V1.1 2010.2.2

RemoDAQ-8031/8031D

RemoDAQ-8033/8033D

RemoDAQ-8036

User's Manual

Beijing Gemotech Intelligent Technology Co.，Ltd

Copyright Notice

Acknowledgments

RemoDAQ is a trademark of **Beijing Gemotech Intelligent Technology Co.，Ltd.**

Edition 1.1

Feb. 2010

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

Table of Contents

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-8031 RTD Module

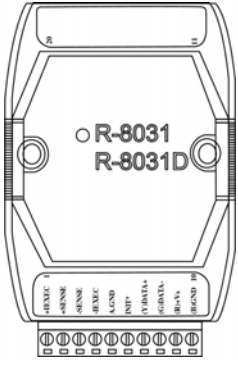
RemoDAQ-8031 RTD input module supports one RTD input channel for temperature measurement. This module can accept 2 wire, 3 wire or 4 wire RTD sensor. The module offers signal conditioning, A/D conversion, ranging, and RS-485 digital communication functions..

RemoDAQ-8036 6-channel RTD Input Module

A RTD module is popular for temperature measurement. Unlike the traditional design, the RemoDAQ-8036 provides six RTD input channels for different types of RTD signal as an effective solution in industrial & building automation. Usually, broken external wiring will lead to inaccurate current value. The RemoDAQ-8036 provides a broken wiring detecting function so users can easily troubleshoot broken wiring problems. This module can accept 2 wires or 3 wires RTD sensor.

RemoDAQ-8031D is the RemoDAQ-8031 with a 4½ digit LED display;
RemoDAQ-8033 is a three channel RTD input module.
RemoDAQ-8033D is the RemoDAQ-8033 with a 4½ digit LED display.

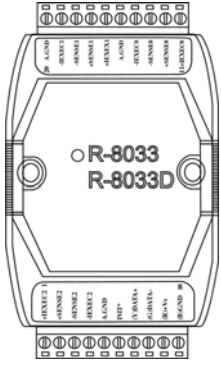
1.1 Pin Assignment & Specifications



RemoDAQ-8031/8031D Specifications：

Input channel	1
Input type	2,3 or 4 wire
RTD type	Pt100a = 0.00385；Pt100a=0.003916；Cu100；Cu50
Output Speed (in bps) Maximum distance	RS-485 (2-wire) 1200,2400,4800,9600,19.2K,38.4K,57.6K,115.2K 4000ft. (1200m.)
Conversion rate	10samples/sec
Bandwidth	5.24Hz
Accuracy	±0.05% or better
Zero drift	0.5μV/°C
Span drift	1.0μV /°C
CMR@50/60Hz	150dB
NMR@50/60Hz	100dB
Isolation voltage	3000VDC

Displayed LED	4½ digits (for R-8031D)
Power supply	10~30VDC
Power consumption	0.7W(R-8031)；1.3W(R-8031D)
Environment	Operating Temperature：-20 ~ 70° C
	Humidity：5 ~ 95%, non-condensing



RemoDAQ-8033/8033D Specifications：

Input channel	3
Input type	2,3 or 4 wire
RTD type	Pt100a = 0.00385；Pt100a=0.003916；Cu100；Cu50
Output Speed (in bps) Maximum distance	RS-485 (2-wire) 1200,2400,4800,9600,19.2K,38.4K,57.6K,115.2K 4000ft. (1200m.)
Conversion rate	15/12.5samples/sec (60/50Hz)
Bandwidth	5.24Hz
Accuracy	±0.1% or better
Zero drift	0.5μV/°C

