



# EDM-VCS 9.0

## Engineering Data Management Software Release Notes

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SPIDER VIBRATION CONTROL SYSTEMS (VCS)  
MULTIPLE-INPUT MULTIPLE-OUTPUT VIBRATION CONTROL SYSTEMS (MIMO VCS)



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## RELEASE HIGHLIGHTS

### Introducing Spider Systems Featuring 256 kHz Sampling Rate (Spider-80Hi and Spider-80Ci)

The Spider-80Hi and Spider-80Ci are the newest and the most powerful front-end cards of the Spider 80Xi platform. These cards are equipped with sampling rates of up to 256 kHz.

The Spider-80Hi is similarly equipped as the Spider-80Xi system with dual ADC technology which provides a dynamic range of 160 dB and 58 stages of a sampling rate selection ranging from as low as 0.48 Hz to as high as 256 kHz.



Raw time data can record continuously at the 256 kHz sampling rate for all channels. The Spider-80Hi has the same form factor as the Spider-80Xi platform and can be used with a Spider-80Xi chassis or Spider-80M chassis.

#### Vibration Control System or Dynamic Signal Analysis

The Spider-80Hi and Spider-80Ci are equipped with synchronized output channels that enable these devices to be used as vibration control systems or for dynamic signal analysis applications.

#### Spider-80Ci (Integrated Charge Amplifiers)

The Spider-80Ci has integrated charge amplifiers in addition to all the features supported by the Spider-80Hi.

#### High Channel Count System

Multiple Spider-80Hi and Spider-80Ci front-ends can combine to create a high channel count system with up to 1024 channels. Up to 8 front-ends can fit within one chassis and multiple chassis can connect through Ethernet using a Spider-HUB industrial network switch.

The high channel count system can also include the Spider-80SGi or Spider-80Ti modules when data from strain, strain gage based sensors, RTDs, thermocouples or any other special sensors need to be acquired with Spider-80Hi system.

#### Time Synchronization

The integration of the IEEE 1588v2 protocol for time synchronization results in accuracy better than 100 ns. This technology provides an excellent phase match even when front-ends are used at their highest sampling rates.

New Hardware Introductions and Improvements to Existing Front-Ends					
Front-end Types	Spider-80Hi	Spider-80Ci	Spider-80Xi	Spider-80SGi	Spider-80Ti
Max Sampling Rate	256 kHz	256 kHz	102.4 kHz	102.4 kHz	2 kHz
Bandwidth	115.2 kHz	115.2 kHz	46 kHz	46 kHz	-
Max Sampling rate for Raw Time Data Recording (Max Channels)	256 kHz (8 Channels /front-end)	256 kHz (8 Channels /front-end)	102.4 kHz (8 Channels /front-end)	102.4 kHz (8 Channels /front-end)	2 kHz (16 Channels/ front-end)
Number of Inputs Per Front-end	8	8	8	8	16
Connector Type	BNC	BNC	BNC	LEMO	3-pin screwed terminal
Input Type	IEPE Voltage TEDS	IEPE Voltage TEDS Charge Inputs	IEPE Voltage TEDS	Voltage Strain gage Strain gage-based sensors MEMS DC-based sensors	3-wire RTD K type thermocouple
Max Input Range	±20Vpk	±20Vpk	±20Vpk	±10V	-----
Dynamic Range	160 dB	160 dB	160 dB	120 dB	-----
Input Protection Voltage	±220V	±220V	±220V	±40V	-----
Analog to Digital Converter Per Channel	Dual 24-bit ADC	Dual 24-bit ADC	Dual 24-bit ADC	24-bit ADC	-----
Phase Match	< 1° up to 20 kHz	< 1° up to 20 kHz	< 1° up to 20 kHz	< 1° up to 20 kHz	-----

### Introducing the Ultra-Compact Spider-20H, Spider-HE & Spider-20i with 256 kHz Sampling Rate

Crystal Instruments' smallest form-factor portable DAQ device received an upgrade in the 9.0 release. The new generation of Spider-20 systems supports sampling rates of up to 256 kHz for data acquisition and recording.



The newest generation of Spider-20 systems are now available in three unique forms:

#### Spider-20H (Wi-Fi)

The Wi-Fi version of Spider-20 supports a 256 kHz sampling rate, includes 4 GB of built-in flash memory and a battery.

#### Spider-20HE

The Ethernet based version of Spider-20 supports a 256 kHz sampling rate, includes 4 GB of built-in flash memory and a battery.

#### Spider-20i

A new addition to the traditional Spider-20 series is the Spider-20i. The Spider-20i is an Ethernet based Spider-20 system supporting

a 256 kHz sampling rate with an industrial enclosure. Without any buttons or a battery, this device is suitable to be deployed in rough industrial environments for momentary or permanent data acquisition, recording or monitoring.

### Extended Input Range

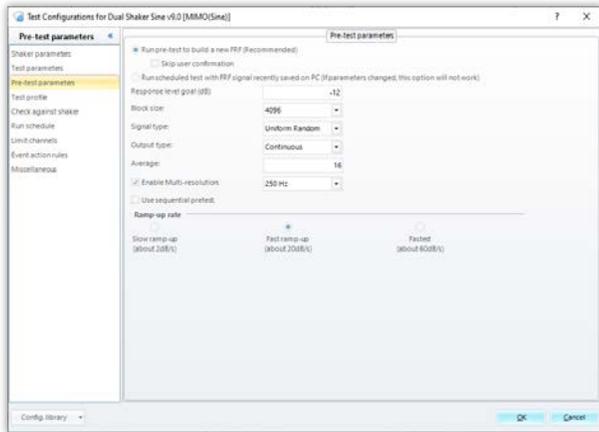
The new generation of Spider-20 products also received an upgrade to the input range. An input range of up to 20V is now available for these devices compared to the 10V input range of the previous generation.

### High Channel Count Synchronized Data Acquisition

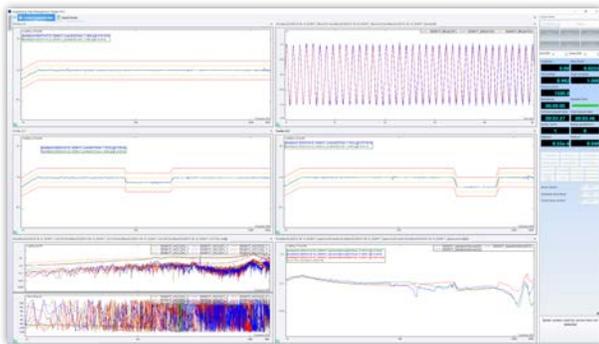
The Ethernet versions of the Spider-20 (Spider-20HE or Spider-20i) can combine into a high channel count system for synchronous data acquisition. The high precision IEEE 1588v2 protocol provides excellent phase match between the channels of different front-ends, even at the highest sampling rate of 256 kHz.

### Introducing Multi-Resolution Pretest in MIMO Sine

Multi-resolution for pretest is added to MIMO Sine control. The cut-off frequency can be set based on the range of the profile. This provides the FRF with much higher frequency resolution at the lower section of the frequency range in addition to improving the control accuracy and the controllable frequency range.

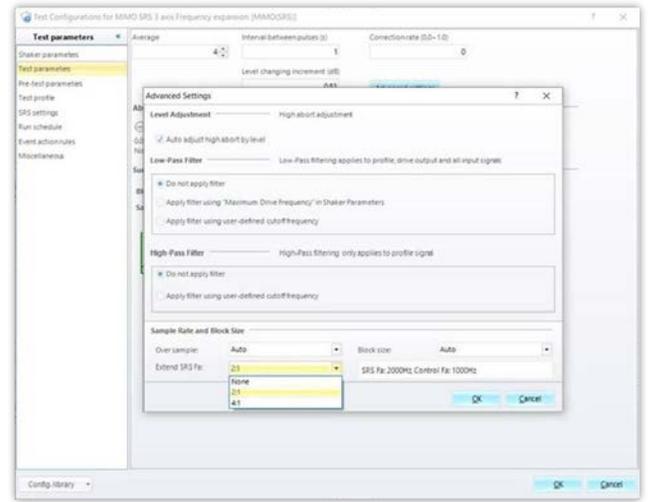


The following is a test carried out on a three-axis shaker table using the multi-resolution pretest. The control frequency range is from 10 Hz to 1500 Hz. The test shows all 3 control channels are under great control. The multi-resolution pretest feature improves the control accuracy and expands the controllable frequency range.

