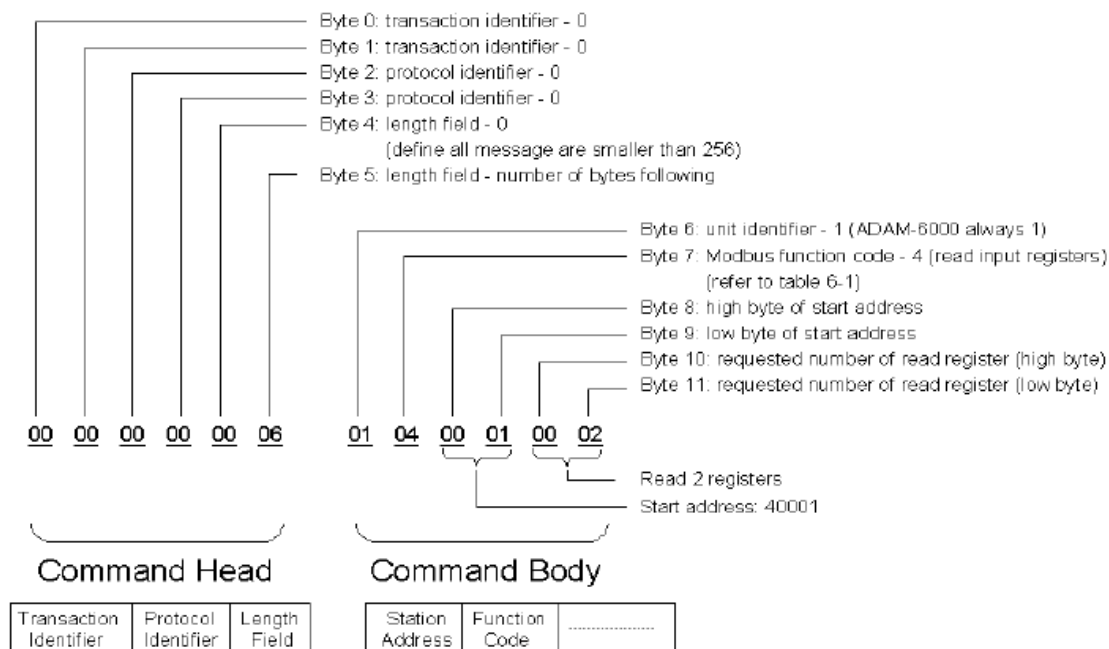
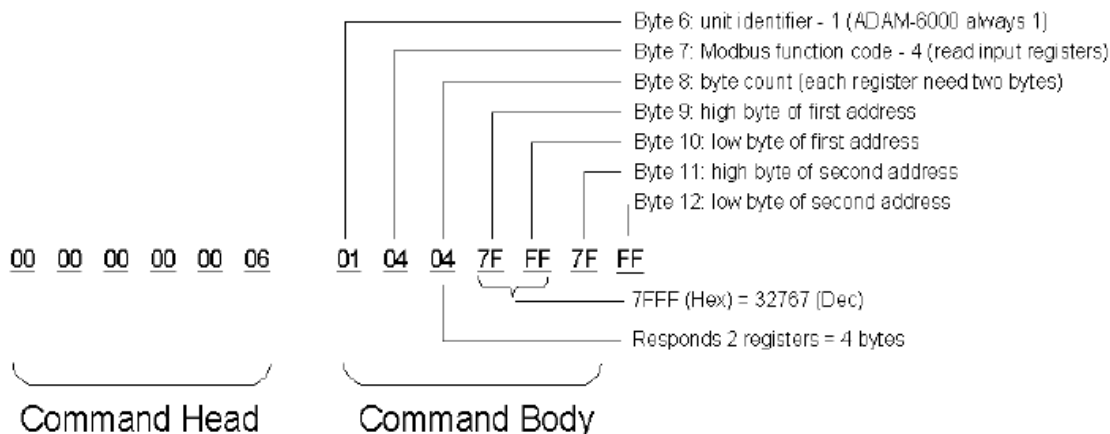


Figure2.1 Request Comment Structure



**Figure2.2 Response Comment Structure**

## 2.2 Modbus Function Code Introductions

To full-fill the programming requirement, there is a series of function code standard 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:

<b>Command Body</b>					
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:

<b>Command Body</b>					
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:

<b>Command Body</b>					
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:

<b>Command Body</b>					
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

Presets 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, function code, start address, and requested number of registers preset.

