



DI-2008

8-Channel USB Voltage and Thermocouple Data Acquisition System

User's Manual ***Manual Revision C***

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DATAQ Instruments, Inc.

241 Springside Drive

Akron, Ohio 44333 U.S.A.

Telephone: 330-668-1444

Fax: 330-666-5434

Designed and manufactured in the
United States of America

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1. Introduction

This manual contains information designed to familiarize you with the features and functions of the DI-2008 Voltage, Thermocouple, and Pulse USB data acquisition system.

Features

The **DI-2008** data acquisition instrument is a portable data recording module that communicates through your computer's USB port. Power is derived from the interface port so no external power is required. Features include:

- 8 fixed differential and isolated analog inputs protected to 120V rms.
- 7 digital I/O ports protected to +30V.
- 16-bit measurement resolution.
- Per channel programmable measurement ranges of ± 10 , ± 25 , ± 50 , ± 100 , ± 250 , ± 500 mV; ± 1 , ± 2.5 , ± 5 , ± 10 , ± 25 , ± 50 Volts or Thermocouple types J, K, T, B, R, S, E, and N.
- Built-in cold junction compensation automatically enabled for any channel programmed as a thermocouple.
- Sample rates from as high as 2 kHz (for a single channel) to as low as 1 sample every 2.5 hours.
- A push-button to tag remote events in WINDAQ software.
- LED indication for easy notification of device status.
- Free WinDaq/Lite provides access to all instrument features. WinDaq/Unlock required per instrument to operate multiple units using ChannelStretch™*
- ChannelStretch™ Technology allows you to sync up to 16 units (requires unlock code for each device)
- Counter channel (terminal count of 65535).
- Frequency channel (10 Hz to 50 kHz full scale across 12 programmable ranges).
- 15V excitation power supply output to power external sensors.
- Included .Net Class supports programming the DI-2008 under any .Net programming language.*
- Fully documented instrument protocol for programming the device in operating systems other than Windows.*

*ChannelStretch requires that each device be unlocked when used with WinDaq software. WinDaq unlock is not required for ChannelStretch if programming devices using the .Net class or instrument protocol.

Analog Inputs

The DI-2008 features eight isolated differential channel inputs located on the sixteen-position screw terminal blocks for easy connection and operation. Each channel can be programmed to acquire data as Voltage (± 10 , ± 25 , ± 50 , ± 100 , ± 250 , ± 500 mV; ± 1 , ± 2.5 , ± 5 , ± 10 , ± 25 , ± 50 Volts) or Thermocouple temperature (types J, K, T, B, R, S, E, and N are supported).

Utilize the functionality of WINDAQ software to experience all the features encased in these small, inexpensive instruments. Unlock code required to expand channel count using the ChannelStretch feature.

Digital I/O

The DI-2008 contains seven digital ports that may each be used as a general-purpose digital input or for a specific function as designated on the device. Digital port D0 may be used for WinDaq Events; Digital port D1 may be used for WinDaq remote Start/Stop; Digital port D2 may be used for rate measurements; Digital port D3 may be used for

counts; Digital ports D4-D6 are general-purpose digital input ports. Please Note: Digital outputs are not supported in WinDaq software. Each port may be configured as a switch using your own program.

Software

All software required to record and playback waveforms is included with the purchase of any DI-2108-P data acquisition system via download.

WINDAQ® Recording and Playback Software

WINDAQ Acquisition and WINDAQ Waveform Browser allow you to record and playback data acquired through your instrument. WINDAQ software is an invaluable resource to record and analyze your data and is available for free from our web site (www.dataq.com).

WINDAQ Lite Data Acquisition software (free) can be used to record waveforms directly and continuously to disk while monitoring a real time display of the waveforms on-screen. It operates, displays, and records all channels in real time. An optional unlock code is available to allow you to synchronize multiple units and expand channel count using ChannelStretch.

WINDAQ Waveform Browser playback software (also known as “WWB”) offers an easy way to review and analyze acquired waveforms. A built-in data file translator allows the user to display multiple waveforms acquired by WINDAQ Acquisition software or any of a wide range of data acquisition packages. The software’s disk-streaming design allows data files of any length to be graphically displayed rapidly, in normal or reverse time directions. Seven standard cursor-based measurements, frequency domain, and statistical analysis functions help simplify waveform analysis and interpretation. WINDAQ Waveform Browser is free and installed when installing WINDAQ Software.

Help

All WINDAQ software utilizes context-sensitive help. Help may be accessed through the Help menu or by pressing the F1 key with any pull-down menu item selected. This will take you directly to the Help topic most relevant to that particular function or feature. Help topics discuss in detail each function available in the software.

2. Specifications

Analog Inputs

Number of Channels:

8

Channel Configuration:

Differential, Isolated

Programmable measurements per channel:

Voltage, Thermocouple

Programmable thermocouple types and measurement range per channel:

Over 25 ± 3 °C ambient temperature range.

Stable ambient temperature.

Following 30 minutes warm-up.

Excluding common mode error.

Excluding thermocouple error.

TC Type	Range (°C)	Accuracy (°C)
J	-190 to 1200	$\pm(0.1\% \text{ of span} + 2)$
K	-180 to 1360	
T	-190 to 400	$\pm(0.1\% \text{ of span} + 1)$
B	600 to 1000	$\pm(0.2\% \text{ of span} + 4)$
	1001 to 1810	$\pm(0.1\% \text{ of span} + 3)$
R	-40 to 300	$\pm(0.2\% \text{ of span} + 6)$
	301 to 1760	$\pm(0.1\% \text{ of span} + 3)$
S	-40 to 400	$\pm(0.2\% \text{ of span} + 6)$
	401 to 1750	$\pm(0.1\% \text{ of span} + 3)$
E	-160 to 990	$\pm(0.1\% \text{ of span} + 1)$
N	-170 to 50	$\pm(0.1\% \text{ of span} + 3)$
	51 to 1290	$\pm(0.1\% \text{ of span} + 1)$

Programmable voltage measurements ranges per channel:

At 25 °C ambient temperature.

Following 30 minutes warm-up.

Excluding common mode error.

Range (\pm)	Accuracy
10 mV	$\pm(0.05\% \text{ of range} + 10 \mu\text{V})$
25 mV	
50 mV	
100 mV	
250 mV	
500 mV	
1 V	
2.5 V	
5 V	
10 V	
25 V	
50 V	

Input impedance:

1 M Ω , all ranges

Isolation:

Input-to-output, Channel-to-channel

Absolute max input without damage:

120 Vrms

Maximum common mode voltage: 120 Vrms
Minimum common mode rejection (330 Ω unbalance): >110 dB (DC to 60 Hz)
Channel-to-channel crosstalk rejection: > 100 dB
($R_{\text{source}} \leq 330 \Omega$; $\text{Freq}_{\text{source}} \leq 60 \text{ Hz}$)

Digital Ports

Number of ports: 7
Type: MOSFET switch
Configuration: Programmable as an input or switch
Pull-up value: 4.7 k Ω
Isolation: None
Input high voltage threshold: 2.4 V minimum
Input low voltage threshold: 0.8 V maximum
Absolute maximum input without damage: $\pm 30 \text{ V}$ peak

Count/Rate

Digital port assignment: Count: Port 2 as input; Rate: Port 3 as input
Internal pull-up value: 4.7 k Ω
Input high voltage threshold: 2.4V
Input low voltage threshold: 0.8V
Terminal count: 65,535
Maximum rate frequency: 50 kHz
Minimum rate frequency: 0.5 Hz
Maximum count frequency: 50 kHz

ADC Characteristics

Voltage measurement resolution:

Range (\pm)	Resolution	Units
10 mV	0.305	μV
25 mV	0.763	
50 mV	1.53	
100 mV	3.05	
250 mV	7.63	
500 mV	15.26	
1 V	30.5	
2.5 V	76.3	
5 V	152.6	
10 V	305	
25 V	763	mV
50 V	1.53	

Minimum temperature measurement resolution:

TC Type	Resolution	Units
J	0.086	°C
K	0.096	
T	0.037	
B	0.096	
R/S	0.111	
E	0.073	
N	0.092	

4-20 mA current loop resolution:
(5 VFS range with 250Ω shunt resistor)

13,100 ADC counts over the 4-20 mA range

Maximum sample throughput rate:

Single enabled channel: 2 kHz
Two or more enabled channels: 200 Hz

Minimum sample throughput rate:
(Hardware)

1 enabled analog channel: 0.000109 Hz (1 sample every 9141.99 sec.)
2 or more enabled analog channels: 0.000011 Hz (1 sample every 91419.93 sec.)

Minimum sample throughput rate:
(with WinDaq software)

.0001969 Hz

Sample rate timing accuracy:

50 ppm

Indicators, Connections, Controls

Interface:

USB 2.0 (mini-B style connector)

Indicators (LED):

Power, Active, Event

Input connections:

Two 16-position terminal strips

Push button:

Manual event when used with WinDaq software

Environmental

Operating temperature range:

0 to 70 °C

CJC range:

-20 to 80 °C

Storage temperature:

-20 to 80 °C

Storage humidity:

0 to 90 %RH, non-condensing

ChannelStretch™*

WinDaq software:

If any synced device has two or more enabled analog channels, all synced devices must enable the same number of analog and digital channels and the same sample throughput rate. If all synced devices have one or zero enabled analog channels, sample rate per channel must be the same across all devices.