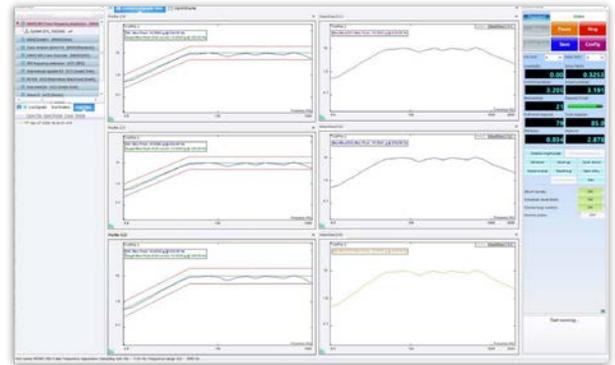


### Extended SRS Span for MIMO SRS

MIMO SRS has extended the SRS analysis span. With a 2:1 or 4:1 selection, analysis SRS signals will have double or quadruple the frequency range compared to the control SRS signals.

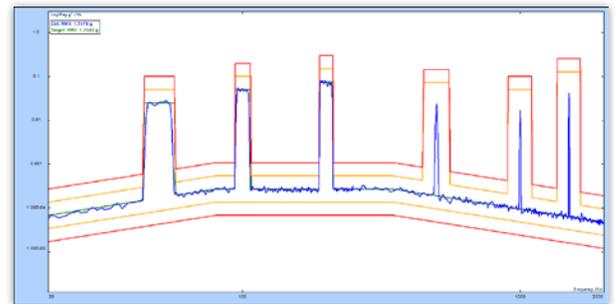


With extend SRS Fa set at 2:1 ratio, the SRS analysis span is extended over the SRS control frequency span. The analysis SRS signals covers up to 2000 Hz, while the control SRS signals' Fa is up to 1008 Hz.



### Multi-Resolution Support for SoR and RoR Tests

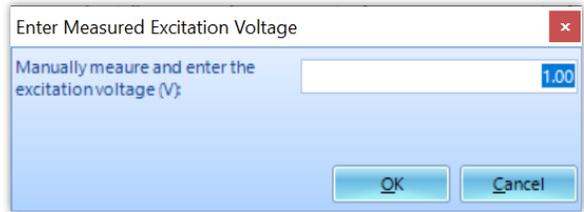
EDM 9.0 extends support for multi-resolution to Sine on Random and Random on Random tests.



The low frequency sine tones can now be controlled and analyzed with great accuracy.

### Introducing the Sine Beat Seismic Test Type

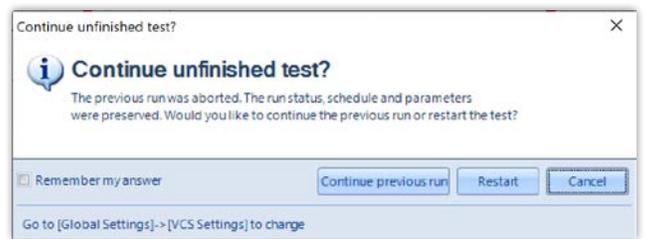
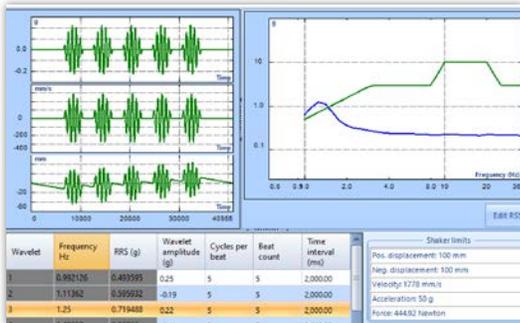
The Sine Beat Seismic test type is introduced in EDM 9.0. This test type is for the seismic qualification of electrical equipment. It complies with IEEE 344 or IEC 980. The profile is defined by the RSS, where the amplitude of each frequency point determines the amplitude of the wavelet applied to the sine beats time waveform at each frequency of the RSS. Each sine beat is defined by wavelet amplitude, cycles/beat, beat count, and time interval.



Users also have the option to manually measure the excitation voltage at the terminals and to enter it. These options ensure that the excitation voltage is accurately used to measure the data with complete precision.

### Save and Continue an Unfinished Test

Unfinished tests in EDM-VCS or EDM-DSA that are aborted due to a user event or by a system event are now automatically saved. The unfinished duration of these tests can now be continued exactly from the point where it was stopped.



### Support for Strain-gage Based Sensors on Spider-80SG or Spider-80SGi

The Spider-80SG is capable of supporting all types of strain gage based sensors along with the ability to send customized excitation voltage to the sensors.

On/Off	Measurement quantity	Input mode	Engineers unit	Sensitivity	Input range	Power supply	Read sensor's excitation
<input checked="" type="checkbox"/>	Force	Bridge based Sensor	g	0.00010 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	IC Differential	g	2.10000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sensor	g	2.20000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.00000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.00000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.00000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.00000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.00000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)

The sensitivity of strain gage based sensors are typically ratio-metric and depends on the excitation voltage.

EDM 9.0 introduces the Bridge based sensor as one of the input modes. Selecting this option allows users to configure the sensitivity as a ratio-metric value.

On/Off	Measurement quantity	Input mode	Engineers unit	Sensitivity	Input range	Power supply	Read sensor's excitation
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	0.00010 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.10000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.20000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)
<input checked="" type="checkbox"/>	Force	Bridge based Sen...	g	2.00000 (mV/V/LBF)	10V	2.5V	2.5V (Auto)

In addition to the availability of setting the sensitivity, it also important to use the accurate value of the excitation voltage to read the measurement quantity accurately.

Due to the voltage drop across the lead wires connecting the sensor to the front-end, there could be a voltage drop which, at times, could be significant to mandate its measurement for accurately estimating the measurements.

EDM 9.0 provides users with the option to automatically measure the excitation voltage as seen at the terminals by using the remote sensing feature.

This feature is predominantly helpful in various vibration controller tests scenarios where a test has ended prematurely or must be stopped prematurely by the user. The following scenarios illustrate helpful applications of this feature.

- Users can run very long vibration tests for several days by stopping the test at the end of the day and continuing it on a different day.
- Tests aborted due to sensors falling off or damaged fixtures can be continued after the necessary fixes are completed.

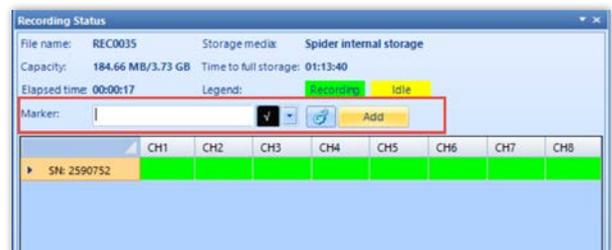
EDM 9.0 is programmed to cache the test whenever the test stops without completing the run schedule. The user has an option to continue the test from the point where it was stopped or to restart the test from the beginning.

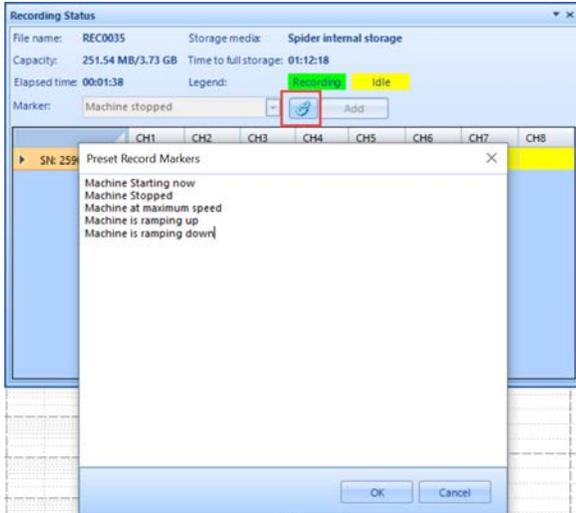
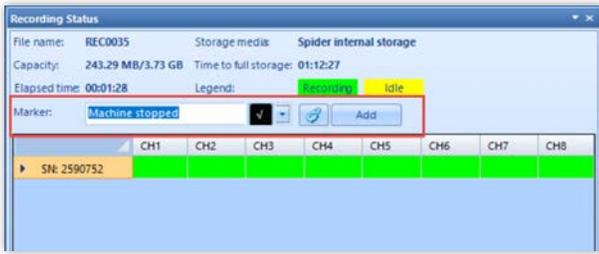
The cached test is available even after EDM or the PC restarts.

