

V1.1 2009.02.13

# **RemoDAQ-8000 DIO Series**

## **User's Manual**



**Beijing Gemotech Intelligent Technology Co., Ltd**

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## Acknowledgments

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**Edition 1.1**

**Feb. 2009**

## **Additional Information and Assistance**

1. Visit the **Gemotech** websites at **www.gemotech.cn** where you can find the latest information about the product.
2. Contact your distributor, sales representative, or **Gemotech** 's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

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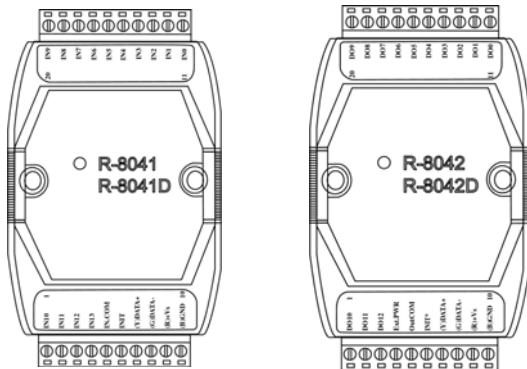
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# 1 Introduction

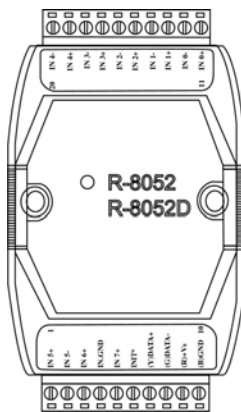
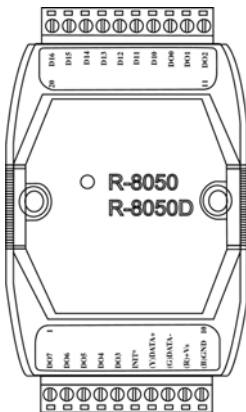
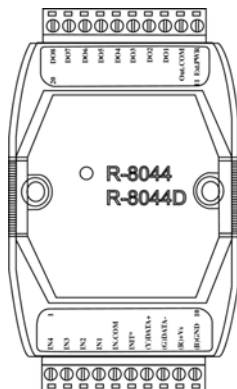
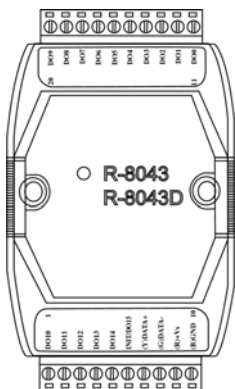
The RemoDAQ-8000 Series is a set of intelligent sensor to computer interface modules containing built in microprocessor. They are remotely controlled through a simple set of commands issued in ASCII format and transmitted in RS-485 protocol. They provide signal conditioning, isolation, ranging, A/D and D/A conversion, data comparison, digital communication, timer/counter, wireless communication, collection AC and other functions.

The DIO modules support TTL signal, photo-isolated digital input, relay contact output, solid-state relay output, photoMOS output and open-collector output. Reference *Sec.1.1* for detail information.

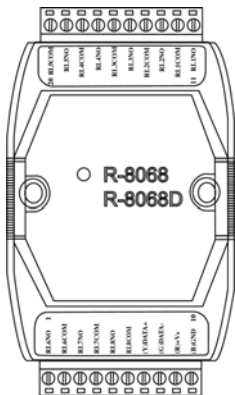
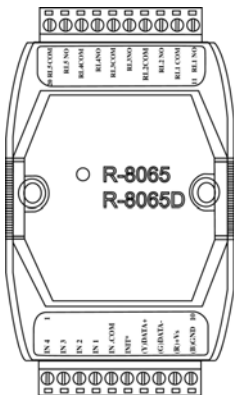
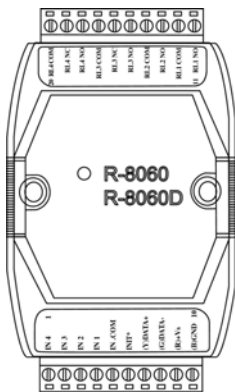
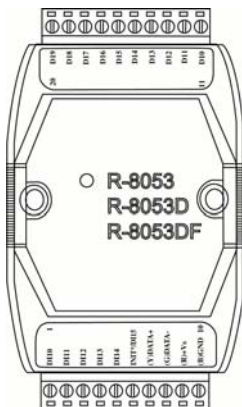
## 1.1 Pin Assignment & Specifications



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<b>Digital Input Module</b>			
	R-8041/41D	R-8052/52D	R-8053/53D/53DF
Input channel	14	8	16
Isolation	Single-ended Isolation	6 diff /2 single-ended	Non-isolated
Isolation Voltage	3750Vrms	5000Vrms	Non-isolated
Digital level 0	+1V max	+1V max	+2V max
Digital level 1	+4~+30V	+4~+30V	+4~+30V
Input Impedance	3K ohms	3K ohms	820 ohms
Power Consumption	0.2W(R-8041) 0.9W(R-8041D)	0.2W(R-8052) 0.6W(R-8052D)	0.7W(R-8053) 0.9W(R-8053D)
Power input	+10V~+30V		
Operating Temperature: -20 ~ 70° C      Humidity: 5 ~ 95%, non-condensing			
<b>Remark:</b> When DI changes , input state is delivered initiative (R-8053DF)			

<b>Relay Output Modules</b>			
	R-8060/60D	R-8065/65D	R-8068/68D
Output channel	4	5	8
Relay type	RL1,RL2: FormA RL3,RL4: FormC	FormA	FormA
Contact rating	0.6A@125VAC 2A@30VDC	5A@250VAC 5A@30VDC	1A@250VAC 2A@30VDC
Surge strength	1500V	4000V	1000VAC
Operate time	3mS	6mS Max	5mS
Release time	2mS	3mS Max	2mS
Min.Life	5*10 <sup>5</sup> ops	10 <sup>5</sup> ops	5*10 <sup>5</sup> ops
Input channel	4	4	Non
Isolation	Single-ended Isolation	Single-ended Isolation	
Isolation voltage	3750 Vrms	3750 Vrms	

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Digital Level 0	+1 Vmax	+1 Vmax	
Digital Level 1	+4~+30V	+4~+30V	
Input impedance	3K ohms	3K ohms	
Power consumption	1.3W(R-8060) 1.9W(R-8060D)	2.2W(R-8065) 1.3W(R-8065D)	1.5W(R-8068) 2.2W(R-8068D)
Power input	+10~+30VDC		
Operating Temperature: -20 ~ 70° C      Humidity: 5 ~ 95%, non-condensing			