Programmed (.Net- or protocol-based):

Sample rate per channel must be the same across all synced devices.

*One or more digital ports configured as a discrete input counts as one digital channel. Rate and count inputs count as one digital channel each.

Power

Excitation output: +15 V dc (-7.5% to +2.5%) at 70% load (47 mA), 67 mA at full load
Power consumption from USB port: 0.75 Watts

Physical Characteristics

Enclosure: Hardened Plastic
Mounting: Desktop; bulkhead
Dimensions: 6.68W × 3.28D × 1.13H in.
(169.67W × 83.13D × 28.7H cm.)
Weight: 5.7 ounces (162 grams)

Software

WinDaq software: [Click for supported operating systems](#)
Programming: DATAQ Instruments Dot Net SDK, Instrument protocol, DLL, and ActiveX Control

3. Installation

The following items are included with each DI-2008 USB Data Acquisition System. Verify that you have the following:

- A DI-2008 USB data acquisition instrument.
- 6-foot USB cable.
- A DATAQ Instruments screwdriver for signal lead connections.

If an item is missing or damaged, call DATAQ Instruments at 330-668-1444. We will guide you through the appropriate steps for replacing missing or damaged items. Save the original packing material in the unlikely event that your unit must, for any reason, be sent back to DATAQ Instruments.

Install WINDAQ Software

All software for the DI-2008 can be installed via a download-able executable directly from the DATAQ Instruments web site. No CD is shipped with the device. You may burn the executable onto a CD or USB drive to transport the software to a computer with no internet connection.

1. Disconnect all DATAQ Instruments USB devices from your Computer.



2. Go to <http://run.dataq.com>.
3. You must subscribe to our newsletter in order to get the software download link (you can opt-out after download).
4. Save the file to your local hard drive.
5. Double-click on the downloaded file to extract the program and begin software installation.

6. Follow the on-screen prompts and enter any required information.
7. Software installation is complete - you will now see a “Successful Installation” box - click **OK** to exit WINDAQ Installation.

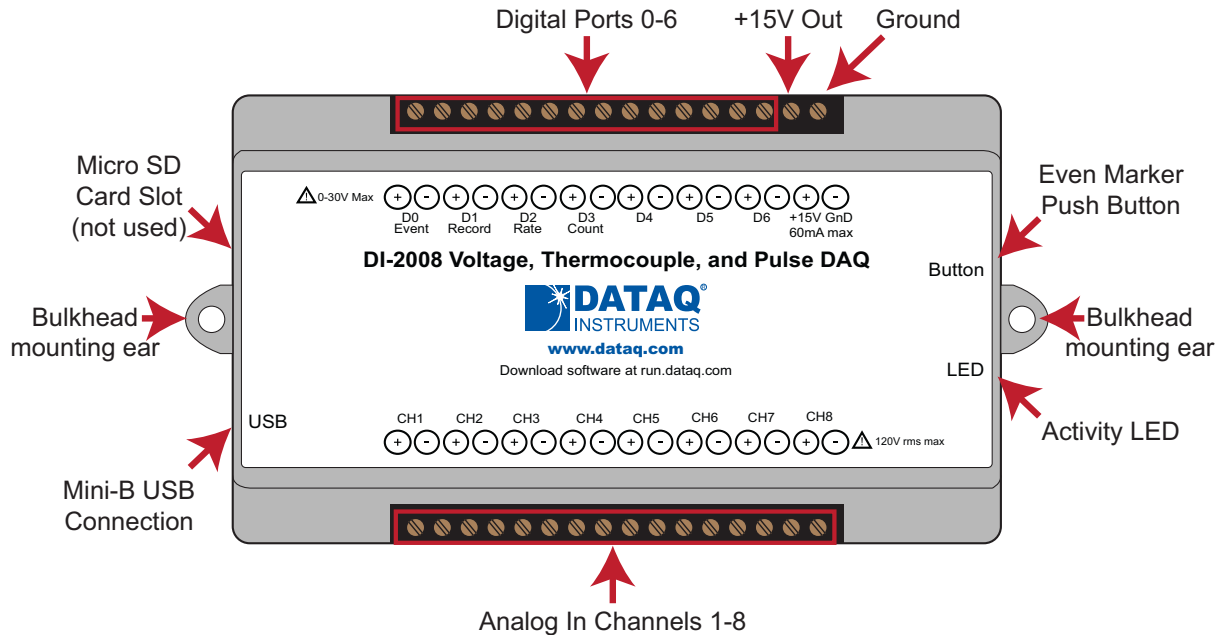
You can now plug the device(s) into your PC. Click on the appropriate program group (specified above — default is Start > Programs > WINDAQ) and click on “DATAQ Instruments Hardware Manager” to access WINDAQ software.

Connect the Instrument to Your Computer

DI-2008 instruments can be connected to your computer’s USB port using the provided USB cable. No external power is required. Connect one end of the communications cable to the instrument port and the other to your PC’s port.

***Note:** Use a powered USB hub or a USB port on your PC. Non-powered USB hubs may not have sufficient power to run the instrument.*

4. Controls, Indicators, and Connections



Please note: The Micro SD card slot is not used in the DI-2008. Allowing foreign materials to enter the device through the Micro SD card slot may result in damage to the instrument.

Mini-B USB Connection

Use the supplied USB cable to connect and power the instrument through your computer's USB port.

Screw Terminals

All input signal connections are made to the 16-port screw terminals. Each terminal is labeled on the instrument case.

⚠ CAUTION ⚠

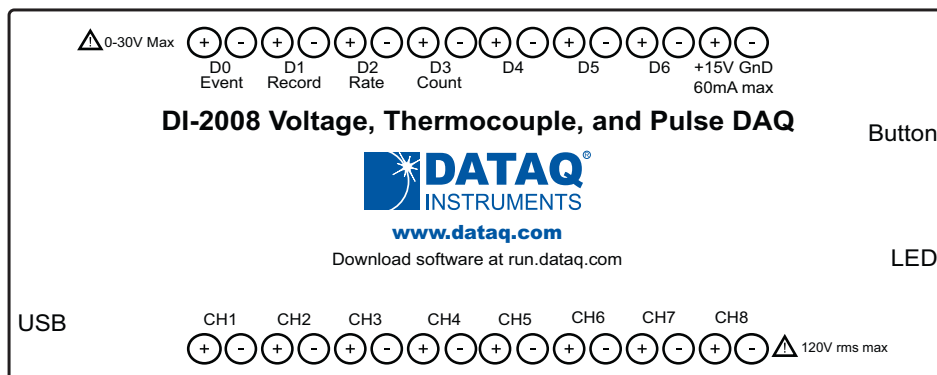
Never touch exposed screw terminal connector pins or screws. This instrument is electrically isolated, which means that a potentially lethal voltage may be present on the screw terminals depending upon the measurement.

To avoid ESD damage in handling the device, take the following precautions:

Ground yourself with a grounding strap or by touching a grounded object before and during your handling of the instrument.

DI-2008 Signal Connections

Refer to the following for screw terminal port identification.



CH#: Analog channels 1-8 (Programmable ± 10 , ± 25 , ± 50 , ± 100 , ± 250 , ± 500 mV; ± 1 , ± 2.5 , ± 5 , ± 10 , ± 25 , ± 50 Volts or Thermocouple type J, K, T, B, R, S, E, N; 120V rms max.)

D#: Digital port (0-6). Can also be used for specific WINDAQ functions (30 Vmax).

D0 Event — WINDAQ Remote Event Marker (or general-purpose)

D1 Record — WINDAQ Remote Start/Stop (or general-purpose)

D2 Rate — Rate Input (or general-purpose)

D3 Count — Counter Input (or general-purpose)

D4 - D6 — General-purpose digital ports

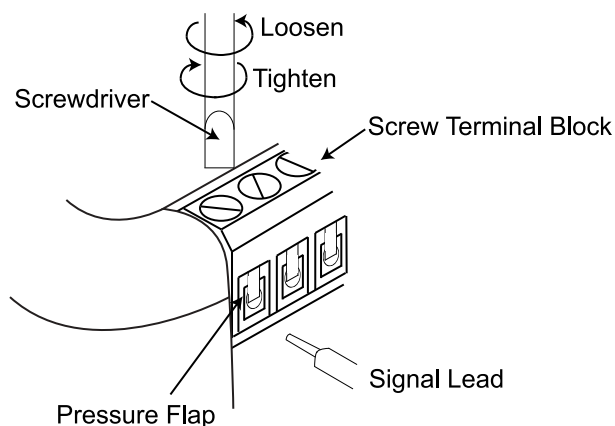
+15V: +15V out. Max current = 67mA.

GND: Ground.

