

## Precision Voltage Measurement Instruments: Ideal for Li-ion Cells

**VOLTpoint™** is a family of precision instruments designed for measuring a wide range of voltage inputs; ideally suited for cell-by-cell battery testing where sources range from millivolts to  $\pm 400V$ . Available in both USB and Ethernet (LXI) versions, VOLTpoint can be configured with up to 48 input channels. Each VOLTpoint instrument ships with a ready-to-measure application, allowing you to view, graph, and export your data.

VOLTpoint uses **ISO-Channel™** technology to eliminate connection problems by using galvanic isolation methods to guarantee 1000V isolation between sensor grounds. The result is that accuracy is preserved for all sensor inputs. Formerly, connections to sensors for industrial measurement have frequently resulted in noisy results or ground loops. The implied assumption is that each sensor's ground is at the same reference potential. But if the grounds are different from one another, severe common mode noise problems occur.

### Applications

- Hybrid-Electric Vehicle (HEV) battery performance
- Li-ion Cell measurements
- High voltage, precision battery stack, or cell balance measurements
- High power portable equipment
- Motor shunt measurements
- Commercial, military hybrid vehicles
- Fuel cell stacks
- High voltage data acquisition
- Battery back-up monitoring

### Key Design Features

- **ISO-Channel™** for each input signal... preserves accuracy
- **Dedicated 24-bit, Delta Sigma A/D converter** for each voltage input channel for simultaneous, high-resolution measurements
- **1000V galvanic isolation** channel-to-channel and to the host computer to protect signal integrity
- **Maximum 300 $\mu$ V error** for  $\pm 10V$  range, 2mV error for  $\pm 100V$  range
- **3 software selectable input ranges** on voltage boards:  $\pm 10V$ ,  $\pm 100V$ ,  $\pm 400V$  on a per channel basis
- Easy access jacks for **quick wiring**
- **Ethernet or USB** operation



*Figure 1. VOLTpoint allows direct battery cell connection of voltages up to  $\pm 400V$  with 1000V isolation between any of the 48 channels. Ground loops are eliminated through the isolation of each channel using the ISO-Channel technology. The  $\pm 10V$  range allows resolution and accuracy of less than 300 microvolts. The  $\pm 400V$  range is available for measuring stacked cells or higher voltages.*

### Voltage Inputs

VOLTpoint instruments support up to 48 inputs with 24-bit resolution per channel. The DT9873 and DT8873 provide 3 software selectable input ranges on voltage boards:  $\pm 10V$ ,  $\pm 100V$ ,  $\pm 400V$  on a per channel basis. The VOLTpoint architecture uses an A/D per channel, allowing sampling rates of up to 10Hz per channel over all 48 channels.

### High-Stability, Low Drift Voltage References

VOLTpoint uses high-precision, high-stability, low-drift voltage references rated at 4 PPM per degree and 100 PPM drift per year. This means VOLTpoint is accurate now and will remain that way over time.

### Digital Input/Output Lines

VOLTpoint instruments feature eight, isolated, digital input lines. The digital input lines operate from +3 to +28V DC, with a switching time of 2ms maximum. VOLTpoint instruments are perfect for driving relays directly, featuring eight, isolated, digital output lines. The outputs are solid-state relays that operate at  $\pm 30V$  and 400mA peak (AC or DC) with a switching time of 2ms maximum. VOLTpoint instruments include channel-to-channel isolation of up to 250V between digital I/O lines. If the application requires greater channel-to-channel isolation, every other digital line may be used. This reduces the number of digital I/O lines, but provides channel-to-channel isolation of 500V (one channel can be +250V while the adjacent channel can be -250V).

## Remote Measurements

The network-ready versions of VOLTpoint (DT8873) provide a standard Ethernet connection to support remote monitoring and control from the field or on the factory floor. Input channels can be expanded by simply adding more instruments to the network.

## Custom Designed DC-DC Converters

Our custom DC-DC converters circuits have a unique power distribution system that supplies power to only 2 of the 6 boards at any one time. Cycling non-adjacent boards in this manner creates less power surges, reduces noise, and improves the overall system performance.

