

# VIBpoint Framework

## For Serious Vibration Measurement

VIBpoint™

The ultimate in Sound and Vibration measurement. No programming, just configure and run. Perform sophisticated measurements with a wide range of USB or Ethernet data acquisition modules that are fully supported for accelerometer, IEPE, and strain sensor devices.

VIBpoint Framework allows the users to focus on getting their work done by providing the physical measurement connectivity, high level tools to get up and running quickly, signal processing for single and dual channel FFT functions, data logging, and report generation.

### Major Benefits:

- Just configure and run for modal analysis, failure analysis, and quality determinations...no programming, just point and click
- Physical Measurement modules, USB or Ethernet, provide instant connection to wide variety of accelerometers, IEPE devices, and strain...no wiring, just standard connections
- Applications that change and grow to more channels or modules are automatically extended to acquire all data synchronously
- Portable operation in the field for sound and vibration on laptops through USB power for all data acquisition modules
- Application provides FFT, FRF, THD, SNR, SINAD, ENOB and displays results in plot windows
- Easy-to-use configuration windows allow quick setup of all features for acquiring, processing, plotting, and displaying data

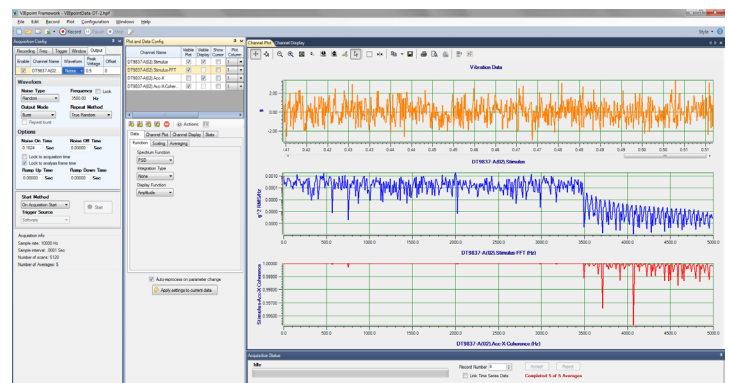


Figure 1. VIBpoint Framework adds real-time analysis features to vibration and strain test systems. The software is navigated through a series of easy to use configuration windows.

