DATAQ®
INSTRUMENTS

Low-Cost, Portable, USB/ Ethernet Data Logger System

16 Single-ended, 8 Differential Analog Inputs

Stand-alone Data Logger Option Allows Data to be Saved to SD

Multiple Hardware Options

Front of DI-710

The DATAQ Instruments DI-710 Series of products is a family of instruments for general purpose and stand-alone data logger data acquisition applications. Options include interface type, input voltage range, and PC-connected or stand-alone data logger operation. Interface options are USB or Ethernet. Gain ranges have selectable factors per channel of 1, 2, 4, and 8, or 1, 10, 100, and 1000. Instruments with the stand-alone data logger option feature a built-in multimedia socket that accepts standard Secure Digital (SD) memories to which acquired data may be stored without a connected PC. SD memories are the same commonly available mass storage devices used with digital cameras and MP3 players. Memories ranging in size from 16 MB to 2 GB are supported. Instruments without this option must remain tethered to a PC's USB or Ethernet port during data acquisition and use the PC's own program and memory to store acquired data.

All DI-710 Series products feature 14-bit measurement resolution, sixteen analog input channels that may be configured for single ended or differential operation per channel, and an 8-bit digital bi-directional port. PC-connected instruments stream data to the PC from as low as 0.048 Hz up to as high as 4,800 Hz throughput rate. Stand-alone data loggers store to their SD memory from as low as 0.0017 Hz up to as high as 14,400 samples per second. All DI-710 instruments are supplied with two removable, 16-position screw terminal access connectors.

Features

Stand-alone Data Logger Operation
Use a Secure Digital Card to record and store data—up to 2GB. A FIFO memory configuration allows the DI-710 to record continuously using a circular buffer approach. A push button allows manual start/stop control over the recording process. A multi color LED shows instrument status (Record, Standby, Busy, Error).

Wide Signal Measurement Range
Suitable for use with all types of transducers, the 16-channel single-ended, 8-channel differential DI-710 features a per-channel measurement range of ±10 V over four gain ranges. This allows you to simultaneously measure a wide range of signals with ease.

Flexible Programmability
Channel-by-channel software selection of gain and single-ended/differential operation.

High Throughput Rate
Supports sample throughput rates up to 4800 samples/sec to PC (depending on host computer speed) or up to 14,400 samples/sec to memory card (stand-alone data loggers).

High Resolution
14-bit resolution analog to digital conversion provides a responsive instrument capable of registering changes as small as one part in 8.192 (±0.012% of the full scale measurement range).

File Protection
When powered down unexpectedly, the DI-710 Stand-alone model retains all data saved to its memory card.