Connecting Signal Leads

Connect signal leads to the DI-2008:

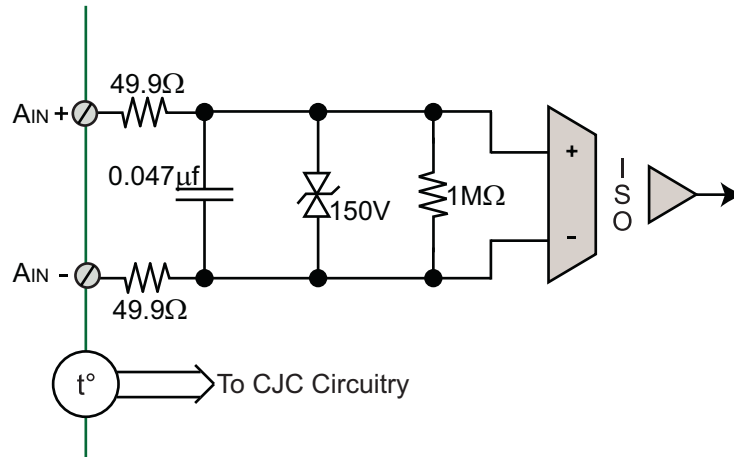
1. Insert the stripped end of a signal lead into the desired terminal directly under the screw.
2. Tighten the pressure flap by rotating the screw clockwise with a small screwdriver. Make sure that the pressure flap tightens only against the signal wire and not the wire insulation. Do not over-tighten.
3. Tug gently on the signal lead to ensure that it is firmly secured.



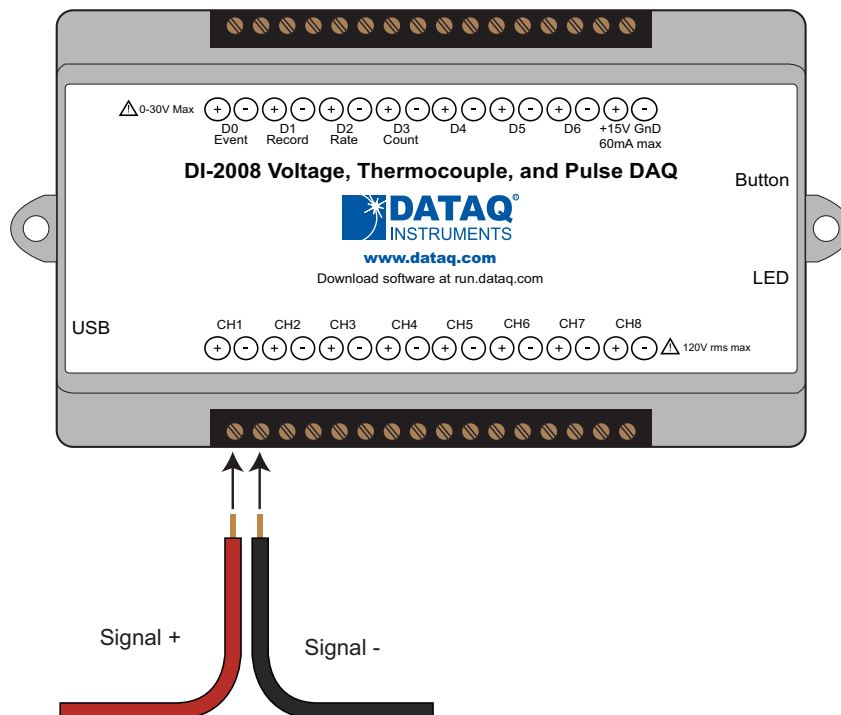
When an input signal is connected and WINDAQ Acquisition software is run, WINDAQ's real time display immediately reveals the input waveform on your computer's monitor.

Analog Inputs

Eight differential analog inputs measure ± 10 , ± 25 , ± 50 , ± 100 , ± 200 , ± 500 mV; ± 1 , ± 2.5 , ± 5 , ± 10 , ± 25 , ± 50 Volts or Thermocouple temperatures types J, K, T, B, R, S, E, and N (CH1 to CH8, programmable per channel). Designed to withstand 120 V rms.



Use the following diagram to connect Analog Input Channel 1.



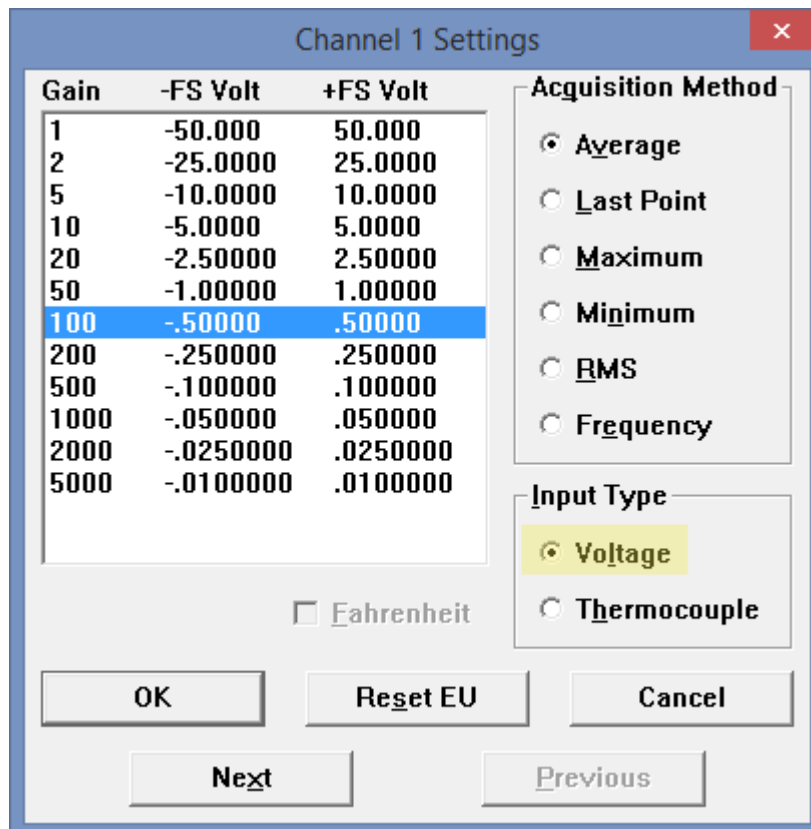
Gain Settings for Voltage Measurements

Each analog input channel on the DI-2008 may be programmed for one of 12 gain ranges.

Measurement Range	Gain Setting
±50V Full Scale	1
±25V Full Scale	2
±10V Full Scale	5
±5V Full Scale	10
±2.5V Full Scale	20
±1V Full Scale	50
±500mV Full Scale	100
±250mV Full Scale	200
±100mV Full Scale	500
±50mV Full Scale	1000
±25mV Full Scale	2000
±10mV Full Scale	5000

Change the gain setting for each channel individually:

1. Select the channel (click on the channel box in the left hand side of the waveform screen).
2. Open the Channel Settings dialog box. Select **Edit > Channel Settings** in the menu or press F10.



3. Select **Voltage** in the Input Type selection box.
4. Click on the desired gain setting for that channel.
5. Click the **Next** button to access channel settings for the next channel or click the **OK** button to close the dialog box.

Thermocouple Measurements

Each analog input channel on the DI-2008 may be programmed for one of 8 possible thermocouple types (B, E, J, K, N, R, S, or T). Change the thermocouple type for each channel individually:

1. Select the channel (click on the channel box in the left hand side of the waveform screen).
2. Open the Channel Settings dialog box. Select **Edit > Channel Settings** in the menu or press F10.

The image shows the 'Channel 1 Settings' dialog box. It contains a table for TC types, a list of Acquisition Methods, an Input Type selection, and a Fahrenheit checkbox. The 'B' TC type is selected in the table, 'Average' is selected in Acquisition Method, 'Thermocouple' is selected in Input Type, and the 'Fahrenheit' checkbox is checked.

TC type	-FS °F	+FS °F
B	482.0	3308.0
E	-328.0	1832.0
J	-346.0	2192.0
K	-328.0	2501.6
N	-328.0	2372.0
R	-58.0	3214.4
S	-58.0	3214.4
T	-328.0	752.0

Acquisition Method

- ☒ Average
- ☐ Last Point
- ☐ Maximum
- ☐ Minimum
- ☐ RMS
- ☐ Frequency

Input Type

- ☐ Voltage
- ☒ Thermocouple

☒ Fahrenheit

Buttons: OK, Cancel, Next, Previous

3. Select **Thermocouple** in the Input Type selection box.
4. Select the desired thermocouple type for that channel.
5. Click the **Next** button to access channel settings for the next channel or click the **OK** button to close the dialog box.

Temperature scale may be changed to Celcius by un-checking the **Fahrenheit** check box. This changes the scale for **all** thermocouple temperature measurements.

Digital Ports

The DI-2008 contains 7 general-purpose digital ports. Each digital port can be configured as a digital input or used as a switch to control an external load (up to 30 V and 100 mA). Many of the ports also provide specific functionality in WINDAQ or a third-party program.

D0 Event is for WINDAQ Remote Events. This bit inserts an event marker in your data.

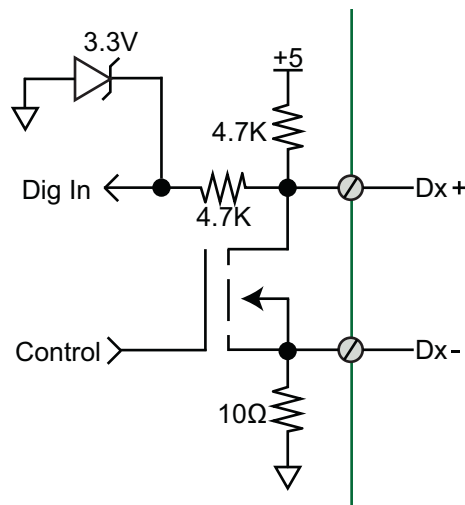
D1 Record is for WINDAQ Remote Storage. This bit can be programmed to begin recording data.