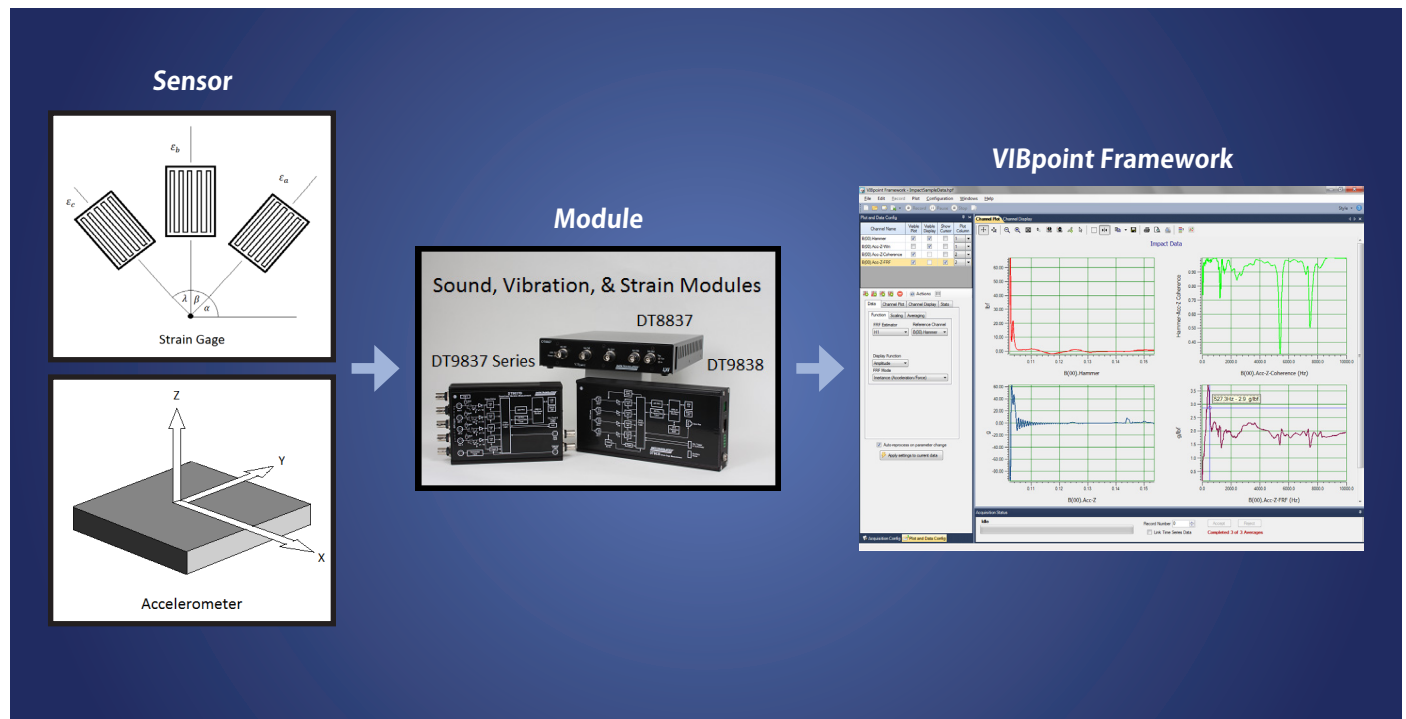
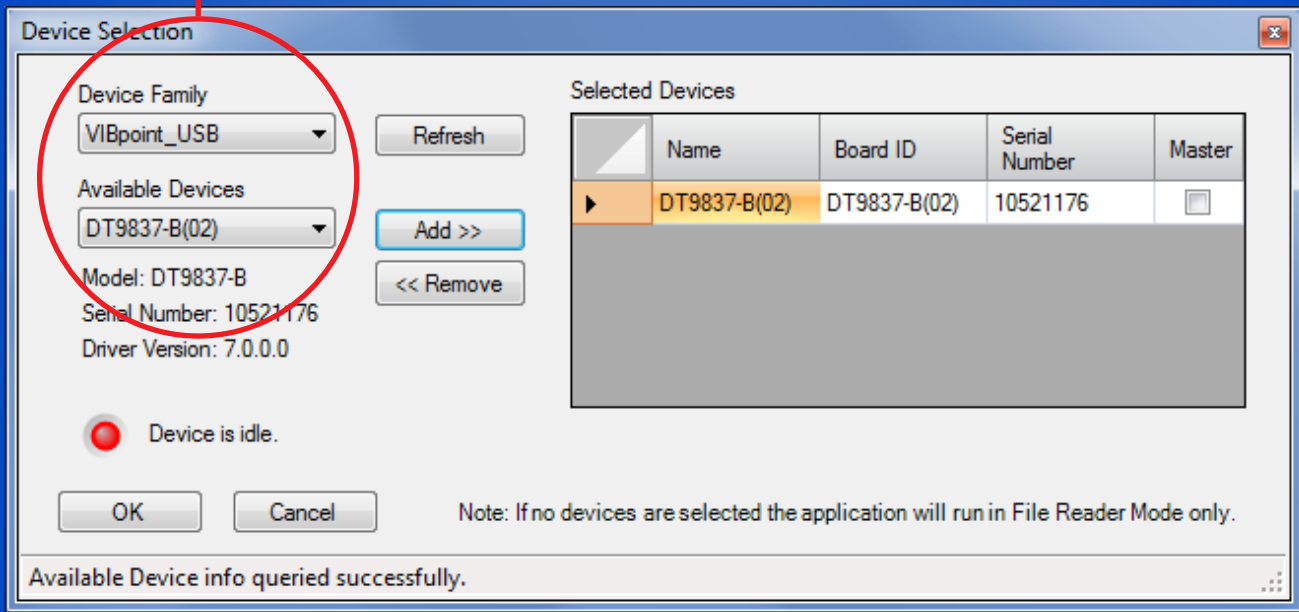


Figure 2. VIBpoint Framework supports the DT9837/DT8837 Series, DT9838, and DT9847 Series of vibration, noise, and strain modules.

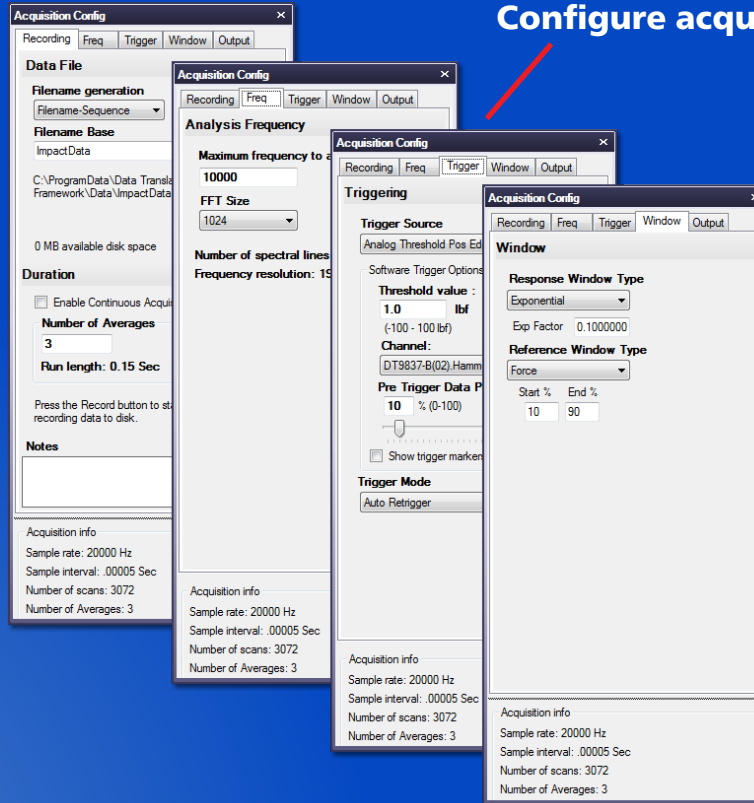
Quickly and easily perform sophisticated measurements in 8 simple steps.

