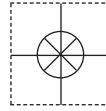


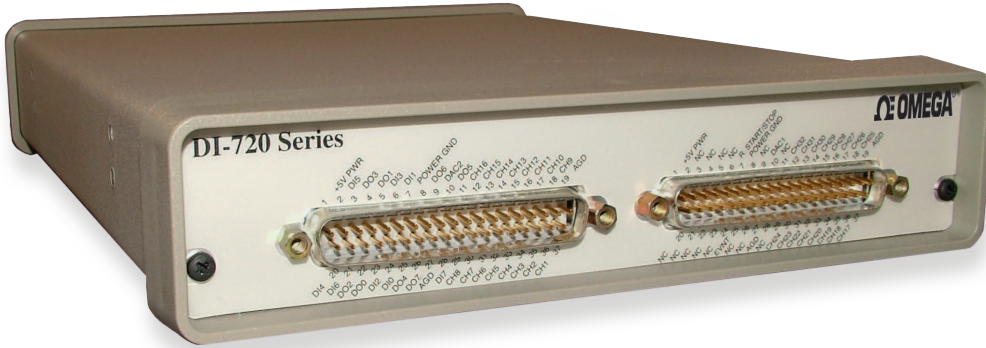
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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

WARNING: These products are not designed for use in, and should not be used for, human applications.

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1. Introduction

Congratulations on your purchase of a DI-720 Series or DI-730 Series data acquisition instrument. These instruments permit data acquisition on IBM personal computers and compatibles from either Windows or the DOS programming environments.

This manual describes how to connect and use all of the instruments in the DI-720 and DI-730 Series. 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-7x0 Series" (this means that the procedure or information applies equally to the DI-720-P, DI-720-EN, DI-720-USB, DI-730-P, DI-730-EN, or to the DI-730-USB). In cases where the resemblance is not equal, separate procedures/descriptions exist for each instrument.

It is assumed that you have a general understanding of data acquisition, digital I/O, and DSP operations, and that you possess enough proficiency in software to write your own application and/or diagnostic programs.

Features

The DI-7x0 Series provides the following features:

- All instruments connect to the parallel port of any desktop, transportable, notebook, or laptop PC-compatible computer. Most communicate through the PC's parallel port in standard, bi-directional, or EPP mode. Models DI-720-EN and DI-730-EN only communicate in bi-directional or EPP parallel port modes. Models DI-720-EN, DI-730-EN, DI-720-USB, and DI-730-USB add optional Ethernet and USB communication modes respectively.
- Per channel software-configurable settings:
 - Single-ended or differential input (DI-720 Series only).
 - Input gain.
 - Sample rate.
 - Signal Averaging.
- Flexible power requirements. All instruments operate from any standard 60Hz, 120V AC wall outlet with the supplied power adapter. Or, power the instruments from any +9 to +36 volt DC source, such as a car battery.
- 250kHz burst sampling rate.
- 16-bit A/D converter, for high resolution measurement accuracy.
- 256-entry input list allows you to scan any sequence of input channels at any available gain. The 256-entry input list also allows you to average 32,768 consecutive readings per channel for low-noise output signals.
- 256 counters are assigned to the input list allowing each channel to be programmed for a different sample rate.
- Supports analog pre- and post-triggering of data acquisition based on the level and slope of a specified channel.

The following provides a brief overview of the major subsystems of the DI-7x0 Series.

Analog Input

32 single-ended/16 differential analog inputs (on DI-720 Series instruments) or 8 differential analog inputs (on DI-730 Series instruments) allow your analog signals to be converted into 16-bit digital data via the onboard A/D converter.

The DI-720 Series features software-programmable input measurement ranges of $\pm 10\text{V}$ full scale at a gain of 1; $\pm 5\text{V}$ full scale at a gain of 2; $\pm 2.5\text{V}$ full scale at a gain of 4; and $\pm 1.25\text{V}$ full scale at a gain of 8. The DI-730 Series features software programmable input measurement ranges of $\pm 10\text{mV}$, $\pm 100\text{mV}$, $\pm 1\text{V}$, $\pm 10\text{V}$, $\pm 100\text{V}$, and $\pm 1000\text{V}$ full scale (the $\pm 1000\text{V}$ range is useable up to $\pm 800\text{ VDC}$ or peak AC).

Analog Output

On DI-720 instruments, the D/A subsystem features two, buffered, 12-bit D/A converters for outputting analog data. DI-730 instruments have only one 12-bit D/A converter for outputting analog data.

Both instruments feature a software-programmable output range of $\pm 10V$.

Both instruments feature an onboard 16-entry output counter list that allows you to write analog or digital output at the maximum conversion rate of the instrument.

Digital Input and Output (DI-720 Series Only)

The DI-720 Series contains 8 each input and 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.

