



DI-718B Series

8 Channel Data Logger with Signal-Conditioned Inputs

DI-718Bx Series

16 Channel Data Logger with Signal-Conditioned Inputs

User's Manual ***Manual Revision Y***

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Warranty and Service Policy

Product Warranty

DATAQ Instruments, Inc. warrants that this hardware will be free from defects in materials and workmanship under normal use and service for a period of one year from the date of shipment. DATAQ Instruments' obligations under this warranty shall not arise until the defective material is shipped freight prepaid to DATAQ Instruments. The only responsibility of DATAQ Instruments under this warranty is to repair or replace, at its discretion and on a free of charge basis, the defective material.

This warranty does not extend to products that have been repaired or altered by persons other than DATAQ Instruments employees, or products that have been subjected to misuse, neglect, improper installation, or accident.

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2. DATAQ Instruments will repair or replace any defective product within 5 days of its receipt.
3. For in-warranty repairs, DATAQ Instruments will return repaired items to the buyer freight prepaid. Out of warranty repairs will be returned with freight prepaid and added to the service invoice.

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1. Introduction

Congratulations on your purchase of the DI-718B data logger/data acquisition system or DI-718Bx data logger/data acquisition system. The DI-718B is designed specifically to accept DI-8B modules — the world's smallest fully functional isolated analog signal conditioner.

Features

Common features of the DI-718B and the DI-718Bx are:

- 4,800 Hz maximum sampling rate—14,400 Hz when in Stand-alone data logger operating mode.
- 0.048 Hz minimum sampling rate—0.0017 Hz when in Stand-alone data logger operating mode.
- 14-bit A/D converter for high resolution measurement accuracy.
- The Stand-alone option allows the user to configure a recording session through their PC then record data in the field to an SD card (**without** being connected to their PC).

The **DI-718B** has the following additional features:

- Accepts up to 8 DI-8B amplifier modules accommodating virtually any industrial signal.
- USB or Ethernet interface options.

The **DI-718Bx** has the following additional features:

- Accepts up to 16 DI-8B amplifier modules accommodating virtually any industrial signal.
- Ethernet interface.

Analog Inputs

DI-718B models provide 8 *fixed* single-ended analog inputs that allow your analog signals to be converted into 14-bit digital data via an on board A/D converter. Differential input is not supported.

DI-718Bx models provide 16 *fixed* single-ended analog inputs that allow your analog signals to be converted into 14-bit digital data via an on board A/D converter. Differential input is not supported.

Digital Inputs

The **DI-718B** provides two digital input channels for Remote Control Operations (Remote Start/Stop and Remote Events) that may be accessed using the Built-In Remote Control Jack (see "Built-In Remote Control Jack" on page 17). Remote Control configuration and setup is easily accessible in both WINDAQ Acquisition software and in the Dataq Instruments Hardware Manager (when configuring the instrument for Stand-alone operation).

The **DI-718Bx** provides 8 software-programmable digital lines (bits) for input/output operations. These lines provide an interface for the transfer of data between user memory and a peripheral device connected to the instrument. Digital inputs can monitor alarms or sensors with TTL outputs, while digital outputs can drive TTL inputs on control or measurement equipment. Remote control can be utilized with bits 0 and 1 and is easily accessed using WINDAQ Acquisition software or, for stand-alone models, in the stand-alone setup panel. To avoid using an analog input channel for Digital I/O, Channel 17 may be enabled as the digital channel. To use the Remote Control features in WINDAQ Acquisition software either Channel 1 or Channel 17 **must** be configured as the Digital Input channel. Access digital I/O ports from the rear panel of the device. See "Digital I/O and Monitor Out" on page 26. Digital I/O bits are not available in Stand-alone mode except for Remote Control functions.

Software

All software required to record and playback waveforms is included with the purchase of any DI-718 model including WINDAQ Acquisition and Playback software and the Dataq Instruments Hardware Manager.

WINDAQ® Recording and Playback Software

WINDAQ Acquisition and WINDAQ Waveform Browser allow you to record and playback data acquired through your instrument. Whether using a Stand-alone model or a PC-connected instrument, WINDAQ is an invaluable resource for analyzing data. A special version (see "WinDaq Waveform Browser for SD" on page 34) of WINDAQ Waveform Browser (free) is required to read waveform data recorded to a Memory Card but is easily transferred to the standard version for more analytical features.

WINDAQ Acquisition software can be used to record waveforms directly and continuously to disk while monitoring a real time display of the waveforms on-screen. It operates and displays waveform signals in real time at the full sample rate of the instrument being used. WINDAQ is free but is restricted to recording throughput rates of 1108 Hz with a DI-718. An optional Unlock Code for high speed allows you to record data at the speed of your data acquisition system. When you install the software, a trial version of High Speed is automatically installed allowing you to run the software for a limited time. Activation is required for continued use to ensure compliance with the Software License Agreement. This software is accessed through the Dataq Instruments Hardware Manager which can be found in the Start menu under the WINDAQ program group called **Dataq Instruments Hardware Manager**.

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.

The DATAQ Instruments Hardware Manager

The DATAQ Instruments Hardware Manager allows you to effectively manage and run multiple instruments installed and connected to your PC or your Network—or even over the internet. This software can be found in the Start menu under the WINDAQ program group called **Dataq Instruments Hardware Manager**. Access WINDAQ Acquisition software, upload data from your memory card, check the status of your memory card, format your memory card, configure a Stand-alone data acquisition session, and more in this easy-to-use point and click environment. View the Help files by clicking on View Help in the Help menu or by pressing F1.

Help

All WINDAQ software utilizes context-sensitive help. Help may be accessed through the Help menu or by pressing the F1 key with any feature 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:	DI-718B: 8 configured for signal conditioned inputs DI-718Bx: 16 configured for signal conditioned inputs
Channel Configuration:	Defined by DI-8B Module
Input Impedance:	Defined by DI-8B Module
Input offset voltage:	Defined by DI-8B Module
Channel-to-Channel crosstalk rejection:	-75db @ 100Ω unbalance
Offset temperature coefficient:	0.25μV/°C
Digital Filtering:	PC-connected models: Conditional over-sampling; peak/valley detect, last point, average, frequency, RMS Stand-alone models: None
Measurement Range:	Defined by DI-8B module on a channel-by-channel basis. <i>Note: Not all DI-8B amplifier modules support ± excitation, but all support ± channel inputs.</i>
Accuracy:	DI-718B: ±0.25%FSR (1800 S/s, averaging mode) DI-718Bx: ±0.05%FSR ±50μV + 8B module + CJC error (test conditions: 1 channel; 100 S/s; averaging mode)
Resolution:	±1 part in 8,192
Gain (DI-718Bx only):	1, 2, 4, 8 software selectable per channel.
CJC Error:	±1.5°C plus 8B Module (spec measured at 25°C with no air circulation and Low Current Module configuration only).

A/D Characteristics

Type:	Successive Approximation
Resolution:	14-bit
Monotonicity:	±2 LSB
Conversion Time:	69.4μs

Scanning Characteristics

Maximum sample throughput rate:	PC-connected: 4,800 Hz Stand-alone: 14,400 Hz* *Dependent on SD card used. Low speed SD cards can sample up to 2,000 Hz; High speed cards can sample up to 14,400 Hz. Some high speed cards cannot sample as high at 14,400 Hz but their capability can only be determined by trial and error (Model 101014-2G has been tested and approved).
Minimum sample throughput rate:	PC-connected: 0.0034 Hz; Stand-alone: 0.0017 Hz
Maximum scan list size:	DI-718B: 9 entries; DI-718Bx: 18 entries
Sample buffer size:	2kb

Digital I/O

Bits: DI-718B: 2 Inputs (Remote Storage and Remote Event)
DI-718Bx: 8 bi-directional (including Remote Storage/Event)

Input voltage levels: Min. required “1” 2V; Max allowed “0” 0.8V

Calibration

Calibration Cycle: One year

Ethernet Interface

Type: 10/100Base-T

Connector: RJ-45

Protocol: TCP/IP

Server Type: DHCP

USB Interface (DI-718B Models only)

Connector: USB

Protocol: USB 2.0

Removable Memory (Stand-alone Models only)

Type: Standard Secure Digital (not SDHD or SDxC). Sample rates of 2kHz require SD speeds of 133x or higher. Up to 2kHz require speeds of 13x or higher.

Capacity: 16MB to 2GB

Real Time Clock

Type: Date, hour, minute, second

Resolution: 1 second

Accuracy: 20 ppm

Controls (Stand-alone Models only)

Single push-button: Provides manual control over Record and Standby modes.

Indicators

Stand-alone models: Three color LED indicating Record, Standby, and Error conditions.

PC-connected models: Power LED

Transfer Rate to PC

Real Time: up to 4,800 samples per second

From SD Memory (Ethernet): up to 3,000 samples per second

General

Panel Indicators:	Mode LED
Panel Controls:	Control push-button (Stand-alone models)
Panel slots:	Accepts SD-type flash memory
Input connectors:	DI-718B: Two, removable sixteen position terminal blocks DI-781Bx: Four, removable sixteen position terminal blocks for signal-conditioned channels.
Operating Environment:	0°C to 70°C
Enclosure:	Aluminum base with steel wrap-around. Aluminum end-panels with plastic bezels. Aluminum top hatch for access to 8B backplane.
Dimensions:	DI-718B: 5.4D × 4.1W × 1.5H in. (13.81D × 10.48W × 3.81H cm.) DI-718Bx: 7.29W × 9L × 1.52H in. (18.52W × 22.86L × 3.86H cm.)
Weight:	DI-718B: 14 oz. (397 grams) + DI-8B Modules DI-718Bx: 2 lbs. 10 oz. (1.19 kg) + DI-8B Modules
Power Requirements:	USB: 9 to 36 VDC, 2 watts + 8B modules Ethernet: 9 to 36 VDC, 2.5 watts + 8B modules

3. Installation

Unpacking

The following items are included with each instrument. Verify that you have the following:

- DI-718B or DI-718Bx Series Instrument.
- DI-8B Module(s) as ordered.
- Communications cable (USB only - Ethernet models do not come with an Ethernet cable).
- Power cable.
- Jumpers to enable CJC (DI-718B only — jumpers for the DI-718Bx are located on the circuit board).
- Two (or four) removable 16 position screw terminal blocks.
- DI-718B models include a 3.5mm stereo phone plug for Remote Control Operations (“Built-In Remote Control Jack” on page 17).
- The *WINDAQ Resource* CD-ROM.
- DATAQ screwdriver for connecting signal leads to the screw terminal(s).
- This Hardware Manual.

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.

USB Device Installation

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



2. Insert the *WINDAQ Resource CD* in your drive. The installation software should start automatically within 20 seconds. If it does not, start it manually by double-clicking the Setup application (setup.exe) located on the root of the *WINDAQ Resource CD*.
3. In the “What do you want to do?” window, select “Install WinDaq Software” and click **OK**.
4. In the “Installing Software” window, select the “Install Software for DI-148, DI-158, DI-710, DI-715B, and DI-718B(x) instruments” option and click **OK**.
5. In the “WinDaq Installation” dialog box, select the “Install Software” option and click **OK** to continue. If you wish to view the hardware documentation you may do so now by clicking on the appropriate radio button. Documentation will be saved to your hard drive during this installation.
6. In the “Welcome!” box, click **OK** to continue.
7. Read the License Agreement. If you accept the terms, click **Accept and Continue**. If you choose not to accept, click on the **Do not accept and stop** button to end the installation.
8. When prompted, enter your registration information (name and company) in the appropriate text boxes and click **OK**. Confirm your registration information before continuing.
9. When prompted, specify the directory where you want to install your WINDAQ software. It is recommended that you accept the default. If you have already successfully installed a DI-148, DI-158, DI-710, DI-715B, or DI-718B instrument be sure to install to the same folder.
10. In the “Select an Interface” box select **USB** and click **OK**.
11. **DO NOT** connect your USB device or cable to your PC until installation is complete. If your device is currently connected, please disconnect it before continuing with this installation. Once your device is disconnected, click the **OK** button.
12. When prompted to Select a Program Manager Group specify a destination (or group window) in the Start Menu for WINDAQ software icons. It is recommended that you accept the default.
13. In the “Installation Option” dialog box specify whether you want all users to have access to WINDAQ software or just the current User. Click Yes to allow all users to have access, click No to allow just the current user to have access.
14. After WINDAQ Software installs, you will be prompted to install WINDAQ/XL Trial Version and Advanced CODAS Analysis software. If you wish to install either software click on Yes in the appropriate dialog box. Follow the on screen prompts to complete installation.
15. 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 and apply power (if required). You do not need to re-install this software when installing more DI- 71x USB devices to your PC.

Click on the appropriate program group (specified above — default is Start > Programs > WINDAQ) and click on “DATAQ Instruments Hardware Manager” to run WINDAQ software. All DATAQ Instruments software is located in the same program group.

Ethernet Device Installation

Install WINDAQ Software and the DATAQ Instruments Hardware Manager.

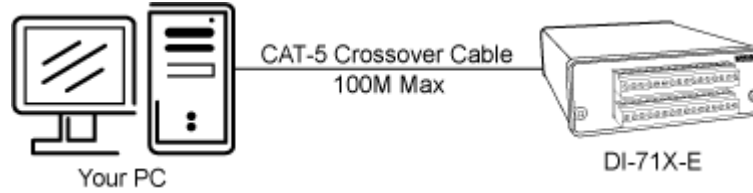
1. Insert the *WINDAQ Resource CD* in your drive. The installation software should start automatically within 20 seconds. If it does not, start it manually by double-clicking the Setup application (*setup.exe*) located on the root of the *WINDAQ Resource CD*.
2. In the “What do you want to do?” window, select “Install Software” and click **OK**.
3. In the “Installing Software” window, select the “Install Software for DI-148, DI-158, DI-710, DI-715B, and DI-718B(x) instruments” option and click **OK**.
4. In the “WinDaq Installation” dialog box, select the “Install Software” option and click **OK** to continue. If you wish to view the full hardware documentation you may do so now by clicking on the appropriate radio button. Documentation will be saved to your hard drive during installation.
5. In the “Welcome!” box, click **OK** to continue.
6. Read the License Agreement. If you accept the terms, click **Accept and Continue**. If you choose not to accept, click on the **Do not accept and stop** button to end the installation.
7. When prompted, enter your registration information (name and company) in the appropriate text boxes and click **OK**. Confirm your registration information before continuing.
8. When prompted, specify the directory where you want to install your WINDAQ software. It is recommended that you accept the default. If you have already successfully installed a DI-148, DI-158, DI-710, DI-715B, or DI-718B instrument be sure to install to the same folder.
9. In the “Select an Interface” box select the **Ethernet** option and click **OK** to continue.
10. When prompted to Select a Program Manager Group specify a destination (or group window) in the Start Menu for WINDAQ software icons. It is recommended that you accept the default.
11. In the “Installation Option” dialog box specify whether you want all users to have access to WINDAQ software or just the current User. Click **Yes** to allow all users to have access, click **No** to allow just the current user to have access.
12. After WINDAQ Software installs, you will be prompted to install WINDAQ/XL Trial Version and Advanced CODAS Analysis software. If you wish to install either software click on **Yes** in the appropriate dialog box. Follow the on screen prompts to complete installation.
13. Installation is complete - you will now see a “Successful Installation” box - click **OK** to exit WINDAQ Installation.

Ethernet devices can now be connected to your network or PC. Follow the appropriate instructions in “Installing an Ethernet Device Directly Connected to your PC or Connected via a Hub or Switch Where ONLY DI-71x Products are Installed” on page 10 “Installing an Ethernet Device via a Distributed Network Without a DHCP Server” on page 13, or “Installing an Ethernet Device via a Distributed Network with a DHCP Server” on page 14 of this manual for your specific network connections configuration.

Click on the appropriate program group (specified above — default is Start > Programs > WINDAQ) and click on “DATAQ Instruments Hardware Manager” to run WINDAQ software. All DATAQ Instruments software is located in the same program group.