### Introducing Time Markers for Raw Time Recording Data

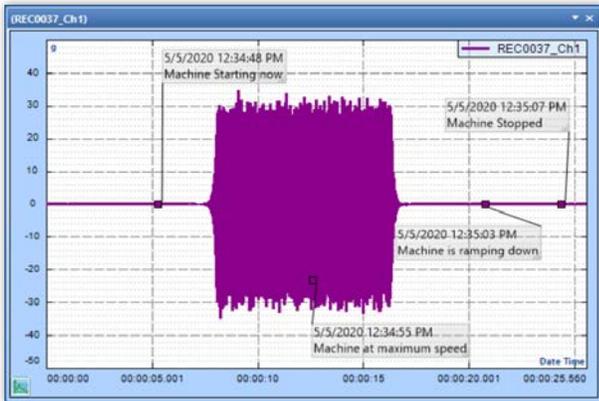
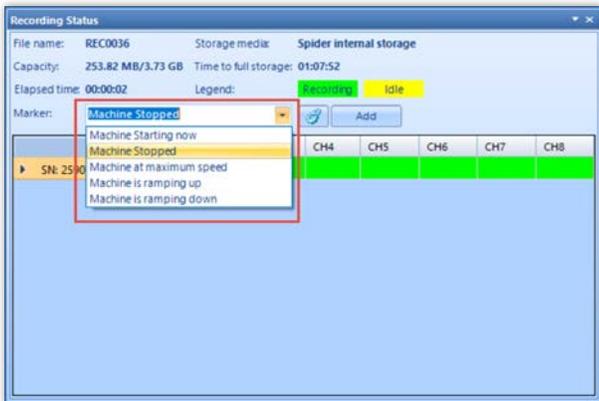
During raw time recording, users will find it useful to mark an event for review after the data is downloaded. EDM 9.0 is introducing this feature for all EDM modules.

Add a simple marker by clicking on the "Add" button or add specific text into the available text box to insert further details.





Users have the option to pre-configure a list of events and to quickly select an event to mark the recording.



The added markers are available in the raw time data for a review at any time after the test is complete.

## Support for Microsoft SQL Server 2017 and 2019

EDM 9.0 has received significant upgrades in all areas including support for the latest version of Microsoft SQL Server.



Support for SQL Server 2017 and 2019 is included to allow users to take advantage of the powerful features provided by this software.

## Ease of Connecting IEPE Sensors with Spider-80SGi

The introduction of support for IEPE sensors extends the Spider-80SGi system capabilities as a powerful general-purpose data acquisition device. The Spider-80SGi system now supports a wide range of sensors including strain gages, strain gage-based sensors, MEMS sensors, DC sensors, and potentiometers in addition to IEPE sensors.



The provided break-box is convenient for custom connecting strain gages or any of the supported sensor types.

The new breakout box released with EDM 9.0 includes BNC connectors to facilitate effortless connections to IEPE based sensors.

## Introducing EDM-VCS Simulation

EDM-VCS Simulation software is released with EDM 9.0.



This vibration control system simulation software works without any Spider hardware and allows new EDM users to evaluate the wide range of functions offered by Crystal Instruments powerful EDM-VCS software.

Existing users can also benefit by exploring the range of new features being introduced in newer EDM versions before deciding to add these features to existing equipment.

This friendly simulation utility works on SQL Lite and does not require the installation of the complete EDM Suite to explore the system's full functionality and ease of use.

**NEW FEATURES**

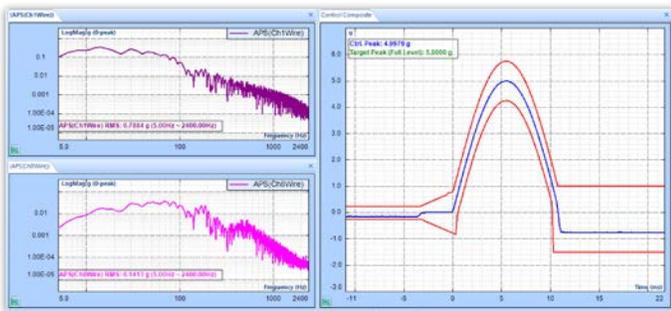
**New Features in EDM Vibration Control Software**  
*Introducing DOF Selection in the Control Panel*

Users can select MIMO sine, the enhanced status panel for output/control level status display, the control DOF, or the drive DOF, and the corresponding value will be shown on the control panel.



*Introducing APS Signals in Shock, Transient Time History (TTH), Time Waveform Replication (TWR), Shock Response Spectrum (SRS), and Earthquake Testing*

Shock, TTH, & TWR tests are mainly controlled in the time domain and the profile is also defined in time domain. SRS and earthquake testing profiles are defined in terms of octaves.

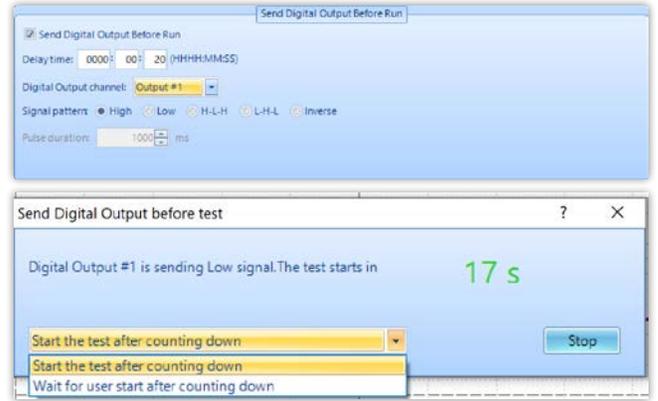


APS signals in these tests have also been increasingly used to determine the frequency characteristics of some monitor channels. APS signals, being derived from the FFT are a useful way to identify the frequency content of these time based signals.

*Send Digital Output Before Starting Test*

The Spider system can be used to turn on the amplifier or other equipment just before starting a test. Running the amplifier or the equipment for an indefinite amount of time prior to the test is undesirable and inefficient at times.

EDM 9.0 allows users to send the digital output and then start the test after a user specified time period.



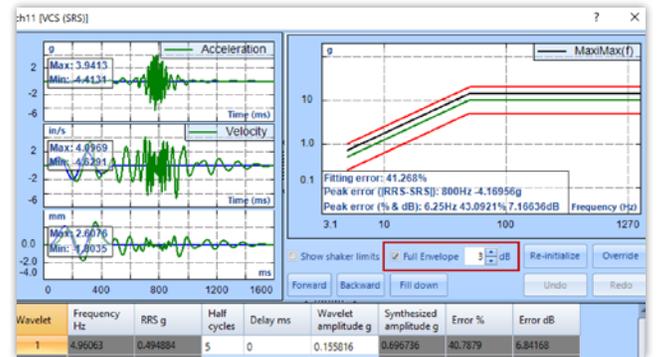
The digital output can be configured to start the amplifier or any other equipment associated with running the vibration control test. The user can conveniently specify the duration after which the test should start to ensure that the required equipment is up and running by the time test starts.

*Scale the Synthesized SRS in SRS and Earthquake Test Types*

Requirements from several standards vary on how the synthesized SRS should match with the profile. While some standards require the SRS to be within the alarm limits, some standards require that at least 50% of the synthesized SRS should be above the profile.

EDM 9.0 introduces a scaling feature that is applied to the envelope of a synthesized SRS. Users can adjust these values to ensure the desired requirements of the standard is met.

If the synthesized SRS is slightly above or below the requirements of the test standard, the user simply needs to adjust the envelope to increase or decrease the envelope of the SRS spectrum.