2. Specifications

Signal Connections

Signal connections are made directly to the two, 37-pin, D-type connectors on the front panel of DI-720 Series instruments or to the 5-way binding posts (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, which is an optional, general purpose signal interface that provides convenient, 5-way binding posts (banana jacks) for analog input signals and a screw-terminal strip for digital and analog output signals. Refer to chapter 5 Accessories in this manual for complete DI-205 details. Note that the DI-205 is an extra-cost option that 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 parallel port communication modes (models DI-720-EN and DI-730-EN only support bi-directional and EPP parallel port 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-730 Series: 8 differential

Converter resolution: 16-bit

Common mode rejection ratio:

DI-720 Series: 80 dB minimum @ $A_v=1$

DI-730 Series: 20 dB minimum @ DC to 60Hz

Accuracy: $\pm 0.25\%$ of full scale range

Crosstalk: -75 dB @ 100kHz and 100W unbalance

Sample throughput rate:

Printer port: Standard port 40,000; bi-directional port 80,000; EPP 250,000 samples/second max (software selectable per channel)

USB: 200,000 samples/second max

Ethernet: 2,000 samples/second max

Maximum analog measurement range
(software selectable per channel)

DI-720 Series: $\pm 10V$ full scale at a gain of 1
 $\pm 5V$ full scale at a gain of 2
 $\pm 2.5V$ full scale at a gain of 4
 $\pm 1.25V$ full scale at a gain of 8

	DI-730 Series: $\pm 10\text{mV}$ full scale $\pm 100\text{mV}$ full scale $\pm 1\text{V}$ full scale $\pm 10\text{V}$ full scale $\pm 100\text{V}$ full scale $\pm 1000\text{V}$ full scale ($\pm 1000\text{V}$ range useable up to $\pm 800\text{VDC}$ or peak AC)
Gain error:	1 bit max @ 1kHz sample rate
Input offset voltage:	1 bit max @ 1kHz sample rate
Input settling time:	4 μs to 0.01% at all gains
Input impedance	
	DI-720 Series: $\text{M}\Omega$ resistor tied to GND on the input channel
	DI-730 Series: 0 $\text{M}\Omega$

Analog Outputs

Number of channels:	DI-720 Series: Two buffered analog outputs DI-730 Series: One analog output
Resolution:	12-bit; 1 part in 4,096 @ 250kHz
Output voltage range:	$\pm 10\text{V}$ full scale
Output impedance:	10 Ω
Sample rate:	standard port 40,000; bi-directional port 80,000; EPP 250,000 samples/second max (software selectable per channel)
Output offset voltage:	1 bit max @ 1kHz sample rate
Gain error:	1 part in 16,384 @ 1kHz

Digital Input/Output (DI-720 Series Only)

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

Timing Input/Output

Number of input counters:	256
Number of output counters:	16
Resolution:	1 part in 32,768
Base clock accuracy:	0.01%
Counter input frequency:	16 MHz

Input Scan List

Capacity:	240 elements
-----------	--------------

Output Scan List

Capacity 16 elements

On-board DSP

Type: Analog Devices ADSP2181, 32 MIPS
Clock frequency: 16 MHz external, 64 MHz internal
Data memory: 8k words
Program memory: 8k words

Physical/Environmental

Box dimensions: 7.29"W by 9"L by 1.52"H

I/O connector:

DI-720 Series: 37-pin male D-type

DI-730 Series: Banana jacks

Weight: 3 lbs

Operating environment:

Component temperature: 0° to 70° C

Relative humidity: 0% to 90% non condensing

Storage environment:

Temperature: 55° to 150° C

Relative humidity: 0% to 90% non condensing

Notes:

3. Getting Started

Unpacking

The following items are included with each DI-7x0 Series instrument. Verify that you have the following:

- DI-7x0 Series instrument (i.e., DI-720-P, DI-720-EN, DI-720-USB, DI-730-P, DI-730-EN, or DI-730-USB)
- Communications cable designed to connect the DI-7x0 Series instrument to your computer's parallel (or printer) port. If you ordered a DI-720-USB or DI-730-USB, you will have a second cable designed to connect the instrument to your computer's USB port.
- CD-ROM, "The Software Resource"
- DI-720 Series/DI-730 Series User's Manual (which you are currently reading)
- WINDAQ Software, in one of two forms:

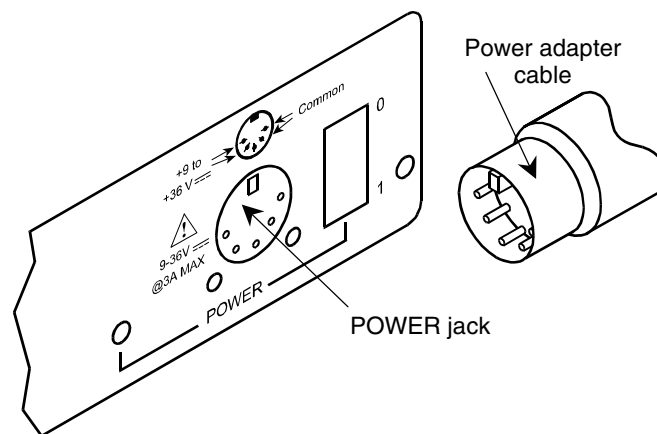
If you ordered WINDAQ /Pro or WINDAQ /Pro+ recording software with your DI-7xx Series instrument (an extracost option), there will be a sticker with a password on the sleeve of your CD-ROM. This password will give you access to that software. If you did not order WINDAQ /Pro or WINDAQ /Pro+ recording software, the WINDAQ/Lite recording software will be available to you without a password.