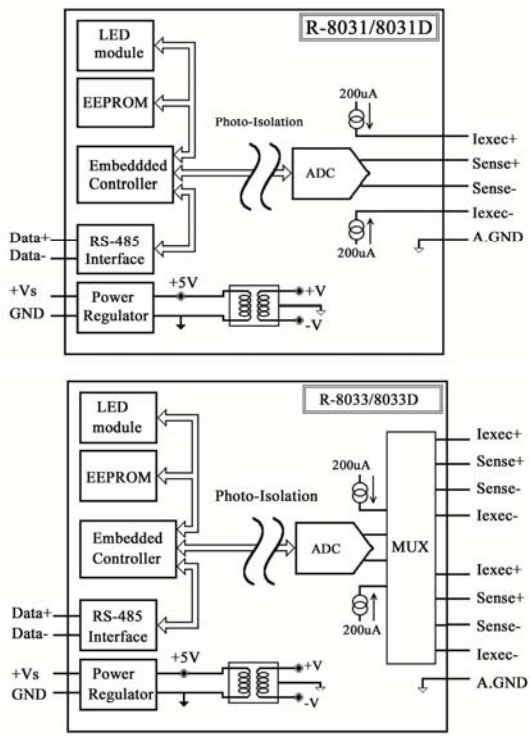
Span drift	1.0μV /°C
CMR@50/60Hz	150dB
NMR@50/60Hz	100dB
Isolation voltage	3000VDC
Displayed LED	4½ digits (for R-8031D)
Power supply	10~30VDC
Power consumption	1.0W(R-8033)；1.6W(R-8033D)
Environment	Operating Temperature：-20 ~ 70° C
	Humidity：5 ~ 95%, non-condensing

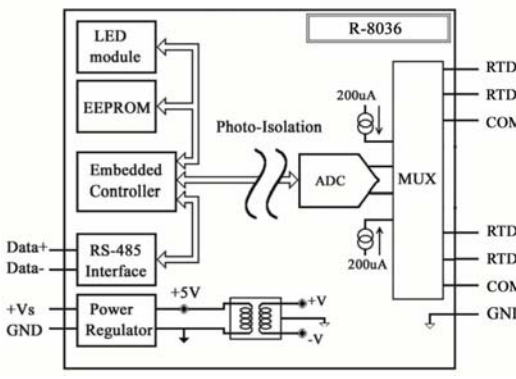
RemoDAQ-8036 Specifications：

Input channel	6
Input type	2, 3 wire
RTD type	Pt100a = 0.00385；Pt100a=0.003916；Cu100；Cu50
Output	RS-485 (2-wire)

Speed (in bps) Maximum distance	1200,2400,4800,9600,19.2K,38.4K,57.6K,115.2K 4000ft. (1200m.)
Conversion rate	10 samples/sec (60/50Hz)
Bandwidth	5.24Hz
Accuracy	±0.05% or better
Zero drift	0.5μV/°C
Span drift	1.0μV /°C
CMR@50/60Hz	150dB
NMR@50/60Hz	100dB
Isolation voltage	3000VDC
Power supply	10~30VDC
Power consumption	1W
I/O connector type	13-pin plug-terminal
Environment	Operating Temperature：-20 ~ 70° C
	Humidity：5 ~ 95%, non-condensing

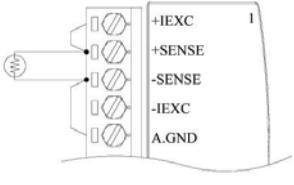
1.2 Block Diagram



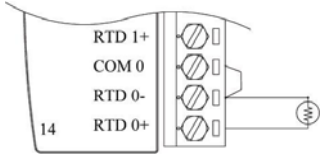


1.3 Application Wiring

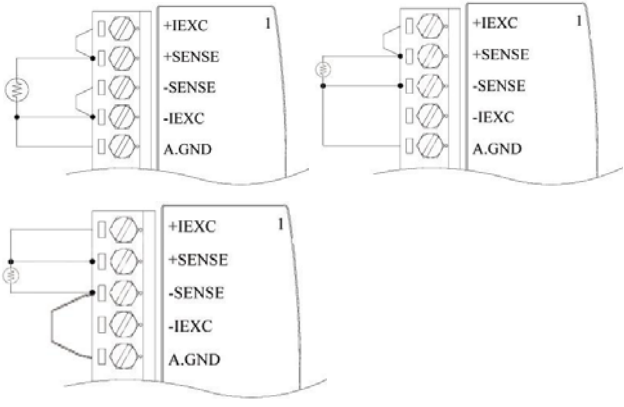
2-wire RTD connection
R-8031/31D/33/33D



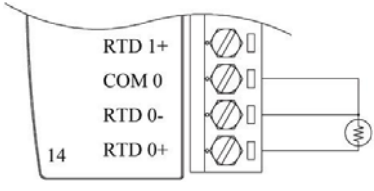
2-wire RTD connection
R-8036



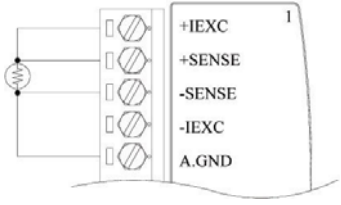
3-wire RTD connection (R-8031/31D/33/33D)



3-wire RTD connection (R-8036)



4-wire RTD connection (R-8031/31D/33/33D)



1.4 Default Setting

- Address：01
- RTD type：Type 20，Pt100,-100℃~+100℃
- Baudrate：9600 bps
- Checksum disable,60Hz rejection，engineering unit format
- Filter at 60 Hz rejection (except R-8036)

1.5 Calibration

What do you need to do calibration?