<b>Command Body</b>					
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-8352 MODBUS Mapping Table

Table 2-1

Address (Decimal)	Address (Hex)	Ch	Attribute	Description
0001	00H	0	Read	DI0
0002	01H	1	Read	DI1
.....	.....	.....	.....	.....
0008	07H	7	Read	DI7
0017	10H	0	R/W	DO0
0018	11H	1	R/W	DO1
.....	.....	.....	.....	.....
0024	17H	7	R/W	DO7
0033	20H	0	R/W	Counter Start(1)/Stop(0)
0034	21H		Write	Clear Counter(1)
0035	22H		R/W	Clear Overflow <sup>③</sup>
0036	23H		R/W	DI Latch Status4 <sup>④</sup>
0037	24H	1	R/W	Counter Start(1)/Stop(0)
0038	25H		Write	Clear Counter(1)
0039	26H		R/W	Clear Overflow <sup>③</sup>
0040	27H		R/W	DI Latch Status4 <sup>④</sup>
0041	28H	2	R/W	Counter Start(1)/Stop(0)
0042	29H		Write	Clear Counter(1)
0043	2AH		R/W	Clear Overflow <sup>③</sup>
0044	2BH		R/W	DI Latch Status4 <sup>④</sup>
0045	2CH	3	R/W	Counter Start(1)/Stop(0)
0046	2DH		Write	Clear Counter(1)
0047	2EH		R/W	Clear Overflow <sup>③</sup>
0048	2FH		R/W	DI Latch Status4 <sup>④</sup>
0049	30H	4	R/W	Counter Start(1)/Stop(0)
0050	31H		Write	Clear Counter(1)
0051	32H		R/W	Clear Overflow <sup>③</sup>
0052	33H		R/W	DI Latch Status4 <sup>④</sup>
0053	34H	5	R/W	Counter Start(1)/Stop(0)
0054	35H		Write	Clear Counter(1)
0055	36H		R/W	Clear Overflow <sup>③</sup>
0056	37H		R/W	DI Latch Status4 <sup>④</sup>

Address (Decimal)	Address (Hex)	Ch	Attribute	Description
0057	38H	6	R/W	Counter Start(1)/Stop(0)
0058	39H		Write	Clear Counter(1)
0059	3AH		R/W	Clear Overflow <sup>③</sup>
0060	3BH		R/W	DI Latch Status4 <sup>④</sup>
0061	3CH	7	R/W	Counter Start(1)/Stop(0)
0062	3DH		Write	Clear Counter(1)
0063	3EH		R/W	Clear Overflow <sup>③</sup>
0064	3FH		R/W	DI Latch Status4 <sup>④</sup>
40001 ~ 40002	0H ~ 1H	0	Read	Counter/Frequency Value <sup>①</sup>
40003 ~ 40004	2H ~ 3H	1	Read	
.....	.....	.....	.....	
40015 ~ 40016	0EH ~ 0FH	7	Read	
40017 ~ 40018	10H ~ 11H	0	R/W	Pulse Output Low Level Width <sup>②</sup>
40019 ~ 40020	12H ~ 13H	1	R/W	
.....	.....	.....	.....	
40031 ~ 40032	1EH ~ 1FH	8	R/W	
40033 ~ 40034	20H ~ 21H	0	R/W	Pulse Output High Level Width <sup>②</sup>
40039 ~ 40040	22H ~ 23H	1	R/W	
.....	.....	.....	.....	
40047 ~ 40048	2EH ~ 2FH	8	R/W	
40049 ~ 40050	30H ~ 31H	0	R/W	Set Absolute Pulse <sup>⑤</sup>
40051 ~ 40052	32H ~ 33H	1	R/W	
.....	.....	.....	.....	
40053 ~ 40064	3EH ~ 3FH	8	R/W	



