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The way PC-based instrumentation should be

DI-720 Series

32 Channel USB, Ethernet, or Printer Port Data Acquisition System

DI-722 Series

Extended Measurement Range Data Acquisition System

DI-730 Series

High Voltage Range Data Acquisition System

DI-725/E

Channel Expander

DI-78B

8B Module Channel Expander

DI-75B

5B Module Channel Expander

User's Manual

Manual Revision AO

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M-100763

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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Service Policy

1. All products returned to DATAQ Instruments for service, regardless of warranty status, must be on a freight-prepaid basis.

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.

⚠ CAUTION ⚠

READ BEFORE CONNECTING INPUT SIGNALS

The data acquisition device you have purchased and are about to use contains input channels that are **NOT ISOLATED** (all channels on DI-72x products are not isolated; only the expansion channels of DI-730 instruments are not isolated). This means that it is susceptible to common mode voltages that could cause damage to the device. **SUCH DAMAGE IS NOT COVERED BY THE PRODUCT'S WARRANTY**. Please read the following carefully before deploying the product. Contact DATAQ Instruments Support at 330-668-1444 for all questions.

This product can tolerate a maximum applied voltage of only ±20V peak without damage. Although you may be certain that the signal you want to measure is lower than this level, a common mode voltage (CMV) with an unknown value may combine with your signal of interest to exceed this ±20V limit. In such instances, the product will be damaged. Verify a CMV does not exist before connecting signals and acquiring data with your device. Use the following procedure to check for CMV:

1. DO NOT connect your data acquisition device to the device under test. If the device under test is connected to your data acquisition device, disconnect it.

2. Connect your data acquisition device to the appropriate interface on your PC (USB, Ethernet, RS-232 Serial, or Parallel Printer Port).

3. Apply power to your data acquisition device, your PC, and the device under test.

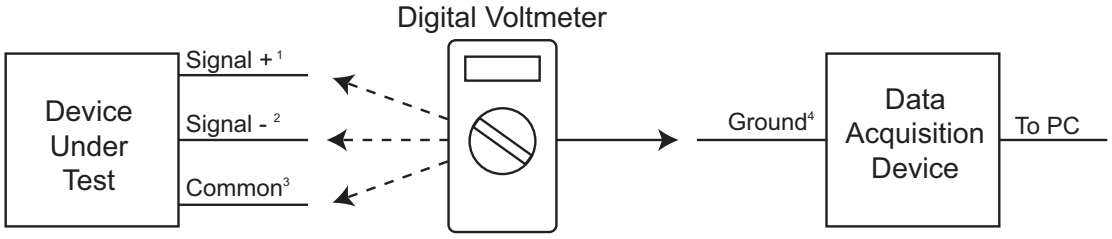
4. Use a digital voltmeter to make the following measurements:

   a. Measure the voltage (both the AC and DC range) between the ground terminal of your data acquisition device and Signal+ of the device under test. This measurement should not exceed the Full Scale Range of your data acquisition device.

   b. Measure the voltage (both the AC and DC range) between the ground terminal of your data acquisition device and Signal- of the device under test. This measurement should be at or very near 0 Volts.

   c. Measure the voltage (both the AC and DC range) between the ground terminal of your data acquisition device and Common of the device under test. This measurement should be at or very near 0 Volts.

5. Should ANY of these measurements exceed their recommendation **DO NOT CONNECT SIGNALS** to the data acquisition device. A common mode voltage may exist that could destroy the instrument. You MUST determine the source of the CMV and eliminate it before taking any measurements.



[1]Measured signal is not to exceed the Full Scale Range of your data acquisition device.

[2]Measured signal must be at or very near 0 volts.

[3]Measured signal must be at or very near 0 volts.

[4]Connect to AGD (Analog Ground) port on DI-72x (all input channels), and DI-730 (expansion channels only) instruments.

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1. Introduction

Congratulations on your purchase of a DI-720, DI-722, or DI-730 Series data acquisition instrument. This manual describes how to connect and use all of the instruments in the DI-720, DI-722, and DI-730 Series plus the available accessories and expanders. Throughout the majority of this manual, enough similarity exists to describe all instruments with the same procedure. The convention used to annotate this similarity is "DI-7xx Series." In cases where the resemblance is not the same, separate procedures/descriptions exist for each instrument.

Features

The DI-7xx Series has the following features:

- All instruments connect to the printer port of any PC-compatible computer. Most communicate in standard, bi-directional or EPP mode. Models DI-720-EN, DI-722-EN, and DI-730-EN add optional Ethernet communication. DI-720-USB, DI-722-USB, and DI-730-USB add optional USB communication.
- Per channel software-configurable settings including input gain, sample rate, intelligent oversampling modes (signal averaging, maximum value, minimum value, and last point), and single-ended or differential input.
- DI-720 Series Instruments offer 32 single-ended/16 differential (software selectable per channel) general purpose inputs (±10V Full Scale).
- DI-722-16 Series Instruments offer 16 fixed differential extended measurement range (±20V Full Scale) inputs and 16 single-ended/8 differential (software selectable per channel) general purpose (±10V Full Scale) inputs.
- DI-722-32 Series Instruments offer 32 extended measurement range differential inputs (±20V Full Scale).
- DI-730 Series Instruments offer 8 fixed isolated high voltage range (±1000V Full Scale) differential inputs and 16 general-purpose (±10V Full Scale) non-isolated inputs (available through the **EXPANSION** (USB and PP models) or **Channel Expansion** (EN models) connector on the rear of the instrument). General purpose inputs are connected directly to a multiplexer. Each channel can be configured for single-ended or differential operation on a channel-by-channel basis. General-purpose inputs can have gain factors of 1, 2, 4 or 8 applied on a channel-by-channel basis.
- Ethernet Instruments provide synchronous distributed data acquisition through CAT-5 Ethernet cables (connected through the **Expansion** port).
- Flexible power requirements. All instruments operate from any standard 60Hz, 120V AC wall outlet with the supplied power adapter. Alternately, you may power the instrument from any +9 to +36 volt DC source.
- High sample throughput rates. The DI-720 can record at up to 200KHz throughput. The DI-722 Series can record at up to 50KHz throughput. The DI-730 Series can record at up to 150KHz throughput. See "Analog Inputs" on page 3 for full sample rate specifications.
- Analog-to-Digital converters. DI-720 and DI-722 Series provide 16-bit A/D converters for high-resolution measurement accuracy (14 bits maximum resolution using WINDAQ software). DI-730 Series provide a 14-bit A/D converter.
- Supports analog pre- and post-triggering of data acquisition based on the level and slope of a specified channel.

Analog Input

32 single-ended/16 differential analog inputs (on DI-720 Series instruments), 16 singled-ended/24 differential analog inputs (on DI-722-16 Series instruments), 32 differential analog inputs (on DI-722-32 Series instruments) or 8 fixed

differential analog inputs plus 16 general purpose non isolated inputs (on DI-730 Series instruments) allow your analog signals to be converted into 14-to-16-bit digital data via the on board A/D converter.

DI-720 Series Instruments feature software-programmable input measurement ranges of ±10V, ±5V, ±2.5V, and ±1.25V full scale with gain ranges of 1, 2, 4, and 8 for all channels.

DI-722 Series Instruments feature software programmable input measurement ranges of ±20V, ±10V, ±5V, and ±2.5V full scale with gain ranges of 1, 2, 4, and 8 for all fixed differential extended measurement range inputs. General-purpose inputs feature software-programmable input measurement ranges of ±10V, ±5V, ±2.5V, and ±1.25V full scale with gain ranges of 1, 2, 4, and 8.

DI-730 Series Instruments feature software programmable input measurement ranges of ±10mV, ±100mV, ±1V, ±10V, ±100V and ±1000V full scale with gain ranges of 1, 10, 100, 1000, 10000, and 100000 for the 8 fixed isolated high voltage range differential inputs. General-purpose inputs feature software-programmable input measurement ranges of ±10V, ±5V, ±2.5V, and ±1.25V full scale with gain ranges of 1, 2, 4, and 8.

Analog Output

On DI-720 and DI-722 instruments, the D/A subsystem features two buffered, 12-bit D/A converters for outputting analog data. DI-730 instruments have one 12-bit D/A converter. DI-7xx Series instruments feature a software-programmable output range of ±10V and feature an on-board 16-entry output counter list that allows you to write analog or digital output at the maximum conversion rate of the instrument.

***Note**: Analog output is not available in DI-7xx Ethernet and USB modules while Analog Input is being used.*

Digital Input and Output (DI-720 Series Only)

The DI-720-P contains 8 digital input and 8 digital output lines 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. The DI-720-EN and DI-720-USB have 8 digital input and 4 digital output lines available.

2. Specifications

Signal Connections

Make signal connections to the two 37-pin, D-type connectors on the front panel of DI-720/722 Series instruments or to the banana jacks on the front panel of DI-730 Series instruments. On DI-720 Series instruments, signal connections can also be made with the DI-205 (optional) general purpose signal interface providing convenient banana jacks for analog input signals. See “The DI-205: Signal Input/Output Panel” on page 41 for more information. Note: the DI-205 is an extra-cost option and is not included with the purchase of a DI-720 Series instrument.

Interface Characteristics

Compatible computer architecture:	Any PC architecture. Connects to computer via the parallel (or printer) port. Supports standard, bi-directional, or EPP communication modes. Optional communication interfaces include Ethernet and Universal Serial Bus (USB).

Analog Inputs

Number of input channels:	
DI-720 Series	32 single-ended/16 differential (software selectable per channel)
DI-722-16 Series	24 differential, 16 single-ended (software selectable on channels 17-32)
DI-722-32 Series	32 differential
DI-730 Series	8 isolated fixed differential plus 16 non-isolated general purpose inputs (16 single ended or 8 differential)
Converter resolution:	DI-72x: 16-bit; 14-bit when used with WINDAQ software DI-730: 14-bit
Common mode rejection ratio:	DI-72x: 80 dB minimum @ A_V=1 DI-730: 120 dB minimum @ DC to 60Hz
Accuracy:	V_{in} <= 800V ±(0.25% of full-scale range ±100µv) V_{in} > 800V ±(0.5% of full-scale range)
Crosstalk:	-75 dB @100kHz (50 KHz for DI-722) into 100 Ω unbalanced
Sample throughput rate (max samples/second; software selectable per channel):	
Standard Printer Port	DI-720, DI-722, and DI-730: 40,000 samples/second max
Bi-directional Printer Port	DI-720: 80,000 samples/second max DI-722: 50,000 samples/second max DI-730: 80,000 samples/second max
EPP Printer Port	DI-720: 200,000 samples/second max DI-722: 50,000 samples/second max DI-730: 150,000 samples/second max
USB	DI-720: 200,000 samples/second max DI-722: 50,000 samples/second max DI-730: 150,000 samples/second max
Ethernet	DI-720: 180,000 samples/second max DI-722: 50,000 samples/second max DI-730: 150,000 samples/second max

Maximum analog measurement range (software selectable per channel):

DI-720 Series and DI-722/DI-730 general purpose channels	±10V full scale at a gain of 1 ±5V full scale at a gain of 2 ±2.5V full scale at a gain of 4 ±1.25V full scale at a gain of 8
DI-722 Series Amplified	±20 V full scale at a gain of 1 ±10 V full scale at a gain of 2 ±5 V full scale at a gain of 4 ±2.5 V full scale at a gain of 8
DI-730 Series	±10mV full scale ±100mV full scale ±1V full scale ±10V full scale ±100V full scale ±1000V full scale

Maximum Input without Damage (either input to ground):

DI-720: ±30VDC or Peak AC
DI-722: 120V RMS
DI-730: ±1500VDC or Peak AC (8 high voltage channels only)

Gain error:	1 bit max @ 1kHz sample rate
Input offset voltage:	1 bit max @ 1kHz sample rate
Input settling time:	4µs to 0.01% at all gains
Input impedance:	DI-720: 1 MΩ resistor tied to GND on the input channel DI-722: 1 MΩ DI-730: 10 MΩ

Maximum jitter between synchronized units: 5 microseconds

Analog Outputs

Number of channels:	DI-720: Two buffered analog outputs DI-722: None DI-730: One analog output
Resolution:	12-bit; 1 part in 4,096 @ 250kHz
Output voltage range:	±10V full scale
Output impedance:	0.1Ω - output current should not exceed 1mA (10KΩ load or lighter)
Maximum Sample rate (samples/second): (software selectable per channel)	standard port: 40,000 bi-directional port: 80,000 EPP: 150,000
Output offset voltage:	1 bit max @ 1kHz sample rate

Digital Input/Output (DI-720 Series Only)

Capacity:	8 input and 8 output
Compatibility:	TTL compatible
Max source current:	0.4mA @ 2.4V
Max sink current:	8mA @ 0.5V
Digital input termination:	4.7kΩ pull-up to +5VDC

Timing Input/Output

Number of counters:	240 input, 16 output
Resolution:	1 part in 32,768
Base clock accuracy:	0.005% or 50ppm
Counter input frequency:	16 MHz

Scan Lists

Input Scan List:	USB: Capacity—128 elements Printer Port and Ethernet: Capacity—240 elements
Output Scan List:	Capacity—16 elements

Triggering

Pre-trigger length and Post-trigger length:	Printer Port and Ethernet products: (Pre-trigger points + Post-trigger points) × the number of enabled channels must be less than or equal to 64,000 USB products: (Pre-trigger points + Post-trigger points) × the number of enabled channels must be less than or equal to 15,000
Trigger channel:	Any channel
Trigger level hysteresis:	8-bit (256 counts)

On-board DSP

Type:	Analog Devices ADSP2181, 32 MIPS
Clock frequency:	16 MHz external, 64 MHz internal
Data memory:	16k words
Program memory:	16k words

Physical/Environmental

Box dimensions:	7.29"W × 9"L × 1.52"H
I/O connector:	DI-720: 37-pin male D-type DI-722: 37-pin male D-type DI-730: Banana jacks
Weight:	approx. 3 lbs.
Operating environment:	
Component temperature	0º to 70º C
Relative humidity	0% to 90% non-condensing
Storage environment:	
Temperature	-40º to 100º C
Relative humidity	0% to 90% non-condensing

Power Supply Voltage and Power Consumption

Voltage:	9-36 VDC

Power:	DI-720: 4.5 Watts DI-722: 10 Watts DI-730: 14 Watts

3. Getting Started

Unpacking

The following items are included with each DI-720, DI-722, or DI-730 Series instrument. Verify that you have the following:

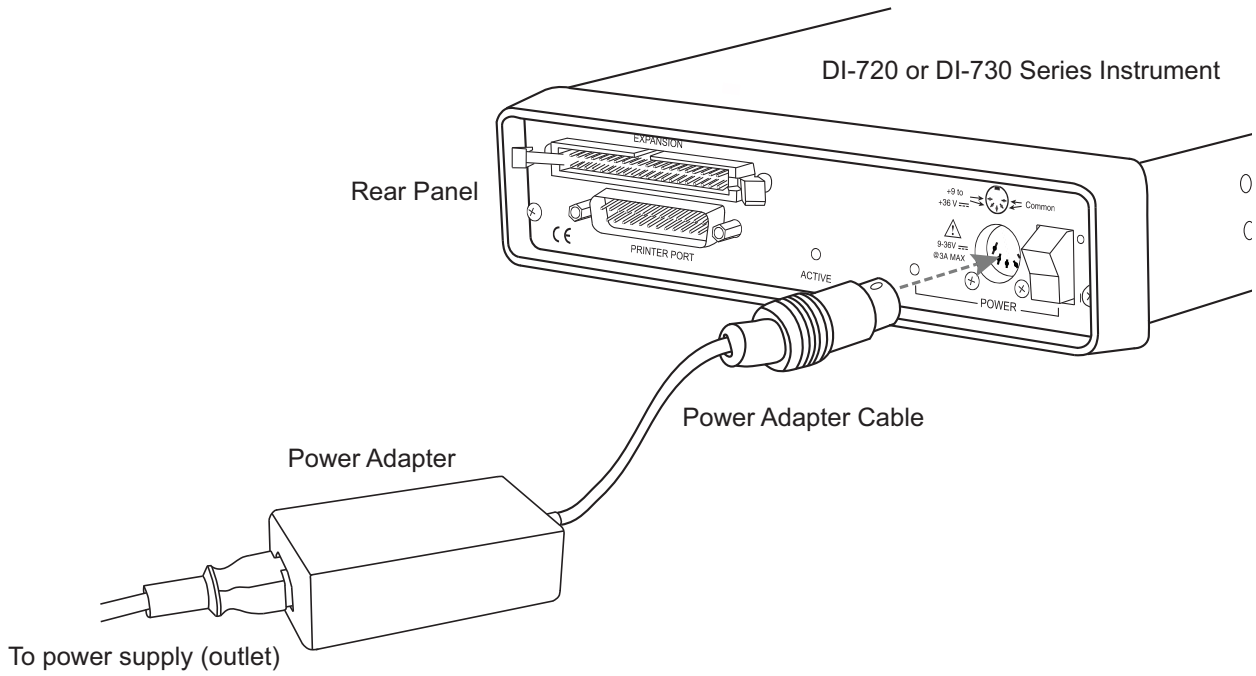
- Your DI-720, DI-722, or DI-730 Series Instrument.
- One USB, ethernet or printer port communications cable to connect the DI-7xx Series instrument to your computer (depending on your model).
- The DATAQ Instruments Software CD. The DATAQ Instruments Software CD contains all software required to run your instrument. If you ordered an unlock code (WINDAQ/Pro or WINDAQ/Pro+), there will be a sticker with a password on the sleeve of your CD-ROM.

If an item is missing or damaged, call DATAQ Instruments at 330-668-1444. DATAQ support 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.

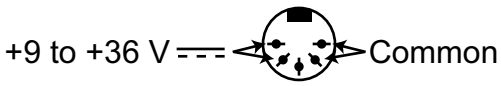
Applying Power to the DI-7xx Series Instrument

Use the following procedure to apply power to your DI-7xx Series instrument:

1. Plug the five-pin DIN end of the power adapter cable into the five-pin jack labeled POWER on the rear panel of the instrument.



2. Plug the appropriate end of the supplied power cord into the power adapter and the other end into any standard 120VAC, 60Hz, single-phase outlet. If an alternate power source is to be used, refer to the following pin-out diagram for power requirements:



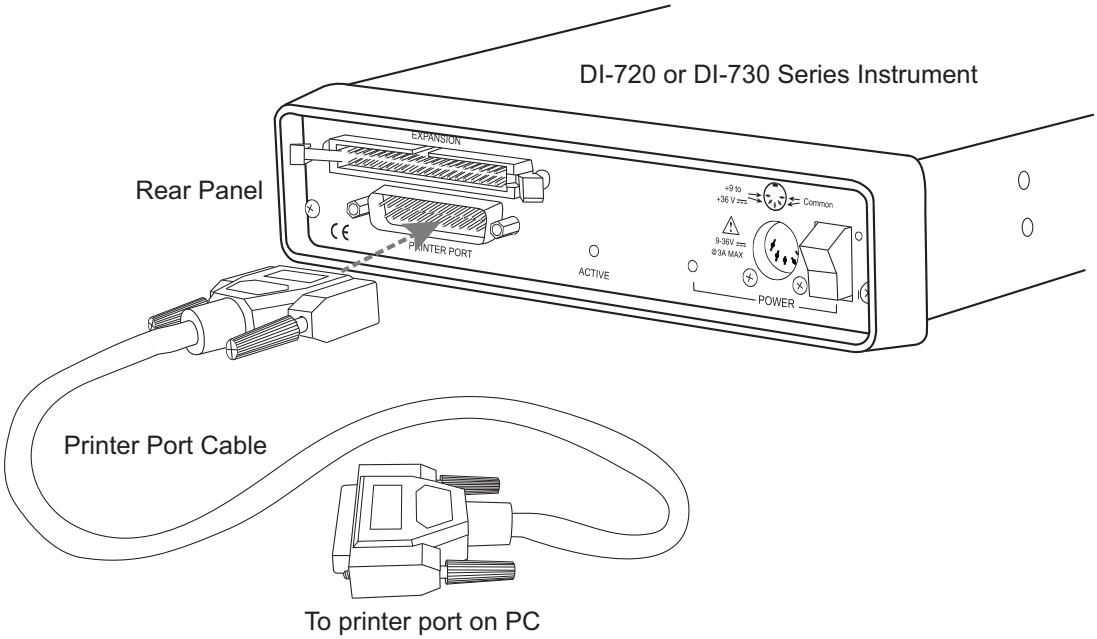
3. Turn the POWER switch on.

Printer Port Instrument Installation

All DI-7xx Series instruments can use your computer's parallel (or printer) port to interface digital and analog signals to your computer. Ethernet/USB models provide Ethernet or USB communication ports (cannot be used concurrently with the printer port).

1. Plug the appropriate end of the supplied parallel communications cable to the 25-pin male connector labeled PRINTER PORT on the rear panel of the DI-7xx Series instrument.

2. Connect the other end of this cable to your computer's parallel (printer) port. Note the LPT port number to which you connected your device (LPT1, LPT2, etc.).



3. Set up your computer's Printer Port operating mode. The parallel port may be set up in Standard, Bi-directional, or EPP mode to communicate with your instrument. Choose a parallel port mode based on the desired sample rate:

Parallel Port Mode	Maximum Data Throughput*
Standard	DI-720, DI-722, and DI-730: 40,000 samples/second
Bi-directional (PS/2)	DI-720 and DI-730: 80,000 samples/second DI-722: 50,000 samples/second
EPP	DI-720: 200,000 samples/second DI-722: 50,000 samples/second DI-730: 150,000 samples/second
*Maximum stream-to-disk rate using WINDAQ software on a 350 MHz Pentium II machine running Windows 98. Triggered storage rates will be faster. Contact DATAQ Instruments to determine expected maximum sample rates for other machine speeds and operating systems.	

For example, if you will record five channels at 20 Hz each, then the Standard mode will be more than adequate (5 channels @ 20 Hz = 100 Hz throughput, which is well within the DI-7xx Series 40KHz standard mode throughput). If, however, you plan to record at a much higher sample rate (for example, five channels at 10KHz each) the Standard mode will not reliably record your data gap-free — this throughput rate exceeds the DI-7xx's

standard mode maximum throughput (5 channels @ 10KHz = 50KHz). To reliably record data gap-free at this sample rate, your computer's parallel port must be operated in something other than standard mode.

Access your computer's CMOS setup routine to change the printer port operating mode. This usually can be accomplished by pressing a certain key (or keys) on your keyboard at the beginning of your computer's boot-up process. A message telling you which key to press is usually displayed on your monitor at the beginning of the boot-up process. If you do not see such a message, consult your computer documentation for CMOS setup information.

4. Apply power to the DI-7xx instrument. Windows must be running. Close all other applications.

5. Install WINDAQ Software. All software is included in *The DATAQ Instruments Software CD*.

   a. Insert the *The DATAQ Instruments Software CD* into your CD-ROM drive. The Windows auto run feature should start the installation program. If the Windows auto run feature is not enabled on your PC, run the setup.exe program located on the root of the CD directory.

   b. In the “What do you want to do?” dialog box select the **Install Software** radio button and click **OK**.

   c. In the “Installing Software” dialog box select the **Install Software for all other products** radio button and click **OK**.

   d. In the “Specify the product” dialog box you must choose the version of WINDAQ you would like to install. If you purchased an unlock code (WINDAQ/Pro or Pro+), select the appropriate option and click OK. If you did not purchase an unlock code, choose the WINDAQ/Lite option and click **OK**.

   e. In the “Specify the Instrument” dialog box select the **DI-720/740/730HV Portable Instruments** radio button and click **OK**.

   f. In the “Specify the Instrument” dialog box select the **Parallel Port (Printer Port)** radio button and click **OK**.

   g. Read the warning information and follow any instructions relevant to your situation in the “Welcome” dialog box. Click **OK** to continue the installation.

   h. Read through the Software License agreement carefully and either **Accept and Continue** or **Cancel** to exit the installation.

   i. Enter your Registration Information in the appropriate text boxes and click **OK**.

   j. Select the destination directory where you would like all folders and files to reside on your hard drive. We recommend you accept the default path, but you can name this new directory anything you like. Simply substitute the desired drive and directory in the Destination Directory text box. Once you have chosen the directory click **OK**.

   k. The “Make Backups?” dialog box provides the option of creating backup copies of any files that may be replaced during installation. This is a safety courtesy; backup copies are not required. Click on **No** if you don't want to make backups. Click on **Yes** to create backups. If you decide to create backups, you will be prompted to specify a backup file directory.

   l. Specify the instrument you are installing. If you are installing a DI-720 or DI-722 select the **DI-720/DI-740/DI-722/DI-5001 Portable Unit** radio button. If you are installing a DI-730 select the **DI-730HV Portable Unit** radio button. Click **OK** to continue.

   m. Choose the Printer Port you connected your instrument to (LPT1, LTP2, or LPT3). Click **OK** to continue.

n. Select the program manager group you would like to place the program shortcuts in your Windows programs. The default is recommended, but you can specify any program group or create a new one. Click **OK** to continue.

o. The "Installation Option" dialog box allows you to specify access to WINDAQ for multiple users on the same PC. If you are the only user or you would like to allow access to all users click **Yes**. If there are multiple users and you would like to be the only one able to access WINDAQ click **No**. Click **Cancel** to abort the installation.

p. Select the desired options for installation of WINDAQ/XL and Advanced CODAS.

q. Installation is complete. Re-start your PC to enable WINDAQ device drivers for the printer port.

6. Run WinDaq software from the program group designated in Step 5n above (default is *Start* > *Programs* > *WINDAQ* > *WinDaq* Pro(version of the software installed - Lite/Pro/Pro+) *Data Acq DI-7xx*(model number) *LPT*. For help running WinDaq Acquisition and Playback software please see the help files inside the application (F1 for context-sensitive help or use the Help menu).

USB Instrument Installation

USB instruments require driver installation before they can communicate with your PC. Your USB device may be installed and run as a Printer Port device if desired (see "Printer Port Instrument Installation" on page 8 to install and run as a Printer Port device). The USB and Printer Port communications interfaces cannot be used concurrently.

1. Disconnect all DATAQ Instruments USB devices from your PC before continuing with installation.



2. Install WINDAQ Software. All software and drivers are included in *The DATAQ Instruments Software CD*.

a. Insert the *The DATAQ Instruments Software CD* into your CD-ROM drive. The Windows auto run feature should start the installation program. If the Windows auto run feature is not enabled on your PC, run the setup.exe program located on the root of the CD directory.

b. In the "What do you want to do?" dialog box select the **Install Software** radio button and click **OK**.

c. In the “Installing Software” dialog box select the **Install Software for all other products** radio button and click **OK**.

d. In the “Specify the product” dialog box you must choose the version of WINDAQ you would like to install. If you purchased and unlock code (WINDAQ/Pro or Pro+), select the appropriate option and click OK. If you did not purchase an unlock code, choose the WINDAQ/Lite option and click **OK**.

e. In the “Specify the Instrument” dialog box select the **DI-720/740/730HV Portable Instruments** radio button and click **OK**.

f. In the “Specify the Instrument” dialog box select the **Universal Serial Bus (USB)** radio button and click **OK**.

g. The “Welcome!” dialog box allows you to cancel the installation. Click **OK** to continue installation or **Cancel** to abort.

h. Read through the Software License agreement carefully and either **Accept and Continue** or **Cancel** to exit the installation.

i. Enter your Registration Information in the appropriate text boxes and click **OK**.

j. Select the destination directory where you would like all folders and files to reside on your hard drive. We recommend you accept the default path, but you can name this new directory anything you like. Simply substitute the desired drive and directory in the Destination Directory text box. Once you have chosen the directory click **OK**.

k. The “Make Backups?” dialog box provides the option of creating backup copies of any files that may be replaced during installation. This is a safety courtesy; backup copies are not required. Click on **No** if you don't want to make backups. Click on **Yes** to create backups. If you decide to create backups, you will be prompted to specify a backup file directory.

l. Select the program manager group you would like to place the program shortcuts in your Windows programs. The default is recommended, but you can specify any program group or create a new one. Click **OK** to continue.

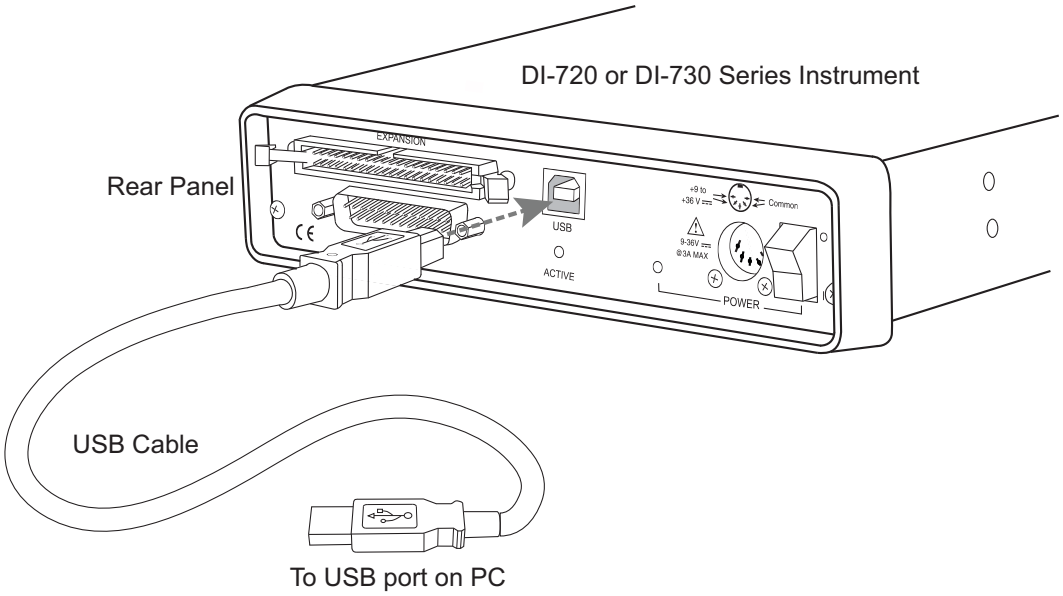
m. Enter the ID address of your instrument. Every DI-720-USB, DI-722-USB or DI-730-USB is initially assigned an ID address of 0. If you are adding only one DI-720-USB, DI-722-USB or DI-730-USB to your system or if this is the first USB instrument you are installing, do not change the ID address. If this is not the first DI-720, DI-722 or DI-730 USB device, change the ID address. The second device installed should have an ID address of 1, the third device installed should have an ID address of 2, etc. Click **OK** to continue installation.

n. The “Installation Option” dialog box allows you to specify access to WINDAQ for multiple users on the same PC. If you are the only user or you would like to allow access to all users click **Yes**. If there are multiple users and you would like to be the only one able to access WINDAQ click **No**. Click **Cancel** to abort the installation.

o. Select the desired options for installation of WINDAQ/XL and Advanced CODAS.

p. Installation is complete. If you are installing multiple devices, run through the installation for each device making sure to change the ID address in step m above. This does not install multiple versions of the software.

3. You may now connect your USB instrument to your PC. Plug the appropriate end of the supplied USB communications cable into the USB port (labeled USB) on the rear panel of the instrument. Connect the other end of this cable to your computer's USB port.



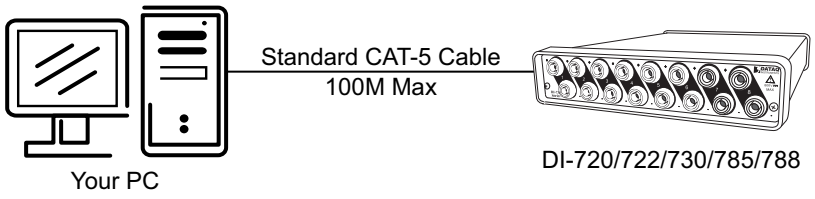
4. Run WinDaq software from the program group designated in Step 7n above (default is *Start* > *Programs* > *WINDAQ* > *WinDaq Pro*(version of the software installed - Lite/Pro/Pro+) *Data Acq DI-7xx*(model number) *USBx*(ID address - usually 0). For help running WinDaq Acquisition and Playback software please see the help files inside the application (F1 for context-sensitive help or use the Help menu).

Ethernet Instrument Installation

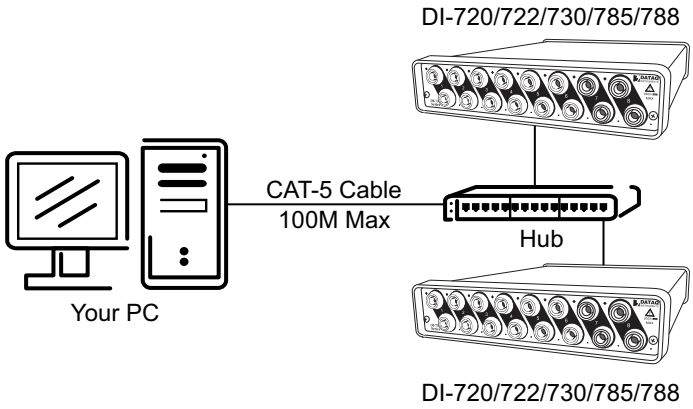
Your Ethernet device may be installed and run as a Printer Port device if desired (see “Printer Port Instrument Installation” on page 8 to install and run as a Printer Port device). The Ethernet and Printer Port communications interfaces cannot be used concurrently. If you are installing multiple devices in a daisy chain for the purpose of synchronous distributed data acquisition please see “Daisy-Chaining Multiple Ethernet Products” on page 18 before installing the software. You may only access one device per network outside your subnet.

Installing an Ethernet Device Directly Connected to your PC or Connected via a Hub/Switch where ONLY DI-72x, DI-730, or DI-78x 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.



Installation of an Ethernet device via a hub/switch containing ONLY DI-720/722/730/785/788 products also requires you to change the IP address of your network card.



