

200mV to 80V Full Scale Measurement Range

5 Virtual Instruments in One: Voltmeter, Oscilloscope, Spectrum Analyzer, Data Logger, and Function Generator

Convenient USB Interface

Two Analog Input Channels

Sample Throughput Rates up to 100MHz

Up to 16-bit Resolution

DATAQ Instruments' DI-770 Series products provide hardware and software to support high speed data acquisition in a manner that is both price- and performance-competitive with stand-alone digital storage oscilloscopes. Two hardware versions are offered, one sampling at a maximum rate of 25 MHz and another at 100 MHz. Both hardware products are supported by WinDaq/Scope software. DI-770 hardware with supplied WinDaq/Scope software really offer five virtual instruments in one: A voltmeter, oscilloscope, spectrum analyzer, data logger, and a function/arbitrary waveform generator. These features, combined into one instrument, offer unprecedented instrumentation power, speed, and flexibility. DI-770 hardware offers two analog input channels with 8-, 12-, 14-, or 16-bit resolution depending upon sample rate. Each channel provides a 200 mV to 80 V full scale input range, a 128K sample record buffer, and supports a sampling rate per channel of up to 100 MHz, depending upon the model.

The DI-770 is provided with two 1:1 and 10:1 switchable oscilloscope probes. The product is provided in the same form factor as other DATAQ Instruments troubleshooting instruments, like the model DI-730. Package size measures L 9" × W 7.29" × H 1.52".



Features

5 Virtual Instruments in One

DI-770 Hardware coupled with the provided WinDaq/Scope Software essentially offers 5 virtual instruments: an Oscilloscope, Voltmeter, Data Logger, Spectrum Analyzer, and Function/Arbitrary Waveform Generator.

High Throughput Rate

Supports sample throughput rates up to 100MHz for the DI-770-100 or 25MHz for the DI-770-25.

Easy to Connect and Use

The DI-770 features a USB 2.0 interface that is backward compatible with USB 1.1. Power is derived directly through the USB cable so no external power supply is required.

Compact Size

Measuring only L 9" × W 7.29" × H 1.52"—the same size as our DI-720 and DI-730 Series instruments—the DI-770 is the smallest multi-instrument solution for field maintenance and troubleshooting applications.

Stackable

The DI-770 can be directly mounted on any DI-720 or DI-730 Series instrument to create a system combination capable of addressing the entire industrial spectrum of voltages and frequencies.

High Resolution

8-, 12-, 14-, or 16-bit measurement resolution possible dependent on sample rate.

Oscilloscope Virtual Instrument

The Oscilloscope Virtual Instrument features an auto setup function, WYSIWYG real-time operation, cursor-based measurements, X-Y plot generation, an adjustable sampling frequency, selectable pre-trigger values, a time axis zoom, and much more.

Voltmeter Virtual Instrument

The Voltmeter Virtual Instrument features up to six fully configurable displays, 11 different mathematical operations per display (including True RMS, peak-to-peak, mean, max, min, dbm, et al), 16 different display modes for calculated values, and more. The Voltmeter can be used simultaneously with the Oscilloscope or Spectrum Analyzer.

Data Logger Virtual Instrument

The Data Logger Virtual Instrument displays data in real time and records to disk. It features cursor-based measurements, a time axis zoom, and much more.

Spectrum Analyzer Virtual Instrument

The Spectrum Analyzer Virtual Instrument features true real time operation and five windowing functions, generating up to a 16K spectrum.

Function/Arbitrary Waveform Generator

The Function/Arbitrary Waveform Generator features five different waveform shapes (sine, triangle, square, DC, white noise), arbitrary waveform generator output, and all the other features of a traditional function generator.