Address (Decimal)	Address (Hex)	Ch	Attribute	Description
40065 ~ 40066	40H ~ 41H	0	R/W	Set Incremental Pulse⑥
40067 ~ 40068	42H ~ 43H	1	R/W	
.....	.....	.....	.....	
40079 ~ 40080	4EH ~ 4FH	8	R/W	
40211	D2		Read	Name :83H, 52H
40213	D4		R/W	Version:A1H, 00H
40257	100H	0	R/W	DI0 Mode:00H, VVH⑦
40258	101H	1	R/W	DI1 Mode:00H, VVH⑦
.....	.....	.....	.....	.....
40264	107H	7	R/W	DI7 Mode:00H, VVH⑦
40273	110H	0	R/W	DO0 Mode:00H, SSH⑧
40274	111H	1	R/W	DO1 Mode:00H, SSH⑧
.....	.....	.....	.....	.....
40280	117H	7	R/W	DO7 Mode:00H, SSH⑧
40301	12CH	ALL	R	DI Value
40303	12EH	ALL	R/W	DO Value

**Note:**

- ① How to retrieve the counter/frequency value:  
Counter (decimal) = (value of 40002) \* 65536 + (value of 40001)  
**Frequency (decimal) = value of 40001。**
- ② Time Unit: 0.1ms。
- ③ If the count number is overflow, this bit will be 1. Once this bit is read, the value will return to 0.
- ④ When DI channel is configured as “High to low latch” or “Low to high latch”, this bit will be 1 if the latch condition occurs. After that, value of this bit will keep 1 until user writes 0 to this bit (clear the latch status).
- ⑤ Decide how many pulses will be generated. When user writes 0 to this bit, it will continuously generate pulse.
- ⑥ During the pulse generation, user can use this bit to generate more pulses. For example, “Absolute pulse” is set as 100. During its generation, user

can set “Incremental pulse” as 10. After the 100 pulses are generated, the extra 10 pulses will continue to be generated.

⑦DI mode:

VV(Hex)	00	01	02	03	04
DI mode	DI	Count	High to Low Latch	High to Low Latch	Frequency

⑧DO mode:

SS(Hex)	00	01
DO mode	DO	Pulse Output

## Chapter 3 Software Instructions

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

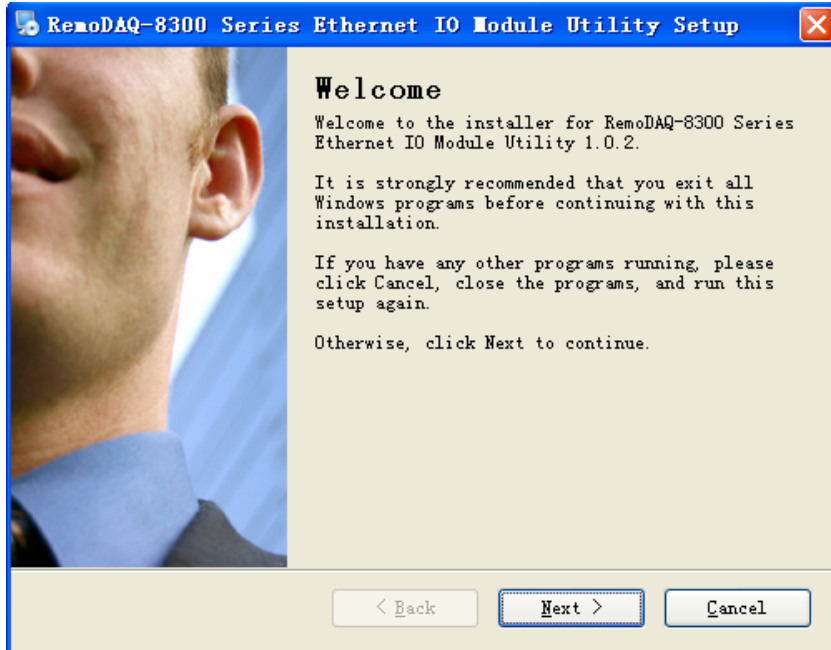


Figure 3.1

2, Click Next, under the silent installation.

