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# **RemoDAQ-9000 Series I/O Module**

## **User's Manual**



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

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## I/O Module Introduction

### Introduction

This manual introduces the detail specifications and application wiring of each RemoDAQ-9000 I/O modules. To organize a RemoDAQ-9421/9821 Series controller, you need to select I/O modules to interface the main unit with field devices or processes that you have previously determined. DSLC provides 11 types of RemoDAQ-9000 I/O modules for various applications. Following table is the I/O modules support list we provided for user's choice.

Module	Name	Specification	Reference
Analog I/O	RemoDAQ -9017	8-ch. AI	Isolated
	RemoDAQ -9018	7-ch. Thermocouple input	Isolated
	RemoDAQ -9024	4-ch. AO	Isolated
	RemoDAQ -9033	3-ch. RTD input	Isolated

Digital I/O	RemoDAQ -9050	7-ch. DI/O	Non-isolated
	RemoDAQ -9051D	16-ch. DI W/LED	Non-isolated
	RemoDAQ -9051S	16-ch. Isolated DI w/LED	Isolated
	RemoDAQ -9052	8-ch. DI	Isolated
	RemoDAQ -9055S	16-ch. Isolated DI/O w/LED	Non-isolated
	RemoDAQ -9056D	16-ch. DO W/LED	Non-isolated
	RemoDAQ -9056S	16-ch. Isolated DO w/ LED	Isolated
	RemoDAQ -9056SO	16-ch. Iso. DO w/LED (Source)	Isolated
Relay Output	RemoDAQ -9060	6-ch. Relay output	Isolated
	RemoDAQ -9069	8-ch. Relay output	Isolated

Counter /Frequency	RemoDAQ -9080	4-ch. Counter/Frequency	Isolated
Series I/O	RemoDAQ -9090	4-port RS232	Non-isolated

Table1: I/O Module Support List

## 1 Analog Input Modules

Analog input modules use an A/D converter to convert sensor voltage, current, thermocouple or RTD signals into digital data. The digital data is then translated into engineer units. The analog input modules protect your equipment from ground loops and power surges by providing opto-isolation of the A/D input and transformer based isolation up to 3,000V<sub>DC</sub>.

### **RemoDAQ-9017 8-channel analog input module**

RemoDAQ-9017 is a 16-bit, 8-channel analog differential input module that provides programmable input ranges on all channels. It accepts millivolt inputs ( $\pm 150\text{mV}$ ,  $\pm 500\text{mV}$ ), voltage inputs ( $\pm 1\text{V}$ ,  $\pm 5\text{V}$  and  $\pm 10\text{V}$ ) and

current input ( $\pm 20\text{mA}$ , requires  $125\Omega$  resistor) . The module provides data to the host computer in engineering units ( $\text{mV}$ 、 $\text{V}$  or  $\text{mA}$ ) . This module is an extremely cost-effective solution for industrial measurement and monitoring applications. Its opto-isolated inputs provide  $3,000\text{V}_{\text{DC}}$  of isolation between the analog input and the module, protecting the module and peripherals from damage due to high input line voltage. Additionally, the module uses analog multiplexers with active over-voltage protection. The active protection circuitry assures that signal fidelity is maintained even under fault conditions that would destroy other multiplexers. This module can withstand an input voltage surge of  $70\text{ Vp-p}$  with  $\pm 15\text{V}$  supplies.



## RemoDAQ-9017

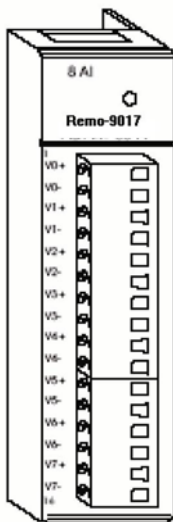


Figure 1: RemoDAQ-9017 frontal view

## Application wiring

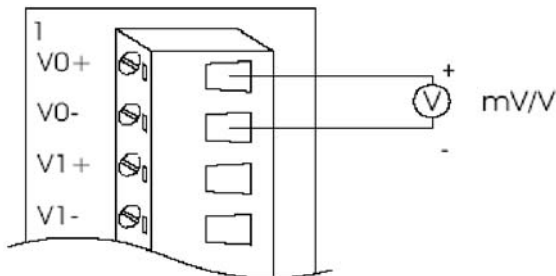


Figure 2: Millivolt and volt input

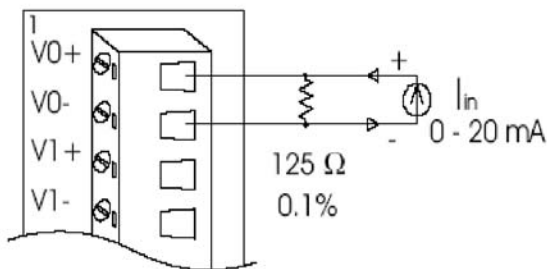


Figure 3: Process current input

**Note:** To keep measurement accuracy please short the

channels that are not in use.

### Technical specification of RemoDAQ-9017

Analog Input Channels	Eight differential
Input Type	MV, V, mA
Input Range	$\pm 150\text{mV}$ , $\pm 500\text{mV}$ , $\pm 1\text{V}$ , $\pm 5\text{V}$ , $\pm 10\text{V}$ 和 $\pm 20\text{mA}$
Isolation Voltage	$3000\text{V}_{\text{DC}}$
Sampling Rate	10 samples/sec (total)
Analog Input Signal Limit	15V max.
Max. allowable voltage difference between two connectors in a module	15V max.
Input Impedance	$2\text{M}\Omega$
Bandwidth	$13.1\text{Hz}@50\text{Hz}$ , $15.72\text{Hz}@60\text{Hz}$
Accuracy	$\pm 0.1\%$ or better
Zero Drift	$\pm 1.5\mu\text{V}/^{\circ}\text{C}$
Span Drift	$\pm 25\text{PPM}/^{\circ}\text{C}$

CMR@50/60Hz	92 dB min.
Power Requirement	+10~+30V (non-regulated)
Power Consumption	1.2W

Table 2: Technical specification of RemoDAQ-9017

### **RemoDAQ-9018 7-channel thermocouple input module**

The RemoDAQ-9018 is a 16-bit, 7-channel thermocouple input module that features programmable input range on all channels. It accepts millivolt inputs ( $\pm 15\text{mV}$ ,  $\pm 2.5\text{mV}$ ), voltage inputs ( $\pm 1\text{V}$ ,  $\pm 2.5\text{V}$ ), current inputs ( $\pm 20\text{mA}$ , requires  $125\Omega$  resistor) and thermocouple input (J, K, T, R, S, E, B).

The module forwards the data to host computer in engineering units (mV, V, mA or  $^{\circ}\text{C}$ ). An external CJC on the plug-in terminal is designed for accurate temperature measurement.

## RemoDAQ-9018

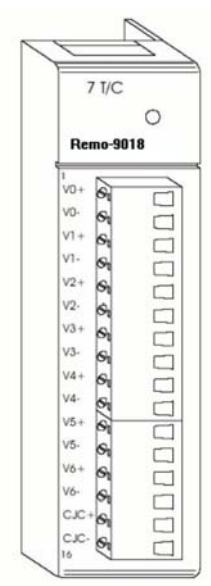


Figure 4: RemoDAQ-9018 module frontal view

## Application wiring

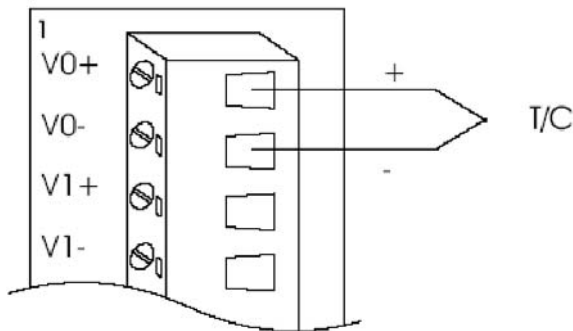


Figure 5: Thermocouple input

## Technical specification of RemoDAQ-9018

Analog Input Channel	Seven differential
Input Type	mV, V, mA, Thermocouple
Input Range	$\pm 15\text{mV}$ , $\pm 50\text{mV}$ , $\pm 100\text{mV}$ , $\pm 500\text{mV}$ , $\pm 1\text{V}$ , $\pm 2.5\text{V}$ and $\pm 20\text{mA}$
T/C Type and Temperature Range	<div>J      0~760℃</div> <div>K      0~1370℃</div> <div>T      -100~400℃</div>

	E      0~1400°C R      500~1750°C S      500~1750°C B      500~1800°C
Isolation Voltage	3000V <sub>DC</sub>
Sampling Rate	10 sample/sec (total)
Input Impedance	2MΩ
Bandwidth	13.1Hz@50Hz, 15.72Hz@60Hz
Accuracy	±0.1% or better
Zero Drift	±0.3μV/°C
Span Drift	±25PPM/°C
CMR@50/60Hz	92 dB min.
Power Consumption	1.2W

Table 3: Technical specification of RemoDAQ-9018

### RemoDAQ-9033 3-channel RTD input module

The RemoDAQ-9033 is a 16-bit, 3-channel RTD input module that features programmable input range on all channels. This module is an extremely cost-effective solution for industrial measurement and monitoring applications. Its opto-isolated inputs provide 3,000V<sub>DC</sub> of

isolation between the analog input and the module, protecting the module and peripherals from damage due to high input line voltage.