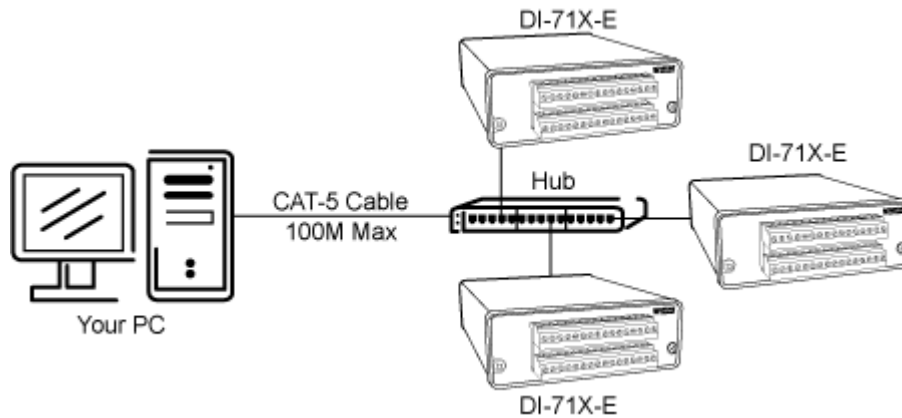
Installing an Ethernet Device Directly Connected to your PC or Connected via a Hub or Switch Where ONLY DI-71x Products are Installed

Installation of an Ethernet device directly connected to the network card on your computer requires you to change the IP address of your network card.



Note: When installing an Ethernet device directly connected to your PC you **MUST** use a crossover cable (provided).

Installation of an Ethernet device via an Ethernet hub/switch containing ONLY DI-71x products also requires you to change the IP address of your network card.



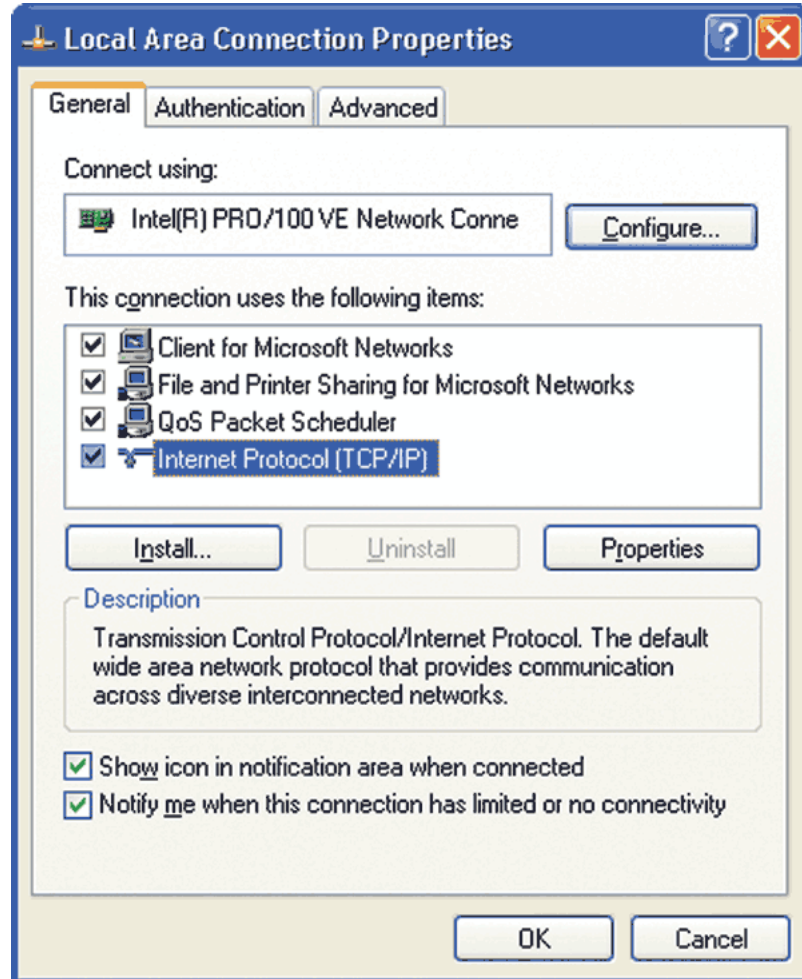
Note: For hubs that do not have an auto-switching sensor (usually older hubs) you must **not** use a crossover cable.

1. Install software (see “Ethernet Device Installation” on page 9).
1. Find the **Network Connections** on your computer (usually in the **Control Panel**).
2. Double-click on the **Local Area Connection** icon.



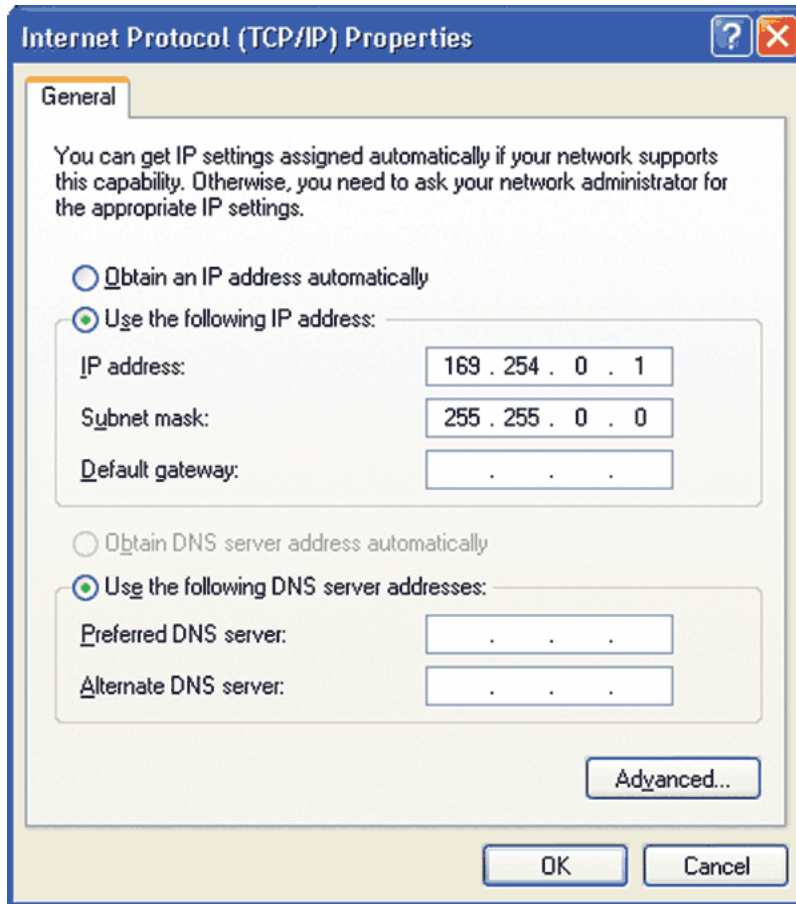
3. Click on the **Properties** button.

4. Select **Internet Protocol (TCP/IP)** in the “This connection uses the following items” window and click on the **Properties** button.



5. Click on the **General** tab.
6. Select the radio button **Use the following IP address**.
7. Enter 169.254.0.1 in the space provided for the IP address.

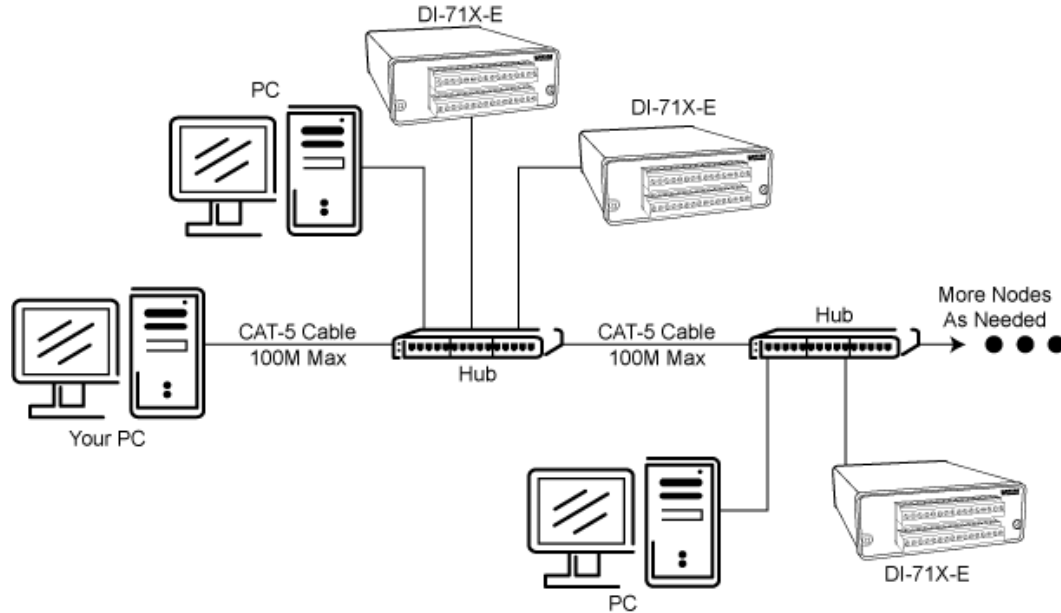
8. Enter 255.255.0.0 in the space provided for the Subnet mask.



9. Click on the **OK** button to close the *Internet Protocol (TCP/IP) Properties* dialog box then click on the **OK** button in the *Local Area Connection Properties* dialog box for the changes to take effect.
10. You will now be able to see the device in the DATAQ Instruments Hardware Manager (you may have to click on the **Update List** button).

Installing an Ethernet Device via a Distributed Network Without a DHCP Server

Installation of an Ethernet device connected to a distributed network that does not have a DHCP server or where the DHCP server is turned off requires you to obtain an IP address from your system administrator.



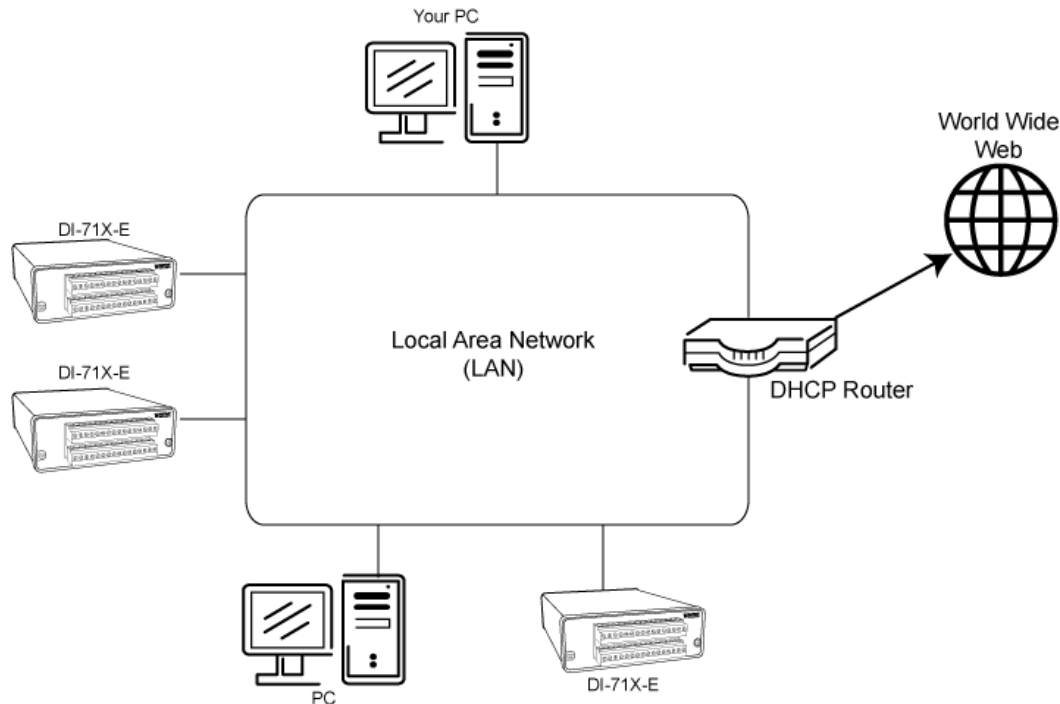
Note: In the illustration above, the Hubs could instead be routers with DHCP turned off (i.e., a static IP assigned network). Contact your system administrator for details about your network.

1. Have the system administrator designate an IP address for your device.
2. Install software (see “Ethernet Device Installation” on page 9).
3. Plug the device into your network and apply power.
4. Open the DATAQ Instruments Hardware Manager software.
5. In the dropdown command list (lower left-hand corner), select **Static IP**. The Manage IP Addresses dialog box will open.
6. Click on the MAC address of your device in the list of displayed MAC addresses (the MAC address of your device can be found on the silver sticker located on the bottom of your device).
7. Enter the IP address your system administrator assigned to you in the **New IP Address** text boxes.
8. Click on the **Set Static** button. Your device will appear in the list of available devices in the main DATAQ Instruments Hardware Manager window. It may take more than 15 seconds for your device to appear in the list. If you get a “No Devices Found” error after following the above instructions, click the **Update List** button until the device appears in the list.

Note: These instructions change the settings inside the device. If you move the device to a DHCP-enabled network (i.e., where IP addresses are assigned automatically by a DHCP server or router) you will need to change the device settings using the DATAQ Instruments Hardware Manager. See the DATAQ Instruments Hardware Manager help file for complete details.

Installing an Ethernet Device via a Distributed Network with a DHCP Server

Installation of an Ethernet device connected to a distributed network that has a DHCP server (i.e., a DHCP router automatically assigns IP addresses to each device connected to the network) requires no extra setup (i.e., it is a “plug and play” device).



Note: If you are unsure whether your network is DHCP-enabled or not, check with your system administrator before installing WINDAQ.

1. Install software (see “Ethernet Device Installation” on page 9).
2. Connect your Ethernet device to your Local Area Network.
3. Apply power to the device.
4. You will now be able to see the device in the DATAQ Instruments Hardware Manager (you may have to click the **Update List** button).

Activation of WINDAQ/High Speed Option

Activation is required for continued use of WINDAQ/HS (High Speed option) to ensure compliance with the Software License Agreement. The Software License Agreement can be found in the WINDAQ Software manual or in the WINDAQ program group (License.txt). The WINDAQ/HS Software may be activated through the **Help** menu by clicking on **Unlock WINDAQ/HS** or by waiting for the trial version to expire. Trial versions are good for 40 High Speed (over 1108 Hz throughput) recording sessions. The High Speed version may be purchased after the trial period expires through our online store or by phone. For help or for questions regarding Activation and/or the Software License Agreement, contact DATAQ Instruments Customer Support.

Dataq Instruments Hardware Manager

The Dataq Instruments Hardware Manager is installed when installing any DI-718B or DI-718Bx instrument. This software allows you to effectively manage and run multiple instruments installed and connected to your PC or your Network—or even over the internet. WINDAQ Data Acquisition Software and the Stand-alone Set Up program are

both accessed through the Dataq Instruments Hardware Manager. The Dataq Instruments Hardware Manager may be accessed through the Windows Program Manager Group as specified during installation (default is *Start > Programs > WINDAQ > Dataq Instruments Hardware Manager*). All available devices will automatically appear in the list box when you run the software. For help with the Dataq Instruments Hardware Manager access the Help Files using either the Help menu item or by pressing the F1 key to access context-sensitive help.