Typical DI-770 Configurations



DI-770 Only



DI-770 in tandem with a DI-720 Series Product



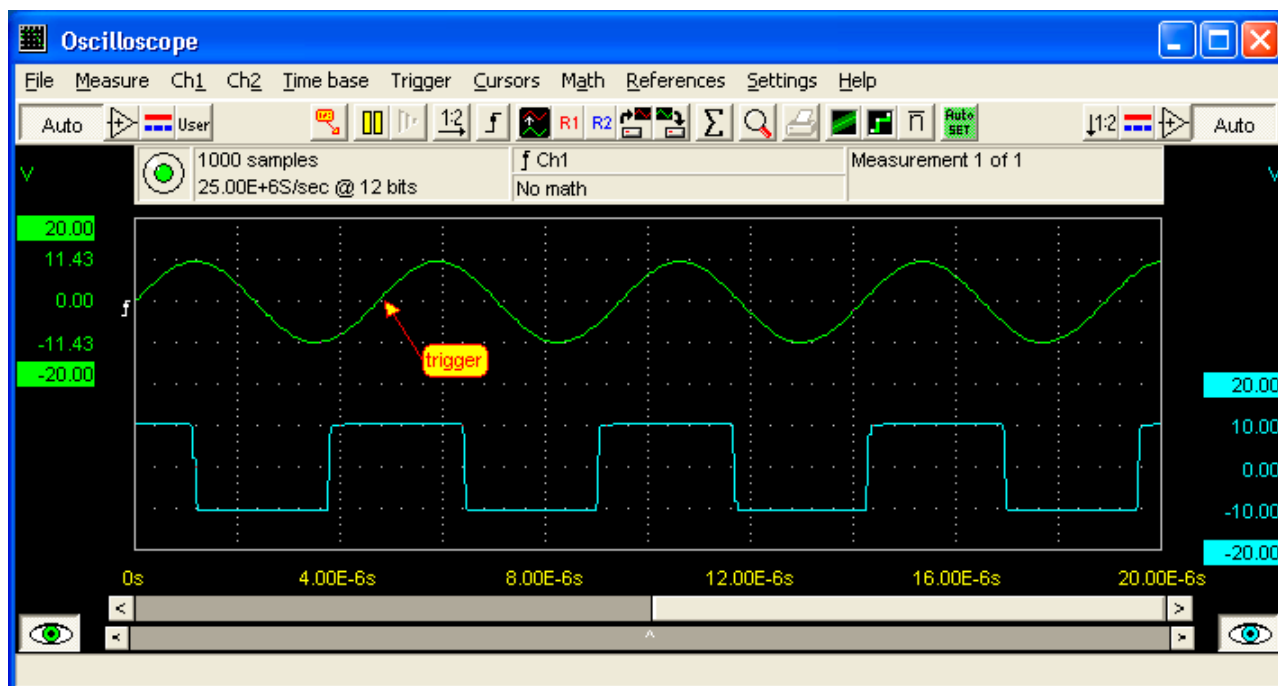
DI-770 in tandem with a DI-730 Series Product

The DI-770 Offers Flexible Performance

Used by itself or in combination with other DATAQ Instruments products, the DI-770 replaces conventional digital storage oscilloscopes (DSOs) that lack the DI-770's small size and direct computer compatibility. Add to this the instrument's ability to operate incrementally as a voltmeter, data logger, spectrum analyzer, and a function/arbitrary waveform generator and the instrument is solidly positioned as an alternative to multiple, bulky conventional instruments. In field maintenance and troubleshooting applications size matters, and the DI-770 is the smallest multi-instrument solution available.

Oscilloscope

The oscilloscope function of the DI-770 offers all the features of a traditional instrument without the bulk and expense.



Key features

- Definable record lengths ranging from 10 to 131,060 samples.
- Definable pre-trigger positions ranging from 0 to 100% allows you to capture events leading up to a trigger.
- Timesaving Auto Setup feature automatically senses signal voltage level and frequency, and then sets optimal acquisition parameters.
- Fast and easy time zoom using our unique scroll bar.
- Adjustable sampling frequency to adapt to any signal frequency.
- Selectable signal averaging allows any degree of waveform smoothing with average sizes of 1,4,16,32,64,128, or 256 samples.
- Waveform envelope mode highlights min/max changes over time.
- Software selectable vertical offset and gain per channel.
- Point-and-click trigger level, slope and hysteresis adjustments.
- Selectable linear or quadratic interpolation smoothes waveform displays.
- Adjustable cursors for precise time and amplitude measurements.
- Disk storage feature allows you to store and recall reference signals to aid waveform comparison and interpretation.
- Channel math features allow real time channel addition and subtraction.
- Supports comment tags to mark specific on-screen events.
- Supports color hardcopy.
- Provided with a complete Windows help facility.

Voltmeter

The DI-770's intelligent voltmeter function allows it to replace traditional panel meters at a fraction of the price.