**Note:** Owing to the conversion time required by the A/D converter, the initialization time of each RemoDAQ-9033 module is 5 seconds. So the total initialization time will be about 20 seconds if all 4 I/O slots in a RemoDAQ-9000 main unit contain RemoDAQ-9033 modules.



## RemoDAQ-9033

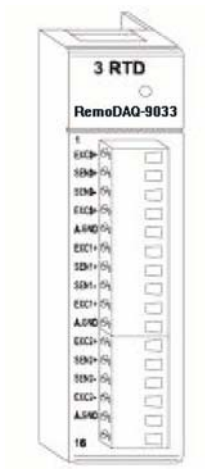


Figure 6: RemoDAQ-9033 module frontal view

## Application wiring

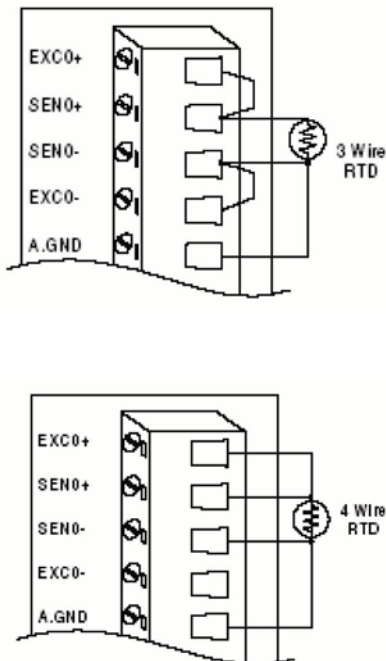


Figure 7: RTD input

**Technical specification of RemoDAQ-9033**

Analog input channels	3
Input type	Pt or Ni RTD
RTD type and temperature range	Pt -100~100℃ a=0.00385
	Pt 0~100℃ a=0.00385
	Pt 0~200℃ a=0.00385
	Pt 0~600℃ a=0.00385
	Pt -100~100℃ a=0.00392
	Pt 0~100℃ a=0.00392
	Pt 0~200℃ a=0.00392
	Pt 0~600℃ a=0.00392
	Ni -80~100℃
	Ni 0~100℃
Isolated voltage	3000V <sub>DC</sub>
Sampling rate	10 sample/sec (total)
Input impedance	2M
Bandwidth	13.1Hz@50Hz
	15.72Hz@60Hz
Input connections	2、3 or 4 wire

Accuracy	$\pm 0.1\%$ or better
Zero drift	$\pm 0.015^{\circ}\text{C}/^{\circ}\text{C}$
Span drift	$\pm 0.01^{\circ}\text{C}/^{\circ}\text{C}$
CMR@50/60Hz	150dB
NMR@50/60Hz	100dB
Power Consumption	1.2W

Table 4: Technical specification of RemoDAQ-9033

### RemoDAQ-9033 RTD Input Impedance Calibration

1. Apply power to the module and let it warm up for about 30 minutes.
2. Make sure that the module is correctly installed and is properly configured for the input range you want to calibrate. You can use the RemoDAQ utility software to help in this.
3. Connect the correct reference self-resistance between the screw terminals of the RemoDAQ-9033 as shown in the following wiring diagram. Table 5 below shows the correct values of the span and zero calibration resistances to be connect. Reference resistance used

can be from a precision resistance decade box or from discrete resistors with the values 60, 140, 200 and 440 ohms.

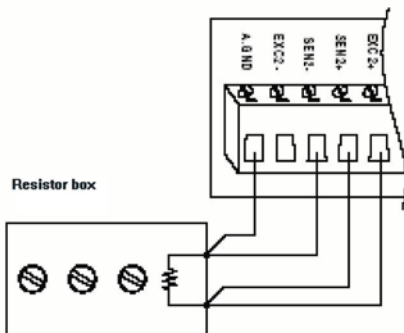


Figure 8: Applying calibration resistance

4. First, with the correct zero (offset) calibration resistance connected as shown above, issue a Zero Calibration command to the module using the Calibrate option in the RemoDAQ utility software.
5. Second, with the correct span resistance connected as shown above, issue a Span Calibration command to the module using the Calibrate option in the RemoDAQ utility software. Note that the module zero calibration

must be completed prior to the span calibration.

**Note:** If the above procedure is ineffective, the user must first issue a RTD Self Calibration command \$aaSi2 to the module and then complete steps 4 and 5 after self calibration is complete.

### Calibration resistance (RemoDAQ-9033)

Input Range Code (Hex)	Input Range	Span Calibration Resistance	Zero Calibration Resistance
20	Pt,-100~100℃ A=0.00385	140 Ohms	60 Ohms
21	Pt, 0~100℃ A=0.00385	140 Ohms	60 Ohms
22	Pt, 0~200℃ A=0.00385	200 Ohms	60 Ohms
23	Pt, 0~600℃ A=0.00385	440 Ohms	60 Ohms
24	Pt,-100~100℃	140 Ohms	60 Ohms

	A=0.00392		
25	Pt, 0~100℃ A=0.00392	140 Ohms	60 Ohms
26	Pt, 0~200℃ A=0.00392	200 Ohms	60 Ohms
27	Pt, 0~600℃ A=0.00392	440 Ohms	60 Ohms
28	Ni, -80~100℃	200 Ohms	60 Ohms
29	Ni, 0~100℃	200 Ohms	60 Ohms

Table 5: Calibration resistance of RemoDAQ-9033

## 2 Analog Output Modules

### **RemoDAQ-9024 4-channel analog output module**

RemoDAQ-9024 is a 4-channel analog output module. It receives its digital input through the RS-485 interface of the RemoDAQ-9421/9821 system module from the host computer. The format of the data is engineering unit. It then uses the D/A converter controlled by the system module to convert the digital data into output signals.

You can specify slew rate and start up currents through

the configuration software. The analog output can also be configured as current or voltage through the software utility. The module protects your equipment from ground loops and power surges by providing opto-isolation of the D/A output and transformer based isolation up to 500V<sub>DC</sub>.

### **Slew rate**

The slew rate is defined as the slope indicated the ascending or descending rate per second of the analog output from the present to the required.