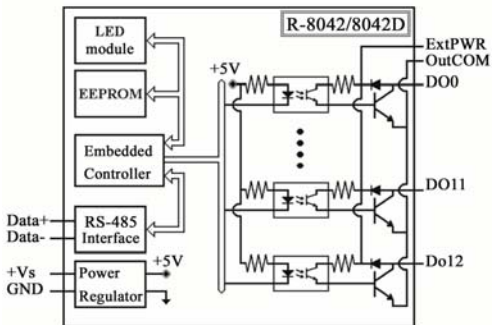
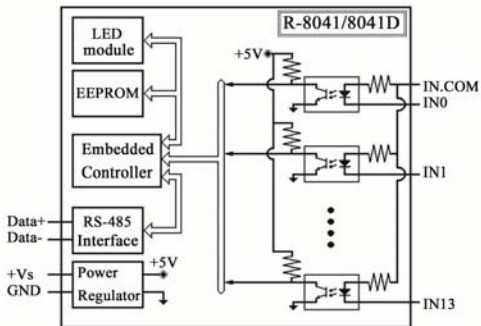
<b>Solid-State Relay Output Modules</b>		
	R-8065A/65AD	R-8065B/65BD
Output channel	5	5
SSR type	AC-SSR	DC-SSR
Load voltage range	24~265 Vrms	3~30 VDC
Leakage current	1.5 mArms	0.1 mA
Max. Load current	1.0 Arms	1.0 A
Min. Operate time	1 mS	1 mS
Min. Release time	1/2 cycle +1 mS	1 mS
Dielectric strength	2500 Vrms	2500 Vrms
Input channel	4	4
Isolation	Single-ended Isolation	Single-ended Isolation
Isolation voltage	3750 Vrms	3750 Vrms
Digital level 0	+1 Vmax	+1 Vmax
Digital level 1	+4~+30V	+4~+30V
Input impedance	3K ohms	3K ohms
Power consumption	1.6W(R-8065A)	1.5W(R-8065B)
	0.8W(R-8065AD)	0.7W(R-8065BD)
Power input	+10~+30VDC	
Operating Temperature: -20 ~ 70° C      Humidity: 5 ~ 95%, non-condensing		

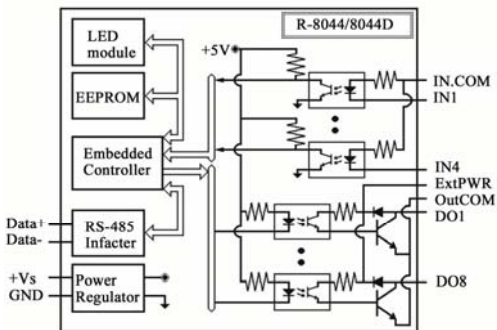
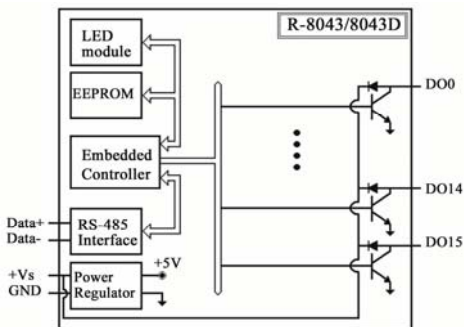
## RemoDAQ-8000 DIO Series User's Manual

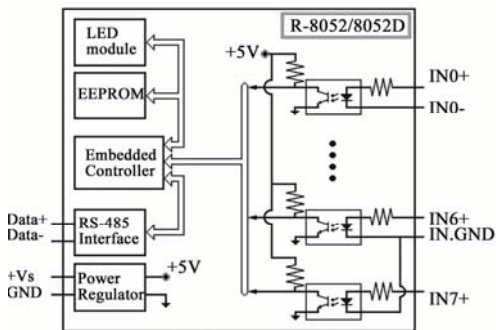
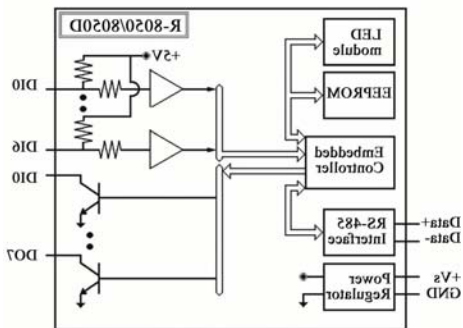
<b>PhotoMOS Output modules</b>	
	R-8066/8066D
Output channel	7
Load current	0.13A
Load voltage	350V max
Isolation voltage	5000VAC
TurnOn time	0.7 mS typ
TurnOff time	0.05 mS typ
Power input	+10V~30VDC
Power consumption	0.5W(R-8066); 0.8W(R-8066D)
Operating Temperature: -20 ~ 70° C      Humidity: 5 ~ 95%, non-condensing	

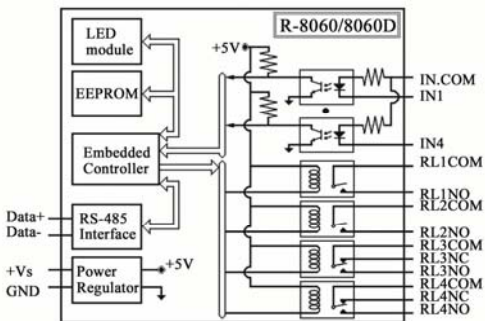
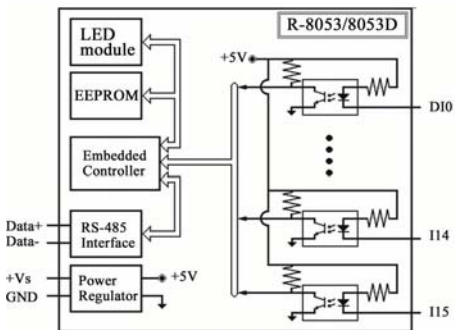
<b>Open Collector Output Modules</b>				
	R-8042/42D	R-8044/44D	R-8043/43D	R-8050/50D
Output channel	13	8	16	8
Isolation	Single-ended Isolation		Non-isolation	
Isolation voltage	3750Vrms			
Load voltage	Max + 30V			
Max. Load voltage	100mA	600mA	100mA	30mA
Input channel	No-inputs		4	7
Isolation			Single-ended Isolation	Non-isolation
Isolation voltage			3750V	
Digital level 0			1Vmax	1Vmax
Digital level 1			4~30V	3.5~30V
Input impedance			3K ohms	
Power consumption			1.0W (8042)	0.4W (8043)
	1.7W (8042D)	1.1W (8043D)	1.7W(8044D)	1.1W (8050D)
Power input	+10V~+30VDC			
Operating Temperature: -20 ~ 70° C      Humidity: 5 ~ 95%, non-condensing				