If an item is missing or damaged, call the manufacturer. They 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 the manufacturer.

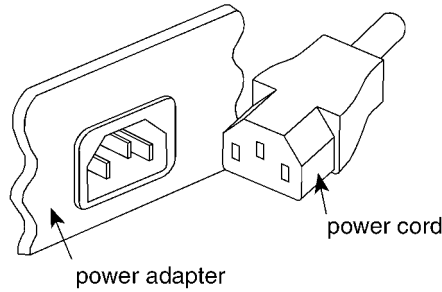
Applying Power to the DI-7x0 Series Instrument

Use the following procedure to apply power to your DI-7x0 Series instrument:

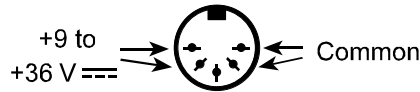
1. Plug the five-pin DIN end of the power adapter cable into the five-pin jack labeled POWER on the rear panel of the instrument.



- Plug one 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.



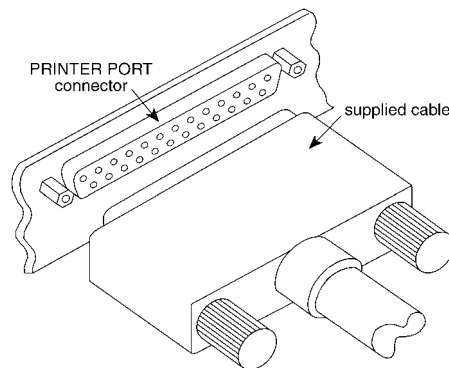
- Turn the POWER switch on.

Connecting the DI-7xx Series Instrument to your Computer

All DI-7xx Series instruments use your computer's parallel (or printer) port to interface digital and analog signals to your computer. Optionally, DI-7xx Series instruments with Ethernet or USB communication ports can also be used to interface digital and analog signals to your computer, although not concurrently with the printer port.

Parallel (Printer) Port Operation (All Instruments)

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 and connect the other end of this cable to your computer's parallel (printer) port.



7xx Series instruments, other parallel port communication modes allow data to pass from the instrument to your computer at higher speeds. Depending on the age of your computer and/or the sophistication of your parallel port, you may have as many as four parallel port communication mode options: standard, bi-directional (PS/2), enhanced parallel port (EPP) and extended capabilities port mode (ECP). DI-7xx Series instruments support the following three parallel port operating modes:

<u>Parallel Port Mode</u>	<u>Maximum Data Throughput*</u>
Standard	40,000 samples/second
Bi-directional (PS/2)	80,000 samples/second
EPP (DI-720)	250,000 samples/second
EPP (DI-730)	150,000 samples/second

*This test is done under Windows 98.

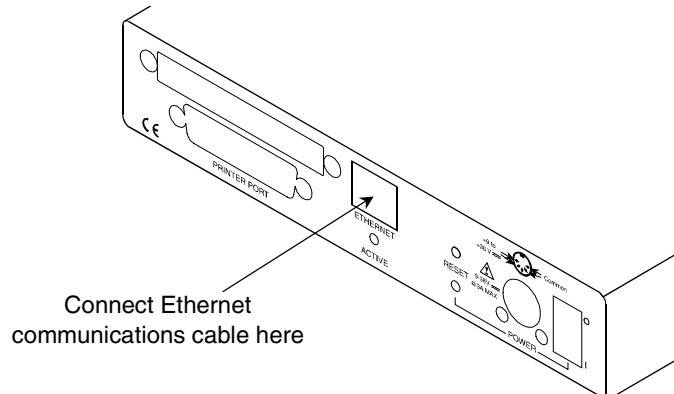
The parallel port mode you use will depend on how many channels you wish to record and how fast you wish to record them.

If, for example, you are only planning to record five channels at 20 Hz each, then standard mode operation will be more than adequate ($5 \text{ channels} \times 20 \text{ Hz} = 100 \text{ Hz}$ 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 parallel port mode will not reliably record your data gap-free, since this throughput rate exceeds the DI-7xx's standard mode maximum throughput ($5 \text{ channels} \times 10\text{KHz} = 50\text{KHz}$, which is greater than the 40KHz standard mode maximum throughput spec). To reliably record data gap-free at this sample rate, your computer's parallel port must be operated in something other than standard mode.

The only way to change your computer's parallel port operating mode (if necessary) is to access your computer's CMOS setup routine. 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. In some cases, a message telling you which key to press is briefly 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 complete CMOS setup routine details.