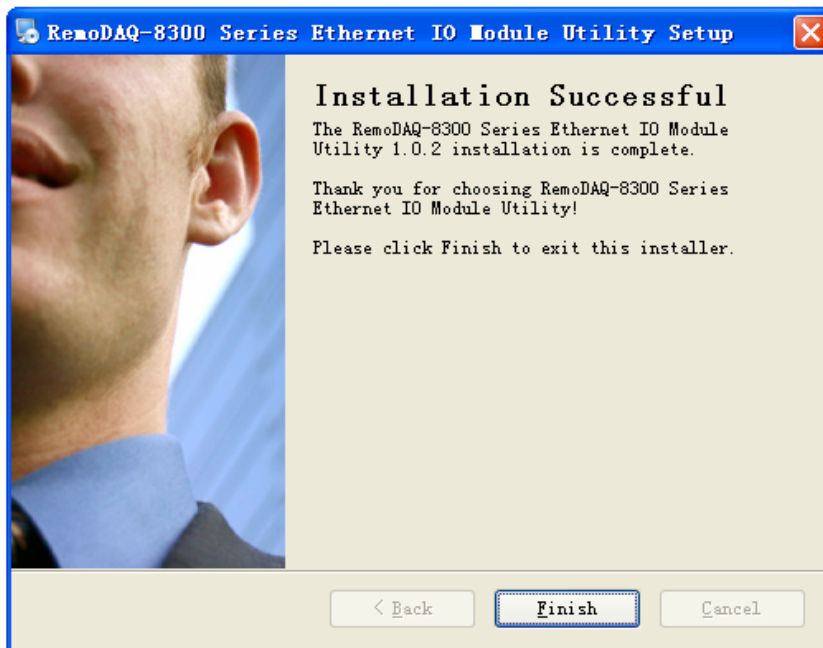


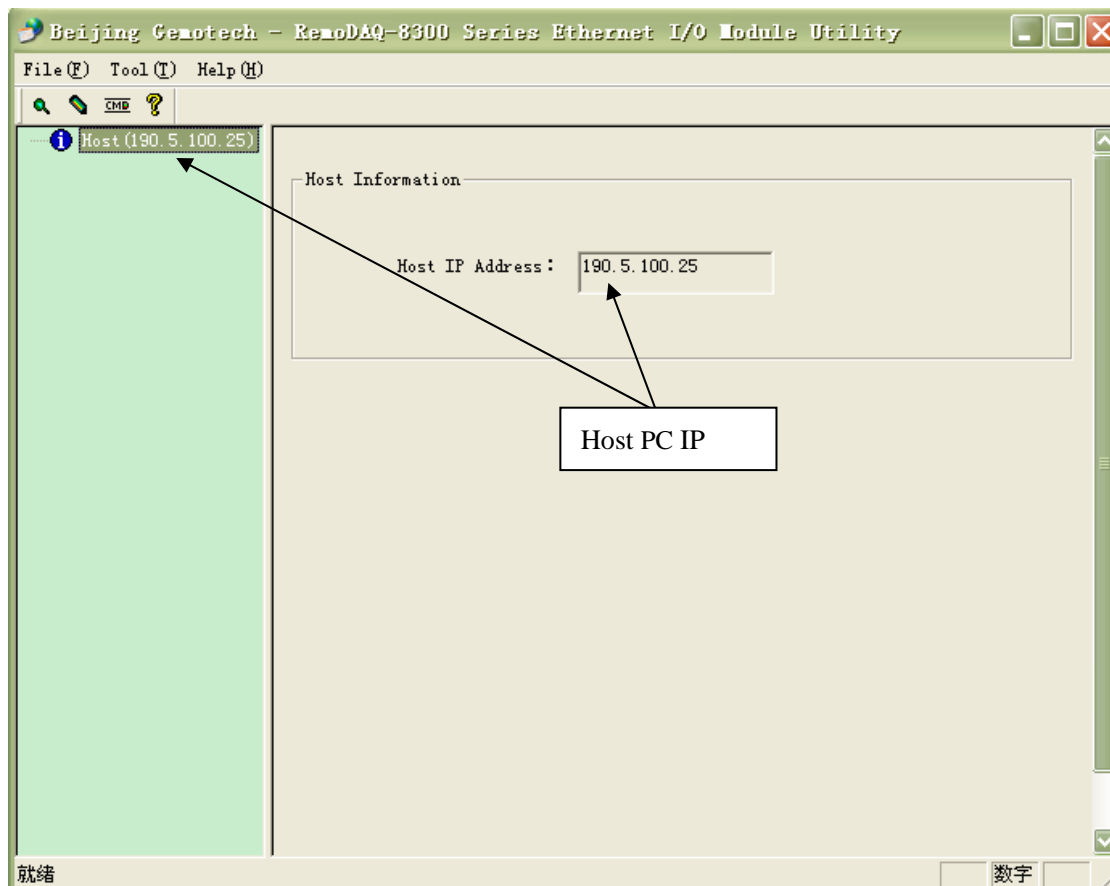
Figure 3.2

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



**Figure 3.3**

- 5, Double click the shortcut icon into the