## Select input device



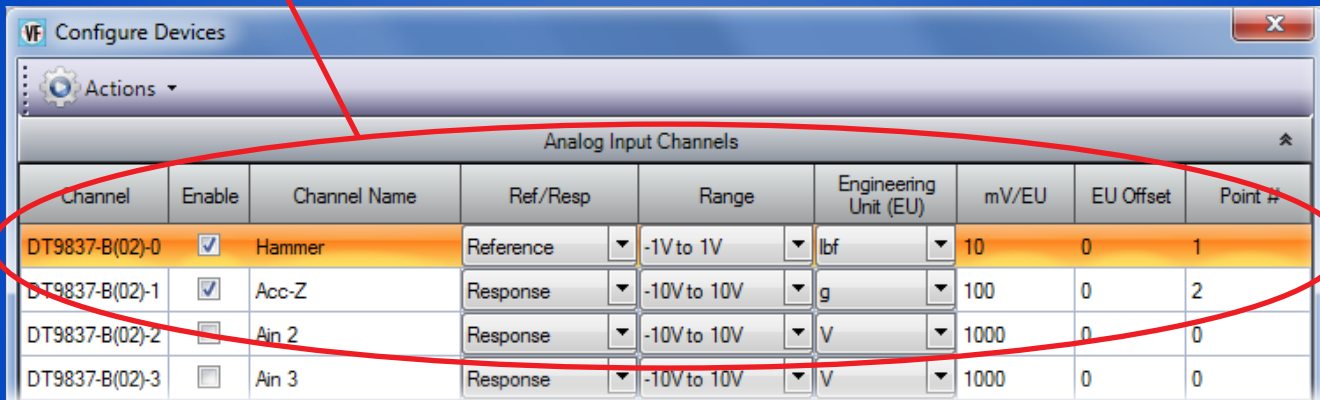
STEP 1: Select Input Device from available device dropdown menu.

## Configure acquisition settings



STEP 2: Use the Recording, Freq, Trigger, Window, and Output tabs to configure the acquisition settings, including the number of records to acquire, the maximum frequency to analyze, the trigger that starts acquisition, the window to apply to the FFT channel, and the analog output channel settings.

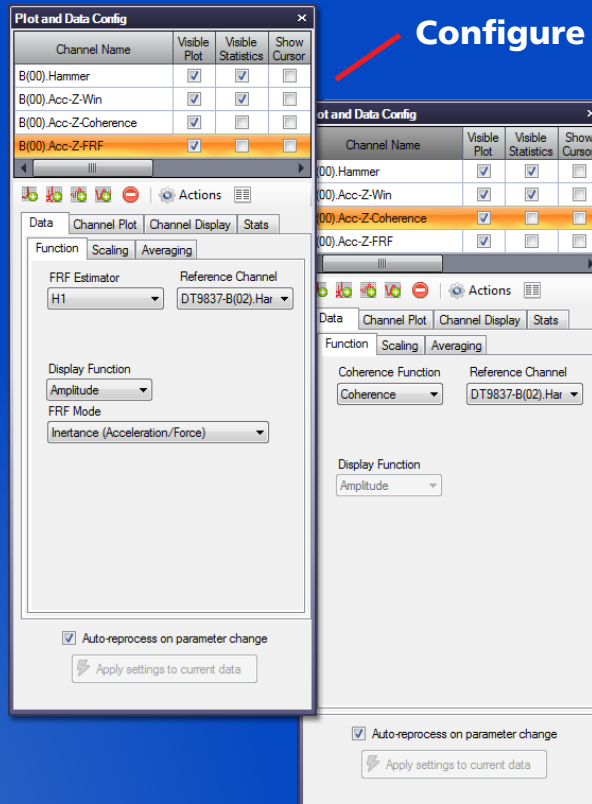
## Configure sensor inputs



Channel	Enable	Channel Name	Ref/Resp	Range	Engineering Unit (EU)	mV/EU	EU Offset	Point #
DT9837-B(02)-0	<input checked="" type="checkbox"/>	Hammer	Reference	-1V to 1V	lbf	10	0	1
DT9837-B(02)-1	<input checked="" type="checkbox"/>	Acc-Z	Response	-10V to 10V	g	100	0	2
DT9837-B(02)-2	<input type="checkbox"/>	Ain 2	Response	-10V to 10V	V	1000	0	0
DT9837-B(02)-3	<input type="checkbox"/>	Ain 3	Response	-10V to 10V	V	1000	0	0

**STEP 3:** Configure settings for channels in the analog input data stream, including the channel name, reference and response channel designations, input range, coupling type, current source, engineering units, scaling factors, and so on.