## 1000V Galvanic Isolation

A vast majority of applications reside in industrial environments. By their nature, such environments create a wide variety of problems for data acquisition systems. Noise and high voltage inherent in industrial machinery can adversely affect a measurement instrument, from a relatively benign discrepancy in an acquired value to the destruction of the entire instrument. High quality galvanic isolation helps both situations. Galvanic isolation improves system accuracy by eliminating the unwanted effects of voltage transients, ground loops, and acts as an “insurance policy” against the damaging effects of high voltages. Plus running at 10Hz provides extremely high normal mode rejection for power line related noise. The combination of isolation, Sigma-Delta inherent filtering, and the added analog filtering to remove high-frequency noise, gives the ultimate in measurement performance.

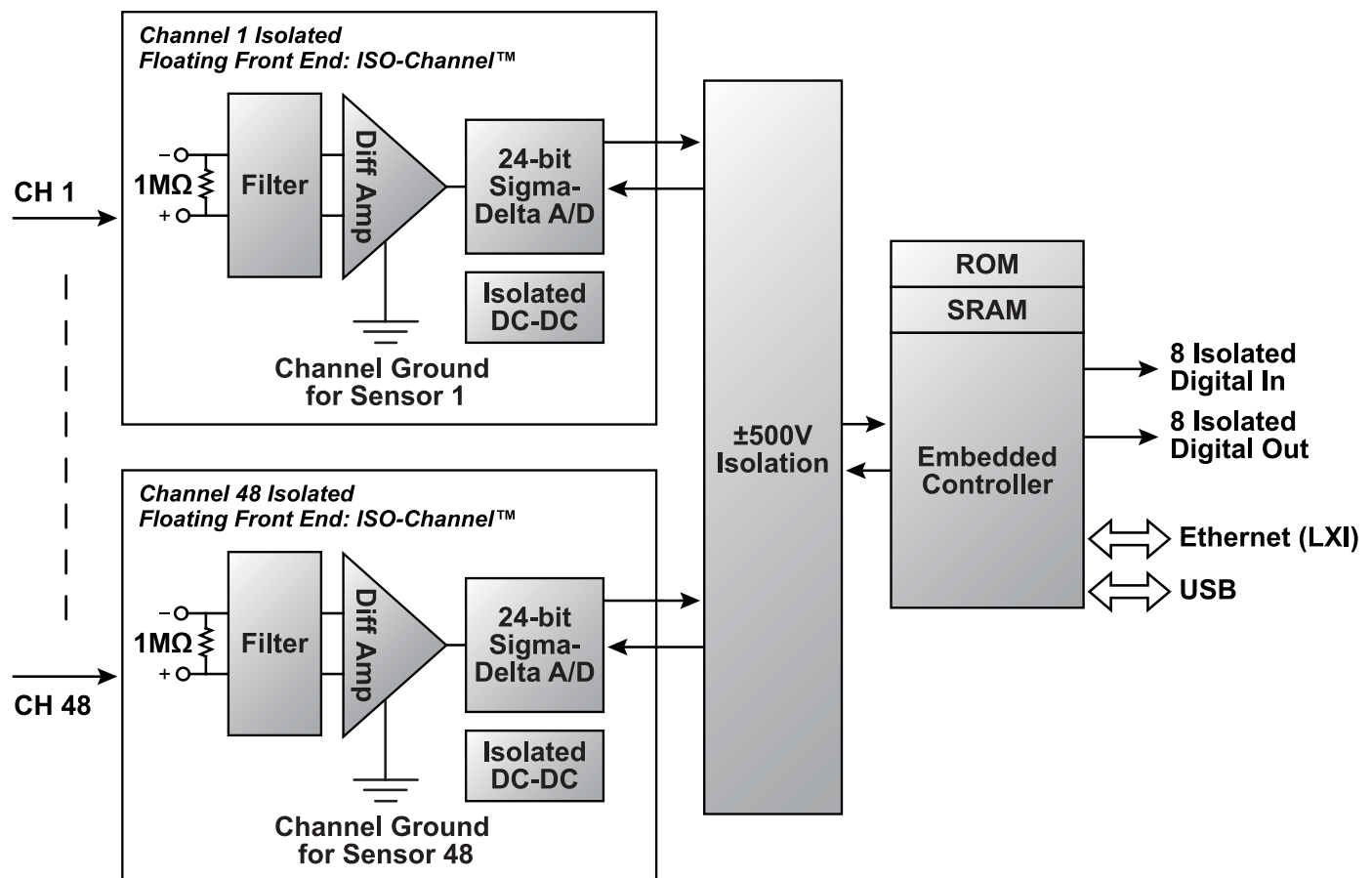


Figure 2. VOLTpoint allows network connection via Ethernet for monitoring or controlling measurements anywhere. USB connection is also available.