interface 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 is used the first time, its IP will be 192.168.0.1 by default .

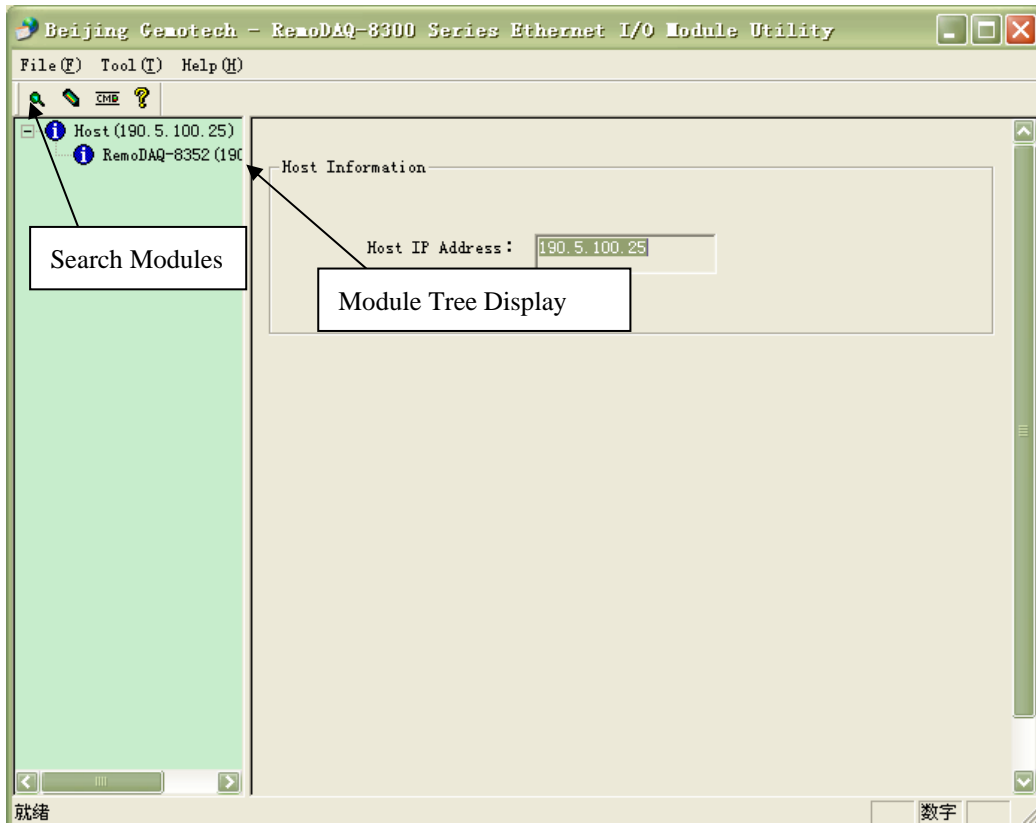


Figure 3.5

7, Click NetWork Setting.

