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RemoDAQ-8055

User's Manual

Beijing Gemotech Intelligent Technology Co.，Ltd

Acknowledgments

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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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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.

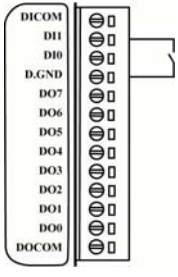
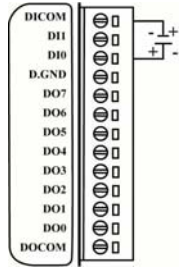
RemoDAQ-8055 is a 8 channel isolated DI and 8 channel isolated DO module with 3000Vdc optical isolation, it is suitable for critical applications.the inputs accept 10~50V voltage to fit others digit voltage signals and the outputs can supply 5~40V open collector. The RemoDAQ-8055 is user friendly with built LED indicator for status reading.

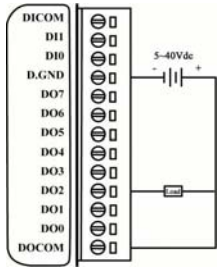
1.1 Pin Assignment & Specifications

RemoDAQ-8055 Specifications：

Channel：8 channel isolated DI and 8 channel isolated DO	
ESD	2000Vdc
Opto-isolated response time	25μs
Input voltage： Dry contact：Logic level 0--ON Logic level 1—OFF (Close to GND) Wet contact：Logic level 0—3V Logic level 1—10~50V	
Over-voltage protect	70Vdc
Isolation voltage	3000VDC
Powet supply	10~30VDC
Powet consumption	1.2W
Environment	Operating Temperature：-20 ~ 70° C
	Humidity：5 ~ 95%, non-condensing

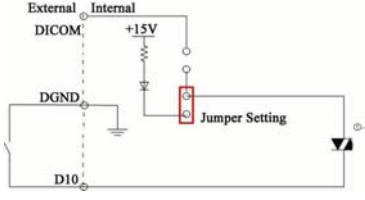
1.2 Application Wiring

Dry Wire Connection	Wet Wire Connection
	

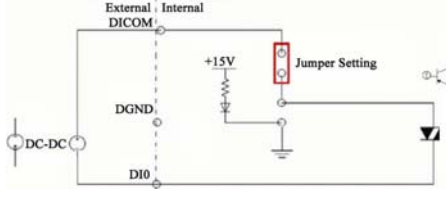
Digit output wire connection	

1.3 Jumper Setting

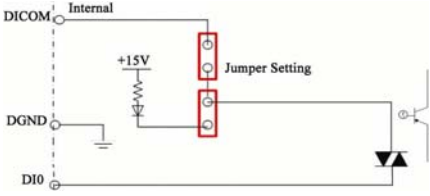
Dry Contact Input Diagram：



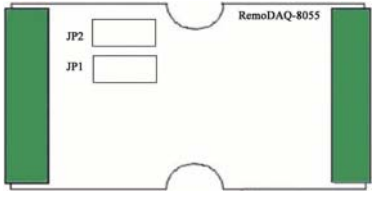
Wet Contact Input Diagram：



Default Jumper Setting



Notice：Here input voltage of DICOM can't under +15V



- J1 is setting for digit input Dry contact
- J2 is setting for digit input Wet contact
- In default setting mode, J1 and J2 support dry and wet contact at the same time

1.4 Default Setting

- Address：01
- Baudrate：9600 bps
- Checksum disable,60Hz rejection，engineer unit format

1.5 Install List

Baudrate Setting (CC)

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

Data format setting（FF）

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

*****1：0=60Hz Restrain　　1=50Hz Restrain

*****2：Checksum：0=Disabled　1=Enable

*3：00 = Engineering Unit Format

01 = Percentage Format

10 = 2's Complement HEX Format

2 Initialization & Installation

2.1 Installation Guideline

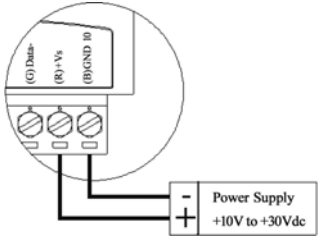


Figure 2-1 Powet Supply Connections

We advise that the following standard colors (as indicated on the modules) be used for powet 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 successfully 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.