D2 Rate is for Rate measurements: 10Hz to 50kHz.

D3 Count is for Counter/Timer measurements up to 65,536.

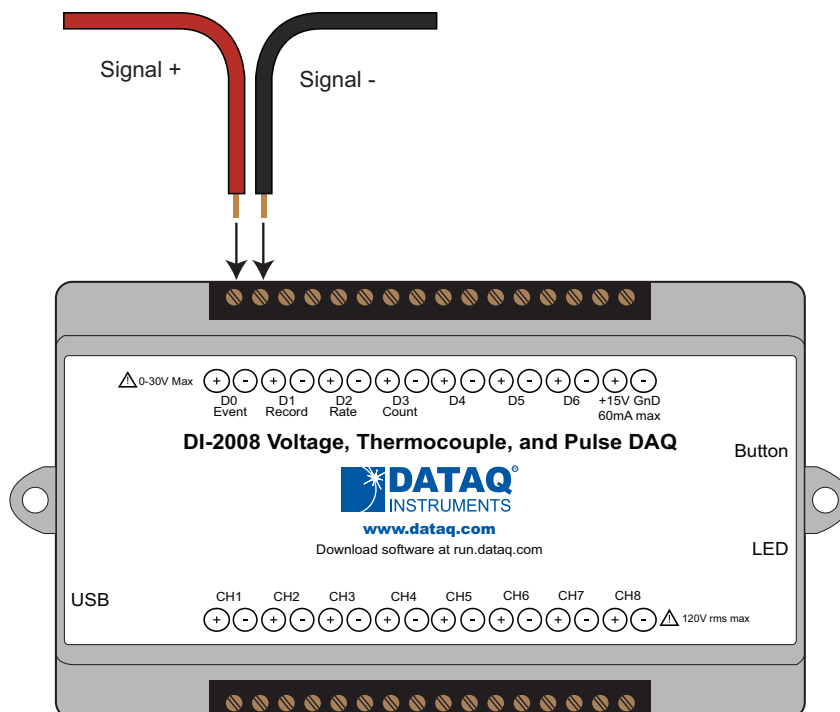
D4 - D6 are general-purpose digital inputs.

Equivalent Digital I/O Circuit:



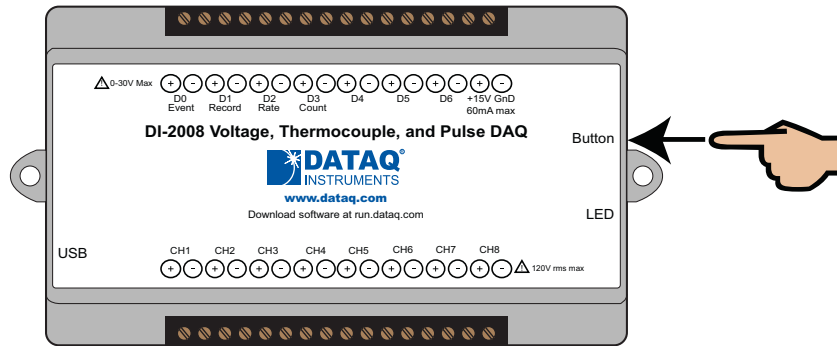
WINDAQ Remote Events (D0 Event)

To use a switch closure or TTL signal to record WINDAQ Event Markers, connect signal leads to the appropriate Remote Control Event terminals on the DI-2008 as shown below.



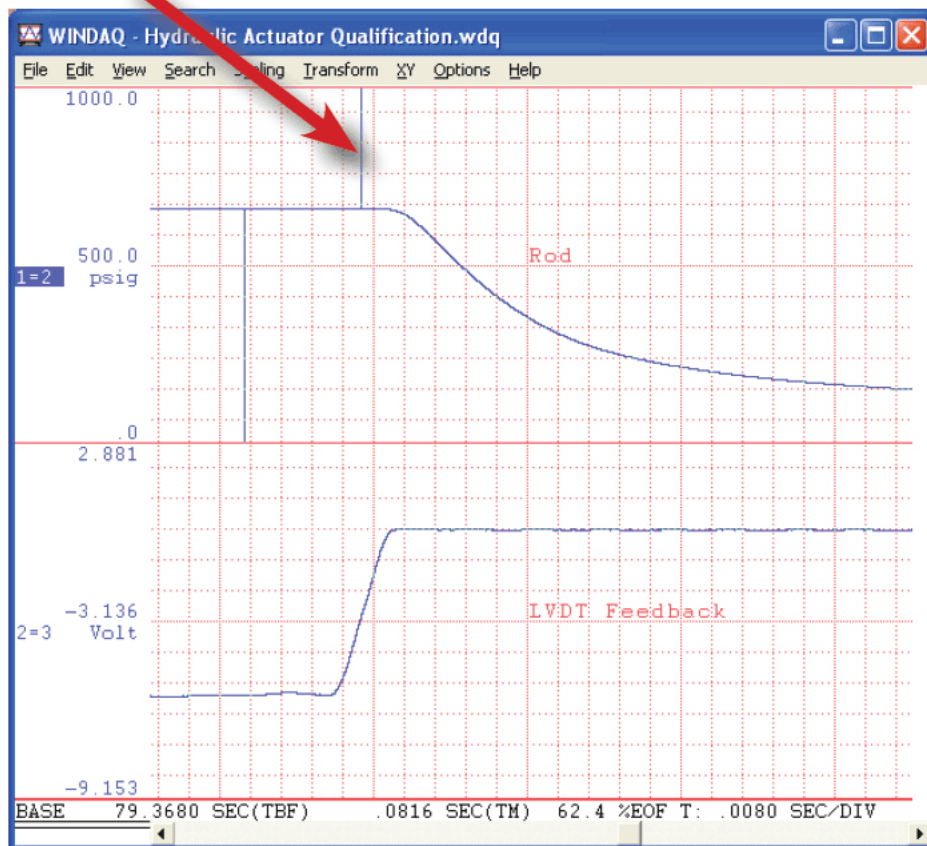
Once the switch closure or TTL signal is connected, activate Remote Events through WINDAQ Acquisition Software. Events may be automatically placed on the rising or falling edge of the trigger signal. Use the menu command **Options > Remote Events +** to set WINDAQ to place event markers on low-to-high transitions of the Event input. Use the menu command **Options > Remote Events -** to set WINDAQ to place event markers on high-to-low transitions of the Event input.

Event markers may also be placed in your data file manually by pressing the push button on the DI-2008 Instrument. You must enable Remote Events in WINDAQ to use the button (use the menu command **Options > Remote Events +** or **Options > Remote Events -**).



An example event marker in a WINDAQ data file is shown below.

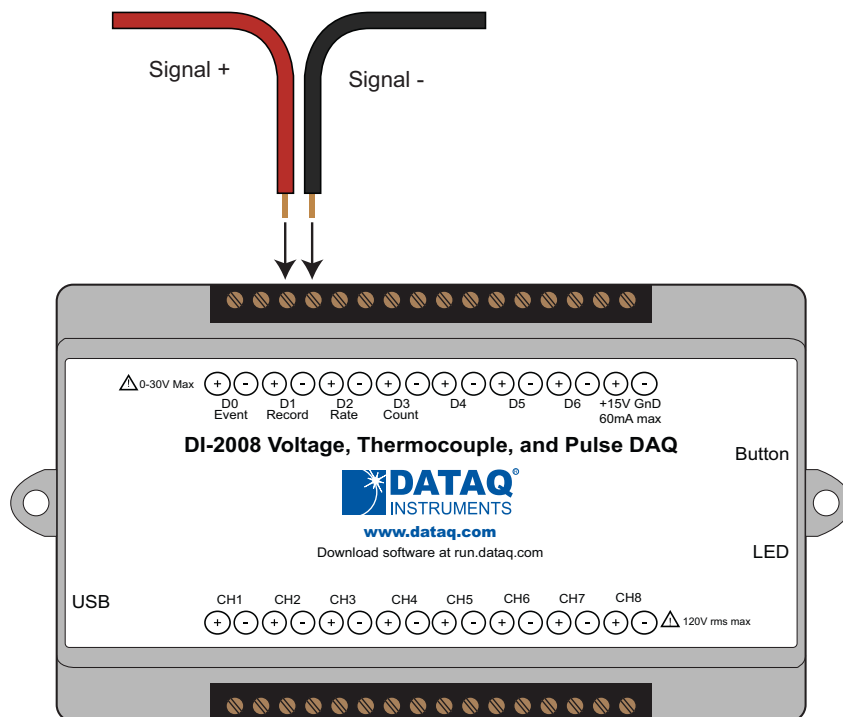
Event Marker*



***Please Note:** Event Markers do not display in the real-time WINDAQ acquisition software - they only display in the WINDAQ playback software (WWB). Acquisition starts go up; Event markers spike downward.

WinDAQ Remote Storage (D1 Record)

To use a switch closure or TTL signal (30 VDC max) to begin recording data remotely, connect signal leads to the appropriate Remote Control Record terminals on the DI-2008 as shown below.