## Configure processing channels



**Plot and Data Config**

Channel Name	Visible Plot	Visible Statistics	Show Cursor
B(00).Hammer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B(00).Acc-Z-Win	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B(00).Acc-Z-Coherence	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B(00).Acc-Z-FRF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Function: FRF Estimator | Reference Channel: DT9837-B(02).Har

Display Function: Amplitude | FRF Mode: Inertance (Acceleration/Force)

☒ Auto-reprocess on parameter change

Apply settings to current data

**Plot and Data Config**

Channel Name	Visible Plot	Visible Statistics	Show Cursor
B(00).Hammer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B(00).Acc-Z-Win	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B(00).Acc-Z-Coherence	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B(00).Acc-Z-FRF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Function: Coherence Function | Reference Channel: DT9837-B(02).Har

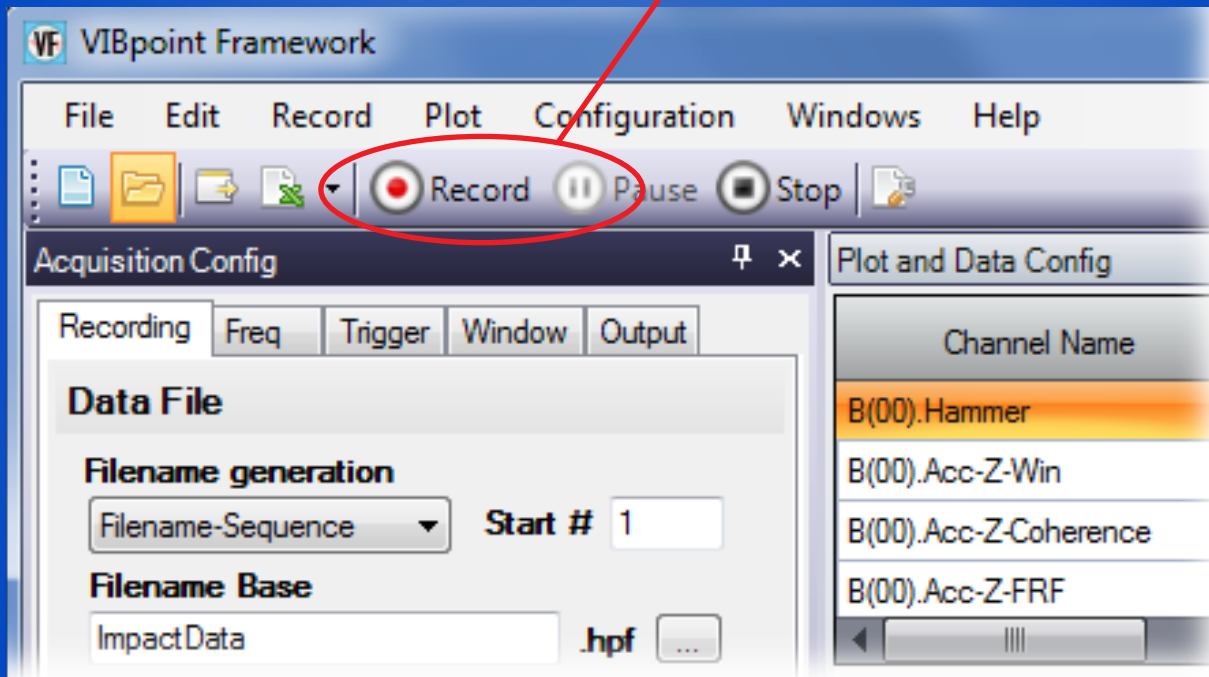
Display Function: Amplitude

☒ Auto-reprocess on parameter change

Apply settings to current data

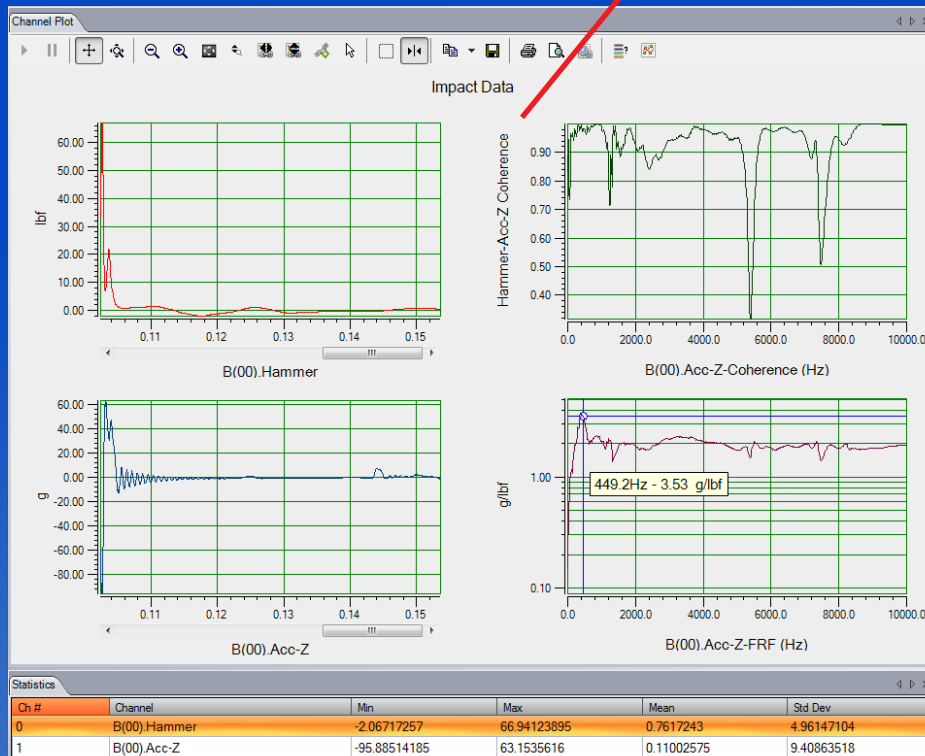
**STEP 4:** Use the Plot and Data Config window to select the channels to display, to add FFT channels, to configure the parameters for generating the FFT data, and to configure the appearance of the display.

**Record data**



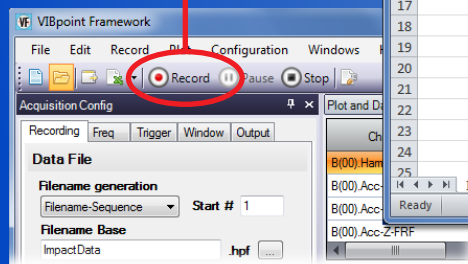
**STEP 5:** Press the Record button to start the acquisition of continuous, gap-free records.

**Analyze**



**STEP 6:** Use the Channel Plot, Channel Display, and Statistics windows to view and analyze the acquired data.

## View data in Excel



Frequency	Magnitude	Magnitude	Phase