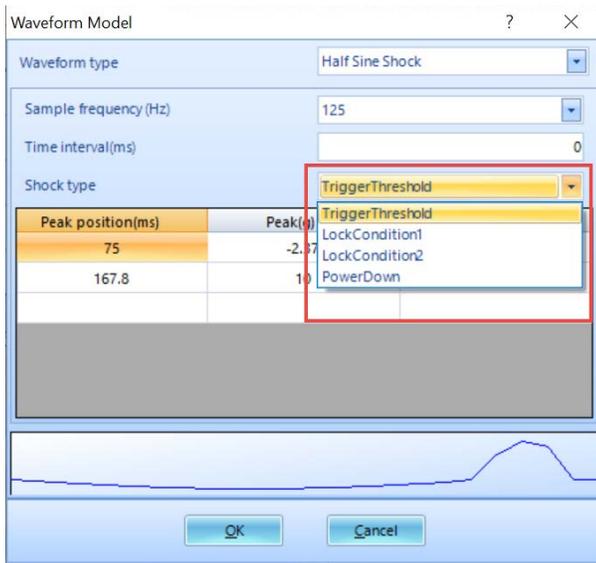


*Special Half-Sine Shock Waveforms Simulating Vehicular Dynamic Conditions Added to TTH*

Testing for critical equipment inside vehicles needs to consider all the common and rare scenarios the vehicle may experience. Special conditions involving crashes also require sufficient testing to ensure the safety of components such as batteries.

New standards have been introduced to designate waveforms that simulate various vehicular conditions. One of the standards that define rapid changes to acceleration is added to the TTH list of waveforms in the EDM 9.0 release.

*(continued on next page)*



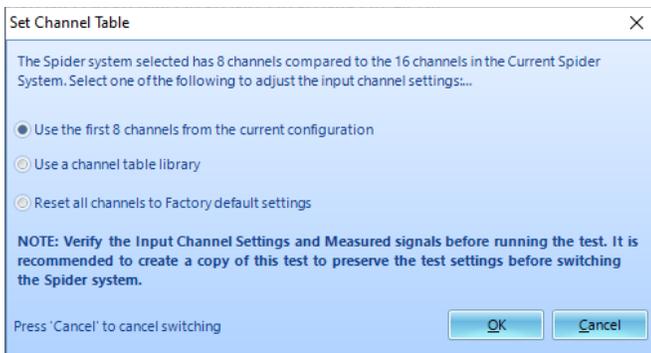
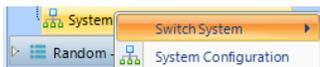
Test objects mounted within the vehicles should endure these tests to prove the performance of their intended tasks under extreme circumstances.

### New General Features

#### Ease of Adding Modules to Tests or Switching Tests Between Spider Systems of Different Channel Counts

EDM 9.0 introduces a convenient way to modify the Spider system associated with the test to any other Spider system of a different channel count.

This extends the capabilities of the test templates to be used for any channel count system. In addition, a test using the Spider-NAS can be switched to a system without a Spider-NAS.



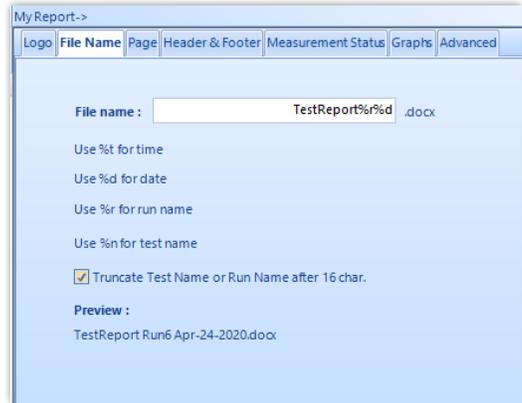
Smart algorithms handle the addition or removal of channels without deleting the existing channel configuration.

Channel specific configurations including limit channel setup are preserved for the channels that are carried over after the change to the number of input channels.

#### Introducing Customizable File Names for Report

File names for reports is an important aspect when there is a high quantity of reports generated from several tests.

EDM 9.0 introduces several customization characteristics to generate the file name of reports.

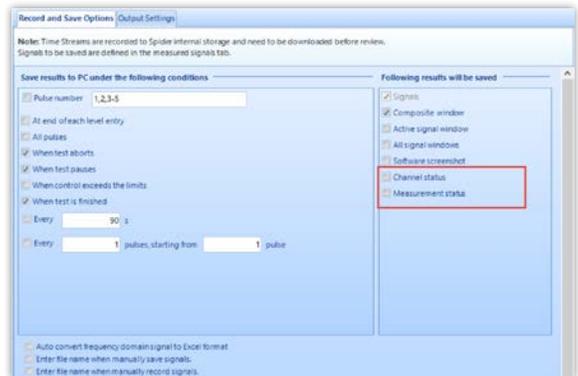


Users can generate a report using customized names combined with macros for test name, run name, date, time or a combination of any test characteristics.

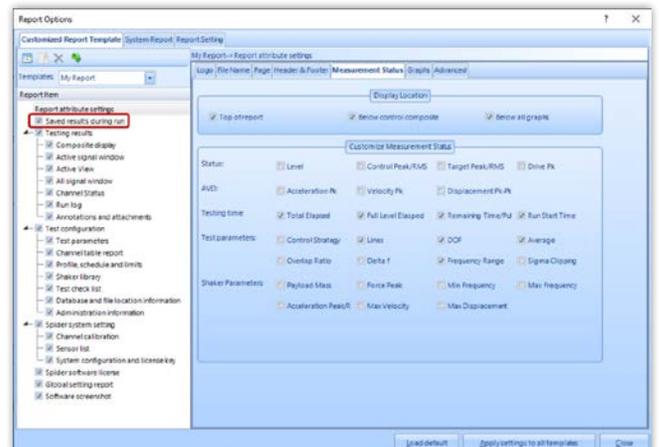
#### Channel Status and Measurement Status Added to Saved Signals and Report

Channel status includes peak, RMS, and average values in addition to any error codes generated for a channel. The measurement status includes information about elapsed time, remaining time, control or target RMS, and peak values (VCS) to name a few.

These values are dynamic and continuously change over the course of a test. When signals are saved, it is also essential to identify the measurement status and channel status at that instant to make the signal data more meaningful and complete.



EDM 9.0 introduces saving channel status and measurement status along with the time and frequency signals. A customizable combination, called results, can be selected by the user every time needs saving.



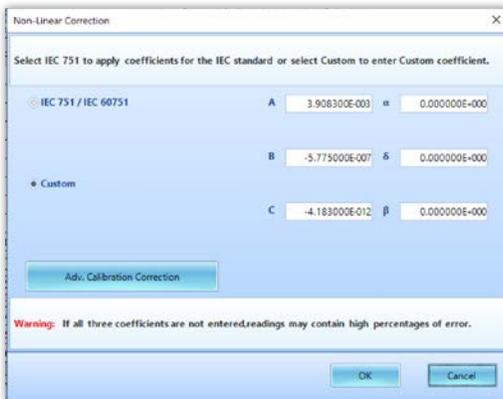
The information is also made available when a report is generated to ensure that all the relevant information is saved to the report.

**Introducing Advanced RTD Non-Linearity Correction for Accurate Temperature Measurements**

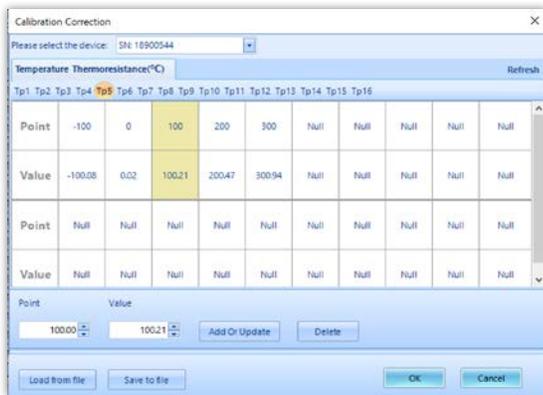
RTD sensors are typically non-linear in the range of measurements that they operate. To ensure an accurate measurement of temperature from the RTDs, it is important to correct for the non-linearity.

RTD PT100	Custom	Auto
RTD PT100	IEC 751/IEC607	Auto
RTD PT100	IEC 751/IEC60751	Auto
RTD PT100	Custom	Auto
RTD PT100	IEC 751/IEC60751	Auto

The advanced non-linearity corrections are now available from the input channel table which can either be based on a standard or custom defined.



A choice of A, B and C values or  $\alpha$ ,  $\beta$  and  $\delta$  values can be defined by the user.