Key features

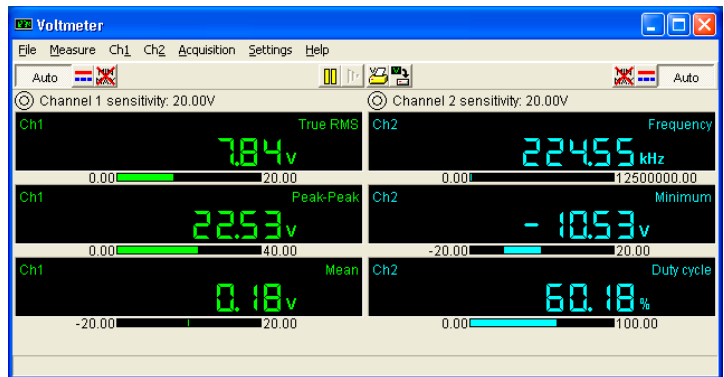
- Displays up to six fully configurable channels.
- Quick view bar graph per channel allows a fast signal size interpretation.
- Eleven selectable mathematical operations on the measured data may be enabled per channel:

True RMS	Maximum value	Power value
Peak-to-peak	Minimum value	Crest factor
Mean value	dbm	Frequency
Duty cycle	Momentary value	

- Sixteen configurable value displays for each channel:

Ch1	Ch2-Ch1	$\log(\text{Ch1} \div \text{Ch2})$	> then Hi
Ch2	Ch1*Ch2	$\log(\text{Ch2} \div \text{Ch1})$	< then Lo
Ch1+Ch2	Ch1÷Ch2	Minimum value	<> Hi Lo
Ch1-Ch2	Ch2÷Ch1	Maximum value	>< Comp

- Supports disk or printer logging with an adjustable interval between measurements. Files recorded to disk can be read back into the oscilloscope or data logger virtual instruments.
- The voltmeter virtual instrument may be used simultaneously with the oscilloscope and/or spectrum analyzer virtual instruments.

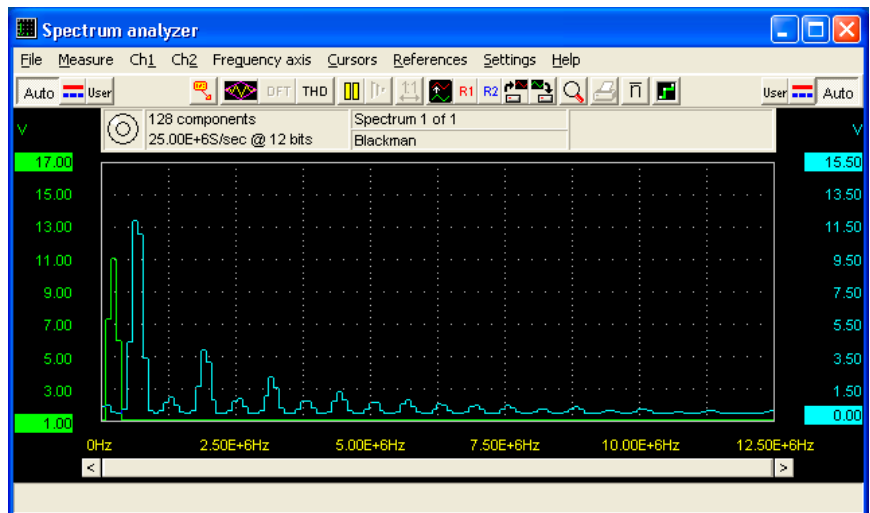


Spectrum Analyzer

The common way to examine electrical signals is in the time domain using an oscilloscope. The time domain is used to determine amplitude, time and phase information, which is necessary to describe the behavior of an electrical system. A spectrum analyzer allows incremental evaluation by allowing waveform information to be displayed in the frequency domain. This approach displays in a histogram fashion all the frequencies and their respective magnitudes that comprise a complex time domain waveform.

Key features

- True real time operation.
- Supports color hardcopy.
- Determines a spectrum from time domain segments up to 16K samples long.
- Simultaneous use with the oscilloscope allows you to see the signal both in the time domain and the frequency domain.
- Supports graphical interpolation to improve spectrum interpretation.
- Allows intuitive adjustments of horizontal and vertical offsets and gains using advanced graphical controls.
- Allows linear and logarithmic vertical axes scaling.
- Supports five different window functions to reduce discontinuity errors in the Fast Fourier Transform.
- Supports a high precision Discrete Fourier Transform to eliminate discontinuity errors completely for periodic waveforms.
- Selectable signal averaging allows any degree of spectrum smoothing with average sizes of 1,4,16,32,64,128, or 256 samples.
- Supports Total Harmonic Distortion calculation up to 100 harmonics.
- Supports the ability to store and recall reference spectrums.