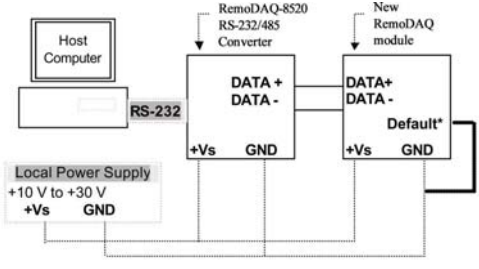


Figure 2-2 Layout for Initialization the RemoDAQ module

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 theRemoDAQ 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-8031 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：

%0107200600(cr)

% = change configuration

01 = target module at address 00 to：

07 = change address to 07 hexadecimal

20 = set input range to Type 08

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 poweted down and poweted 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 Baud rate and Checksum

Baud rate 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:

- Powet on all components except the RemoDAQ Module.
- Powet 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 powet to the RemoDAQ Module OFF.
- Remove the grounding of the INIT* terminal and powet 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 command (or response) string except the character return(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)

General Command Sets			
Command	**Name**	**Command Description**	**Sec.**
%AANNTTCCFF	Configuration	Sets the address,input range, baudrate,dataformat,checksum status	3.1
#AABB(data)	Digital data out	Writes specified values to either a single or all channels simultaneously	3.2
#**	N/A	Synchrous sample IDI	3.3
$AA2	Configuration status	Return the configuration parameters for the module	3.4
$AA6	Read channel status	Get the enable/disable status of all channels in the module	3.5
$AAF	Read firmware version	Return the firmware version code	3.6
$AA4	Readback the data of synchronous sample	Readback the IDI input by synchronous #**	3.7
$AA5	Reset status	Checks if module has been reset since the last $AA5 command	3.8
$AAX0TTTTDDDD	Write safty value	Force the DO channels to safety status when communication is time-out and over pre-defined period.	3.9
$AAX1	Read safty valur	Read the time-out setting and pre-defined safety status of channels.	3.10
$AAX2	Read safty flag	Requests the Safty Flag of the addressed digital I/O module to see whether the safety value has been executed since Write Safety Value command was set.	3.11

3.1 %AANNTTCCFF

Name： Configuration

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

Syntax： %AANNTTCCFF (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, we should INIT* termination land.

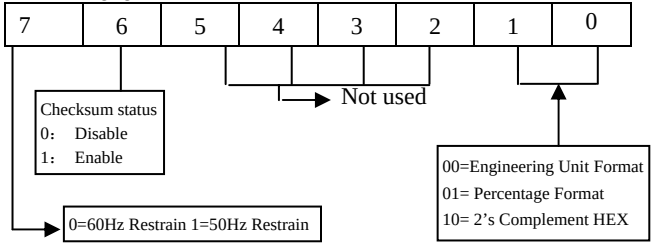


Figure 3-1 Data format setting of AI modules

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 no response.

! command is valid.

? command is invalid.

AA address of setting module (00-FF)

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

Example：

Command：%0102080600(cr) Response：!02(cr)

Change address from 01 to 02,an input type 20, 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

3.2 #AABB(data)

Name： Digital Data Out Command

Description： Sets a single digital output channel or all digital output channels simultaneously.

Syntax： #AABB(data)(cr)

$ delimiter character.

AA address of reading module (00~FF)

BB channel state

data digital data output value

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

Response： >(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.

AA address of module(00~FF)

Example：

Command：#010005 Response：>

Set address 01 digital output value 15h,channel 0and channel 2 will be set to ON, other channels are set to OFF, return success.