## ISO-Channel™

ISO-Channel uses galvanic isolation methods to guarantee 1000V isolation between any input channel to any other input channel and earth ground. Common mode noise and ground loop problems are eliminated with ISO-Channel since sensors that are at different ground reference levels are easily accommodated, even if they are at widely differing voltages of hundreds of volts or transients to thousands of volts.

ISO-Channel vastly increases reliability by implementing a 24-bit A/D converter per channel on each of many channels, all operating in parallel. Older system designs with relay front ends are prone to system failure through “sticking channels” or magnetic field influence. The all solid-state ISO-Channel provides digital transfer of valuable sensor data with optical or transformer isolation.

The result is that accuracy is preserved for all sensor inputs. This is especially useful when conditions change in the electrical environment due to motor current surges, electromagnetic radiation, or noisy industrial equipment turning on/off.

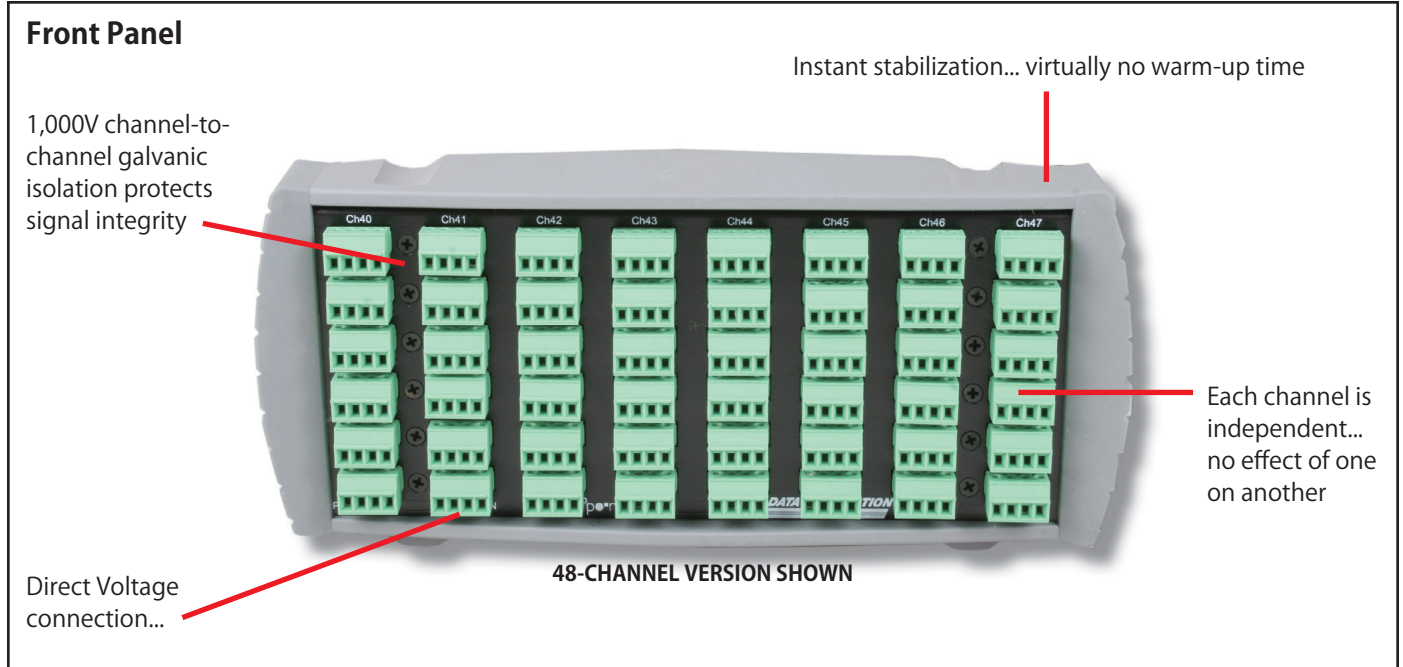


Figure 3. Every channel provides direct precision voltage connections as shown above.