Easy to Connect & Use
Installs in seconds. Simply connect to your computer's USB port or to an Ethernet port. Connect power, then connect your signals to the provided screw terminal blocks (16 ports each). Stand-alone data loggers just require a Secure Digital Card and power.
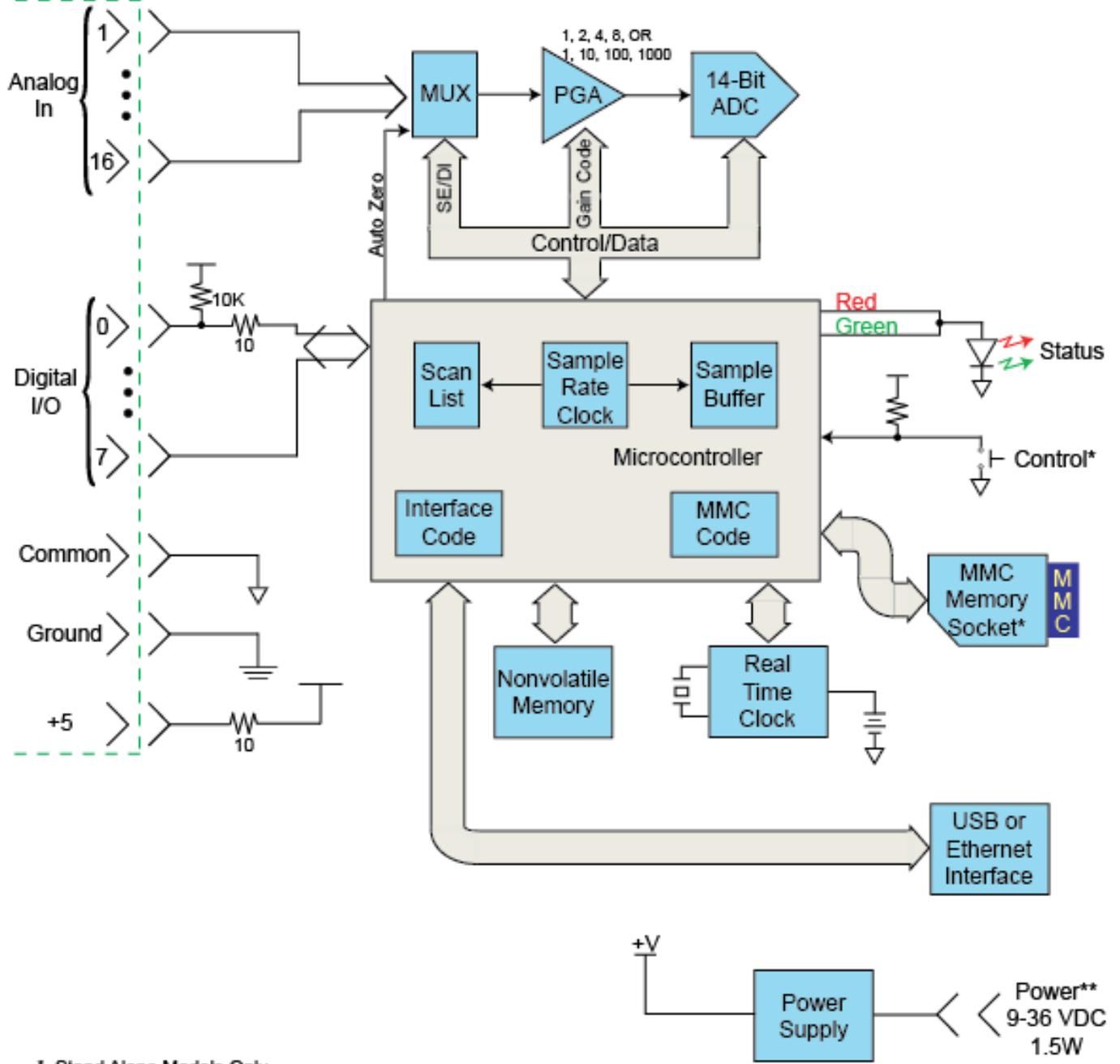
Includes Software
Be up and running minutes out of the box with WINDAQ software. WINDAQ Recording and Playback software is included free with the purchase of every DI-710 instrument. Record at rates up to 1000 Hz using WINDAQ Acquisition software. Purchase an option Unlock Code to record data as high as 4,800 Hz throughput to pc. Use Playback software (WWB) to review, measure, and analyze your data during or after a recording session.