1. Find the **Network Connections** on your computer (usually in the Control Panel).

2. Double-click on the **Local Area Connection** icon.



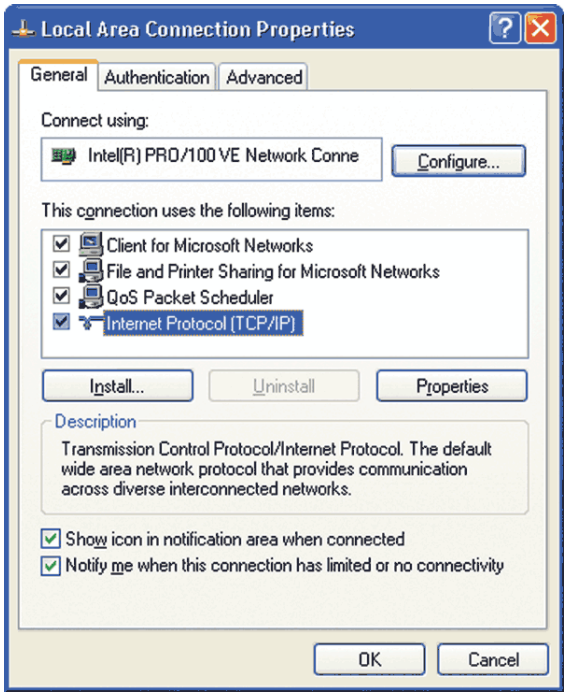
Windows XP



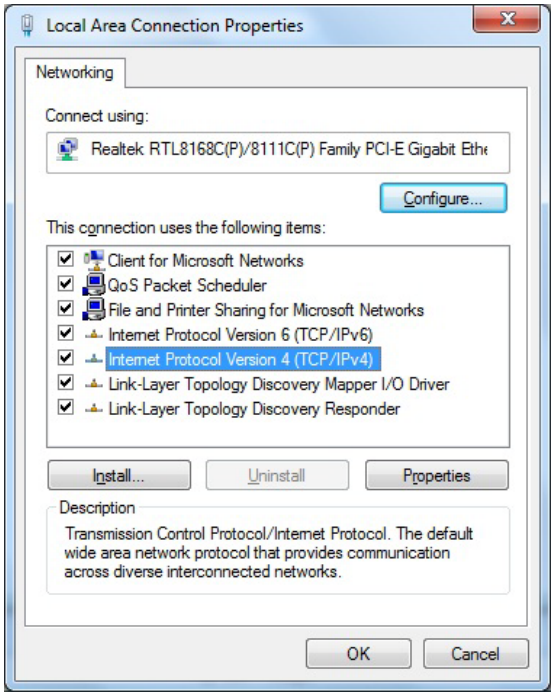
Windows 7

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

4. Select **Internet Protocol (TCP/IP)** in Windows XP or **Internet Protocol Version 4 (TCP/IPv4)** in Windows 7 in the "This connection uses the following items" window and click on the **Properties** button.



Windows XP



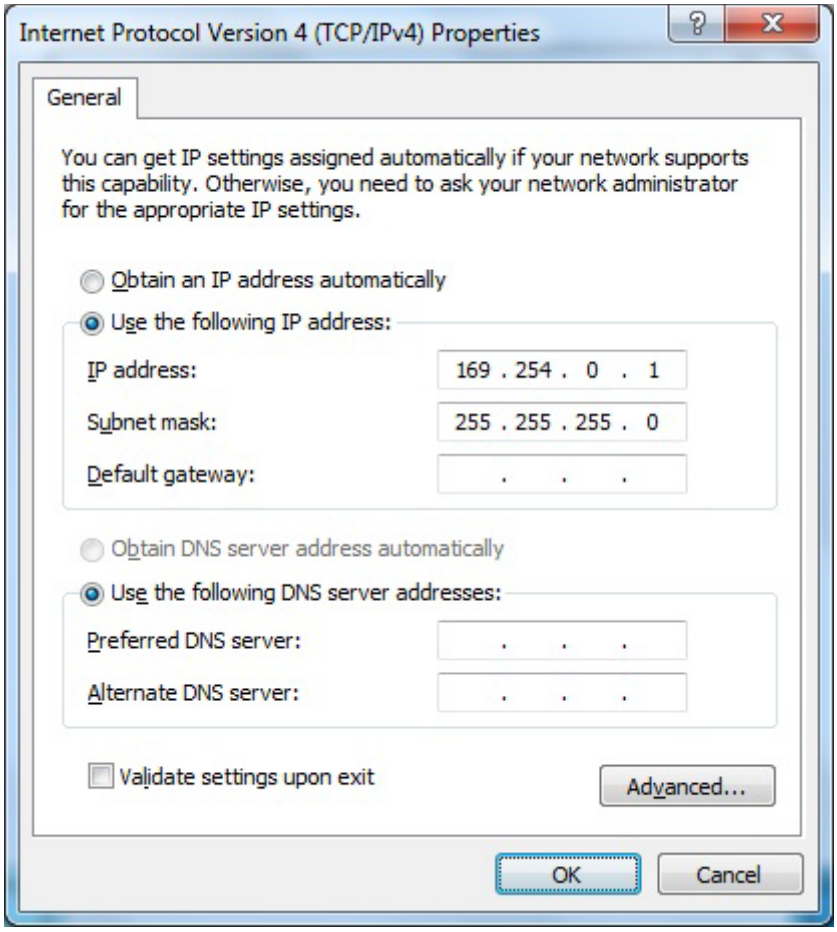
Windows 7

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.

Note: *If you unplug your device and connect your PC to a network or router you should change the TCP/IP properties back to their original state.*

10. Install WINDAQ software (see “Installing WinDaq software for Ethernet Products” on page 17).

11. Run the TCP/IP Manager software (default location is *Start > Programs > WINDAQ > IP Manager*).

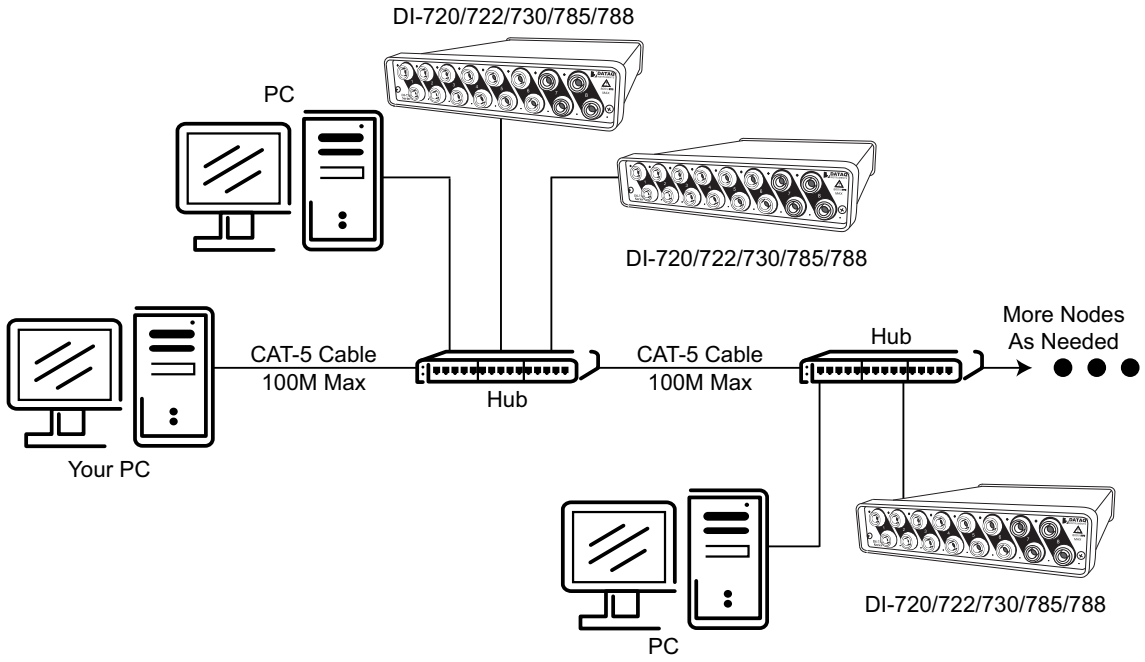
12. Connect the device (see “Connecting your Ethernet Instrument to your PC or Network” on page 17) to your PC or hub.

13. Apply power the device (see “Applying Power to the DI-7xx Series Instrument” on page 7).

Note: *Always start the TCP/IP Manager software BEFORE powering the device to avoid extended delays resolving IP addresses.*

Installing an Ethernet device via a distributed network without a DHCP server where one or more DATAQ Instruments devices will coexist with other Ethernet devices, and where static IP address are individually assigned

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 set a static IP to the device after installation to drastically reduce the amount of time it takes for the TCP/IP Manager to find the device.



***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 WINDAQ software (see “Installing WinDaq software for Ethernet Products” on page 17) entering the device’s MAC address at Step 14.
3. Run the TCP/IP Manager software (default location is *Start > Programs > WINDAQ > IP Manager*).
4. Connect the device to your network (see “Connecting your Ethernet Instrument to your PC or Network” on page 17).
5. Power the device (see “Applying Power to the DI-7xx Series Instrument” on page 7).
6. In the *TCP/IP Manager main window*, **select the device** you have installed.
7. Select the **Change IP Address** drop down command.

8. Select the **Set a static IP Address** radio button.



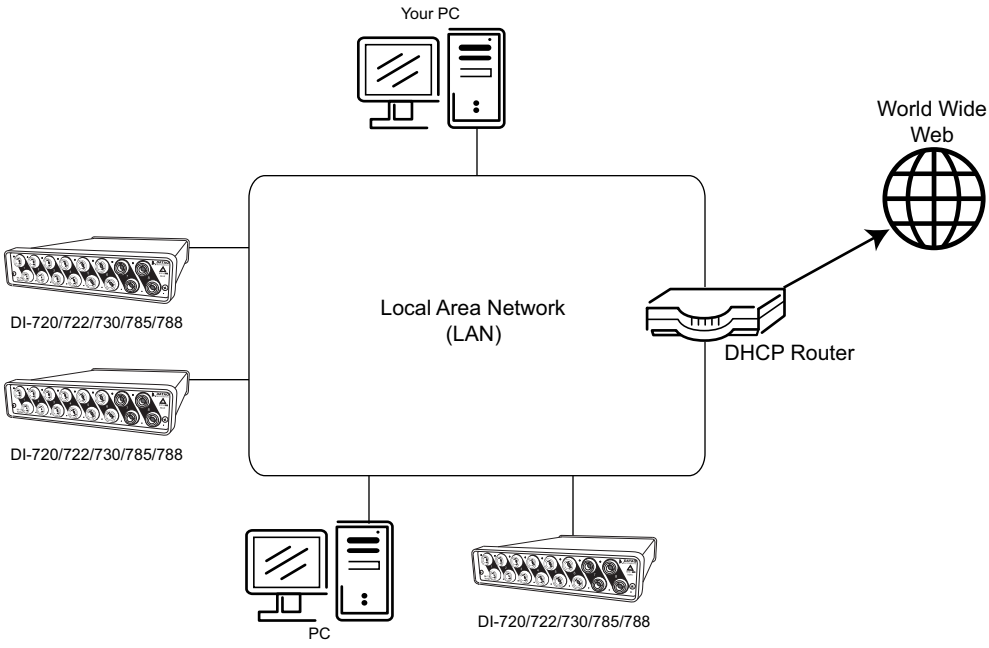
9. Enter the IP address provided by your system administrator in Step 1 above. **Do not** check the Remote Device checkbox.

10. Click on the **OK** button for the change to take effect.

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 TCP/IP Manager. See the Dataq Instruments TCP/IP 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.



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

1. Install WINDAQ software (see “Installing WinDaq software for Ethernet Products” on page 17).

2. Connect your Ethernet device to your Local Area Network (see “Connecting your Ethernet Instrument to your PC or Network” on page 17).

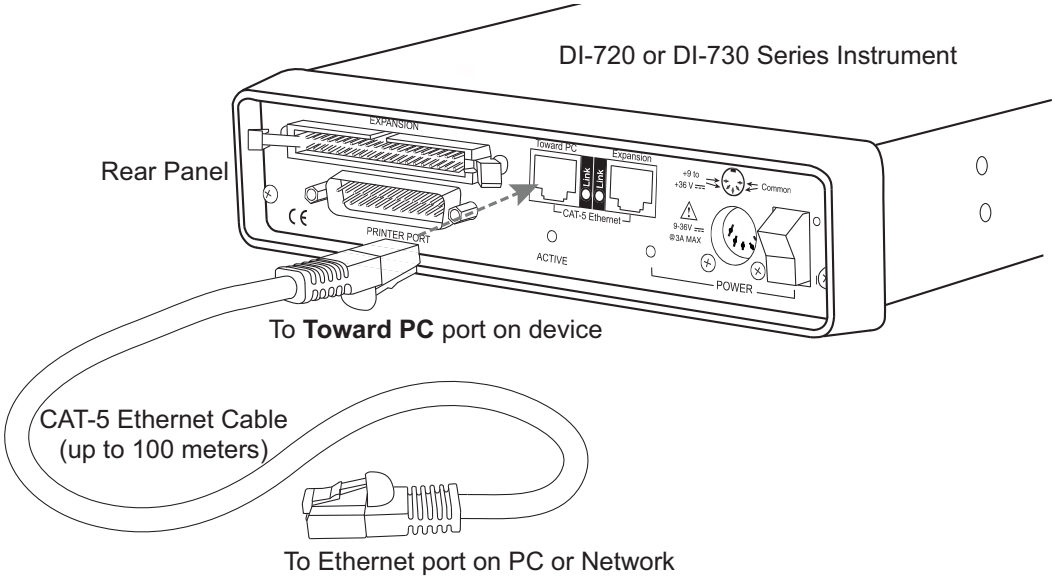
3. Run the TCP/IP Manager software (default location is *Start > Programs > WINDAQ > IP Manager*).

4. Apply power to the device (see "Applying Power to the DI-7xx Series Instrument" on page 7).

Connecting your Ethernet Instrument to your PC or Network

1. Connect one end of a CAT-5 Ethernet cable to the **Toward PC** port on the rear of the instrument.

2. Connect the other end of the CAT-5 Ethernet cable to an Ethernet port on your PC or to a port on an accessible network.



Note: *DO NOT connect the Expansion port back to your network or PC. These Ethernet products use an Ethernet switch. Looping any Ethernet switch will cause your network or PC to crash.*

Installing WINDAQ software for Ethernet Products

All software is included in *The DATAQ Instruments Software CD*.

1. Insert the *The DATAQ Instruments Software CD* into your CD-ROM drive. The Windows auto run feature should start the installation program. If the Windows auto run feature is not enabled on your PC, run the setup.exe program located on the root of the CD directory.

2. In the "What do you want to do?" dialog box select the **Install Software** radio button and click **OK**.

3. In the "Installing Software" dialog box select the **Install Software for all other products** radio button and click **OK**.

4. In the "Specify the product" dialog box you must choose the version of WINDAQ you would like to install. If you purchased and unlock code (WINDAQ/Pro or Pro+), select the appropriate option and click OK. If you did not purchase an unlock code, choose the WINDAQ/Lite option and click **OK**.

5. In the "Specify the Instrument" dialog box select the **DI-720/740/730HV Portable Instruments** radio button and click **OK**.

6. In the "Specify the Instrument" dialog box select the **Ethernet** radio button and click **OK**.

7. Check the sticker located on the bottom of your instrument and note the model number. In the "Select a device" dialog select the model number of your device and click **OK**.

8. The “Welcome!” dialog box allows you to cancel the installation. Click **OK** to continue installation or **Cancel** to abort.

9. Read through the Software License agreement carefully and either **Accept and Continue** or **Cancel** to exit the installation.

10. Enter your Registration Information in the appropriate text boxes and click **OK**.

11. Select the destination directory where you would like all folders and files to reside on your hard drive. We recommend you accept the default path, but you can name this new directory anything you like. Simply substitute the desired drive and directory in the Destination Directory text box. Once you have chosen the directory click **OK**.

12. The “Make Backups?” dialog box provides the option of creating backup copies of any files that may be replaced during installation. This is a safety courtesy; backup copies are not required. Click on **No** if you don't want to make backups. Click on **Yes** to create backups. If you decide to create backups, you will be prompted to specify a backup file directory.

13. Select the program manager group you would like to place the program shortcuts in your Windows programs. The default is recommended, but you can specify any program group or create a new one. Click **OK** to continue.

14. You must know either the MAC address or the IP address of the device to continue. The MAC address is located on the sticker on the bottom of your device. IP addresses must be retrieved from the system administrator. Enter the MAC address or IP address in the text box provided in the “MAC or IP address of the device” dialog box. If you are installing a device that is not connected to your Local Area Network, you should enter the IP address here. The software will go to that IP address and retrieve the MAC address for you. This will save further setup in the TCP/IP Manager. Click **OK** to continue. ***Note:*** *If you enter the wrong MAC address you will have to re-run this installation program with the correct MAC address to access the device.*

15. Click **Yes** in the “More ethernet devices to install” dialog box if you are installing multiple Ethernet devices.

16. Repeat Steps 14 and 15 until all Ethernet devices’ MAC addresses have been entered. Click **No** to continue installation.

17. The “Installation Option” dialog box allows you to specify access to WINDAQ for multiple users on the same PC. If you are the only user or you would like to allow access to all users click **Yes**. If there are multiple users and you would like to be the only one able to access WINDAQ click **No**. Click **Cancel** to abort the installation.

18. Select the desired options for installation of WINDAQ/XL and Advanced CODAS.

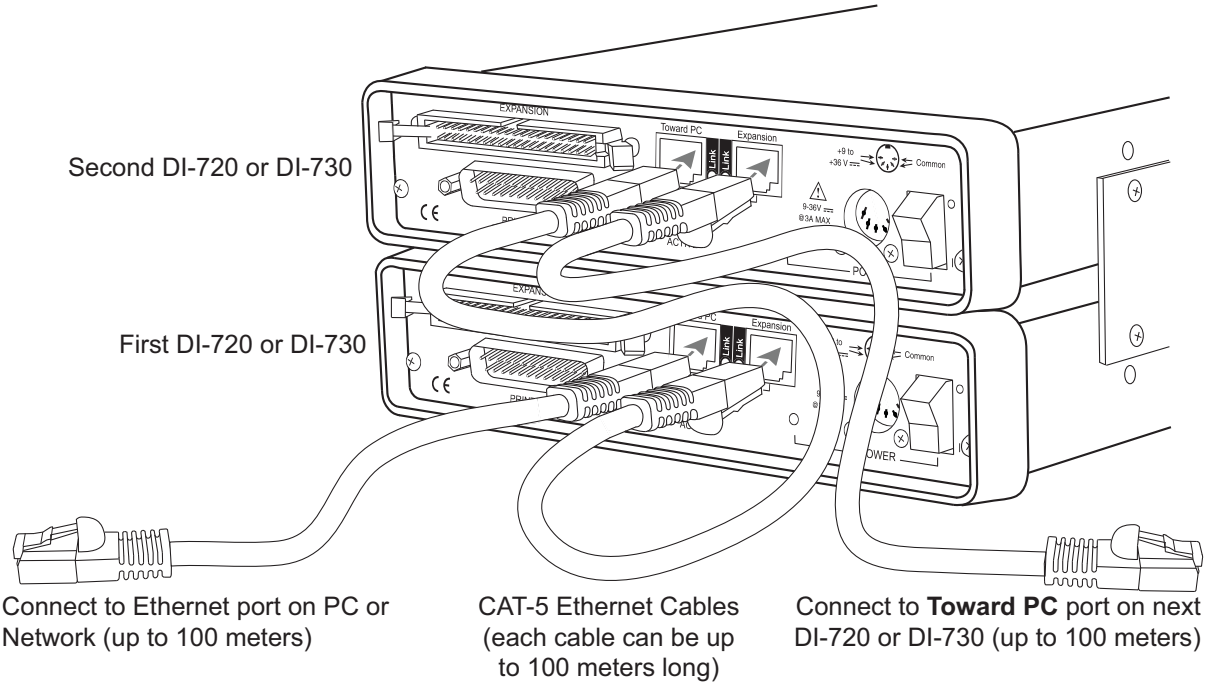
19. Installation is complete. Run the TCP/IP Manager via the Windows program group specified during WINDAQ Software installation (default is *Start > Programs > WINDAQ > IP Manager*) to access the device and run WINDAQ Acquisition Software

Daisy-Chaining Multiple Ethernet Products

Multiple Ethernet products may be daisy-chained together to allow for one synchronous distributed data acquisition system. Multiple DI-720, DI-722, and/or DI-730 instruments may be placed in the same daisy chain. To maintain synchronicity, Ethernet hubs and switches cannot be used between units. Make sure to enter each MAC address during installation. Daisy-chains must be installed to your Local Area Network (LAN) — you cannot access more than one device per IP address outside of your subnet. If you are not sure whether or not the devices are in your subnet see your system administrator before installation. You may acquire data from only one daisy chain at a time (i.e., the same PC cannot access two daisy chained groups at the same time).

Note: *If you are installing a daisy-chained group of instruments for the purpose of synchronous distributed data acquisition, do not allow any other units or daisy chains to be installed to your subnet. Running other devices on the same subnet will cause the synced units to become unsynced.*

1. Connect one end of a CAT-5 Ethernet cable to the **Toward PC** port of the first Ethernet device.
2. Connect the other end of the same CAT-5 Ethernet cable to the Ethernet port on your PC or LAN.
3. Connect one end of another CAT-5 Ethernet Cable to the **Expansion** port on the rear of the first Ethernet device.
4. Connect the other end of the same CAT-5 Ethernet cable to the **Toward PC** port on the second Ethernet device.
5. Continue installing more Ethernet devices by connecting a CAT-5 Ethernet cable to the **Expansion** port of the last device in the chain and the **Toward PC** port on the next device you are adding to the chain. Up to 32 devices may be installed in a single daisy chain. Each device may be 100 meters apart. Use the illustration below for reference.



Note: *DO NOT connect the Expansion port on the last product in the chain back to your network or PC. These Ethernet products use an Ethernet switch. Looping any Ethernet switch will cause your network or PC to crash.*

Use the TCP/IP Manager to run WINDAQ Acquisition Software (see "TCP/IP Manager (Ethernet Models Only)" on page 19). WINDAQ Acquisition Software provides data acquisition and recording capabilities. Daisy-chained units record separate files synchronously (one file for each unit) and place them in a user-defined Session folder. The user may define which units to use in a daisy-chain so not all units have to be used for a recording session.

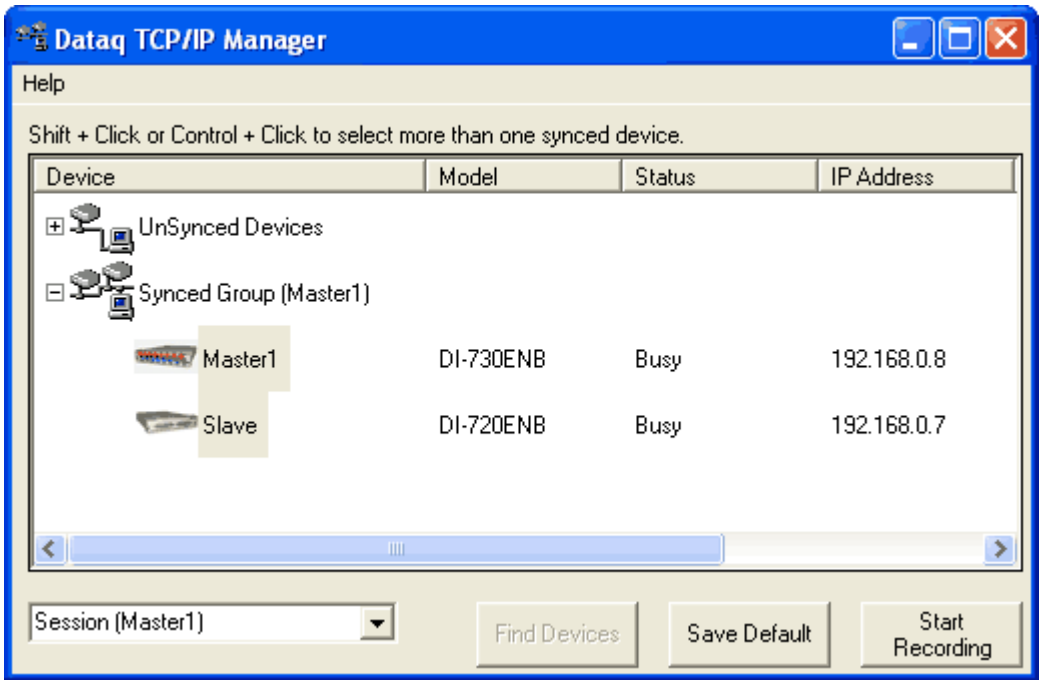
Use the WWB Navigator to playback and analyze multiple data files in a Session folder (see "WinDaq Waveform Navigator (Ethernet models only)" on page 20) synchronously. The user may choose which files to view and analyze so not all data files in a session have to be viewed at the same time. Individual files may be independently opened using WINDAQ Playback Software (WINDAQ Waveform Browser).

TCP/IP Manager (Ethernet Models Only)

The TCP/IP Manager allows you to easily manage all DI-720, DI-722 and DI-730 Ethernet Instruments installed on your PC. The TCP/IP manager is installed when installing WINDAQ Software. Access the TCP/IP Manager via the Windows program group specified during WINDAQ Software installation (default is *Start* > *Programs* > *WINDAQ* > *IP Manager*). For help with TCP/IP settings and the TCP/IP Manager see the help files accessible in the application (press F1 to access context-sensitive help or use the Help menu).

The main TCP/IP window shows all Ethernet devices installed on your PC. Devices could be busy or unavailable if there are multiple users. If you entered the wrong MAC address during installation, the status of the device will be "Off Line." "UnSynced" devices are all single units installed to your network (units that are not daisy-chained). Synced Groups are daisy-chained instruments. There is one Synced Group for each daisy chain. Each Synced Group is named using the first device in the chain (in parentheses).

Use the drop down command menu to change the description of a device. All commands are performed by first selecting a device, then using the drop down command menu. Multiple devices in the same Synced Group may be selected for a recording session by using the Shift or Control key. Multiple Synced Groups cannot be accessed by the same PC at the same time.



WINDAQ Acquisition software must be initiated from the TCP/IP Manager for all DI-720, DI-722, and DI-730 instruments. To begin a recording session select a single device or a group of daisy-chained devices (using the Control or Shift key) and click the **Start WINDAQ** button. Each device will open an instance of WINDAQ Acquisition software. Change channel settings, calibration, and display options independently for each device using each instance of WINDAQ. Most WINDAQ menu items are available when recording synced devices with the following exceptions: The Open and Record menu items in the File Menu are not available; The Triggered Mode, Triggered Storage, and Remote Storage menu items in the Options Menu are not available.

WINDAQ Waveform Navigator (Ethernet models only)

The WINDAQ Waveform Browser Navigator allows you to display and scroll through data recorded synchronously using multiple daisy-chained DI-720, DI-722, and/or DI-730 Ethernet instruments.Access the application via the Windows program group specified during WINDAQ Software installation (default is *Start* > *Programs* > *WINDAQ* > *WWB Navigator*). Select multiple files from a Session folder to open them in the WINDAQ Waveform Navigator. Use the scroll bar to navigate through all the data files synchronously.

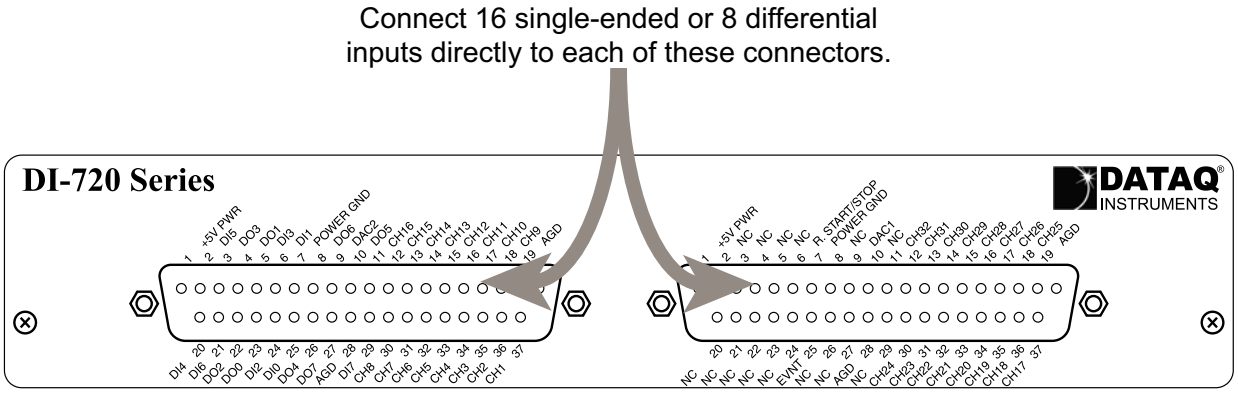


For help with the WINDAQ Waveform Navigator see the help files accessible in the application (press F1 to access context-sensitive help or use the Help menu).

4. Instrument Controls, Indicators, and Connectors

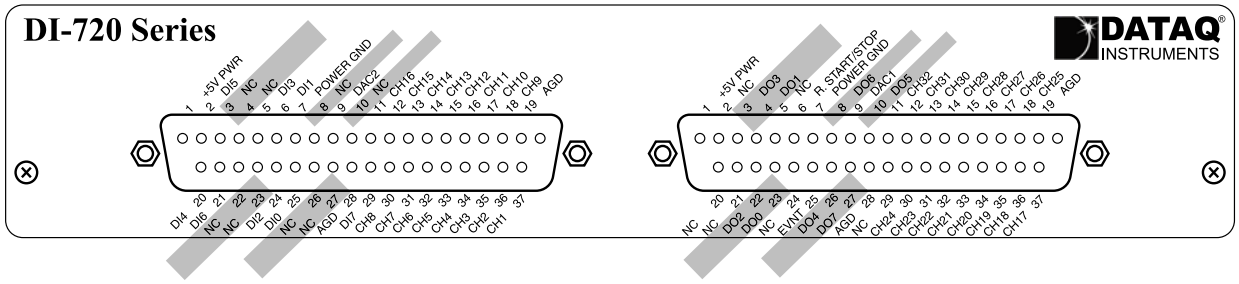
Connect most signal leads to the front panel of DI-720, DI-722, and DI-730 Series instruments. Power, communications, and expansion connectors can be found on the rear of the instrument.

DI-720 Series Instrument Front Panel



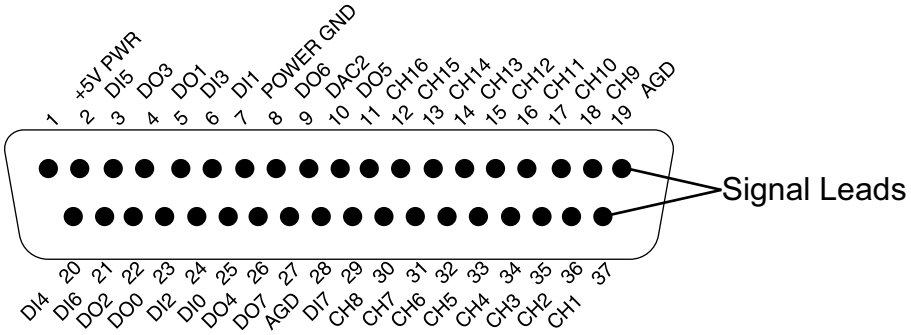
The 37-pin male “D” connector on the left is used to interface analog input channels 1 through 16, digital inputs 1-8, and digital outputs 1-8. The analog inputs are labeled CH1 through CH16, the digital inputs are labeled DI0 through DI7, and the digital outputs are labeled DO0 through DO7. Other items include DAC2, which is a digital to analog converter that serves as a general-purpose analog output accessible through WINDAQ and SDK software, and two analog grounds labeled AGD.

Note: *When using your DI-720-USB as a printer port device, Digital Output ports DO1, DO2, and DO3 are unavailable. If you have an expander (**excluding** the DI-78B and DI-75B) connected via the rear panel of the DI-720-USB, Digital Output is not available. When using your DI-720-USB as a USB device the digital outputs are moved to the second 37 pin D-sub connector (on the right hand side of the instrument).*



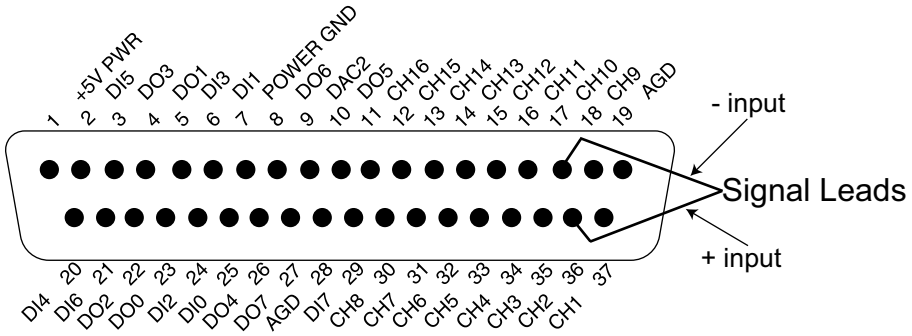
Read “CAUTION” on page v before connecting input signals. DI-720 Series instruments can accept 32 high-level or preconditioned analog inputs in single-ended configuration or 16 high-level or preconditioned analog inputs in a differential configuration. High-level inputs are typically low impedance, no-conditioning-required signals in the

range of ±1.25 to ±10 volts full scale. Single-ended inputs are configured by connecting one signal lead to the desired channel and the other signal lead to analog ground (AGD).



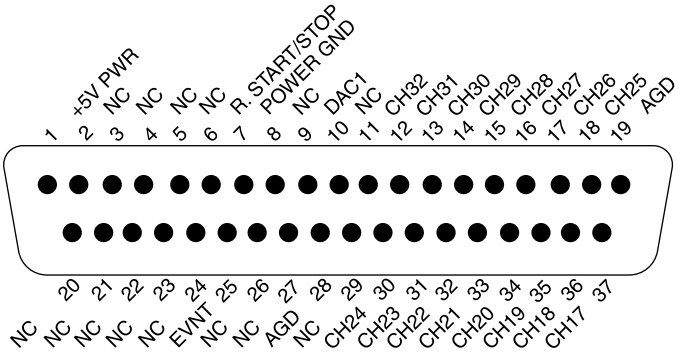
Channel 1 configured for single-ended operation

Differential inputs occupy two channels (e.g., these channel pairs constitute a differential input: 1 and 9, 2 and 10, 3 and 11, 4 and 12, 5 and 13, 6 and 14, 7 and 15, 8 and 16, etc.), with the lowest numbered channel in the pair assuming the positive (+) input and the channel number. For example, say we have channels 2 and 10 configured as a differential input. Channel 2 is the positive (+) input, channel 10 is the negative (-) input, and the pair is referred to as "channel 2 differential."