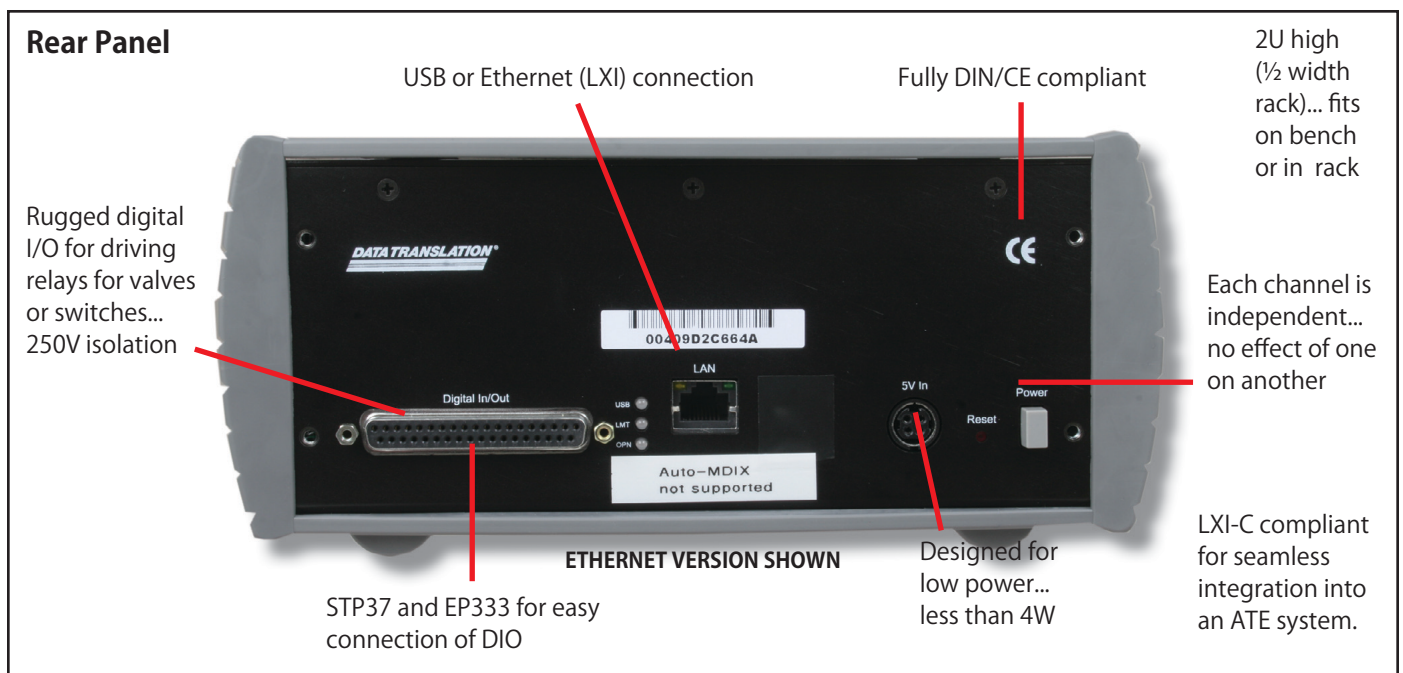
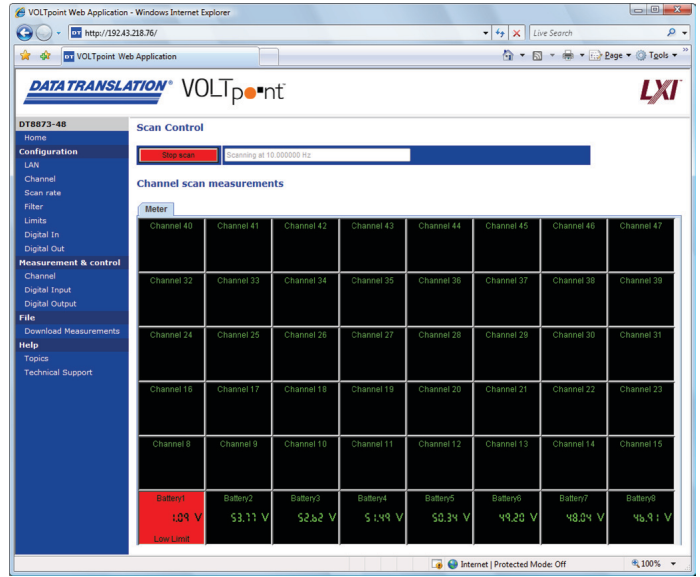
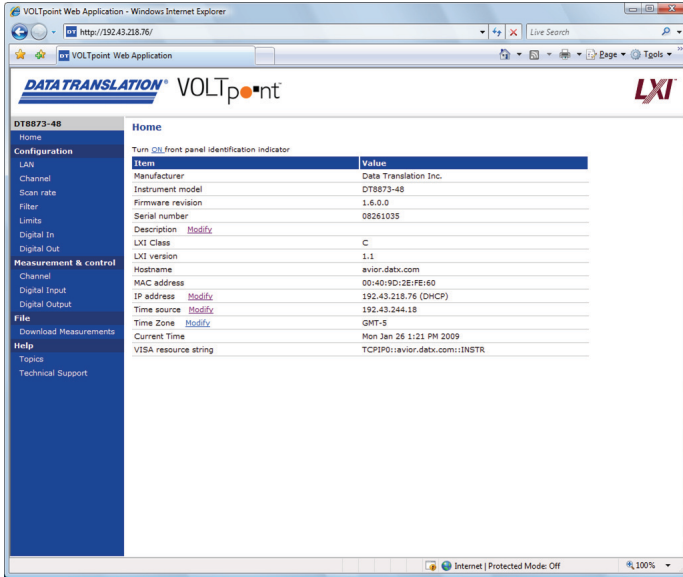