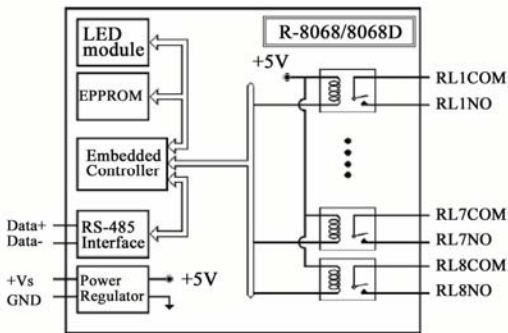
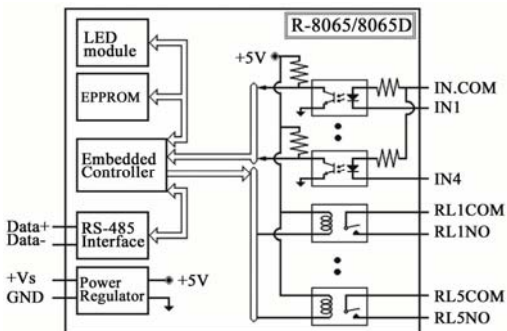
## 1.2 Block Diagram









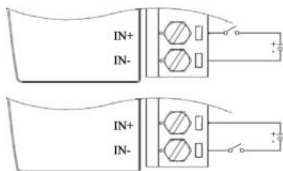




### 1.3 Application Wiring

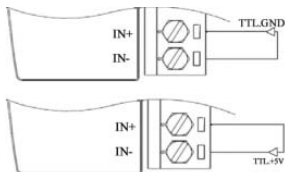
Dry Contact signal input

R-8052/52D

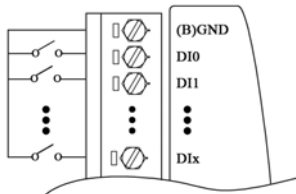


TTL/CMOS signal input

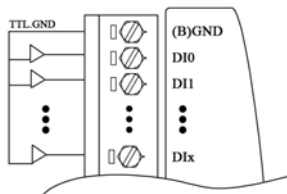
R-8052/52D



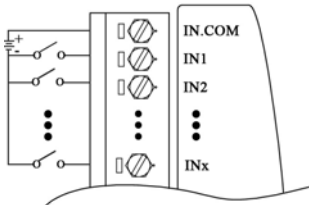
R-8050/50D/53/53D/53DF



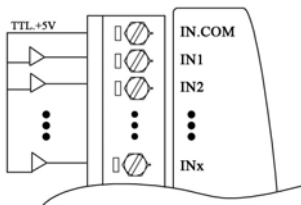
R-8050/50D/53/53D/53DF



R-8041/41D/44/44D/60/60D/65/65D

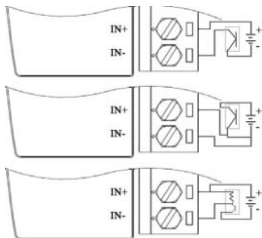


R-8041/41D/44/44D/60/60D/65/65D

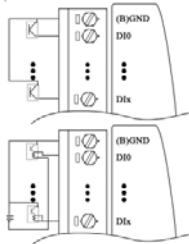


Open Collector signal input

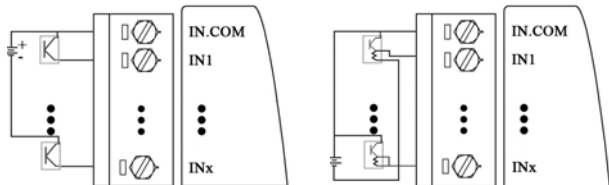
R-8052/52D



R-8050/50D



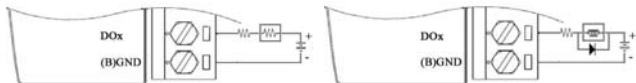
R-8041/41D/44/44D/60/60D/65/65D



## Open Collector output

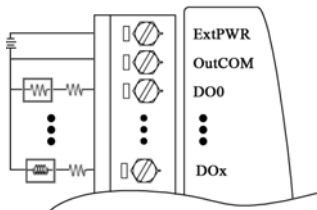
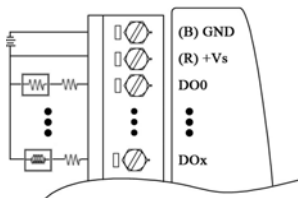
RemoDAQ-8050/50D

Note: while connect inductive load(for example to drive relay), the diode is needed for prevent the counter EMF.



R-8043/43D

R-8042/42D/44/44D



## 1.4 Default Setting

- Address: 01
- Type: Type 40 for DIO modules
- Baudrate: 9600 bps
- Checksum disable
- R-8043/8043D jumper setting at DO15
- R-8053/8053D/8053DF jumper setting at DI15

## 1.5 Jumper Setting

R-8043/8043D: Jumper J3 for select the pin INIT\*/DO15

DO15                      DO15  INIT\*

INIT                        DO15  INIT\*

R-8053/53D/53DF: Jumper J1 for select the pin INIT\*/DI15

DO15                      DI15  INIT\*

INIT                        DI15  INIT\*

## 1.6 Install List

### Baudrate Setting (CC)

Code	03	04	05	06	07	08	09	0A
Baudrate	1200	2400	4800	9600	19200	38400	57600	115200

### Type Setting (TT)

Type = 40 for DIO mode

### Data format setting (FF)

7	6	5	4	3	2	1	0
*1	*2	0				*3	

\*1: Counter Update Direction: 0=falling Edge, 1=Rising Edge

\*2: Checksum Bit: 0=Disable, 1=Enable

\*3: 8050 = 0 (Bit[2.1.0]=000); 8060 = 1 (Bit[2.1.0]=001)

8052 = 2 (Bit[2.1.0]=010); 8053 = 3 (Bit[2.1.0]=011)

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8068 = 4 (Bit[2.1.0]=100)

### Read Digital Input/Output Data Format

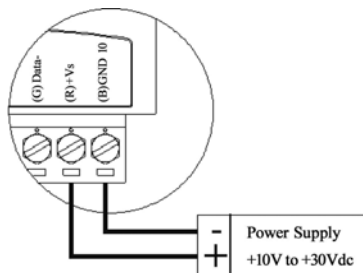
Data of \$AA6, \$AA4, \$AALS: (First Data)(Second Data)00

Data of @AA: (First Data)(Second Data)