Channel 2 configured for differential operation

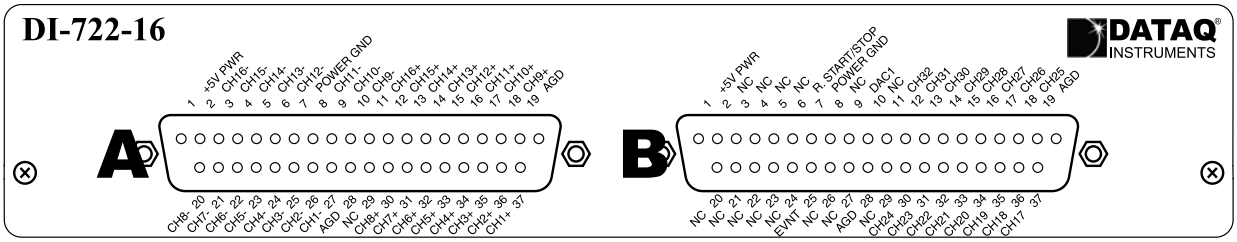
The 37-pin male "D" connector on the right provides access to analog input channels 17 through 32

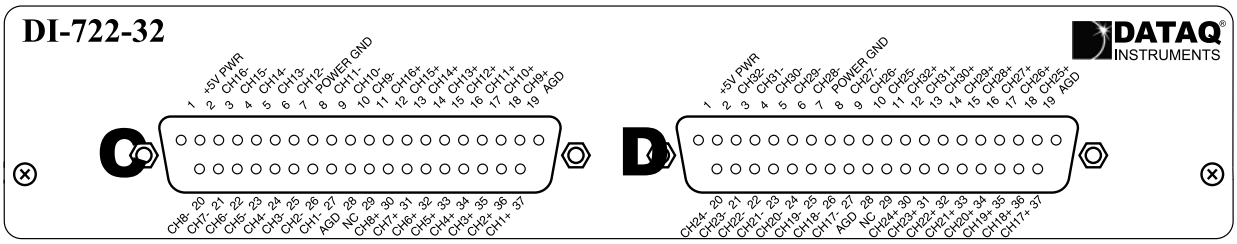


This connector also includes DAC1, which is a second digital-to-analog converter that serves as a general purpose analog output; R. START/STOP, which allows you to remotely start and stop data storage to disk with a switch or

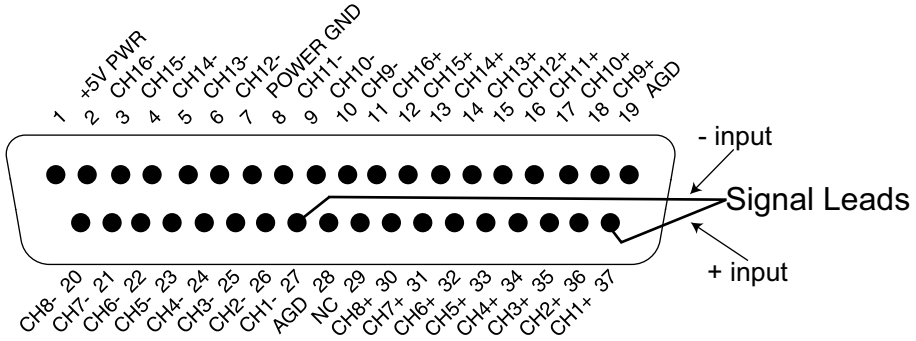
TTL level signal; EVNT, which allows you to remotely trigger event markers with a switch or TTL level signal; and two analog grounds labeled AGD.

DI-722 Series Instrument Front Panel





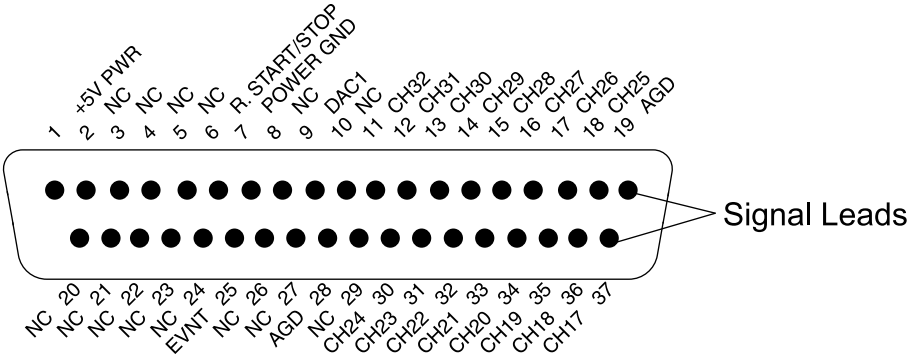
The 37-pin male “D” connectors on the DI-722-32 (labeled C and D) and the one on the left of the DI-722-16 (labeled A) are used to interface analog input channels to the DI-722 Series instrument. The analog inputs are labeled CH1+, CH1- through CH16+, CH16- for the DI-722-16 and CH1+, CH1- through CH32+, CH32- for the DI-722-32. The analog grounds are labeled AGD.



Applies to differential connectors A, C, and D - Channel 1

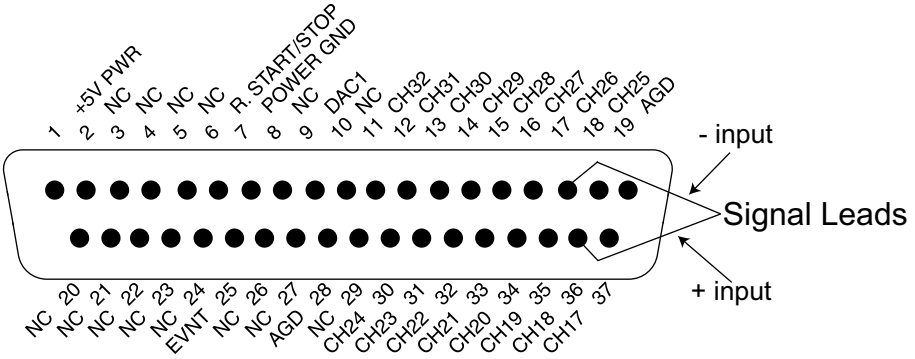
Read “CAUTION” on page v before connecting input signals. The DI-722-16 can accept 16 high-level or preconditioned analog inputs in single-ended configuration or 16 high-level or preconditioned analog inputs in differential configuration (through the 37-pin D connector labeled B above). High-level inputs are typically low impedance, no-

conditioning-required signals in the range of ±1.25 to ±10 volts full scale. Single-ended inputs are configured by connecting one signal lead to the desired channel and the other signal lead to analog ground (AGD):

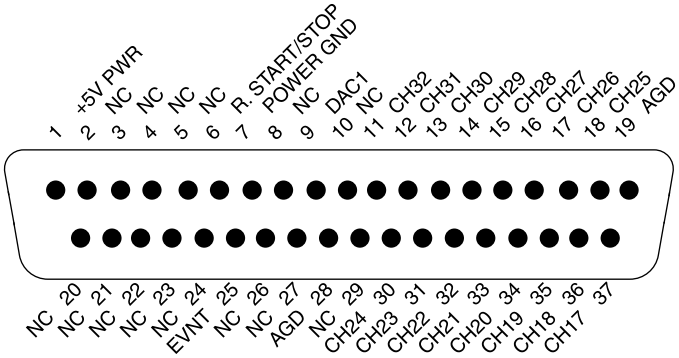


Applies to single-ended Connector B - Channel 17

Differential inputs occupy two channels (e.g., these channel pairs constitute a differential input: 17 and 25, 18 and 26, 19 and 27, 20 and 28, 21 and 29, 22 and 30, 23 and 31, 24 and 32), with the lowest numbered channel in the pair assuming the positive (+) input and the channel number. For example, say we have channels 18 and 26 configured as a differential input. Channel 18 is the positive (+) input, channel 26 is the negative (-) input, and the pair is referred to as “channel 18 differential.”



The 37-pin male “D” connector on the DI-722-16 (labeled B in the graphic of the front panel) provides access to analog input channels 17 through 32

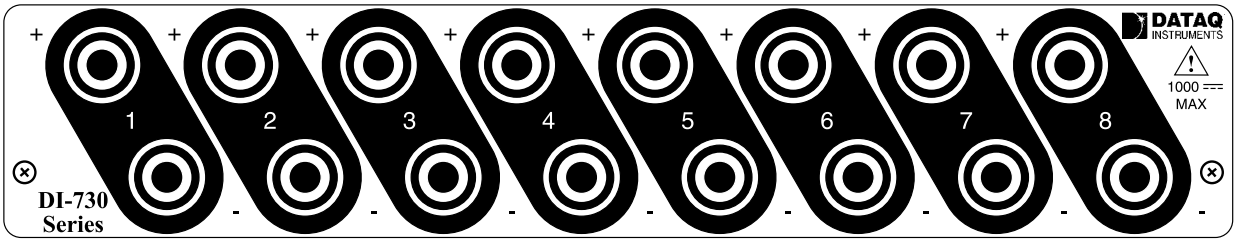


This connector also includes DAC1, which is a second digital-to-analog converter that serves as a general purpose analog output; R. START/STOP, which allows you to remotely start and stop data storage to disk with a switch or

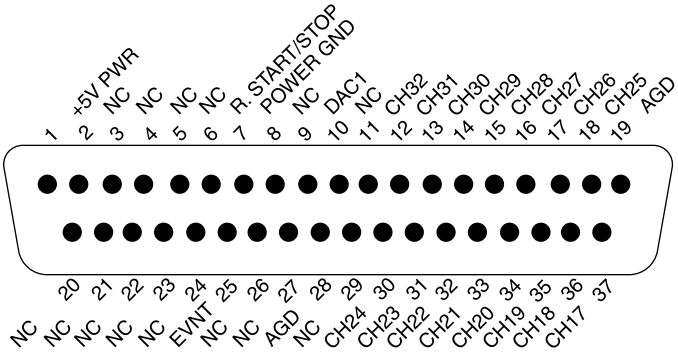
TTL level signal; EVNT, which allows you to remotely trigger event markers with a switch or TTL level signal; and two analog grounds labeled AGD.

DI-730 Series Instrument Front Panel

DI-730 Series instruments can accept any eight differential analog inputs within a range of ±10mV to ±1000VDC (or peak AC). Its ±1000V of channel-to-channel and input-to-output isolation protects delicate control circuits, computer equipment, and personnel from high common mode voltages.



Use the **EXPANSION** (USB and PP devices) or **Channel Expansion** (EN devices) port on the rear of the instrument with optional CABL-7 (part number 100679) to access the 16 general-purpose (±10V Full Scale) analog inputs. Use the following diagram for pinout (see also “DI-720, DI-722, and DI-730 Series Instrument Rear Panel” on page 28).

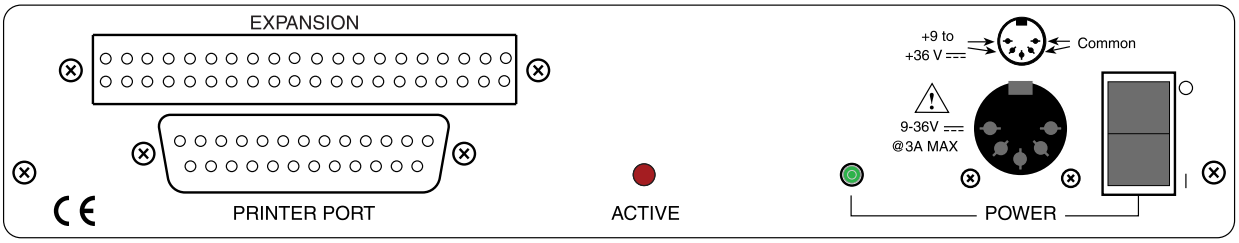


Be sure to read “CAUTION” on page v before connecting signals to the Expansion port of your DI-730 device.

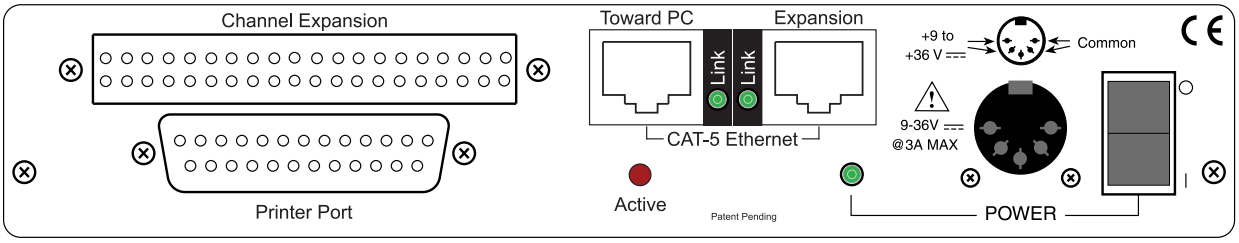
DI-720, DI-722, and DI-730 Series Instrument Rear Panel

The rear panel options are the same for DI-720, DI-722, and DI-730 Series instruments:

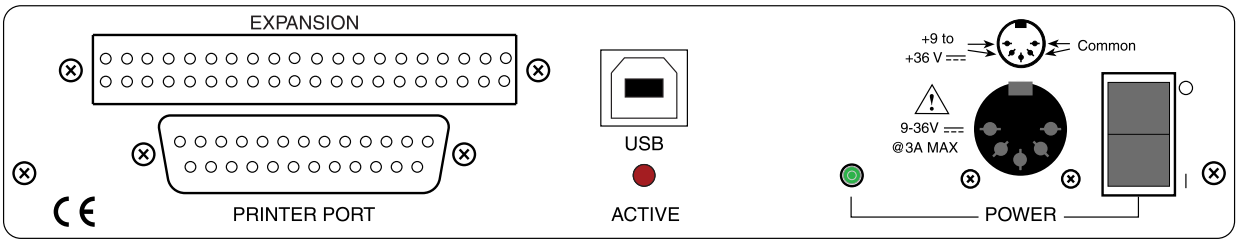
Instrument Rear Panel



Instrument Rear Panel with Ethernet Option



Instrument Rear Panel with USB Option



PRINTER PORT—Connects your instrument to the Printer Port of your PC using the supplied Printer Port Cable. All DI-720, DI-722, and DI-730 Series instruments support standard, bi-directional and enhanced (EPP) printer port communication modes (Ethernet and USB models only support bi-directional and EPP modes).

ACTIVE—DI-7xx-P instruments: Glows red when the instrument is streaming data. This includes all digital input/output (where applicable), analog output and analog input functions. DI-7xx-EN instruments: Glows red whenever data is sent back to the host computer. DI-7xx-USB instruments: Glows when the USB controller is enabled.

POWER—This indicator glows green when power is applied to the DI-720, DI-722, or DI-730 Series instrument.

POWER INPUT JACK—Allows you to apply power to the instrument. Power can be applied with the included power adapter or you can use an alternate source, as long as it is suitable (+9 to +36VDC @ 3A maximum).

POWER SWITCH—Controls power to the DI-720, DI-722, or DI-730 Series instrument. 1 is on, 0 is off.

CAT-5 Ethernet (EN models)—In addition to printer port communications, models DI-720-EN, DI-722-EN, and DI-730-EN add Ethernet communication capability with this 10baseT port. Connect the **Toward PC** port to an Ethernet port on your PC or Network. Use the **Expansion** port to daisy-chain multiple units together (see “Daisy-Chaining Multiple Ethernet Products” on page 18). Note that the Ethernet communication interface cannot be used concurrently with the printer port.

USB (USB models)—In addition to printer port communications, models DI-720-USB, DI-722-USB, and DI-730-USB add Universal Serial Bus (USB) communication capability. Note that the USB communication interface cannot be used concurrently with the printer port.

EXPANSION (USB and PP models) or Channel Expansion (EN models) —When being used for expansion, models DI-78B, DI-75B, DI-725 and DI-725E are plugged directly into this connector. The input signals are then connected to the DI-78B, DI-75B, DI-725 or DI-725B expansion instrument. Use the following diagram for pinout.



5. Calibration Verification

This section provides calibration verification procedures for the A/D and D/A subsystems of the DI-7xx unit. Your instrument is calibrated before it is shipped and, therefore, does not need immediate calibration. Should your unit not comply with the calibration guidelines presented below, arrange to have DATAQ Instruments recalibrate your instrument.

Required Equipment

A/D Calibration (For DI-720, DI-722, and DI-730 Series Instruments)

- A precision DVM with resolution as a function of the input range being calibrated:

  minimum DVM resolution = Instrument FSR x 0.1%

  For example, suppose we have a DI-720-P and we want to calibrate the ±10 volt range (the DI-720 delivers ±10 volts at a gain of 1):

  10V x 0.1% = 10mV

  So we would need a DVM with a resolution of 10V or more to calibrate the ±10 volt range.

- A stable voltage source with a stability specification equal to or greater than the minimum DVM resolution, as calculated above, required to calibrate the instrument at the highest desired gain.

  OR

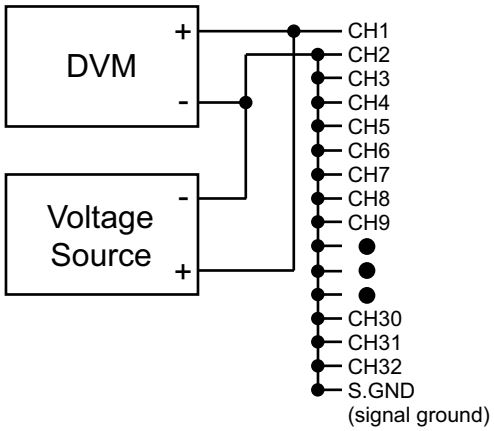
- An alternative is to use a voltage calibrator with enough resolution, as calculated above, to calibrate the instrument at the highest desired gain.

D/A Calibration (DI-720 Instruments Only)

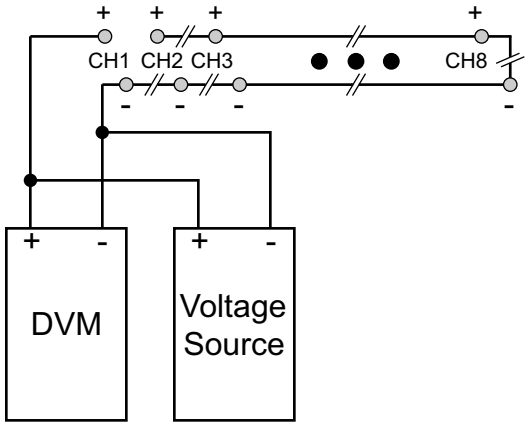
- A precision DVM with resolution of at least 1mV.

A/D Calibration Verification (DI-720, DI-722, and DI-730 Series Instruments)

Calibration verification of DI-720 Series instruments' A/D subsystem is performed on channel 1, with all other channels returned to analog common. Calibration of DI-730 Series instrument's A/D subsystem is performed on a channel-by-channel basis for the 8 wide range inputs and on channel 17 for the general-purpose channels. The following figures illustrate the necessary connections:

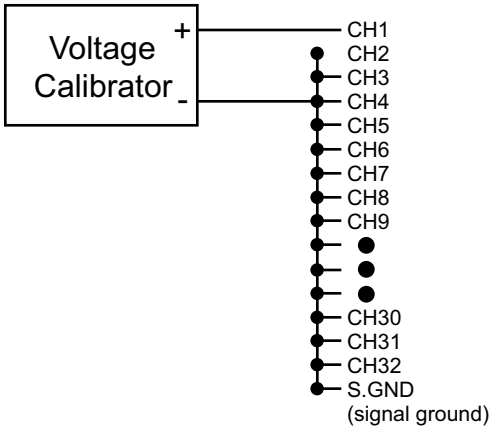


DI-720 Series Instruments And
16 DI-730 General-Purpose Channels

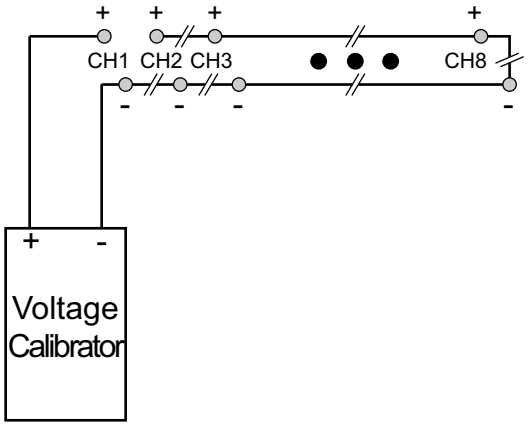


DI-722 and DI-730 Series 8 Wide-Range Channels (accessible from the front panel). Channels should be measured in isolation and not in groups with the shortest lead possible.

Or if you are using the alternative voltage calibrator, the following figure illustrates the necessary connections:



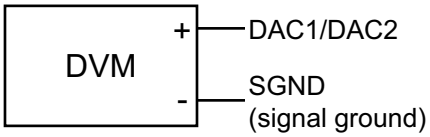
DI-720 Series Instruments
16 DI-730 General-Purpose Channels



DI-722 and DI-730 Series 8 Wide-Range Channels (accessible from the front panel). Channels should be measured in isolation and not in groups with the shortest lead possible.

D/A Calibration (DI-720 Series Only)

D/A calibration involves adjusting the analog outputs to the correct full-scale range using the analog data value. The following figure illustrates the necessary connections:



When the above circuit is connected, the calibration program can be initiated by typing “DI720CAL” at the DOS prompt. D/A calibration is accomplished by following the on screen prompts.

Offset Calibration Verification (DI-720 and DI-722 Instruments Only)

1. Connect your voltage calibrator, or combination DVM and voltage source to your DI-7XX instrument as shown above. Apply zero volts to the instrument (or short the instrument's analog channel input to ground).

2. Open the WINDAQ/Lite/Pro/Pro+ data acquisition screen. Enable the channel you will use to quantify offset. Since all channels are adjusted together, any channel may be selected. Enable a maximum burst sample rate of 50,000 Hz by selecting EDIT-PREFERENCES-MAX SAMPLE RATE. Enable a WINDAQ sample rate of 50 Hz. Set the Acquisition Mode to AVERAGE and the gain factor to 1 through WINDAQ's CHANNEL SETTINGS menu for the selected channel.

3. Referring to WINDAQ software's voltage display for the channel you're evaluating, compare this value to that given in the OFFSET column of TABLE (1) for the selected gain factor.

4. Repeat steps 2 and 3 using a gain of 2, 4 and 8 for the selected channel.

5. If any readings are out of the acceptable ranges described in TABLE (1) arrange to have your instrument recalibrated by DATAQ Instruments.

Full Scale (Span) Calibration Verification (DI-720 and DI-722 Instruments Only)

1. Referring again to TABLE (1) set the instrument's gain to 1 and apply the voltage indicated by the SPAN VOLTAGE column of TABLE (1) to the selected channel. Note that since all channels are calibrated together, any channel may be selected. ***NOTE: For DI-722 general purpose channels, refer to TABLE 1. For DI-722 differential channels, refer to TABLE 2.*

2. Verify the reading by comparing the value displayed by WINDAQ software with the value of TABLE (1) in the SPAN ACCURACY column.

3. Repeat for gain selections of 2, 4, and 8.

4. If any readings are out of the acceptable ranges described in TABLE (1) arrange to have your instrument recalibrated by DATAQ Instruments.

TABLE 1

Gain Factor	Offset @ 0V	Span Voltage	Span Accuracy*
1	0V ±20mV	9.800V	9.800V ±25mV
2	0V ±10mV	4.900V	4.900V ±12.5mV
4	0V ±5mV	2.400V	2.400V ±6.25mV
8	0V ±5mV	1.200V	1.200 ±3.125mV

* Excludes offset errors.

TABLE 2 (Only applicable for DI-722 differential channels)

Gain Factor	Offset @ 0V	Span Voltage	Span Accuracy*
1	0V ±40mV	19.600V	19.600V ±50mV
2	0V ±20mV	9.800V	9.800V ±25mV
4	0V ±10mV	4.800V	4.800V ±12.5mV
8	0V ±10mV	2.400V	2.400 ±6.25mV

* Excludes offset errors

Offset Calibration Verification (DI-730 Instruments only)

1. Connect your voltage calibrator, or combination DVM and voltage source to your DI-730 instrument as shown above. Apply zero volts to the instrument (or short the instrument's analog channel input to ground).

2. Open the WINDAQ/Lite/Pro/Pro+ data acquisition screen. Enable the channel you want to verify. Enable a maximum burst sample rate of 50,000 Hz by selecting EDIT-PREFERENCES-MAX SAMPLE RATE. Enable a WINDAQ sample rate of 50 Hz. Set the Acquisition Mode to AVERAGE select the 10mV range through WINDAQ's CHANNEL SETTINGS menu for the selected channel.

3. Referring to WINDAQ software's voltage display for the channel you're evaluating, compare this value to that given in the OFFSET column of TABLE (2) for the selected range.

4. Repeat steps 2 and 3 using for each measurement range.

5. Select the next channel, and repeat steps 2 through 4.

6. If any readings are out of the acceptable ranges described in TABLE (2) arrange to have your instrument recalibrated by DATAQ Instruments.

Full Scale (Span) Calibration Verification (DI-730 Instruments Only)

1. Referring again to TABLE (2) select the 10mV range and apply the voltage indicated by the SPAN VOLTAGE column of TABLE (2) to the selected channel.

2. Verify the reading by comparing the value displayed by WINDAQ software with the value of TABLE (2) in the SPAN ACCURACY column.

3. Repeat steps 1 and 2 for all ranges.

4. Repeat steps 1 through 3 for all channels.

5. If any readings are out of the acceptable ranges described in TABLE (1) arrange to have your instrument recalibrated by DATAQ Instruments.

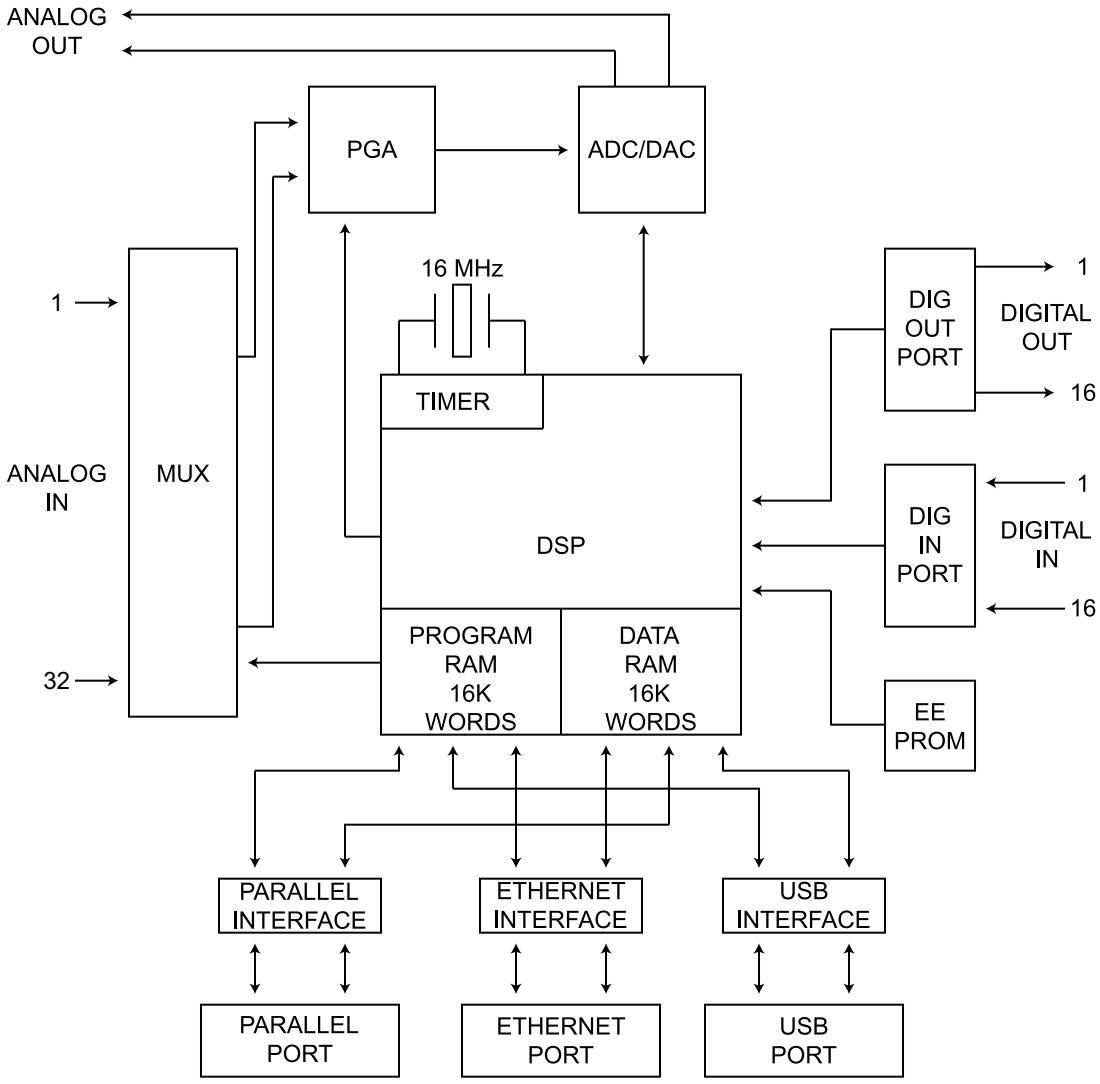
TABLE (2)

Channel Group	Range	Offset @ 0V	Span Voltage	Span Accuracy
1 through 8	10mV	0 ±0.04mV	9mV	9mV ±125µV*
	100mV	0 ±0.4mV	90mV	90mV ±350µV*
	1V	0 ±4mV	900mV	900mV ±2.6mV
	10V	0 ±10mV	9V	9V ±25.1mV
	100V	0 ±100mV	90V	90V ±0.2501V
	1000V	0 ±1V	700V	700V ±2.5V
17 through 32	10V	0 ±25mV	9V	9V ±25mV
	5V	0 ±13mV	4.5V	4.5V ±12.5mV
	2.5V	0 ±7mV	2V	2V ±6.25mV
	1.25V	0 ±4mV	1V	1V ±3.125mV

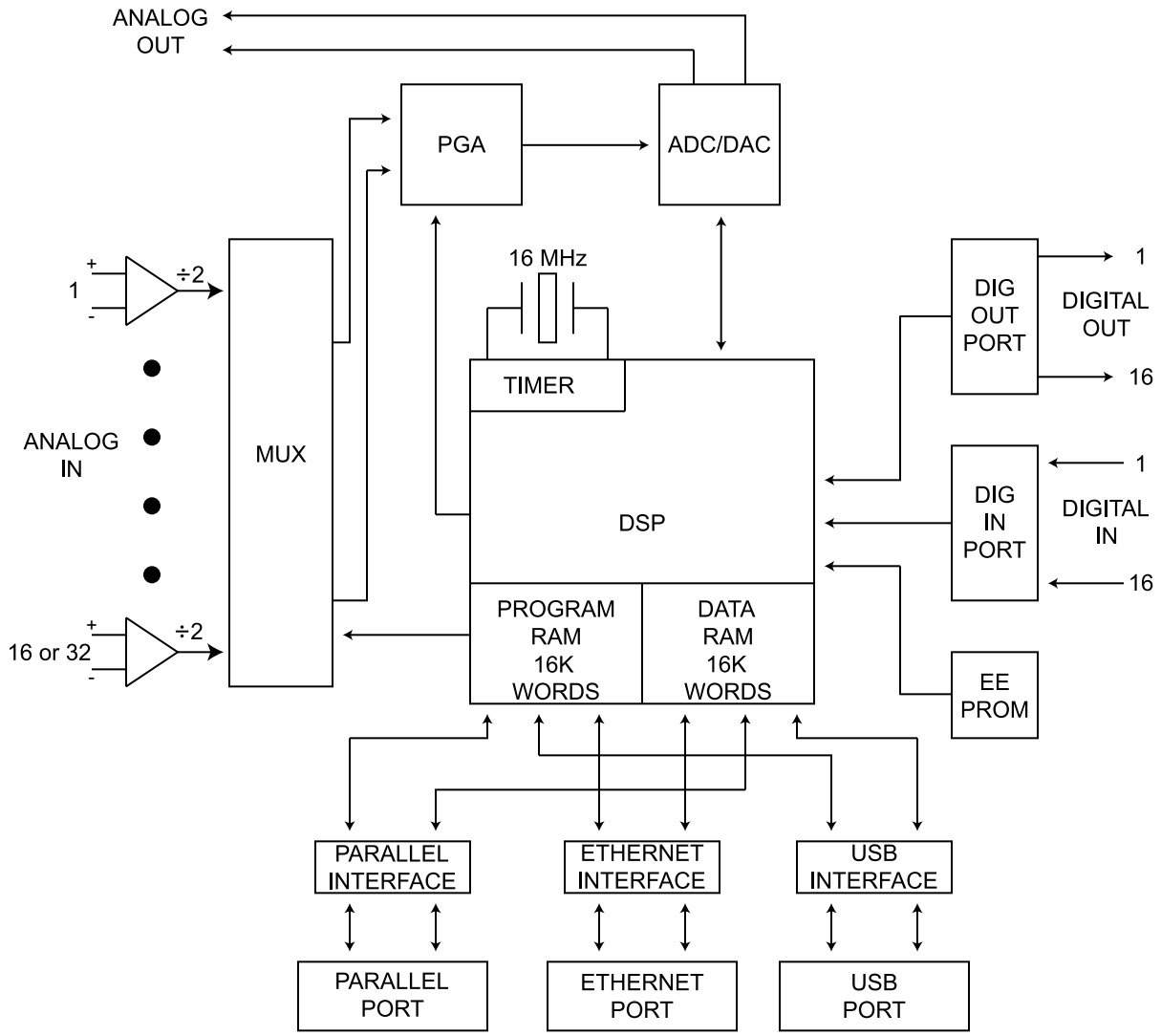
* These low-level measurements require an environment free from electrical noise.