RTD sensors that have deviated from the standard can be corrected using a table if the correction values are known.

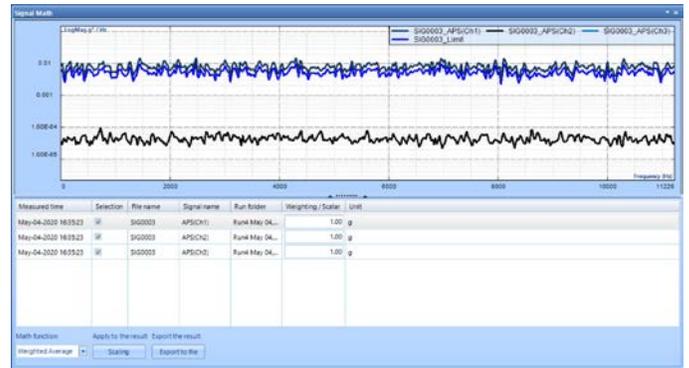
**Real Time Signal Averaging Tool**

A real time signal averaging tool is introduced in the EDM 9.0 release.

Users can use the display math tool by dragging and dropping any number of time or frequency signals.

Options for standard or weighted average are available. The results generated through the average can be conveniently exported to one

of the wide range of formats supported by EDM software.

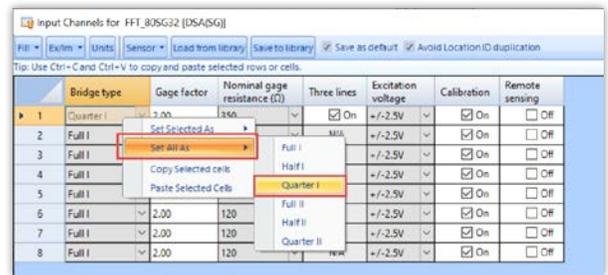


A widely used application for this feature is to use the resulting spectra as a limit profile.

**Simultaneously Configure All Strain Gage Input Channel Parameters**

Users can simultaneously assign measurement quantity and sensitivity for multiple channels in the input channel table.

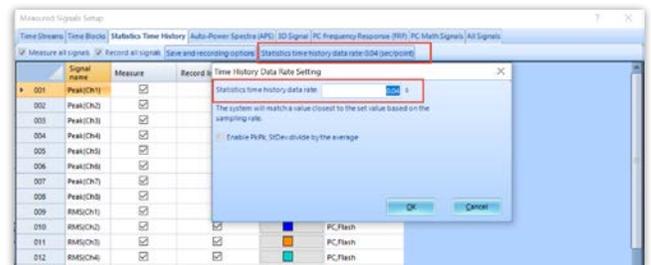
This feature is now extended to the strain gage input channels' parameters.



It is now possible to simultaneously set the bridge type, gage factor or any of the strain gage related parameters. This feature will greatly simplify the strain gage configuration for high channel count systems.

**Customizable Rate for Statistics Time History Signals**

Time history signals can be customized to be measured for a user defined time period.



This new option is available where the time history signals are defined. Custom values in seconds or within hundredth of a fraction can be entered.

**Addition of Measurement Point, Coordinates and DOF to Input Channel Table**

The input channel table in DSA and VCS now includes measurement point, coordinate and DOF information.

Dir/Ch	Channel Type	Location ID	Measurement quantity	Engineer used	Sensitivity	Input mode	Non-Linear correction	Sense	Max. sensor range	High-Pass Filter (Hz)	Gain	Measurement Point	Coordinate
1	Ctrl	Ctrl	Acceleration		1.0000 cm/g	AC-Single End	PLA	PLA	20.000 (1)	0%	1	1	1
2	ED Ch	Monitor	Acceleration		0.7000 cm/g	ED	PLA	PLA	20.000 (1)	0%	1	1	1

This information not only acts as a reference for users but also helps during Vibration Visualization for VCS or DSA tests.

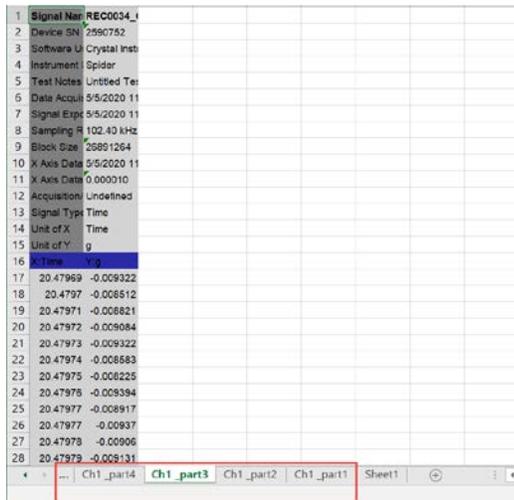
This data can also be used with EDM-Modal for Modal Analysis.

### Export to Multiple Excel Files

Microsoft Excel is a useful tool for analyzing or saving data. All EDM modules support exporting time and frequency signal data to Excel files. However, Excel has a limitation to the number of rows and columns that are defined.

When exporting raw time recording data at high sampling rates, the number of data points are usually so large that it will exceed the row limitation of Excel.

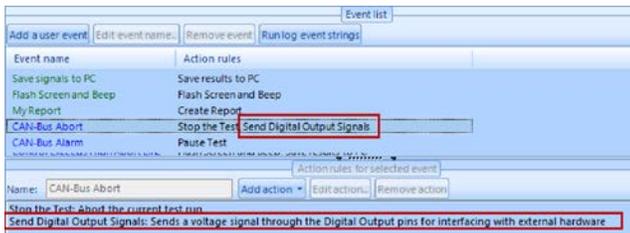
To prevent data loss, EDM 9.0 introduces the option to split and export data to multiple Excel tabs.



### New CAN bus Features

#### CAN bus Supports Digital Outputs

Send digital output is now supported by triggering the CAN bus abort limit. Signals from CAN bus not only trigger actions by EDM, but also external devices connected to the controller.



### MAJOR IMPROVEMENTS

#### EDM Vibration Control Software

##### Save Signals in Check Only Mode

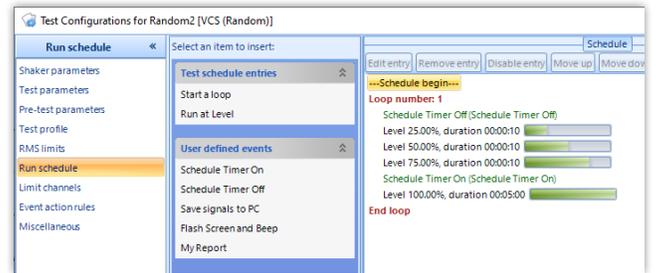
EDM-VCS has a check only mode feature where the input channels turn on, but no drive output is generated. In this mode, both time and frequency signals are available and used to determine if all channels are working according to their intended operations.



In the EDM 9.0 release, an option to save the time or frequency signals is available in addition to the raw time data recording feature.

### Schedule Timer Settings are Included in Event Action Rules

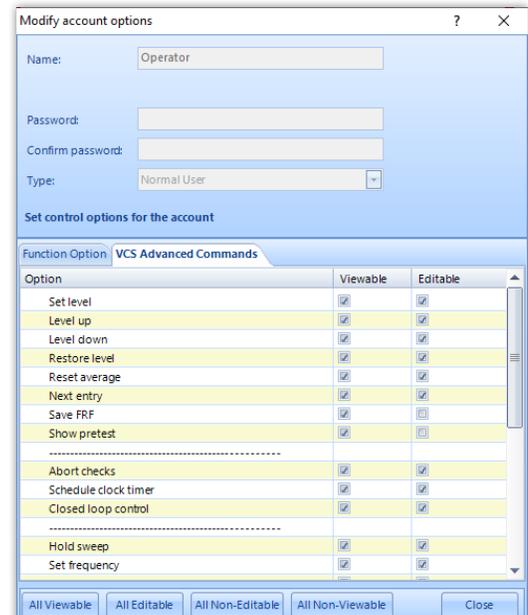
Once a run schedule is defined, the test will run according to the run schedule. In some tests, it is required to manually ensure the steady state of the device under test before proceeding towards the next entry, which can be done by turning off the schedule timer. This mode is accessible to the user from the advanced command buttons during run time. When the schedule timer is turned off, the test can continue to run in its last known state.