	First Data		Second Data	
R-8041/8041D	DI(8-13)	00 ~ 3F	DI(0-7)	00 ~ FF
R-8042/8042D	DO(8-12)	00 ~ 1F	DO(0-7)	00 ~ FF
R-8043/8043D	DO(8-15)	00 ~ FF	DO(0-7)	00 ~ FF
R-8044/8044D	DO(1-8)	00 ~ FF	DI(1-4)	00 ~ 0F
R-8050/8050D	DO(0-7)	00 ~ FF	DI(0-6)	00 ~ 7F
R-8052/8052D	DI(0-7)	00 ~ FF	00	00
R-8053/8053D	DI(8-15)	00 ~ FF	DI(0-7)	00 ~ FF
R-8060/8060D	DO(1-4)	00 ~ 0F	DI(1-4)	00 ~ 0F
R-8065s *1	DO(1-5)	00 ~ 1F	DI(1-4)	00 ~ 0F
R-8068/8068D	DO(1-8)	00 ~ FF	00	00
*1 RemoDAQ-8065s include R-8065/8065D/8065A/8065AD/8065B/8065BD				

## 2 Initialization & Installation

### 2.1 Installation Guideline



**Figure 2-1** Power Supply Connections

We advise that the following standard colors (as indicated on the modules) be used for power lines:

+Vs (R)	Red
GND (B)	Black

We advice that the following standard colors (as indicated on the modules) be used for the communication lines:

DATA+ (Y)	Yellow
DATA- (G)	Green

### 2.2 Software Installation

1. If you have already installed “RemoDAQ-8000 Utility”

- then skip other steps.
2. Backup your software diskette.
  3. Insert “RemoDAQ-8000 Utility” disc into CD-ROM:
  4. Change drive to the path of CD-ROM. For example, your drive of CD-ROM is F: then change the drive to F:
  5. Find the setup of “RemoDAQ-8000 Utility” and run it.
  6. Please follow the steps of setup program then you can successful to install the RemoDAQ-8000 Utility

## 2.3 Basic configuration and hook-up

Before placing a module in an existing network, the module should be configured. Though all modules are initially configured at the factory, it is recommended to check that the baud rate is set correctly.

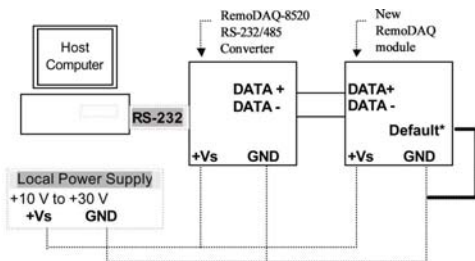
### **Default Factory Settings**

Baud rate: 9600 Bit/sec.

Address: 01 (hexadecimal)

Checksum: disable

The basic hook-up for module configuration is shown below.



**Figure 2-2** Layout for Initialization the RemoDAQ module

The following items are required to configure a module: a RemoDAQ converter module, a personal computer with RS-232 port (baudrate set to 9600) and the RemoDAQ utility software.

### **Configuration with the RemoDAQ Utility Software**

The easiest way to configure the RemoDAQ module is by using the RemoDAQ utility software: an easy-to-use menu-structured program will guide you through every step of the configuration.

### **Configuration with the RemoDAQ command set**

RemoDAQ modules can also be configured by issuing direct commands from a terminal emulation program within what is part of the RemoDAQ utility software.

The following example guides you through the setup of an analog input module. Assume that RemoDAQ-8042 still has its default settings (baud rate 9600 and address 01h). Before the module is reconfigured, it is first requested to send its default settings.



To change the configuration setting of the analog input module, the following command is issued:

%0107400600(cr)

% = change configuration

01 = target module at address 00 to:

07 = change address to 07 hexadecimal

40 = set input range to Type 40

06 = set baud rate to 9600

00 = set integration time to 50 ms (60 Hz)

disable checksum

set data format to engineering units

(See Chapter 3, Command Set for a full description of the syntax of the configuration command for module)

When the module received the configuration command it will respond with its new address: !07(cr)

**NOTICE:** *All reconfiguration except changing of baud rate and checksum values can be done dynamically, i.e. the modules need not to be reset. When changing the baud rate or checksum, these changes should be made for all connected devices. After reconfiguration, all modules should be powered down and powered up to force a reboot and let the changes take effect.*

## 2.4 Baudrate and Checksum

RemoDAQ modules contain EEPROMs to store configuration information and calibration constants. The

EEPROM replaces the usual array of switches and ports required to specify baudrate, input/output range etc.

All of the RemoDAQ modules can be configured remotely through their communication ports, without having to physically alter port or switch settings.

Forcing the module in the INIT\* state does not change any parameters in the module's EEPROM. When the module is in the INIT\* state with its INIT\* and GND terminals shorted, all configuration settings can be changed and the module will respond to all other commands normally.

### **Changing Baudrate and Checksum**

Baudrate and checksum settings have several things in common:

- They should be the same for all modules and host computer.
- Their setting can only be changed by putting a module in the INIT\* state.
- Changed settings can only take effect after a module is rebooted

To alter baudrate or checksum settings you must perform the following steps:

- Power on all components except the RemoDAQ Module.
- Power the RemoDAQ module on while shorting the INIT\* and GND terminals
- Wait at least 7 seconds to let self calibration and ranging take effect.
- Configure the checksum status and/or the baud rate.
- Switch the power to the RemoDAQ Module OFF.

- Remove the grounding of the INIT\* terminal and power the module on.
- Wait at least 7 seconds to let self calibration and ranging take effect.
- Check the settings (If the baud rate has changed, the settings on the host computer should be changed accordingly).

## 3 Command Set

### Introduction

To avoid communication conflicts when several devices try to send data at the same time, all actions are instigated by the host computer. The basic form is a command/response protocol with the host initiating the sequence.

When modules are not transmitting they are in listen mode. The host issues a command to a module with a specified address and waits a certain amount of time for the module to respond. If no response arrives, a timeout aborts the sequence and returns control to the host.

Changing RemoDAQ's configuration might require the module to perform auto calibration before changes can take effect. Especially when changing the range, the module has to perform all stages of auto calibration that it also performs when booted. When this process is under way, the module does not respond to any other commands.

The command set includes the exact delays that might

occur when modules are reconfigured.

### Syntax

[delimiter character][address][command][data][checksum]  
[carriage return]

Every command begins with a delimiter character. There are four valid characters: a dollar sign \$, a pound sign #, a percentage sign % and an at sign @.

The delimiter character is followed by a two-character address (hexadecimal) that specifies the target module. The actual two-character command follows the address. Depending on the command, an optional data segment follows the command string. An optional two character checksum may be appended to the total string. Every command is terminated by a carriage return (cr).

### Calculate Checksum:

1. Calculate ASCII sum of all characters of a command (or a response) string except the character returns (cr).
2. Mask the sum of string with 0ffh.