Figure 4. Digital I/O, power, and USB or Ethernet connections are provided on the back panel.

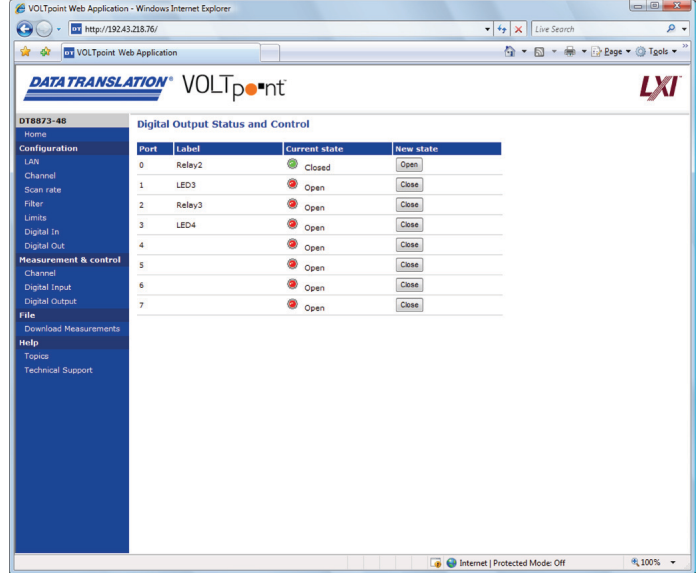
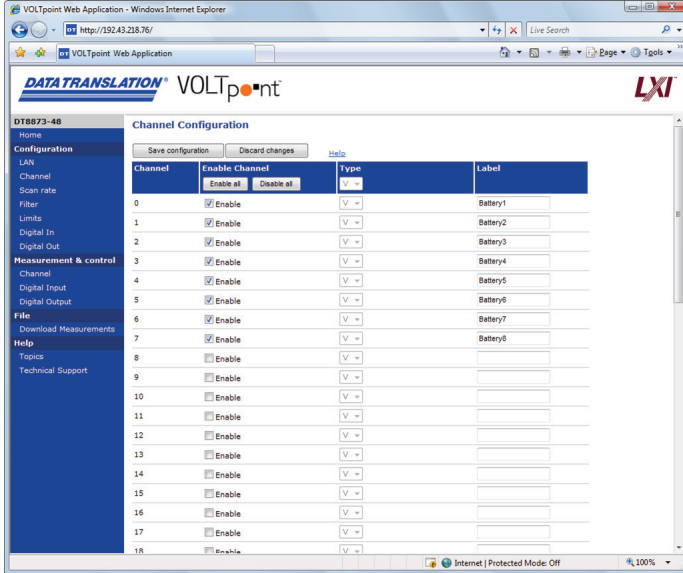


## Web Access

Using the built-in web-based application, you can configure, measure, and control the VOLTpoint instruments either locally or remotely.

## Measurement & Control Pages

You can use the measurement and control web pages to start or stop a scan, update the value of the digital output port, or read the value of the digital input port.