1. One 5 1/2 digital multimeter.
2. A voltage calibrator or very stable and noise free DC voltage generator.
3. A precision resistance decade box or discrete resistors.
4. RemoDAQ-8000 Utility

Type	Zero calibration	Span calibration

20~27	0 Ohms	375 Ohms
2B~2F	0 Ohms	0 Ohms

Calibrate Order：

1. Apply power to the module and let it warm up for about 30 minutes
2. Setting type
3. Enable calibration
4. Apply zero calibration resistance
5. Perform zero calibration command
6. Apply span calibration resistance
7. Perform span calibration command
8. Repeat step 3 to step 6 three times.

The calibration order with other types is to it similar, but in first step installation type from time to time place difference.

Notice：

1. Through 2-wire RTD connection calibrate resistance.
2. For RemoDAQ-8036, join resistance on 0 channel.

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

RTD type setting (TT)

Code	RTD type	Temperature Range
20	Platinum100,a=0.00385	-100 ~ 100

21	Platinum100,a=0.00385	0 ~ 100
22	Platinum100,a=0.00385	0 ~ 200
23	Platinum100,a=0.00385	0 ~ 600
24	Platinum100,a=0.003916	-100 ~ 100
25	Platinum100,a=0.003916	0 ~ 100
26	Platinum100,a=0.003916	0 ~ 200
27	Platinum100,a=0.003916	0 ~ 600
2B	Cu100	-50~150
2C	Cu50	-50 ~ 150

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

11 = Ohms

Analog Input Type And Data Format Table

Code	Input span	Data format	+F.S.	-F.S
20	Platinum 100 a=0.00385 -100~100℃	Project Unit	+100.00	-100.00
		%（FSR）	+100.00	-100.00
		2's Complement HEX	7FFF	8000
		Ohm	+138.50	+060.60
21	Platinum 100 a=0.00385 0~100℃	Project Unit	+100.00	+000.00
		%（FSR）	+100.00	+000.00
		2's Complement HEX	7FFF	0000
		Ohm	+138.50	+100.00
22	Platinum 100 a=0.00385 0~200℃	Project Unit	+200.00	+000.00
		%（FSR）	+100.00	+000.00
		2's Complement HEX	7FFF	0000
		Ohm	+175.84	+100.00
23	Platinum 100 a=0.00385 0~600℃	Project Unit	+600.00	+000.00
		%（FSR）	+100.00	+000.00
		2's Complement HEX	7FFF	8000
		Ohm	+313.59	+060.00
24	Platinum 100 a=0.003916 -100~100℃	Project Unit	+100.00	-100.00
		%（FSR）	+100.00	-100.00
		2's Complement HEX	7FFF	8000
		Ohm	+139.16	+060.60
25	Platinum 100 a=0.003916	Project Unit	+100.00	+000.00
		%（FSR）	+100.00	+000.00

	0~100℃	2's Complement HEX	7FFF	0000
		Ohm	+139.16	+100.00
26	Platinum 100 a=0.003916 0~200℃	Project Unit	+200.00	+000.00
		%（FSR）	+100.00	+000.00
		2's Complement HEX	7FFF	0000
		Ohm	+177.13	+100.00
27	Platinum 100 a=0.003916 0~600℃	Project Unit	+600.00	+000.00
		%（FSR）	+100.00	+000.00
		2's Complement HEX	7FFF	0000
		Ohm	+317.28	+100.00
2B	Cu100 -50~150℃	Project Unit	+150.00	-050.00
		%（FSR）	+100.00	-033.33
		2's Complement HEX	7FFF	D554
		Ohm	+164.27	+078.49
2C	Cu50 0~100℃	Project Unit	+150.00	-50.00
		%（FSR）	+100.00	-033.33
		2's Complement HEX	7FFF	D554
		Ohm	+082.13	+039.24

RTD Over range / Under range Reading

	Over rang	Under range
Project Unit	+9999	-0000
%（FSR）	+9999	-0000
2's Complement HEX	7FFF	8000

2 Initialization & Installation

2.1 Installation Guideline

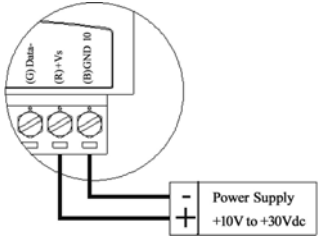


Figure 2-1 Power Supply Connections

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 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.