### Example:

Command string: \$012(cr)

Sum of string='\$'+ '0'+ '1'+ '2'=24h+30h+31h+32h=B7h

The checksum is B7h, and [CHK] = "B7"

Command string with checksum: \$012B7(cr)

Response string: !01200600 (cr)

Sum of string: '!'+ '0'+ '1'+ '2'+ '0'+ '0'+ '6'+ '0'+ '0'  
 =1h+30h+31h+32h+30h+30h+36h+30h+30h=1AAh

The checksum is AAh, and [CHK] = "AA"

Response string with checksum: !01200600AA(cr)

<b>General Command Sets</b>			
<b>Syntax</b>	<b>Command Name</b>	<b>Command Description</b>	<b>Notes</b>
%AANNTTCFF	Configuration	Sets the address,input range, baudrate,data format,checksum status	3.1
#AABBDD	Digital data output	Return the output value from the module in the currently configured data format	3.2
#AAN	Read digital input reversely	Return the input value from the module channels N in the currently configured data format	3.3
\$AA2	Configuration status	Return the configuration parameters for the module	3.4
\$AA5	Reset Status	Checks if module has been reset since the last \$AA5 command	3.5
\$AA6	Digital I/O value	Returns the values of the digital I/O channel in the addressed module	3.6
\$AAF	Read firmware version	Return the firmware version code	3.7
\$AAM	Read module name	Return the module name	3.8
\$AAC	Clear latched digital input	Return correct or error	3.9

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\$AACN	Clear digital input count	Return correct or error	3.10
\$AALS	Read latched digital input	Return the input value from the module	3.11
@AA	Digital I/O status	Returns the status of the digital I/O channel in the addressed module.	3.12
@AA(Data)	Set digital output	Return correct or error	3.13
~AAO(data)	Set module name	Return correct or error	3.14

### Host Watchdog Related Command Sets

Command Syntax	Command Name	Command Description	Notes
~**	Host OK	'Host ok' send to the module	3.15
~AA0	Read module status	Return module status	3.16
~AA1	Reset module status	Return success or error	3.17
~AA2	Read host watchdog timeout interval	Return timeout interval	3.18
~AA3EVV	Set host watchdog timeout interval	Return success or error	3.19
~AA4V	Read poweron value and safe value	Return power on value and safe value	3.20

### 3.1 %AANNTCCFF

**Name** Configuration

**Description** Sets address, type code, baudrate, data format

**Syntax** %AANNTCCFF(cr)

% delimiter character.

AA address of setting module (00-FF)

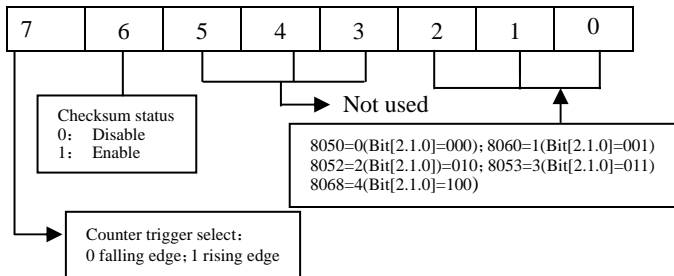
NN New address (00-FF)

TT New type

CC New baudrate

FF New data format

When changing baudrate or checksum,with should INIT\* termination land



**Figure 3-1 Data format setting of AI modules**

**Response:** !AA(cr) If the command was valid.

?AA(cr) If an invalid operation was entered. If the INIT\*terminal was not grounded when attempting to change baud rate or checksum settings.

Syntax error or communication error may get to response

! command is valid.

? command is invalid.

AA address of setting module (00-FF)

(cr) is the terminating character, carriage return (0Dh)

**Example:**

Command: %0102400600(cr) Response: !02(cr)

Change address from 01 to 02, 40 for DIO mode, baud rate 9600, integration time 50 ms (60 Hz), engineering units data format and no checksum checking or generation.

The response indicates that the command was received.

**Table 3-1 Baudrate Code**

Code	03	04	05	06	07	08	09	0A
Baudrate	1200	2400	4800	9600	19200	38400	57600	115200

**Type Code**

Type = 40 for DIO mode



### 3.2 #AABBDD

**Name:** Digital output

**Description:** Return the output value from the module in the currently configured data format.

**Syntax** #AABBDD(cr)

# delimiter character.

AA address of reading module(00~FF)

BBDD output command and parameter.

(cr) is the terminating character, carriage return (0Dh).

For output multi-channel,the BB=00,0A or 0B the select which output group,and the DD is the output value.

Parameter for Multi-Channel Output					
	Output channel	DD for command # AABBDD			
		BB=00/0A		BB=0B	
R-8042/42D	13	00 ~ FF	DO(0-7)	00 ~ 1F	DO(8-12)
R-8043/43D	16	00 ~ FF	DO(0-7)	00 ~ FF	DO(8-15)
R-8044/44D	8	00 ~ FF	DO(1-8)	NA	NA
R-8050/50D	8	00 ~ FF	DO(0-7)	NA	NA
R-8060/60D	4	00 ~ 0F	RL(1-4)	NA	NA
R-8065s *1	5	00 ~ 1F	RL(1-5)	NA	NA
R-8068/68D	8	00 ~ FF	RL(1-8)	NA	NA
*1 R-8065s include R-8065/8065D					

For output single-channel, the BB=1c, Ac or Bc where c is the selected channel, and the DD must be 00 to clear output and 01 to set output.

Parameter for Single-Channel Output				
	Single channel output command # AABDD			
	C(BB=1C/AC)		C(BB=BC)	
R-8042/8042D	0 ~ 7	DO(0-7)	0 ~ 4	DO(8-12)
R-8043/8043D	0 ~ 7	DO(0-7)	0 ~ 7	DO(8-15)
R-8044/8044D	0 ~ 7	DO(1-8)	NA	NA
R-8050/8050D	0 ~ 7	DO(0-7)	NA	NA
R-8060/8060D	0 ~ 3	RL(1-4)	NA	NA
R-8065s *1	0 ~ 4	RL(1-5)	NA	NA
R-8068/8068D	0 ~ 7	RL(1-8)	NA	NA
*1 R-8065s include R-8065/8065D				

**Response:** Valid Command: >[CHK](cr)  
 Invalid Command: ?[CHK](cr)  
 Ignored Command: ![CHK](cr)

Syntax error or communication error may get no response.

- > delimiter for valid command.
- ? delimiter for invalid command.
- ! delimiter for ignore the command. The module's host watchdog timeout status is set, and the output is set to Safe Value.

**Example:**

Command: #0100FF Receive : >

Assume module is R-8044, set address 01 output value FF, return success.

Command: #021701 Receive : ?