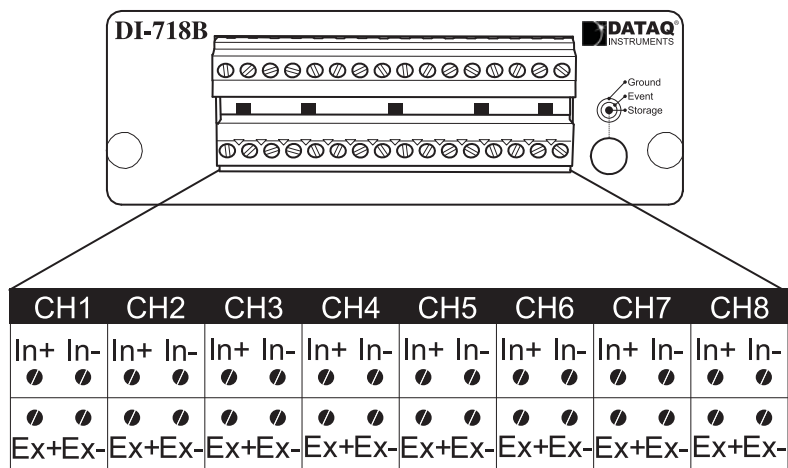
4. Instrument Controls, Indicators, and Connections

Instrument Front Panel

The Front panel of both DI-718B and DI-718Bx instruments provide screw terminal connection ports for analog input signal leads. The DI-718B front panel also provides remote events and stop/start remote recording control features via a built-in remote control jack.

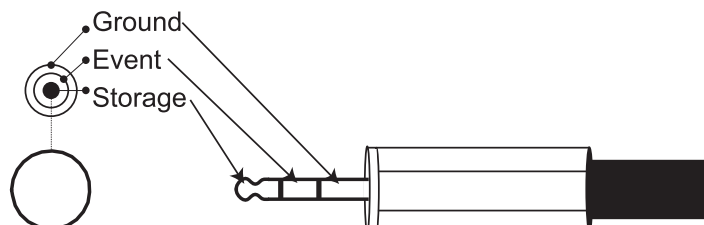
DI-718B Models

The two 16-port screw terminals on the front of the instrument are used to interface analog input channels 1 through 8. Each channel has four terminals: In+, In-, Ex+, and Ex- for input signals and excitation (if required). Use the sticker located on the top of your instrument for quick reference to terminal access port designations.

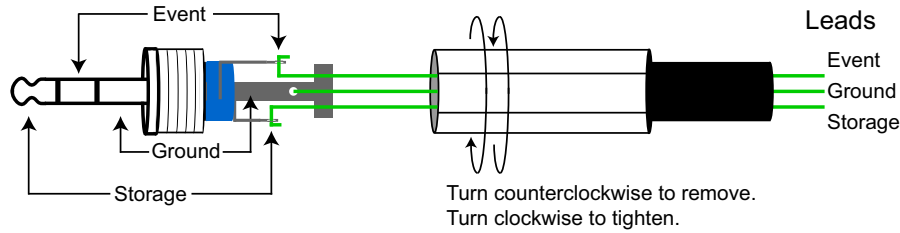


Built-In Remote Control Jack

The built-in remote control jack located on the front panel of the DI-718B accepts a standard 3.5mm stereo phone plug (provided) and provides access to remote events and stop/start remote recording control features. Refer to the diagram on the front panel for quick reference.



Connect signal leads inside the plug using the following diagram.

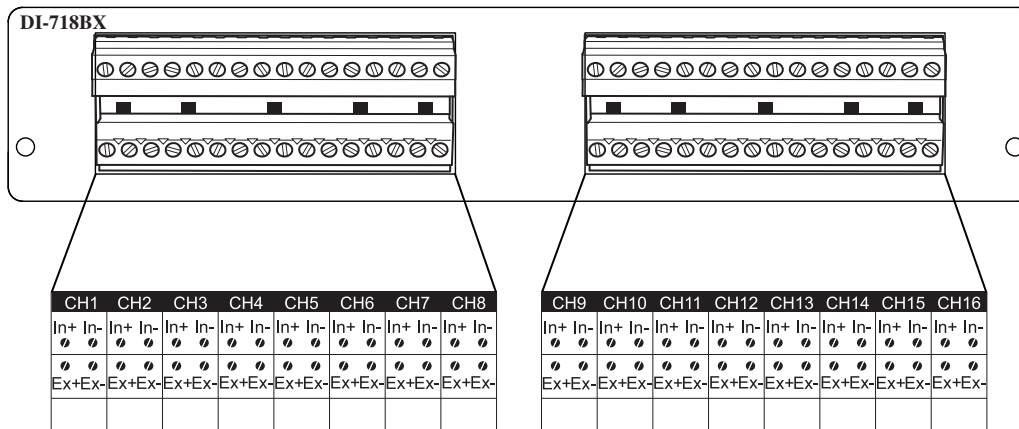


The Remote Control Feature can be used in Stand-alone mode or when using WINDAQ Acquisition software. See your software Help Files for instructions on setting up the Remote Control Feature.

Enabling Remote Storage (Start/Stop) when in stand-alone operating mode (see “Stand-alone data logger operation” on page 32) essentially adds another channel to the scan list and directly affects the per channel sample rate. For example, if your throughput rate is 1200Hz and you have 3 channels enabled (400Hz per channel), enabling Remote Storage will lower the per channel rate to 300Hz (throughput stays at 1200Hz).

DI-718Bx Models

The four 16-port screw terminals on the front of the instrument are used to interface analog input channels 1 through 16. Each channel has four terminals: In+, In-, Ex+, and Ex- for input signals and excitation (if required). Use the sticker located on the top of your instrument for quick reference to terminal access port designations.



Installing DI-8B Modules

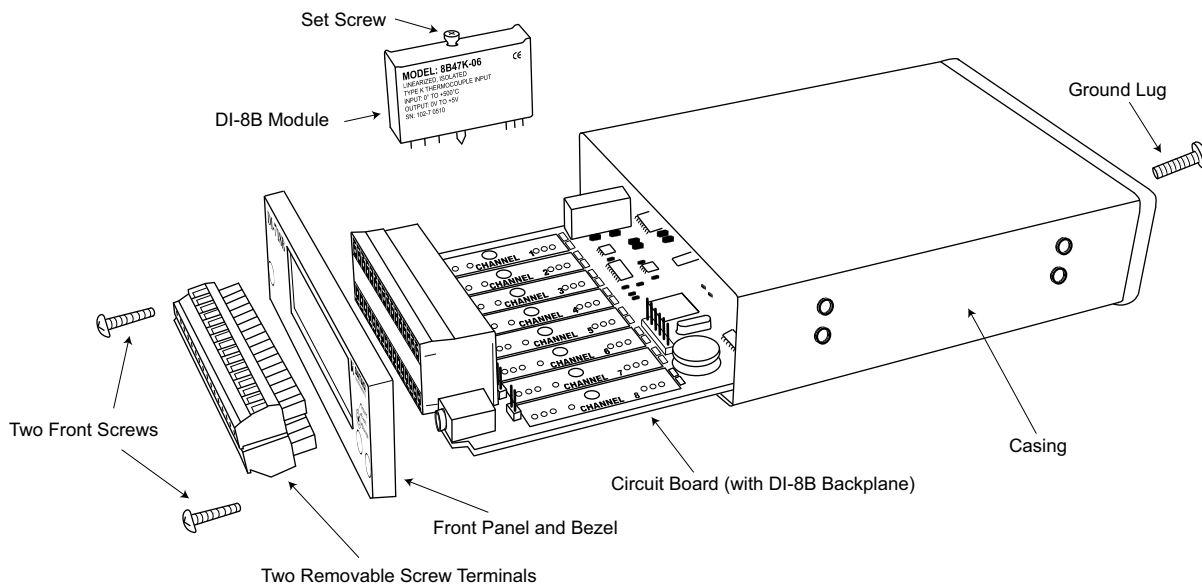
DI-8B modules are installed on the DI-8B backplane located on the instrument circuit board. DI-718B instruments require you to remove the front panel and bezel to access the backplane. DI-718Bx models provide a removable top hatch for easy access.

Installing DI-8B modules in DI-718B Instruments

DI-718B Series instruments can accept up to eight DI-8B modules. Modules are installed to the DI-8B backplane located on the instrument circuit board. You must remove the front panel and bezel and the ground lug on the rear of the instrument to access the DI-8B backplane.

1. Unplug the device and make sure there is no power to the instrument.
2. Remove the two screw terminal blocks on the front of the instrument.

3. Remove the front panel and bezel by removing the two outside screws on the front of the instrument.
4. Remove the Ground Lug located on the back of the instrument.
5. Pull the circuit board apart from the casing to reveal the DI-8B backplane.



6. Plug the DI-8B module firmly into one of the channel positions clearly labelled on the backplane and secure with the set screw. DI-8B modules are installed on (or removed from) the socketed DI-8B backplane (located on the circuit board) and are secured with a non-removable mounting screw. Each channel position is labeled “CHANNEL 1,” “CHANNEL 2,” etc. on the socketed backplane. The DI-8B modules can be mixed or matched in any combination suitable for the application and are identical in pinout and size, so it doesn't matter which module gets plugged into which channel position.
7. Using an erasable pencil write the module number of each DI-8B module installed on the sticker located on the top of the instrument to indicate which module is installed at each channel position.

718B Screw Terminal Access

CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
In+ In-	In+ In-	In+ In-	In+ In-	In+ In-	In+ In-	In+ In-	In+ In-
Ex+Ex-	Ex+Ex-	Ex+Ex-	Ex+Ex-	Ex+Ex-	Ex+Ex-	Ex+Ex-	Ex+Ex-
Modules Installed							

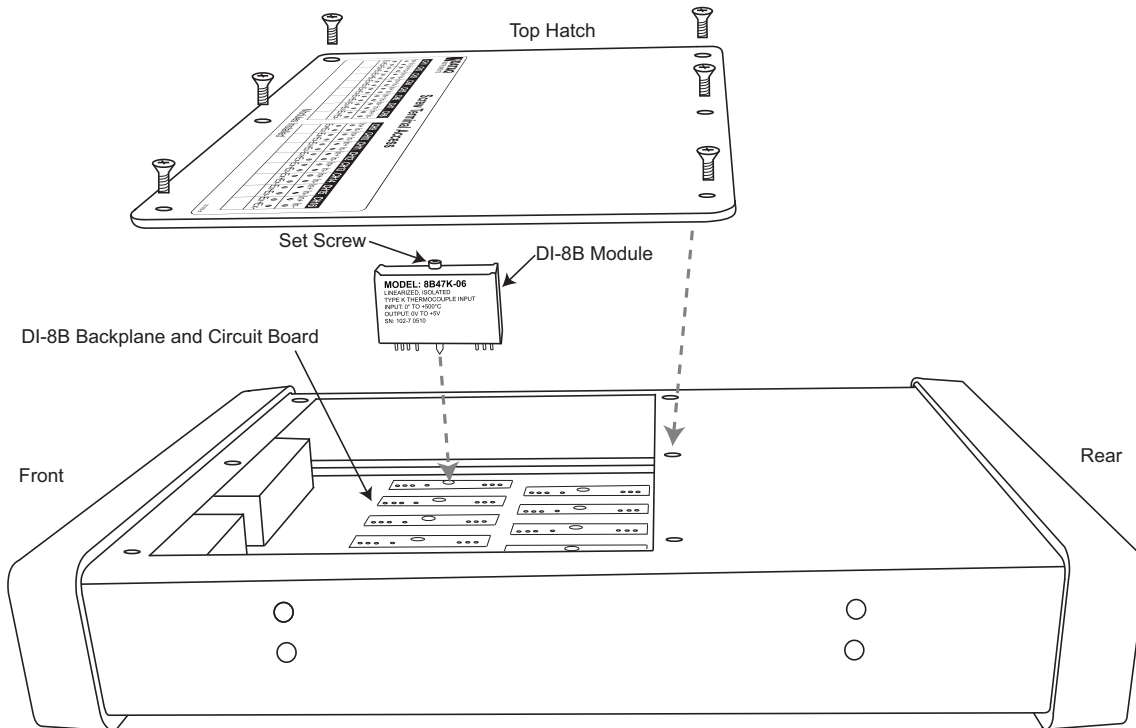
Write Installed Modules in the spaces provided with an erasable pencil.

8. After all modules are installed and indicated on the sticker reassemble the instrument making sure not to over-tighten the front screws. **Note:** If your are installing a thermocouple module you must enable the Cold Junction Compensation jumper for that channel (see “Enabling CJC in DI-718B Instruments” on page 21 for more information).

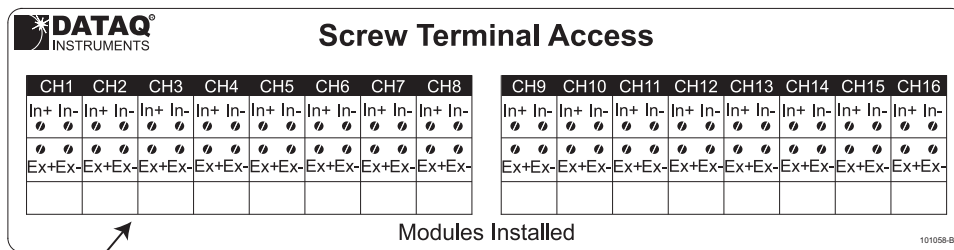
Installing DI-8B modules in DI-718Bx Instruments

DI-718Bx Series instruments can accept up to sixteen DI-8B modules. Modules are installed to the DI-8B backplane located on the instrument circuit board. You must remove the top hatch to access the backplane.

1. Unplug the device and make sure there is no power to the instrument.
2. Unscrew the six screws on the top of the instrument and remove the top hatch cover to reveal the DI-8B backplane.
3. Plug the DI-8B module firmly into one of the channel positions clearly labeled on the backplane and secure with the set screw. **Note:** Be sure to completely screw the module into place or vibrations could short the system. DI-8B modules are installed on (or removed from) the socketed DI-8B backplane (located on the circuit board) and are secured with a non-removable mounting screw. Each channel position is labeled “CHANNEL 1,” “CHANNEL 2,” etc. on the socketed backplane. The DI-8B modules can be mixed or matched in any combination suitable for the application and are identical in pinout and size, so it doesn't matter which module gets plugged into which channel position.



4. Using an erasable pencil write the module number of each DI-8B module installed on the sticker located on the top hatch to indicate which module is installed at each channel position.



Write Installed Modules in the spaces provided with an erasable pencil.

5. After all modules are installed and indicated on the sticker replace the top hatch and screw firmly into place. **Note:** If your are installing a thermocouple module you must enable the Cold Junction Compensation jumper for that channel (see “Enabling CJC in DI-718Bx Instruments” on page 22 for more information).

Enabling CJC for Thermocouple Modules

Enable Cold Junction Compensation for each Thermocouple Input module installed. The CJC Enable Jumpers are located on the circuit board of the instrument. **Note:** *If you are not using a Thermocouple Input Module on that channel be sure the jumper is disabled (removed or installed on only one pin) because this will affect the input signal*

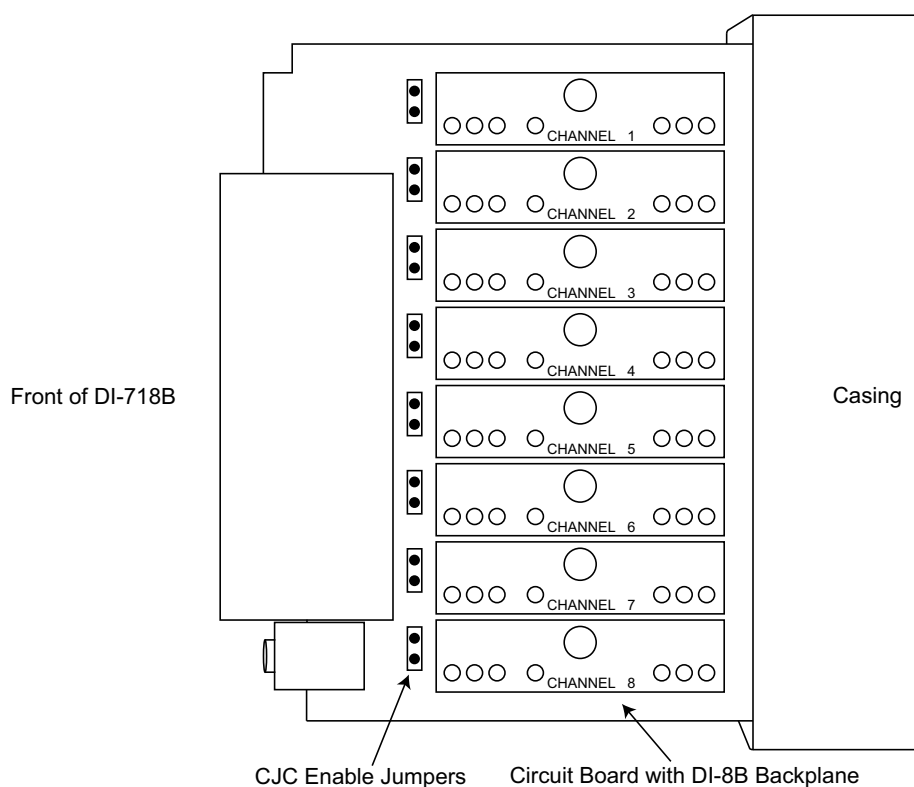
Enabling CJC in DI-718B Instruments

If you are installing a Thermocouple Input Module you must enable the Cold Junction Compensation jumper. Each channel has its own CJC enable jumper located in front of each channel position on the instrument circuit board (see also “Installing DI-8B modules in DI-718B Instruments” on page 18 for disassembly).