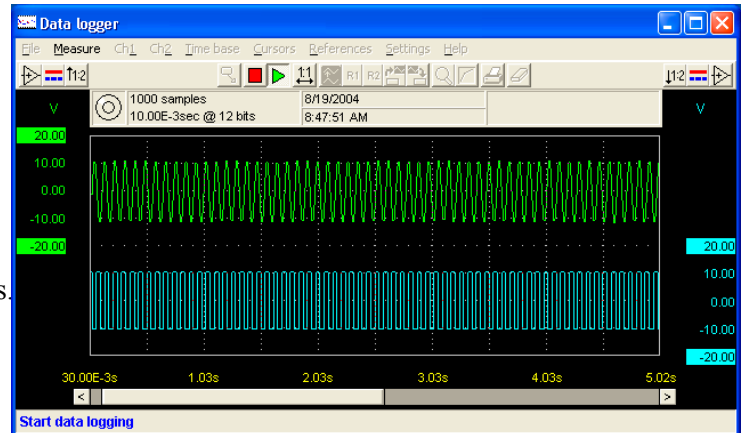


Data Logger

The data logger instrument is ideal for trend plotting signals that change slowly with respect to time. It is a real time instrument, meaning that each measured sample is displayed immediately as it's acquired. The data logger can sample using time intervals that vary between 0.01 sec and 500 seconds, and a total of 131,060 samples may be acquired. As it's acquired, each sample is immediately displayed. When the number of samples is larger than the display width, two different methods can be used to display the next sample. The scan mode clears and fills the screen again from left to right. The scroll mode shifts through the display from right to left, always maintaining one entire screen width of historical information.

Key features

- Up to 128K samples may be displayed at once without loss of information.
- Fast and easy time zoom using our unique scroll bar.
- Software selectable vertical offset and gain per channel.
- Extended cursor measurements.
- Supports the ability to store and recall reference signal.
- Supports comment tags to mark specific on-screen events.
- Supports color hardcopy.



Function Generator

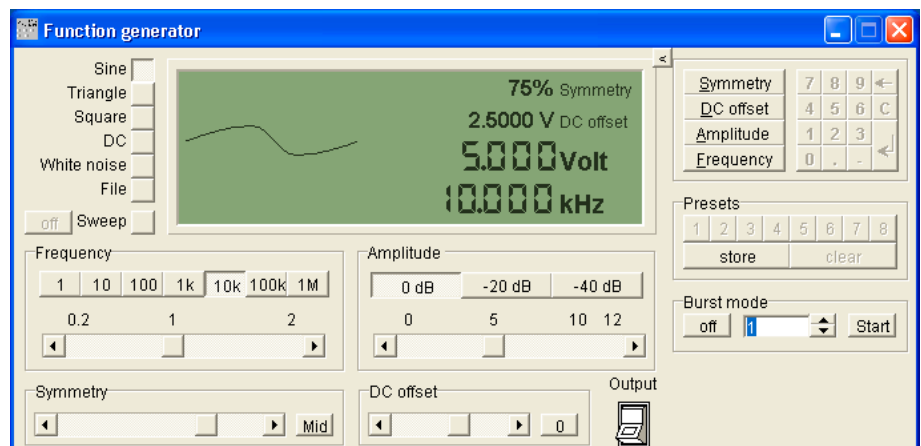
The function generator offers five default signal shapes: sine wave, triangle, square, DC and white noise. The selected signal shape is immediately shown in the display of the generator. The amplitude of the signal can be freely set between 0 V and 12 V peak. A DC offset between 0 and 12 V can also be applied, along with a symmetry ranging from 1% to 99%. The frequency of the signal can be set from almost 0 to 2 MHz.

The function generator also offers a sweep function. The sweep operates together with the spectrum analyzer. It can be set manually but it can also copy the sweep limits from the lower frequency and higher frequency from the spectrum analyzer. Together with the “measure maximum values” mode from the spectrum analyzer this gives a fast and easy way to create frequency response graphs.

It is also possible to generate a signal that was previously measured using the oscilloscope. With the File button a signal file can be loaded into the function generator memory. The generator will then generate this signal, while the amplitude, and frequency can still be adjusted. Eight user definable presets are available, in which often used signals can be stored. With a single click on a button the required signal is generated.

Key features

- Choose from five preprogrammed waveform shapes: sine, square, triangle, DC, white noise.
- Arbitrary waveform generator output accepts waveform data from file-based information that can be automatically created by the oscilloscope application.
- Supports all the features of a traditional function generator such as adjustable frequency and amplitude.
- Supports output frequencies as high as 2 MHz, and output amplitudes up to 12V peak.