Set address 02 channel 7 on, return the channel is invalid

for R-8065 only has 5-channel outputs (0 to 4).

Command: #0300FF Receive : !

Set address 03 output value FF,return ignore.The module's host watchdog timeout status is set, and the output is set to Safe Value.

**Notice:** The command is useless for **R-8041/41D/52/52D/53/53D/53DF**  
**3.3 #AAN**

**Name:** Read Digital Input Counter from channel N

**Description:** The command will return the value of counter from a specified module in hex format.

**Syntax:** #AAN (cr)

# delimiter character.

AA address of reading module(00~FF)

N channel

(cr) is the terminating character, carriage return (0Dh).

**Response:** !AA(cr) if the command was valid.

?AA (cr) if an invalid operation was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of the module (00~FF)

**Example:**

Command: #32 Response: >00103

Read address 03 and channel 2, return +02.455

Command: #28 Response: ?02

Read address 02 and channel 8, return error channel number.

**Notice:** The command is useless for **R-8042/42D/43/43D/68/68D**

### 3.4 \$AA2

**Name:** Configuration Status

**Description:** The command requests the return of the configuration data from the analog input module at address AA.

**Syntax:** \$AA2 (cr)

\$ delimiter character.

AA address of reading module (00~FF)

2 the Configuration Status command.

(cr) the terminating character, carriage return (0Dh).

**Response:** !AATTCCFF(cr) if the command is valid.

?AA (cr) if an invalid operation was entered.

Syntax error or communication error may get to response

! command is valid.

? command is invalid.

AA address of module(00~FF)

TT the type code.

CC the baud rate code.

FF data format

(Also see the %AANNTTCCFF configuration command)

**Example:**

Command: \$012 Response: !01400600  
Read address 01 configuration, return success.

### 3.5 \$AA5

**Name:** Read Reset Status

**Description:** Instructs the addressed module to read its reset status and return the acquired data.

**Syntax:** \$AA5(cr)

\$ delimiter character.

AA address of reading module(00~FF)

5 command for read reset status

(cr) is the terminating character, carriage return (0Dh).

**Response:** !AAS (cr) if the command is valid.

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

S reset status, 1 = the module is been reset,

0 = the module is not been reseted

**Example:**

Command: \$015 Response: !011

Read address 01 reset status, return first read.

Command: \$015 Receive: !010

Read address 01 reset status, return no reset occurred.

### 3.6 \$AA6

**Name:** Read Digital I/O Value

**Description:** Asks a specified input module to return the status of the digital I/O channel.

**Syntax:** \$AA6 (cr)

\$ delimiter character.

AA address of reading module(00~FF)

6 read digital I/O status command.

(cr) is the terminating character, carriage return (0Dh).

**Response:** !(data)(cr) if the command is valid.

?AA (cr) if an invalid operation was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

data digital input/output value

**Example:**

Command: \$016 Response: !0F0000

Assume module is R-8060, read address 01 DIO value, return 0F00

### 3.7 \$AAF

**Name:** Read Firmware Version

**Description:** The command requests the module at address AA to return the version code of its firmware.

**Syntax:** \$AAF (cr)

\$ delimiter character.

AA address of reading module(00~FF)

F identifies the version command.

(cr) is the terminating character, carriage return (ODh)

**Response:** !AA(data)(cr) if the command is valid.

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

Data is the version code of the module's firmware at address AA.

**Example:**

Command: \$01F Receive: !01040101

Read address 01 firmware version, return version 040101

Command: \$02F Receive: !02050101

Read address 02 firmware version, return version 050101

### 3.8 \$AAM

**Name:** Read Module Name

**Description:** The command requests the module at address AA to return its name.

**Syntax:** \$AAM (cr)

\$ delimiter character.

AA address of reading module (00~FF).

M the Read Module Name command.

(cr) is the terminating character, carriage return (ODh)

**Response:** !AA(data)(cr) if the command is valid.

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

data the name of the module

**Example:**

Command: \$01M Receive: !018042

Read address 01 module name, return name 8042.

Command: \$03M Receive: !038060D

Read address 03 module name, return name 8060D.



### 3.9 \$AAC

**Name:** Clear Latched Digital Input

**Description:** Asks the module to return the status of the digital I/O channel

**Syntax:** \$AAC (cr)

\$ delimiter character.

AA address of reading module(00~FF)

C command for clear latched digital input

(cr) is the terminating character, carriage return (ODh)

**Response:** !AA (cr) if the command is valid.

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module(00~FF)

**Example:**

Command: \$01L0 Receive: !01FFFF00

Read address 01 latch-low data, return FFFF.

Command: \$01C Receive: !01

Clear address 01 latched data, return success.

Command: \$01L0 Receive: !01000000

Read address 01 latch-low data, return 0000.

**Notice:** The command is useless for **R-8042/42D/43/43D/68/68D**  
**3.10 \$AACN**

**Name:** Clear Digital Input Counter

**Description:** Asks the module to return the status of the digital I/O counter.

**Syntax:** ~AAO(Data) (cr)

\$ delimiter character.

AA address of reading module(00~FF)

C command for clear latched digital input counter

(cr) is the terminating character, carriage return (ODh)

**Response:** !AA(cr) if the command is valid.

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

**Example:**

Command: #010 Receive: !0100123

Read address 01 input channel 0 counter value, return 123.

Command: \$01C0 Receive: !01

Clear address 01 input channel 0 counter value,return success.

Command: #010 Receive: !0100000

Read address 01 input channel 0 counter value, return 0.

**Notice:** The command is useless for **R-8042/42D/43/43D/68/68D**

### 3.11 \$AALS

**Name:** Read Latched Digital Input

**Syntax:** \$AALS (cr)

\$ delimiter character.

AA address of reading module(00~FF)

L command for read latched digital input

S 1 = select latch high status, 0 = select latch low status

(cr) is the terminating character, carriage return (ODh)

**Response:** !(data)(cr) if the command is valid.

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response

! command is valid.

? command is invalid.

AA address of response module(00~FF)

data read status: 1= the input channel is latched,

0=the input channel is not latched.

**Example:**

Command: \$01L1 Receive: !012300

Read address 01 latch-high data, return 0123.

Command: \$01C Receive: !01

Clear address 01 latched data, return success.

Command: \$01L1 Receive: !000000

Read address 01 latch-high data, return 0.

**Notice:** The command is useless for **R-8042/42D/43/43D/68/68D**

### 3.12 @AA

**Name:** Read Digital I/O State

**Description:** The addressed of module is instructed to return the value of its DI/O channels.

**Syntax:** @AA (cr)

@ delimiter character.

AA address of reading module(00~FF)

(cr) represents terminating character, carriage return (0Dh).