1. Unplug the device and make sure there is no power to the instrument.
2. Remove the front panel and bezel by removing the two screws on the front of the instrument.
3. Remove the ground lug from the back of the instrument.
4. Pull the circuit board apart from the casing to reveal the CJC Enable Jumpers.
5. Install a jumper onto the board for each channel that uses a thermocouple module. Eight jumpers are provided with the DI-718B for this purpose.

Note: *If you are not using a Thermocouple Input Module on that channel be sure the jumper is disabled (removed or installed on only one pin) because this will affect the input signal.*

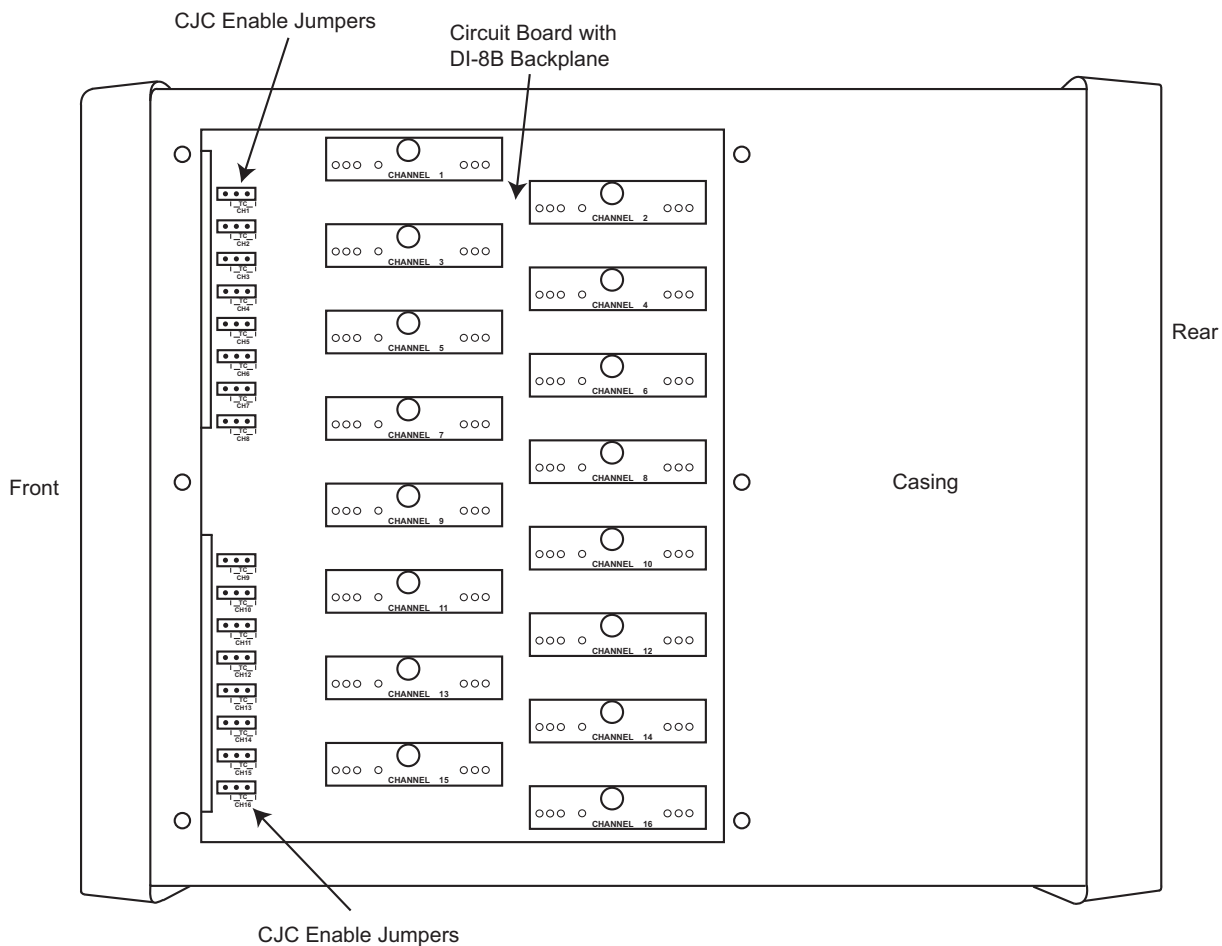
6. After the DI-8B modules and jumpers are installed reassemble the instrument making sure not to overtighten the two front screws.



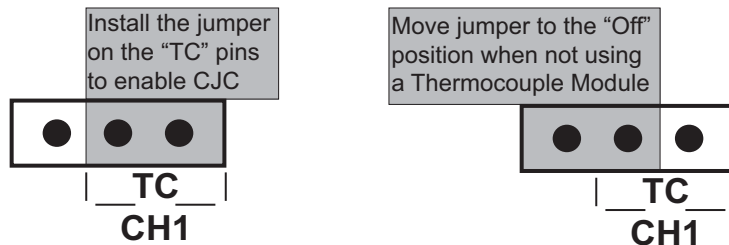
Enabling CJC in DI-718Bx Instruments

If you are installing a Thermocouple Input Module you must enable the Cold Junction Compensation jumper. Each channel has its own CJC enable jumper located towards the front of the instrument on the instrument circuit board (see also “Installing DI-8B modules in DI-718Bx Instruments” on page 19 for disassembly).

1. Unplug the device and make sure there is no power to the instrument.
2. Unscrew the six screws on the top of the instrument and remove the top hatch cover to reveal the DI-8B backplane and the CJC Enable Jumpers.



3. Each jumper is labelled on the circuit board as “TC CH#” where # is the channel number. Jumpers are installed on the circuit board in the “off” position. Move the jumper to the “TC” pins for each channel using a Thermocouple module. **Note:** If you are not using a Thermocouple Input Module on that channel be sure the jumper is disabled (in the “off” position) because this will affect the input signal.

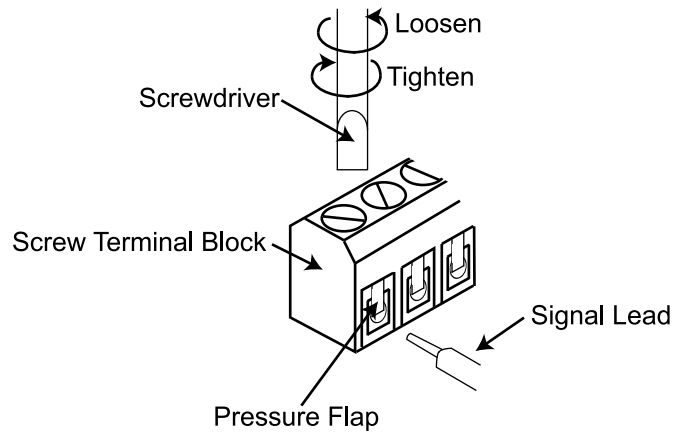


4. After all necessary jumpers are installed, reassemble the instrument.

Connecting Signals

Use the removable screw terminal blocks located on the front of the instrument to connect your analog input signals. Refer to the Screw Terminal Access sticker on the top of the instrument for pinout.

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.

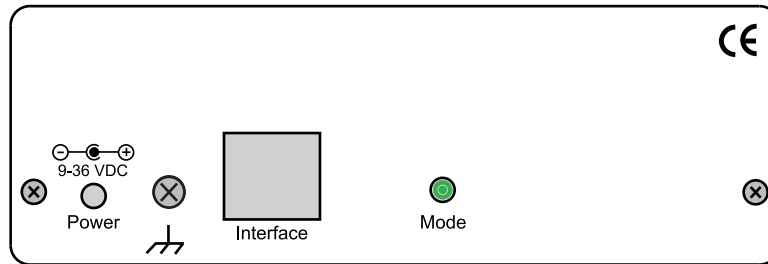
Instrument Rear Panel

The rear panel of DI-718B instruments provide access to power and interface connections, Ground, and a mode LED. The rear panel of stand-alone data logger models also provide a removable flash memory slot and a control button.

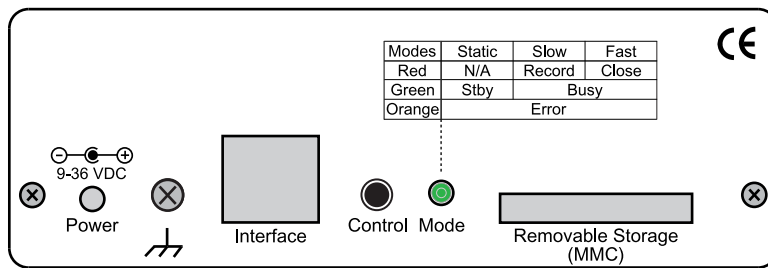
DI-718B Rear Panel

The Rear panel of your DI-718B Model can vary depending on your model. Stand-alone models add a removable storage slot, the LED Mode table, and a Control Button.

DI-718B Rear Panel PC Connected Models



DI-718B Rear Panel Stand-alone Data Loggers



Power Input Jack

Power must be applied with the included power adapter or with an alternate appropriate source (9-36VDC, 15 watts max).

Ground Lug

This ground lug should always be connected to a solid chassis or earth ground. This connection is mandatory for the unit to meet CE guidelines.

Interface Port

The Interface port allows you to connect the instrument to your PC via USB or Ethernet cable.

Control Button (Stand-alone models only)

The Control Button can be used to stop or start recording data to your memory card (SD) when using the instrument as a stand-alone data logger. The Control Button can also be used to reconfigure the instrument to factory default settings and to re-format memory card files left open due to power failure or other circumstance. The Control Button is inoperable while running WINDAQ Acquisition software. See “Control Button Operations” on page 26 for operations.

Mode LED Indicator

Indicates what mode the instrument is currently in. Use the chart on the rear panel of the instrument for quick reference. See “Mode LED Indicator” on page 27 for a list of modes.

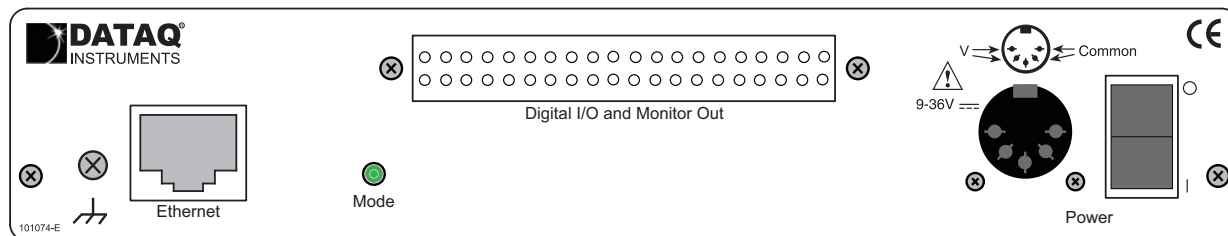
Removable Storage (SD) Slot (Stand-alone models only)

Use any standard Secure Digital Card (SD) from 16MB to 2GB. Push card completely into slot. Press to release (eject) memory card when recording is complete. Please note that some memory cards may not be fast enough for the instrument. SD memory cards are available through the DATAQ web site (www.dataq.com) as are SD card readers (manufacturer varies).

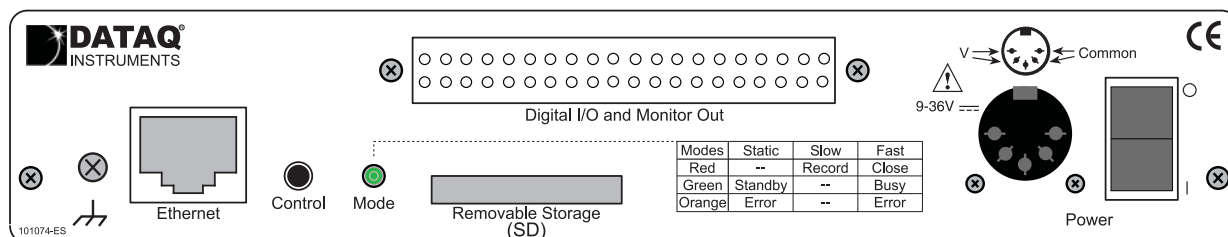
DI-718Bx Rear Panel

The Rear panel of your DI-718Bx Model can vary depending on your model. Stand-alone models add a removable storage slot, the LED Mode table, and a Control Button.

DI-718BX Rear Panel PC Connected Models



DI-718BX Rear Panel Stand-alone Models



Ground Lug

This ground lug should always be connected to a solid chassis or earth ground. This connection is mandatory for the unit to meet CE guidelines.

Ethernet Port

The Ethernet port allows you to connect the instrument to your PC or network via an Ethernet cable.

Control Button (Stand-alone models only)

The Control Button can be used to stop or start recording data to your memory card (SD) when using the instrument as a stand-alone data logger. The Control Button can also be used to reconfigure the instrument to factory default settings and to re-format memory card files left open due to power failure or other circumstance. The Control Button is inoperable while running WINDAQ Acquisition software. See "Control Button Operations" on page 26 for operations.

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Use any standard Secure Digital Card (SD) from 16MB to 2GB. Push card completely into slot. Press to release (eject) memory card when recording is complete. Please note that some memory cards may not be fast enough for the instrument. SD memory cards are available through the DATAQ web site (www.dataq.com) as are SD card readers (manufacturer varies).

Digital I/O and Monitor Out

Provides easy access to Digital I/O bits as well as Monitor Out. Use the DI-705 with CABL-7 to access these ports. See “DI-705 (for DI-718Bx models only)” on page 39 for connection and pinout.

Power Input Jack

Allows you to apply power to the instrument. Power should be applied using the included power adapter.

Power Switch

Controls power to the DI-718Bx instrument. 1 is on, 0 is off.

Control Button Operations

The Control Button can be used to stop or start recording data to your memory card (SD) when using the instrument as a stand-alone data logger. The Control Button can also be used to reconfigure the instrument to factory default settings and to re-format memory card files left open due to power failure or other circumstance. The Control Button is inoperable while running WINDAQ Acquisition software.

Start Recording

To Start recording data to your memory card the Instrument must be in Standby Mode (Mode LED is Green). Press and hold the Control Button until the Mode LED turns off (about 1 second). Release the Control Button. The Mode LED will rapidly blink green to indicate the instrument is creating a new file. When the Mode LED slowly blinks red, data is being recorded. Each subsequent recording session creates a new file (numbered sequentially).

Stop Recording

To Stop recording data to your memory card the Instrument must be in Record mode (Mode LED is flashing red @ 1 Hz). Press and hold the Control Button until the Mode LED turns off (about 1 second). Release the Control Button. Mode LED will rapidly blink red to indicate the instrument is closing the data file for use with playback and/or analysis software. Do not remove the memory card before the instrument completely closes the file. When Mode LED turns green the memory card may be removed. Removing the card before completion will cause Error Mode (Mode LED is orange).