## RemoDAQ-9024

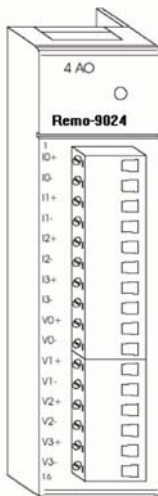


Figure 9: RemoDAQ-9024 module frontal view

## Application wiring

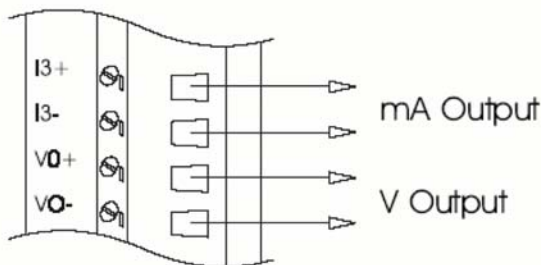


Figure 10: Analog output

## Technical specification of RemoDAQ-9024

Analog Output Channel	4
Output Type	V, mA
Output Range	0~20mA, 4~20mA, 0~10V
Isolation Voltage	3000V <sub>DC</sub>
Output Impedance	0.5Ω
Accuracy	Current output: $\pm 0.1\%$ FSR Voltage output: $\pm 0.2\%$ FSR
Zero Drift	Voltage output: $\pm 30\mu\text{V}/^\circ\text{C}$ Current output: $\pm 0.2\mu\text{A}/^\circ\text{C}$

Resolution	$\pm 0.015\% \text{FSR}$
Span            Temperature Coefficient	$\pm 25 \text{PPM}/^{\circ}\text{C}$
Programmable    Output Slope	0.125~128.0mA/s 0.0625~64.0mV/s
Current Load Resistor	0~500 $\Omega$ (Source)
Power Consumption	2.5W(Max.)

Table 6: Technical specification of RemoDAQ-9024

### 3 Analog I/O Modules Calibration

Analog input/output modules are calibrated when you receive them. However, calibration is sometimes required. No screw driver is necessary because calibration is done in software with calibration parameters stored in the RemoDAQ-9000 analog I/O module's onboard EEPROM. The RemoDAQ-9000 system comes with the RemoDAQ utility software that supports calibration of analog input and analog output. Besides the calibration that is carried out through software, the modules incorporate automatic Zero Calibration and automatic Span Calibration at boot up or

reset.

### **Analog input module calibration**

Module: RemoDAQ-9017, 9018

1. Apply power to the RemoDAQ-9000 system that the analog input module is plugged into and let it warm up for about 30 minutes.
2. Assure that the module is correctly installed and is properly configured for the input range you want to calibrate. You can do this by using the RemoDAQ utility software.
3. Use a precision voltage source to apply a span calibration voltage to the module's V0+ and V0- terminals. (See Table 5-2 and 5-3 for reference voltage for each range.)

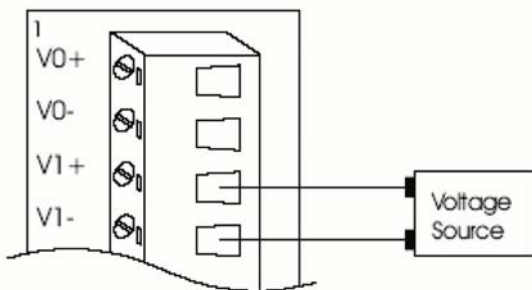


Figure 11: Applying calibration voltage

4. Execute the Zero Calibration command (also called the Offset Calibration command).

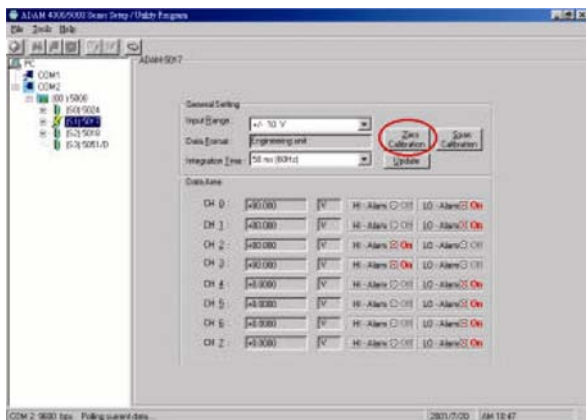


Figure 12: Zero Calibration

- Execute the Span Calibration command. This can be done with RemoDAQ utility software.

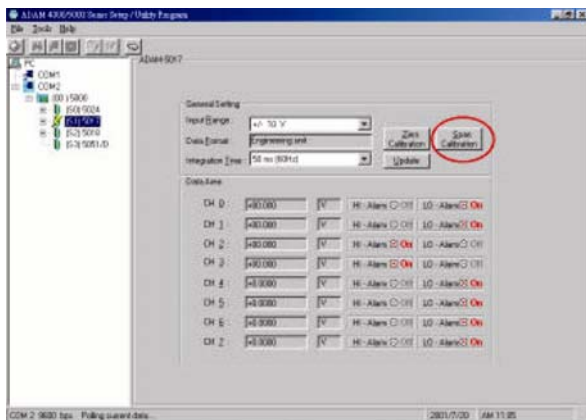


Figure 13: Span calibration

## 6. CJC Calibration (only for T/C input module)

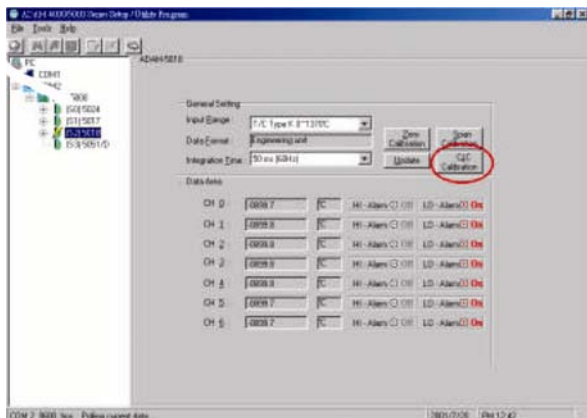


Figure 14: Cold junction calibration

**\*Note:** Zero calibration and span calibration must be completed before CJC calibration. To calibrate CJC, the thermocouple attached to RemoDAQ-9018 and a standard thermometer should be used to measure a standard known temperature, such as the freezing point of pure water. The amount of offset between the RemoDAQ-9018 and the standard thermometer is then used in the RemoDAQ utility to complete CJC calibration.



**Calibration voltage (RemoDAQ-9017/9018)**

Module	Input range code (Hex)	Input range	Span calibration voltage
9018	00h	$\pm 15\text{mV}$	+15mV
	01h	$\pm 50\text{mV}$	+50mV
	02h	$\pm 100\text{mV}$	+100mV
	03h	$\pm 500\text{mV}$	+500mV
	04h	$\pm 1\text{V}$	+1V
	05h	$\pm 2.5\text{V}$	+2.5V
	06h	$\pm 20\text{mA}$	+20mA (1)
	0Eh	J thermocouple 0~1370°C	+50mV
	0Fh	K thermocouple 0~1370°C	+50mV
	10h	T thermocouple -100~400°C	+22mV
	11h	E thermocouple 0~1000°C	+80mV

	12h	R thermocouple 500~1750°C	+22mV
	13h	S thermocouple 500~1800°C	+22mV
	14h	B thermocouple 500~1800°C	+152mV
9017	07h	Not used	
	08h	$\pm 10V$	+10V
	09h	$\pm 5V$	+5V
	0Ah	$\pm 1V$	+1V
	0Bh	$\pm 500mV$	+500mV
	0Ch	$\pm 150mV$	+150mV
	0Dh	$\pm 20mV$	+20mV

Table 7: Calibration voltage of RemoDAQ-9017/9018

### Analog output module calibration

The output current of analog output modules can be calibrated by using a low calibration value and a high calibration value. The analog output modules can be configured for one of two ranges: 0~20mA and 4~20mA. Since the low limit of the 0~20mA range (0mA) is

internally an absolute reference (no power or immeasurably small power), just two levels are needed for calibration: 4mA and 20mA.

1. Apply power to the RemoDAQ-9000 system including the analog output module for about 30 minutes.
2. Assure that the module is correctly installed and that its configuration is according to your specification and that it matches the output range you want to calibrate. You can do this by using the RemoDAQ utility software.
3. Connect either a 5-digit mA meter or voltmeter with a shunt resistor ( $250\Omega$ , 0.01%, and 10ppm) to the screw terminals of the module.