0.00E+00	0.83476682	0.148496	0.00E+00
19.53125	0.94666421	0.59844965	26.06157
39.0625	0.75658349	0.39593293	0.523641
58.59375	0.73408657	0.90901749	-23.3537
78.125	0.82380726	1.07035063	-57.0172
97.65625	0.96567073	1.05723228	-54.5462
117.1875	0.95639175	1.16551045	-51.2318
136.71875	0.96934183	1.06739406	-51.9557
156.25	0.9655653	1.24814996	-76.3348
175.78125	0.94056436	1.62614583	-78.1863
195.3125	0.96791347	1.82804894	-76.4321
214.84375	0.98413543	1.92783117	-81.6191
234.375	0.97655778	1.93439307	-84.3262
253.90625	0.9549462	2.0449168	-93.7453
273.4375	0.98263541	2.43072631	-99.4922
292.96875	0.99258015	2.81421758	-99.5978

STEP 7: Click the Open Current Data in Excel button to analyze the data in Excel.

## Export data

**Data Domain to Save**

☐ Time History Data

☒ Frequency Domain Data

**Channels to Save**

☒ All enabled channels

☐ Visible channels only

**Output File Format**

☒ Universal File Format-ASCII (.uff)

☐ Tab Delimited Text (.txt)

☐ Comma Delimited Text (.csv)

☐ Include device and channel info

**Filename generation**

Filename-Sequence Start # 1

**Filename base**

ImpactUFF .uff

C:\Users\sullivan\AppData\Local\Data Translation\VIBpoint Framework\Data\SavedRange.uff

**Time Domain Data Options**

☒ Save all data

☐ Save range of records

Record 0 to 2

**Frequency Domain Data Options**

☐ Save Real FRF data

☒ Save Complex FRF data

☒ Save averaging results

☐ Save range of source records

Record 0 to 2

Export

Open in Excel

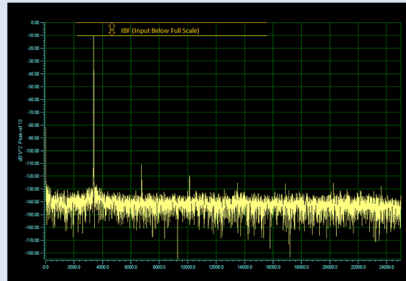
Close

STEP 8: Specify how to save the data. Supported file formats include the Universal File Format – ASCII (.UFF), tab-delimited text (.TXT), and comma-delimited text (.CSV).