**Response:** >(data) (cr) if the command was valid

?AA (cr) if an invalid command was issued.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

data read DIO status

**Example:**

Command: @01 Receive: >0F00

Read address 01 DIO status, return 0F00.

**Notice: (RemoDAQ-8053DF)**

When DI changes, input state is delivered initiative.

### 3.13 @AA (Data)

**Name:** Set Digital Output

**Description:** Sets the values of the module's digital outputs.

**Syntax:** @AA(data)(cr)

@ is a delimiter character.

AA address of reading module(00~FF)

(data) output value,the data format is following:

(data) is one character for output channel less than 4

For RemoDAQ-8060/8060D, from 0 to F

(data) is two characters for output channel less than 8

For R-8044/8044D/8050/8050D,from 00 to FF

For R-8065/8065D,from 00 to 1F

For R-8068/8068D,from 00 to 7F

(data) is four characters for output channel less than 16

For R-8042/8042D,from 0000 to 1FFF

For R-8043/8043D,from 0000 to FFFF

(cr) represents terminating character, carriage return (0Dh).

**Response:** Valid Command: >[CHK](cr)

Invalid Command: ?[CHK](cr)

Ignore Command: ![CHK](cr)

Syntax error or communication error may get to response

! command is valid.

? command is invalid.

! delimiter for ignores command. The module is in Host Watchdog Timeout Mode, and the output is set to safe value.

**Example:**

Command: @017 Receive : >

Output address 02 value 7, return success.(The example is suitable or RemoDAQ-8060/60D)

Command: @0200 Receive : >

Output address 01 value 00, return success.(The example is suitable for R-8044/8044D/8050/8050D/8065/8065D)

Command: @030012 Receive : !

Output address 03 value 0012, return the module is in host watchdog timeout mode, the output command is ignored.  
(The example is suitable for R-8042/8042D/8043/8043D)

**Notice:** The command is useless for **R-8041/41D/52/52D/53/53D/53DF**

### 3.14 ~AAO(data)

**Name:** Set Module Name

**Description:** Set the module name and return success or error.

**Syntax:** ~AAO (Data) (cr)

\$ delimiter character.

AA address of setting module (00~FF)

O Set Module Name command.

Data new name for module, max 6 characters

(cr) is the terminating character, carriage return (ODh)

**Response:** !AA(cr) if the command is valid.

?AA(cr) if an invalid command was issued.

Syntax error or communication error may get to response

! command is valid.

? command is invalid.

AA address of response module (00~FF)

**Example:**

Command: ~01O8050      Receive: !01

Set address 01 module name to 8050, return success.

Command: \$01M      Receive: !018050

Read address 01 module name, return 8050.

### 3.15 ~\*\*

**Description:** When host watchdog timer is enable, host computer must send this command to every module before timeout otherwise **“host watchdog timer enable”** module's output value will go to safety state output value.

**Syntax:** ~\*\* (cr)

~ delimiter character

\*\* command for all modules

**Response:** No response

**Example:**

Command: ~\*\*      No response

Send host OK to all modules



### 3.16 ~AA0

**Name:** Read Module Status

**Description:** Read command leading code setting and host watchdog status.

**Syntax:** ~AA0(cr)

~ delimiter character

AA address of setting module(00~FF)

0 command for reading module status

**Response:** !AASS(cr) if the command was valid.

?AA (cr) if an invalid parameter was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

SS module status, 00=host watchdog timeout status is clear

04=host watchdog timeout status is set.

The status will store into EEPROM and only may reset by the command ~AA1.

**Example:**

Refer Sec.3.19 ~AA3EVV example

### 3.17 ~AA1

**Name:** Reset Module Status

**Description:** Reset module status

**Syntax:** ~AA1 (cr)

~ delimiter character

AA address of setting module(00~FF)

1 command for reset module status

**Response:** !AA(cr) if the command was valid.

?AA(cr) if an invalid parameter was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

**Example:**

Refer Sec.3.19 ~AA3EVV example

### 3.18 ~AA2

**Name:** Read Host Watchdog Timeout Interval

**Description:** Read Host Watchdog Timeout Interval

**Syntax:** ~AA2 (cr)

~ delimiter character

AA address of setting module(00~FF)

2 command for read Host Watchdog Timeout Interval

**Response:** !AAVV(cr) if the command was valid.

?AA(cr) if an invalid parameter was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

VV timeout interval in HEX format, each count for 0.1 second; 0.1 = 0.1 second and FF = 25.5 second

**Example:**

Refer Sec.3.19 ~AA3E VV example

### 3.19 ~AA3EVV

**Name:** Set Host Watchdog Timeout Interval

**Description:** Set host watchdog timer .

**Syntax:** ~AA3EVV (cr)

~ delimiter character

AA address of setting module (00~FF)

3 command for set Host Watchdog Timeout Interval

E 1=Enable;0=Disable host watchdog

VV time value, from 01 to FF, each for 0.1 second

**Response:** !AA (cr) if the command was valid.

?AA (cr) if an invalid parameter was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

**Example:**

Command: ~010      Receive: !0100

Read address 01 module status, return host watchdog timeout status is clear.

Command: ~013164      Receive: !01

Set address 01 host watchdog timeout value 10.0 seconds and enable host watchdog, return success.

Command: ~012      Receive: !01164

Read address 01 host watchdog timeout value, return that host watchdog is enabled, and time interval is 10.0 seconds.

Command: ~\*\*            No response

Reset the host watchdog timer. Wait for about 10 seconds and don't send command ~\*\*, the LED of module will go to flash. The flash LED indicates the host watchdog timeout status is set.

Command: ~010            Receive: !0104

Read address 01 module status, return host watchdog timeout status is set.

Command: ~011            Receive: !01

Reset address 01 host watchdog timeout status, return success. And the LED of this module stop flash.

Command: ~010            Receive: !0100

Read address 01 module status, return host watchdog timeout status is clear.

### 3.20 ~AA4

**Name:** Read PowerOn Value and Safe Value

**Description:** Return PowerOn value and safe value

**Syntax:** ~AA4 (cr)

~ delimiter character

AA address of setting module (00~FF)

4 command for read PowerOn/Safe value

V P = read PowerOn value, S = read Safe value

**Response:** !AA(data) (cr) if the command was valid.

?AA (cr) if an invalid parameter was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module(00~FF)

data PowerOn Value or Safe Value

For R-8042/8042D/8043/8043D (data) is VVVV,

where VVVV is the PowerOn Value (or Safe Value).

For other modules,(data) is VV00, where VV is the PowerOn Value(or Safe Value).

**Example:**

Command: @010000           Receive : >

Output address 01 value 0000, return success.

Command: ~015S            Receive : !01

Set address 01 Safe Value, return success.