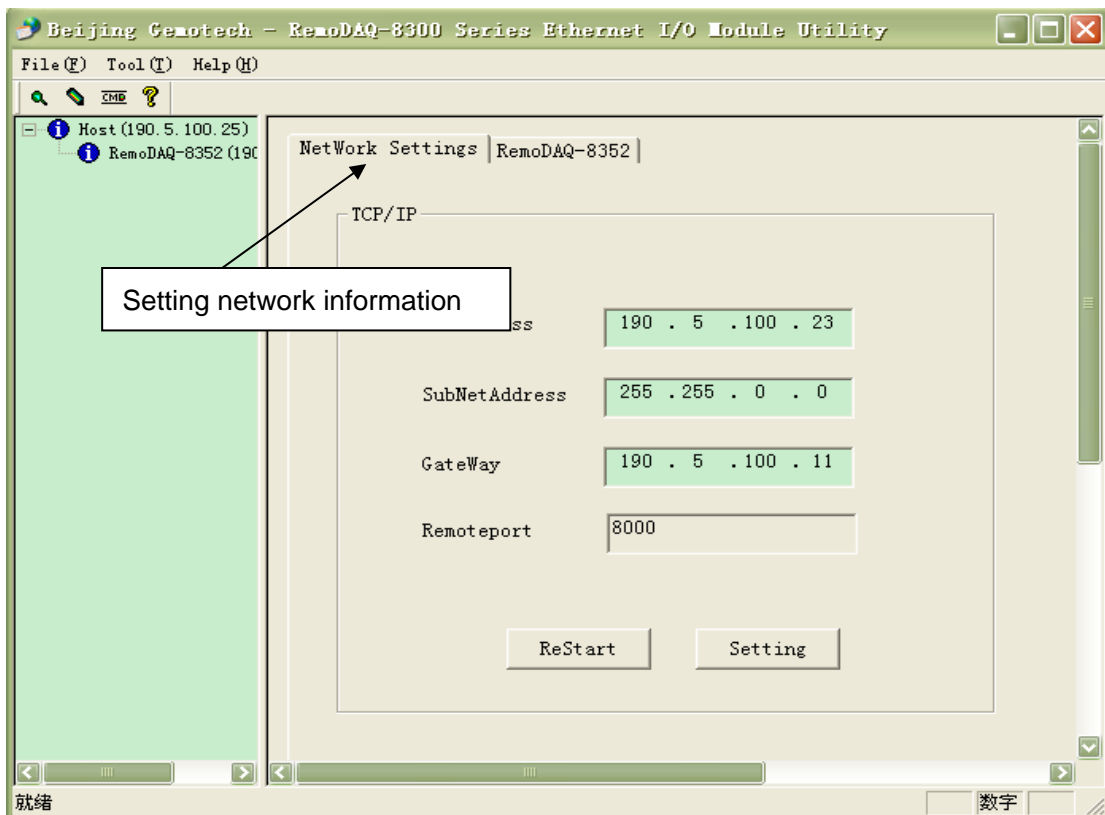


Figure 3.6

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-8352 into the application interface.