## Dynamic Performance Functions Provided:

### Input Below Full Scale (IBF)

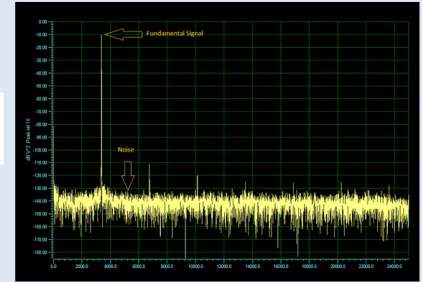
$$IBF = 20 \cdot \log_{10} \left( \frac{V_s}{V_f} \right)$$



This function returns a value in dB units representing the level of the main signal component relative to the full scale voltage of the channel.

### Signal-to-Noise Ratio (SNR)

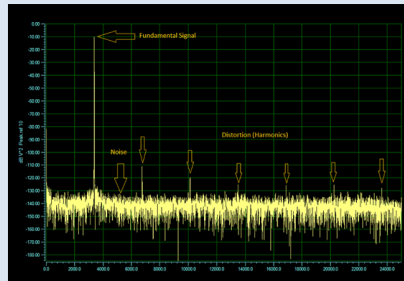
$$SNR = 20 \cdot \log_{10} \left( \frac{V_s}{V_n} \right)$$



This function returns a value in dB units representing the level of the main signal component relative to the total noise, (i.e. harmonics are not included).

### Signal-to-Noise and Distortion Ratio (SINAD)

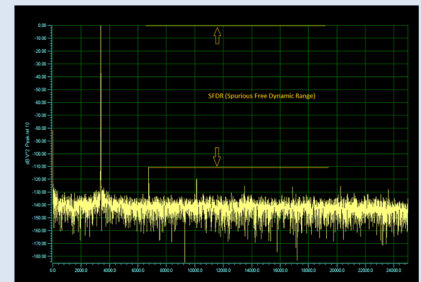
$$SINAD = 20 \cdot \log_{10} \left( \frac{V_s}{V_{n+d}} \right)$$



This function returns a value in dB units representing the level of the main signal component relative to the total noise, including harmonics.

### Spurious Free Dynamic Range (SFDR)

$$SFDR = 20 \cdot \log_{10} \left( \frac{V_f}{V_d} \right)$$

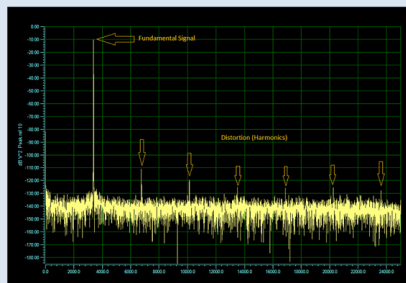


This function returns a value in dB units representing the level of the full scale range to the greatest noise or distortion component.

### Total Harmonic Distortion (THD)

$$THD = 20 \cdot \log_{10} \left( \frac{\sqrt{h_1^2 + \dots + h_5^2}}{V_s} \right)$$

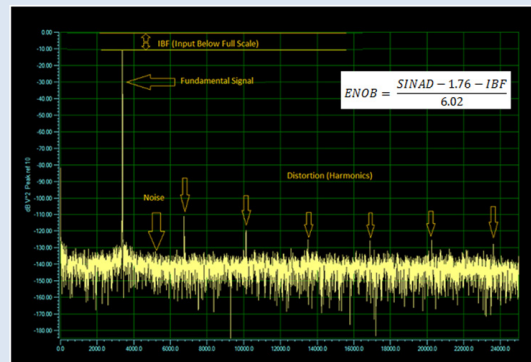
$$THD = \left( \frac{\sqrt{h_1^2 + \dots + h_5^2}}{V_s} \right) \cdot 100$$



This function returns a value in dB units and percent (%) representing the level of the harmonic distortion of the first 5 harmonics relative to the main signal component.

### Effective Number of Bits (ENOB)

$$ENOB = \frac{SINAD - 1.76 - IBF}{6.02}$$



This function returns a value in bits representing the quality of a digitized signal. The input signal is typically sinusoidal and should be near full scale to properly characterize the AD and/or system.