DATAQ Instruments Hardware Manager Software allows you to effectively manage and run multiple units installed to your PC, your network, or even over the Internet. It includes configuration software for stand-alone data loggers allowing a complete data acquisition configuration to be designed and downloaded from any local or remote PC. Upload software allows you to read data stored to an SD card over the DI-710's Ethernet interface.
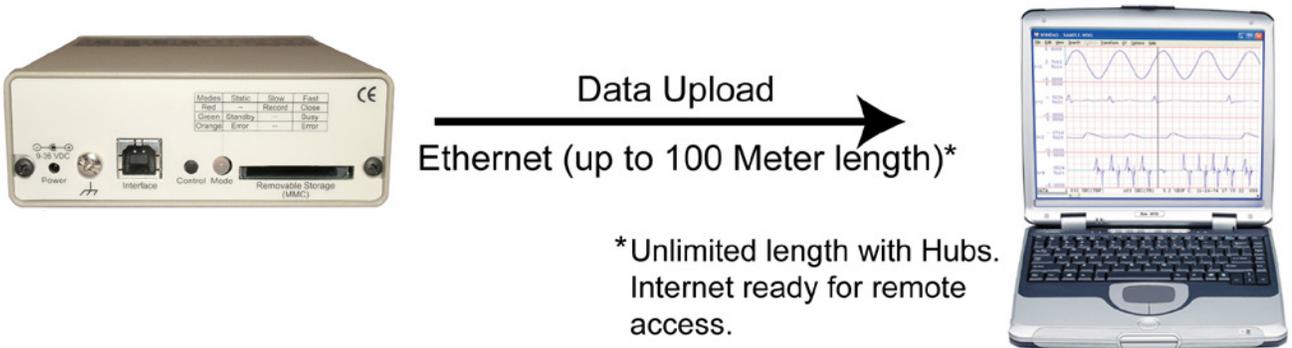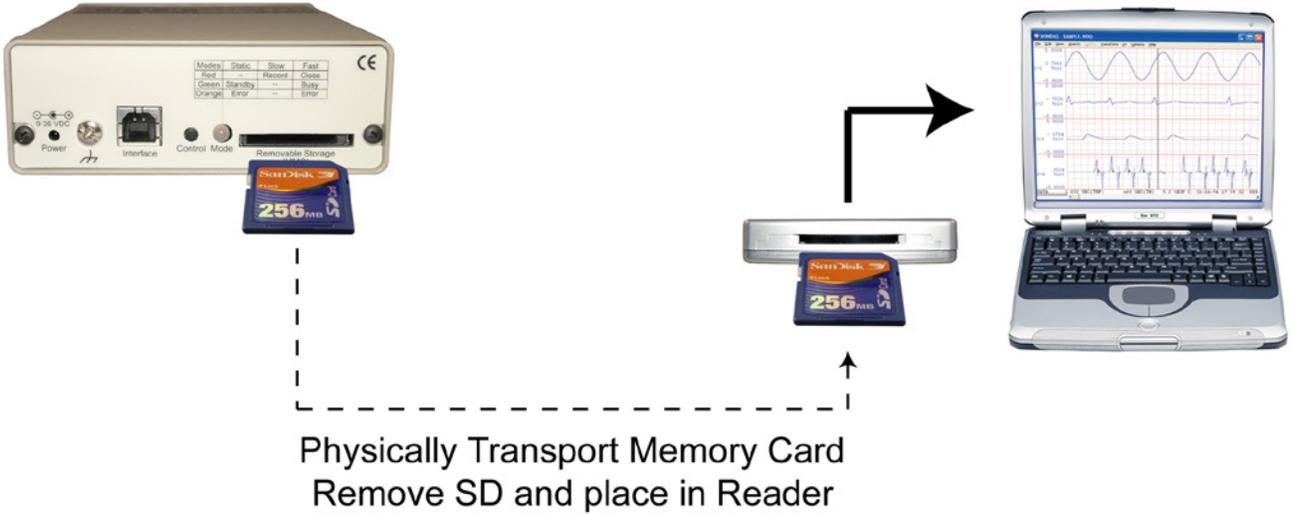
Dual Removable 16-Position Screw Terminals

Analog In: 1 ... 16

MUX → PGA → 14-Bit ADC

1, 2, 4, 8, OR
1, 10, 100, 1000

Auto Zero

SE/DI

Gain Code

Control/Data

10K
10

Digital I/O: 0 ... 7

Microcontroller

Scan List ← Sample Rate Clock → Sample Buffer

Interface Code   MMC Code

Red
Green
Status

Control*

MMC Memory Socket*
MMC

Common

Ground

+5
10

Nonvolatile Memory

Real Time Clock

USB or Ethernet Interface

+V

Power Supply

Power**
9-36 VDC
1.5W

* Stand Alone Models Only
** Non-stand-alone USB models are powered by the PC's USB port