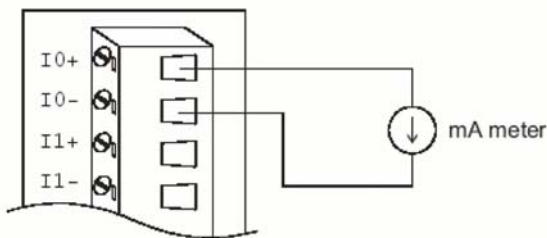


Figure 15: Output module calibration

4. Issue the Analog Data Out command to module with an output value of 4mA.
5. Check the actual output value at the modules terminals. If this does not equal to 4mA, use the “Trim” option in the “Calibrate” submenu to change the actual output. Trim the module until the mA meter indicates exactly **4mA**, or in case of a voltage meter with shunt resistor, the meter indicates exactly 1V. (When using a voltmeter with a shunt resistor to calibrate 20mA, the correct voltage should be 5V.)
6. Issue a 4mA Calibration command to indicate that the output is calibrated and to store the calibration parameters in the EEPROM of the module.
7. Execute an Analog Data Out command with an output value of 20mA. The module's output will be approximately 20mA.
8. Execute the Trim Calibration command as often as necessary until the output current is equal to exactly 20mA.
9. Execute the 20mA Calibration command to indicate that the present output is exactly 20mA. The analog

output module will store its calibration parameters into the unit's EEPROM.

## 4 Digital Input/Output Modules

### **RemoDAQ-9050 16-channel universal digital I/O module**

The RemoDAQ-9050 features 16 digital input/output channels. Each channel can be independently configured to be an input or an output channel by the setting of its DIP switch. The digital outputs are open collector transistor switches that can be controlled from RemoDAQ-9000. The switches can also be used to control solid-state relays, which in turn can control heaters, pumps and power equipment. The RemoDAQ-9000 can use the module's digital inputs to determine the state of limit or safety switches, or to receive RemoDAQte digital signals.

**Warning ! A channel may be destroyed if it is subjected to an input signal while it is configured to be an output channel.**

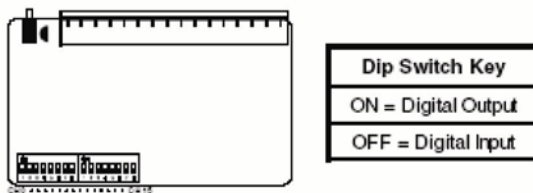


Figure 16: DIP switch setting for digital I/O channel

## RemoDAQ-9050



Figure 17: RemoDAQ-9050 module frontal view

## Application wiring

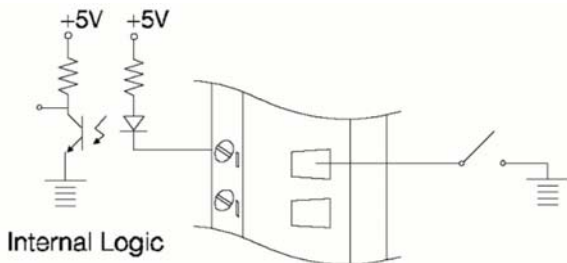


Figure 18: Dry contact signal input (RemoDAQ-9050)

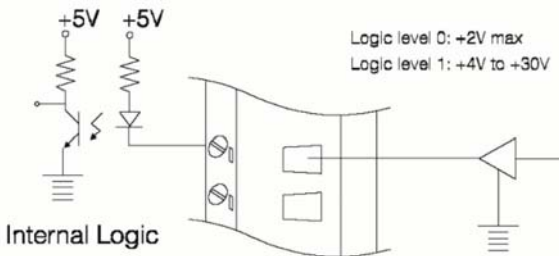


Figure 19: Wet contact signal input (RemoDAQ-9050)

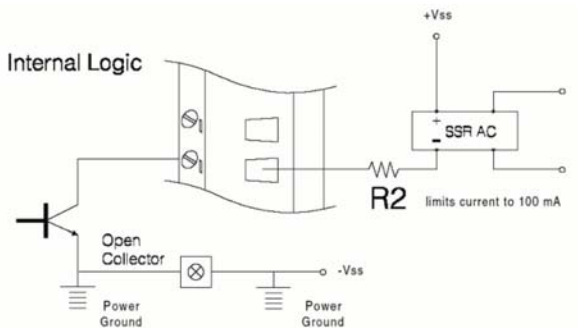


Figure 20: Digital output used with SSR (RemoDAQ-9050)

### Technical specification of RemoDAQ-9050

Points	16
Channel Setting	Selectable by DIP switch
Digital Input	Dry Contact Logic Level 0: close to GND; Logic Level 1: open Wet Contact Logic Level 0: 2V max; Logic Level 1: +4V~+30V
Digital Output	Open collector to 30V, 100mA max load
Power Dissipation	450mW



Power Consumption	0.4W
-------------------	------

Table 8: Technical specification of RemoDAQ-9050

**RemoDAQ-9051D 16-channel digital input module**

The RemoDAQ-9051D provides 16 digital input channels. The RemoDAQ-9421/9821 can use the module's digital inputs to determine the state of limit or safety switches or to receive RemoDAQte digital signals.

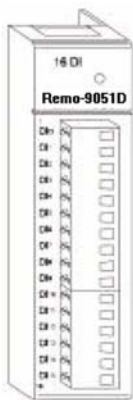
**RemoDAQ-9051D**

Figure 21: RemoDAQ-9051D module frontal view

## Application wiring

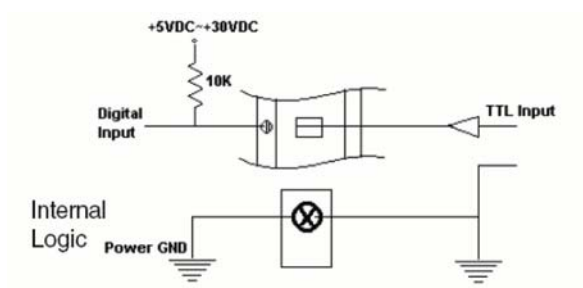


Figure 22: TTL input (RemoDAQ-9051D)

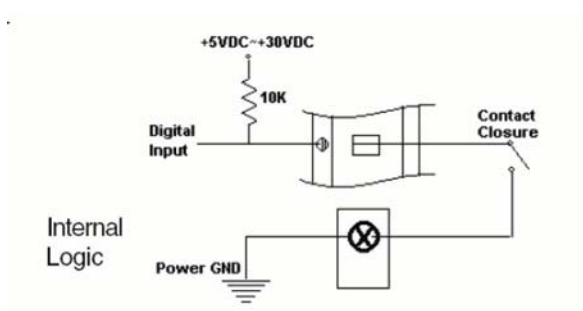


Figure 23: Contact closure input (RemoDAQ-9051D)

**Technical specification of RemoDAQ-9051D**

Points	16
Digital input	Logic level 0: +1V max Logic level 1: +3.5~30V; Pull up current: 0.5mA, 10K $\Omega$ resistor to +5V
Power consumption	0.3W
Indicator	Have

Table 9: Technical specification of RemoDAQ-9051D

**RemoDAQ-9051S 16-channel Isolated Digital Input Module with LED**

The RemoDAQ-9051S provides 16 isolated digital input channels for critical environments need individual channel isolating protection. Different from other RemoDAQ-9000 I/O modules, RemoDAQ-9051S designed with 21 pins plug terminal.

**RemoDAQ-9051S**

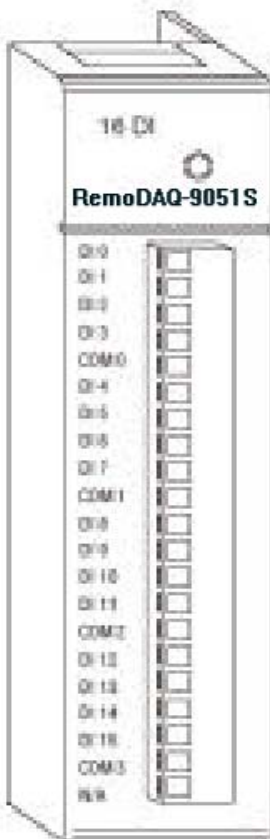


Figure24: RemoDAQ-9051S module front view

## Application Wiring

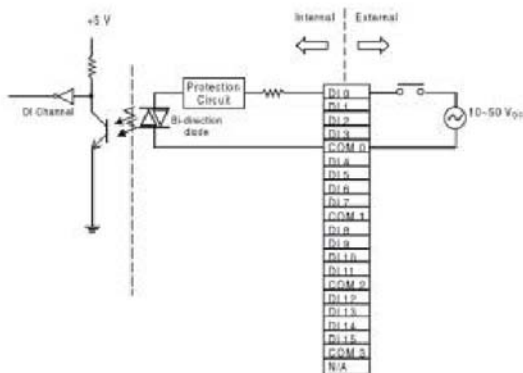


Figure25: RemoDAQ-9051S module wiring diagram

## Technical specification of RemoDAQ-9051S

<b>Point</b>	16(4-channel/group)
<b>Digital Input</b>	Logic Level 0: +3V max Logic Level 1: +10~50V
<b>Optical Isolation</b>	2500V <sub>DC</sub>
<b>Opto-isolator response</b>	25μs

<b>time</b>	
<b>Over-voltage Protection</b>	70V <sub>DC</sub>
<b>Power Consumption</b>	0.8W
<b>LED Indicator</b>	On when active
<b>I/O Connector Type</b>	21-pin plug-terminal

Table10: Technical specification of RemoDAQ-9051S

### **RemoDAQ-9052 8-channel isolated digital input module**

The RemoDAQ-9052 provides 8 fully independent isolated channels. All have 5000V<sub>RMS</sub> isolation to prevent ground loop effects and to prevent damage from power surges on the input lines.