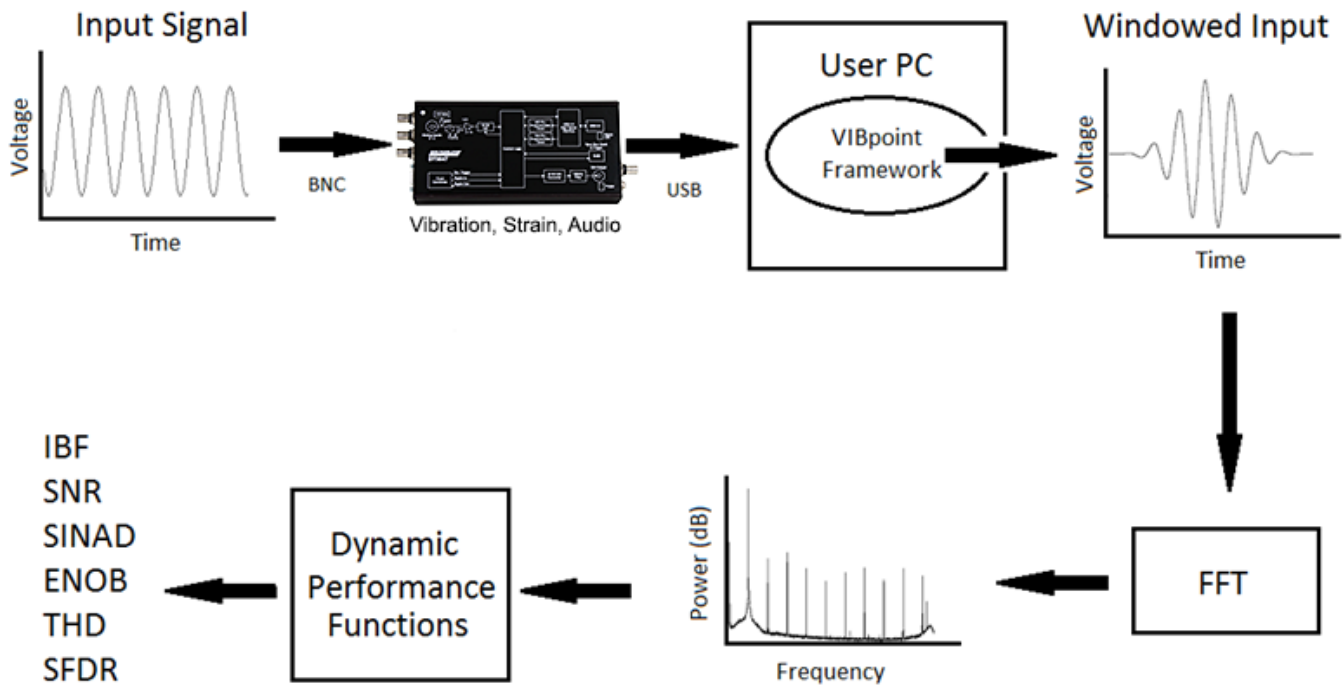


Figure 3. VIBpoint Framework allows you to take an input signal and record and analyze the data using FFT frequency domain analysis functions.

VIBpoint Framework adds real-time analysis features to DT9837 series, DT8837, DT9838, and DT9847 series vibration and strain test systems. VIBpoint Framework features tools to acquire continuous and triggered data, record data to disk, read a recorded data file, analyze the acquired data using single FFT and two-channel FFT functions, and produce a variety of output stimuli for modal analysis testing. The software is navigated through a series of easy-to-use configuration windows, allowing flexible selection of the desired acquisition, processing, plotting and display parameters.

### Data Acquisition and Display

- Discover and select supported devices (DT8837, DT9837 series, DT9838, DT9847 series)
- Configure all input channel settings for the attached sensors, such as the enable state, IEPE settings, strain gage settings, input range, engineering units and scaling for the sensor, reference/response assignment, and tachometer settings
- Customize many aspects of the User Interface including window layout and docking, colors and themes, Channel Plot (Chart Recorder) row/column/size configuration, colors, fonts, custom header annotation, signal overlay etc.
- Horizontal & vertical axis zoom with scrolling and auto and manual scaling
- Linear & Log horizontal and vertical axis scaling with decimal and exponential formatting
- Simultaneously acquire data from all selected channels on each connected device
- Freerun or Triggered acquisition with accept/reject controls for impact testing
- Continuous acquisition or fixed number of averages
- Pause/Resume acquisition
- Log acquired data to disk, file can be opened later for further processing
- Display time domain measurements in Channel Plot and/or Digital Display
- Display averaged frequency domain waveforms or individual records and optionally lock corresponding acquired time domain signals to each record.
- Display original and/or windowed time domain data
- Load/save configuration files which include: channel and acquisition settings, processing functions, user interface layout, etc.
- Print & Copy data and/or Channel Plot to Clipboard
- Directly open recorded or processed data in Excel
- Export data as Comma or Tab Delimited Text, or in Universal File Format, and export Channel Plot window to a variety of graphics file formats

## Data Processing and Analysis

- Single channel FFT functions
  - Spectrum
  - Auto Spectrum
  - Power Spectral Density (PSD)
- Two channel FFT function
  - Frequency Response Functions (FRF) : Mobility, Compliance, Apparent Mass, Impedance, Dynamic Stiffness or custom FRF with H1, H2, or H3 Estimator types
  - Cross Spectrum and Cross Power Spectral Density
  - Coherence and Coherent Output Power
- Display frequency domain data as:
  - Amplitude
  - Phase
  - Real part
  - Imaginary part
  - Nyquist (Real & Imaginary)
- Single and Double Integration
- dB or Linear and Peak, Peak to Peak, or RMS Scaling options
- Linear and Exponential Averaging Types, and RMS, Vector and Peak Hold Averaging Modes
- Supported Windows include: Rectangular, Force, Cosine Taper, Exponential, Hanning, Hamming, Bartlett, Blackman, Blackman Harris, Flat Top
- Configure and view statistics about the FFT data, including the frequency and value of the highest peaks
- Any processing parameters can be changed post-acquisition and the results are immediately calculated and displayed