Specifications

Oscilloscope

Display channels:	CH1, CH2, CH1 and CH2
Display Mode	Envelope: On/Off
	Averaging: 1 .. 256 averaging
	Math mode: CH1+CH2, CH1-CH2, CH2-CH1
	Polarity: Normal, Invert
Vertical position setting:	200mV, 500mV, 1V, 2V, 5V, 10V, 20V, 40V, 80V full scale
Vertical gain setting:	0.25 to 8 magnifying
Input coupling:	AC/DC
Time base minimum:	20 day's/div
Time base maximum:	100nsec/div (770-100); 400nsec/div (770-25)
Time base gain:	0.25 to 8 magnifying
Time base accuracy:	±100 ppm from 0°C to 70°C
Record length:	1 to 131060 samples per channel
Record view scroll bar gain:	1 to 125
Trigger mode:	free run, delayed run, auto, single, edge triggered, window, peak, external
Trigger system:	two digital trigger levels, 4096 positions
Trigger source:	CH1, CH2, External, Keyboard and Master
Trigger level:	0-100% full input range
Pre trigger:	1 to 131060 samples per channel
Post trigger:	1 to 131060 samples per channel
Trigger delay:	1 to 131060 samples per channel
Trigger hysteresis:	0 to 100% full input range
Trigger hysteresis resolution:	0.025 % full scale
Auto disk measuring:	1 to 1000 file's
Auto setup:	connect and show
Zooming:	window control, gain vertical and horizontal
Cursor system:	two cursors, autotracking, auto correct points
Cursor mode:	large cursors, small cursors
Cursor measurements:	rise time left; rise time right; sample time left; sample time right; sample time difference; cursor frequency; Voltage left; Voltage right; Voltage difference; slew rate left; slew rate right; fase difference in Degrees, Radials or cos()
Color settings:	CH1, CH2, Ref CH1, Ref CH2, math, trigger, timebase, background, raster, cursors
Fonts:	user selectable

Voltmeter

Display channels:	CH1, CH2, CH1 and CH2
Display size:	user selectable
Number of displays:	1 to 6 user selectable
Frequency range:	DI-770-25: 10Hz to 2MHz DI-770-100: 10Hz to 10MHz
Full scale reading:	2000 counts
Accuracy DC coupled:	0.2% ±10 counts
Accuracy AC coupled:	0.3% ±10 counts (10 to 1 MHz); 0.7% ±20 counts (1 to 5 MHz); 2.5% ±20 counts (1 to 5 MHz); low frequency roll off frequency is 10 Hz
Measurements:	True RMS, Peak-Peak, Mean, Max, Min, dBm, Power, Crest, Frequency, Duty cycle, Moment, value
Display mode:	CH1, CH2, CH1*CH2, CH1/CH2, CH1-CH2, CH2-CH1, CH1+CH2, >the Hi, <then Lo, ><COMP, <> HI LO, MAX, MIN, LOG(CH1/CH2), LOG CH2/CH1)
Measure units:	Volt, Amp, °C, °F, Watt, %, Meter, Colomd, Hertz, Bar, user defined
Relative:	CH1, CH2, user defined value
Sound settings:	None; 100Hz; 200Hz; 500Hz; 1kHz; 2kHz; 10kHz
Data storing:	direct on paper; on disk; on network
Acquisition hysteresis:	used defined value

Transient Recorder

Measuring channels:	CH1, CH2, CH1 and CH2
Measuring points:	1 to 131060
Measure time between to points:	0.01 sec to 500 sec
Measure time span:	21 min to 750 days
Measure mode:	scroll mode or scan mode
Cursor readout:	see oscilloscope
Time reference:	time of start, time of measuring, time differency

Spectrum Analyzer

Display channels:	CH1, CH2, CH1 and CH2
Display mode:	single shot, continuous
Measuring mode:	max mode, standard mode
Vertical position setting:	200mVolt, 500mVolt, 1V, 2V, 5V, 10V, 20V, 40V, 80V full scale
Vertical gain setting:	0.25 to 4 magnifying
Input coupling:	AC/DC
Frequency axis:	Logarithmic, linear, octaves or third octave
Octave range:	22.1Hz to 22.6 kHz
Frequency range:	DI-770-100: 0.01 Hz to 50 MHz DI-770-25: 0.01 Hz to 12.5 MHz
Record length:	32768 to 32 frequency components
Windows functions:	rectangular, Hanning, Hamming, Bartlett, Blackman, Parzen
Averaging:	1 to 256 measurements
Cursor readout:	see oscilloscope
Total Harmonic Distortion:	1 to 100 spectrums