## RemoDAQ-9052

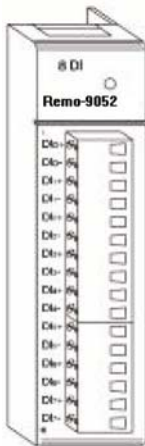


Figure 26: RemoDAQ-9052 module frontal view





## **RemoDAQ-9055S 16-channel Isolated Digital I/O Module with LED**

The RemoDAQ-9055S provides 8 isolated digital input and 8 isolated output channels for critical environments need individual channel isolating protection. Different from other RemoDAQ-9000 I/O modules, RemoDAQ-9051S designed with 21 pins plug terminal.

### **RemoDAQ-9055S**

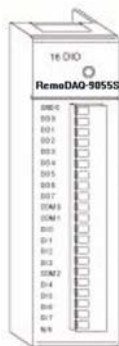


Figure28: RemoDAQ-9055S module front view

## Application Wiring

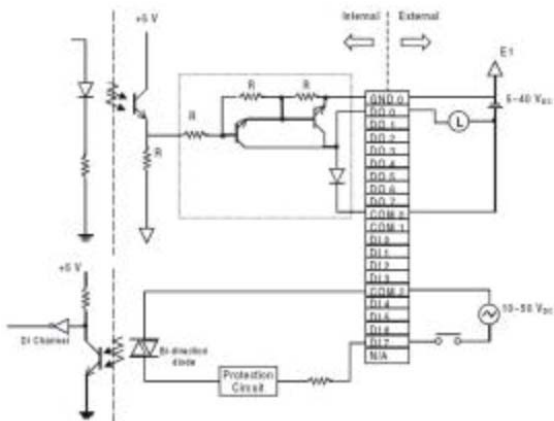


Figure29: RemoDAQ-9055S module wiring diagram

## Technical specification of RemoDAQ-9055S

<b>Points</b>	16
<b>Digital Output</b>	8 (8-channel/group)
<b>Open collector to 40 V</b>	200 mA max load per channel
<b>Optical Isolation</b>	2500 V <sub>DC</sub>

<b>Opto-isolator response time</b>	25 $\mu$ s
<b>Supply Voltage</b>	5 ~ 40 V <sub>DC</sub>
<b>Digital Input</b>	<p>8(4-channel/group) <b>Dry Contact</b> Logic Level 0: close to GND</p> <p>Logic Level 1: open <b>Wet Contact</b> Logic Level 0: + 3 V max Logic Level 1: + 10 to 50 V</p>
<b>Dry Contact &amp; Wet contact</b>	Selectable
<b>Optical Isolation</b>	2500 V <sub>DC</sub>
<b>Opto-isolator response time</b>	25 $\mu$ s
<b>Over-voltage Protect</b>	70 V <sub>DC</sub>
<b>Power Consumption</b>	0.68 W

<b>LED Indicator</b>	On when active
<b>I/O Connector Type</b>	21-pin plug-terminal

Table12: Technical specification of RemoDAQ-9055S

**RemoDAQ-9056D 16-channel digital output module w/LED**

The RemoDAQ-9056D features 16 digital output channels. The digital outputs are open-collector transistor switches that you can control from the RemoDAQ-9000 main unit. You also can use the switches to control solid-state relays.

## RemoDAQ-9056D

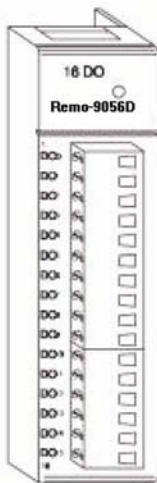


Figure 30: RemoDAQ-9056D module frontal view

## Application wiring

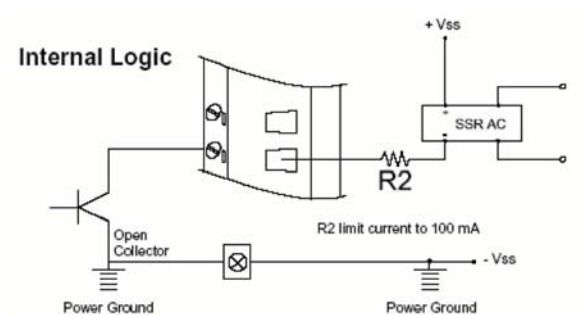


Figure31:Digital output used with SSR(RemoDAQ-9056D)

### Technical specification of RemoDAQ-9056D

There are 16-point digital input and 16-point digital output modules in the RemoDAQ-9000 series. The addition of these solid state digital I/O devices allows these modules to control or monitor the interfaces between high power DC or AC lines and TTL logic signals. A command from the host converts these signals into logic levels suitable for the solid-state I/O device.

Points	16
Digital output	Open collector to 30V 100mA max

	load
Power dissipation	450mW
Power consumption	0.25W

Table 13: Technical specification of RemoDAQ-9056D

**RemoDAQ-9056S 16-channel Isolated Digital Output Module with LED**

The RemoDAQ-9056S provides 16 isolated digital output channels for critical environments need individual channel isolating protection. Different from other RemoDAQ-9000 I/O modules, RemoDAQ-5056S designed with 21 pins plug terminal.

## RemoDAQ-9056S

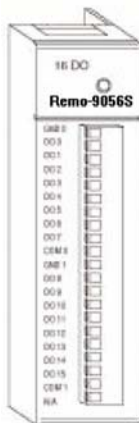


Figure 32: RemoDAQ-9056S module frontal view



## Application wiring

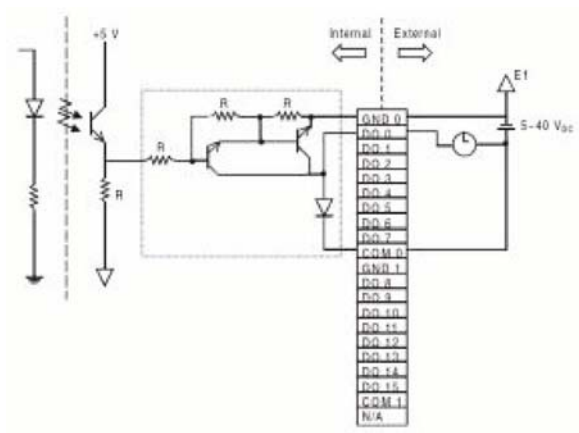


Figure 33: RemoDAQ-9056S module wiring diagram

## Technical specification of RemoDAQ-9056S

Points	16 (8-channel/group)
Digital Output	Open collector to 40V 200mA max load per channel
Optical Isolation	2500V <sub>DC</sub>
Opto-isolator response time	25μS

Supply Voltage	5~40V <sub>DC</sub>
Power consumption	0.6W
LED Indicator	On when active
I/O Connector Type	21-pin plug-terminal

Table 14: Technical specification of RemoDAQ-9056S

### **RemoDAQ-9056SO 16-channel Isolated Digital Output Module with LED**

The RemoDAQ-9056SO provides 16 channels source type isolated digital output for critical environments need individual channel isolating protection. Addition to the source output wiring, all of the specification and command sets are the same with RemoDAQ-9056SO.