Ethernet Operation (DI-720-EN or DI-730-EN Only)

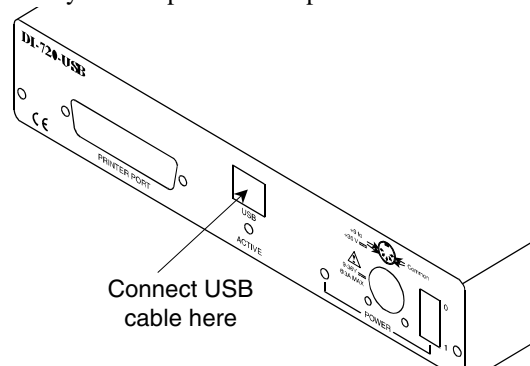
If you have the DI-720-EN or DI-730-EN and you want to use the optional Ethernet communications interface, plug the appropriate end of your Ethernet communications cable into the 10base-T Ethernet port (labeled ETHERNET) on the rear panel of the instrument. Note that you must disconnect the parallel communications cable from the 25-pin male connector labeled PRINTER PORT on the rear panel of the instrument (if connected) in order to use the Ethernet communications interface. Parallel and Ethernet communications cannot be used concurrently.



USB Operation (DI-720-USB or DI-730-USB Only)

If you have the DI-720-USB or DI-730-USB and you want to use the optional USB communications interface, you must use Windows 98 or better.

1. With your computer powered, Windows running and all other applications closed, 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.



The addition of this new hardware will be “sensed” by Windows and the “Add New Hardware Wizard” will automatically be launched, anticipating the installation of a device driver for the new hardware.

2. Insert the WINDAQ Resource CD-ROM into your CD-ROM drive. (The directory on the CD-ROM that contains the appropriate drivers is D:\USB drivers.)
3. From the initial “Add New Hardware Wizard” screen click Next to get started, then choose the search for best driver option (recommended) and click Next.
4. Specify the CD-ROM drive that contains the WINDAQ Resource CD-ROM as the search location and click Next.
5. Follow the onscreen prompts. Depending on how Windows was originally installed on your computer, you may need additional files from your Windows distribution CD-ROM to complete the driver installation. A dialog box will appear indicating the drivers have been found. Click Next to continue.

With the driver installation complete, continue with step 6 to install WINDAQ software. Before continuing, make sure the WINDAQ Resource CD-ROM is in your CD-ROM drive.

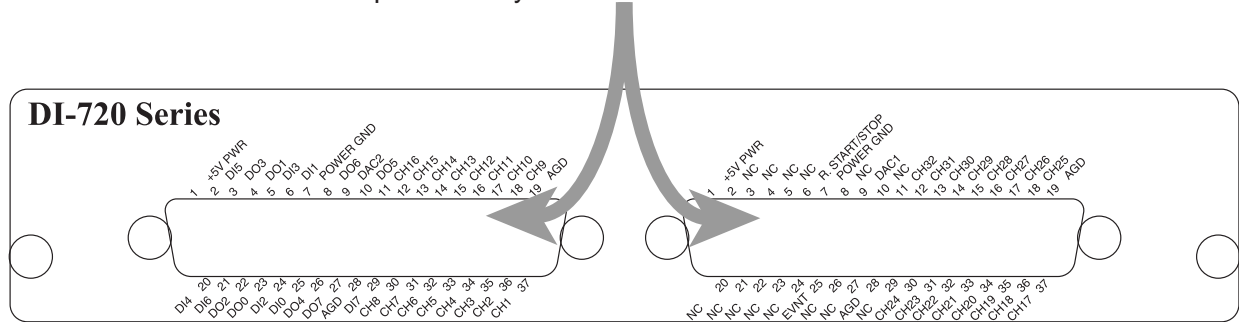
6. Click the Start button on the taskbar and then click Run...
7. In the text box that appears, type d:\setup (where d specifies the drive containing the CD-ROM you inserted in step 2) and press ENTER. A welcome dialog box appears onscreen.
8. Choose the OK button to start the installation.
9. Follow the instructions onscreen to specify the directory where you want to install WINDAQ software. 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.
10. Choose the OK button. A dialog box is displayed asking if you would like to make backup copies of all files replaced during the installation. This is offered as a safety courtesy; backup copies are not required. Choose the No button if you don't want to make backups. Choose the Yes button to create backups. If you decide to create backups, you will be prompted to specify a backup file directory.
11. Specify a destination (or group window) for WINDAQ software icons. Again we recommend the default path, but you can specify any group window you like.
12. Enter the ID address of the box. Every DI-720-USB or DI-730-USB is initially assigned an ID address of “0”. If you are adding only one DI-720-USB or DI-730-USB to your system, do nothing. Default ID address “0” will work fine.
13. If you are installing only one DI-720-USB or DI-730-USB on your system, then installation is complete. If you are installing multiple devices, change the Device ID and run through the installation for each device (this does not install multiple versions of the software).

Controls and Indicators

The following describes the user accessible items on the DI-720 and DI-730 Series instruments.