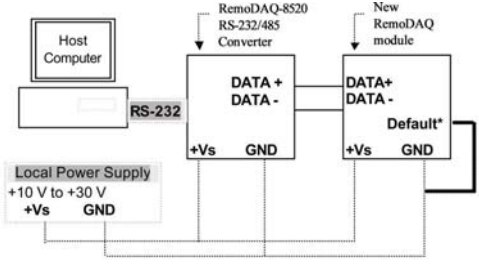


Figure 2-2 Layout for Initialization the RemoDAQ module

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 20

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 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：

- 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 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 Syntax	**Command Name**	**Command Description**	**Notes**
%AANNTTCCFF	Configuration	Sets the address,input range, baudrate,dataformat,checksum status	3.1
#AA	Analog data in	Return the input value from the module in the currently configured data format	3.2
#AAN	Analog data in	Return the input value from the module channels N in the currently configured data format	3.3
$AA0	Span calibration	Calibrates an AI module to correct for gain errors	3.4
$AA1	Zero Calibration	Calibrates an AI module to correct for gain errors	3.5
$AA2	Configuration status	Return the configuration parameters for the module	3.6
$AA8	Read LED configuration	Read the LED configuration which determines whether LED will display data from the module or from the host computer	3.7
$AA8V	Set LED configuration	Set the LED configuration which determines whether LED will display data from the module or from the host computer	3.8
$AA9(data)	Send LED data	The computer sends data to the module to display on its LED	3.9
$AAF	Read firmware version	Return the firmware version code	3.10
$AAM	Read module name	Return the module name	3.11
~AAO(data)	Set module name	Return correct or error	3.12
~AAEV	Enable/Disable calibration	Return correct or error	3.13

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.

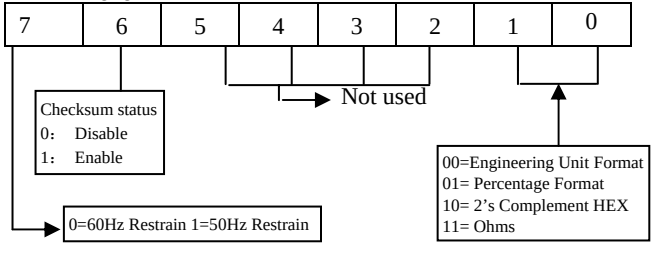


Figure 3-1 Data format setting of AI modules

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：%0102200600(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 Input Rang Codes (Type Code)

Code	RTD type	Temperature Range
20	Platinum100,a=0.00385	-100 ~ 100
21	Platinum100,a=0.00385	0 ~ 100
22	Platinum100,a=0.00385	0 ~ 200
23	Platinum100,a=0.00385	0 ~ 600
24	Platinum100,a=0.003916	-100 ~ 100
25	Platinum100,a=0.003916	0 ~ 100
26	Platinum100,a=0.003916	0 ~ 200
27	Platinum100,a=0.003916	0 ~ 600
2B	Cu100	-50~150
2C	Cu50	-50 ~ 150

Table 3-2 Baudrate Code

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

3.2 #AA

Name： Analog Data In

Description： Command will return the input value from module in the currently configured data format.

Syntax #AA(cr)

delimiter character.

AA address of reading module(00~FF)

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

Response： >(data)(cr)

Syntax error or communication error may get no response.

> delimiter character.

data AI input value,the data is the combination for each channel respectively

Example：

Command：#01 Response：>+02.555

Read analog input value at address 01, return with +02.555

Command：#04 Response：>+02.422+05.457+04.654

Read analog input value at address 04(R-8033/33D), return values of 3 channels

3.3 #AAN

Name： Analog Data From channel N

Description： The command will return the input value from one of the 8 channels of a specified (AA) module in the currently configured data format.