## RemoDAQ-9056SO

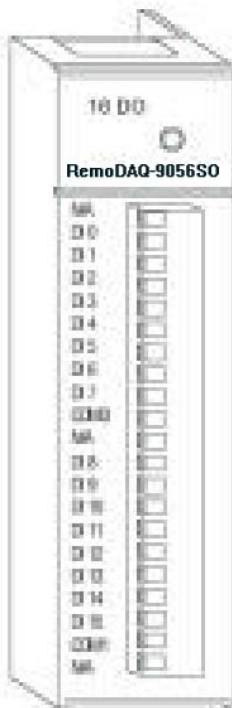


Figure34: RemoDAQ-9056SO module front view

## Application wiring

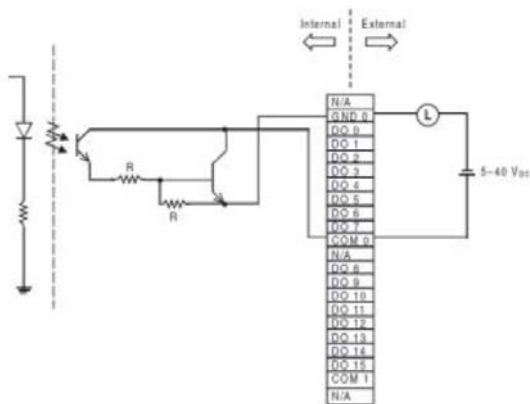


Figure35: RemoDAQ-9056SO module wiring diagram

## Technical Specification of RemoDAQ-9056SO

<b>Points</b>	16(8-channel/group)
<b>Digital Output</b>	Open collector to 40 V 200 mA max load per channel
<b>Optical Isolation</b>	2500 VDC
<b>Opto-isolator response time</b>	25 us

<b>Supply Voltage</b>	5 ~ 40 VDC
<b>Power consumption</b>	0.6 W
<b>LED Indicator</b>	On when active
<b>I/O Connector Type</b>	21-pin plug-terminal

*Table15: Technical specification of RemoDAQ-9056SO*

## 5 Relay Output Modules

### **RemoDAQ-9060 relay output module**

The RemoDAQ-9060 relay output module is a low-cost alternative to SSR modules. It provides 6 relay channels, two of Form A and four of Form C.

## RemoDAQ-9060

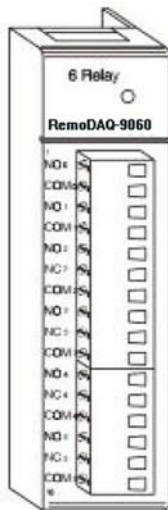


Figure36: RemoDAQ-9060 module frontal view

## Application wiring

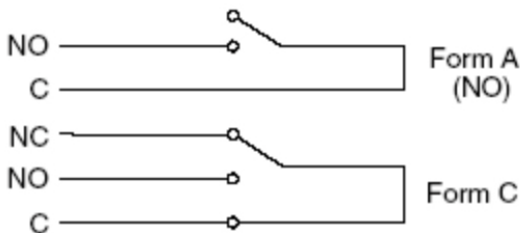


Figure37: Relay output

## Technical specifications of RemoDAQ-9060

<b>Points</b>	6, two Form A and four Form C
<b>Contact rating</b>	AC: 125 V @ 0.6A; 250 V @ 0.3 A DC: 30 V @ 2 A; 110 V @ 0.6 A
<b>Breakdown voltage</b>	500 V <sub>AC</sub> (50/60 Hz)
<b>Relay on time (typical)</b>	3 ms
<b>Relay off time</b>	1 ms

<b>(typical)</b>	
<b>Total switching time</b>	10 ms
<b>Insulation resistance</b>	1000 M $\Omega$ min. @ 500 V <sub>DC</sub>
<b>Power consumption</b>	0.7 W

*Table16: Technical specifications of RemoDAQ-9060***RemoDAQ-9069 relay output module**

The RemoDAQ-9069 relay output module provides 8 relay channels of Form A. Switches can be used to control the relays. Considered to user friendly, the RemoDAQ-9069 also built with LED indicator for status reading easily. And it also provides a choice to clear or keep output status when reset by adjusting a jumper.

**Specification**

- Number of Output Channel: 8 Form A
- Contact Rating: AC: 250V@5A  
DC: 30V@5A
- Breakdown Voltage: 750V<sub>AC</sub> (50/60Hz)
- Insulation Resistance: 1000M $\Omega$ @500V<sub>DC</sub>



- LED Indicator: On: active  
Off: Non-active
- Power Consumption: 0.25W (Typical); 2.2W (Max)
- Isolation: 4000V<sub>RMS</sub>
- Relay response time: On: 5ms  
Off: 5.6ms
- Clear or keep relay status when reset (selectable by jumper)

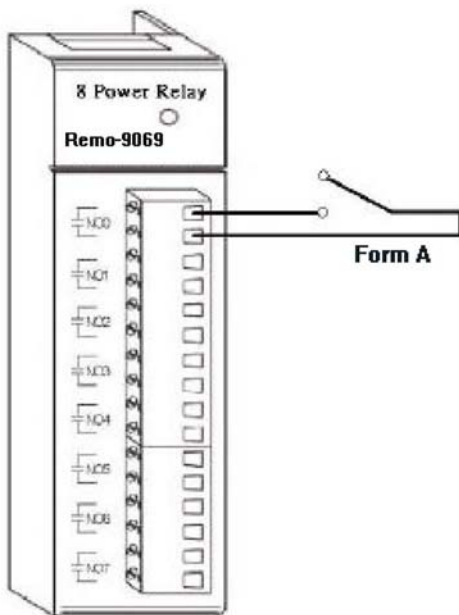


Figure38: The wiring of RemoDAQ-9069 module frontal view

## **6 Serial Module**

### **Overview**

#### **Compatible RemoDAQ-9000 Series Main Units**

The RemoDAQ-9090 is a 4-port RS-232 communication module to be implemented with the following DSLC RemoDAQ-9000 series main units: RemoDAQ-9421/9821 (with library Version V1.10 or above)

#### **RemoDAQ-9090 4-port RS-232 Communication Module**

##### **Bi-direction Communication**

The RemoDAQ-9090 is equipped with 4 RS-232 ports, which makes it especially suitable for bi-direction communication. It can simultaneously read data from other third-party devices such as Bar Code and PLC as long as these devices are equipped with a RS-232 interface. Furthermore, the RemoDAQ-9090 can issue command to

control other devices. It is fully integrated with the RemoDAQ-9000 and RemoDAQ-8000 series, and transmits data to each other through the RS-232 port. The whole integrated system is an intelligent stand-alone system and can connect and issue commands to control devices such as printers and PLCs in RemoDAQ factory location.

The RemoDAQ-9090 transmits and receives data by polling communication, and each port can receive up to 128 bytes in the FIFO. For continuous data longer than 128 bytes, please refer to table 11 for Baud Setting to avoid data loss.

Baudrate (bps)	1152 00	576 00	384 00	19200	960 0	480 0	240 0
Polling interval (ms)	11.11	22. 22	33. 33	66.66	133 .33	266 .66	533 .33

Table 17: Baud Rate setting reference table

### **Communication Backup Function**

With the RemoDAQ-9090 you can implement dual communication channels between your PC and the RemoDAQ system. Even when one of the two communication channels is down, your system can still function through the alternative communication channel. This dual communication channels can be implemented by application software.