6. Block Diagram

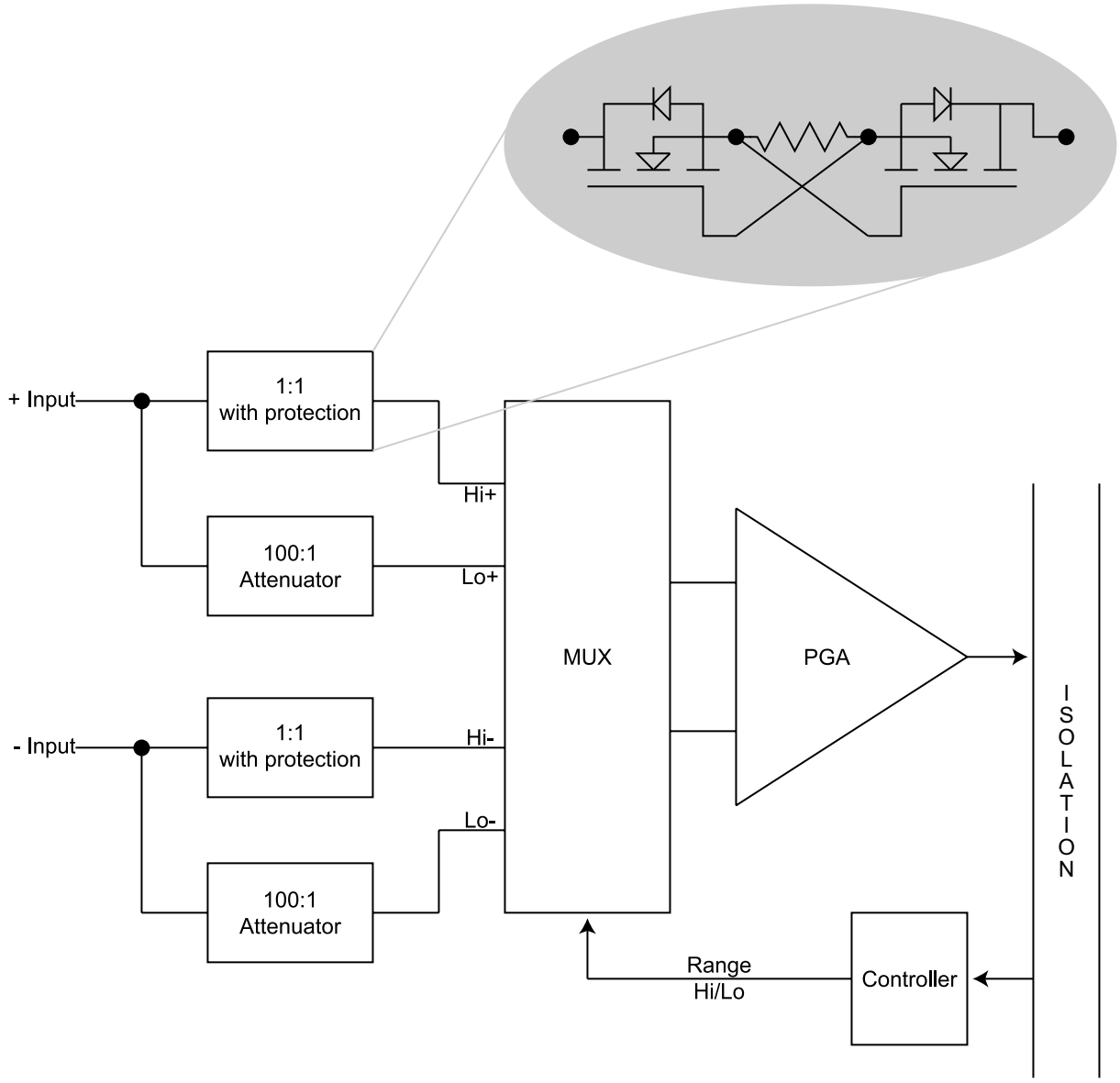
DI-720 Series



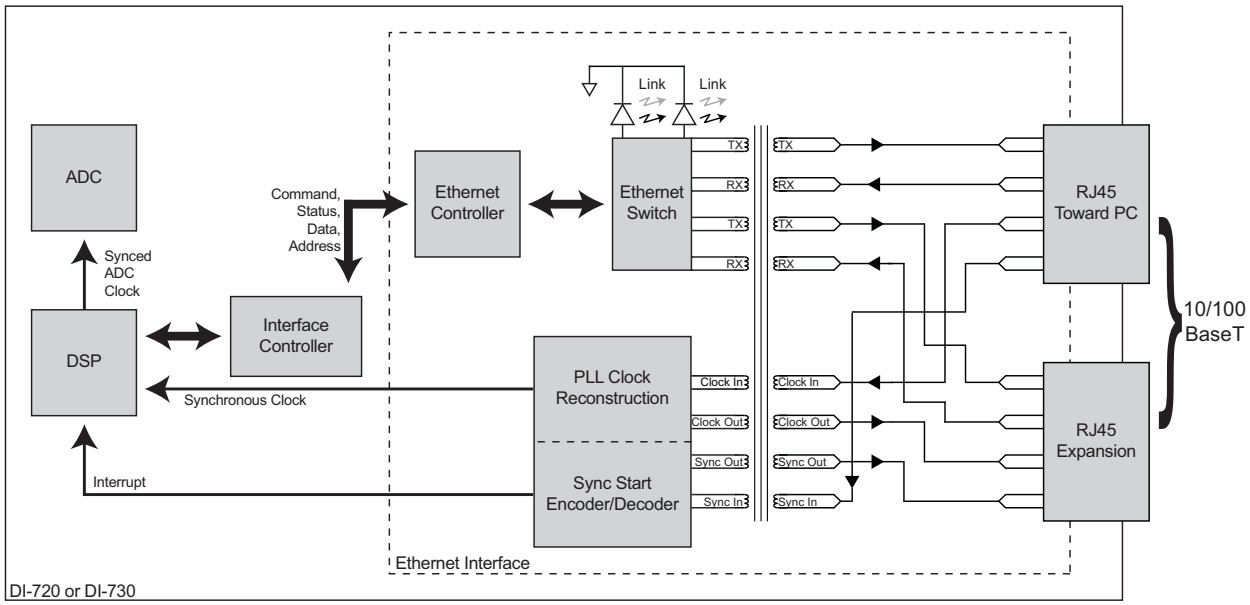
DI-722 Series



DI-730 Series (Analog Input)



Ethernet Instruments



7. Accessories

This section describes hardware products that may be used with DI-720, DI-722, and DI-730 Series instruments.

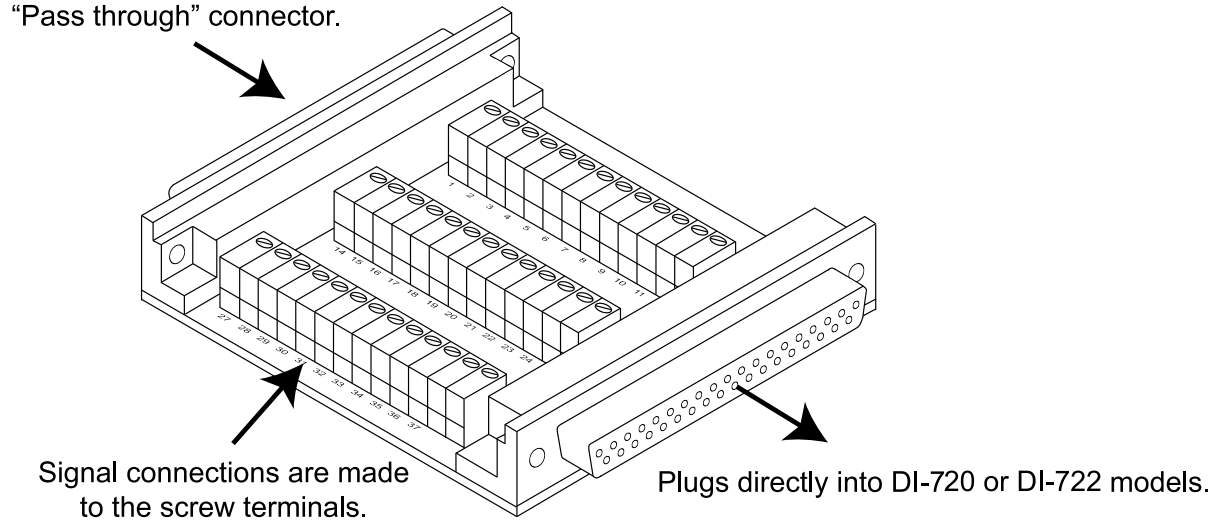
The DI-705: Signal Input/Output Option 40
The DI-205: Signal Input/Output Panel 41
DI-725(E) Channel Expansion Unit 46
DI-78B 8B Module Channel Expander 52
DI-8B Modules 60
DI-8B30/31 Analog Voltage Input Modules, 3Hz Bandwidth 60
DI-8B32 Analog Current Input Modules 61
DI-8B34 Linearized 2- or 3-Wire RTD Input Modules 62
DI-8B35 Linearized 4-Wire RTD Input Modules 63
DI-8B36 Potentiometer Input Modules 64
DI-8B38 Strain Gage Input Modules, Narrow & Wide Bandwidth 65
DI-8B40/41 Analog Voltage Input Modules, 1kHz Bandwidth 66
DI-8B42 2-Wire Transmitter Interface Modules 67
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DI-5B45 Frequency Input Modules 92
DI-5B47 Linearized Thermocouple Input Modules 93
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The DI-705: Signal Input/Output Option

General

The DI-705 plugs into either 37-pin male “D” connector on the front panel of DI-72x Series instruments and provides convenient screw terminal access to analog inputs, analog outputs, and digital inputs and/or outputs. The screw terminals accept 16-22 gauge wire and each is silk-screened with the corresponding “D” connector pin number. The DI-705 also features a 37-pin male “pass-through” connector, which allows you to connect our BNC cable (model number CABL-4), or our 5B back plane cable (model number CABLE-1), or any 37-pin DAS-16 compatible cable to the DI-720 while still allowing screw terminal access.

Input Signal Configuration



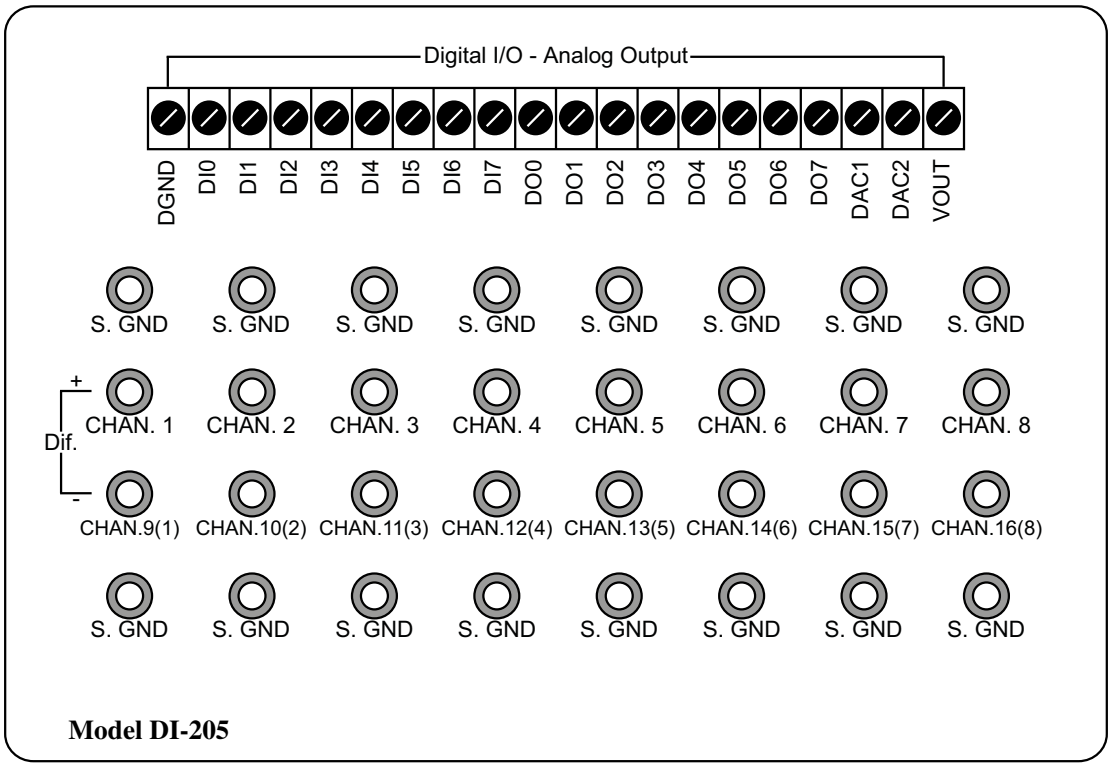
Any combination of single-ended or differential channels may be connected to the DI-705, but keep in mind a differential channel uses two analog inputs. Configure single-ended and differential channels on the DI-705 the same way as on the DI-72x. Refer to the heading titled “DI-720 Series Instrument Front Panel” or “DI-722 Series Instrument Front Panel” in the Getting Started section of this manual for single-ended/differential configuration details.

The DI-205: Signal Input/Output Panel

General

The DI-205 is a termination panel for general purpose input and output. The DI-205 along with the supplied cable provides a convenient way to interface digital input/output, analog output and analog input signals to DI-720 Series instruments. Signal connection is via terminal strip for digital and analog output signals, or 5-way binding posts (banana jacks) for analog input signals.

DI-205 Input/Output Panel Interconnections



Digital Inputs (DI0 to DI7)

The left end of the 20-connector screw terminal labeled “DGND” and “DI0” through “DI7” indicates the digital input ports of the DI-205.

Digital Outputs (DO0 to DO7)

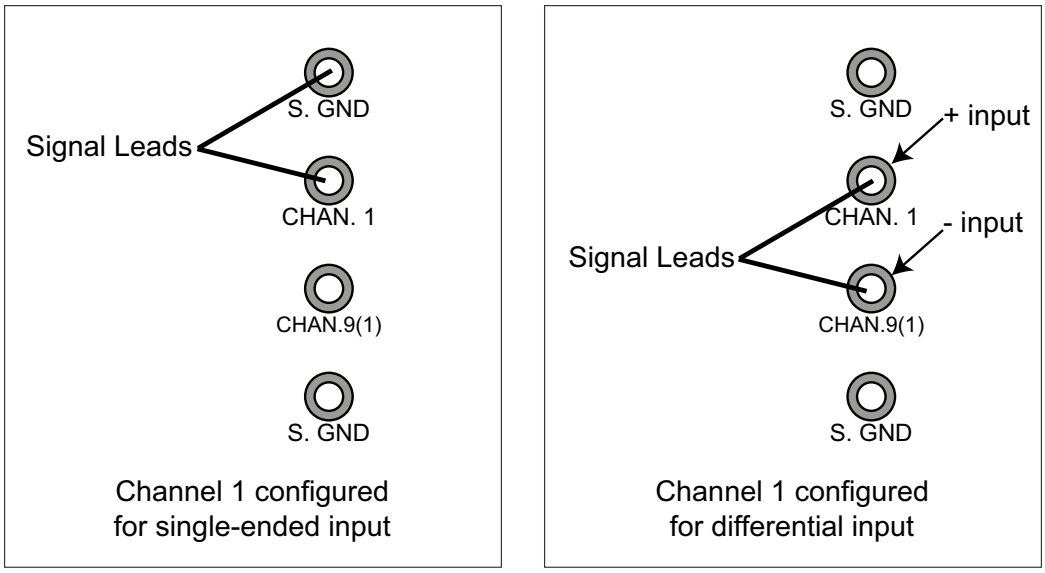
The 8 digital output lines labeled “DO0” through “DO7” indicate the digital output ports of the DI-205.

Analog Output (DAC1, DAC2, VOUT)

The digital-to-analog converter (DAC) outputs have two applications: As a general purpose analog output accessible through WINDAQ or Programmer’s SDK software or as a variable signal suppression voltage automatically enabled and multiplexed to all channels through Programmer’s SDK software.

Input Signal Configuration

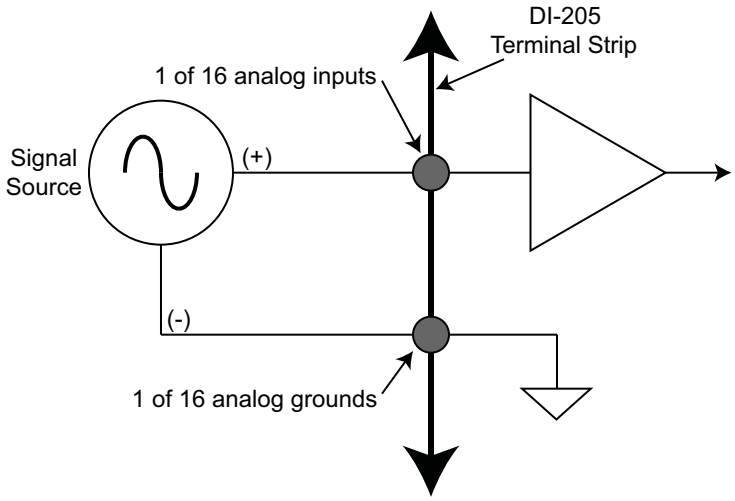
Each DI-205 may be configured to connect to 16 single-ended or 8 differential channels. In addition, any combination of single-ended or differential channels may be applied. A differential channel is configured by using two single-ended inputs according to the following illustration:



Note that when an input channel is configured for differential operation, the binding post associated with that channel's high (+) input assumes the channel number.

Connecting a Single-ended Amplifier

A single-ended amplifier is the most straightforward approach to connecting signals to the DI-205. However, to derive adequate performance, the use of a single-ended amplifier requires that the signal to be measured is relatively high level (greater than or equal to 1V full scale), and the distance from the signal source to the DI-205 is relatively short (less than 15 feet). Assuming these conditions exist, a single-ended amplifier may be connected to your signal source as follows:

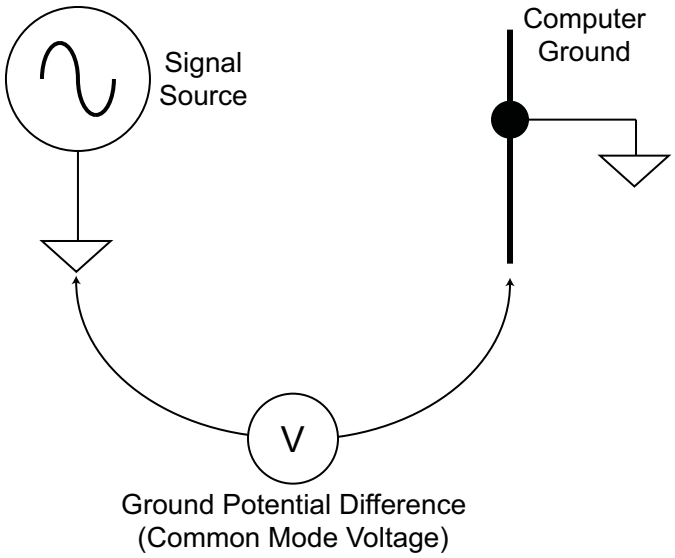


Connecting a Differential Amplifier

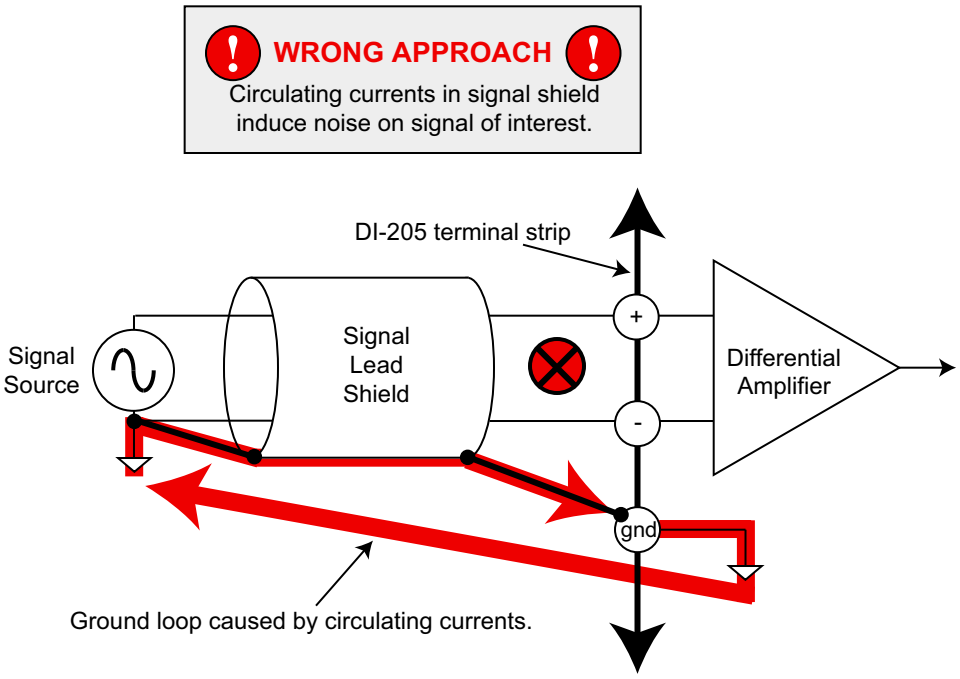
A differential channel configuration is a special case approach to signal measurement that should be used with all low-level measurements (less than 1v) or when the signal to be measured is located far away from the DI-205 (greater than 15 feet). When in a differential operating mode, the amplifier sees the difference in voltage between the high (+) and low (-) inputs. Differential amplifiers have the advantage of reducing common mode voltages (those appearing simultaneously and in phase on both inputs). This capability may be leveraged to great advantage to reduce noise riding on a signal of interest.

Two signal measurement conditions govern your configuration of a differential channel input: The signal to be measured is ground-referenced; or the signal to be measured is isolated from ground.

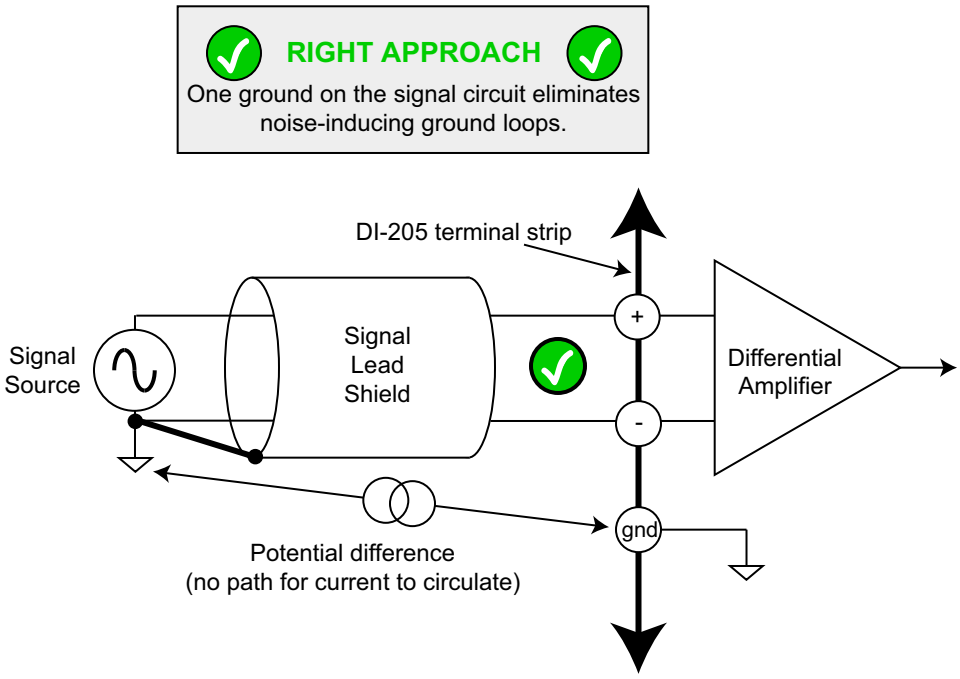
Ground-referenced Signal Sources—A ground-referenced signal source is one with a local ground that may not be (and probably is not) at the same potential as the computer's ground. This potential difference between signal ground and computer ground is referred to as a common mode voltage and is caused by a number of different factors.



The most common of these is different physical locations of the computer and signal ground points. Since wire is not a perfect conductor (exhibiting zero resistance regardless of length) a voltage drop, however small, will always be present. The differential amplifier is unique in its ability to measure signals originating from sources with different ground potentials relative to the computer **provided it is connected properly**.

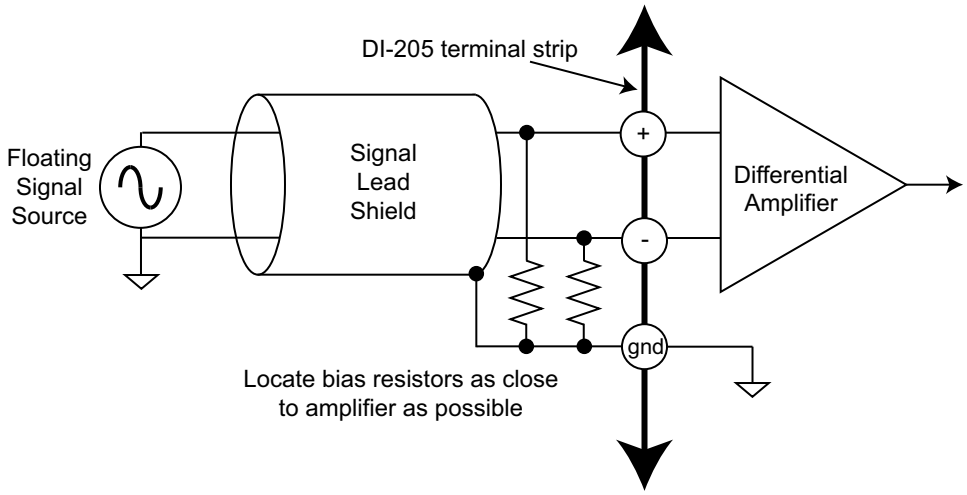


The most common error made in connecting differential amplifiers is the tendency to ground both ends of a signal shield. This causes current to flow through the shield and induces noise on the signal to be measured. Ensuring that only one ground exists on the signal circuit eliminates this problem.



Isolated Signal Sources—There are two considerations when connecting a differential amplifier to an isolated signal source: The elimination of ground loops as described above, and the use of bias resistors to provide bias current for the differential amplifier's positive and negative inputs.

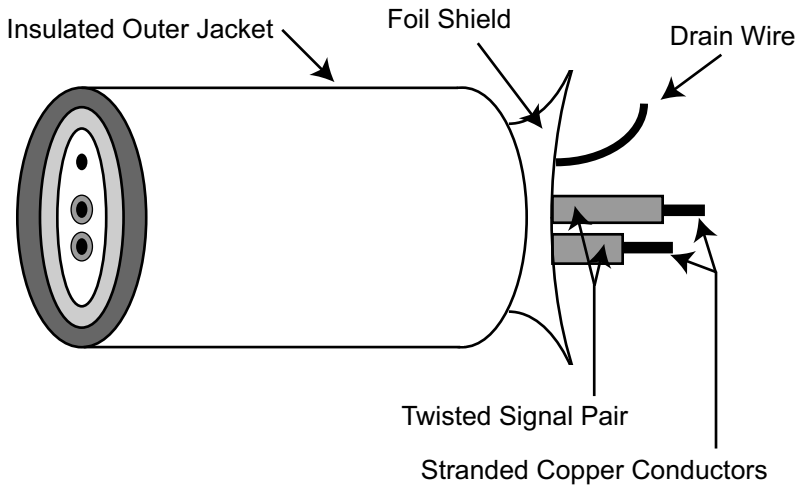
The bias resistors should be chosen to be as low as possible, but the value you use is dependent upon the output impedance of your signal source. Generally, the value of the bias resistor should be 10 times the output impedance of your signal source or higher. Bias resistors greater than 1MΩ are not recommended.



Signal Cable and the Differential Amplifier

Quick rule-of-thumb: Any application requiring a differential amplifier also defines a need for quality signal cable. Four elements combine to ensure adequate quality signal cable: a twisted signal pair with low resistance stranded

copper conductors; surrounded by a multiple-folded foil shield; with a copper stranded drain wire; all contained within an insulated outer jacket.



In applications where such signal cable is used, a dramatic decrease in noise pickup will be experienced. The drain wire should be considered as the shield and should be connected as described in the Connecting a Differential Amplifier section above. Signal cable meeting all four criteria for quality is Belden No. 8641.

DI-725(E) Channel Expansion Unit

The DI-725 is a 32-channel analog expansion device for DI-400, DI-720, and DI-730 instruments. The DI-725 features 32 differential analog inputs. The DI-725 is powered by the host DI-400, DI-720, or DI-730 instrument and in most cases will not need an additional power supply. However, when several DI-725s are linked together, an additional power source may be required (indicated by a glowing POWER LOW lamp). The DI-725E requires an additional power source connected via the power input jacks located on the rear panel of the instrument.

Input signal ranges are as follows:

Gain (Software Selectable)	Measurement Range (DI-725*)	Measurement Range (DI-725E**)
1	±10V	±20V
2	±5V	±10V
4	±2.5V	±5V
8	±1.25V	±2.5V

* For the DI-725, overvoltage protection is ±30V powered on and off.

** For the DI-725E, overvoltage protection is ±120V powered on and off.

In return for the 32 expansion channels it provides, each DI-725 consumes two channels from its host instrument. When a single DI-725 is connected to a DI-400, the combination provides 46 total channels (14 channels are still available on the host DI-400). When connected to a DI-720, the combination delivers 62 total channels (30 are still available on the host DI-720). When connected to a DI-730, the DI-725 adds 32 high level differential inputs to the host's 8 wide measurement range inputs for a diverse blend of 40 total channels. A maximum of 240 channels may be configured using multiple DI-725s.

Connecting the DI-725 to the Host Instrument

***NOTE**: The included expansion signal cable and dual-ended power cable are sized to fit when the DI-725 is stacked on top of (or below) the host DI-720 or DI-730 instrument. If you are using these instruments and they are not in a stacked configuration, do so before proceeding.*

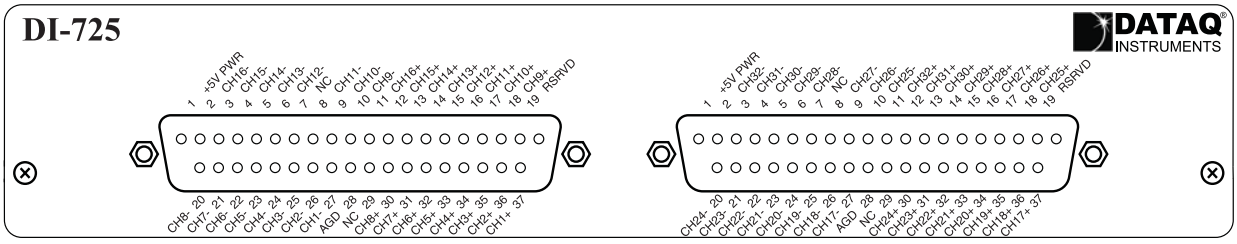
1. Connect the appropriate end of the included expansion signal cable to the host instrument:

If you have this instrument:	Then connect the expansion cable to:
DI-400	The DI-400's 37-pin "D" connector
DI-720	EXPANSION on the rear panel of the DI-720
DI-730	EXPANSION on the rear panel of the DI-730

2. Connect the other end of the expansion cable to EXPANSION IN on the rear panel of the DI-725. Power for the DI-725 is obtained from the host instrument through this cable. Power for the DI-725E must be supplied via the power input jacks.

Features, Controls, and Indicators

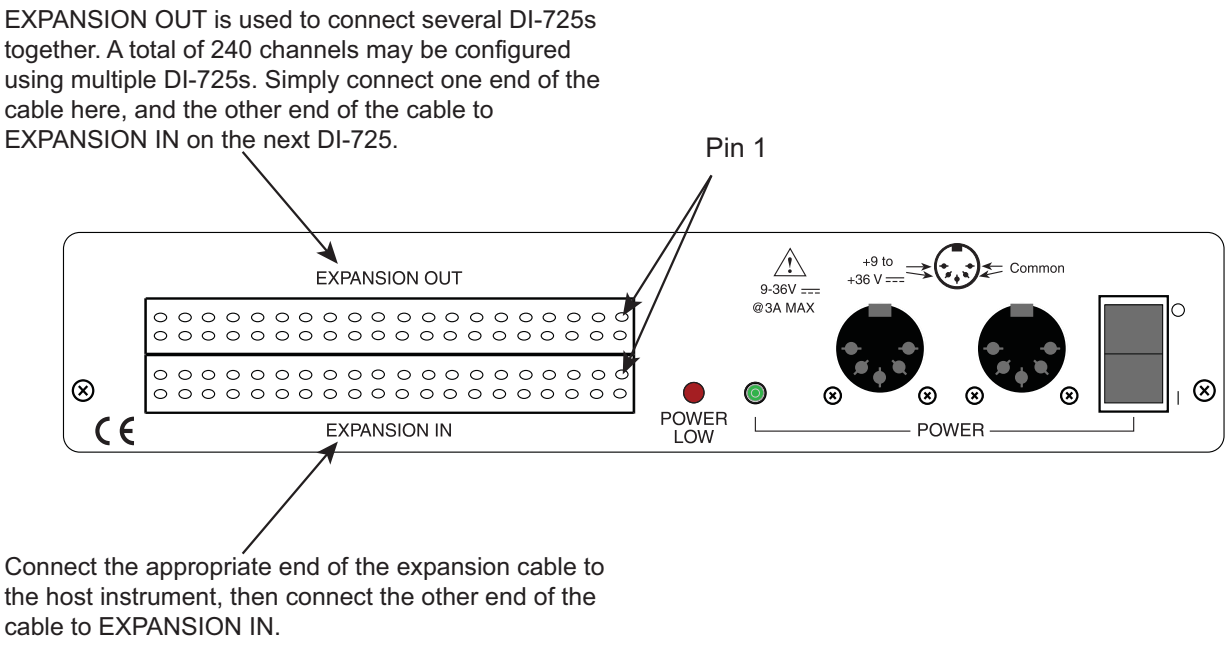
DI-725 Front Panel



The two, 37-pin, male "D" connectors are used to connect your analog input signals to the DI-725. It can accept 32 high-level or preconditioned analog inputs in a differential configuration (one positive (+) and one negative (-) signal

lead per channel). High-level inputs are typically low impedance, no-conditioning-required signals in the range of ±1.25 to ±10 volts full scale.

DI-725 Rear Panel



POWER switch — Controls power to the DI-725 instrument. 1 is on, 0 is off.

POWER input jacks — Allows you to apply an alternate power source to the instrument, if necessary. The DI-725 is powered by its host DI-400, DI-720, or DI-730 instrument and in most cases will not need an additional power supply. However, many factors can influence how much power is available to the DI-725 from its host instrument. When the DI-725 cannot derive adequate power from its host instrument, the POWER LOW indicator will glow red. This indicates that an alternate power source is necessary. Any suitable power source (+9 to +36 volts DC at 3A maximum) may be connected to either jack to provide the necessary power. When an alternate power source is connected, the remaining jack can be used as an additional power outlet.

POWER status lamp — Glows green when the POWER switch is in the 1 position, indicating power is applied.