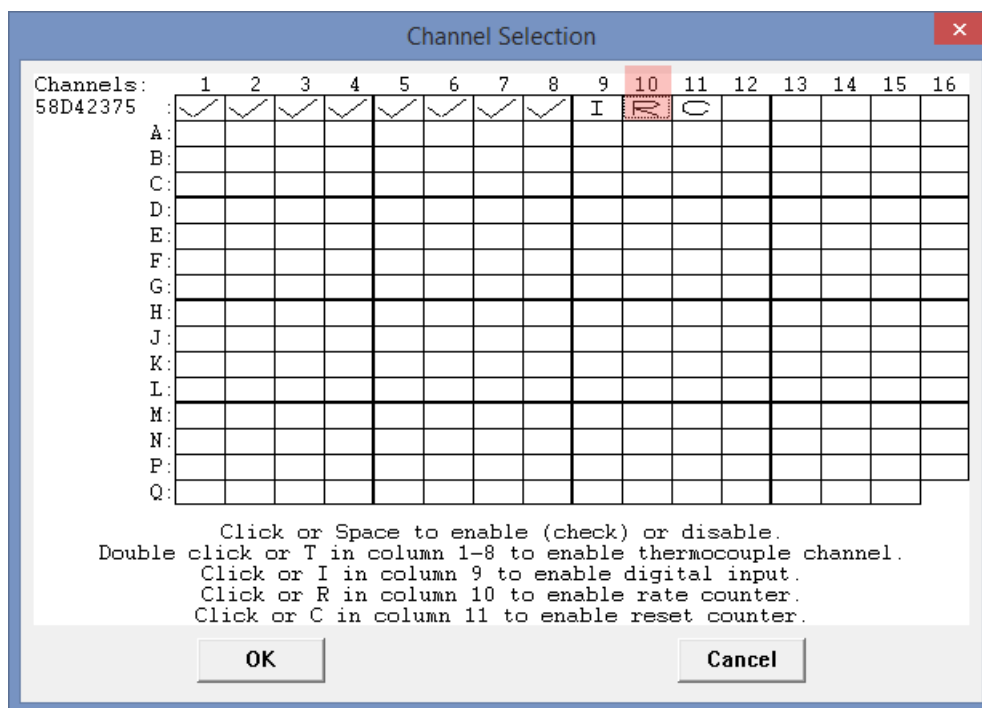


Once the switch closure or TTL signal (30 VDC max) is connected, activate Remote Storage (Record) through WINDAQ Acquisition Software. Storage to Disk may be automatically placed on the rising or falling edge of the trigger signal. Use the menu command **Options > Remote Storage 1** to set WINDAQ to begin recording on low-to-high transitions of the Record input. Use the menu command **Options > Remote Storage 0** to set WINDAQ to begin recording on high-to-low transitions of the Record input.

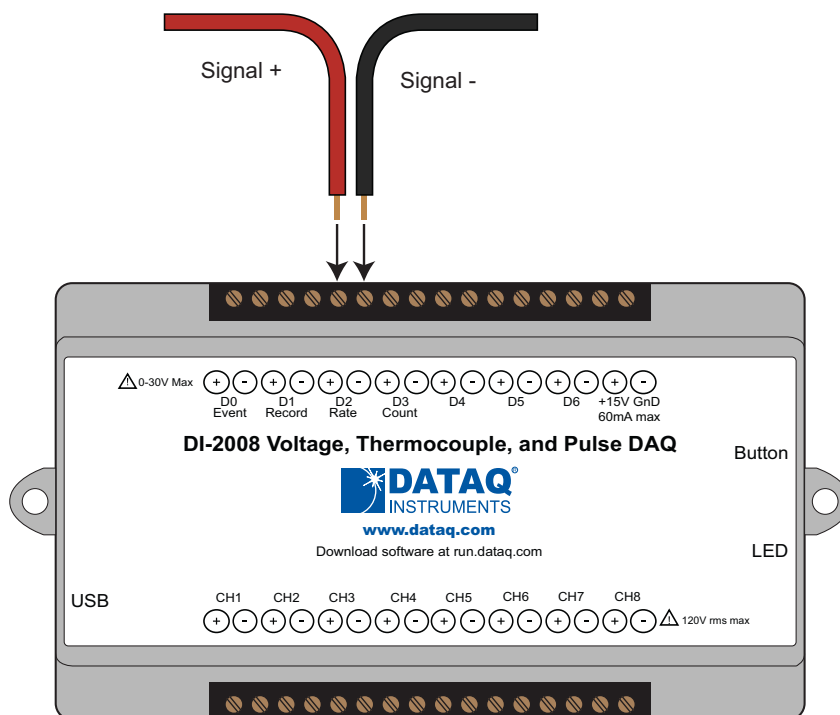
WinDAQ Rate (D2 Rate)

Enable channel 10 to record Rate, or the number of falling-edge transitions per unit of time that are applied to this input. Click on **Edit > Channels** in the WINDAQ Acquisition menu to open the Channel Selection grid. Channel 10 is

the designated Rate channel. Click on the Channel 10 channel box to enable/disable Rates. The Channel 10 channel box will display an “R” when enabled.



Connect any TTL pulse stream (30 VDC max) to the D2 Rate channel on the DI-2008.



Select Channel 10 in the channel display, then select **Edit > Channel Settings** in the menu to specify a full scale range for the Rate channel. Ranges of 10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, and 50000 Hz are available. Choose a range that comes closest to your expected full scale rate or frequency. For example, if you need to

measure the output of a flow meter that can measure a maximum flow rate of 100 gallons per minute, and the output frequency at that rate is 100 Hz, you would choose the 100 Hz range setting. A range setting of 200 Hz full scale sacrifices half of the instrument's resolution at 200 gallons per minute, and a range of 50 Hz allows measurements to only 50 gallons per minute full scale.

Gain	-FS Hz	+FS Hz
2	.0	50000.0
5	.0	20000.0
10	.0	10000.0
20	.0	5000.0
50	.0	2000.0
100	.0	1000.0
200	.0	500.0
500	.0	200.0
1000	.0	100.0
2000	.0	50.0
5000	.0	20.0
10000	.0	10.0

Acquisition Method

☐ Average

☒ Last Point

☐ Maximum

☐ Minimum

☐ RMS

☐ Frequency

Input Type

☒ Voltage

☐ Thermocouple

Filt Len = ☐ Cycles/min

OK Reset EU Cancel

Next Previous

Check the **Cycles/min** box to display and select frequencies reported in cycles per minute instead of cycles per second (the measurement interval remains the same). Tachometer measurements in units of RPM (revolutions per minute) is just one example that benefits from selecting this option. For example, if the 100 Hz range setting is selected and **Cycles/min** is checked, the full scale range is actually 6000 cycles per minute.

WINDAQ Counter (D3 Count)

Enable channel 11 to record Counts, or the number of falling-edge transitions that are applied to this input. The count may be reset via WINDAQ software or under program control as necessary. Click on **Edit > Channels** in the WINDAQ

Acquisition menu to open the Channel Selection grid. Channel 11 is the designated Count channel. Click on the Channel 11 channel box to enable/disable Counts. The Channel 11 channel box will display a “C” when enabled.

Channel Selection

Channels: 58D5037A

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A:	✓	✓	✓	✓	✓	✓	✓	✓	I	R	C					
B:																
C:																
D:																
E:																
F:																
G:																
H:																
J:																
K:																
L:																
M:																
N:																
P:																
Q:																

Click or Space to enable (check) or disable.
 Double click or T in column 1-8 to enable thermocouple channel.
 Click or I in column 9 to enable digital input.
 Click or R in column 10 to enable rate counter.
 Click or C in column 11 to enable reset counter.

OK Cancel

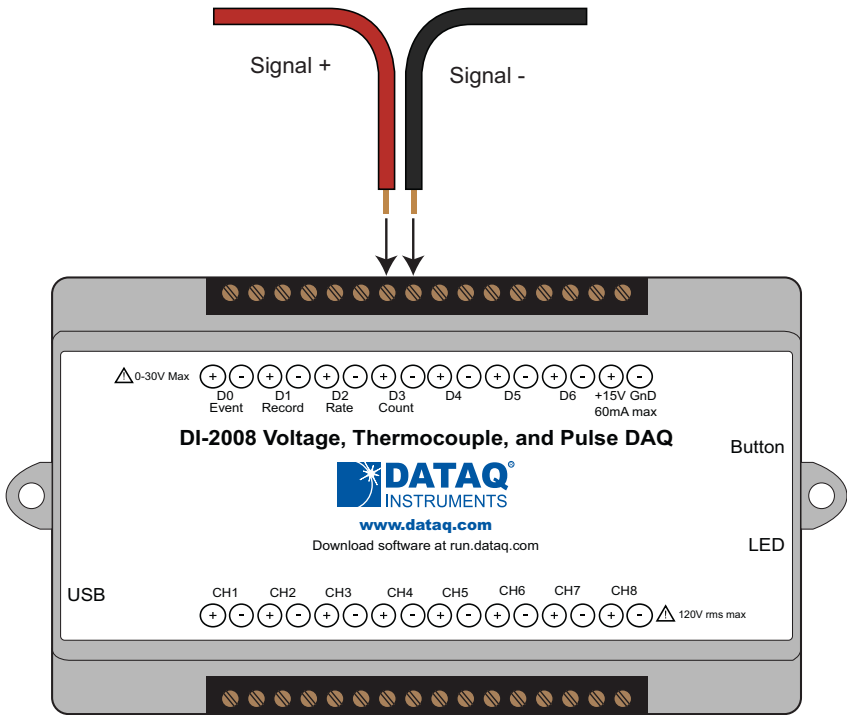
The counter channel accumulates counts over time whether recording or in standby mode as soon as the Counter channel is enabled. The *accumulated* values will be recorded to your data file unless you reset the counts to zero. The maximum count value is 65,535 before the counter resets to zero automatically.