### **RemoDAQ-9090 Module Diagram**

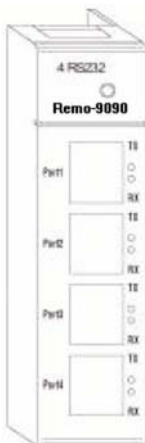


Figure 39: RemoDAQ-9090 module

## Application Wiring

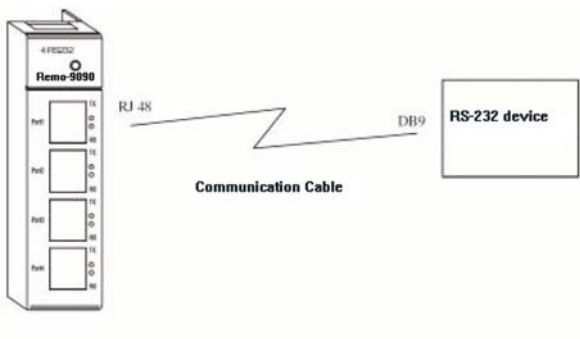


Figure 40: RemoDAQ-9090 Application Wiring

### Pin Mapping

Pin name	RJ-48	DB9
/DCD	1	1
RX	2	2
TX	3	3
/DTR	4	4
GND	5	5

/DSR	6	6
/RTS	7	7
/CTS	8	8
RI 或+5V	9	9
GND	10	X

### Technical specification of RemoDAQ-9090

Function	Provides communication ports for the RemoDAQ-9421/9821 to integrate other devices with communication function into your system
Electrical Interface	4 ports (RS-232)
Communication Rates	4800,9600,19200,38400,115200bps
FIFO	128 字节/UART (Tx/Rx)
Indicator	Tx (Orange), Rx (Green)
Power Required	100mA@5V <sub>DC</sub> , Default in RI mode(*)

Table 18: RemoDAQ-9090 technical specifications

- User can define the communication ports with 5VDC



output by switching the jumper, and the maximum current output is 400mA.

### **I/O Slots and I/O Ports Numbering**

The RemoDAQ-9090 module provides 4 RS-232 ports for communication with target devices. The ports are numbered 1 through 4. For programming, the definition of port number depends on the slot number and port number. For example, the second port on the RemoDAQ-9090 in slot 1 is defined to port 12.

### **Jumper Settings**

This section tells you how to set the jumpers to configure your RemoDAQ-9090 module. There are 4 jumpers on the PC Board. User can choose RI signal or 5V output for each port by setting these jumpers (system default is RI signal).

The following figure shows the location of the jumpers:

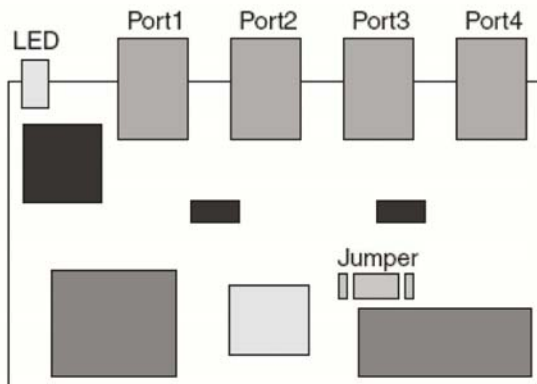


Figure 41: Jumper locations on the CPU card

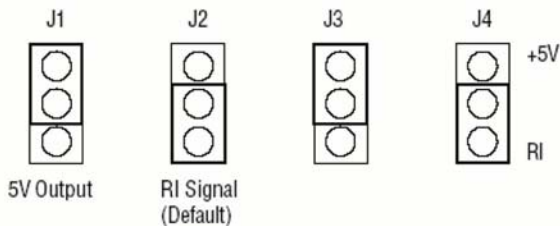


Figure 42: Jumper Setting

### **LED Status of the RemoDAQ-9090 Module**

There are 2 LEDs for each port on the front panel of the RemoDAQ-9090 to display specific communication status:

- a. Green LED (RX): Data Receiving Status; the LED indicator is on when the port is receiving data.
- b. Orange LED (TX): Data Transmitting Status; the LED indicator is on when the port is transmitting data.

### **Configure Your RemoDAQ-9090 Module**

This section explains how to configure an RemoDAQ-9090 module before implementing it into your application.

#### **Quick Start**

Step 1 : Get your host PC ready, and run the RemoDAQ-9421/9821 Utility software.

Step 2: Install the RemoDAQ-9090 module, and power on your RemoDAQ-9421/9821 main unit.

Step 3: Download the executable program to main unit.

Step 4: Monitor the RemoDAQ-9090 module's current status from the PC through the utility software.

### **A basic example program for the RemoDAQ-9090**

```
main()
{
//Install the port you would like to use. Here we install slot 0,
port 1.
port_install(1);
//Here we install slot 2, port 2.
port_install(22);
//Select the working port. Here we select slot 0, port 1.
port_select(1);
//Set port data format.
//Here we set the data format of port 1 as length:8; parity:0;
stop_bit:1. (N81)
port_set_format(1,8,0,1);
//Set port speed. Here we set communication speed of port1
```

as 115200bps.

```
// (L is necessary)
```

```
port_set_speed(1,115200L);
```

```
//Enable port FIFO. Here we enable 128 byte FIFO for  
port1.
```

```
port_enable_fifo(1);
```

```
//After these above settings are enabled, you can apply any  
other function library to implement your program.
```

```
}
```

#### **A receive-and-transmit example program for the RemoDAQ-9090**

```
main()
```

```
{
```

```
int err_value, char character port_installed(1);
```

```
port_enable_fifo(1);
```

```
//Check whether error has been received or not.
```

```
err_value=port_rx_error(1);
```

```
//If error detected, print out the message.
```

```
If(err_value)
```

```

{
printf("\n RX Error, The LSR Value=%0.2X",err_value);
}
//check whether FIFO receives data or not; if data received,
read a character.
if(port_rx_ready(1))
{
character=port_rx(1);
}
//check whether FIFO is empty or not, if empty, send a
character.
if(port_tx_empty(1))
{
port_tx(1,character);
}
}

```

## 7 Counter/Frequency Module

### Overview

### Compatible RemoDAQ-9000 Series Main Units

RemoDAQ-9080 is a 4-channel counter/frequency module that designed to be implemented within the following DSLC RemoDAQ-9000 series main units:

RemoDAQ-9X10

RemoDAQ-9X11

RemoDAQ-9X20

RemoDAQ-9X21

***Please make sure that the RemoDAQ-9080 counter/frequency module is properly inserted into the compatible main units.***

### **RemoDAQ-9080 4-channel Counter/Frequency**

With RemoDAQ-9080 4-Channel Counter/Frequency Module, users can select either counter or frequency mode for data output. RemoDAQ-9080 offers users a variety of very flexible and versatile applications such as below:

### **Counter Mode or Frequency Mode**

If you want to measure the number of input signals

for totalizer function, you may use counter mode to measure quantities such as movement and flow quantity. Alternatively, you can also select frequency mode to calculate the instantaneous differential of quantities such as rotating speed, frequency or flow rate, and present them in specific engineering formats.

### **Up/Down or Bi-direction Function**

When operating in counter mode, you can choose either the Up/Down function or the Bi-direction function for different application purposes. The counter will count up or down according to your applications. This counting function helps users obtain the most accurate data.

### **Digital Output Mapping**

Users can either run the utility program or issue a "Set Alarm Connection" command to designate a specific digital output module for the alarm signal to be sent through.



## RemoDAQ-9080 Module Diagram

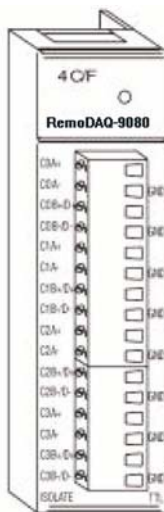


Figure 43: RemoDAQ-9080 Module

## ADAM-5080 Application Wiring

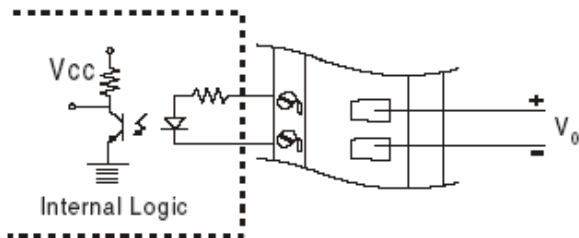


Figure 44: Isolated Input Level

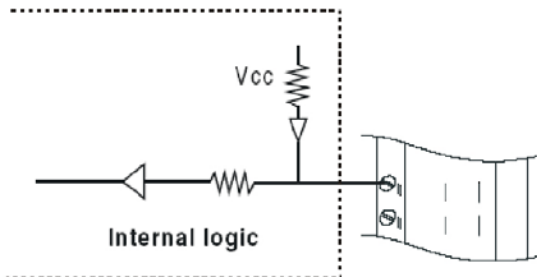


Figure 45: TTL Input Level

## Features -- Counter Mode

## Up/Down Counting

The Up/Down Counter Function offers two types of counting: Up Counting (increasingly) and Down Counting (decreasingly).