Ways to transfer SD data files

Physically Transport Memory Card
Remove SD and place in Reader

Data Upload
Ethernet (up to 100 Meter length)*

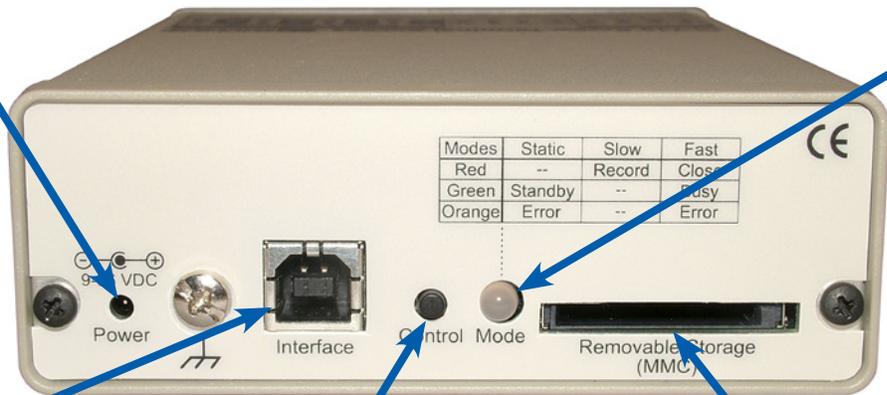*Unlimited length with Hubs.
Internet ready for remote
access.

Rear Panel

Power Jack
May be powered by the provided AC adaptor, or from any 9-36 VDC source. Consumes 2 watts.

"Mode" LED
Tri-color LED indicates instrument status: Standby, Recording, Error.

Modes	Static	Slow	Fast
Red	--	Record	Close
Green	Standby	--	Busy
Orange	Error	--	Error

Interface
May be configured with an Ethernet or USB interface.

"Control" Pushbutton
Allows manual start/stop local control over the recording process and instrument configuration.
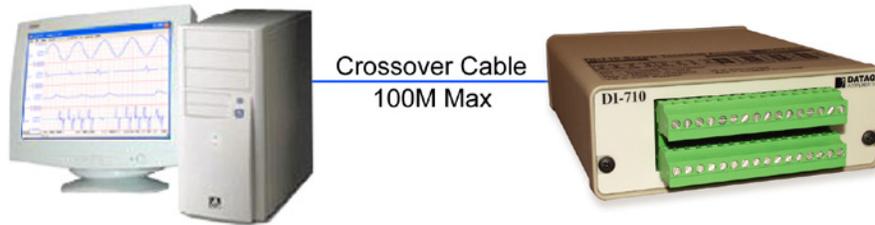
Removable Storage Slot
Accommodates standard and readily available multi-media memory cards for mass storage. These are the same memories used by consumer electronic devices like MP3 players and digital cameras. Accepts memory sizes from 16 MB to 2 GB.
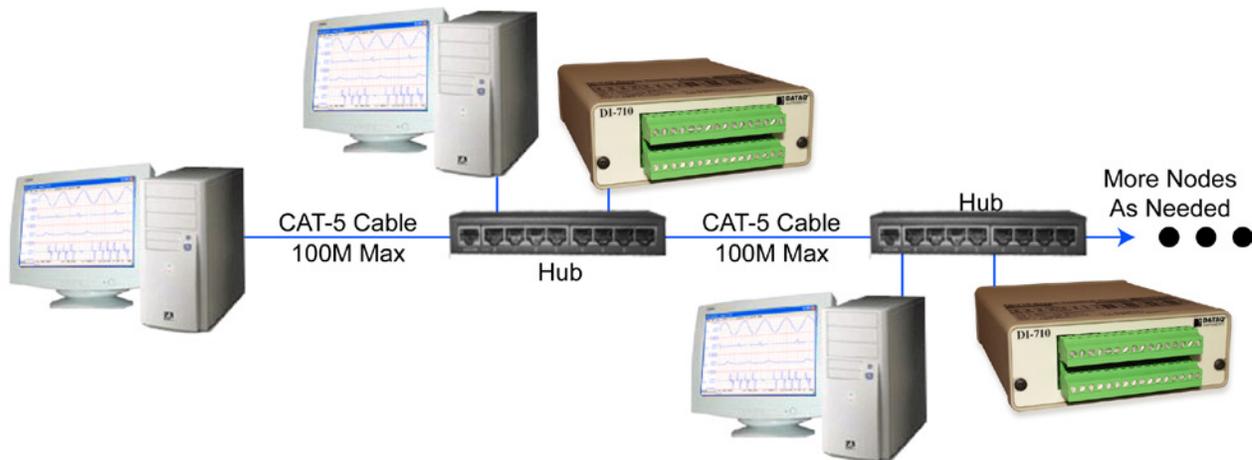
Six Deployment Methods