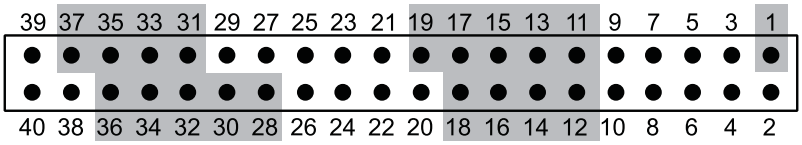
POWER LOW lamp — Glows red when the DI-725 cannot derive adequate power from its host instrument. In this case, an alternate power source is required.

If the POWER LOW lamp comes on and you are using the DI-725 with a DI-720 or DI-730, the power supply that is powering these host instruments can be used to power the DI-725 as well. Simply unplug the five-pin DIN end of the power adapter cable that is currently supplying power to your DI-720 or DI-730, and plug it into one of the DI-725's power input jacks. Now plug one end of the supplied dual-ended power cable into the remaining power jack on the DI-725 and plug the other end into the host instrument power input jack.

EXPANSION OUT connector — Used to connect multiple DI-725's together. Connect one end of an expansion cable to this connector and connect the other end of the cable to EXPANSION IN on the next DI-725.

EXPANSION IN connector — Connects the DI-725 to its host DI-400, DI-720, or DI-730 instrument.

EXPANSION IN and EXPANSION OUT Pinout



Pin	Description
1	+5V
11	Ch 16
12	Ch 15
13	Ch 14
14	Ch 13
15	Ch 12
16	Ch 11
17	Ch 10
18	Ch 9
19	Analog Gnd
28	Analog Gnd
30	Ch 8
31	Ch 7
32	Ch 6
33	Ch 5
34	Ch 4
35	Ch 3
36	Ch 2
37	Ch 1

All other pins have no connection.

Configuring Channels with the DI-725

In WINDAQ/Pro or WINDAQ/Pro+ data acquisition software, channels are enabled or configured for acquisition with the channel selection grid. The channel selection grid is accessed by selecting Channels… from the Edit menu (in the SET-UP operating mode of WINDAQ software).

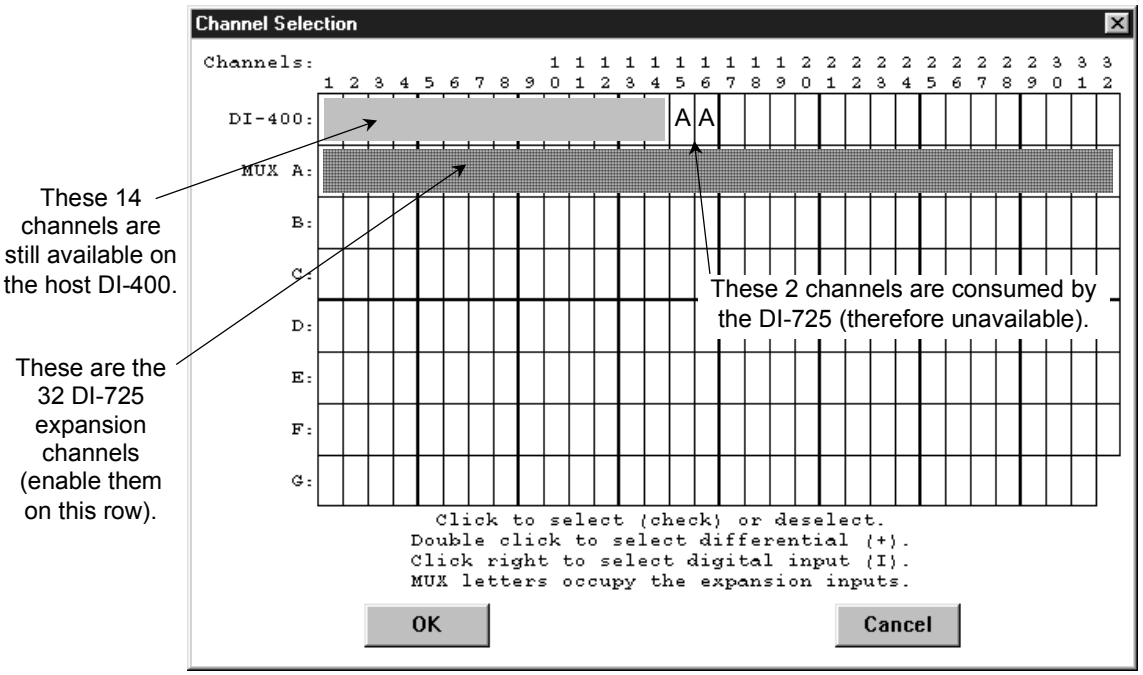
Each box in this grid potentially represents an input channel. An input channel is enabled by clicking the desired box. Which box you click, which mouse button you click with, and how many times you click the mouse button determines whether the input channel is enabled for single-ended operation, differential operation, or digital input operation.

The following pages show how to enable channels when using the DI-725 with a DI-400, DI-720, and DI-730 host instrument.

DI-400 Host Instruments

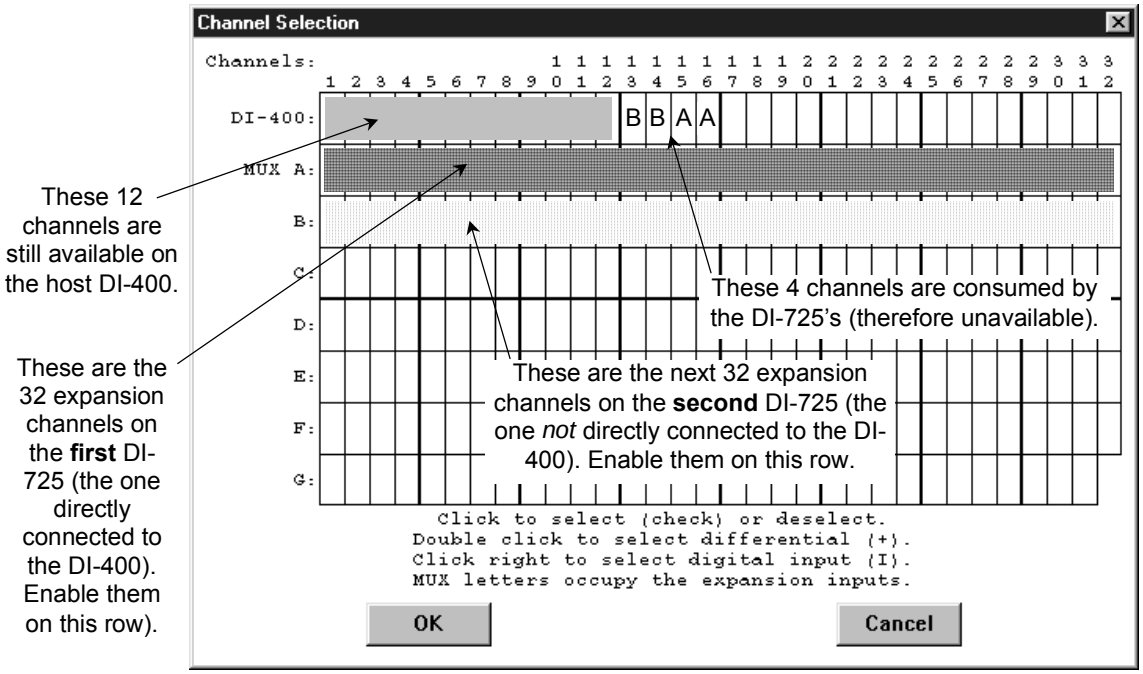
The following channel selection grid is typical when a single DI-725 is used with a DI-400. Note that the DI-400 channels are enabled on the top row of the grid and the DI-725 channels are enabled on the row labeled “MUX A”. The shaded area on the top row shows the channels that are still available on the host DI-400 instrument when the DI-725 is added.

When a Single DI-725 is Used.



The following grid is typical of two DI-725’s used with a DI-400. Note the pattern. Each DI-725 consumes the two highest-numbered channels on the host DI-400, and the expansion channels are enabled on the next MUX row down. The result is similar when more DI-725’s are added to the system.

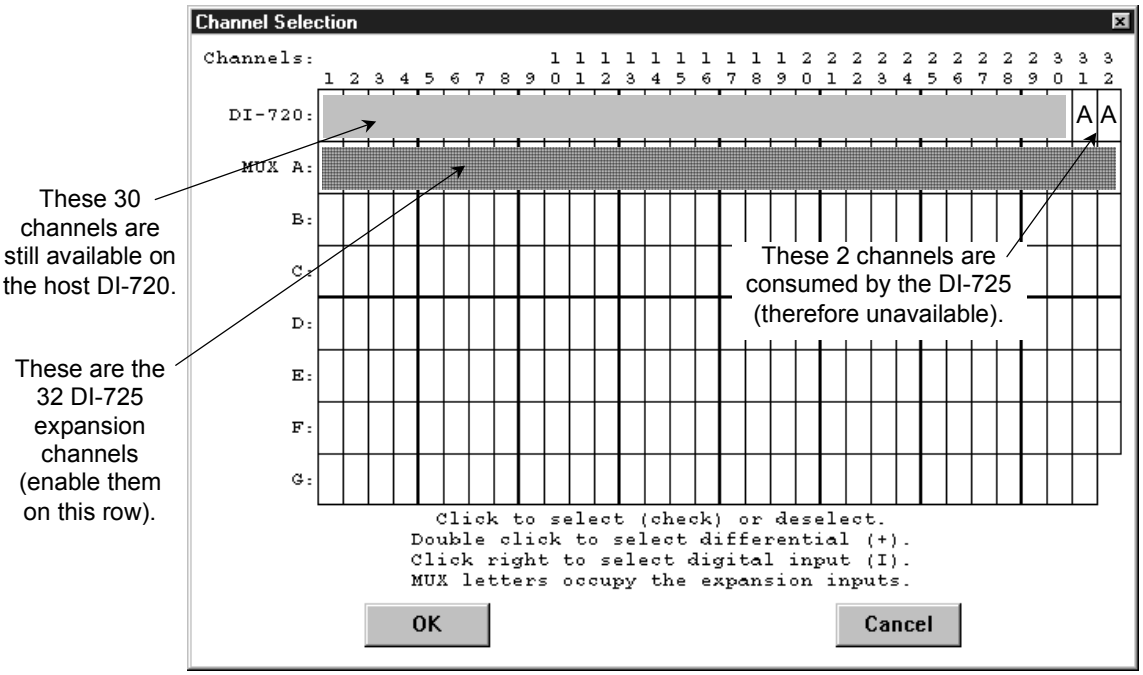
When Two DI-725’s are Used.



DI-720 Host Instruments

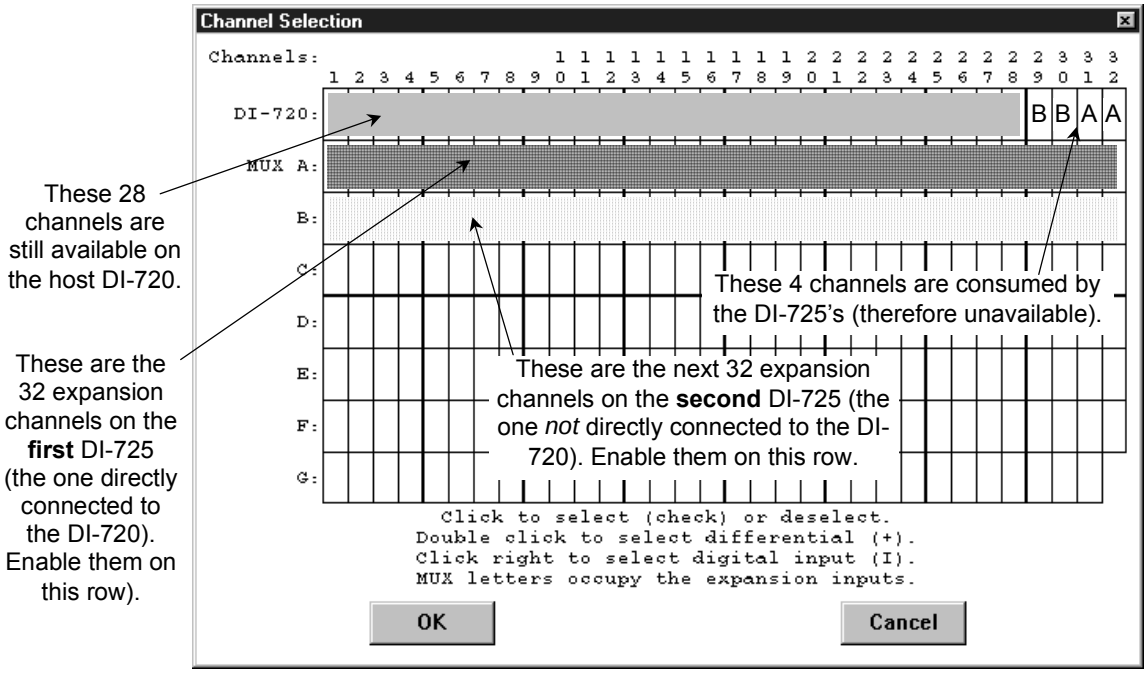
The following channel selection grid is typical when a single DI-725 is used with a DI-720. Note that the DI-720 channels are enabled on the top row of the grid and the DI-725 channels are enabled on the row labeled “MUX A”. The shaded area on the top row shows the channels that are still available on the host DI-720 instrument when the DI-725 is added.

When a Single DI-725 is Used.



The following grid is typical of two DI-725’s used with a DI-720. Note the pattern. Each DI-725 consumes the two highest-numbered channels on the host DI-720, and the expansion channels are enabled on the next MUX row down. The result is similar when more DI-725’s are added to the system.

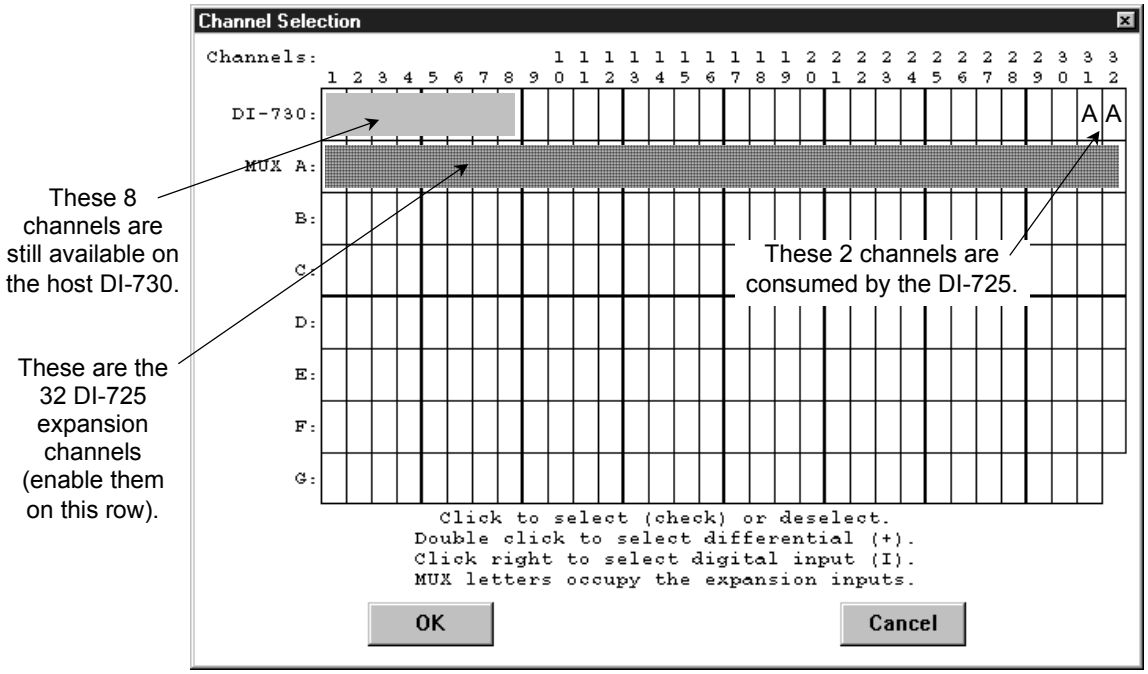
When Two DI-725’s are Used.



DI-730 Host Instruments

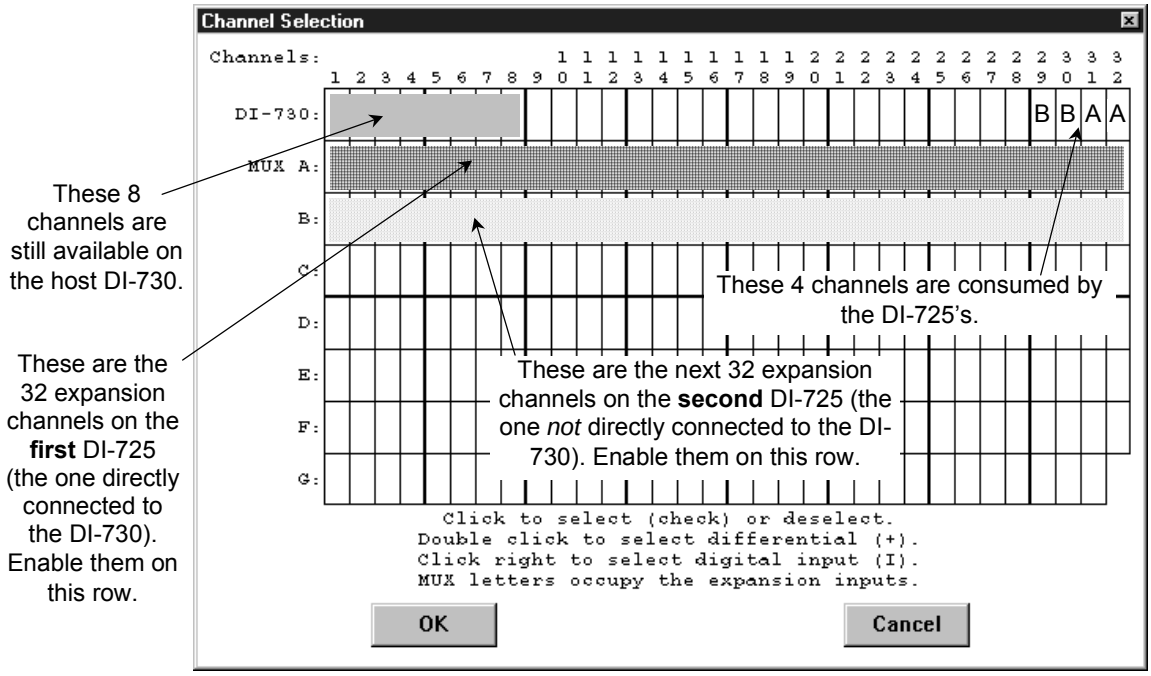
The following channel selection grid is typical when a single DI-725 is used with a DI-730. Note that the DI-730 channels are enabled on the top row of the grid and the DI-725 channels are enabled on the row labeled “MUX A”. The shaded area on the top row of the grid shows the channels that are still available on the host DI-730 instrument when the DI-725 is added.

When a Single DI-725 is Used.



The following grid is typical of two DI-725’ s used with a DI-730. Note the pattern. Each DI-725 consumes the two highest-numbered channels on the host DI-730, and the expansion channels are enabled on the next MUX row down. The result is similar when more DI-725’s are added to the system.

When Two DI-725’s are Used.



DI-78B 8B Module Channel Expander

The DI-78B is a sixteen-channel, 8B-module expansion device for DI-720, DI-722, and DI-730 instruments. Each DI-78B accepts up to sixteen high performance, plug-in signal conditioning modules, expanding the measurement capability of DI-720 and DI-730 instruments to include virtually any isolated, industrial-type signal. Each DI-78B is provided with the appropriate cable to connect it to its host instrument.

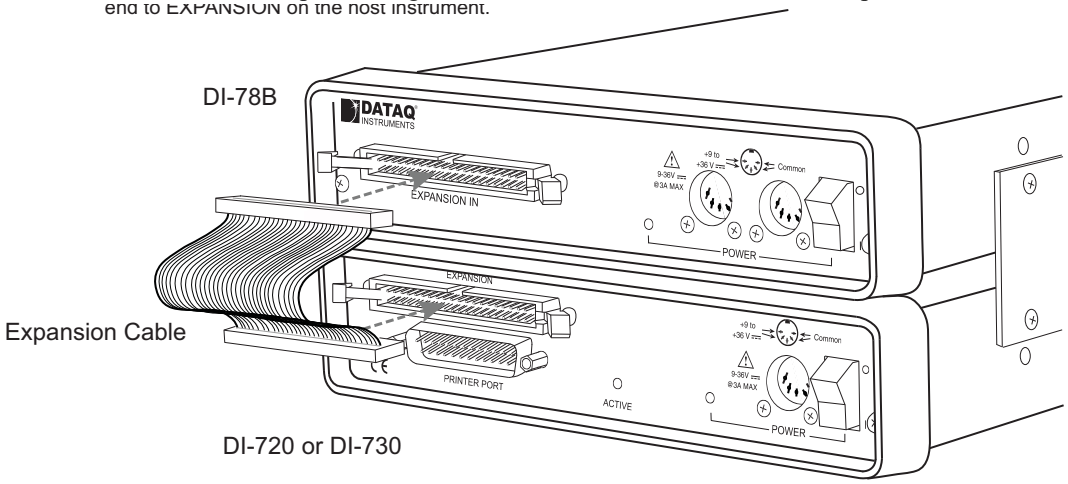
Each DI-78B channel consumes one channel from its host instrument in return for the isolated, signal-conditioned input it provides. One DI-78B instrument may be connected to any DI-720 or DI-730 instrument. Signal connections are made to the DI-78B through four removable screw terminal blocks. Power is obtained from the host DI-720 or DI-730 instrument through the supplied, dual-ended power cable.

Connecting the DI-78B to the Host Instrument

Note: *The included expansion signal cable and the dual ended power cable are sized to fit when the DI-78B is stacked on top of (or under) the host instrument. If the instruments are not in a stacked configuration, do so before proceeding.*

1. Connect one end of the included expansion signal cable to EXPANSION on the rear panel of the host instrument.

2. Connect the other end of the expansion signal cable to EXPANSION IN on the rear panel of the DI-78B.



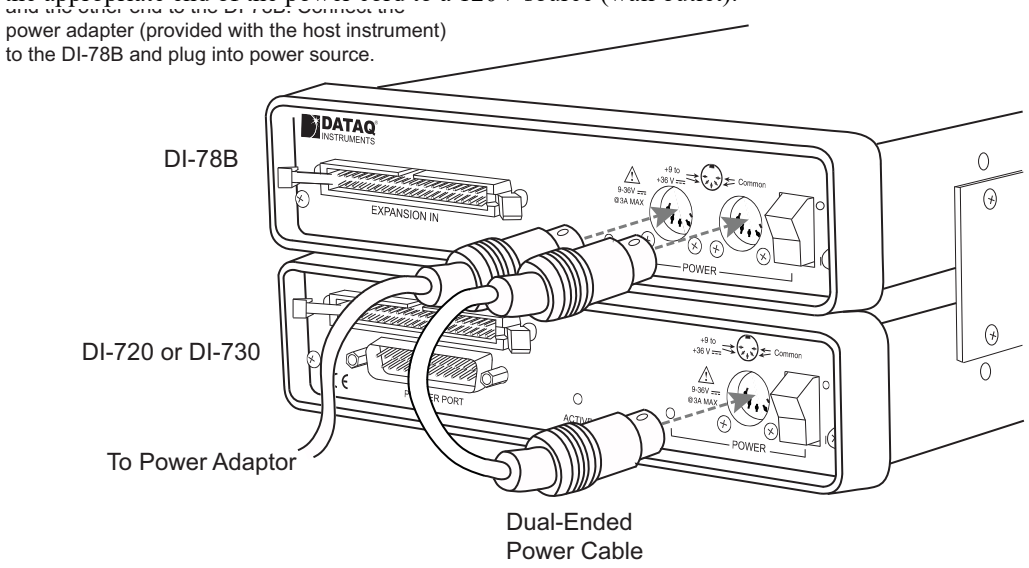
Applying Power to the DI-78B

A separate power supply is not required. Power is obtained from the host DI-720 or DI-730 instrument through the dual-ended power cable supplied with the DI-78B. Modules should be installed before power is applied to the instrument. See “Installing DI-8B Modules” on page 54 for instructions on installing 8B modules.

1. Unplug the five-pin DIN end of the power adapter cable that is currently supplying power to your DI-720 or DI-730 and plug it into one of the DI-78B’s power jacks.

2. Plug one end of the dual -ended power cable into the remaining power jack in the DI-78B and plug the other end into the host instrument power jack.

3. Plug the appropriate end of the power cord to a 120V source (wall outlet).

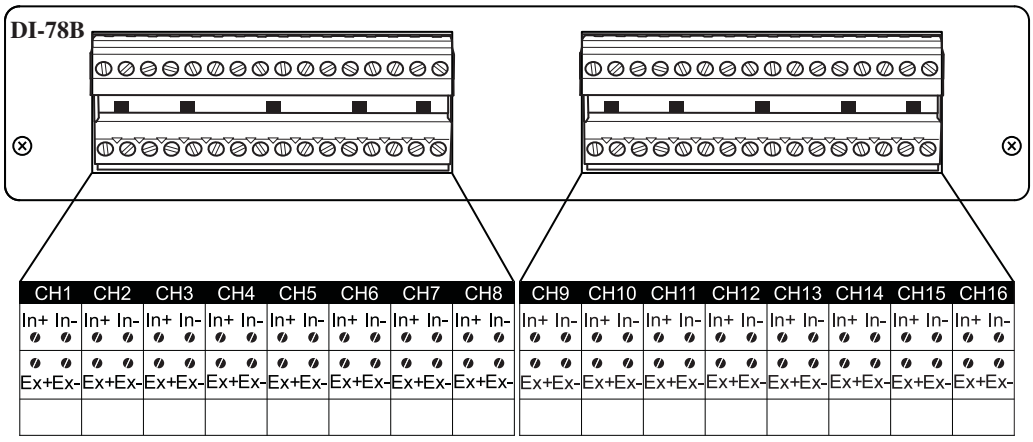


Features, Controls, and Indicators

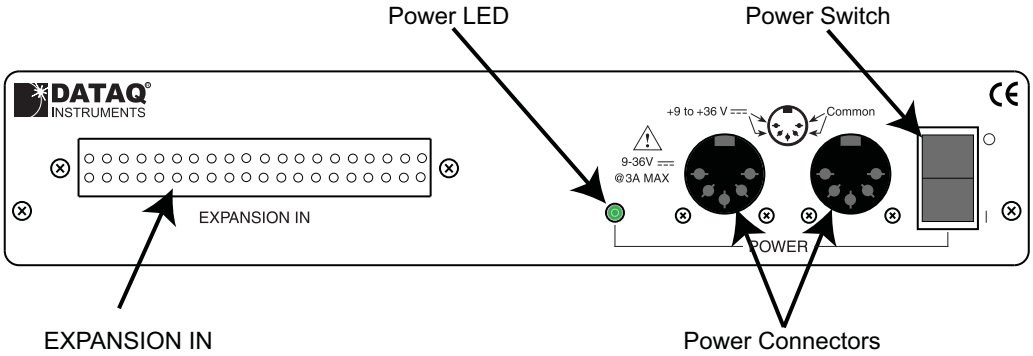
The DI-78 front panel contains four removable sixteen position screw terminal blocks for quick and easy connection of all analog in signal leads. The rear panel provides connections for power and expansion in.

DI-78B Front Panel

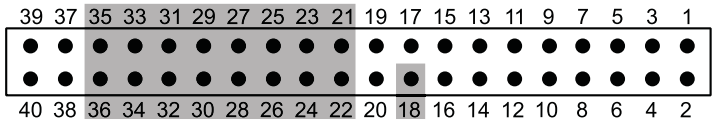
The four 16-port screw terminals on the front of the DI-78B are used to interface analog input channels 1 through 16 (channels 17 through 32 of the host DI-720 or DI-730 instrument). Each channel has four terminals: In+, In-, Ex+, and Ex- for input signals and excitation (if required). Use the sticker located on the top of your instrument for quick reference to terminal access port designations.



DI-78B Rear Panel



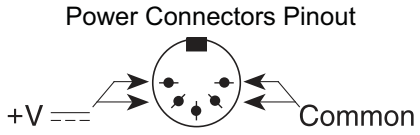
EXPANSION IN connector — Connects the DI-78B to the host instrument. Use the following diagram for pinout.



Pin	Description
18	Analog Ground
21	Channel 16
22	Channel 8
23	Channel 15
24	Channel 7
25	Channel 14
26	Channel 6
27	Channel 13
28	Channel 5
29	Channel 12
30	Channel 4
31	Channel 11
32	Channel 3
33	Channel 10
34	Channel 2
35	Channel 9
36	Channel 1

Power LED — Glows green when power is applied.

Power Connectors — Input jacks to provide power to the instrument. Allows you to apply an alternate power source to the instrument, if necessary. Power may be applied to the host instrument using the provided dual-ended power cable. See “Connecting the DI-78B to the Host Instrument” on page 52. Output capacity of the power supply is 2.5A.



Power switch — Controls power to the DI-78B. 1 position is on, 0 is off.

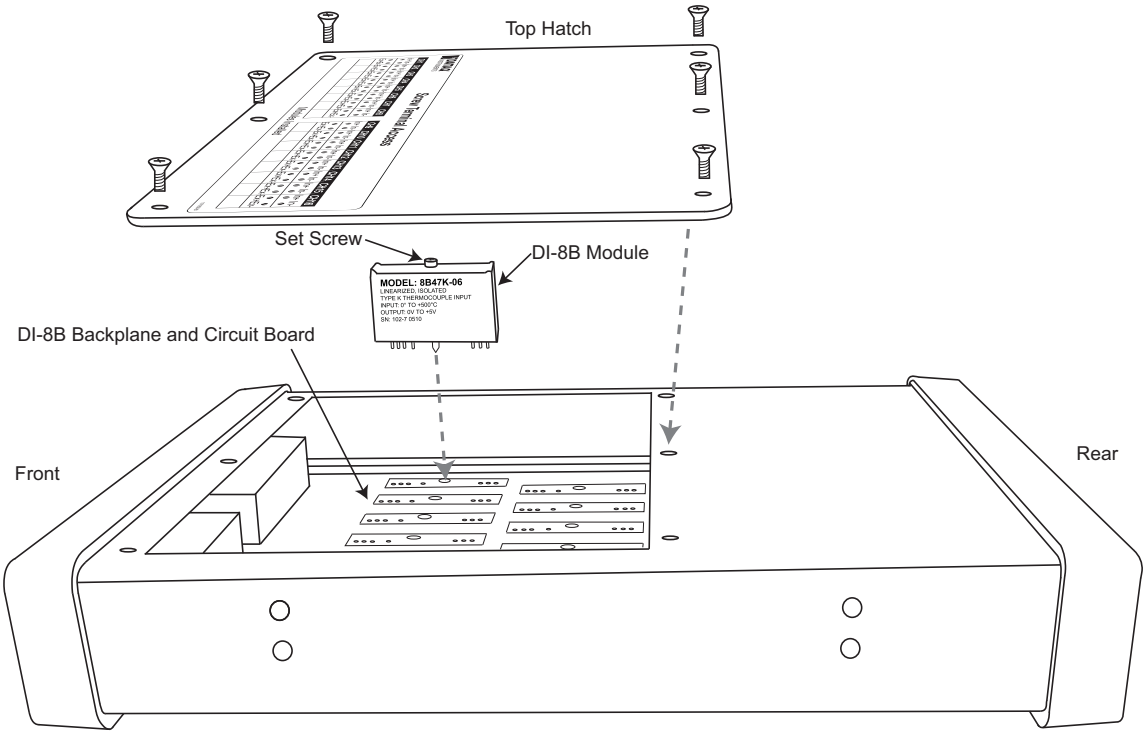
Installing DI-8B Modules

DI-78B instructions accept up to 16 signal conditioned analog inputs. All DI-8B modules must be installed onto the DI-8B backplane (located on the instrument circuit board).

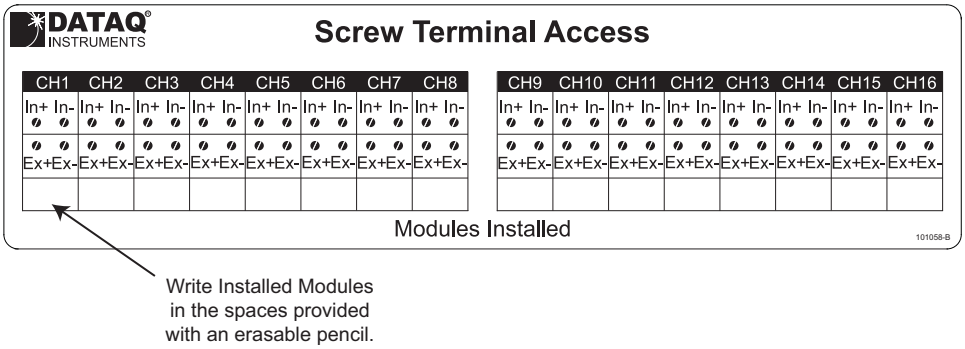
1. Unplug the device and make sure there is no power to the instrument.

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 labelled 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.