## Dynamic Performance Functions

- Input Below Full-scale (IBF)
- Total Harmonic Distortion (THD)
- Spurious Free Dynamic Range (SFDR),
- Signal-to-Noise and Distortion Ratio (SINAD)
- Signal-to-Noise Ratio (SNR)
- Effective Number of Bits (ENOB)

## Waveform Output

- Provides continuous or burst DAC output of noise, swept sine and fixed frequency waveforms
- Synchronize output start/stop with analog input, or start/stop manually
- Specify waveform on/off time and ramp up/ramp down time
- Lock total waveform duration to analysis frame time (triggered), or total acquisition time (freerun)
- Specify waveform peak voltage and offset
- Fixed Frequency options
  - Output frequency value
  - Sine, square, ramp or triangle wave
  - Continuous, burst, or repeat burst output
- Swept Sine options
  - Start/end output frequency values
  - Single sweep or loop
  - Linear or Log frequency change
- Noise options
  - Random, Random Normal, or Pink noise
  - Continuous, burst, or repeat burst output
  - True random or Pseudo random noise

## Modes of Operation

The VIBpoint Framework application offers two operating modes:

- Acquisition mode – Acquire and process analog input sensor and tachometer data. This mode requires use of at least one of the supported Data Translation data acquisition devices. Record the acquired data to disk.
- File reader mode – View a previously recorded data file. In this mode, analyze the data using single function or two-channel FFT functions and the results are immediately calculated and displayed.

## Licensing

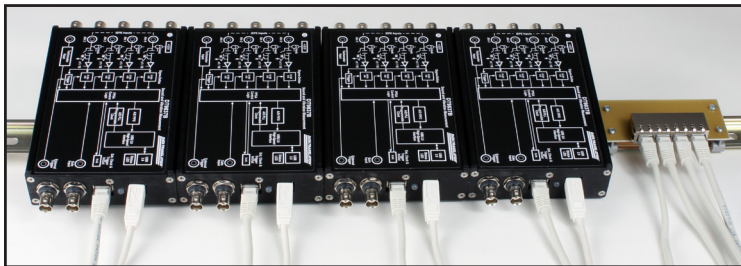
The VIBpoint Framework application is available as a 14-day trial version. Once you start the software, you have 14 consecutive calendar days in which to try the features of the application. When the 14-day trial period has elapsed, you must purchase a license key from Data Translation to continue using the VIBpoint Framework application.



## Supported Devices

- Up to 16 synchronized DT8837 Ethernet modules connected together using the Trigger Bus
- Up to 4 synchronized DT9837A, DT9837B, DT9837C, DT9838, or DT9847 Series USB modules connected together using the RJ45 connector
- One DT9837 USB module

USB						
Model	Analog Inputs	Resolution	Sample Rate	Tachometer	Analog Outputs	Sensor Type
DT9837	4SE	24-bit	52.7kHz	1	1	IEPE, Voltage
DT9837A	4SE-16SE	24-bit	52.7kHz	1	1	IEPE, Voltage
DT9837B	4SE-16SE	24-bit	105.4kHz	1	—	IEPE, Voltage
DT9837C	4SE-16SE	24-bit	105.4kHz	—	1	IEPE, Voltage
DT9838	4DI-16DI	24-bit	52.7kHz	1	—	Strain- and Bridge-Based Voltage
DT9847 Series	1SE-12SE	24-bit	216kHz	—	1-8	IEPE, Voltage
VIBpoint-DT9837A	16SE	24-bit	52.7kHz	4	4	IEPE, Voltage
VIBpoint-DT9837B	16SE	24-bit	105.4kHz	4	—	IEPE, Voltage
VIBpoint-DT9837C	16SE	24-bit	105.4kHz	—	4	IEPE, Voltage
Ethernet						
Model	Analog Inputs	Resolution	Sample Rate	Tachometer	Analog Outputs	Sensor Type
DT8837	4DI-16DI	24-bit	52.7kHz	1	1	IEPE, Voltage
VIBpoint-DT8837	16DI	24-bit	52.7kHz	4	4	IEPE, Voltage



Using USB modules provides maximum flexibility in industrial locations. Shown is the VIBpoint-DT9837B modules on a DIN rail with patch panel.



VIBpoint-DT8837 front panel with BNCs for direct connection to IEPE sensors. This Ethernet configuration can be stacked (4U, 1/2 rack, as shown) or rack-mounted with instrument modules in a 2U, full rack.