Arbitrary Waveform Generator

Singal sources:	sine, triangle, square DC white noise, user defined
Sweep:	locked on spectrum analyzer
Frequency:	0.01 Hz to 2 MHz
Amplitude:	0 ± 12 Volt, max 50 mAmp
Symmetry:	0 to 99%
DC offset:	0 ± 12 Volt
Presets:	10 storage
Record length:	256 Kwords

Acquisition System

Resolution:	8 bit @ 100 MHz; 12 bit @ 50 MHz; 14 bit @ 3.125 MHz; 16 bit @ 195 kHz
Bandwidth (-3dB):	DC to 50 MHz maximum
Sample rate:	DI-770-25: 25 MHz, 40 nsec DI-770-100: 100 MHz, 10 nsec
Sample source:	internal 0.01%, external
Number of input channels:	2 analog
Input sensitivity:	200 mVolt .. 80 Volt full scale
Input protection:	200 Volt (DC + AC peak < 10 kHz)
Input impedance:	1 MOhm / 30 pF
Input coupling:	AC/DC
Input accuracy:	0.2% ± 1 LSB
AC coupling cut off frequency (-3dB):	1 Hz with 1x probe
Memory:	0 - 131060 samples each channel

Arbitrary Waveform Generator (independent from acquisition system)

Resolution:	14 bit @ 50 MHz
Sample rate:	50 MHz
Bandwidth:	DC to 2MHz
Impedance:	50 Ohm
Coupling:	DC
Output amplitude:	-12 Volt .. 12 Volt

...continued on next page

Specifications (continued)

Arbitrary Waveform Generator (independent from acquisition system)

Amplitude step: 0 - ± 0.1 V range, 8192 steps
 ± 0.1 - ± 0.9 V range, 8192 steps
 ± 0.9 - ± 12 V range, 8192 steps
DC level: 0 - ± 12 V in 8192 steps

Waveforms: sine, triangle, square, DC, noise, user defined

Symmetry: 1 - 99%, 1% steps

Memory: 1 - 256 Kwords

Trigger System

System: digital, 2 levels

Source: CH1, CH2, AND, OR, digital external

Trigger modes: rising slope, falling slope, inside window, outside window, peak

Level adjustment: 0 - 100% of full scale

Hysteresis adjustment: 0 - 100% of full scale

Resolution: 0.025% (12 bits)

Pre trigger: 0 - 131060 samples (0 - 100%, one sample resolution)

Post trigger: 0 - 131060 samples (0 - 100%, one sample resolution)

Digital trigger input level: 0 - 3.3 volt (5 volt max)

Power Requirements

Power from USB port: 500 mAmp max (2.5 Watt max)

Power via extension connector: 1500 mAmp max (7.5 Watt max)

Certifications and Compliances

CE mark compliance: CE

Physical

Dimensions: 1.0 $\times$ 6.7 $\times$ 5.2 in. (25 $\times$ 170 $\times$ 140 mm)

Weight: approx. 2 pounds 10 ounces (1190 grams)

Cord length: 1.8 meter (70 inch)

I/O Connectors

Input Channel 1: BNC

Input Channel 2: BNC

Output AWG: BNC

USB: USB 2.0 and USB 1.1 type A

Extension connector: Sub-D 25 pins female

System Requirements

PC I/O connection: USB 2.0 or USB 1.1 port type A

Operating system: Windows 98/2000/ME/XP

Operating Environment

Ambient temperature: 0 to 55 °C

Relative humidity: 10 to 90% non condensing

Storage Environment

Ambient temperature: -20 to 70 °C

Relative humidity: 5 to 95% non condensing

Package

Instrument: DI-770

Accessories: 2 oscilloscope probes 1:1 - 1:10 switchable

Software: Windows 98/2000/ME/XP on CD

Drivers: Windows 98/2000/ME/XP on CD

Manual: printed on paper and digital on CD

Ordering Guide

Description	Order Number
DI-770-25 PC Oscilloscope providing 5 virtual instruments in one package with a USB interface and sample throughput rates up to 25MHz.	DI-770-25
DI-770-100 PC Oscilloscope providing 5 virtual instruments in one package with a USB interface and sample throughput rates up to 100MHz.	DI-770-100



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