5. After all modules are installed and indicated on the sticker reassemble the instrument. ***Note:*** *If your are installing a thermocouple module you must enable the Cold Junction Compensation jumper for that channel (see "Enabling CJC for Thermocouple Modules" below).*

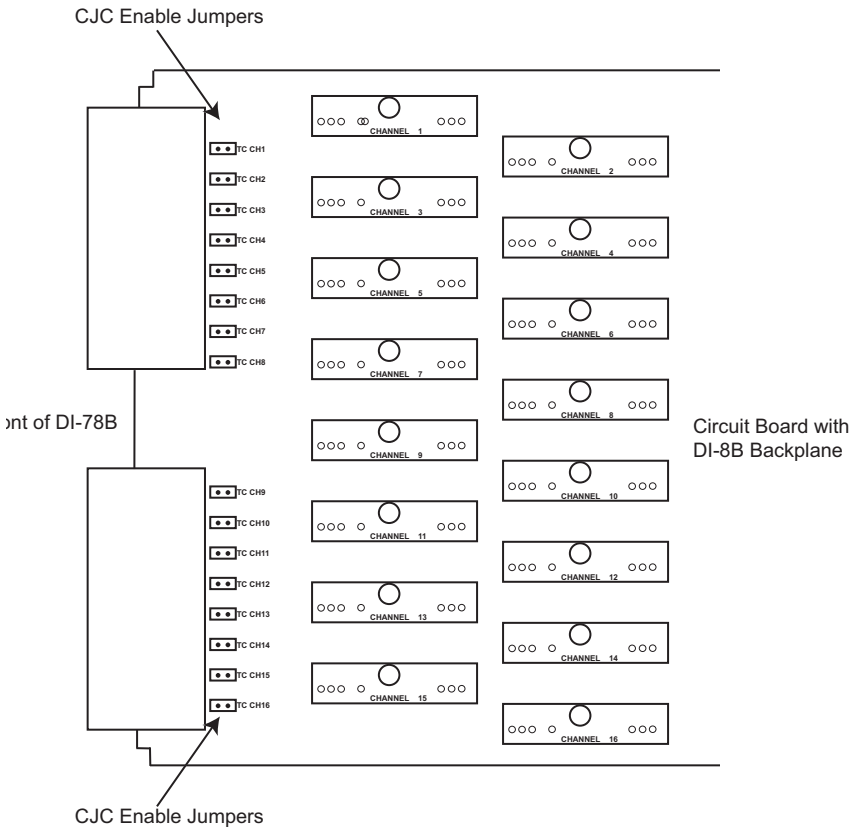
Enabling CJC for Thermocouple Modules

If you are installing a Thermocouple Input Module (see “DI-8B47 Linearized Thermocouple Input Modules” on page 69) 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” on page 54 for disassembly). ***Tip:*** *Install all unused jumpers onto* ***one*** *pin of each channel so they cannot be accidentally misplaced.*

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. Install a jumper onto the board for each channel that uses a thermocouple module. Each jumper is labelled on the circuit board as “TC CH#” where # is the channel number. Sixteen jumpers are provided with the DI-78B for this purpose.



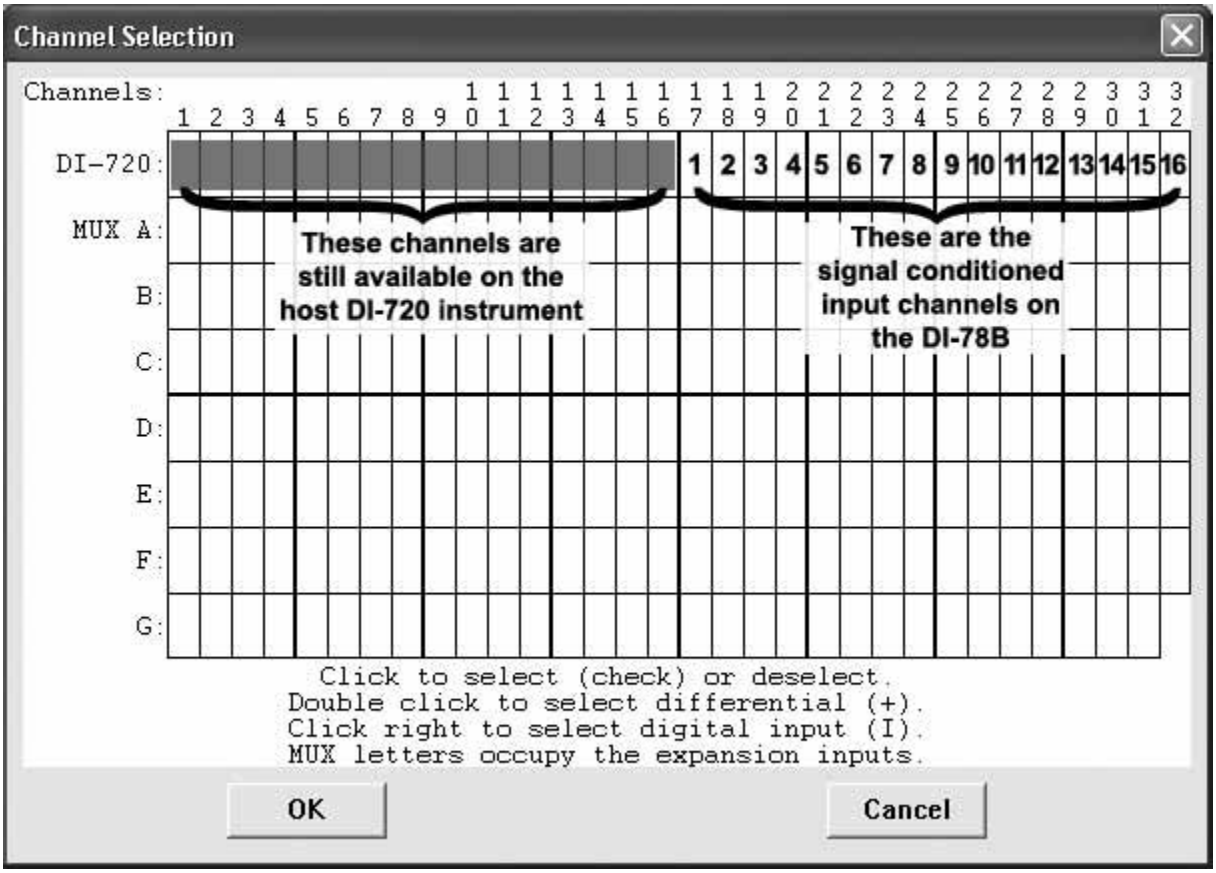
Note: *If you are not using a Thermocouple Input Module on that channel be sure the jumper is disabled (removed or installed on only one* ***pin****) because this will affect the input signal.*

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

Configuring DI-78B Channels in WinDAQ

Channels are enabled in the channel selection grid (select **Channels...** from the **Edit** menu) in WinDAQ Data Acquisition software. Each box in the grid represents an input channel. Click on the desired channel box to enable a channel.

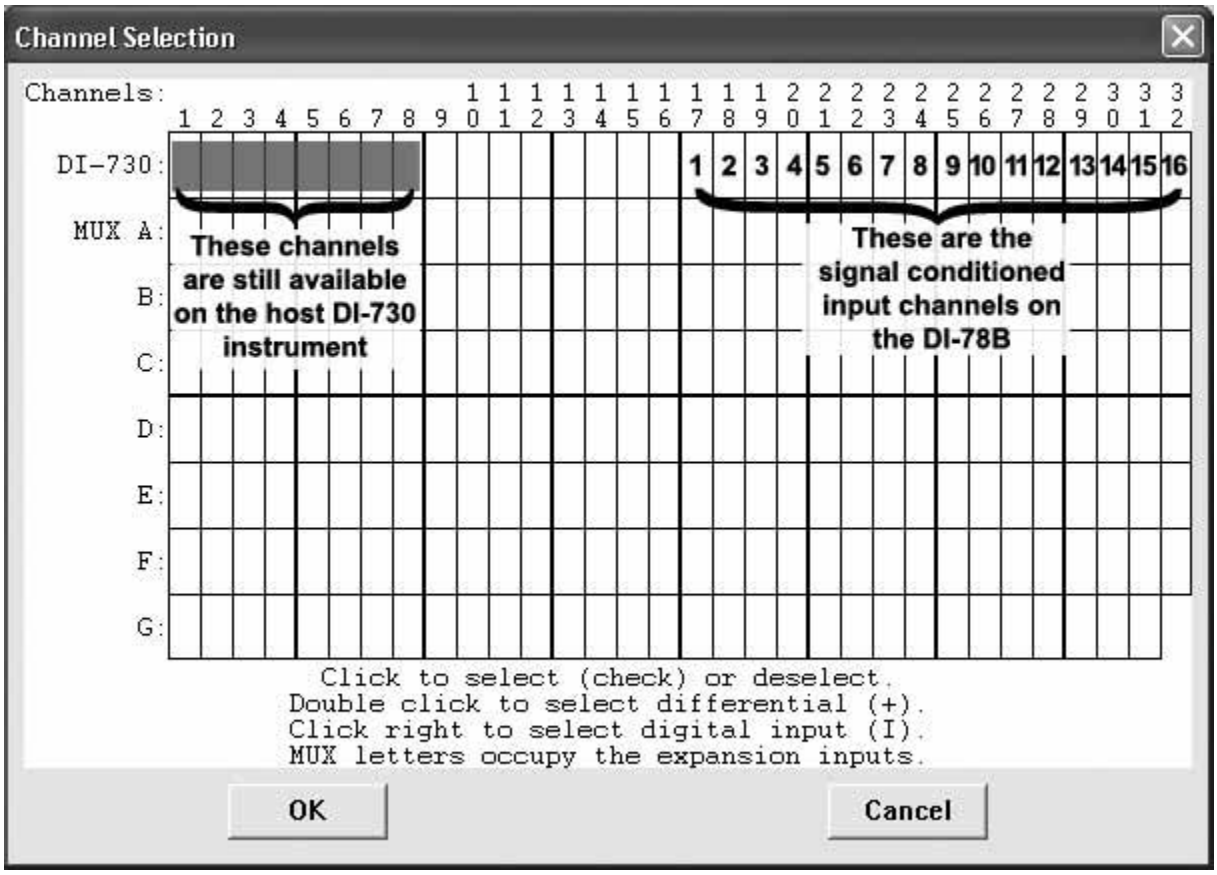
DI-720 Host Instruments



Typical channel selection grid showing a DI-78B with a host DI-720

All channels (on both the DI-720 and the DI-78B) are enabled on the top row of the Channel Selection grid. The shaded areas show the channels that are still available on the host DI-720 instrument when the DI-78B is added. These channels can be enabled as single-ended or differential, the same as before the DI-78B was added. Channels 17 through 32 (channels 1 through 16 on the DI-78B) are defined by DI-8B modules and are enabled by clicking once with the left mouse button. Note that if a DI-8B module is not plugged into a slot on the DI-78B, then that channel is available on the host DI-720 instrument.

DI-730 Host Instruments



Typical channel selection grid showing a DI-78B with a host DI-730

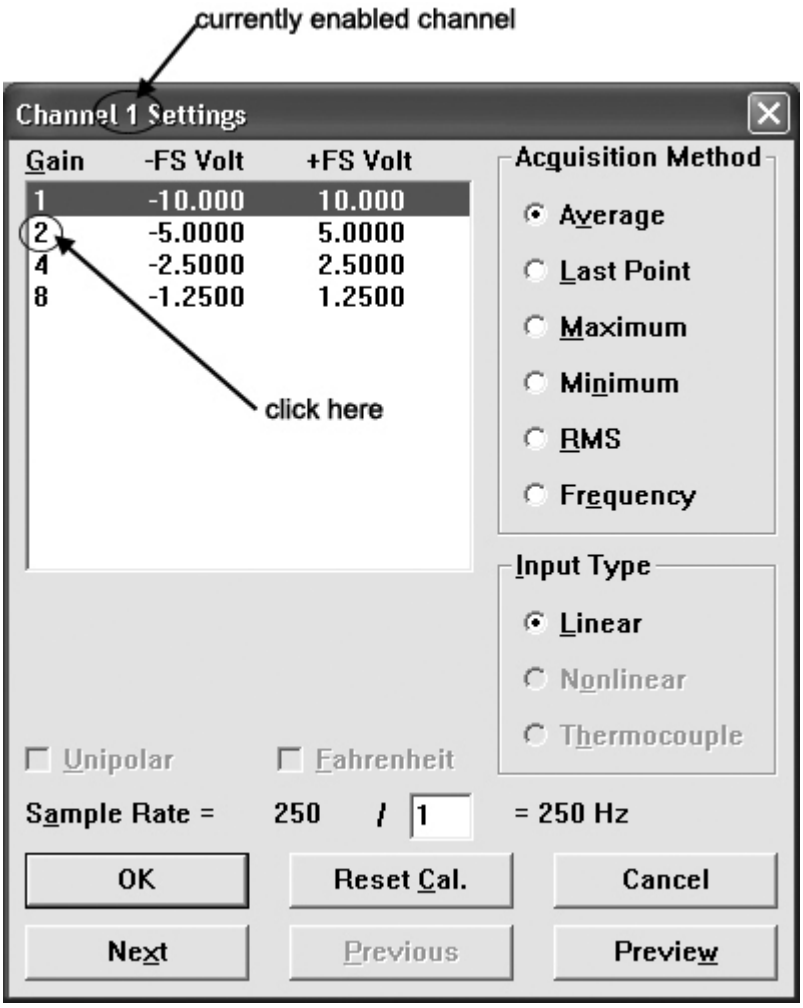
All channels (on both the DI-730 and the DI-78B) are enabled on the top row of the Channel Selection grid. The shaded areas show the channels that are still available on the host DI-730 instrument when the DI-78B is added. Channels 17 through 32 (channels 1 through 16 on the DI-78B) are defined by DI-8B modules and are enabled by clicking once with the left mouse button. The isolated differential inputs on the front panel of the DI-730 are still available.

Configuring DI-78B Channel Gain (you MUST configure gain for proper readings)

The signal conditioned (or DI-8B module) channels on the DI-78B output ±5 volts to the host instrument. Since the DI-78B connections to the DI-720 Series and DI-730 Series (available through the EXPANSION connector) host instruments are ±10 volt input devices, each DI-78B signal conditioned channel in use ***MUST*** be set to a gain of 2, so they have a full scale measurement range of ±5 volts.

1. After you have enabled channels, click on **Channel Settings…** in the **Edit** menu.

This displays the Channel X Settings dialog box (where X represents the currently enabled channel).



2. In the upper left corner of the dialog box, click the gain factor 2 to get a ± full scale range of 5 volts.

3. Click the Next (or Previous) command button at the bottom of the dialog box to step to the next (or previously) enabled channel. Note that when either the Next or Previous button is activated, the channel number in the title bar of the dialog box changes to indicate the channel you are currently working on.

4. Repeat steps 2 and 3 for each DI-78B signal conditioned channel in use.

5. Click the OK command button to close the Channel Settings dialog box.

DI-8B Modules

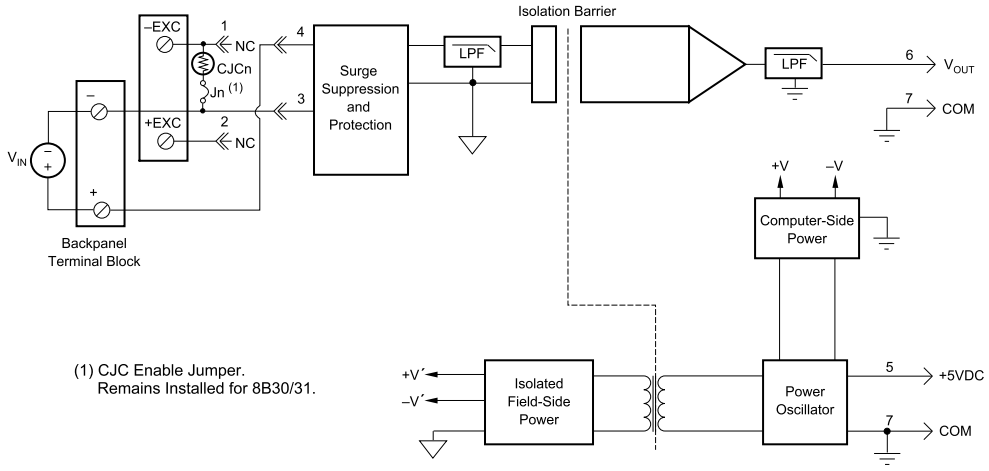
DI-8B30/31 Analog Voltage Input Modules, 3Hz Bandwidth

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, ±5%.



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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

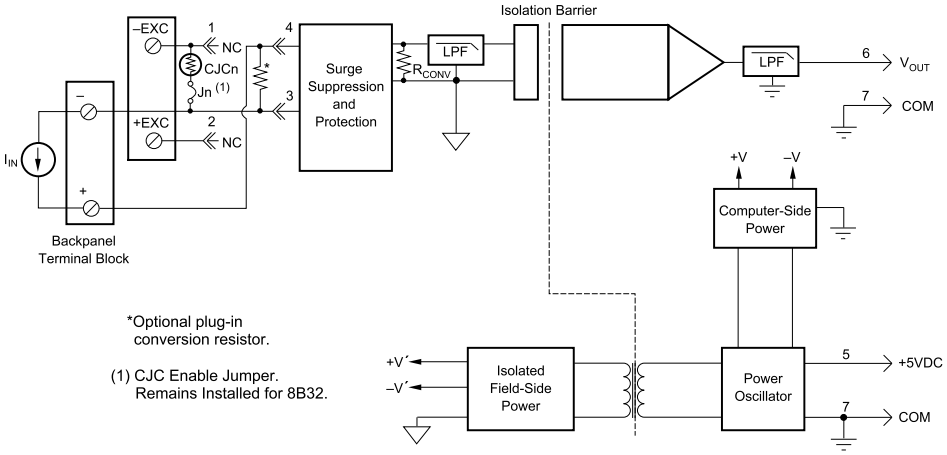
DI-8B32 Analog Current Input Modules

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, ±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

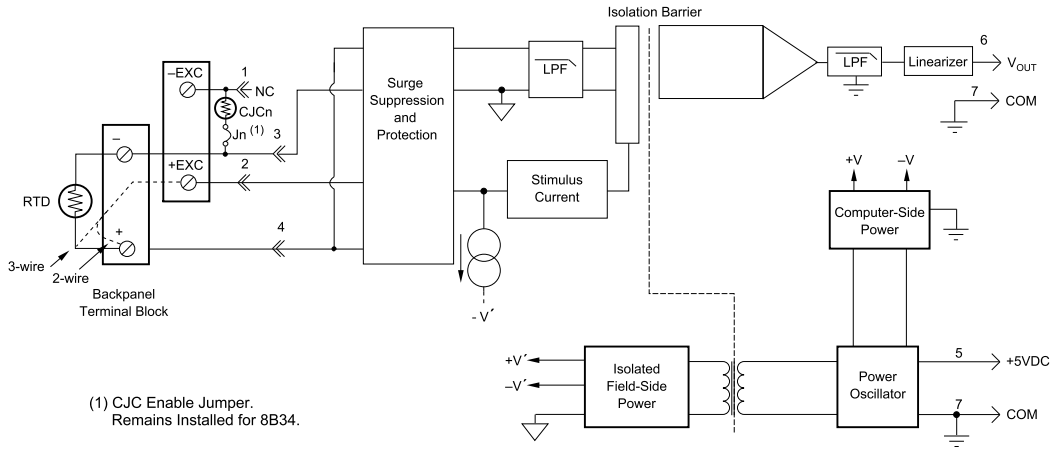
DI-8B34 Linearized 2- or 3-Wire RTD Input Modules

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

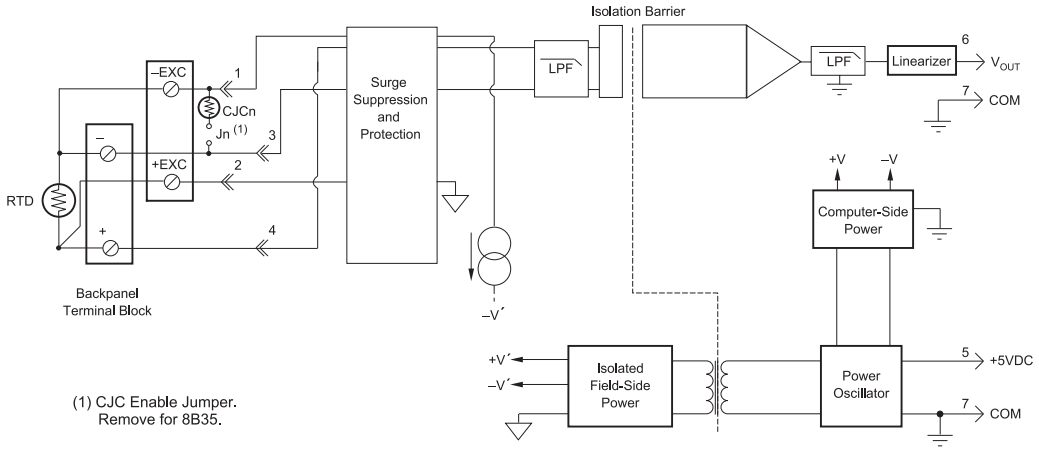
In RTD temperature measurement applications requiring a very high level of accuracy, the DI-8B35 4-Wire RTD input module offers a significant advantage over 3-wire measurement techniques (see block diagram). The DI-8B35 measures only the voltage dropped across the RTD and almost completely ignores the 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 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.

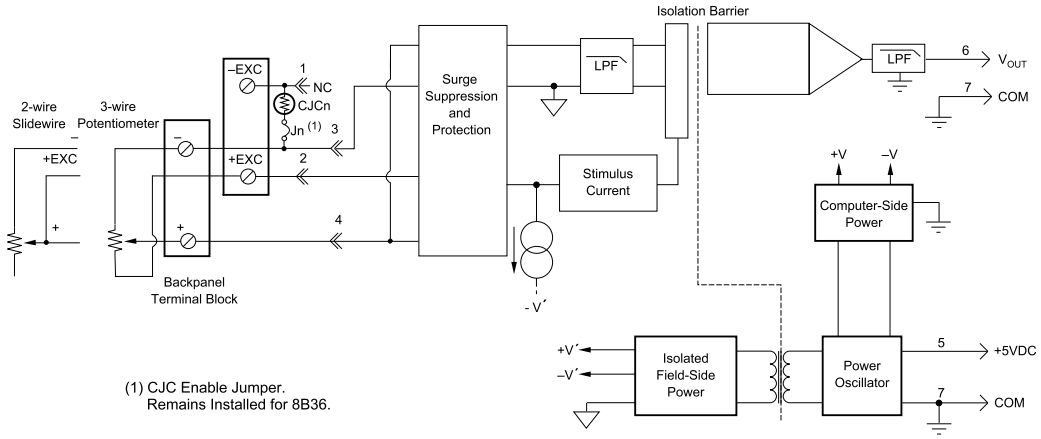
DI-8B36 Potentiometer Input Modules

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 100Ω	0V to +5V
DI-8B36-02	0 to 500Ω	0V to +5V
DI-8B36-03	0 to 1kΩ	0V to +5V
DI-8B36-04	0 to 10kΩ	0V to +5V

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

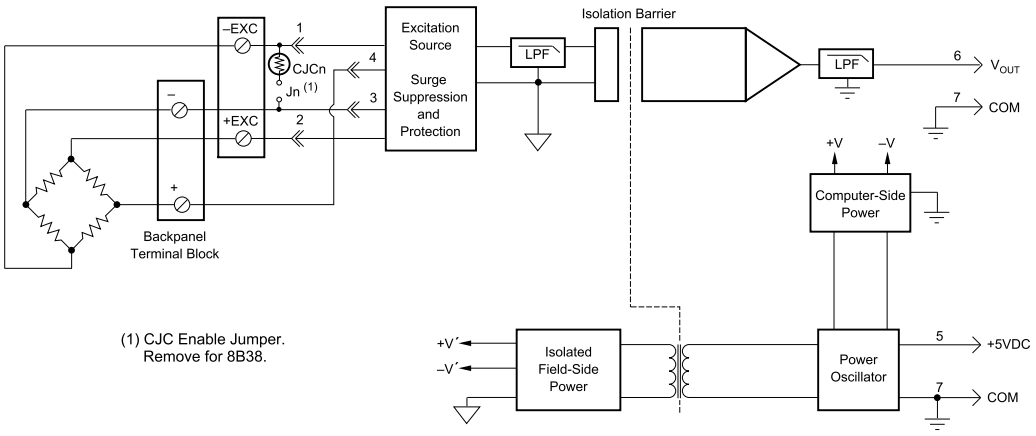
Each DI-8B38 module isolates, filters and amplifies a full-bridge strain gage input signal and provides an analog voltage output.

The 8B38 can interface to transducers with a nominal resistance of 100 to 10k. 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 for anti-aliasing, 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, ±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

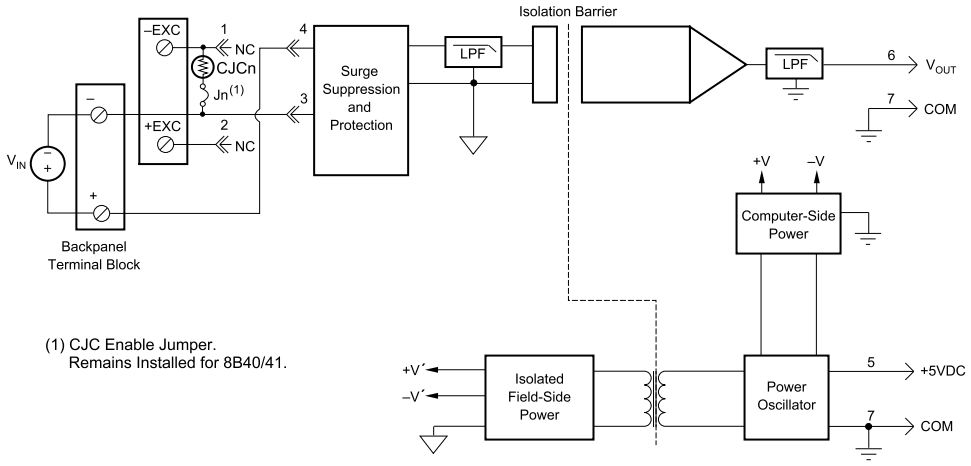
DI-8B40/41 Analog Voltage Input Modules, 1kHz Bandwidth

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 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, ±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

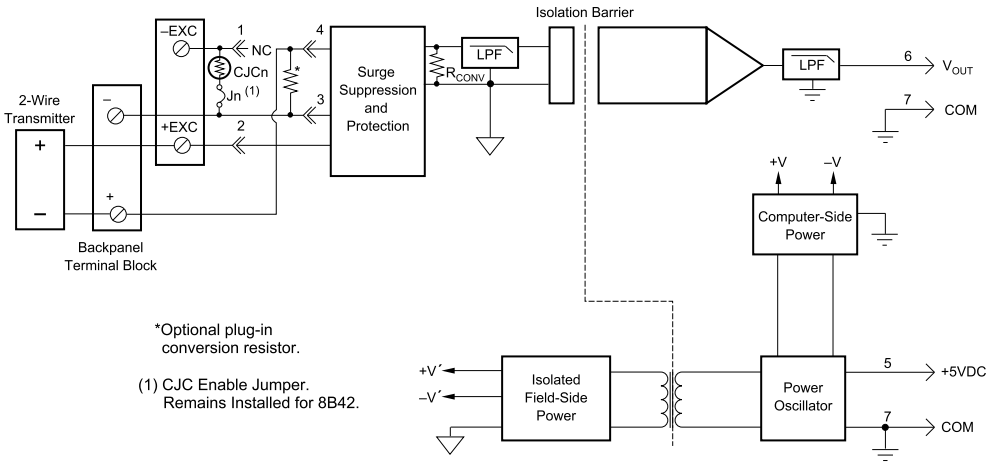
Each DI-8B42 module provides power to a current transmitter, then isolates, filters and amplifies the resulting process current input signal and provides an analog voltage output.

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, ±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-8B45 Frequency Input Modules

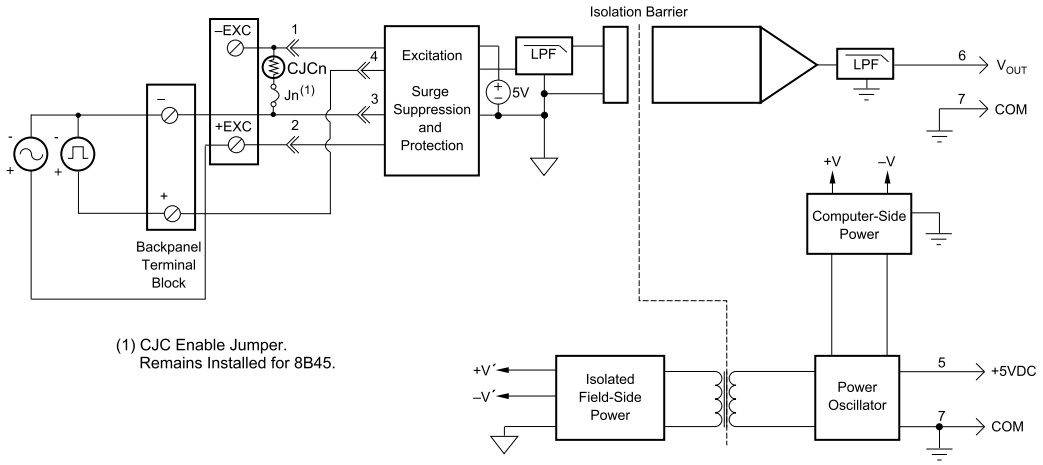
Each DI-8B45 module isolates and conditions a frequency input signal and provides an analog voltage output.

The frequency input signal can be either a TTL level or zero crossing with as little as ±100mV 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, ±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.

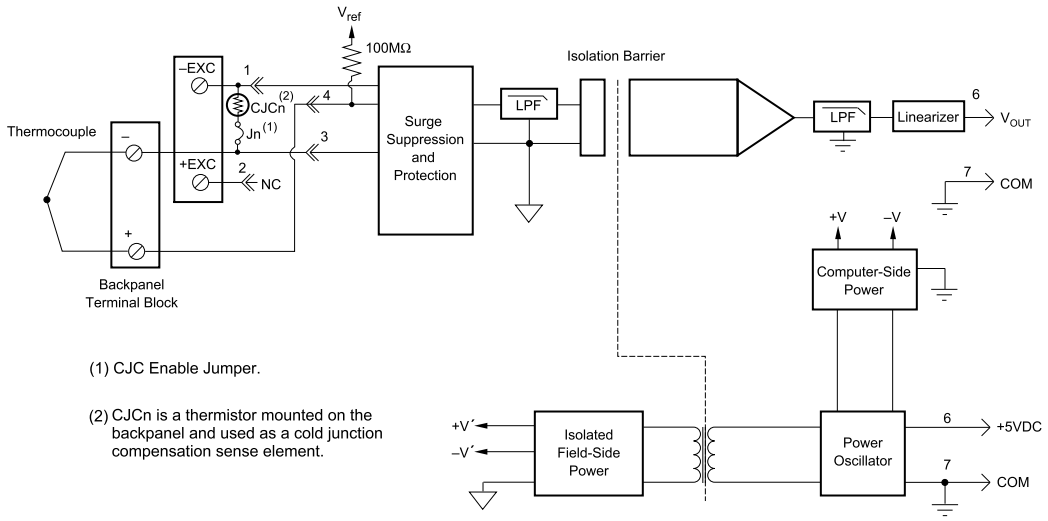
Linearization is accomplished using a four breakpoint piece wise linear approximation.

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.

Note: The temperature accuracy of these thermocouple modules when used with the DI-78B is ±2ºC @25ºC.



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 (+32°F to +392°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.

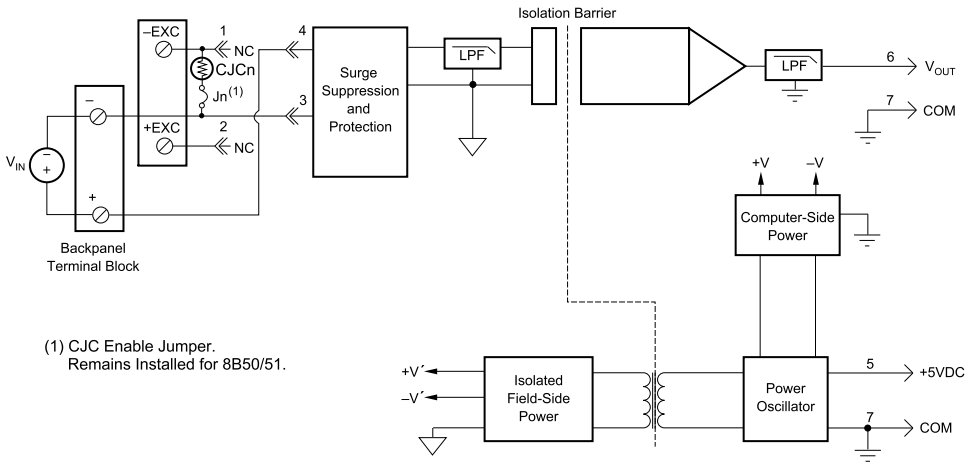
DI-8B50/51 Analog Voltage Input Modules, 20kHz Bandwidth

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, ±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

DI-75B 5B Module Channel Expander

The DI-75B is an eight-channel, 5B-module expansion device for DI-720, DI-722, and DI-730 instruments. Each DI-75B accepts up to eight high performance, plug-in signal conditioning modules, thereby expanding the measurement capability of it host instrument to include virtually any isolated, industrial-type signal. Each DI-75B is provided with the appropriate cable to connect it to its host instrument.

Each DI-75B channel consumes one channel from its host instrument in return for the isolated, signal-conditioned input it provides. A maximum of two DI-75B instruments may be connected to its host instrument to get a total of 16, 5B-conditioned input channels (in addition to any remaining channels within the host instrument). Signal connections are made to the DI-75B through a removable screw terminal block. Power is obtained from the host instrument through the supplied, dual-ended power cable.

Connecting the DI-75B to the Host Instrument

NOTE: The included expansion signal cable and the dual-ended power cable are sized to fit when the DI-75B is stacked on top of (or below) the host instrument. If these instruments are not in a stacked configuration, do so before proceeding.

6. Connect the appropriate end of the included expansion signal cable to the EXPANSION port on the rear panel of the host instrument.

7. Connect the other end of the expansion cable to EXPANSION IN on the rear panel of the DI-75B.

Applying Power to the DI-75B

A separate power supply is not required. Power is obtained from the host instrument through the dual-ended power cable supplied with the DI-75B. Apply power using the following procedure:

1. Unplug the five-pin DIN end of the power adapter cable that is currently supplying power to your DI-720, DI-722, or DI-730, and plug it into one of the DI-75B's power input jacks.