Note: SD cards should be locked before inserting into a card reader. Your PC may try to change the flash card format whenever it reads the data on your SD (if not locked), causing it to lose the unique formatting required for DI-718B use. If the unique format used by the DI-718B is modified, the DI-718B may require you to reformat the memory card.

Formatting the Memory Card

Formatting the card completely removes all data. To format your memory card the instrument must be in Standby Mode (Mode LED is Green). Press and hold the Control Button until the Mode LED turns red (about 5 seconds). Release the Control Button. The Mode LED will blink red to indicate the Instrument is formatting the card. When the Mode LED changes back to green, formatting is complete. Mode LED should be green to indicate successful completion. Formatting is for use with the instrument used to format the card. To use a memory card with a different instrument you will have to reformat the card.

Reconfigure Instrument

To configure your instrument to the default factory data acquisition session settings press and hold the Control Button during power up (i.e., while plugging the instrument in). Mode LED will flash bright green then dim to indicate that the instrument is configured. Release the Control Button. The default settings are: 8 channels enabled at 300 samples per second per channel sample rate.

Fix Errors

The Control Button can also be used to fix some common operating errors. When the instrument is in Error mode, some action must be taken to fix the error before you can use it. Generally, the Control Button can be used to make the instrument operational. See the Error mode in “Mode LED Indicator” on page 27 for more information.

Mode LED Indicator

Indicates what mode the instrument is currently in. Use the chart on the rear panel of the instrument for quick reference. Use the table provided below for a more detailed description of each available state.

State	Mode	Description
Stand-alone data logger operation		
Static Green	Standby	Instrument is powered and available for data acquisition operations. Memory card may be safely removed.
Flashing Green	Busy	Indicates the instrument is busy. Do Not Remove Memory Card.
Orange	Error	Possible errors include, but are not limited to: SD removed prematurely: Memory card removed before the instrument had a chance to close the data file. Reinsert the card and Press the Control button to close the file. When steady green, memory card is closed and can be removed safely. SD Lock: After initially pressing the Control button to begin recording data, two series of blinking Orange before reverting back to Green indicates that the memory card is locked. Use another card or unlock the current one. One series of blinking Orange before reverting back to Green indicates that the memory card is incompatible for use with the instrument. Use the recommended memory card available through DATAQ Instruments, Inc. See also “Troubleshooting” on page 33.
Slow Flashing Red (@ 1Hz)	Record	Indicates the instrument is acquiring and recording data to your memory card. Do Not Remove Memory Card.
Fast Flashing Red	Close	Indicates the instrument is closing the recording session. Do Not Remove Memory Card. Each recording session must be completed before removing the card.
PC-connected operation		
Slow Flashing Red (@ 1Hz)	Record	Indicates the instrument is running and acquiring data for display and/or recording to disk. Occurs when WINDAQ Acquisition is running.
Green	Standby	Indicates WINDAQ has been deactivated and the instrument is in Standby Mode. The Mode LED Indicator will also flash green just before recording to disk to indicate initialization.

5. Operation

Operation for PC-connected Models

PC-based models (DI-718B-U, DI-718B-E, DI-718Bx) are operated and controlled using WINDAQ Software. To begin displaying data on your monitor, make sure all wires and cables are properly connected and start WINDAQ Acquisition by pressing the **Start WINDAQ button** in the Dataq Instruments Hardware Manager (see “Dataq Instruments Hardware Manager” on page 14). After data is recorded, use WINDAQ Waveform Browser to review your data. Consult the context-sensitive help files or your Fast Start WINDAQ Software Manual for directions on using the WINDAQ software package. *Note: If your USB device experiences frequent lock ups, connect the Ground Lug to your PC ground. If the problem persists, please contact Technical Support.*

Enabling/Disabling Digital Remote Control

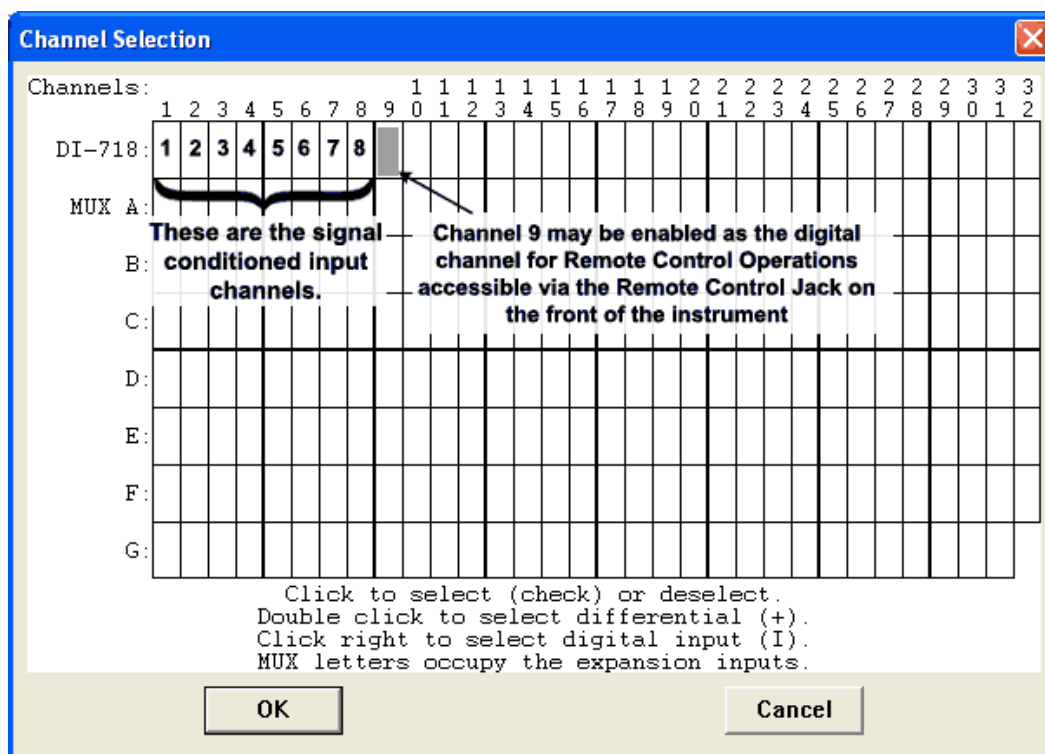
To use the Remote Control features in WINDAQ Acquisition Software with DI-718B instruments Channel 1 or Channel 9 **must** be enabled as the Digital Input channel. For DI-718Bx instruments, Channel 1 or Channel 17 must be enabled as the Digital Input channel

Analog Input Channel Configuration

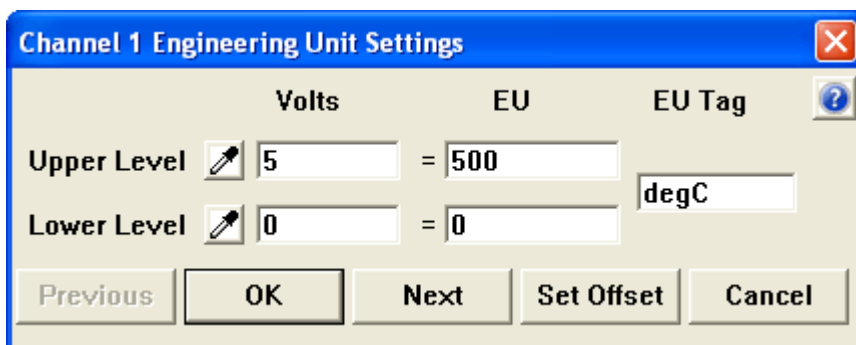
Enabling and configuring channels with the DI-718B and DI-718Bx in WINDAQ Acquisition software is different than enabling channels with other instruments and is not covered in the Help Files.

Enabling Channels for DI-718B Instruments

Use the Channel Selection grid to enable and configure channels. Access the channel selection grid by selecting **Channels...** in the **Edit** menu (in the SET-UP operating mode of WINDAQ software). Each box in this grid represents an input channel. An input channel is enabled by clicking in its channel box. The following channel selection grid is typical for a DI-718B. To use the Remote Control Functions (see also “Built-In Remote Control Jack” on page 17) of WINDAQ Acquisition software Channel 9 or Channel 1 **must** be enabled as the Digital Input Channel.



Enter the appropriate information in the available text boxes. For example, if using a DI-8B47K-05, the Input is 0°C to +500°C and the Output is 0V to +5V. Enter 5 in the Upper Level text box under Volts and 500 in the Upper Level text box under EU (5 volts = 500 degrees C). The Lower level text boxes should be 0 for both (0 volts = 0 degrees C). Enter the appropriate EU tag (here degrees C) Press OK to save the settings..



Operation for Stand-alone Models

Stand-alone Models (DI-718B-US, DI-718B-ES, DI-718Bx-S) can record data directly to a Secure Digital Card (SD) as well as recording data to a PC. When connected to a PC, data recording sessions may be configured and data may be acquired using WINDAQ Acquisition software (just the same as if the model were a PC-based instrument). This makes all the features of WINDAQ Acquisition software available including triggering, user annotation, user commented event markers, appending, and stop/pause data recording (stand-alone data logger operation does not support these features).

When taking your stand-alone model out into the field to use as a stand-alone data logger, you can record data to an SD without the use of a PC. Data sessions can be configured for a specific job using the included configuration software (installed when WINDAQ is installed). All data recorded to the memory card is fully WINDAQ compatible and can be converted then reviewed and analyzed with WINDAQ Playback software.

PC-connected operation

DI-718B and DI-718Bx Instruments enter PC Operation Mode when the instrument is connected to the PC (either directly or through a network) and the user initiates WINDAQ Acquisition software. As soon as PC Operation Mode is entered, the Control button is deactivated and all the features of WINDAQ Acquisition Software are accessible. Consult the context-sensitive help files or your Fast Start WINDAQ Software Manual for directions on using the WINDAQ software package.

Note: When running WINDAQ Acquisition software over the internet, unpredictable latencies may occur, especially at higher sample rates. The unit generally will continue to acquire data after a latency - but there will be gaps in your data.

Networked operation as a data acquisition server (DI-718B-ES and DI-718Bx-S models)

The Ethernet option allows data access from anywhere on a local area network (LAN) or DHCP server. A DI-718B or DI-718Bx instrument configured for Stand-alone operation *and* containing an Ethernet interface transparently becomes like any other computer on the network, able to share data whenever and wherever it is needed. This can be over the LAN to a PC on the other side of the facility, or over the Internet to a PC on the other side of the world. Furthermore, Stand-alone instruments can be easily added to existing networks. Its server functionality means that it does not require a dedicated network to operate efficiently. Data is locally stored to SD memory, where it is available for upload (using the Uploader software) only on demand and as network bandwidth permits. In this manner, Stand-alone instruments with Ethernet interfaces are fully compatible with the intrinsic non-preemptive nature of Ethernet networks.

Stand-alone data logger operation

Use your Stand-alone model as a stand-alone data logger to record a WINDAQ-compatible waveform file onto a Secure Digital Card (SD). After recording, insert the memory card into your card reader to access the data file. The data file can then be opened with WINDAQ Waveform Browser Software for SD allowing analysis and review features. See “WinDaq Waveform Browser for SD” on page 34 for more information regarding WINDAQ Waveform Browser for SD software.

Data may be recorded using a circular FIFO memory configuration allowing you to record data nearly indefinitely or in a non-circular configuration allowing you to stop recording when your memory card is full. Select the desired memory configuration using the Stand-alone Set Up software inside the Dataq Instruments Hardware Manager.

Note: SanDisk SD memory cards have a lifetime expectancy of about 100,000 write actions. Each time data wraps you will use one write action; each singular data file uses two write actions (start and stop). If used properly a memory card will last years. See your memory card's specifications to determine lifetime expectancy.

The Stand-alone Set Up Panel

The Stand-alone Set Up software (installed with WINDAQ—accessible in the WINDAQ program group through the Dataq Instruments Hardware Manager) allows you to customize each data recording session before taking the instrument out into the field. The default settings (i.e., if you do not configure the instrument) are 8 single-ended channels enabled at 300Hz per channel sample rate. The default configuration can be reset at any time on the instrument by holding the Control button in when applying power. Context-sensitive Help is provided within the configuration software. Press F1 to access Help topics related to the currently displayed feature. You must run the software with the device properly installed and connected to your PC.

Operation

To use your instrument as a stand-alone data logger follow these steps:

1. Configure the Instrument using the Set Up software or by re-setting to the default.
2. Connect signal leads (“4. Instrument Controls, Indicators, and Connections” on page 17).
3. Apply Power to the instrument using the supplied Power Cable.
4. Insert the Secure Digital Card (SD) into the Removable Storage Slot.
5. If the memory card has not been used with your instrument, format the memory card before recording data. See “Formatting the Memory Card” on page 26 or use the Format SD Card command in the DATAQ Instruments Hardware Manager.
6. To Record Data to memory card: Press and hold the Control Button until the LED light turns off; release the Control button to initiate the recording session—initialization could last up to 30 seconds depending on memory card used. For Ethernet models you may also use the Start Recording to SD Memory command in the DATAQ Instruments Hardware Manager. This creates a new file numbered sequentially on the memory card. See also “Start Recording” on page 26.
7. To Stop Recording Data to memory card: Press and hold the Control Button until the LED light turns off; release the Control button to end the recording session and close the data file. It could take up to 30 seconds to close the file depending on the memory card used. For Ethernet models you may also use the Stop Recording to SD Memory command in the DATAQ Instruments Hardware Manager. This creates a new file numbered sequentially on the memory card. See also “Stop Recording” on page 26.
8. Access SD data using the uploader software provided in installation (Ethernet models) or by removing the memory card and using a card reader. Data files open in WINDAQ Waveform Browser for SD (see “WinDaq Waveform Browser for SD” on page 34).

Note: To read the data files, SDs **MUST** be locked before inserting into a card reader. If the SD is not locked, Windows may modify the file system and the SD will be unreadable to your instrument requiring you to reformat the card., some SDs may require you to reformat every time you review the data.

Troubleshooting

Use the following chart for errors and resolution.

Problem	Possible Cause(s)	Resolution
When attempting to initiate a recording session the LED blinks green for about 5-10 seconds then quickly blinks orange then back to green.	Memory card not inserted.	Press memory card firmly into the slot until you hear a slight “click” to indicate proper insertion.
When attempting to initiate a recording session, LED blinks orange, then turns green.	SD is locked (write protected).	Unlock the SD Card
	Memory card is full.	Reformat the memory card.
	Memory card is unusable or damaged.	You need a new memory card
Recording is initiated but only runs for a short time when LED blinks orange and stays orange.	Memory card read/write speed in SPI mode is too slow to record data as specified.	Try lowering the sample rate first. If problem persists purchase a new card (recommended: Lexar Professional 133X 2 Gigabyte Secure Digital Flash Memory).
Recording is initiated in Circular Memory configuration, but when the file attempts to wrap, the LED blinks orange and stays orange.	Memory card read/write speed in SPI mode is too slow to record data in circular memory configuration.	
LED is green but I cannot format a memory card.	The instrument is looking for a file that has not been closed (possible due to power failure).	Reinsert the correct memory card and press the control button for about 1 second (until LED turns off) and release. The instrument gives you three chances to find the correct file, if it does not you must format whatever card is there to begin a new recording session.
Mode LED will not change from error state (orange).	This can be caused by switching memory cards during a power failure without giving the instrument a chance to close the data file.	Remove the memory card and unplug the device. Restore power to the device (LED should turn green). Press and hold the control button for about 1 second (until LED turns off) and release. If LED is orange, press it again. When LED turns green reformat your memory card.
When memory card is inserted into a reader a “not formatted” error is seen.	Dependent upon the reader being used.	Sometimes the driver for an SD card reader appears “dead.” Reboot your PC.
When attempting to read the memory card using a card reader, the PC takes an interminably long time to open the data.	Dependent upon the memory card, card reader, and the PC you are using. The amount of time it takes to open the card will vary.	Using the Lock feature on an SD could speed up the process. Be sure to try that before purchasing new equipment.