Ethernet Models add a new dimension to Data Acquisition applications allowing data access over a LAN to a PC on the other side of your facility or over the internet to a PC on the other side of the world. For more information view our application note on the internet at: http://www.dataq.com/applicat/articles/data_logger_ethernet02.htm.

Deployment #1 - One PC directly connected to one DI-710 with a crossover cable.

Crossover Cable
100M Max

DI-710

Deployment #2 - One or more PCs, one or more DI-710s on a Dedicated Network.

DI-710

More Nodes
As Needed

CAT-5 Cable
100M Max

Hub

CAT-5 Cable
100M Max

Hub

DI-710

Deployment #3 - One or more PCs, one or more DI-710s on a LAN.
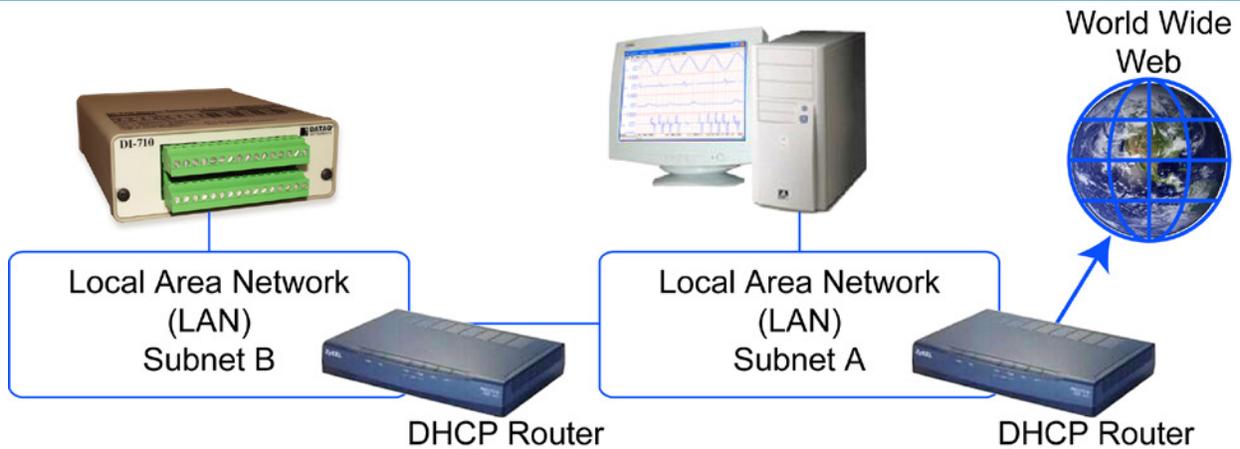

World Wide
Web

DI-710

Local Area Network
(LAN)