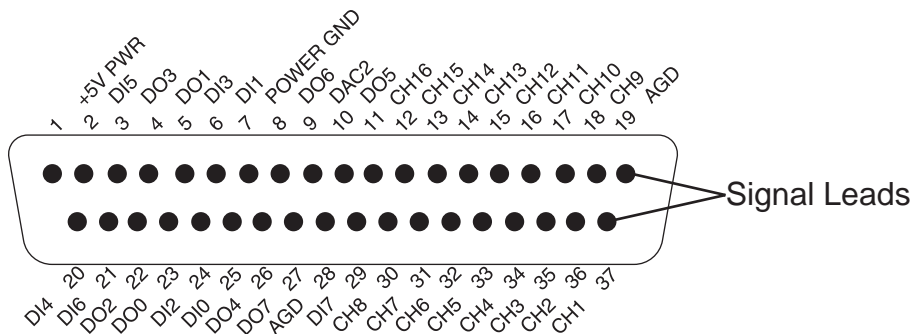
DI-720 Series Instrument Front Panel

Connect 16 single-ended or 8 differential inputs directly to each of these connectors.



The 37-pin male “D” connector on the left is used to interface analog input channels 1 through 16, eight digital inputs, and eight digital outputs to the DI-720 Series instrument. The analog inputs are labeled CH1 IN through CH16 IN, 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. On DI-720 Series instruments with the Ethernet communications option (models DI-720-EN), digital outputs are not available.

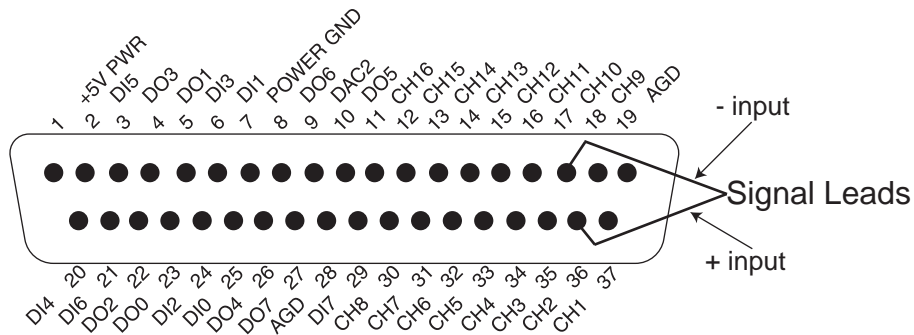
DI-720 Series instruments can accept 32 high-level or preconditioned analog inputs in single-ended configuration or 16 high-level or preconditioned analog inputs in differential configuration. High-level inputs are typically low impedance, no-conditioning-required signals in the range of ± 1.25 to ± 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

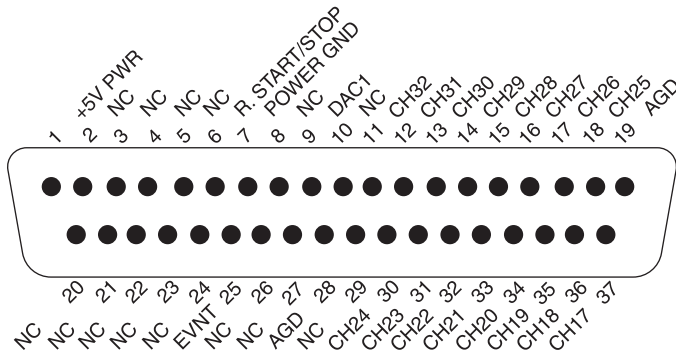
Differential inputs occupy two channels (i.e., these channel pairs constitute a differential input: 1 and 9, 2 and 10, 3 and 11, 4 and 12, 5 and 13, 6 and 14, 7 and 15, 8 and 16, etc.), with the lowest numbered channel in the pair assuming the positive (+) input and the channel number. For example, say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

tial input. Channel 2 is the positive (+) input, channel 10 is the negative (-) input, and the pair is referred to as “channel 2 differential.”



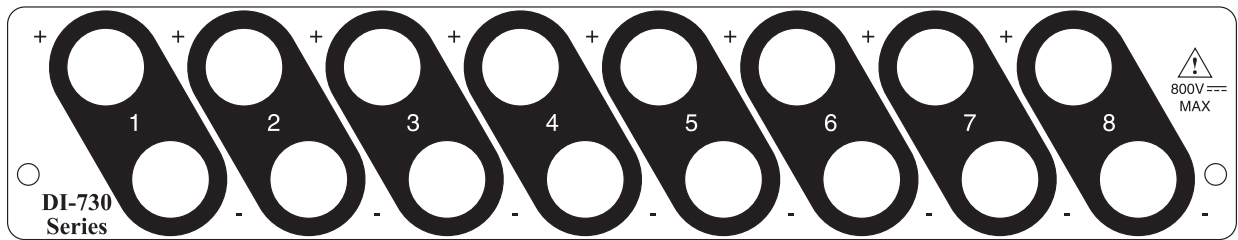
Channel 2 configured for differential operation