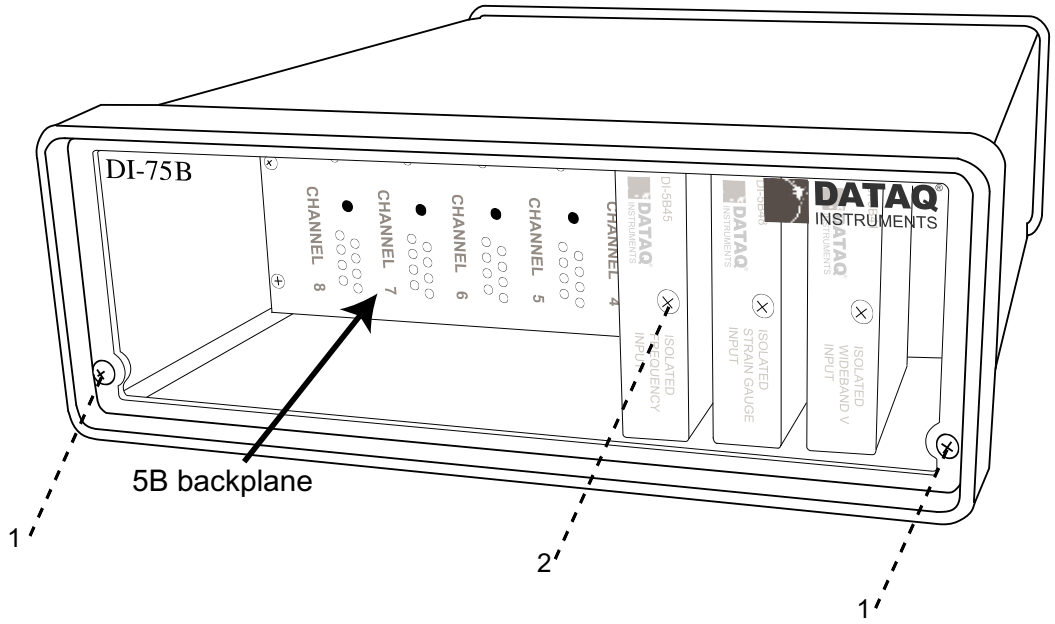
2. Plug one end of the dual-ended power cable into the remaining power jack on the DI-75B and plug the other end into the host instrument power input jack.

Features, Controls, and Indicators

DI-75B Front Panel

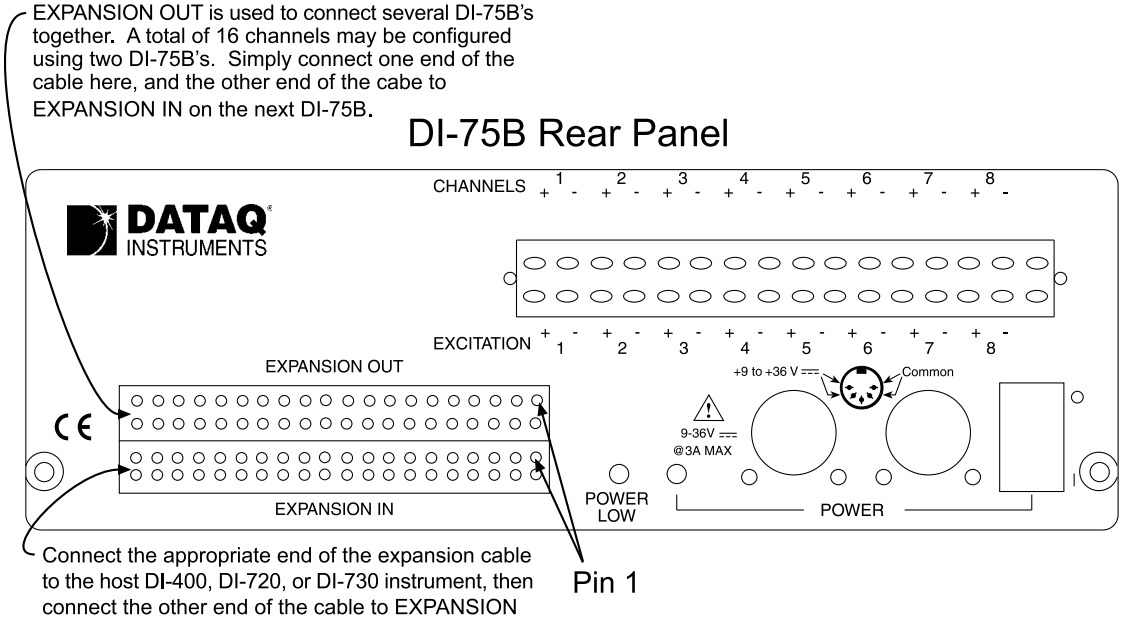
Access to the 5B modules is gained by removing the two screws on each side of the front panel, and then removing the front panel and bezel. **When reattaching the front panel, take care not to overtighten the two screws.**

1. Remove front panel and bezel by removing the two screws.
2. DI-5B Modules are installed to the 5B backplane using the set screw.



DI-5B modules are installed on (or removed from) a socketed backplane and are secured to the backplane with a non-removable mounting screw. Each channel position is labeled “CHANNEL 1,” “CHANNEL 2,” etc., on the socketed backplane. The DI-5B modules can be mixed or matched in any combination suitable for the application.

DI-75B Rear Panel



Expansion IN and Expansion OUT connector pin-out

+5V Power	1	●	●	2	Reserved
Reserved	3	●	●	4	Reserved
Reserved	5	●	●	6	Reserved
Reserved	7	●	●	8	Reserved
Reserved	9	●	●	10	Reserved
R. Start/Stop	11	●	●	12	R. Event Marks
PWR GND	13	●	●	14	Reserved
Reserved	15	●	●	16	Reserved
DAC 1	17	●	●	18	Analog GND
Reserved	19	●	●	20	Reserved
CH 16	21	●	●	22	CH 8
CH 15	23	●	●	24	CH 7
CH 14	25	●	●	26	CH 6
CH 13	27	●	●	28	CH 5
CH 12	29	●	●	30	CH 4
CH 11	31	●	●	32	CH 3
CH 10	33	●	●	34	CH 2
CH 9	35	●	●	36	CH 1
AGND	37	●	●	38	Reserved
Reserved	39	●	●	40	Reserved

Removable Screw Terminal Block — Allows signal connections to be made to the DI-75B. The input signal connections are made along the top row while the excitation connections (for those DI-5B modules that require excitation) are made along the bottom row. Note that this screw terminal block can be removed from the DI-75B, thus making signal connections to the screw terminals easy. Note also that the screw terminal block is "keyed," thus difficult to improperly re-insert. Each channel (labeled "CHANNEL 1," "CHANNEL 2," etc. on the socketed backplane) has four corresponding screw terminals for your signal connections: channel +, channel -, excitation +, and excitation -. These terminals satisfy all transducer inputs and provide sensor excitation when necessary.

POWER switch — Controls power to the DI-75B. 1 is on, 0 is off.

POWER input jacks — Allows you to apply an alternate power source to the instrument, if necessary. When used with either a DI-720 or DI-730, the DI-75B-7 can be powered by these instruments through the supplied dual-ended power cable. Simply unplug the five-pin DIN end of the power adapter cable that is currently supplying power to your DI-720 or DI-730, and plug it into one of the DI-75B's power input jacks. Now plug one end of the dual-ended power cable into the remaining power jack on the DI-75B and plug the other end into the host instrument power input jack. When used with a DI-700, the DI-75B-4 requires a separate power supply (user-supplied or available from Dataq Instruments as an additional cost item, part number 100454-25R).

POWER status lamp — Glows green when the POWER switch is in the 1 position, indicating power is applied to the DI-75B.

POWER LOW lamp — Glows red when the DI-75B cannot derive adequate power from its host instrument. In this case, an alternate power source is required. Any suitable power source (+9 to +36 volts DC at 3A maximum) may be connected to either power input jack to provide the necessary power.

EXPANSION OUT connector — Used to connect multiple DI-75B's together. Connect one end of an expansion cable to this connector and connect the other end of the cable to EXPANSION IN on the next DI-75B instrument.

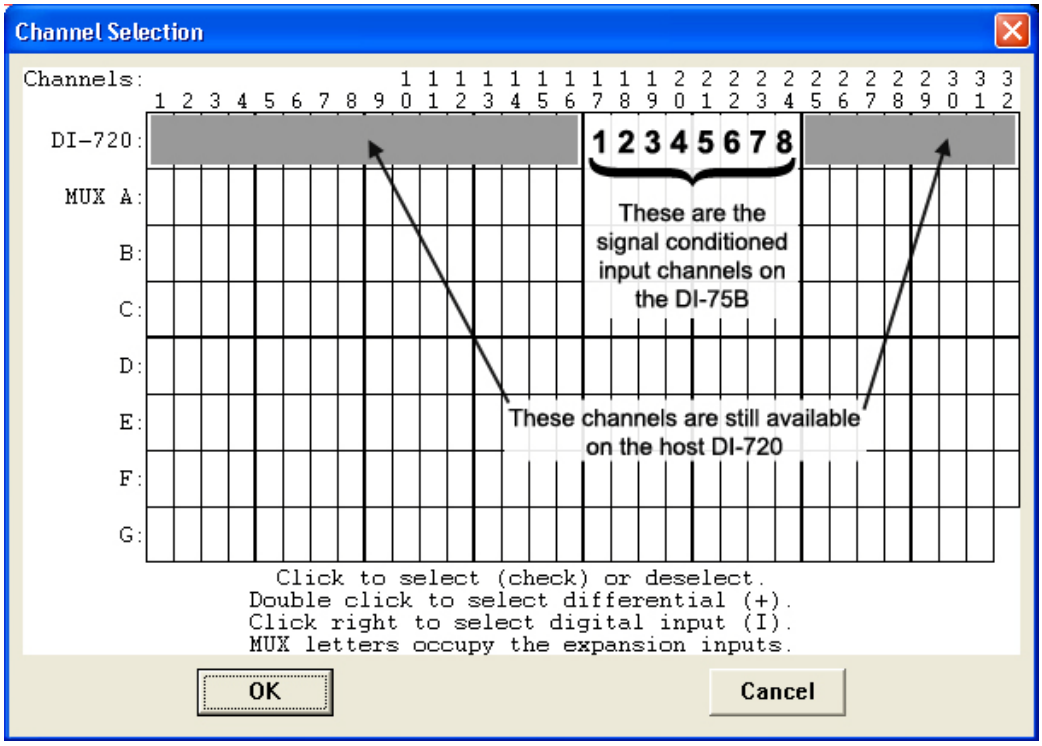
EXPANSION IN connector — Connects the DI-75B to its host instrument.

Configuring Channels with the DI-75B

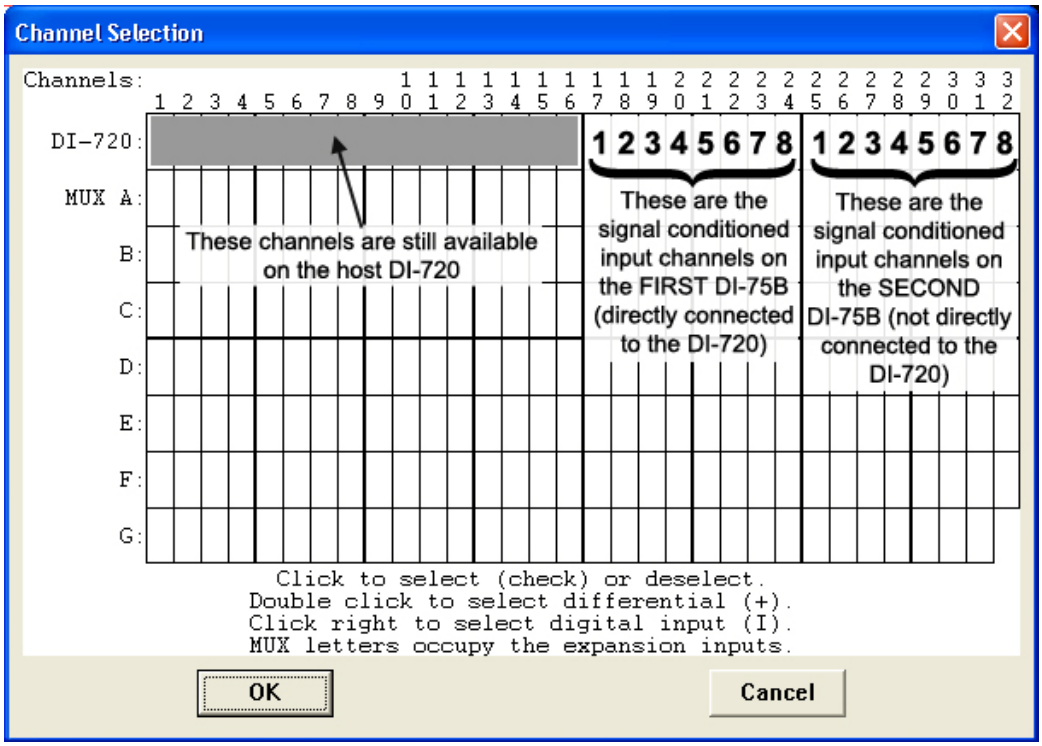
In WINDAQ/Pro or WINDAQ/Pro+ data acquisition software, channels are enabled or configured for acquisition with the channel selection grid. The channel selection grid is accessed by selecting **Channels…** from the **Edit** menu. Consult the WINDAQ help files for more information on selecting channels.

DI-72x Host Instruments

All channels (on both the DI-72x and the DI-75B) are enabled on the top row of the grid. The shaded areas show the channels that are still available on the host instrument after the DI-75B is connected. Channels 17 to 24 (channels 1 to 8 on the DI-75B) are defined by DI-5B modules and are enabled by clicking once with the left mouse button. Note that if a DI-5B module is not plugged into a slot on the DI-75B, then that channel is available on the host instrument.

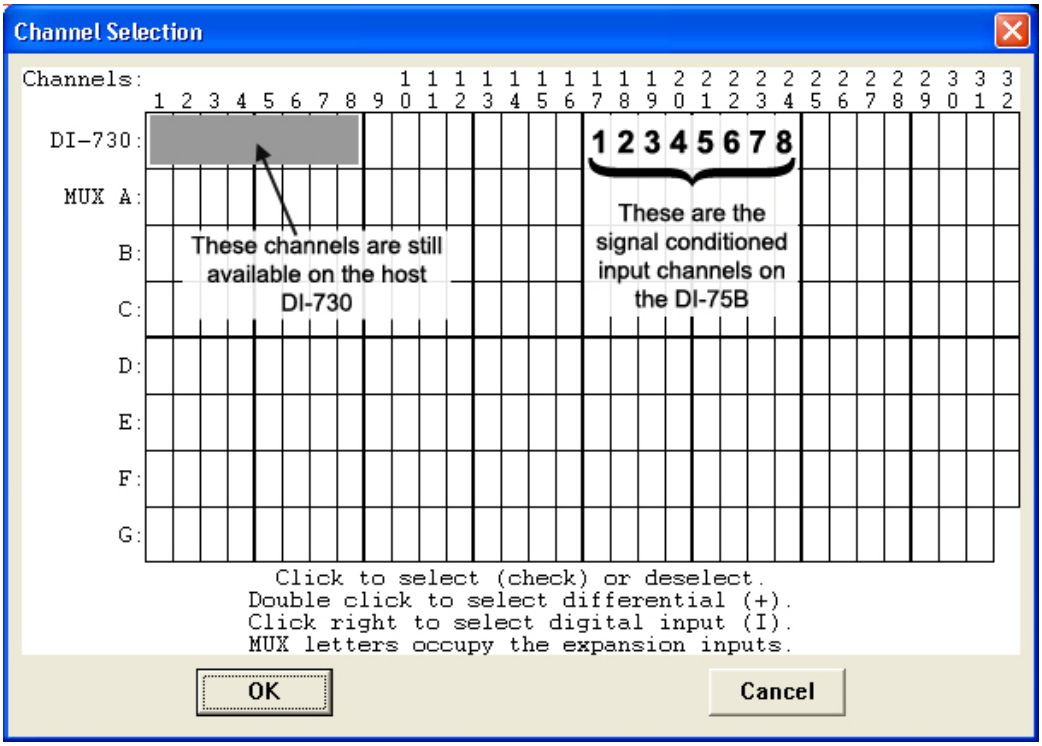


The following grid is typical of two DI-75B's used with a DI-72x. Again, if a DI-5B module is not plugged into a slot on the DI-75B, then that channel is available on the host instrument.

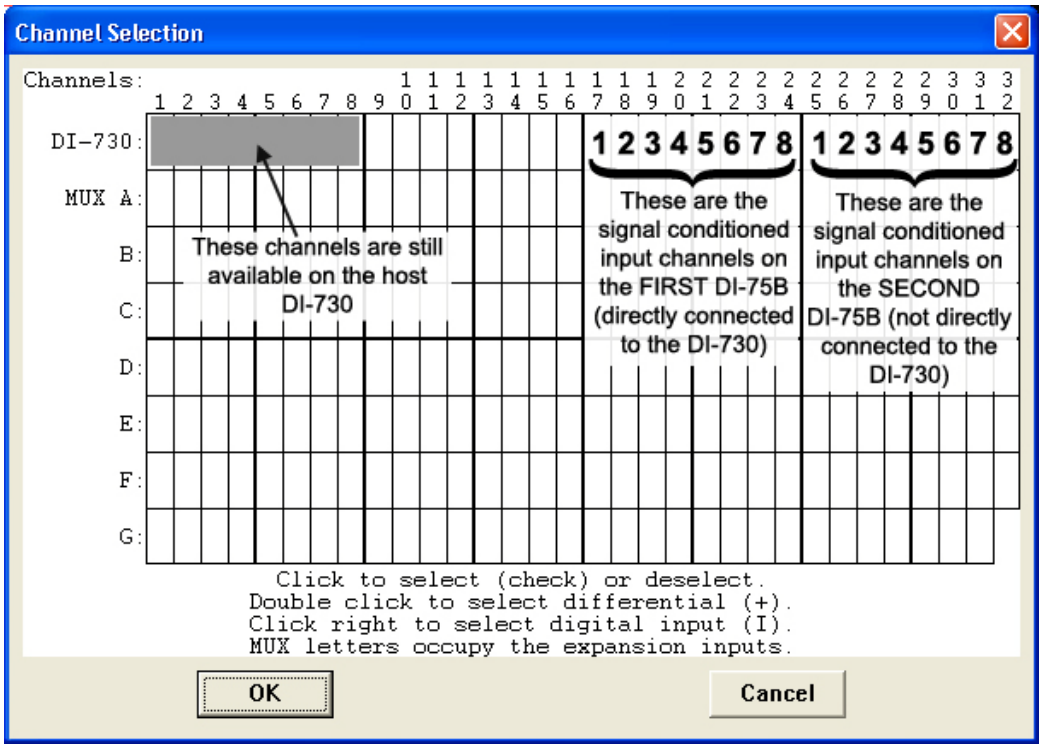


DI-730 Host Instruments

All channels (on both the DI-730 and the DI-75B) are enabled on the top row of the grid. The shaded area shows the channels still available on the host DI-730 instrument when the DI-75B is connected. Channels 17 to 24 (channels 1 to 8 on the DI-75B) are defined by DI-5B modules and are enabled by clicking once with the left mouse button. Note that if a DI-5B module is not plugged into a slot on the DI-75B, then that channel is available on the host instrument.



The following grid is typical of two DI-75B' s used with a DI-730. Again, if a DI-5B module is not plugged into a slot on the DI-75B, then that channel is available on the host DI-730 instrument.

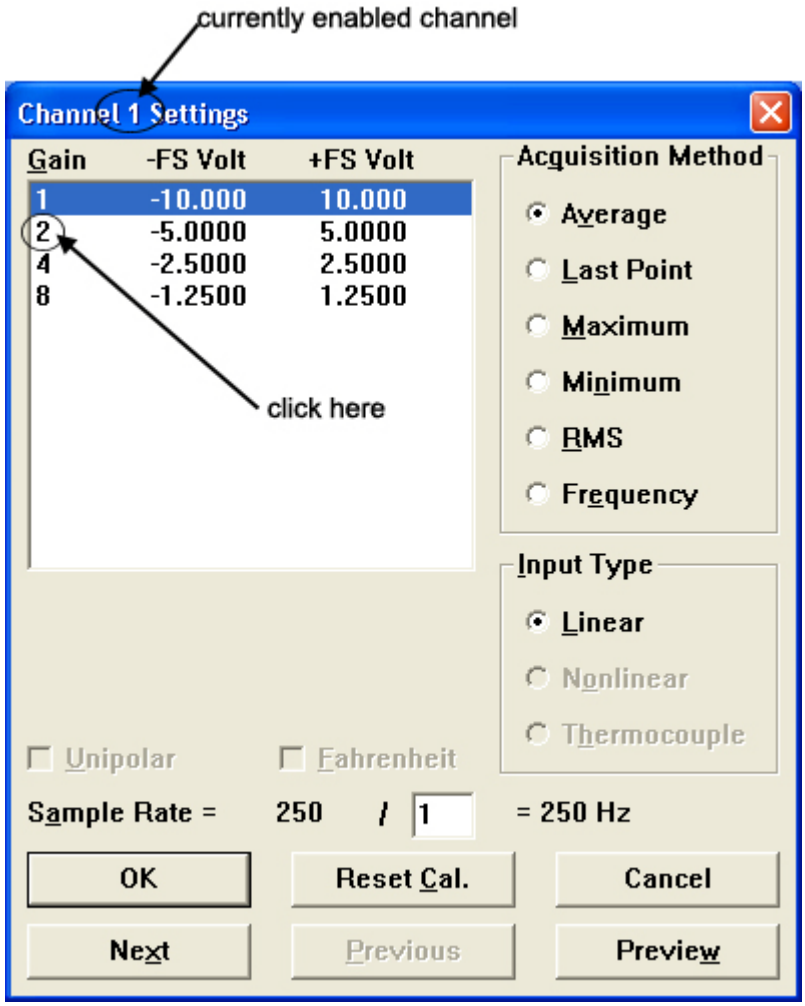


Configuring Host Instrument Channel Gain

The signal conditioned (or DI-5B module) channels on the DI-75B output ±5 volts to the host instrument. Since the DI-75B connections to the DI-700-PGH, DI-720 Series, and DI-730 Series (available through the EXPANSION connector) host instruments are ±10 volt input devices, each DI-75B signal conditioned channel in use must be set to a gain of 2, so they have a full scale measurement range of ±5 volts.

1. Enable channels in WINDAQ/Pro or WINDAQ/Pro+ recording software.

2. In the **Edit** menu click on **Channel Settings…**. The Channel X Settings dialog box (where X represents the currently enabled channel) displays.



3. In the upper left corner of the dialog box, click the gain factor 2 to get a ± full scale range of 5 volts.

4. Click the Next (or Previous) command button at the bottom of the dialog box to step to the next (or previously) enabled channel. Note that when either the Next or Previous button is activated, the channel number in the title bar of the dialog box changes to indicate the channel you are currently working on.

5. Repeat steps 2 and 3 for each DI-75B signal conditioned channel in use.

6. Click the OK command button to close the Channel Settings dialog box.

DI-5B Modules

DI-5B30/31 Analog Voltage Input Modules, Narrow Bandwidth

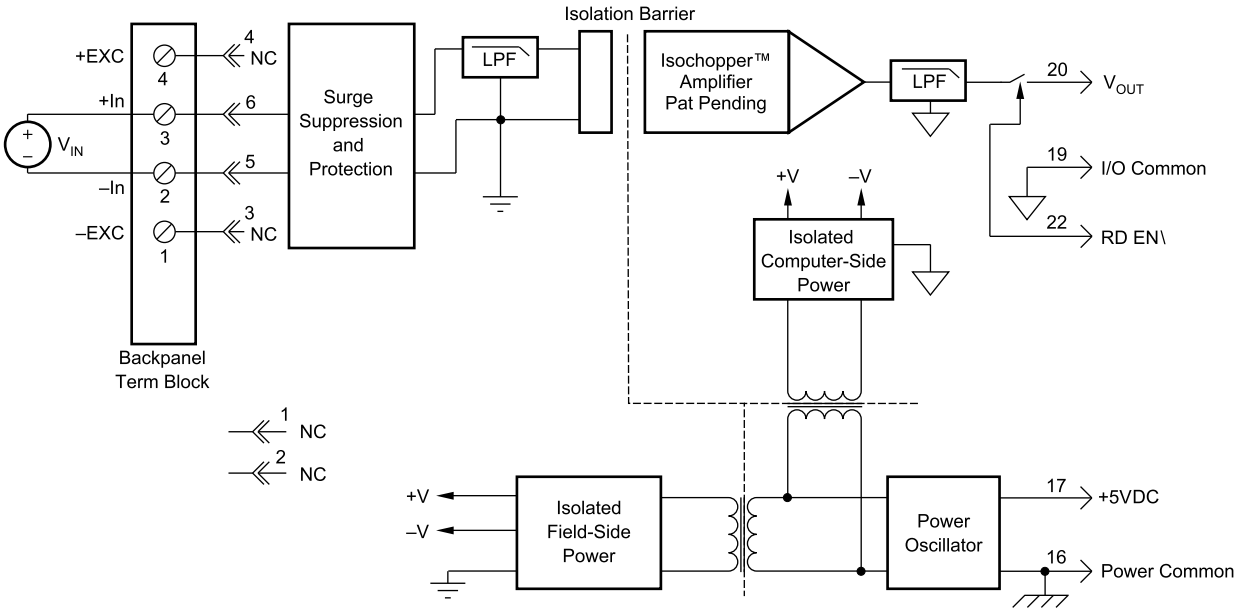
Each DI-5B30 and DI-5B31 voltage input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high level analog voltage output (see block diagram). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B30 and DI-5B31 modules provides protection against accidental connection of power-line voltages up to 240VAC.:



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

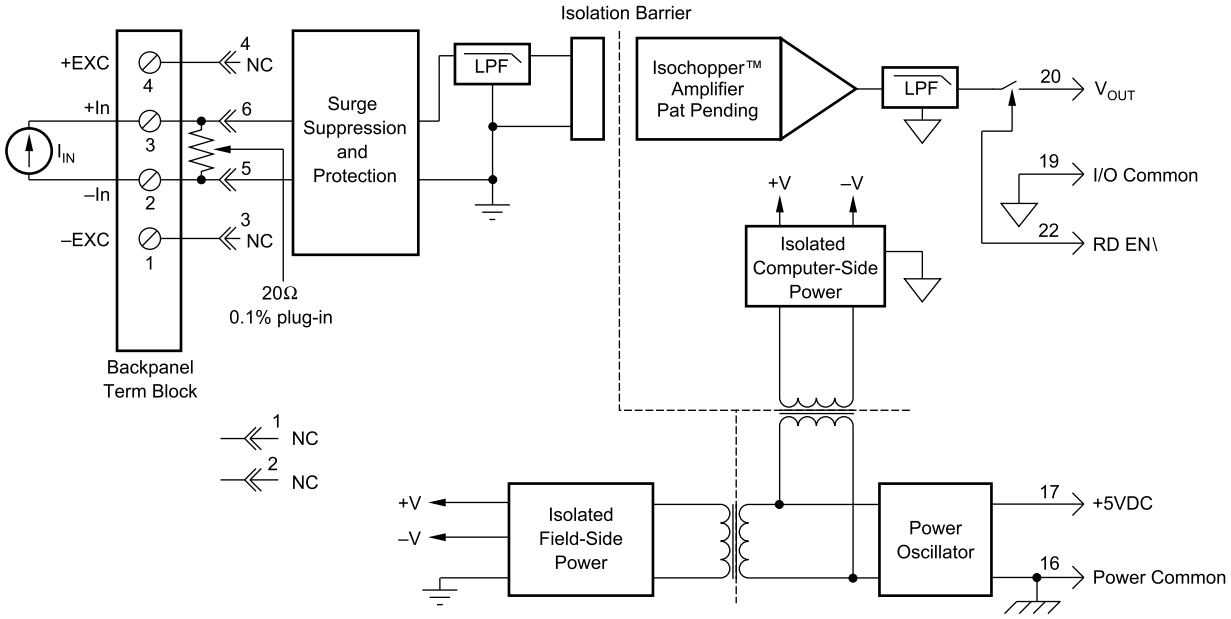
*CSA certification pending.

DI-5B32 Analog Current Input Modules

Each DI-5B32 current input module provides a single channel of analog input which is filtered, isolated, amplified, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

A precision 20Ω current conversion resistor is supplied with the DI-5B32 module (see block diagram for installation details).



Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B32 modules provides protection against accidental connection of power-line voltages up to 240VAC.

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

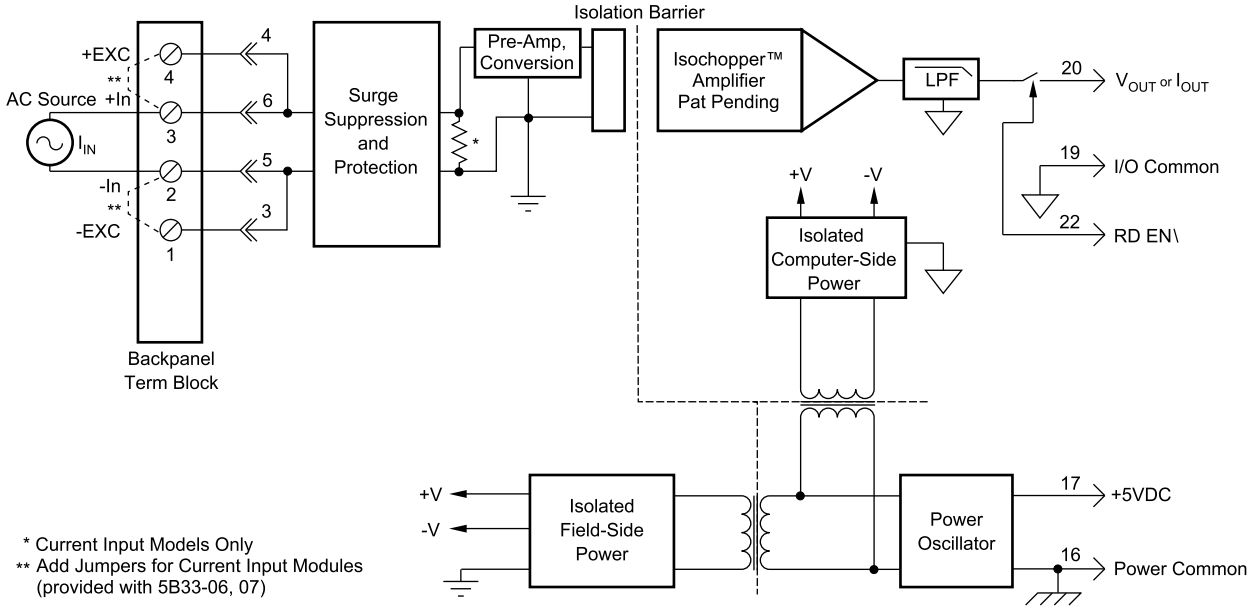
DI-5B33 Isolated True RMS Input Modules

Each DI-5B33 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 (see block diagram).

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

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 industry standard outputs. Modules are powered from +5VDC, ±5%.

For current output models an external loop supply is required having a compliance voltage of 14 to 48VDC. Connection, with series load, is between Pin 20 (+) and Pin 19 (-).



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

DI-5B34 Linearized 2- or 3-Wire RTD Input Modules

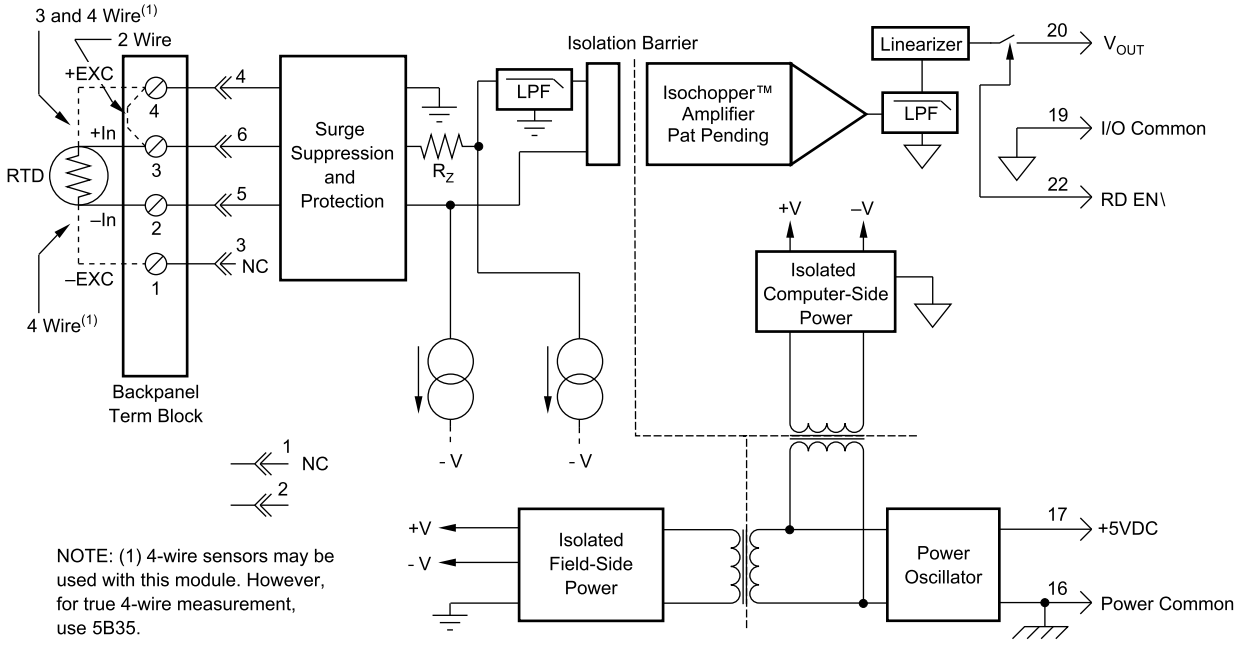
Each DI-5B34 RTD input module provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

RTD excitation is provided from the module by two matched current sources. When using a three-wire RTD, this method allows an equal current to flow in each RTD lead, which cancels the effects of lead resistances. The excitation currents are very small (0.25mA for 100Ω Pt and 120Ω Ni, and 1.0mA for 10Ω Cu) which minimizes self-heating of the RTD.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B34 modules provides protection against accidental connection of power-line voltages up to 240VAC.



Ordering Information			
MODEL	INPUT RANGE	OUTPUT RANGE	ACCURACY*
100Ω Pt, α = 0.00385			
DI-5B34-01	-100°C (-148°F) to +100°C (+212°F)	0V to +5V	±0.46°C
DI-5B34-02	0°C (32°F) to +100°C (+212°F)	0V to +5V	±0.36°C
DI-5B34-03	0°C (32°F) to +200°C (+392°F)	0V to +5V	±0.46°C
DI-5B34-04	0°C (32°F) to +600°C (+1112°F)	0V to +5V	±0.88°C
10Ω Cu, α = 0.004274			
DI-5B34C-01	0°C (32°F) to +120°C (+248°F) (10Ω at 0°C)	0V to +5V	±0.23°C
DI-5B34C-02	0°C (32°F) to +120°C (+248°F) (10Ω at 25°C)	0V to +5V	±0.23°C
DI-5B34C-03**	0°C (32°F) to +160°C (+320°F) (10Ω at 0°C)	0V to +5V	±0.32°C
120Ω Ni, α = 0.00672			
DI-5B34N-01	0°C (32°F) to +300°C (+572°F)	0V to +5V	±0.40°C

* Includes conformity, hysteresis and repeatability.