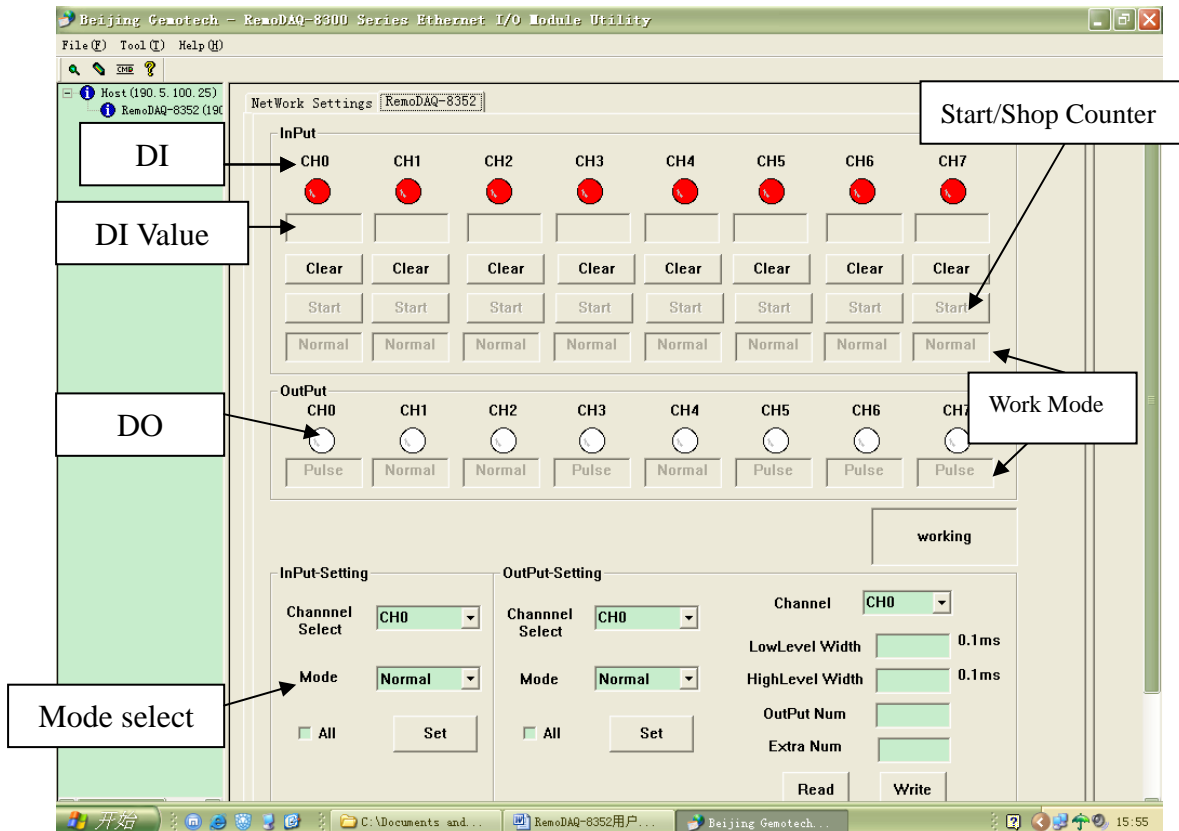


Figure 3.7

## Instructions

### 1. Channel Setting

You can see value of all digital input channels by related LED display in this tab. Besides, you also can control values of all digital output channels by related button. The LED next to the button will display current value of that digital output channel.

### 2. DI setting

You can see digital input value and configure setting for each digital input channel. It is the same that you can control the digital output value and configure setting for each digital output channel.

You can choose different mode for that digital input channel by choosing the **InPut-Setting** area at the bottom left corner of this tab. After you have chosen the channel and the mode, click the **Set** mode button. When you click

the **ALL** check box, all channel will be set in the same mode.

When you choose **Counter** mode, one counter will count the pulse number of the digital signal from the selected channel, and then record the count number in the register. At the bottom of the **InPut** area, current count value of the selected channel is displayed by the **DI Value** (see Figure3.7) text box.

When you choose **Low to High Latch** mode, once the digital input channel detects logic level changes from low to high, the **DI Latch Status** will be set a bit. The **DI Latch Status** will remain the logic high, until you clear latch manually. Then the **DI Latch Status** will back to logic low. The latch status can be seen by the **DI Value** text box at the bottom of the **InPut** area. You can clear latch by clicking the **Clear** button.

When you choose **High to Low Latch** mode, once the digital input channel detects logic level changes from high to low, the **DI Latch Status** will be set a bit. The **DI Latch Status** will remain the logic high, until you clear latch manually. Then the **DI Latch Status** will back to logic low. The latch status can be seen by the **DI Value** text box at the bottom of the **InPut** area. You can clear latch by clicking the **Clear** button.

When you choose **Frequency** mode, RemoDAQ-8300 digital module will calculate the frequency value of the digital input signal from the selected channel. The frequency value will be displayed by the **DI Value** text box at the bottom of the **InPut** area.

### 3. DO setting

You can choose different mode for that digital output channel by choosing the DO mode combo box in the **OutPut-Setting** area. After you have chosen the mode, click the **Set** mode button. When you click the **ALL** check box, all channel will be set in the same mode.

When you choose DO mode, you can control the digital output value of the selected channel by the **DO** button. The current digital output value will be shown by the DO status LED display.

The pulse output is the same as PWR. After you choose the **Pulse output** mode, the selected digital output channel can generate continuous pulse train or finite pulses. You can define the pulse width by entering into the Low signal width and High signal width text box in the **OutPut-Setting** area. After you complete the setting, click the **SET** button. Then you can choose to generate continuous pulse train or finite pulses. After select the pulse output mode, click the **LED** button to generate or stop the pulse output.