Use the Edit > **Reset Count** command in WINDAQ Acquisition software to reset counts immediately to zero. This feature is available in both standby and record modes.

Use the Edit > Preferences > **Reset Count on New File Record** in WINDAQ Acquisition software to reset the count at the start of a new file or when using the Edit > Preferences > Record Next File on Full or Open Next File on Full feature to reset counts to zero every time a new file is started.

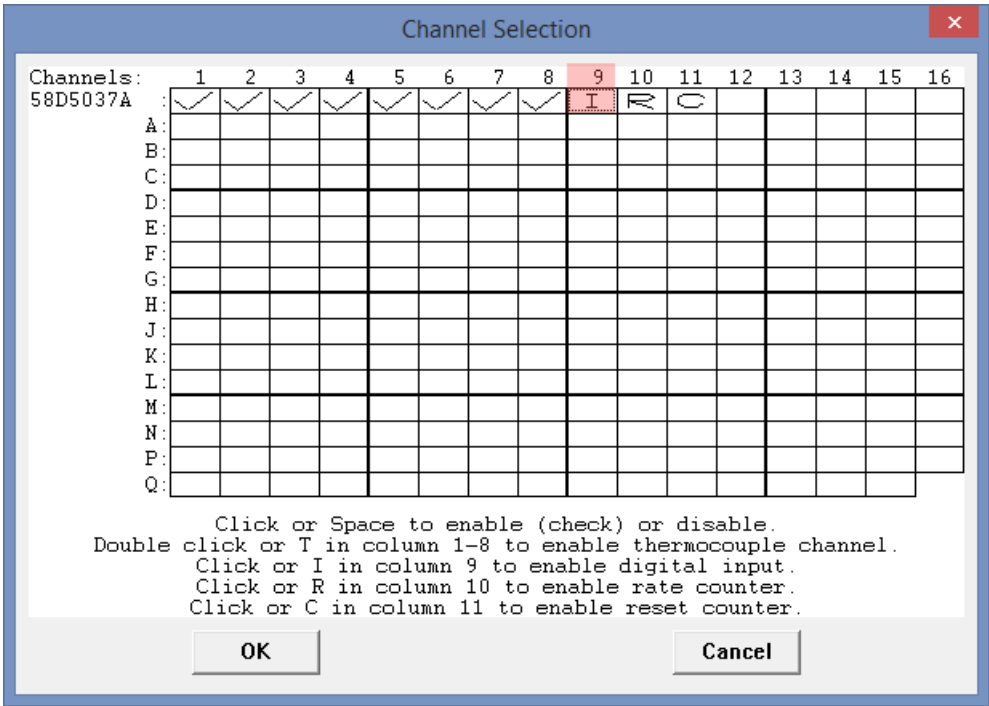
Use the Edit > Preferences > **Reset Count on Manual Record** in WINDAQ Acquisition software to reset counts to zero every time you begin or resume recording a data file using the File > Record command (F4).

Connect any TTL pulse stream (30 VDC max) to the D3 Count channel on the DI-2008.



General Purpose Digital Inputs

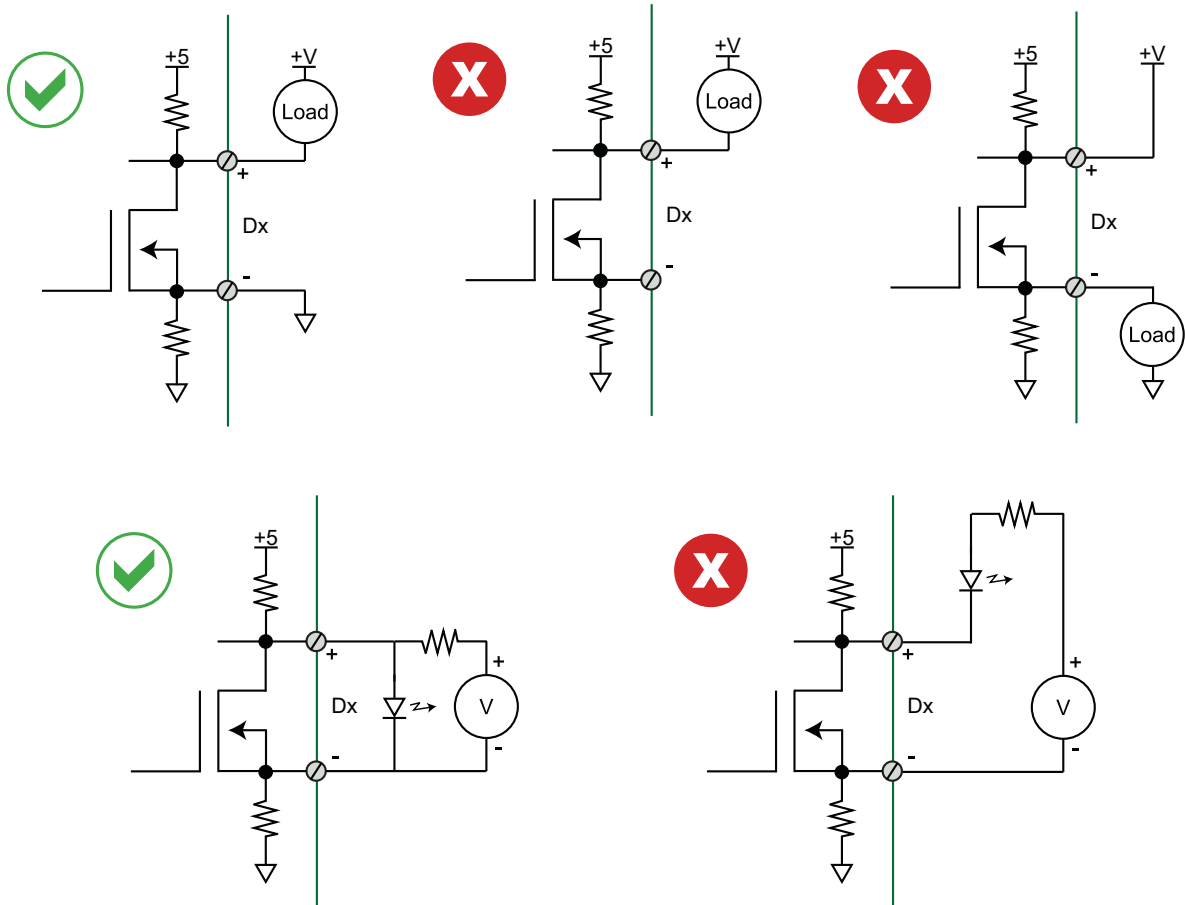
Enable Channel 9 for general-purpose digital input functions. Click on **Edit > Channels** in the WINDAQ Acquisition menu to open the Channel Selection grid. Channel 9 is the designated Digital Input channel. Click on the Channel 9 channel box to enable/disable the digital inputs. The Channel 9 channel box will display an “I” when enabled.



Channel 9 records and displays all the digital inputs, even the state of the Rate and Count inputs if those channels are enabled. With Channel 9 selected in the display window click **Scaling > Digital Plot** to show a digital display and make the data more meaningful on screen.

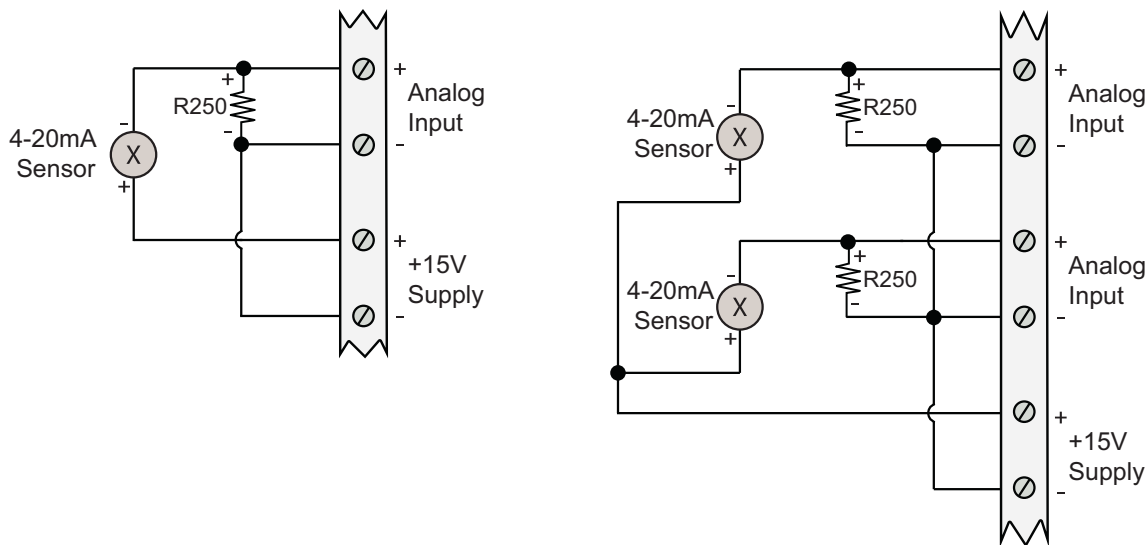
General Purpose Digital Outputs

Take care when configuring the load to be switched to ensure that the digital port is not damaged:

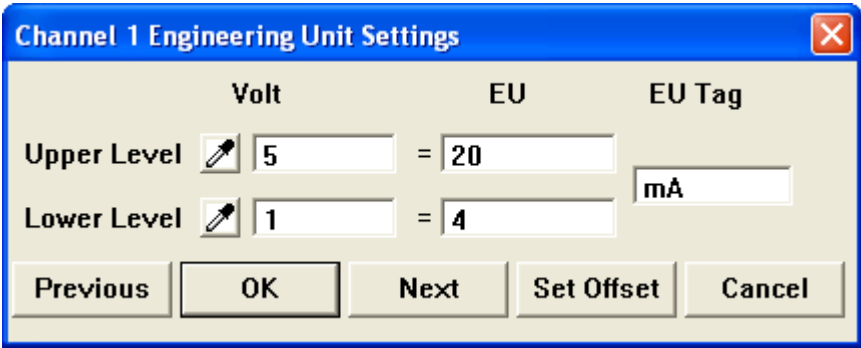


4-20mA Current Loop Measurements

Use the following diagrams for 4-20mA current loop measurement connections.



Set the engineering units as desired and define upper/lower levels in WINDAQ as 1V = 4mA for the low value and 5V = 20mA for the high value. For example, when using WINDAQ Acquisition software, in the EU Settings dialog box:



Enter the following values:

	Vol t	EU	EU Tag
Upper Level	5	20	mA
Lower Level	1	4	

Visit our website at <https://www.dataq.com/blog/data-acquisition/4-20-ma-current-loop-measurements/> to address all popular 4-20mA configurations.

You can also associate these values to a physical measurement such as pressure, load, flow, torque, etc. Read the Help files for more information regarding Engineering Units Settings.

LED Indicator

The DI-2008 provides a multicolor LED for instrument status and notification.

Flashing Green: Indicates power is applied via the USB cable and the device is idle.

Flashing Blue: Indicates the device is in use either by WINDAQ Acquisition Software or a custom user-developed program.

Flashing Red: Indicates a buffer overflow.

Flashing Red/Blue: Indicates buffer overflow that the software recovers from causing gaps in recorded data.

Solid White: Indicates when the Event Button is pushed or the Event terminals are connected via a relay contact or digital input.

Flashing Yellow: Indicates the device that contains the selected channel in WinDAQ Acquisition software when scanning multiple synced devices.

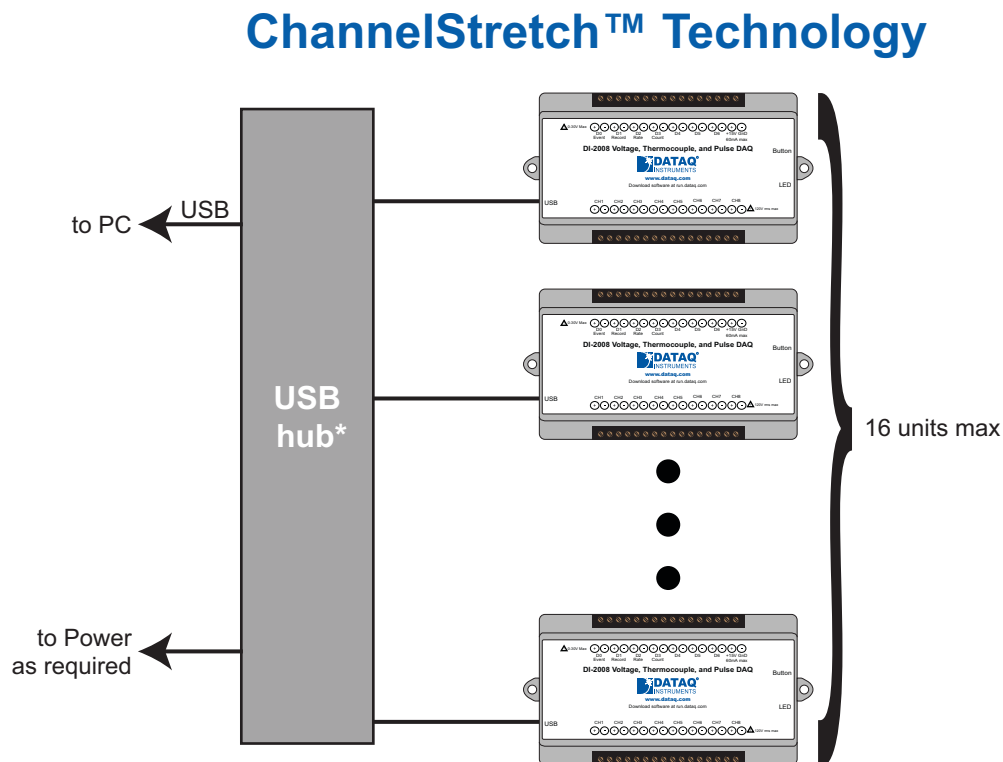
All other Solid colors: Indicates error.

ChannelStretch™

Connect up to 16 DI-2008 devices with a powered USB hub (or multiple cascaded/connected powered USB hubs) to record more than 8 channels of data to a single WinDAQ file. This provides a total of up to 128 analog channels and 112 digital ports. Cascade multiple USB hubs to expand port count. The WinDAQ/Unlock option **per instrument** is required to synchronize two or more DI-2008s when using WinDAQ software.

Connection

All devices must be on the same USB hub or controller* in order to synchronize data acquisition.



*DATAQ Instruments 7-port USB hub (part number 2000310). Cascade for a higher port count.

***Please Note:** Because of the way Windows operating systems manage USB controllers, the only way to be absolutely sure you are on the same controller is to use a powered USB hub.

Channel Selection

For multiple instruments to properly synchronize the following conditions must be met.

If the number of analog channels enabled for any single device is less than 2 (including zero): The sum of analog plus digital channels per device must be equal.*

If the number of analog channels enabled for any single device is greater than or equal to 2: The sum of analog channels per device and the sum of digital channels per device must be equal.*

*One or more digital ports configured as a discrete input counts as one digital channel. The Rate and Count inputs count as one digital channel each. Analog channel configuration (V, mV, TC) is irrelevant.

Devices are listed in the Channel Selection grid in alpha-numeric order of the serial numbers of the device. Devices must be connected to the USB hub before starting WinDaq.

Channel Selection

Channels:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
58D42375	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>												
58D5037A A:																
B:																
C:																
D:																
E:																
F:																
G:																
H:																
J:																
K:																
L:																
M:																
N:																
P:																
Q:																

Click or Space to enable (check) or disable.
 Double click or T in column 1-8 to enable thermocouple channel.
 Click or I in column 9 to enable digital input.
 Click or R in column 10 to enable rate counter.
 Click or C in column 11 to enable reset counter.

OK **Cancel**

In instances where you will record two or more analog channels, enable the same total number of analog channels in each device and the same total number of digital channels in each device.

Channel Selection ✕

Channels:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
58D42375	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		I							
58D5037A	A:	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		R						
B:																
C:																
D:																
E:																
F:																
G:																
H:																
J:																
K:																
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Click or Space to enable (check) or disable.
 Double click or T in column 1-8 to enable thermocouple channel.
 Click or I in column 9 to enable digital input.
 Click or R in column 10 to enable rate counter.
 Click or C in column 11 to enable reset counter.

In instances where you have enabled less than two analog channels (including none), you must have the same total number of channels enabled.

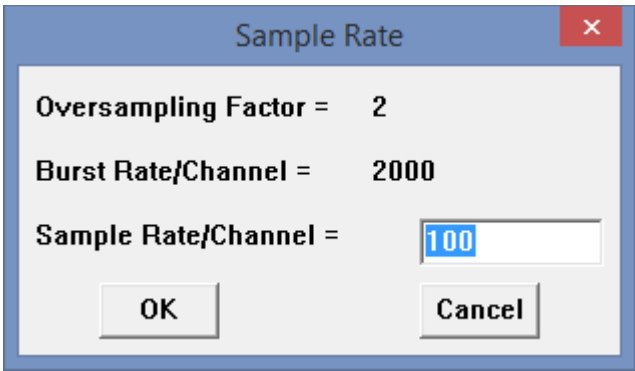
Channel Selection ✕

Channels:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
58D42375	<input checked="" type="checkbox"/>								I							
58D5037A	A:									R	C					
B:																
C:																
D:																
E:																
F:																
G:																
H:																
J:																
K:																
L:																
M:																
N:																
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Q:																

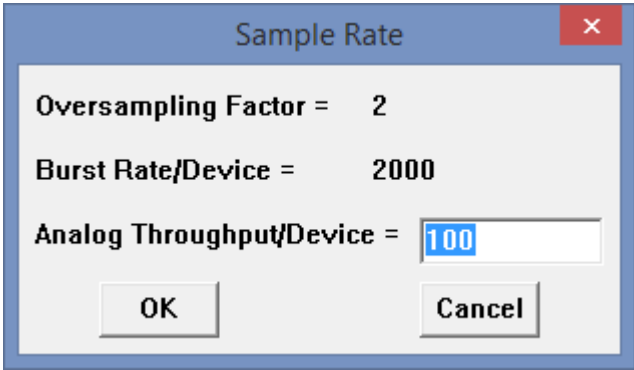
Click or Space to enable (check) or disable.
 Double click or T in column 1-8 to enable thermocouple channel.
 Click or I in column 9 to enable digital input.
 Click or R in column 10 to enable rate counter.
 Click or C in column 11 to enable reset counter.