The 37-pin male “D” connector on the right, labeled EXPANSION, serves a dual purpose. In addition to providing access to analog input channels 17 through 32, this connector also allows you to expand (increase) the total analog input channel capacity of the instrument. Up to 240 channels are possible with the DI-720 Series and expansion instruments. Pinout is as follows:



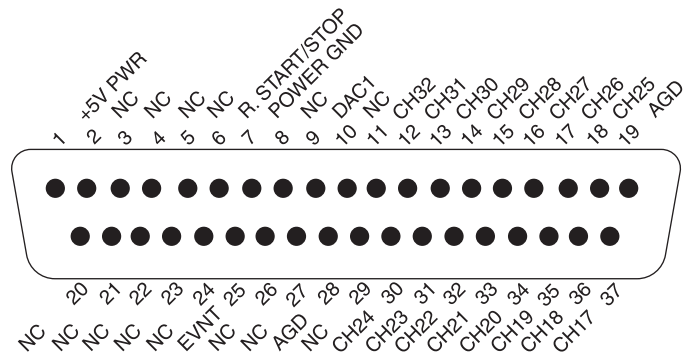
This connector also includes DAC1, which is a second digital-to-analog converter that serves as a general purpose analog output; R. START/STOP, which allows you to remotely start and stop data storage to disk with a switch or TTL level signal; EVNT, which allows you to remotely trigger event markers with a switch or TTL level signal; and two analog grounds labeled AGD.

DI-730 Series Instrument Front Panel



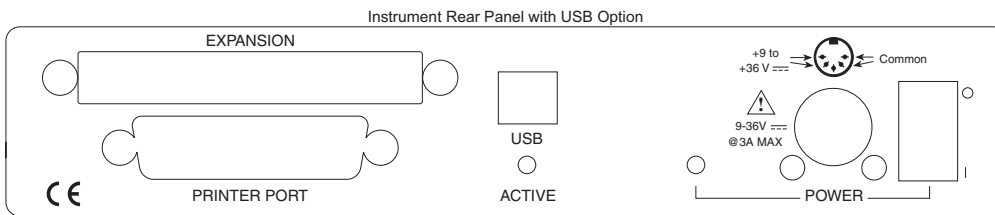
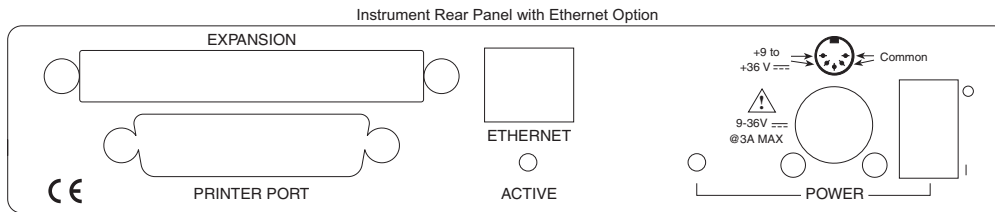
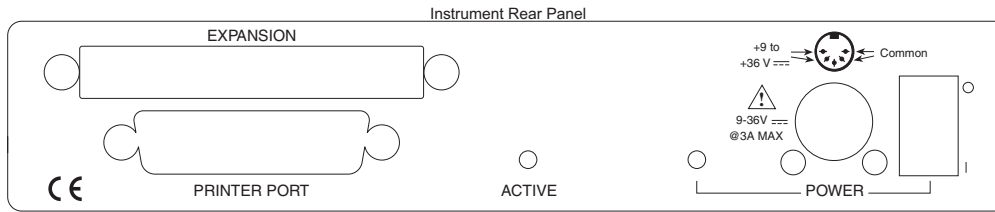
DI-730 Series instruments can accept any eight differential analog inputs within a range of $\pm 10\text{mV}$ to $\pm 800\text{VDC}$ (or peak AC). Its $\pm 1000\text{V}$ of channel-to-channel and input-to-output isolation protect delicate control circuits, computer equipment, and personnel from high common mode voltages.

When optional cable 100679 is plugged into the expansion connector on the rear panel of the DI-730, pinout is as follows:



Instrument Rear Panel

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



PRINTER PORT

The printer port provides a way to get your input signals into your computer. All DI-720 and DI-730 Series instruments support standard, bi-directional and enhanced (EPP) printer port communication modes except for DI-720-EN models, which only support bi-directional and EPP modes.

STATUS LAMPS

DI-720 and DI-730 Series instruments provide two status lamps:

ACTIVE In DI-7xx-P instruments, this indicator will glow red whenever the instrument is streaming data. This includes all digital input/output (where applicable), analog output and analog input functions.

- In DI-7xx-EN instruments, this indicator will glow red whenever data is sent back to the host computer.
- In DI-7xx-USB instruments, this indicator will glow when the USB controller is enabled.

POWER This indicator glows green when power is applied to the DI-720 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 or DI-730 Series instrument. 1 is on, 0 is off.