After viewing data files through a card reader, upon initiating a recording session, the LED blinks orange then turns green.	The instrument has a unique file system. When the data on the memory card opens in Windows, sometimes Windows will modify the file system.	You must reformat the card. To prevent further instances of this error, use the Lock provided on your SD card. With some SD cards you will have to reformat the card with each subsequent use.
When attempting to read the memory card using a card reader, the data file is huge (completely fills up the memory card) and the actual waveform data is difficult to find.	The instrument did not have a chance to properly close the file.	<p>If you have not started using the instrument with a different memory card, reinsert the card and press the LED for about 1 second (until LED turns off) and release. The LED should be green indicating the file is closed and can be read.</p> <p>If you have already configured and used the instrument again, the file can no longer be closed and you will have to search for it and cut/paste the data into a new file.</p>

If power down occurs unexpectedly while recording to SD

The Stand-alone models have a built-in file protection feature. If power is lost while recording, all data—prior to up to 255 samples from the power failure—is available. If power is lost for any reason, the data file will be closed and saved and a new data file will be started when power is restored (Mode LED will flash red @ 1 Hz) if that option is selected in the Hardware Manager Stand-alone setup.

If the memory card is full, the Mode LED will quickly flash orange and then green and will not record new data until reformatted. Circular memory configuration may still be used if the memory card has not started to wrap the data (i.e., as long as the card is not full) and will only wrap data in the available space.

When recording at low sample rates be aware that the memory card must acquire 256 samples before it actually commits them to memory. For example, if you are recording one channel at 1 sample per second and power down occurs unexpectedly, you could lose up to 255 seconds (4 minutes and 15 seconds) of data (255 samples). Use the following formula to determine the maximum amount of data loss at power failure.

$$\frac{255}{\text{Throughput Rate}} = \text{Seconds of data that COULD be lost}$$

Note: Clean and solid power on/off (no slow charging and no ringing) required for new file on power interruption. Once power is on, power interrupt cannot happen again within 5 seconds. If persistent failure upon power interruption occurs, consider a universal power supply (UPS).

Note: Switching memory cards before power is restored is not suggested because the data logger will automatically attempt to close the file. Leave the memory card in until power is restored, then allow the instrument to close the data file. After a new file has begun, stop recording. The memory card may now be removed and read for analysis.

WINDAQ Waveform Browser for SD

All files recorded in Stand-alone data logger operating mode (data saved to SD—.wdc files) must be reviewed in WINDAQ Waveform Browser for SD. Data files recorded using WINDAQ Acquisition software (PC operation—.wdq files) must be reviewed in the standard WINDAQ Waveform Browser. Even if connected to a PC, WINDAQ Waveform Browser cannot eavesdrop on the data being recorded to your memory card. Recording must be stopped and the file must be closed to review the data.

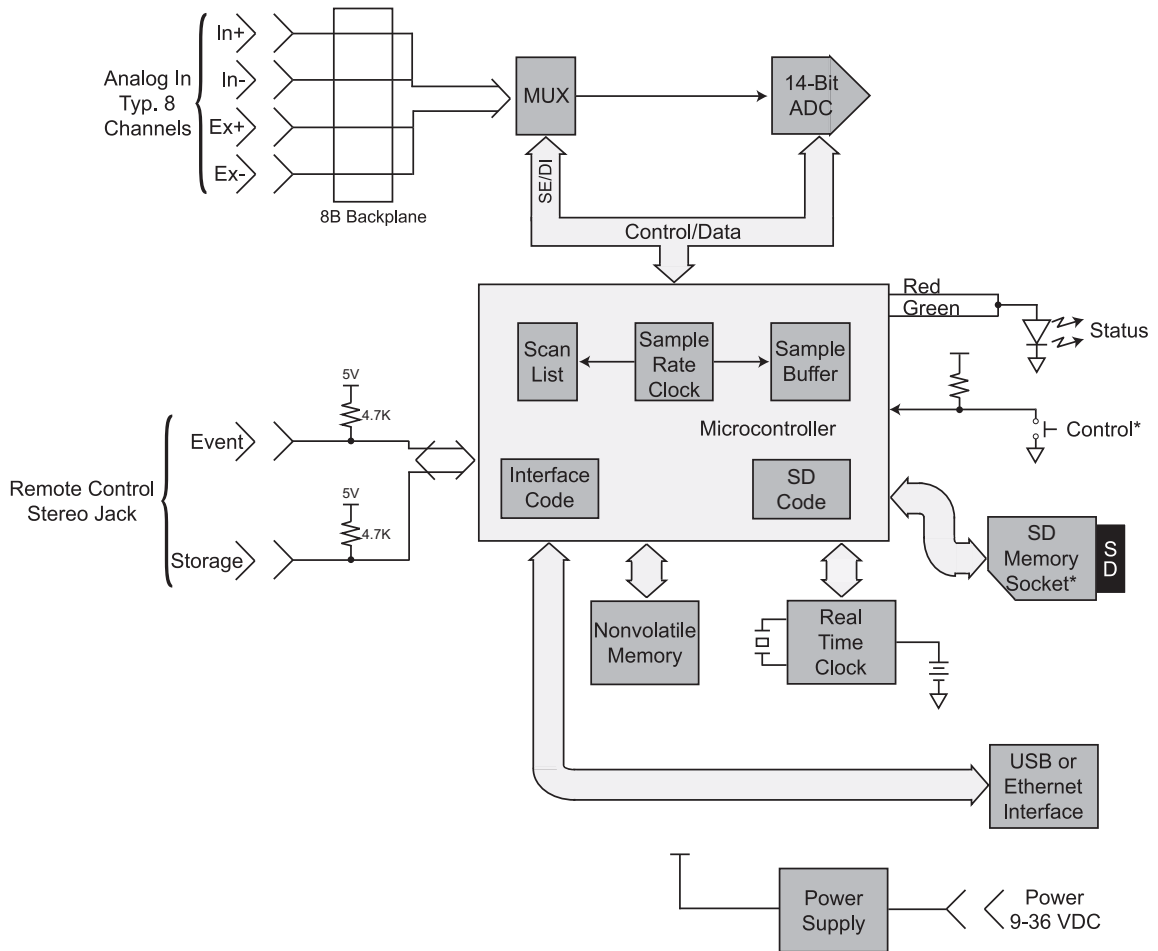
DI-718B and DI-718Bx stand-alone data loggers place 256 equally-spaced event markers into all data files when recording to SD (except when using Remote Controls). This allows easier navigation through larger files. Click on **Event Markers** in the **View** menu to access and “jump to” each of these event markers.

The **Calculate** command in the **File** menu is unavailable in WINDAQ Waveform Browser for SD. Use the **Save As...** command in the **File** menu to save data to another format in order to perform Advanced CODAS calculations (**File > Save As... > option 8) CALC** is still available). Converting data from a .wdc format to a .wdq format is also possible with **File > Save As...** Choose option **2) Binary (with CODAS header)** and enter a file name with .wdq as the extension. For more information regarding the Save As... function, consult your WINDAQ Waveform Browser Help File.

A stand-alone data file acquired with remote events or storage enabled displays an hourglass when opening while it scans for event marks and timestamps in order to construct an Event Marker table. Use File Save or the "Save All" button when changing files or exiting to write the Event Marker table to the file and avoid a delay when the file is opened again.

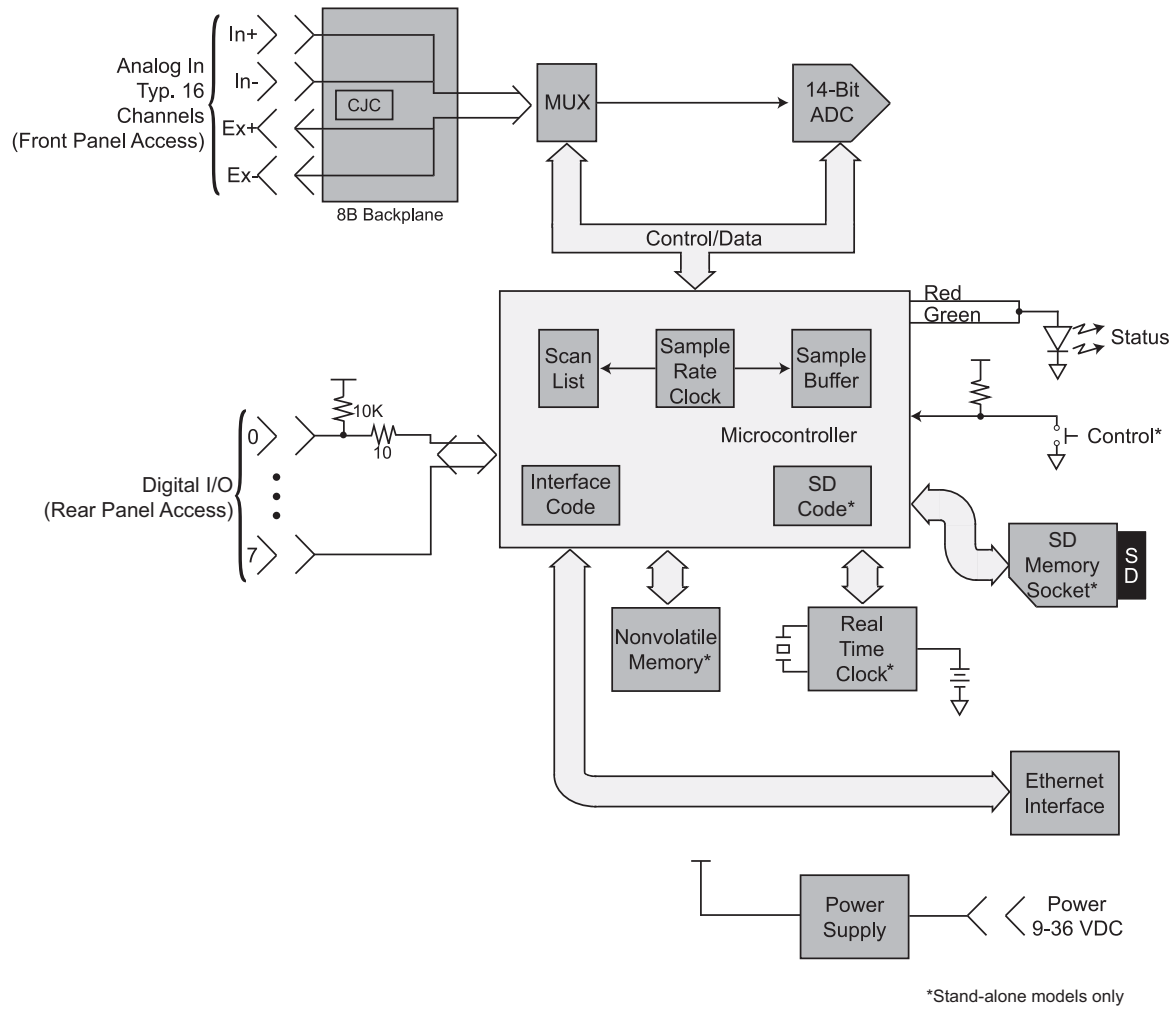
6. Block Diagram

DI-718B Models



*Stand Alone Models Only

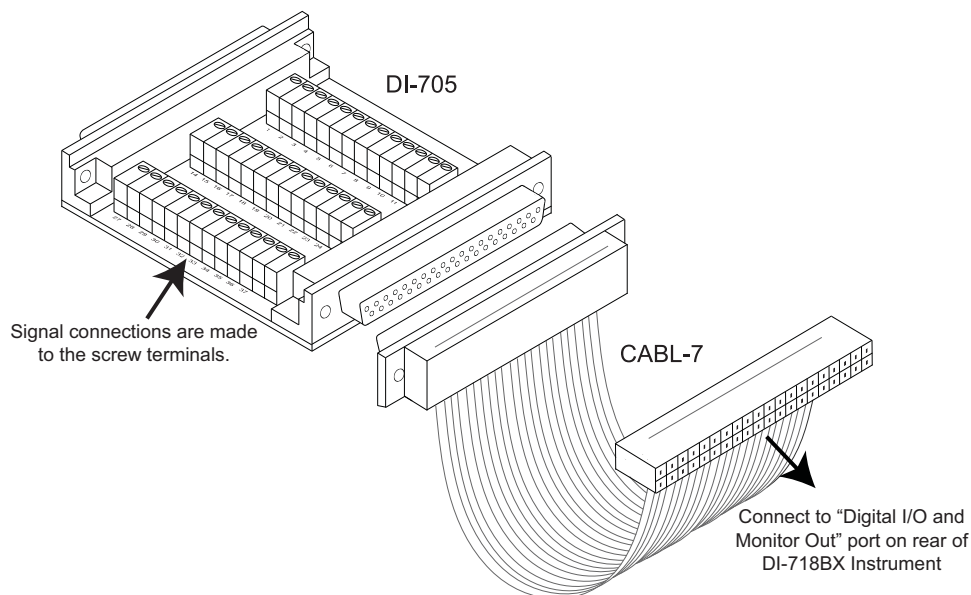
DI-718Bx Models



7. Accessories

DI-705 (for DI-718Bx models only)

Plug the DI-705 into CABL-7 and connect CABL-7 to the Digital I/O and Monitor Out port on the rear panel of the DI-718Bx to access the Digital I/O and Monitor Out port (see “DI-718Bx Rear Panel” on page 25 for location). The screw terminals accept 16-22 gauge wire and each is silk-screened with a pin number (below).



The Digital I/O may be enabled as Channel 17. *Note: The Digital I/O is not available in stand-alone mode — Except for Remote Start/Stop (DI/O0) and Remote Event (DI/O1).* Use the table below for pinout of the DI-705 (screw terminal in **bold**).

1	N.C.	11	CH16	21	DI/O6	31	CH7
2	DI/O5	12	CH15	22	DI/O2	32	CH6
3	DI/O3	13	CH14	23	DI/O0	33	CH5
4	DI/O1	14	CH13	24	DI/O2	34	CH4
5	DI/O3	15	CH12	25	DI/O0	35	CH3
6	DI/O1	16	CH11	26	DI/O4	36	CH2
7	Power GND	17	CH10	27	DI/O7	37	CH1
8	DI/O6	18	CH9	28	AGD		
9	N.C.	19	AGD	29	DI/O7		
10	DI/O5	20	DI/O4	30	CH8		

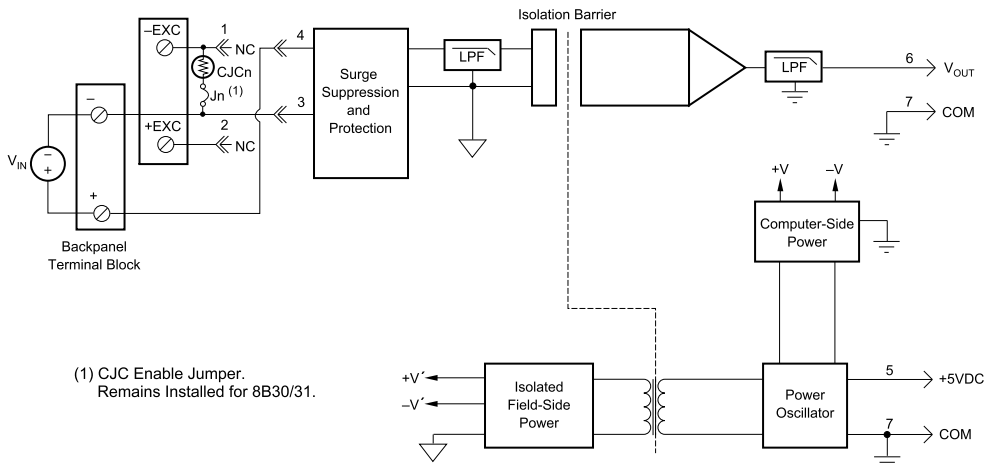
DI-8B30/31 Analog Voltage Input Modules, 3Hz Bandwidth

Each DI-8B30 or DI-8B31 module isolates, filters and amplifies a voltage input signal and provides an analog voltage output.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the DI-8B30 and DI-8B31 modules provides protection against accidental connection of power-line voltages up to 240VAC.

Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B30-01	-10mV to +10mV	-5V to +5V
DI-8B30-02	-50mV to +50mV	-5V to +5V
DI-8B30-03	-100mV to +100mV	-5V to +5V
DI-8B31-01	-1V to +1V	-5V to +5V
DI-8B31-02	-5V to +5V	-5V to +5V
DI-8B31-03	-10V to +10V	-5V to +5V
DI-8B31-07	-20V to +20V	-5V to +5V
DI-8B31-09	-40V to +40V	-5V to +5V
DI-8B31-12	-60V to +60V	-5V to +5V

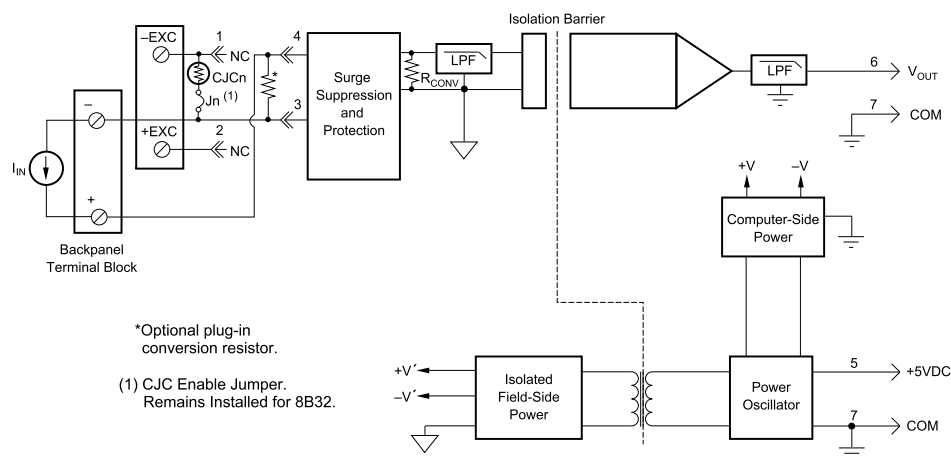
DI-8B32 Analog Current Input Modules

Each DI-8B32 module isolates, filters and amplifies a process current input signal and provides an analog voltage output.

Current to voltage conversion is accomplished internal to the module to ensure high accuracy.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the 8B32 module provides protection against accidental connection of power-line voltages up to 30VAC. Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

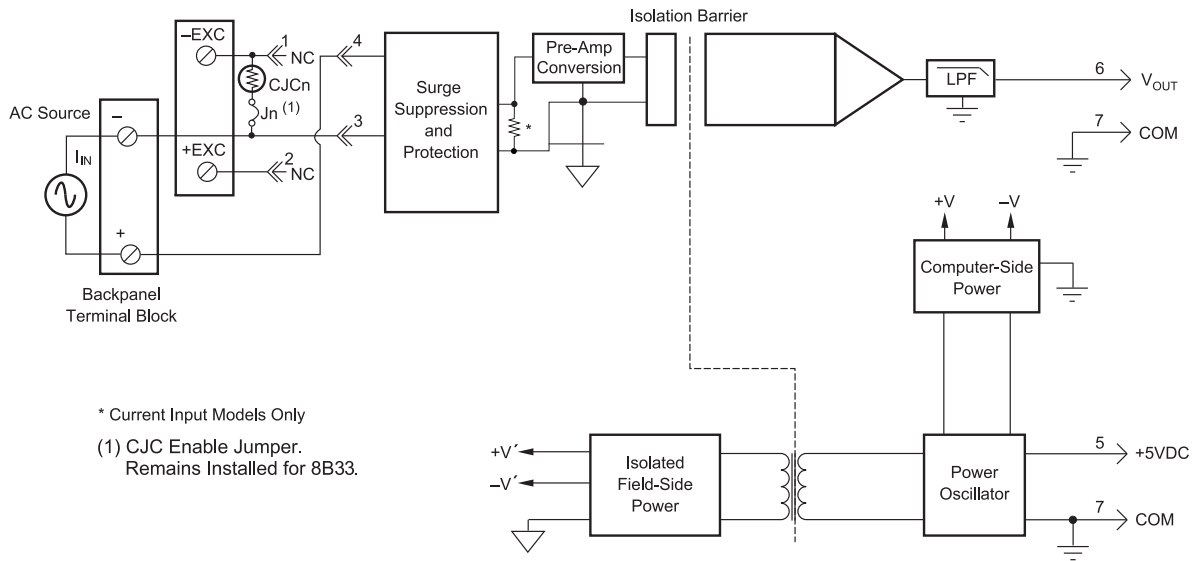
MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B32-01	4mA to 20mA	0V to +5V
DI-8B32-02	0mA to 20mA	0V to +5V

DI-8B33 True RMS Input Modules

Each DI-8B33 True RMS input module provides a single channel of AC input which is converted to its true RMS DC value, filtered, isolated, amplified, and converted to a standard process voltage or current output.

The field voltage or current input signal is processed through a pre-amplifier and RMS converter on the field side of the isolation barrier. The converted DC signal is then chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The computer side circuitry reconstructs, filters, and converts the signal to an industry standard output of 0 to 5 VDC.

Special input circuits provide protection against accidental connection of power line voltages up to 300VAC and against transient events defined by ANSI/IEEE C37.90.1



Ordering Information		
MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B33-01	0mV to 100mV	0V to +5V
DI-8B33-02	0V to 1V	0V to +5V
DI-8B33-03	0V to 10V	0V to +5V
DI-8B33-04	0V to 150V	0V to +5V
DI-8B33-05	0V to 300V	0V to +5V

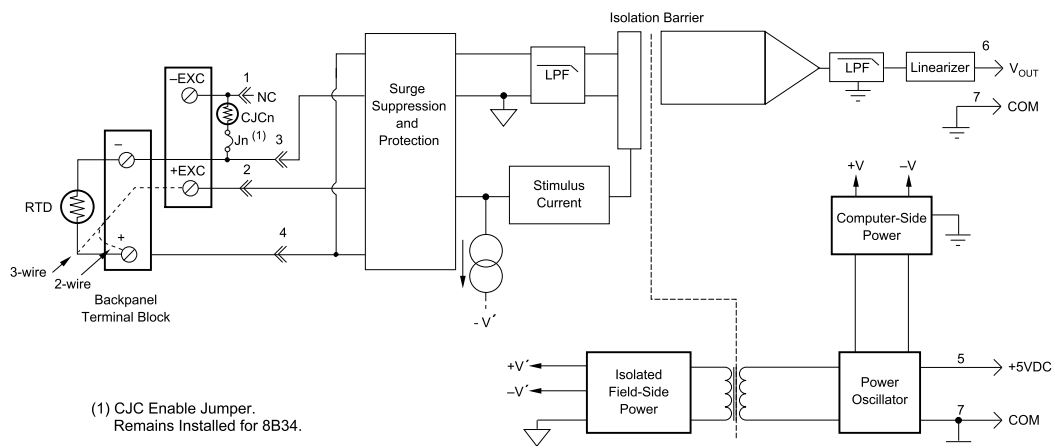
DI-8B34 Linearized 2- or 3-Wire RTD Input Modules

Each DI-8B34 module isolates, filters, amplifies, and linearizes a single channel of temperature input from an RTD and provides an analog voltage output.

RTD excitation is provided from the module using two matched current sources. When using a 3-wire connection, this method allows equal currents to flow through the sensor leads, cancelling the effects of lead resistances. The excitation currents are small (0.25mA) which minimizes the self-heating of the RTD.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the DI-8B34 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE	ACCURACY*
DI-8B34-01	-100°C to +100°C (-148°F to +212°F)	0V to +5V	±0.20°C
DI-8B34-02	0°C to +100°C (+32°F to +212°F)	0V to +5V	±0.15°C
DI-8B34-03	0°C to +200°C (+32°F to +392°F)	0V to +5V	±0.20°C
DI-8B34-04	0°C to +600°C (+32°F to +1112°F)	0V to +5V	±0.45°C

* Includes conformity, hysteresis and repeatability.

DI-8B35 Linearized 4-Wire RTD Input Modules

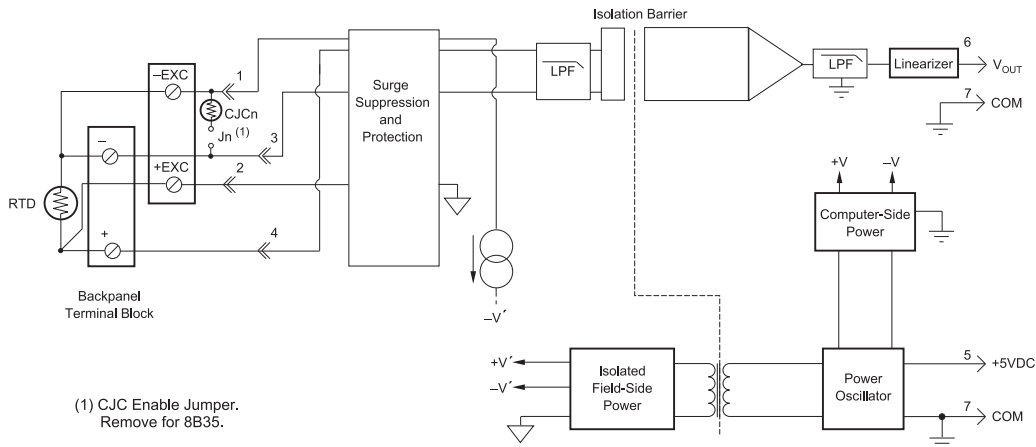
In RTD temperature measurement applications requiring a very high level of accuracy, the DI-8B35 4-Wire RTD input module offers a significant advantage over 3-wire measurement techniques (see block diagram). The DI-8B35 measures only the voltage dropped across the RTD and almost completely ignores the resistance or length of the RTD lead wires. The DI-8B34 3-Wire RTD module provides lead resistance compensation, but requires equal lead resistances, while the DI-8B35 does not require matched lead resistances.

Each DI-8B35 module isolates, filters, amplifies, and linearizes a single channel of temperature input from an RTD and provides an analog voltage output.

RTD excitation is provided from the module using a precision current source. Excitation current does not flow in the input signal leads, which allows RTD measurements to be made independent of lead resistance. The excitation currents are small (0.25mA) which minimizes self-heating of the RTD.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the the DI-8B35 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE	ACCURACY*
DI-8B35-01	-100°C to +100°C (-148°F to +212°F)	0V to +5V	±0.20°C
DI-8B35-02	0°C to +100°C (+32°F to +212°F)	0V to +5V	±0.15°C
DI-8B35-03	0°C to +200°C (+32°F to +392°F)	0V to +5V	±0.20°C
DI-8B35-04	0°C to +600°C (+32°F to +1112°F)	0V to +5V	±0.45°C

* Includes conformity, hysteresis and repeatability.

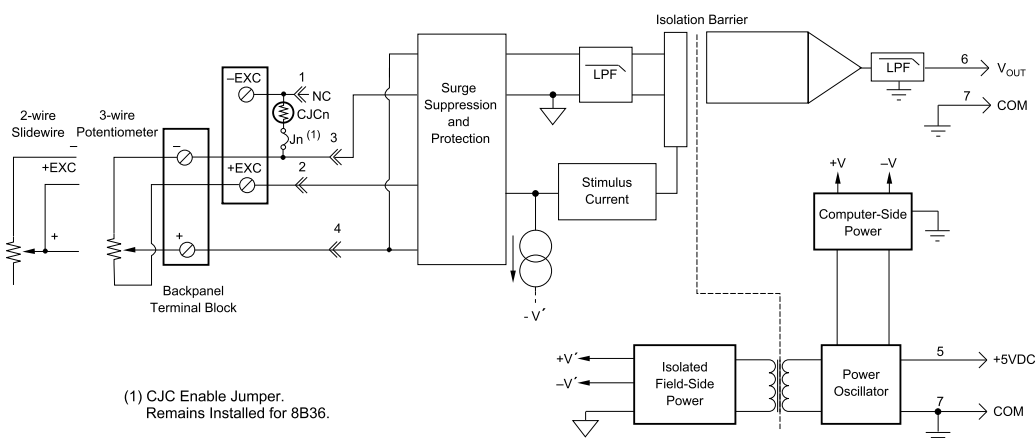
DI-8B36 Potentiometer Input Modules

Each DI-8B36 module isolates, filters and amplifies a single channel of potentiometer input and provides an analog voltage output.

Excitation for the potentiometer is provided by using two matched current sources. When using a 3-wire connection, this method allows equal currents to flow through the sensor leads, cancelling the effects of lead resistances. The excitation currents are small (0.25mA) which minimizes the self-heating of the potentiometer.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the DI-8B36 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.



Ordering Information		
MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B36-01	0 to 100 Ω	0V to +5V
DI-8B36-02	0 to 500 Ω	0V to +5V
DI-8B36-03	0 to 1k Ω	0V to +5V
DI-8B36-04	0 to 10k Ω	0V to +5V

DI-8B38 Strain Gage Input Modules, Narrow & Wide Bandwidth

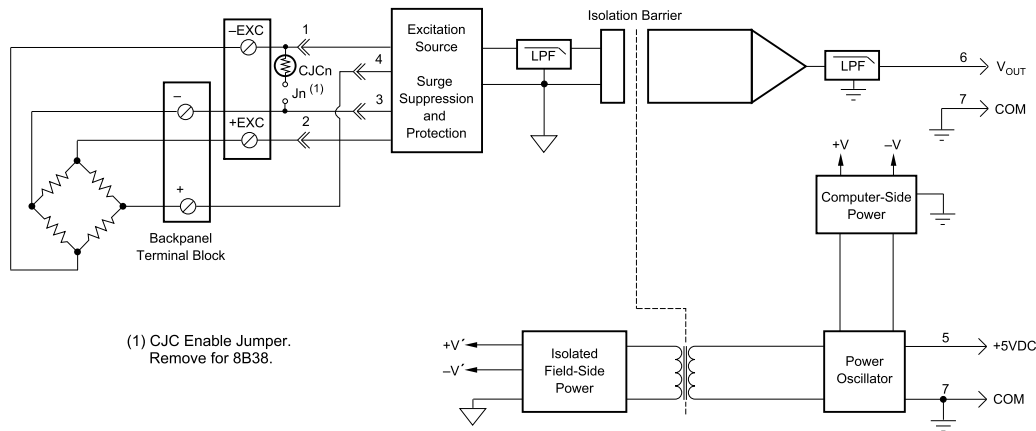
Each DI-8B38 module isolates, filters and amplifies a full-bridge strain gage input signal and provides an analog voltage output.

The 8B38 can interface to transducers with a nominal resistance of 100 to 2k. Bridge excitation is provided from the module with a stable 10.00V or 3.33V source. Full scale sensitivities of 2mV/V and 3mV/V are offered as standard.

Signal filtering is accomplished with a five-pole filter optimized for time and frequency response which provides 100dB per decade of normal-mode rejection above the filter cutoff frequency. One pole of this filter is on the field side of the isolation barrier, and the other four are on the system side.