DHCP Router
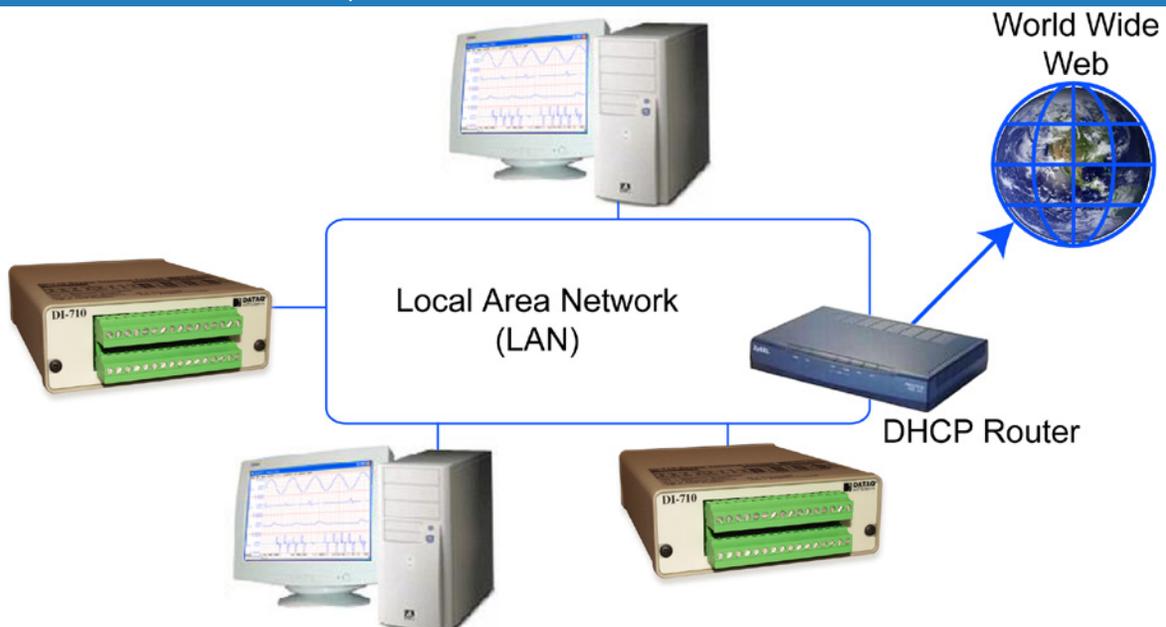
DI-710

Deployment Methods for Ethernet Models

Deployment #4 - One or more PCs, one or more DI-710s on a Wireless Network.

Wi-Fi Router

DI-710

DI-710

DI-710

Deployment #5 - One or more PCs, one or more DI-710s remotely to different LAN subnets.

World Wide Web

DI-710

Local Area Network (LAN) Subnet B

Local Area Network (LAN) Subnet A

DHCP Router

DHCP Router

Deployment #6 - One or more PCs, one or more DI-710s remotely over the Internet.

World Wide Web

ISP

ISP Public IP Address

Local Area Network (LAN)

Local Area Network (LAN)