Users can turn the schedule timer on or off through the run schedule. Users can manually enter the next entry when the required conditions are met and schedule timer automatically kicks in, to ensure that the device is not over tested or under tested.

### User Configurable Permissions for VCS Advanced Command Buttons and Global Settings

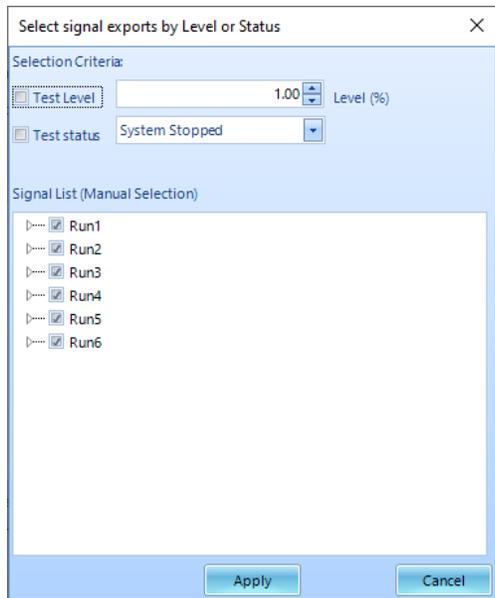
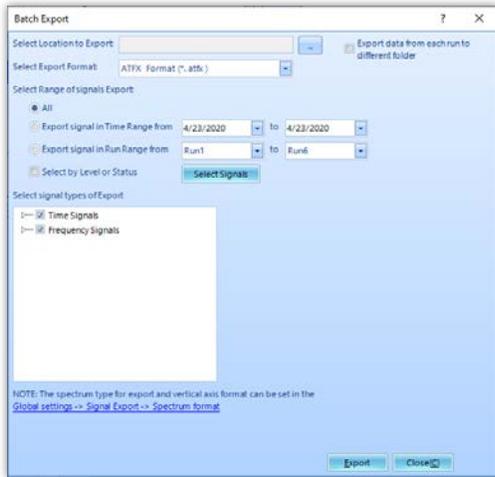
The VCS Advanced Command Buttons and Global Settings includes a wide range of settings that have varied impacts on the test being run.



To avoid accidental changes to important parameters or settings that fall under this category, users can configure access or deny privileges for each specific setting under the advanced command buttons or the global settings.

**Enhancements to Batch Export by Level**

Batch export by level conveniently chooses signals that have been saved at the desired level. Improvements to this feature allows users to select other filter criteria in addition to the level to sort the signals for exporting.



**View Elapsed Time in Run Schedule View**

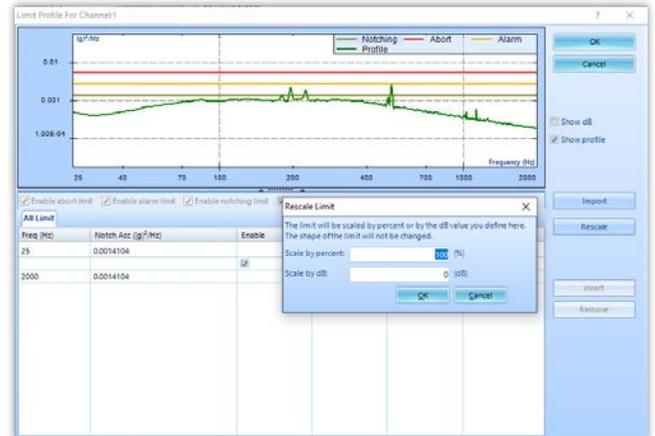
The run schedule view displays the run schedule being executed and highlights the currently running entry.

An improvement to this feature in EDM 9.0 allows the user to see the elapsed time of the run entry.



This information allows the user to conveniently view the elapsed time for this entry and the time it takes for the upcoming entry.

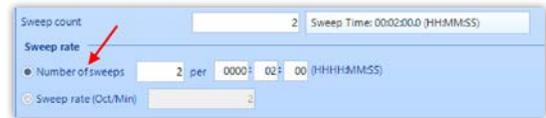
**Rescaling Limit Profiles by dB or Percentage**



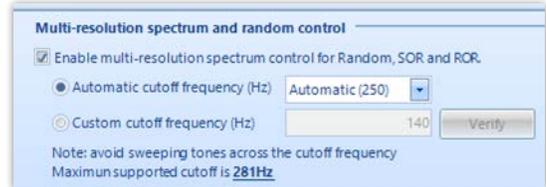
Limit profiles can now be re-scaled using percentage or dB. In most user case scenarios where limits are applied, the limits are scaled versions of the profile. This feature helps simplify the setup process.

**Improvements in Random**

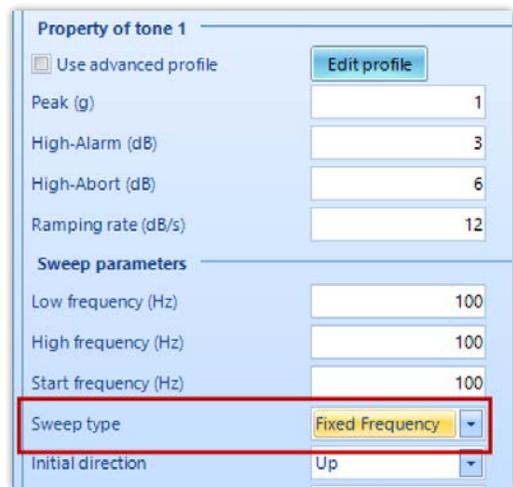
Sweep rate of a SoR sine tone can be defined by either number of sweeps over a duration or sweep rate.



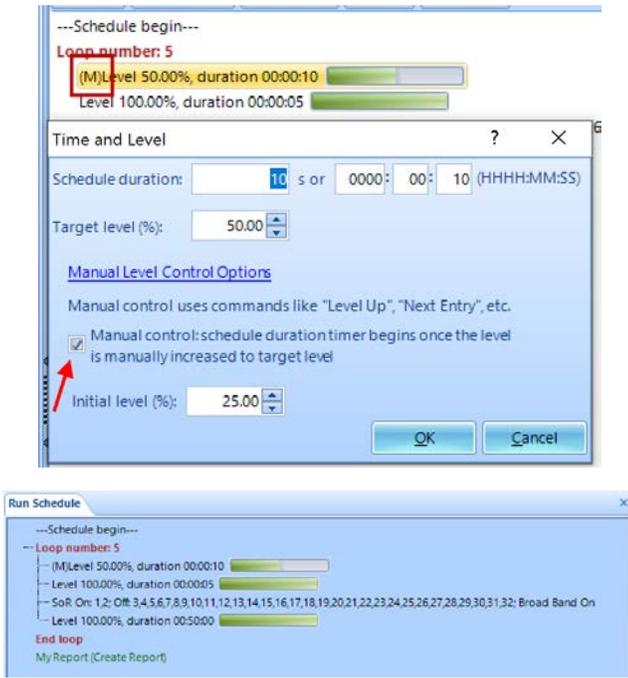
Support for custom cutoff frequency in multi-resolution control settings.



Fast setup for a dwelling sine tone in SoR.