**CSA certification pending.

DI-5B35 Linearized 4-Wire RTD Input Modules

In RTD temperature measurement applications requiring a very high level of accuracy, the DI-5B35 4-Wire RTD input module offers a significant advantage over 3-wire measurement techniques (see block diagram). The DI-5B35 measures only the voltage dropped across the RTD and almost completely ignores the resistance or length of the RTD lead wires. The DI-5B34 3-Wire RTD module provides lead resistance compensation, but requires equal lead resistances, while the DI-5B35 does not require matched lead resistances.

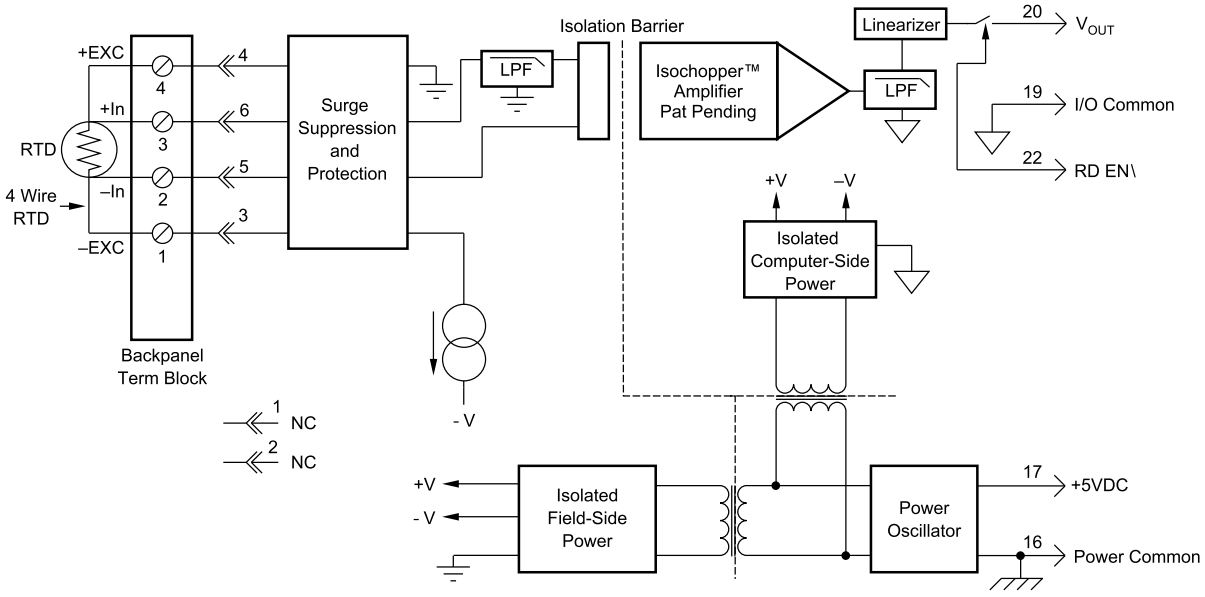
Each DI-5B35 RTD input module provides a single channel of RTD input which is filtered, isolated, amplified, linearized, and converted to a high level analog voltage output. This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

RTD excitation is provided from the module by a precision current source. The excitation current is available on two leads which are separate from the two input signal measuring leads. The excitation current does not flow in the input signal leads, which allows RTD measurement to be totally independent of lead resistance. The excitation current is very small (0.25mA for 100Ω Pt and 120Ω Ni, and 1.0mA for 10Ω Cu) which minimizes self-heating of the RTD.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B35 modules provides protection against accidental connection of power-line voltages up to 240VAC.



Ordering Information			
MODEL	INPUT RANGE	OUTPUT RANGE	ACCURACY*
100Ω Pt, α = 0.00385			
DI-5B35-01	-100°C (-148°F) to +100°C (+212°F)	0V to +5V	±0.46°C
DI-5B35-02	0°C (32°F) to +100°C (+212°F)	0V to +5V	±0.36°C
DI-5B35-03	0°C (32°F) to +200°C (+392°F)	0V to +5V	±0.46°C
DI-5B35-04	0°C (32°F) to +600°C (+1112°F)	0V to +5V	±0.88°C
10Ω Cu, α = 0.004274			
DI-5B35C-01	0°C (32°F) to +120°C (+248°F) (10Ω at 0°C)	0V to +5V	±0.23°C
DI-5B35C-02DI-	0°C (32°F) to +120°C (+248°F) (10Ω at 25°C)	0V to +5V	±0.23°C
5B35C-03**	0°C (32°F) to +160°C (+320°F) (10Ω at 0°C)	0V to +5V	±0.32°C
120Ω Ni, α = 0.00672			
DI-5B35N-01	0°C (32°F) to +300°C (+572°F)	0V to +5V	±0.40°C

* Includes conformity, hysteresis and repeatability.

**CSA certification pending.

DI-5B36 Potentiometer Input Modules

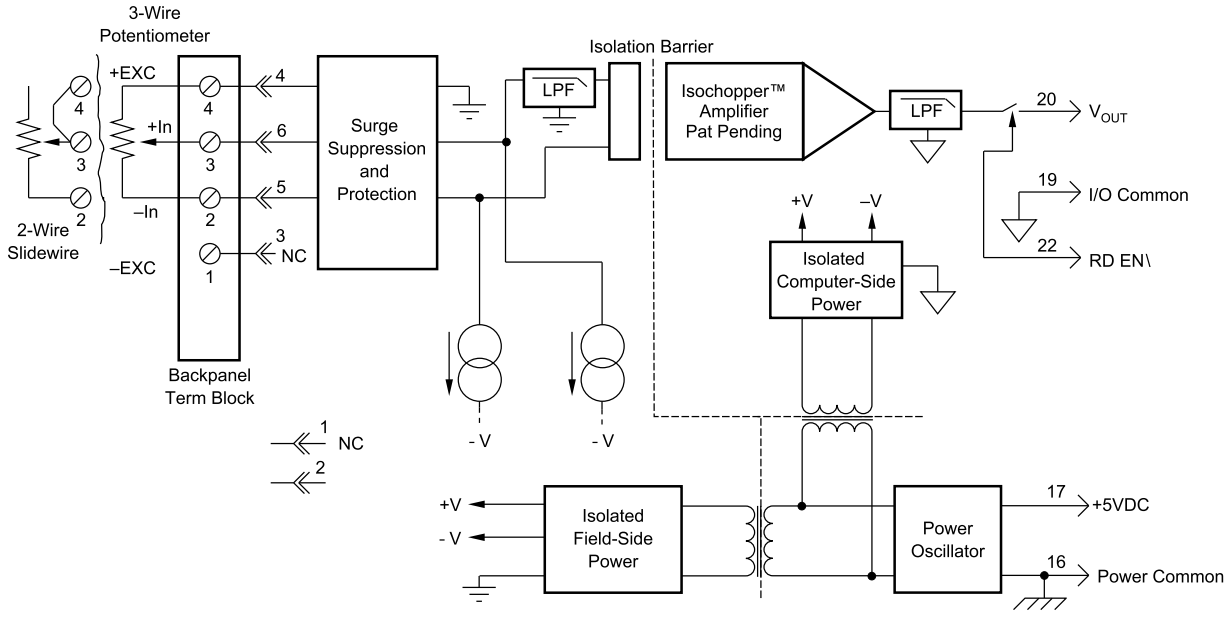
Each DI-5B36 Potentiometer input module provides a single channel of Potentiometer input which is filtered, isolated, amplified, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ± 50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

Excitation for the potentiometer is provided from the module by two matched current sources. When using a three-wire potentiometer, this method allows cancellation of the effects of lead resistances. The excitation currents are very small (less than 1.0mA) which minimizes self-heating of the potentiometer.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are in the output stage. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B36 module provides protection against accidental connection of power-line voltages up to 240VAC.



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

DI-5B38 Strain Gage Input Modules, Narrow & Wide Bandwidth

Each DI-5B38 Strain Gage input module provides a single channel of Strain Gage input which is filtered, isolated, amplified, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

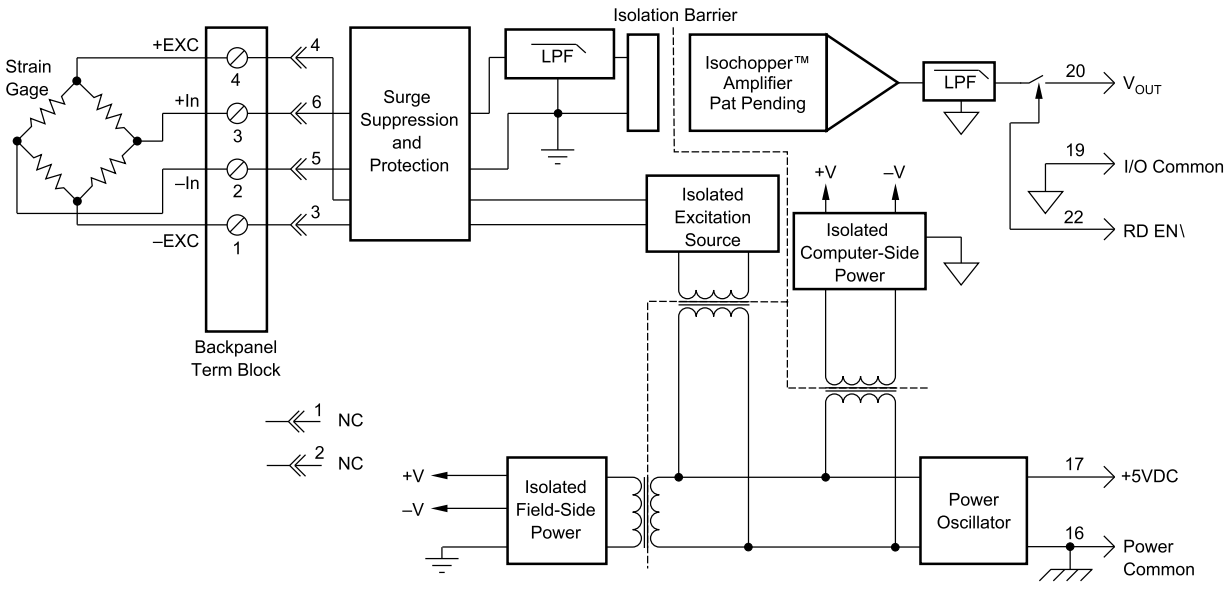
The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

The DI-5B38 can interface to full- or half-bridge transducers with a nominal resistance of 100Ω to 10kΩ. A matched pair of bridge-completion resistors (to ±1mV at +10V excitation) allows use of low cost half- or quarter-bridge transducers. On wide bandwidth modules, the 10kHz bandwidth allows measurement of high speed processes such as vibration analysis.

Strain Gage excitation is provided from the module by a very stable 10V or 3.333V source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. Full scale sensitivities of 2mV/V, 3mV/V or 10mV/V are offered. With 10V excitation, this results in a ±20mV, ±30mV or ±100mV full scale input range.

On wide bandwidth modules, the input signal is processed through a preamplifier on the field side of the isolation barrier. This preamplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 10kHz. On all modules, after initial field side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

Special input circuits on the DI-5B38 module provide protection of the signal inputs and the isolated excitation supply up to 240VAC.



Ordering Information				
MODEL	INPUT BRIDGE TYPE	INPUT RANGE	EXCITATION	OUTPUT RANGE
DI-5B38-31 or DI-5B38-01	Full Bridge	100Ω to 10kΩ	3.333V at 3mV/V Sensitivity	-5V to +5V
DI-5B38-32 or DI-5B38-02	Full Bridge	300Ω to 10kΩ	10.0V at 3mV/V Sensitivity	-5V to +5V
DI-5B38-33 or DI-5B38-03	Half Bridge	100Ω to 10kΩ	3.333V at 3mV/V Sensitivity	-5V to +5V
DI-5B38-34 or DI-5B38-04	Half Bridge	300Ω to 10kΩ	10.0V at 3mV/V Sensitivity	-5V to +5V
DI-5B38-35 or DI-5B38-05	Full Bridge	300Ω to 10kΩ	10.0V at 2mV/V Sensitivity	-5V to +5V
DI-5B38-36 or DI-5B38-06	Full Bridge	100Ω to 10kΩ	3.333V at 10mV/V Sensitivity	-5V to +5V
DI-5B38-37 or DI-5B38-07	Full Bridge	300Ω to 10kΩ	10.0V at 10mV/V Sensitivity	-5V to +5V

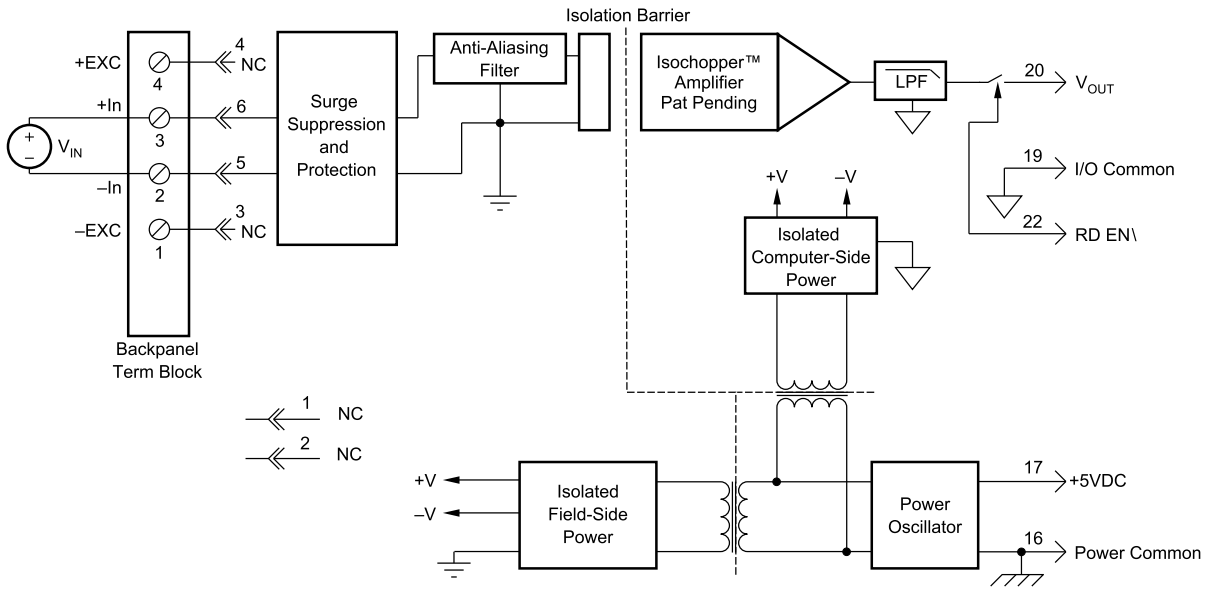
DI-5B40/41 Analog Voltage Input Modules, Wide Bandwidth

Each DI-5B40 and DI-5B41 wide bandwidth voltage input module provides a single channel of analog input which is amplified, isolated, and converted to a high level analog voltage output (see block diagram). This voltage output is logic-switch controlled, allowing these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

The input signal is processed through a preamplifier on the field side of the isolation barrier. This preamplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 10kHz. After amplification, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special input circuit on the DI-5B40 and DI-5B41 modules provides protection against accidental connection of power-line voltages up to 240VAC.



Ordering Information		
MODEL	INPUT RANGE	OUTPUT RANGE
DI-5B40-01	-10mV to +10mV	0V to +5V
DI-5B40-02	-50mV to +50mV	0V to +5V
DI-5B40-03	-100mV to +100mV	0V to +5V
DI-5B41-01	-1V to +1V	0V to +5V
DI-5B41-02	-5V to +5V	0V to +5V
DI-5B41-03	-10V to +10V	0V to +5V
DI-5B41-07**	-20V to +20V	0V to +5V
DI-5B41-09**	-40V to +40V	0V to +5V

*Required for DI-500-HV high voltage option.
**CSA certification pending.

DI-5B42 2-Wire Transmitter Interface Modules

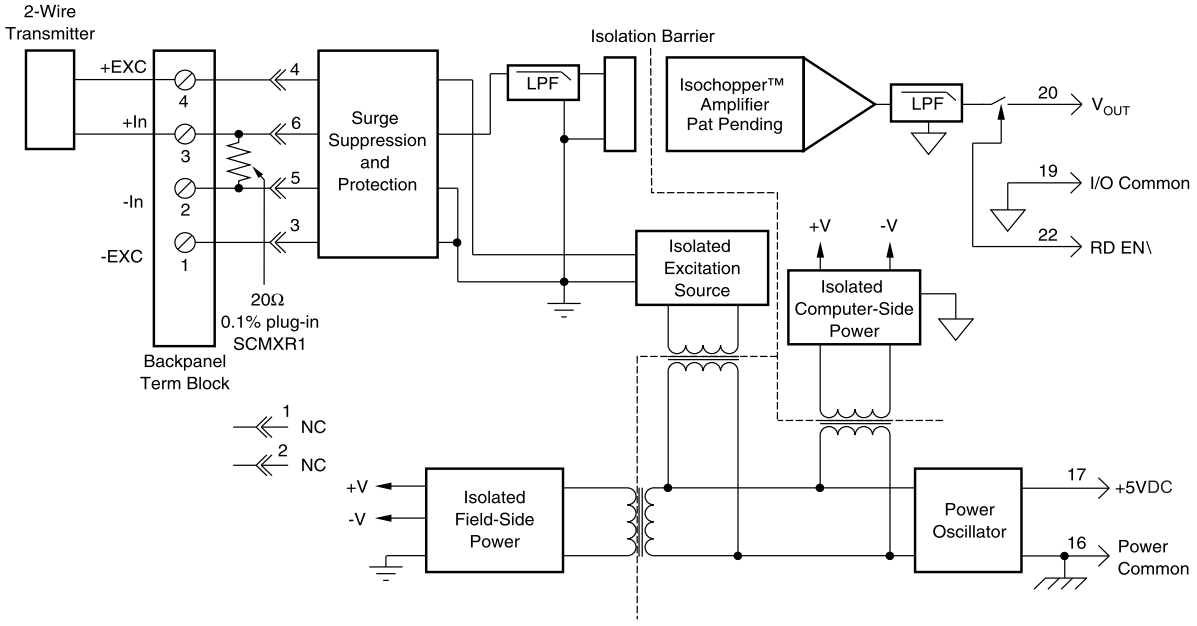
Each DI-5B42 2-wire transmitter interface module provides a single channel which accepts a 4 to 20 mA process current input and provides a standard +1 to +5V output signal (see block diagram). An isolated +20VDC regulated power supply is provided to power the current transmitter. This allows a 2-wire loop powered transmitter to be directly connected to the DI-5B42 without requiring an external power supply. The regulated supply will provide a nominal +20VDC at a loop current of 4mA to 20mA.

The DI-5B42 will provide a 1500V isolation barrier for non-isolated 2-wire field transmitters. It can also be used when additional isolation is required between an isolated 2-wire transmitter and the input stage of the control room computer.

The voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

A precision 20Ω current conversion resistor is supplied with the module. All field inputs are fully protected from accidental connection of power-line voltages up to 240VAC. The module has a 3dB bandwidth of 100Hz. Signal filtering is accomplished with a six-pole filter, with two poles on the field side of the isolation barrier, and the other four on the computer side.



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

DI-5B43 Isolated DC Transducer Amplifier Input Module

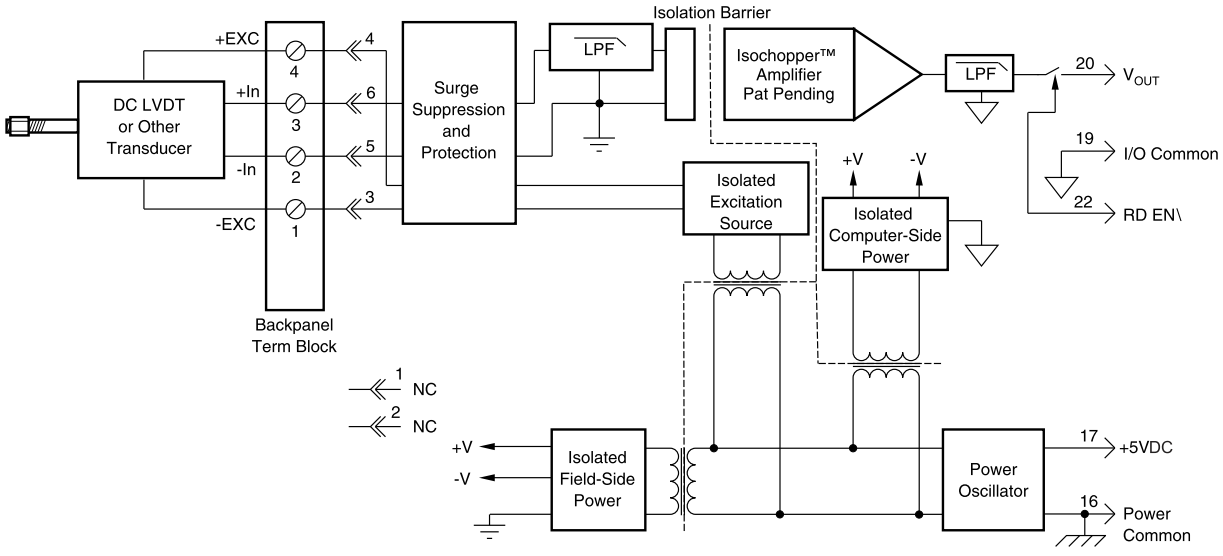
Each DI-5B43 displacement transducer module provides a single channel of displacement transducer input which is filtered, isolated, scaled, and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

The DI-5B43 can interface to DC displacement transducers and other devices which require a precision 10VDC supply and produce a high level output. The 1kHz bandwidth significantly reduces ripple and noise inherent in these devices.

Transducer excitation is provided from the module by a very stable 10V source. The excitation supply is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature offers significant flexibility in real world applications. Ten full scale input ranges are provided, from ±1V to ±10V, producing ±5V full scale output.

The input signal is processed through a preamplifier on the field side of the isolation barrier. This preamplifier has a gain-bandwidth product of 5MHz and is bandwidth limited to 1kHz. After amplification, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%. Special input circuits on the DI-5B43 module provide protection of the signal inputs and the isolated excitation supply up to 240VAC.



Ordering Information		
MODEL*	MAXIMUM INPUT	EXCITATION
DI-5B43-01	±1V	+10.0Vdc @ 40mA
DI-5B43-02A	±2V	+10.0Vdc @ 40mA
DI-5B43-03	±3V	+10.0Vdc @ 40mA
DI-5B43-04A	±4V	+10.0Vdc @ 40mA
DI-5B43-05	±5V	+10.0Vdc @ 40mA
DI-5B43-06	±6V	+10.0Vdc @ 40mA
DI-5B43-07A	±7V	+10.0Vdc @ 40mA
DI-5B43-08A	±8V	+10.0Vdc @ 40mA
DI-5B43-09	±9V	+10.0Vdc @ 40mA
DI-5B43-10	±10V	+10.0Vdc @ 40mA

*CSA certification pending.

DI-5B45 Frequency Input Modules

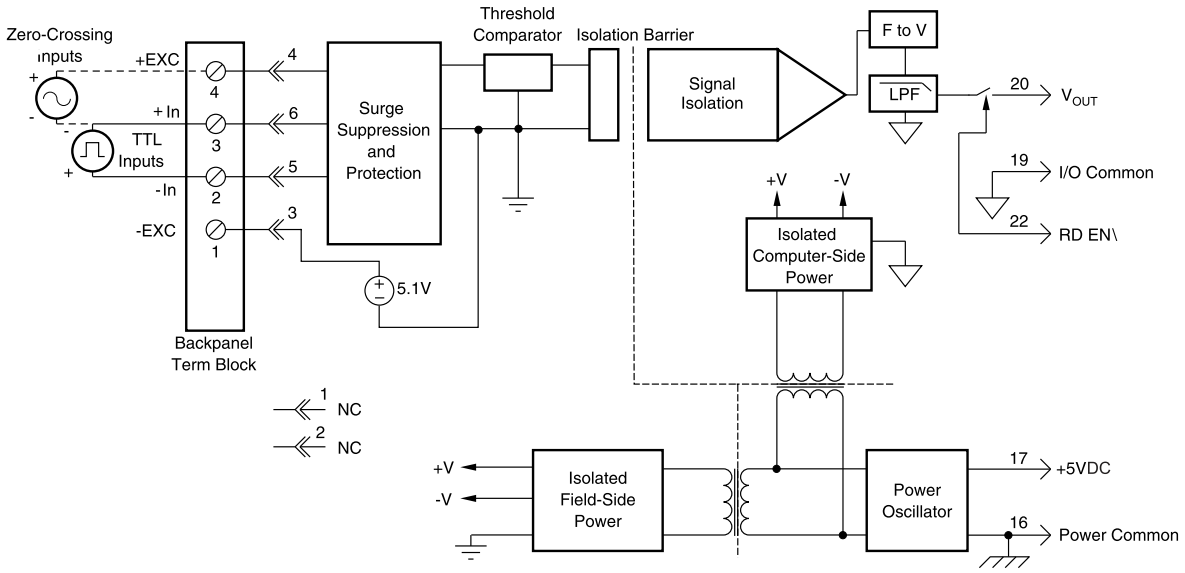
Each DI-5B45 frequency input module provides a single channel of frequency input which is isolated and converted to a high level analog voltage output. This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers (see block diagram).

The frequency input signal can be a TTL level signal or a zero-crossing signal. Terminal 3 (+In) on the field-side terminal block is the “common” or ground connection for input signals. A TTL signal is connected from terminal 2 (-In) to terminal 3 (+In), while a zero-crossing signal is connected from terminal 4 (+EXC) to terminal 3 (+In). Input circuitry for each of the signal types has hysteresis built in. An input signal must cross entirely through the hysteresis region in order to trigger the threshold comparator.

A 5.1V excitation is available for use with magnetic pickup or contact-closure type sensors. The excitation is available on pin 1 (-EXC) and the excitation common is pin 3 (+In).

The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

A special circuit in the input stage of the module provides protection against accidental connection of power-line voltages up to 240VAC.



Ordering Information

MODEL	INPUT RANGE	OUTPUT RANGE	EXCITATION
DI-5B45-01	0 to 500Hz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-02	0 to 1kHz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-03	0 to 3kHz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-04	0 to 5kHz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-05	0 to 10kHz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-06	0 to 25kHz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-07	0 to 50kHz	0 to +5V	+5.1Vdc @ 8mA
DI-5B45-08	0 to 100kHz	0 to +5V	+5.1Vdc @ 8mA

DI-5B47 Linearized Thermocouple Input Modules

Each DI-5B47 thermocouple input module provides a single channel of thermocouple input which is filtered, isolated, amplified, linearized and converted to a high level analog voltage output (see block diagram). This voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

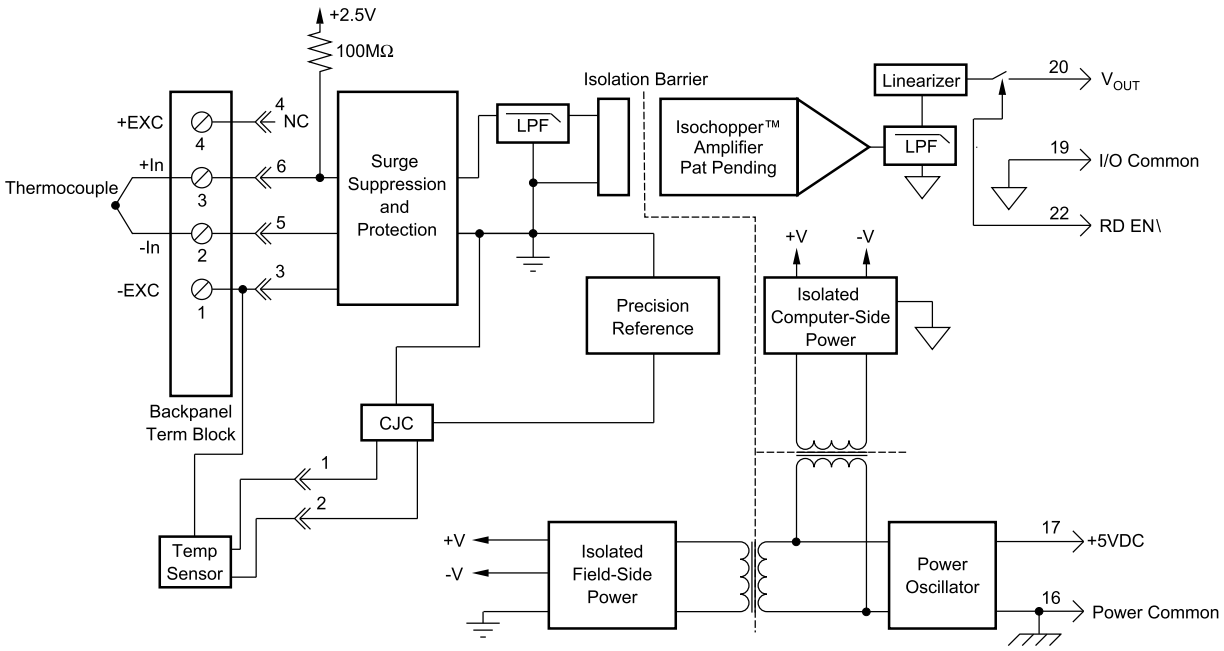
The DI-5B modules are designed with a completely isolated computer side circuit which can be floated to ±50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin to I/O Common, pin 19.

The DI-5B47 can interface to eight industry standard thermocouple types: J, K, T, E, R, S, N, and B. Its corresponding output signal operates over a 0 to +5V range. Each module is cold-junction compensated to correct for parasitic thermocouples formed by the thermocouple wire and screw terminals on the mounting hardware. Upscale open thermocouple detect is provided by an internal pull-up resistor. Downscale indication can be implemented by installing an external 47MΩ resistor, ±20% tolerance, between screw terminals 1 and 3.

Signal filtering is accomplished with a six-pole filter which provides 95dB of normal-mode-rejection at 60Hz and 90dB at 50Hz. Two poles of this filter are on the field side of the isolation barrier, and the other four are on the computer side.

After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges. The module is powered from +5VDC, ±5%.

A special circuit in the input stage of the module provides protection against accidental connection of power-line voltages up to 240VAC.



Ordering Information			
MODEL	TYPE	INPUT RANGE	ACCURACY*
DI-5B47J-01	Type J	0°C to +760°C (+32°F to +1400°F)	±0.61°C
DI-5B47J-02	Type J	-100°C to +300°C (-148°F to +572°F)	±0.32°C
DI-5B47J-03	Type J	0°C to +500°C (+32°F to +932°F)	±0.36°C
DI-5B47J-12**	Type J	-100°C to +760°C (-148°F to +1400°F)	±0.70°C
DI-5B47K-04	Type K	0°C to +1000°C (+32°F to +1832°F)	±0.80°C
DI-5B47K-05	Type K	0°C to +500°C (+32°F to +932°F)	±0.38°C
DI-5B47K-13**	Type K	-100°C to +1350°C (-148°F to +2462°F)	±1.20°C
DI-5B47K-14**	Type K	0°C to +1200°C (+32°F to +2192°F)	±0.96°C

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

**CSA certification pending.

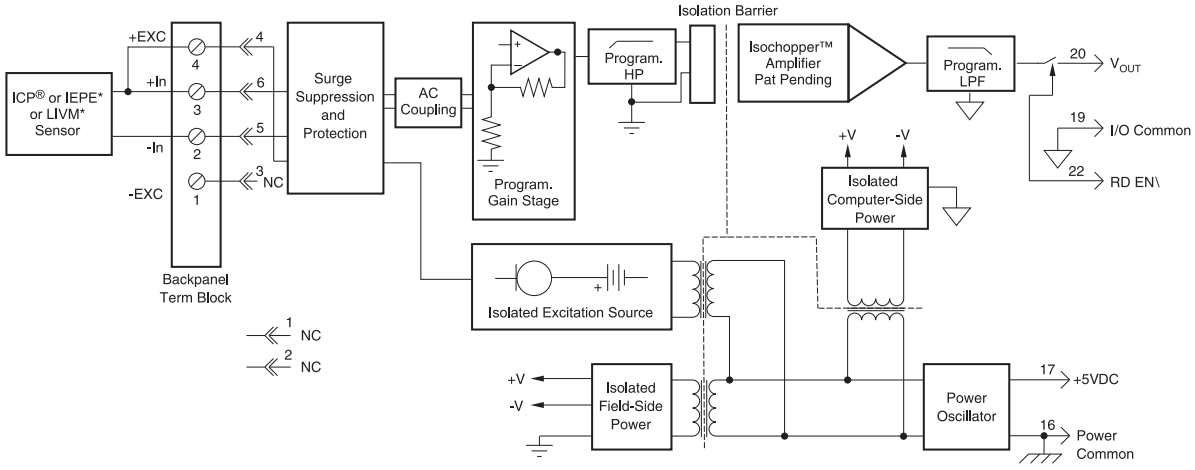
DI-5B48 Accelerometer Input Modules

The DI-5B48 provides excitation to piezoelectric sensors with built-in microelectronic amplifiers, commonly known as ICP®* or IEPE* or LIVM* sensors. The module provides a constant current excitation to the sensor, then isolates, filters, and amplifies the sensor output, yielding a high-level analog voltage output. The excitation current, signal gain, and filter high-pass and low-pass cutoff frequencies are field-configurable through a set of slide switches.

Six poles of signal filtering in the DI-5B48 module result in greater than 100dB of normal-mode rejection for signal frequencies above the cutoff frequency. One pole of filtering is on the field side of the isolation barrier for anti-aliasing purposes and the remaining five-pole programmable Bessel filter is located on the system side. High-pass filtering is achieved through a second order passive filter, located on the field side. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

The DI-5B48 offers the option of setting the constant current source for sensor excitation to common values of 4mA or 9mA with a compliance voltage of 24VDC. Programmable gains of 1, 10 and 100 are selectable and the module offers a ±10V output. The required supply level is +5VDC, ±5%.

To ensure protection of expensive data acquisition equipment, the DI-5B48 module signal inputs and sensor excitation outputs are protected against accidental connection of voltages up to 240Vrms.



Ordering Information				
MODEL	INPUT RANGE	OUTPUT RANGE	BANDWIDTH	ISOLATION VOLTAGE
DI-5B48-01	±10V max	±10V	2.5kHz to 20kHz	1500



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