DHCP Router

DHCP Router
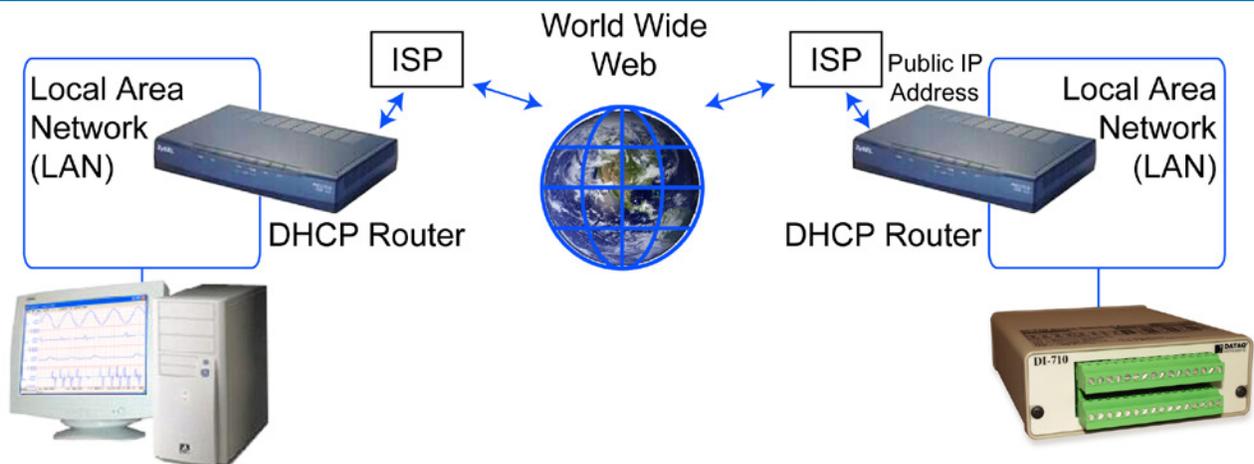
DI-710

View the Ethernet Resource Page for application notes and demos on Ethernet Data Acquisition with DI-71X products. Go to http://www.dataq.com/applicat/ethernet.htm for more information.

Analog Inputs

Number of Channels:	16		
Channel Configuration:	16 single-ended; 8 differential; programmable per channel		

Measurement range, Accuracy, and Resolution

	Gain	Range	Accuracy*	Resolution
PGL Models:	1	±10V	±.05%FSR ±50µV	±1.22mV
	10	±1V	±.05%FSR ±50µV	±122µV
	100	±100mV	±.05%FSR ±50µV	±12.2µV
	1000	±10mV	±.05%FSR ±50µV	±1.22µV
PGH Models	1	±10V	±.05%FSR ±50µV	±1.22mV
	2	±5V	±.05%FSR ±50µV	±610µV
	4	±2.5V	±.05%FSR ±50µV	±305µV
	8	±1.25V	±.05%FSR ±50µV	±153µV

*Test Conditions: Single channel, 100S/s, Averaging mode.

Input Impedance, single-ended:	1MΩ
Input impedance, differential:	1MΩ each input to common
Input bias current:	10µA for a 10V input, single channel
Input offset voltage:	Auto-zero
Input offset current:	2nA (single channel)
Max. normal mode voltage:	30V DC or peak AC
Max. common mode voltage:	30V DC or peak AC
Common mode rejection:	80db, gain=1, 1KΩ unbalance
Channel-to-channel crosstalk rejection:	-75db @ 100Ω unbalance
Gain temperature coefficient:	50 ppm/°C
Offset temperature coefficient:	0.25µV/°C
Digital filtering:	Standard: Conditional over-sampling Stand-alone: None

A/D Characteristics

Type:	Successive approximation
Resolution:	14-bit
Monotonicity:	±2 LSB
Conversion Time:	69µs

Scanning Characteristics

Max. throughput sample rate:*	Standard: 4,800 Hz (requires Unlock Code) Stand-alone: 14,400 Hz**

*When acquiring more than one channel at a gain of 100 max throughput is 7200 Hz; When acquiring more than one channel at a gain of 1000 max throughput is 900 Hz.
**Dependent on SD card used. Low speed SD cards can sample up to 2,000 Hz; High speed cards can sample up to 14,400 Hz. Some high speed cards cannot sample as high at 14,400 Hz but their capability can only be determined by trial and error (Model 101014-2G has been tested and approved).