Command: @01FFFF      Receive : >  
Output address 01 value FFFF, return success.

Command: ~015P      Receive : !01  
Set address 01 PowerOn Value, return success.

Command: ~014S      Receive : !010000  
Read address 01 Safe Value, return 0000.

Command: ~014P      Receive : !01FFFF  
Read address 01 PowerOn Value, return FFFF.

### 3.21 ~AA5V

**Name:** Set Poweron Value and Safe Value

**Syntax:** ~AA4 (cr)

~ delimiter character

AA address of setting module (00~FF)

5 command for set poweron value and safe value

V P = set current output as PowerOn Value

S = set current output as Safe Value

**Response:** !AA (cr) if the command was valid.

?AA (cr) if an invalid parameter was entered.

Syntax error or communication error may get no response.

! command is valid.

? command is invalid.

AA address of response module (00~FF)

**Example:**

Command: @01AA      Receive: >

Output address 01 value AA, return success.

Command: ~015P      Receive: !01

Set address 01 PowerOn Value, return success.

Command: @0155      Receive: >

Output address 01 value 55, return success.

Command: ~015S      Receive: !01

Set address 01 Safe Value, return success.

Command: ~014P      Receive: !01AA00

Read address 01 PowerOn Value, return PowerOn Value AA.

Command: ~014S      Receive: !015500

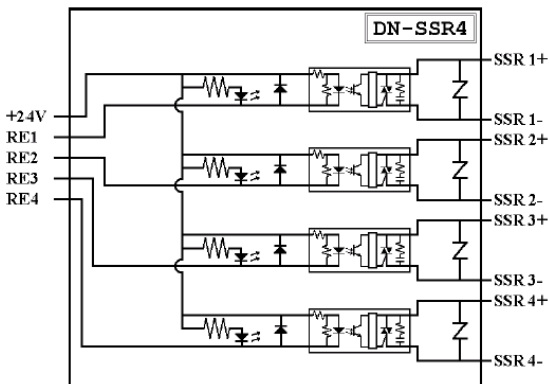
Read address 01 Safe Value, return Safe Value 55.



## 4 DN Module

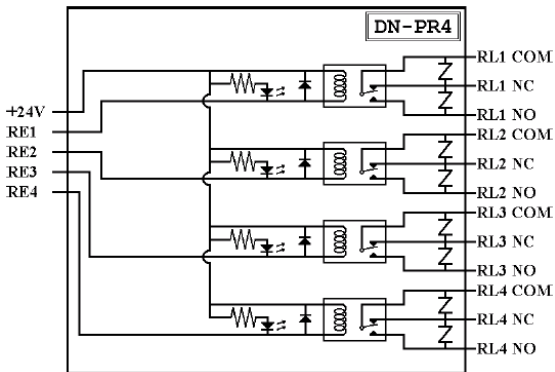
### 4.1 DN-SSR4

- Output Channel: 4 Solid State Relay Contact
- Output Specification:
  - Zero-Cross AC Solid-State Relay Output
  - Rated Load Voltage: 200 to 240 VAC
  - Rated Load Current: 4 Arms
  - Surge Current: 50A
  - Max. Off-State Leakage Current: 5.0 mA
  - Operate Time: 1/2 cycle of voltage sine wave + 1mS
- Input Impedance: 1.5K Ohms
- Din-Rail mounted
- Power Input: +24VDC



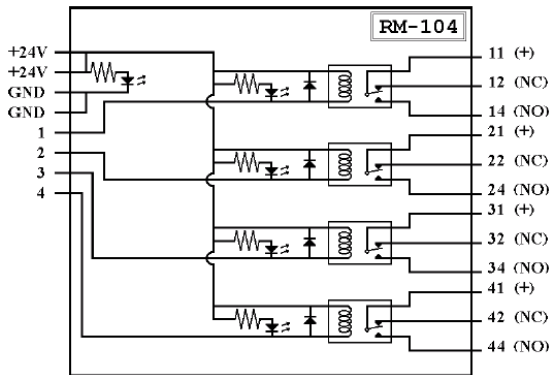
## 4.2 DN-PR4

- Output Channel: 4 Relay Contact
- Output Specification:
  - Form C Relay
  - Norminal Load: 5A@250VAC, 5A@30VDC
  - Max. Switching Power: 1250 VAC
  - Max. Switching Voltage: 250VAC, 150VDC
  - Max. Switching Current: 5A
  - Mechanical/Electrical Life: Min.10\*106/100\*103 ops.
  - Operate/Release Time: Max. 10mS/5mS
  - Dielectric Strength: 2000VAC 1 minute
- Nominal Coil Power: 360mW
- Din-Rail mounted
- Power Input: 24VDC



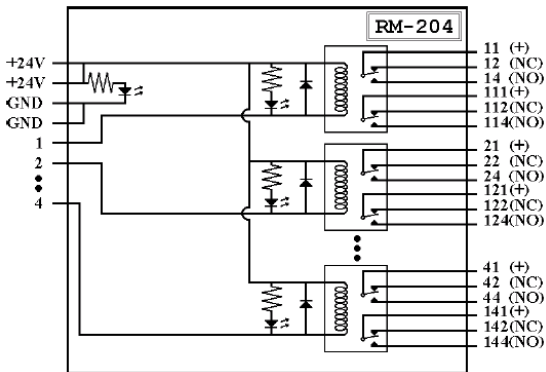
### 4.3 RM-104, RM-108, RM-116

- Output Channel: 4/8/16 Relay Contact
- Output Specification:
  - 1 Form C Relay Contact
  - Rated Load: 16A@250VAC
  - Max. Switching Voltage: 400VAC
  - Max. Peak Current: 30A
  - Standard Contact Material: AgCd0
- Din-Rail mounted
- Dimension:
  - RM-104: 78mm \* 77mm
  - RM-108: 135mm \* 77mm
  - RM-116: 270mm \* 77mm
- Power Input: 24VDC



## 4.4 RM-204, RM-208, RM-216

- Output Channel: 4/8/16 Relay Contact
- Output Specification:
  - 2 Form C Relay Contact
  - Rated Load: 5A@250VAC
  - Max. Switching Voltage: 400VAC
  - Max. Peak Current: 10A
  - Standard Contact Material: Ag Nt
- Din-Rail mounted
- Dimension:
  - RM-204: 78mm \* 77mm
  - RM-208: 135mm \* 77mm
  - RM-216: 270mm \* 77mm
- Power Input: 24VDC



## 4.5 Application

The DN Modules are the IO extension of RemoDAQ-8000 modules. These modules may drive more power and heavy load in application. User may use RemoDAQ-8000 modules, like R-8043 or others, to control the DN modules to drive loads.