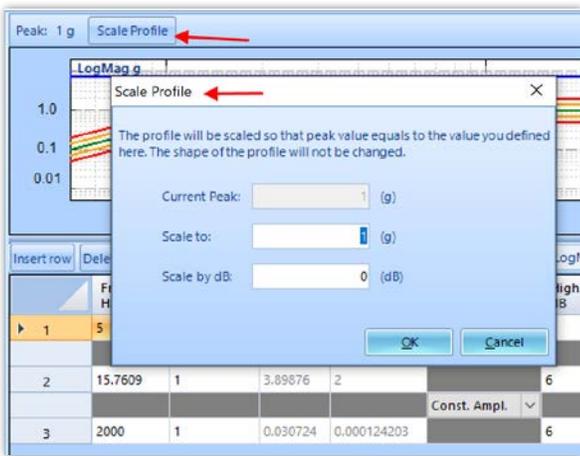


Improved UI for manual control in run schedule (random)

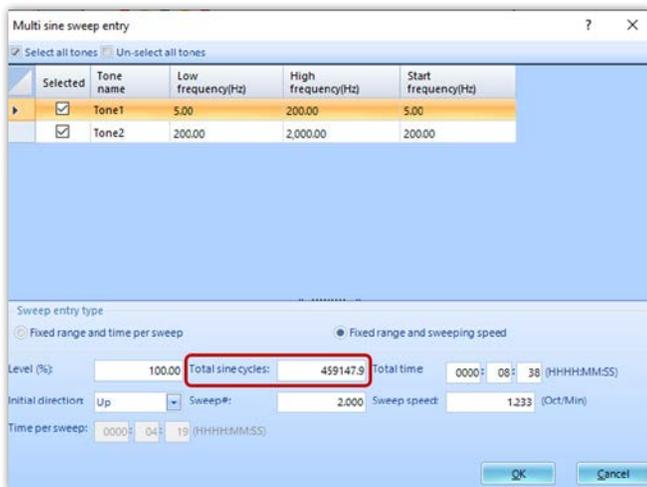


Improvements in Sine/RSTD/Multi-sine

Enter a number to scale the entire sine profile

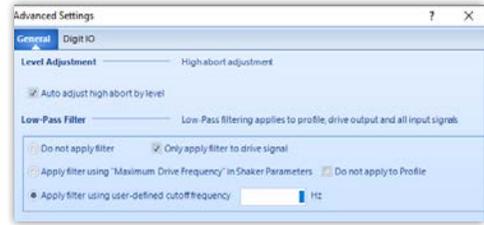


Multi-sine displays "total sine cycles" in the run schedule entry

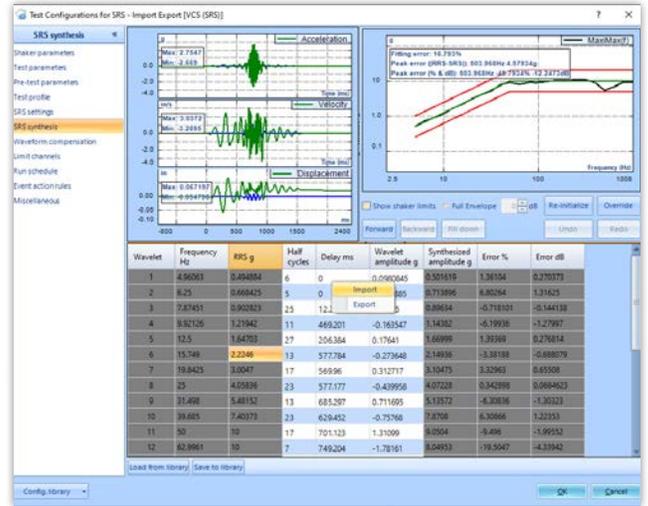


Improvements in Shock/TTH/SRS/Earthquake Testing/ Transient Random

Option for "Only apply filter to drive signal" in low-pass section under Shock advanced settings



Import/Export SRS profile as CSV



EDM MIMO Vibration Control Software

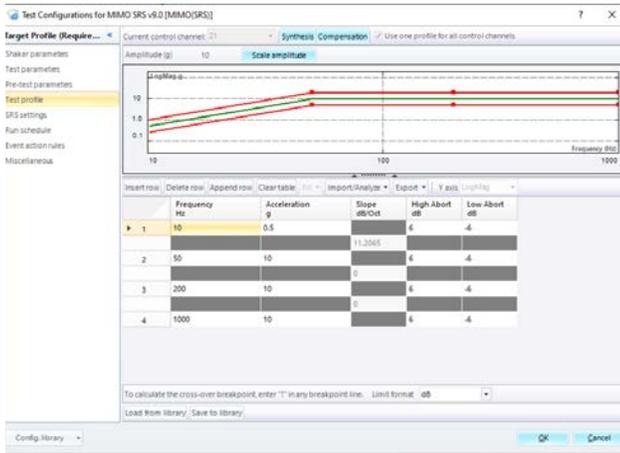
Improved MIMO Random Drive Estimation

MIMO Random expected drive signals are estimated after the pretest. This gives users a better indication of what to expect from the driving level point of view.



### Convenient Synthesized Profile for All Control Channels

The MIMO TTH or MIMO SRS profile has the “use one profile for all control channels” option added. With this enabled, the same synthesized profile can be applied to multiple control channels.



Signal name	Measure	Record list	Signal color	Recording Destination
001	Peak(Ch1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
002	Peak(Ch2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
003	Peak(Ch3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
004	Peak(Ch4)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
005	RMS(Ch1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
006	RMS(Ch2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
007	RMS(Ch3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash
008	RMS(Ch4)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	PC,Flash

### Out of Band Overload Detection on Front-end LEDs

Drop shock tests, pyro shock tests or data acquisition during blast testing may at times have sufficient energy to drive the sensors at their resonance frequency. Piezo resistive sensors are the most suitable for these purposes as they have a higher resonant frequency. However, most IEPE sensors used in these tests have a resonant frequency of less than 100 kHz which may easily saturate the sensor out of its usual band.



Once saturated, the data acquired is corrupted and not usable.

EDM 9.0 added the detection of out of band saturation before any low pass filters to ensure that the data is not corrupted. Hardware indicator LEDs have been programmed to display the out of band saturation.

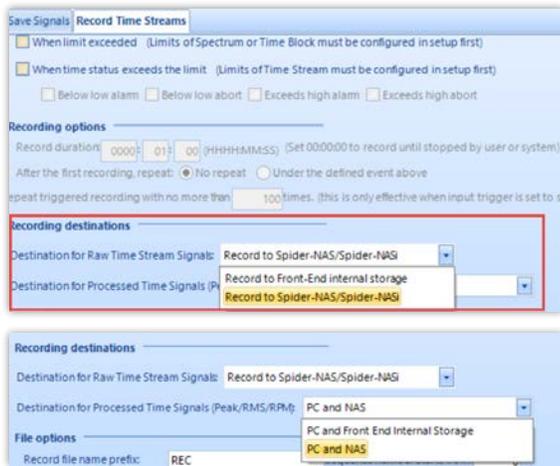
### Enhanced History Review for Time History Signals

Statistics signals in VCS and DSA can be viewed for the entire duration of the test using the PC Recording and History Display feature. In EDM 9.0, the History Review Mode received major improvements.

### General Improvements

#### Conveniently Configure and Review Recording Destination

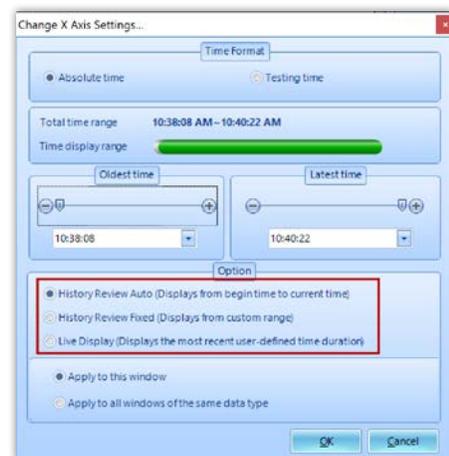
The recording destination is an important parameter when a Spider-NAS is included with a Spider system. EDM 9.0 introduces a convenient option to select the recording destination for the time stream data and statistics time data.



When a PC is available and connected, the statistics time signals always save to the PC for the entire duration of the test which enables users to view the historic data while the test is running. In addition, it is also possible to save the data to the front-end internal storage or Spider-NAS which helps to save data in the absence of a PC or if the network connection is not reliable.

The user selected destination or the default destination is now conveniently viewed through the Measured Signals Setup page.

Signal name	Measure	Record list	Signal color	Recording Destination
001	Ch1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAS
002	Ch2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAS
003	Ch3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAS
004	Ch4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAS
005	Ch5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAS
006	Ch6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAS





The time duration for a specific period of a historic signal or live display is now conveniently configured by the user using several featured options.