ETHERNET PORT

In addition to printer port communications, models DI-720-EN and DI-730-EN add Ethernet communication capability with this 10base T port. Note that the Ethernet communication interface cannot be used concurrently with the printer port.

RESET SWITCH

Models DI-720-EN and DI-730-EN also add a reset switch for resetting Ethernet communications.

USB PORT

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

Notes:

4. 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 the manufacturer recalibrate your instrument.

Required Equipment

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

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

$$\text{minimum DVM resolution} = \text{Instrument FSR} \times 0.1\%$$

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):

$$10\text{V} \times 0.1\% = 10\text{mV}$$

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

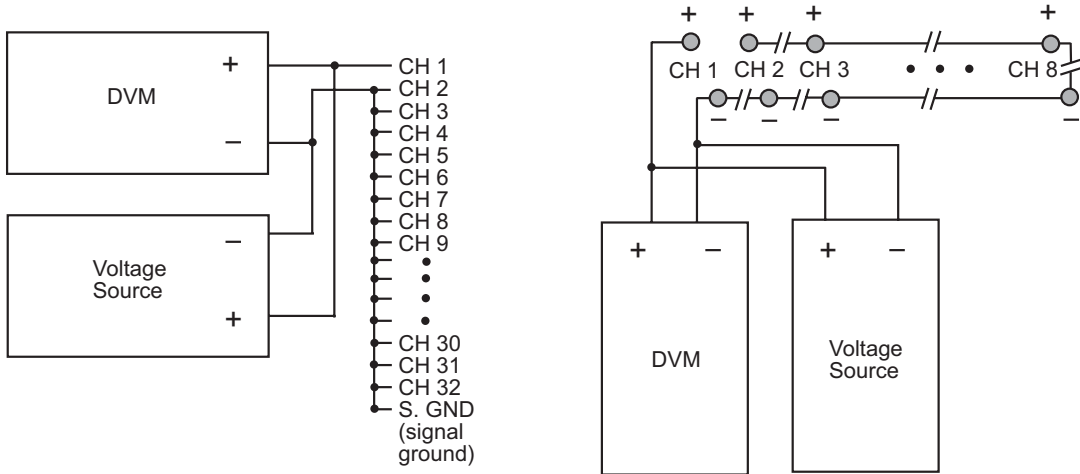
- An alternative is to use a voltage calibrator with enough resolution, as calculated above, to calibrate the instrument at the highest desired gain.

D/A Calibration (DI-720 Instruments Only)

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

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

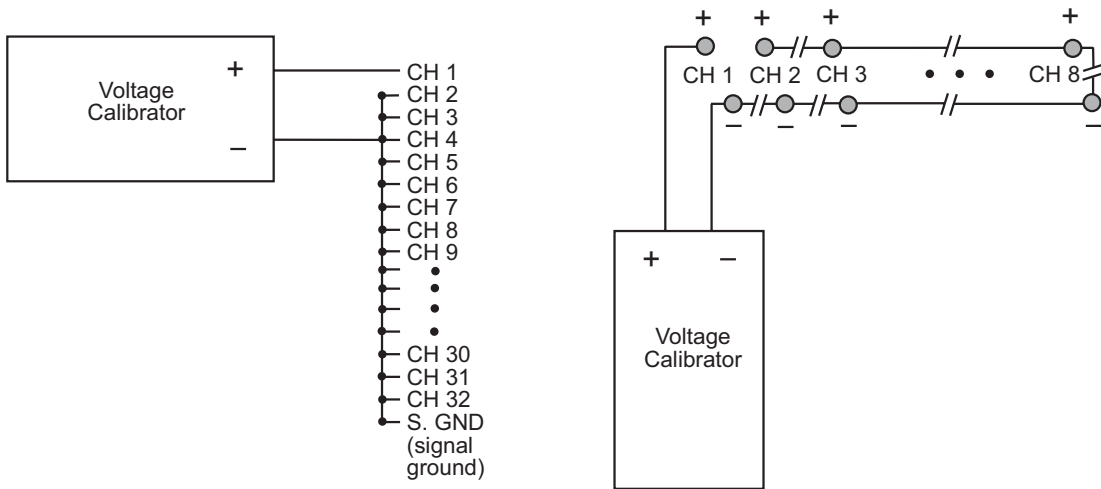
Calibration verification of DI-720 Series instruments' A/D subsystem is performed on channel 1, with all other channels returned to analog common. Calibration of DI-730 Series instrument's A/D subsystem is performed on a channel-by-channel basis for the 8 wide range inputs and on channel 17 for the general-purpose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



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

DI-730 Series 8 Wide-Range Channels

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



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

DI-730 Series 8 Wide-Range Channels

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 Series 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 the manufacturer.

Full Scale (Span) Calibration Verification (DI-720 Series 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.
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 the manufacturer.

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

* Excludes offset errors.

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

* Excludes offset errors

Offset Calibration Verification (DI-730 Series 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 the manufacturer.