Syntax： #AAN(cr)

delimiter character.

AA address of reading module(00~FF)

N channel (0~7)

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

Response： >(data)(cr)

Syntax error or communication error may get no response.

> delimiter character.

data AI input value.(For data formats, refer *sec*.1.7).

Example：

Command：#32 Response：>+02.455

Read address 03 and channel 2, return +02.455

Command：#28 Response：?02

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

Notice： Command only for **RemoDAQ-8033/33D/36**

3.4 $AA0

Name： Span Calibration

Description： Calibrates module to correct for gain errors

Syntax： $AA0(cr)

$ delimiter character.

AA address of the module that is to be calibrated(00~FF)

0 span calibration command.

(cr) 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)

In order to successfully calibrate an analog input module's input range, a proper calibration input signal should be connected to the analog input module before and during the calibration.

Example：

Command：$010 Response：!01

Span calibration of address 01,return success

Command：$020 Response：?02

Span calibration of address 02,return the calibration is not enable before span calibration command.

3.5 $AA1

Name： Zero Calibration

Description： Calibrates module to correct for gain errors.

Syntax： $AA1 (cr)

$ delimiter character.

AA address of the module that is to be calibrated(00~FF)

1 zero calibration command.

(cr) 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)

In order to successfully calibrate an analog input module's input range, a proper calibration input signal should be connected to the analog input module before and during the calibration.

Example：

Command：$011 Response：!01

Zero calibration of address 01,return success

Command：$021 Response：?02

Zero calibration of address 02,return the calibration is not enable before span calibration command.

3.6 $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.

3.7 $AA8

Name： Read LED Data Origin

Description： Read the LED Data Origin status that determines whether LED will display data from the module directly or from the host computer.

Syntax： $AA8 (cr)

$ is a delimiter character.

AA address of reading module(00~FF)

8 identifies the Read LED Data Origin command.

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

Response： !AAV(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)

V LED configuration.

For R-8031D：1=module control，2=host control

For R-8033D：0~2=display channel，3=host control

Example：

Command：$018 Receive：!011

Read address 01 LED configuration，return module control.

Notice： Command only for **RemoDAQ-8031D/33D**

3.8 $AA8V

Name： Select LED Data Origin

Description： Select whether LED will display data from the module directly or from the host computer.

Syntax： $AA8V (cr)

$ is a delimiter character.

AA address of reading module(00~FF)

8 identifies the Select LED Data Origin command.

V LED configuration.

For R-8031D：1=module control，2=host control

For R-8033D：0~2=display channel，3=host control

(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：$0182 Receive：!01

Set address 01 LED to host control，return success.

Notice： Command only for **RemoDAQ-8031D/33D**

3.9 $AA9(Data)

Name： Send Data to LED

Description： The host computer sends data to the addressed module to display on its LED.

Syntax： $AA9(data)(cr)

$ is a delimiter character.

AA address of setting module(00~FF)

9 identifies the Send LED Data command.

Data data for show on the LED，from -19999. to +19999. The data format is sign,5 numerical and decimal point.

(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：$019+123.45 Receive：!01

Send address 01 LED data +123.45，return success.

Command：$029+512.34 Receive：?02

Send address 02 LED data +512.34，return the LED is not setting in the host mode.

Notice： Command only for **RemoDAQ-8031D/33D**

3.10 $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.

Example:

Command：$01F Receive：!01051201

Read address 01 firmware version，return version 051201

Command：$02F Receive：!01040101

Read address 02 firmware version，return version 040101

3.11 $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：!018031

Read address 01 module name，return name 8031.

Command：$03M Receive：!038036

Read address 03 module name，return name 8036.

3.12 ~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 no response.

! command is valid.

? command is invalid.

AA address of response module(00~FF)

Example:

Command：~01O8031 Receive：!01

Set address 01 module name to 8031，return success.

Command：$01M Receive：!018031

Read address 01 module name，return 8031.

3.13 ~AAEV

Name：Enable/Disable Calibration

Syntax：~AAEV (cr)

$ delimiter character.

AA address of reading module(00~FF)

E Enable/Disable calibration command.

V 1=Enable 0=Disable

(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：?01

Perform address 01 span calibration，return the command is invalid before enable calibration.

Command：~01E1 Receive：!01

Set address 01 to enable calibration，return success.

Command：$010 Receive：!01

Perform address 01 span calibration，return success.