**Up Counting:** when C0A+ and C0A- sense any input signals, the counter counts up.

**Down Counting:** when C0B+ and C0B- sense any input signals, the counter counts down. On receiving Up and Down signal simultaneously, the counter will not perform each specific counting accordingly, but will remain at the previous counting value, since these simultaneous signals won't have any effect on counting values.

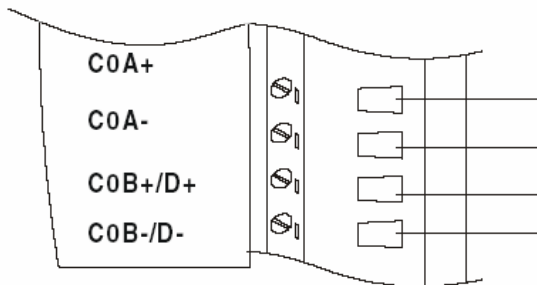


Figure 46: Wiring for Up/Down Counting

**Note:** If you need only one type of counting, connect C0A+ and C0A - for Up Counting only; or connect C0B+ and C0B- for Down Counting only.

### Bi-direction Counting

For implementing Bi-direction Counting, you need to connect C0B+/D+ and C0B-/D- to implement the control function for Up/Down Counting.

**Up Counting:** when the input signal is within logic level "1", the counter value increases.

**Down Counting:** when the input signal is within logic level "0", the counter value decreases.

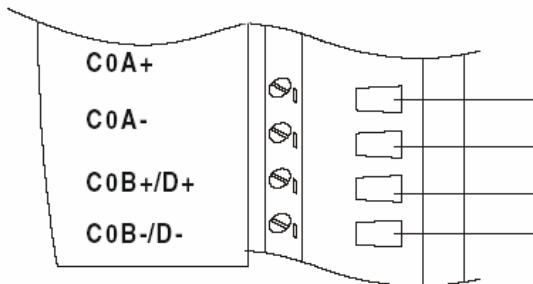


Figure 47: Wiring for Bi-direction Counting

**Note:** If users select TTL mode and don't connect C0B+ C0B-, the counter value will increase. If users select Isolated mode and don't connect C0B+ C0B-, the counter value will decrease.

### Features -- Frequency Mode

If users want to select frequency mode, they can only utilize up Counting type, and can only connect to C0A+ and C0A-.

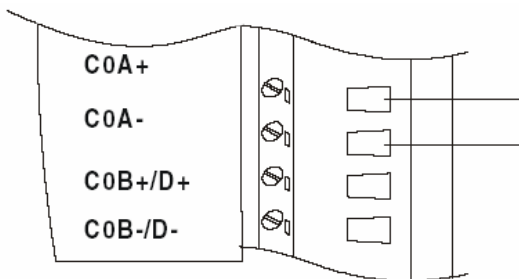


Figure 48: Wiring for Frequency Mode

### Features -- Alarm Setting

According to your application purposes, you can run

the utility program to set different limit values for High/Low Alarm.

### Setting Initial Counter Value

In order to utilize the alarm function, users have to set a high-alarm limit value and/or a low alarm limit value, and an initial value to fulfill the requirements for a basic alarm setting.

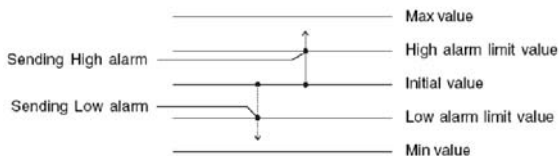


Figure 49: Sending Alarm Signal (recommended settings)

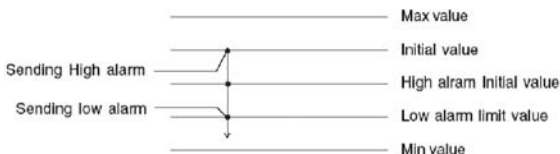


Figure 50: Sending Alarm Signal (settings not recommended)

recommended)

### **Overflow Value**

Overflow value is the number of times the counter value exceeds the Max/Min values you specified. When the counter value exceeds Maximum value, the overflow value increases; when the counter value goes under Minimum value, the overflow value decreases. Besides, when the counter value runs beyond the range of Max/Min value, it will continue counting from the initial value. Furthermore, if users want to check the counter value to see if it is higher or lower than the Max/Min value, they can use the "ReadOverflowFlag" library to gain a readout of the overflow value.

### **Getting the Totalizer Value**

If users want to get the actual counter value, a formula such as follows can facilitate an easy calculation from the initial counter value, overflow value and current counter value:

$$V_{tol} = \{ |V_{ini} - V_{min} \text{ (or } V_{max})| + 1 \} \times |V_{vf}| + |V_{ini} - V_{cur}|$$

$V_{tol}$ : totalizer value

$V_{ini}$ : initial counter value

$V_{min}$ : min. counter value = 0 (fixed value)

$V_{max}$ : max. counter value =  $2^{32} = 4,294,967,295$  (fixed value)

$V_{vf}$ : overflow value

$V_{cur}$ : current counter value

### **Example:**

If the initial value = 10, overflow value = 4, min. value = 0, current counter value = 3, the totalizer value could be calculated as:

$$\text{Totalizer value} = \{ |10 - 0| + 1 \} \times 4 + |10 - 3| = 51$$

### **Features--Digital Output Mapping**



If users want to use Digital Output function, you can use RemoDAQ utility to set specifically module, channel or slot to receive the alarm signals.

- 1: High Alarm State**--Set Alarm state to "Latch" or "Disable".
- 2: High Alarm Limit**--Set Alarm limit from 0 to 4,294,967,295.
- 3: High Alarm Output Mode**--Enable or Disable D.O. Mapping.
- 4: High Alarm Output Slot**--Users can select D.O. modules such as RemoDAQ-9050, RemoDAQ-9055, RemoDAQ-9056, RemoDAQ-9060, RemoDAQ-9068 for the alarm signal to be sent through.
- 5: High Alarm Output Channel**--Select Alarm Output Channel
- 6: Clear Latch Alarm**--Users can select "Enable" or "Disable" option. When selecting "Enable", the latch will be relieved and the alarm state will return to

normal. Once the alarm state returns to normal, the **Clear Latch Alarm** will return to "Disable".

### TTL/Isolated Input Level

According to your need, you can select either TTL or Isolated Input Level by setting the configuration for the jumpers. Select the proper jumper settings for either TTL or Isolated Input according to following figure. Please note that you must configure all six jumpers to the correct configuration for proper function.

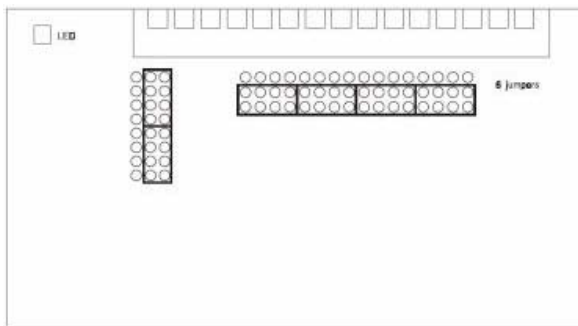


Figure 51: Jumper Location on the RemoDAQ-9080

## Module



TTL Input Level

Isolated Input Level

Figure 52: TTL/Isolated Input Level Selecting

**RemoDAQ-9080 Technical Specifications**

Channel	4
Input Frequency	0.3 ~ 1000 Hz max. (Frequency mode) 5000 Hz max. (Counter mode)
Input Level	Isolated or TTL level
Minimum Pulse Width	500 $\mu$ sec. (Frequency mode) 100 $\mu$ sec. (Counter mode)

Minimum Input Current	2mA (Isolated)
Isolated Input Level	Logic Level 0: +1 V <sub>MAX</sub> Logic Level 1: + 3.5 V to 30 V
TTL Input Level	Logic Level 0: 0 V to 0.8 V Logic Level 1: 2.3 to 5 V
Isolated Voltage	1000 V <sub>RMS</sub>
Mode	Counter (Up/Down, Bi-direction) Frequency
Programmable Digital Noise Filter	8 ~ 65000 $\mu$ sec

*Table19: RemoDAQ-9080 technical specifications*