## Configuration Pages

Web pages are provided for configuring the following aspects of your VOLTpoint instrument: Local Area Network (LAN), input channels that you want to measure, scan parameters (such as the scan rate), alarm limits, and digital I/O lines.

## Capability That Fits Each Application Need

The Measurement Application is an executable program built with Measure Foundry®. The benefit for the user is that the application can be modified or expanded to meet a particular need. For example, the user might want to apply a unique algorithm or formula to their data. Other extensions to the Measurement Application can also be achieved with Measure Foundry. These can then be distributed to run locally or remotely.

## Measurement Application

Your VOLTpoint instrument comes with a ready-to-measure application for measuring voltage data. Developed using Measure Foundry, the Measurement Application allows you to acquire voltage measurements from up to 48 channels, display the data on the screen, and log data to disk for analysis.

You can be productive right out of the box using this software... without writing code! You can even export the data to other applications, like Measure Foundry, Microsoft Excel®, and MATLAB® for more advance analysis. And, since the project file is also provided, you can customize the application to suit your needs using Measure Foundry.

## Key Software Features

- Acquire voltage data from all VOLTpoint instruments on up to 48 channels simultaneously at up to 10Hz per channel
- Configure the channel type and scan rate to suit your application
- Add alarms and min/max points for process control
- Display live signals for real-time visual analysis
- Log data to disk for analysis
- No coding necessary, just load and start measuring right out-of-the-box
- Export data into other applications for advanced post-processing and analysis
- Customize the application, if desired, using the provided project file and Measure Foundry
- Eureka Discovery Utility helps you locate or “discover” all LXI (Ethernet) instruments that are connected to your system
- Measure Foundry has a discovery component that allows LXI and USB VOLTpoint discovery in your application. This allows the user the ability to easily display and select all available instruments, identifies their IP address, as well as all instrument parameters including the manufacturer, model, serial number, and operating state.