Min. throughput sample rate:	Standard: 0.0034 Hz Stand-alone: 0.0017 Hz
Max. scan list size:	17 entries
Sample buffer size:	2kb

Controls (Stand-alone models)

Single push-button:	Manual control Record and Standby

Calibration

Calibration cycle:	One year

Digital I/O

Bits:	8 bidirectional bits
Configuration:	Each bit is programmable as Input or Output
Output voltage levels:	Min. "1" 3V @ 2.5mA sourcing; Max. "0" 0.4V @ 2.5mA sinking
Output current:	Max. source, -2.5 mA; Max. sink, 2.5mA
Input voltage levels:	Min. required "1" 2V; Max allowed "0" 0.8V

Ethernet Interface

Type:	10/100Base-T
Connector:	RJ-45
Protocol:	TCP/IP
Server Type:	DHCP

Removable Memory (Stand-alone models)

Type:	Standard SD (not SDHD or SDxC). Minimum speed of 13x. For sample rates above 2kHz SD speed should be 133x or higher.
Capacity:	16 MB to 2 GB

Real Time Clock (Stand-alone models)

Type:	Date, hour, minute, second
Resolution:	1 second
Accuracy:	20 ppm

Indicators

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

Transfer Rate to PC

Real Time:	up to 4,800 samples per second
From Memory Card:	up to 2,400 samples per second (Ethernet only)

General

Panel indicators:	Mode LED
Panel-accessible Power:	5 VDC @ 10 mA max
Panel Controls:	Control push button (Stand-alone models)
Panel Slots:	Accepts SD-type flash memory
Input connectors:	Two, removable sixteen position terminal blocks
Operating Environment:	0°C to 70°C
Enclosure:	Aluminum base with steel wrap-around. Aluminum end-panels with plastic bezels.
Dimensions:	$5^7/_{16}$"D × $4^1/_8$"W × $1^1/_2$"H (13.81D × 10.48W × 3.81H cm.)
Weight:	14 oz.
Power Requirements:	USB (stand-alone): 9 to 36 VDC, 2 watts max USB (non stand-alone): 5V @ < 2 watts max (supplied by USB port) Ethernet: 9 to 36 VDC, 2.5 watts max

Ordering Guide

Description	Order No.	Description	Order No.
DI-710-UH USB Instrument Low cost, portable, USB data logger with programmable gain ranges of 1, 2, 4, and 8.	DI-710-UH	**DI-710-EH Ethernet Instrument** Low cost, portable, Ethernet data logger with programmable gain ranges of 1, 2, 4, and 8. Includes Power Supply.	DI-710-EH
DI-710-UL USB Instrument Same as DI-710-UH but with programmable gain ranges of 1, 10, 100, and 1000.	DI-710-UL	**DI-710-EL Ethernet Instrument** Same as DI-710-EH but with programmable gain ranges of 1, 10, 100, and 1000. Includes Power Supply.	DI-710-EL
DI-710-UHS USB Stand-alone Instrument Same as DI-710-UH but with stand-alone capability. Includes Power Supply.	DI-710-UHS	**DI-710-EHS Ethernet Stand-alone Instrument** Same as DI-710-EH but with stand-alone capability. Includes Power Supply.	DI-710-EHS
DI-710-ULS USB Stand-alone Instrument Same as DI-710-UL but with stand-alone capability. Includes Power Supply.	DI-710-ULS	**DI-710-ELS Ethernet Stand-alone Instrument** Same as DI-710-EL but with stand-alone capability. Includes Power Supply.	DI-710-ELS
SD Card Reader Reads Secure Digital (SD) and MultiMedia Card (MMC) Memories. For use with Stand-alone models.	101014-CR	**WINDAQ/HS-710** High-Speed Unlock Code for WINDAQ Acquisition software allowing higher sample rates (4.8kHz).	WINDAQ/ HS-710
SD Card Low Speed 2GB SD Card (up to 2 kHz sample rate) High Speed 2GB SD Card (up to 14.4 kHz sample rate)	101014-2GS 101014-2G	**Power Connector** Power Connector (for customers who want to provide their own power).	100952

DATAQ® INSTRUMENTS

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Data Acquisition Product Links
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