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

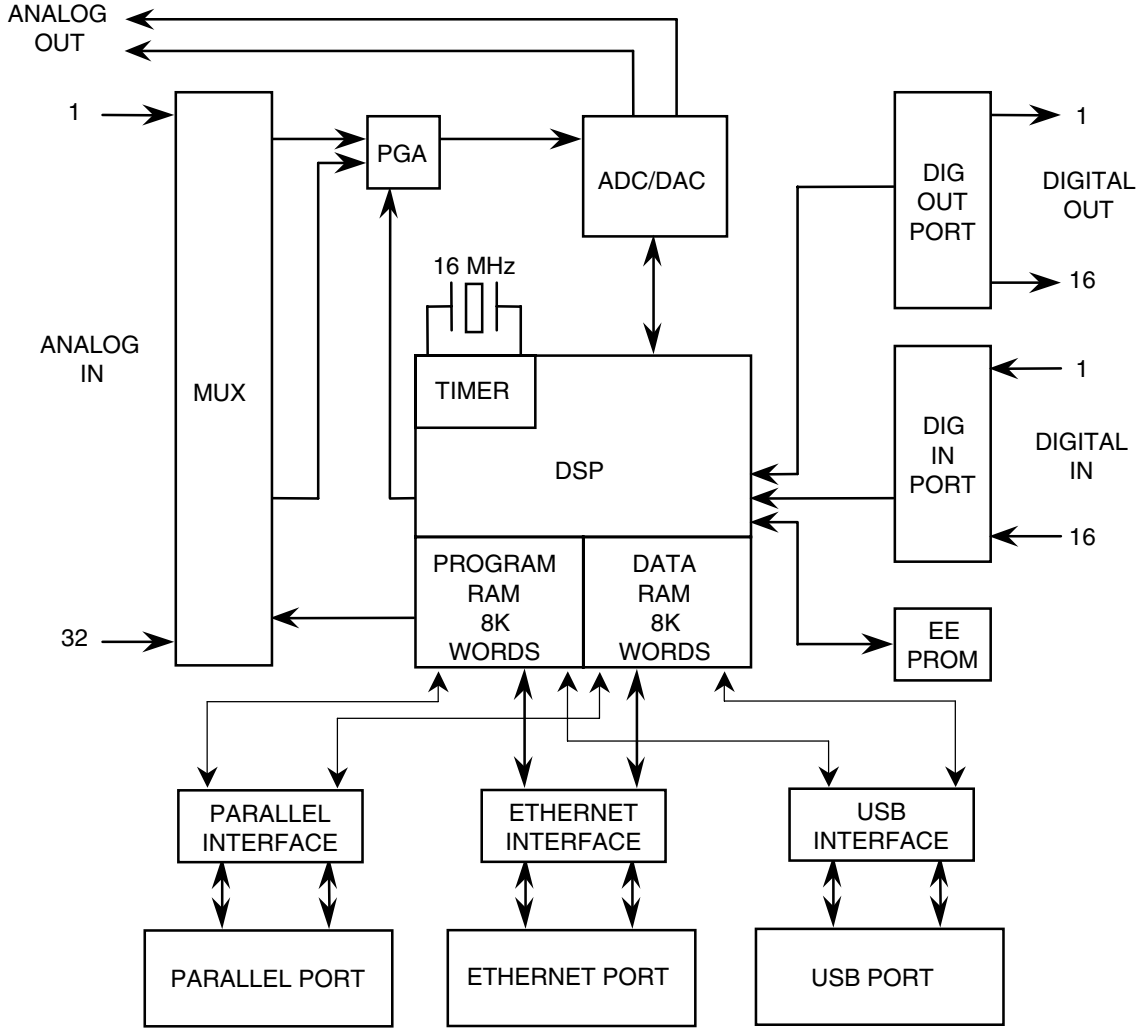
1. Referring again to TABLE (2) select the 10mV range and apply the voltage indicated by the SPAN VOLTAGE column of TABLE (2) to the selected channel.
2. Verify the reading by comparing the value displayed by WINDAQ software with the value of TABLE (2) in the SPAN ACCURACY column.
3. Repeat steps 1 and 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 the manufacturer.

Channel Group	Range	Offset @ 0V	Span Voltage	Span Accuracy*
1 through 8	10mV	0 ±0.04mV	9mV	9mV ±0.025mV**
	100mV	0 ±0.4mV	90mV	90mV ±0.25mV**
	1V	0 ±4mV	900mV	900mV ±2.5mV
	10V	0 ±10mV	9V	9V ±25mV
	100V	0 ±100mV	90V	90V ±250mV
	1000V	0 ±1V	700V	700V ±2V
17 through 32	10V	0 ±5mV	9V	9V ±25mV
	5V	0 ±3mV	4.5V	4.5V ±12.5mV
	2.5V	0 ±2mV	2V	2V ±6.25mV
	1.25V	0 ±1mV	1V	1V ±3.125mV

*Excludes offset errors.

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

5. Block Diagram



Notes:



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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