Sample Rate

The sample rate for DI-2008 devices when only a single analog channel or less per device is enabled is set as a per channel sample rate or “Sample Rate/Channel.” Select **Edit > Sample Rate** in the main menu or press **F3**.



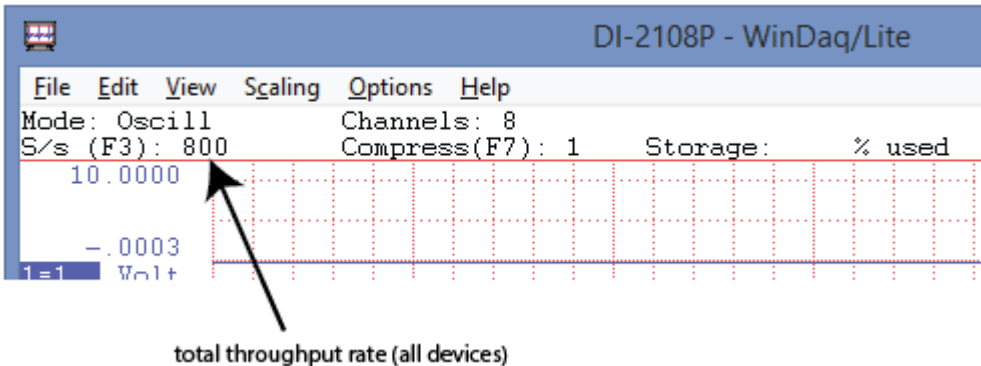
The sample rate for DI-2008 devices when two or more analog channels are enabled is set as a per device analog throughput rate or “Analog Throughput/Device” as the digital channels do not affect the sample rate. Select **Edit > Sample Rate** in the main menu or press **F3**.



The sample rate per channel is displayed in the lower left corner of the WinDag screen at S/s/CHAN: (samples per second per channel).



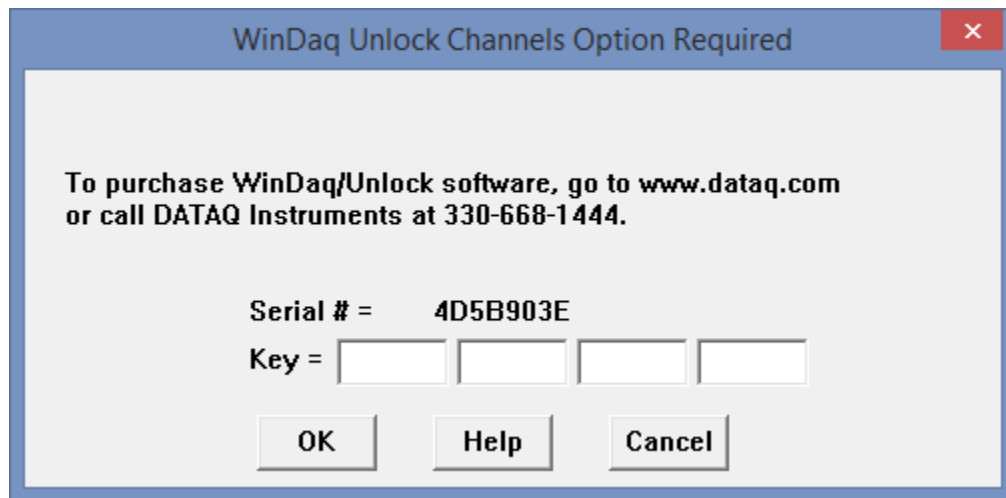
Total throughput rate is displayed in the top-left portion of the WinDag screen at S/s (F3). For example, if two devices are connected and the Sample Rate/Device is 400, S/s would be 800.



5. Unlock WinDag

The DI-2008 will record data from a single device without feature limitations using WinDag/Lite software. An unlock code is required to record data from more than one device. Go to <https://www.dataq.com/products/di-2008/> to purchase the unlock code (click on the Accessories tab) or call 330-668-1444. Once purchased, you will be given a Key code to enter into WinDag. Note that WinDag/Unlock is not required to use ChannelStretch if programming the instrument yourself.

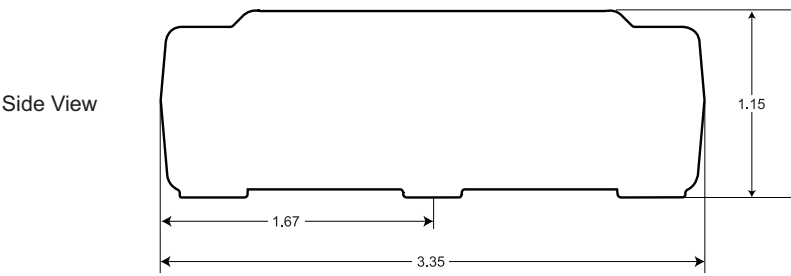
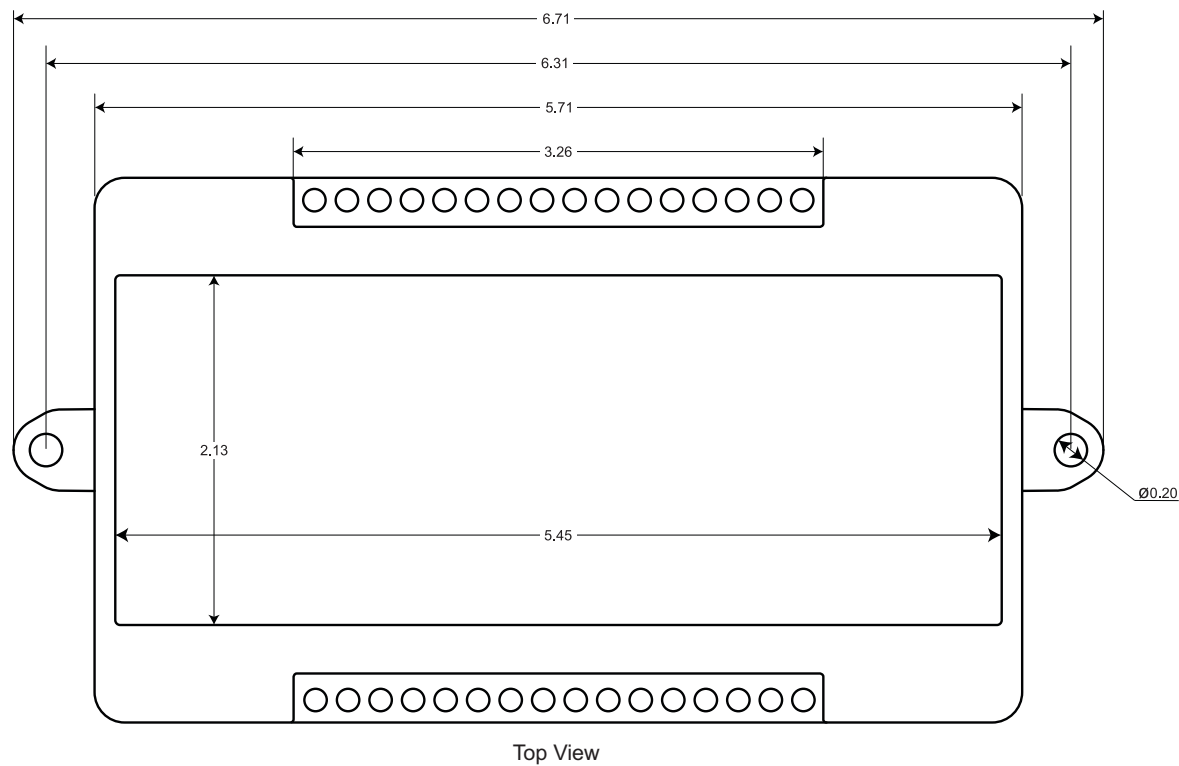
1. Start WinDag Acquisition software.
2. Click the menu item **Help > Unlock WinDag**.



3. Enter the Key in the appropriate dialog boxes.
4. Click **OK**.

You can now record all the channels available on your device.

6. Dimensional Drawing



All dimensions in inches



DATAQ Instruments, Inc.
241 Springside Drive
Akron, Ohio 44333
Telephone: 330-668-1444
Fax: 330-666-5434
E-mail: support@dataq.com

Direct Product Links

(click on text to jump to page)

[Data Acquisition](#) | [Data Logger](#)