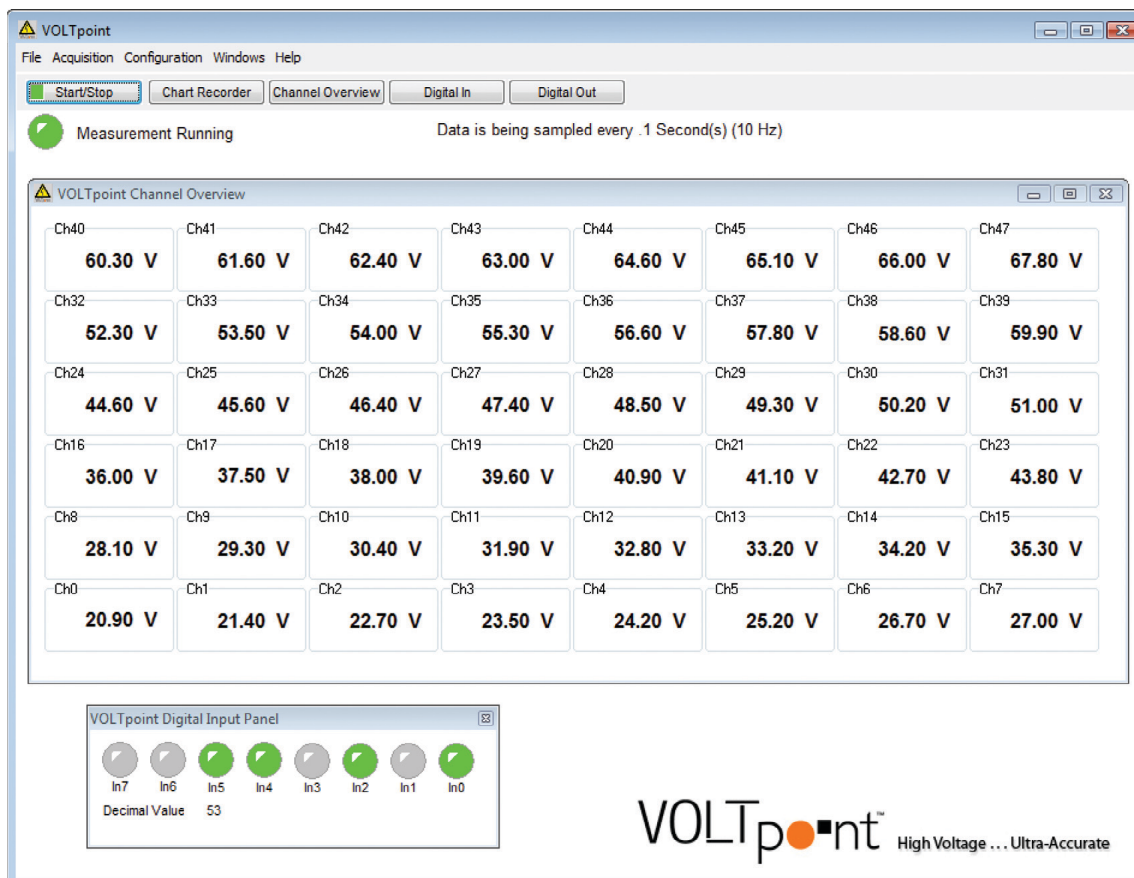


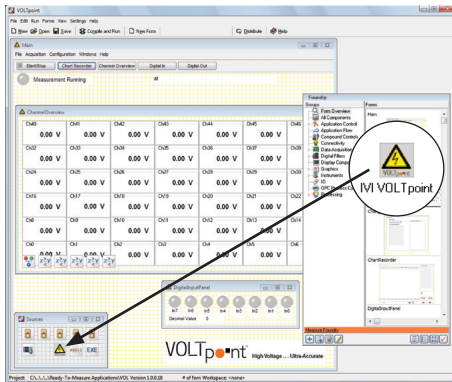
Figure 8. The Measurement Application is a ready-to-run executable that can be easily modified and extended using Measure Foundry. You can select the channels to display, visually analyze the data in real-time, save the data to a file, and analyze the data in Microsoft Excel®.

## For All Versions

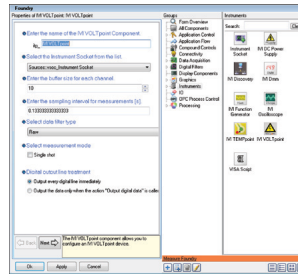
### Measure Foundry

Measure Foundry is a rapid application development package that provides a system solution for your VOLTpoint Instrument. Measure Foundry fulfills the promise of being able to build complex voltage measurement applications easily and without writing any code. The Measurement Application that ships with the instrument can be easily modified using this package.

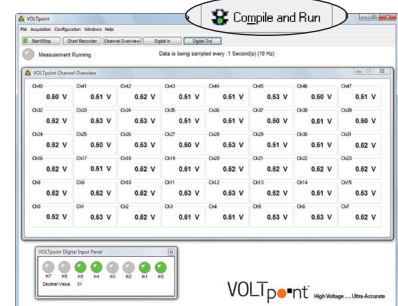
**3 Easy Steps to create your measurement application**



1) Drag and drop your components to create your application.



2) Configure the components through property pages.



3) Compile and Run

### IVI-COM Driver

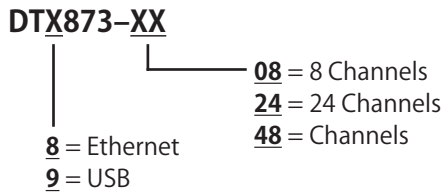
This driver is provided to write application programs for VOLTpoint™ using an IVI-COM instrument interface. It can be used with programs written in Visual C#, Visual Basic® for .NET, or C++ under Visual Studio® 2003/2005/2008. You can also use the IVI-COM driver with LabVIEW® from National Instruments® or MATLAB® from the MathWorks™ to program VOLTpoint instruments.

## For Ethernet (LXI) versions only

### SCPI Commands

Use network sockets to program and control VOLTpoint LXI instruments by sending SCPI commands. Detailed examples and comprehensive reference manual provided.

## VOLTpoint Instruments



For additional channel configurations, please call 1-800-525-8528 or email [sales@datatranslation.com](mailto:sales@datatranslation.com) to discuss your requirements.

### Ordering Examples:

#### **DT9873-48**

VOLTpoint USB instrument with 48 input channels

#### **DT8873-08**

VOLTpoint Ethernet instrument with 8 input channels

## Options

- **SP1309** – Measure Foundry Professional with Instrument Pak
- **STP37** – Digital I/O screw terminal panel
- **EP333** – Cable for attaching the STP37 to the VOLTpoint instrument
- **EP373** – Single Rack-Mount Kit
- **EP374** – Dual Rack-Mount Kit

For more information about VOLTpoint, please visit:  
<http://www.datatranslation.com/VOLTpoint/>

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