3.3 #**

Name： Synchronized Sampling Command

Description： Orders all analog input modules to sample their input values and store the values in special registers.

Syntax： #** (cr)

delimiter character.

AA address of reading module (00~FF)

** the Synchronized Sampling command

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

Response： No responses

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 no response.

! command is valid.

? command is invalid.

AA address of module(00~FF)

TT represents the type code.

CC represents the baud rate code.

FF data format

(Also see the %AANNTTCCFF configuration command)

Example：

Command：$012 Response：!01200600

Read address 01 configuration,return success.

3.5 $AA6

Name： Read Channel Status

Description： Asks a specified input module to return the status of all channels.

Syntax： $AA6 (cr)

$ delimiter character.

AA address of reading module (00~FF)

6 the read channel statues command.

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

Response： !AAVV(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.

AA address of response module (00~FF)

VV channels enable/disable, 00=disable, FF=enable

Example：

Command：$016 Receive：!112200

The first 2-bit character--11H(00010001), showing the output channels 0 and 4 are ON, output channels 1, 2, 3, 5, 6, 7 are OFF.

The second 2-bit character--22H(00100010), showing the logic channels 1 and 5 are high level, input channels 0, 2,

3, 4, 6, 7 are low level.

3.6 $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：!0120050412

Read address 01 firmware version，return version 20050412

Command：$02F Receive：!0120040101

Read address 02 firmware version，return version 20040101

3.7 $AA4

Name： Read Synchronized Data Command

Description： Returns the input value that was stored in the addressed module's register, after command #** was issued.

Syntax： $AA4 (cr)

$ delimiter character.

AA address of reading module (00~FF)

4 Read synchronized data command.

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

Response： !AA(status)(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.

AA address of response module (00~FF)

VV channels enable/disable, 00=disable, FF=enable

status If status = 1, then the data has been sent for the first time since #** command was issued.

If status = 0, then the data has been sent at least once before.

data Synchronized data value

Example：

Command：$014 Response：!011+3.5266

Read address 01 synchronized data value,reture 3.5266,

Status=1,the data has been sent for the first time.

3.8 $AA5

Name： Reset Status Command

Description： Checks the Reset Status of the addressed analog output module to see whether it has been reset since the last Reset Status command was issued to the module.

Syntax： $AA5 (cr)

$ is a delimiter character.

AA address of reading module (00~FF)

5 is the Reset Status command.

(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 reseted

0=the module is not been reseted

Example：

Command：$395(cr) Response：!390(cr)

Read address 01 I/O state, return 0. This indicates that the digital I/O module has not been reset or poweted on since a Reset Status command was issued last time.

3.9 $AAX0TTTTDDDD

Name： Write Safty Value Command

Description： Force the Do channel to safty status when communication is in timeout and over predefines period.

Syntax： $AAX0TTTTDDDD (cr)

$ is a delimiter character.

AA address of reading module (00~FF)

X0 the write safty value command.

TTTT is the time, 100ms per number.

DDDD is the safty value, 4-hex character, the first character D is always 0 and the others are the channels values

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

Response： > (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)

3.10 $AAX1

Name： Read Safty Value Command

Description： Read the timeout setting and predefined safty status of Do channels.

Syntax： $AAX1 (cr)

$ is a delimiter character.

AA address of reading module (00~FF)

X1 the read safty value command.

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

Response： !TTTTDDDD (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)

TTTT is the time, 100ms per number.

DDDD is the safty value,4-hex character,the first character D is always 0 and the others are the channels values.

3.11 $AAX2

Name： Read Safty Flag Command

Description： Requests the safety flag of the addressed to see whether the safety value has been executed since write safety value command was set.

Syntax： $AAX2 (cr)

$ is a delimiter character.

AA address of reading module (00~FF)

X2 the read safty flag command.

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

Response： >XX (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)

XX 00=OFF；01=ON