A special input circuit on the DI-8B38 module provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

MODEL	BANDWIDTH	INPUT RANGE	EXCITATION	OUTPUT RANGE
DI-8B38-01	3kHz	-10mV to +10mV	3.333V at 3mV/V Sensitivity	-5V to +5V
DI-8B38-02	3kHz	-30mV to +30mV	10.0V at 3mV/V Sensitivity	-5V to +5V
DI-8B38-05	3kHz	-20mV to +20mV	10.0V at 2mV/V Sensitivity	-5V to +5V
DI-8B38-31	3Hz	-10mV to +10mV	3.333V at 3mV/V Sensitivity	-5V to +5V
DI-8B38-32	3Hz	-30mV to +30mV	10.0V at 2mV/V Sensitivity	-5V to +5V
DI-8B38-35	3Hz	-20mV to +20mV	10.0V at 2mV/V Sensitivity	-5V to +5V

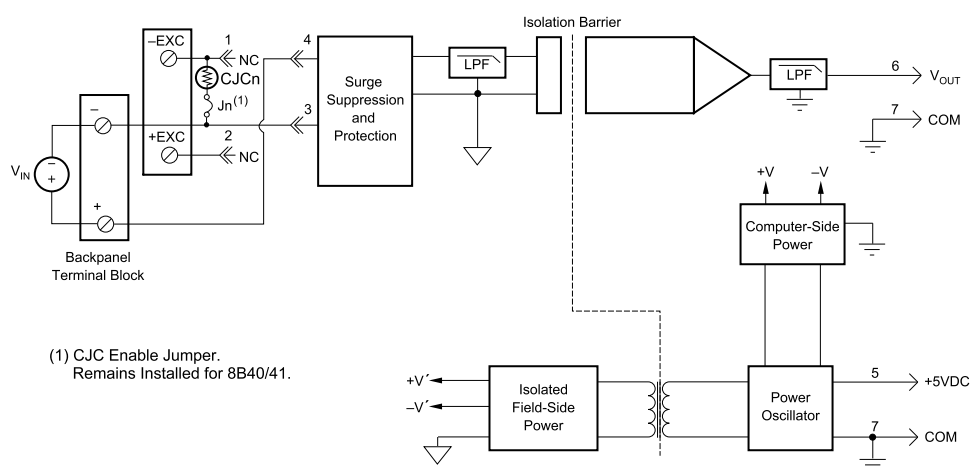
DI-8B40/41 Analog Voltage Input Modules, 1kHz Bandwidth

Each DI-8B40 and DI-8B41 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output.

Signal filtering is accomplished with a multiple pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the remaining poles are on the system side.

A special input circuit on the the DI-8B40 and DI-8B41 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp Circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B40-01	-10mV to +10mV	-5V to +5V
DI-8B40-02	-50mV to +50mV	-5V to +5V
DI-8B40-03	-100mV to +100mV	-5V to +5V
DI-8B41-01	-1V to +1V	-5V to +5V
DI-8B41-02	-5V to +5V	-5V to +5V
DI-8B41-03	-10V to +10V	-5V to +5V
DI-8B41-07	-20V to +20V	-5V to +5V
DI-8B41-09	-40V to +40V	-5V to +5V
DI-8B41-12	-60V to +60V	-5V to +5V

DI-8B42 2-Wire Transmitter Interface Modules

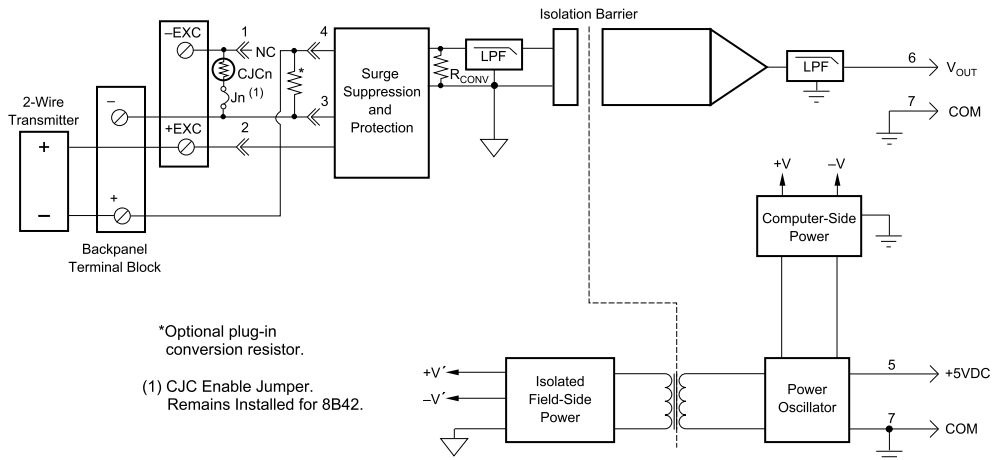
Each DI-8B42 module provides power to a current transmitter, then isolates, filters and amplifies the resulting process current input signal and provides an analog voltage output.

Current to voltage conversion is accomplished internal to the module to ensure high accuracy.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 60dB per decade of normal-mode rejection above 100Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the DI-8B42 module provides protection against accidental connection of power-line voltages up to 40VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information		
MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B42-01	4mA to 20mA	0V to +5V
DI-8B42-02	4mA to 20mA	+1V to +5V

DI-8B43 DC LVDT Input Modules

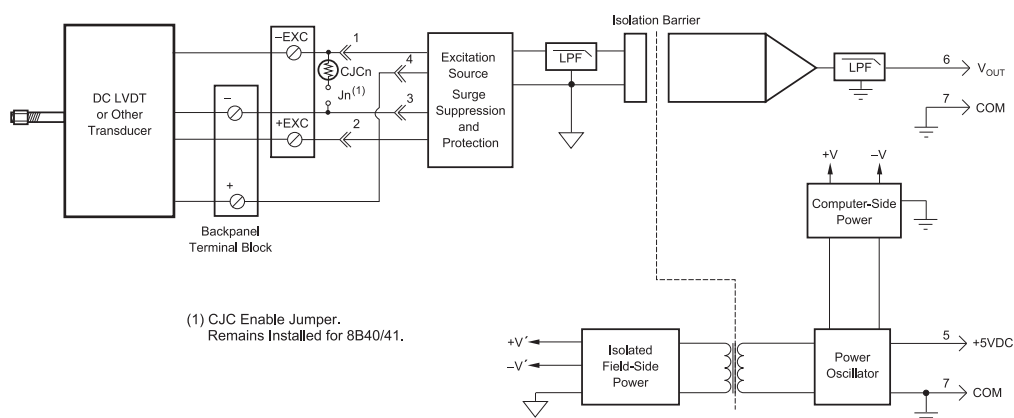
Each 8B43 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output.

The 8B43 can interface to transducers that will operate on a 10V excitation voltage and up to 20mA of excitation current.

Signal filtering is accomplished with a 5-pole filter optimized for time and frequency response which provides 100dBper decade of normal-mode rejection above 1kHz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other four are on the system side.

A special input circuit on the 8B43 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by transformer coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B43-01	-1V to +1V	-5 to +5V
DI-8B43-02	-2V to +2V	-5 to +5V
DI-8B43-03	-3V to +3V	-5 to +5V
DI-8B43-04	-4V to +4V	-5 to +5V
DI-8B43-05	-5V to +5V	-5 to +5V
DI-8B43-11	-1V to +1V	0 to +5V
DI-8B43-12	-2V to +2V	0 to +5V
DI-8B43-13	-3V to +3V	0 to +5V
DI-8B43-14	-4V to +4V	0 to +5V
DI-8B43-15	-5V to +5V	0 to +5V

DI-8B45 Frequency Input Modules

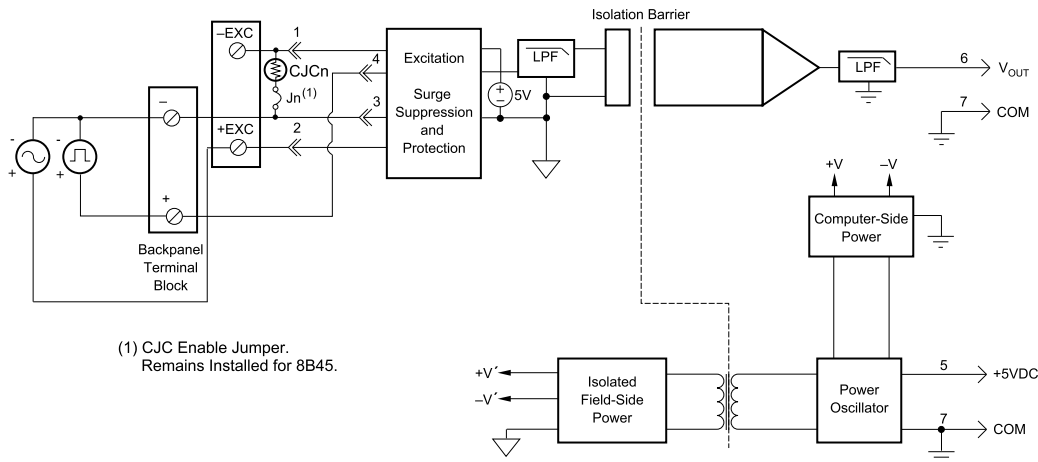
Each DI-8B45 module isolates and conditions a frequency input signal and provides an analog voltage output.

The frequency input signal can be either a TTL level or zero crossing with as little as $\pm 100\text{mV}$ amplitude. Input circuitry for each signal type has built-in hysteresis to prevent spurious noise from corrupting the module output. TTL signals are applied to the + and - terminals while zero crossing signals are applied to the +EXC and - terminals. Reference the block diagram.

A 5V excitation is available for use with magnetic pick-up or contact closure type sensors. The excitation is available on the -EXC terminal with return on the - terminal.

A special input circuit on the DI-8B45 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE	EXCITATION
DI-8B45-01	0 to 500Hz	0 to +5V	+5V at 8mA max
DI-8B45-02	0 to 1kHz	0 to +5V	+5V at 8mA max
DI-8B45-03	0 to 2.5kHz	0 to +5V	+5V at 8mA max
DI-8B45-04	0 to 5kHz	0 to +5V	+5V at 8mA max
DI-8B45-05	0 to 10kHz	0 to +5V	+5V at 8mA max
DI-8B45-06	0 to 25kHz	0 to +5V	+5V at 8mA max
DI-8B45-07	0 to 50kHz	0 to +5V	+5V at 8mA max
DI-8B45-08	0 to 100kHz	0 to +5V	+5V at 8mA max

DI-8B47 Linearized Thermocouple Input Modules

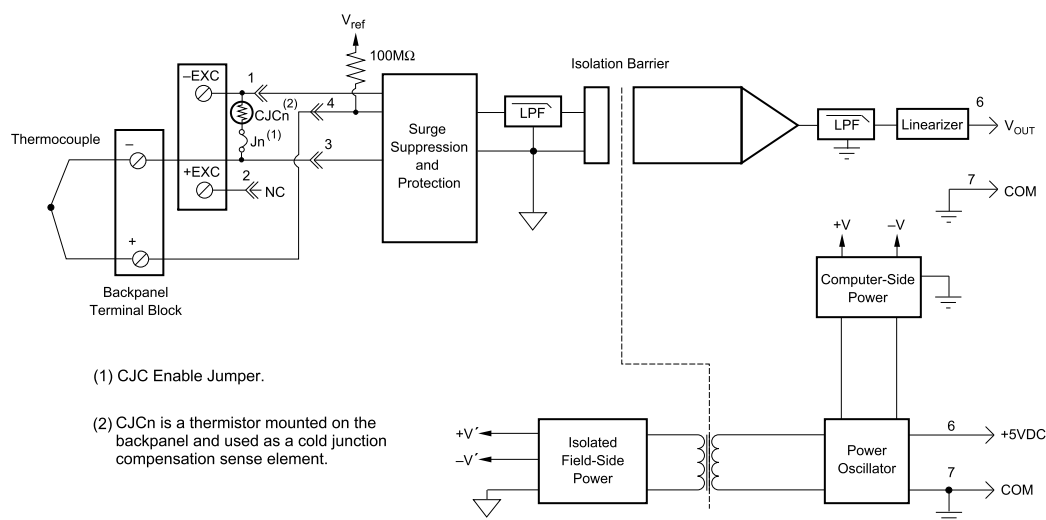
Each DI-8B47 module isolates, filters, amplifies, and linearizes a single channel of temperature input from a thermocouple and provides an analog voltage output.

Linearization is accomplished using a four breakpoint piece wise linear approximation.

The DI-8B47 can interface to industry standard thermocouple type J, K, and T and has an output signal of 0V to +5V. Each module is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting backpanel. Upscale open thermocouple detect is provided by an internal pull-up resistor.

Signal filtering is accomplished with a three-pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the other two are on the system side.

A special input circuit on the DI-8B47 module provides protection against accidental connection of power-line voltages up to 240VAC.



Ordering Information

MODEL	TYPE	INPUT RANGE	ACCURACY*
DI-8B47J-01	Type J	0°C to +760°C (+32°F to +1400°F)	±0.24% ±1.82°C
DI-8B47J-02	Type J	-100°C to +300°C (-148°F to +572°F)	±0.24% ±0.96°C
DI-8B47J-03	Type J	0°C to +500°C (+32°F to +932°F)	±0.21% ±1.05°C
DI-8B47J-12	Type J	-100°C to +760°C (-148°F to +1400°F)	±0.24% ±2.10°C
DI-8B47K-04	Type K	0°C to +1000°C (+32°F to +1832°F)	±0.24% ±2.40°C
DI-8B47K-05	Type K	0°C to +500°C (+32°F to +932°F)	±0.24% ±1.05°C
DI-8B47K-13	Type K	-100°C to +1350°C (-148°F to +2462°F)	±0.24% ±3.60°C
DI-8B47K-14	Type K	0°C to +1200°C (+32°F to +2192°F)	±0.24% ±2.88°C
DI-8B47T-06	Type T	-100°C to +400°C (-148°F to +752°F)	±0.48% ±2.40°C
DI-8B47T-07	Type T	0°C to +200°C (+32°F to +392°F)	±0.39% ±0.75°C

*Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.

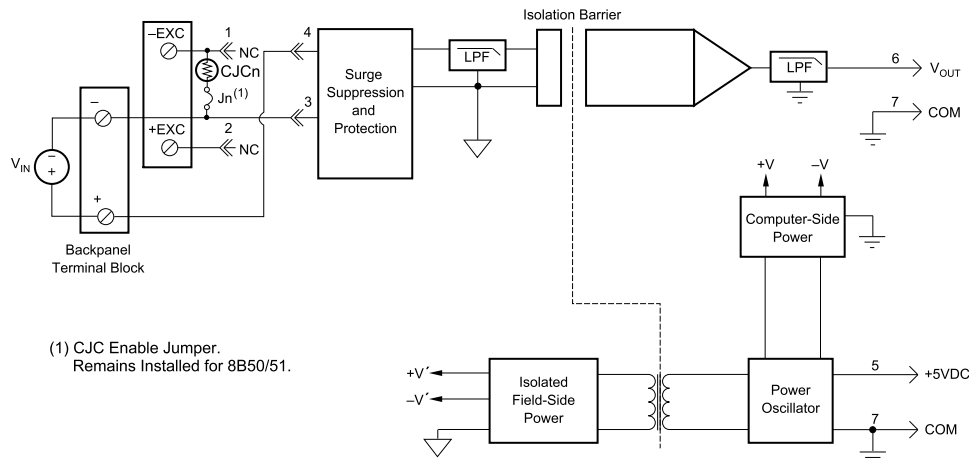
DI-8B50/51 Analog Voltage Input Modules, 20kHz Bandwidth

Each DI-8B50 and DI-8B51 module isolates, filters, and amplifies a voltage input signal and provides an analog voltage output.

Signal filtering is accomplished with a multiple pole filter optimized for time and frequency response which provides 70dB of normal-mode-rejection at 60Hz. One pole of this filter is on the field side of the isolation barrier for anti-aliasing, and the remaining poles are on the system side.

A special input circuit on the DI-8B50 and DI-8B51 modules provides protection against accidental connection of power-line voltages up to 240VAC. Clamp circuits on the I/O and power terminals protect against harmful transients.

Isolation is provided by optical coupling to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, $\pm 5\%$.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE
DI-8B50-01	-10mV to +10mV	-5V to +5V
DI-8B50-02	-50mV to +50mV	-5V to +5V
DI-8B50-03	-100mV to +100mV	-5V to +5V
DI-8B51-01	-1V to +1V	-5V to +5V
DI-8B51-02	-5V to +5V	-5V to +5V
DI-8B51-03	-10V to +10V	-5V to +5V
DI-8B51-07	-20V to +20V	-5V to +5V
DI-8B51-09	-40V to +40V	-5V to +5V
DI-8B51-12	-60V to +60V	-5V to +5V



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