### Introducing Overall RMS Display for All Signals in the Plot

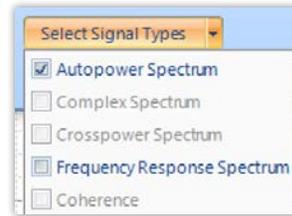
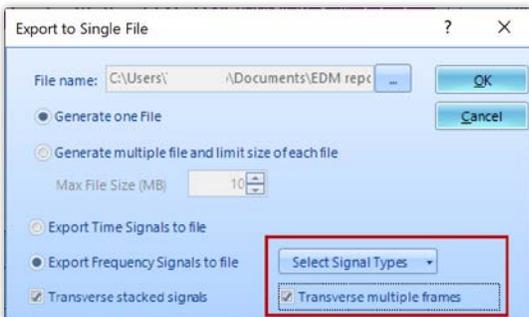
In EDM 9.0, overall RMS for all the signals in a given plot can be computed and displayed.



The total energy in signals acquired through sensors specialized for different frequency ranges can be acquired and the overall energy can be estimated.

### Improvements to "Export to Single File"

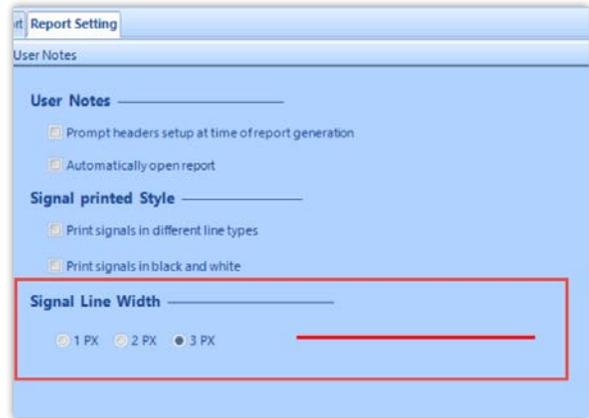
The Export to Single File feature provides an option to export multiple signals from multiple channels as a single file.



This feature is significantly improved. In addition to more options to select the signal types, the option to export in MAT and UNV file formats is added.

### Customizable Line Width for Signals in Report

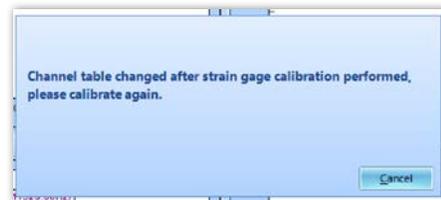
The line width can be independently adjusted for signals displayed on a report.



This allows for the optimum selection of the line width in a report without having to modify the displayed line width in EDM.

### Enhanced Calibration Notification for Strain Gage Calibration

Strain gage channels need to be calibrated to determine the offset and a shunt calibration needs to be performed to accurately estimate the gain. Calculating these values is essential to calculate the strain values accurately. Since these values depend on the sensor used, a calibration needs to be performed each time a sensor (strain gage) is modified.



EDM 9.0 introduces a friendly notification to ensure that users do not forget to calibrate the strain gages to maintain the accuracy of measurements.

### Enhanced Calibration Review Window for Strain Gage Calibration

Once a strain gage calibration is performed which includes offset and gain calculations, the user must review these values to ensure that they are within the expected range.

Strain Gage Calibration

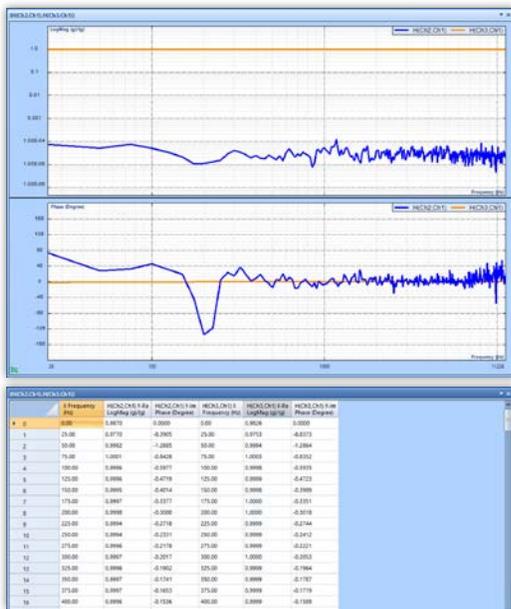
Measure and Calibrate

Location ID	Offset nulling		Shunt calibration				Measured ex.volt.
	Measured strain	Error (%)	Simulated strain	Measured strain	Gain adjust value	Error (%)	
CH1	-2.879 µε	-0.00576 %	1625 µε	1637 µε	0.9928	-0.0237 %	N.A.
CH2	7.923 µε	0.0158 %	0 µε	N.A.	1	N.A.	N.A.
CH3	1.007e+04 µε	20.1 %	0 µε	N.A.	1	N.A.	N.A.
CH4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CH5	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CH6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CH7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CH8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

EDM 9.0 introduces a user-friendly window to detect any obvious errors which can denote an incorrect connection or a bad sensor.

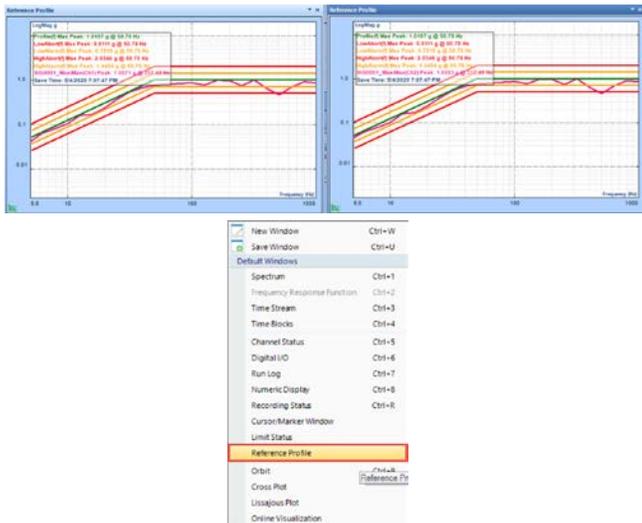
**Improved Text Display for Signals with Phase (FFT/FRF/CPS)**

Users can conveniently display signals consisting of phase information on EDM software. Converting to text format when multiple signals are plotted within the same chart was a limitation in previous versions. Improvements to EDM 9.0 enables users to plot multiple signals on a chart and allows users to display signals in text format.



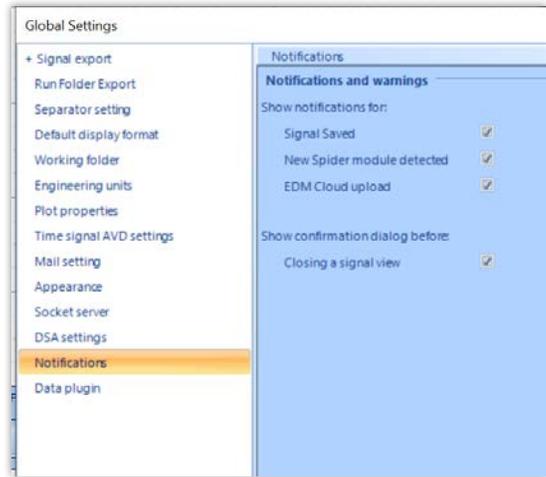
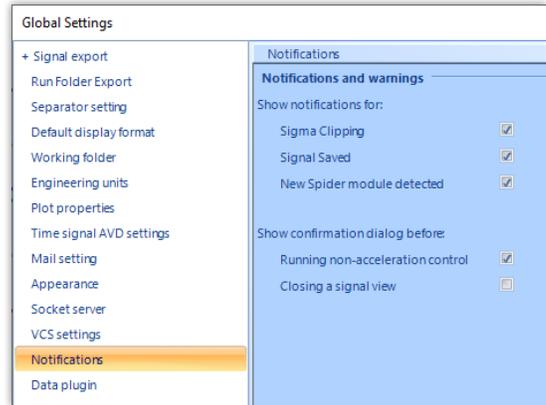
**Enable Multiple Charts of SRS Reference Profiles**

Multiple windows for SRS Reference can be created in EDM 9.0. This allows users to plot different signals in different charts.



**Ability to Disable Certain Notifications in EDM**

Certain notifications are expected to be seen during certain tests. For example, sigma clipping can be frequent when it is set to 3 during a random test since several frames may experience sigma clipping.

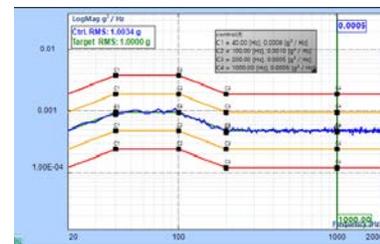


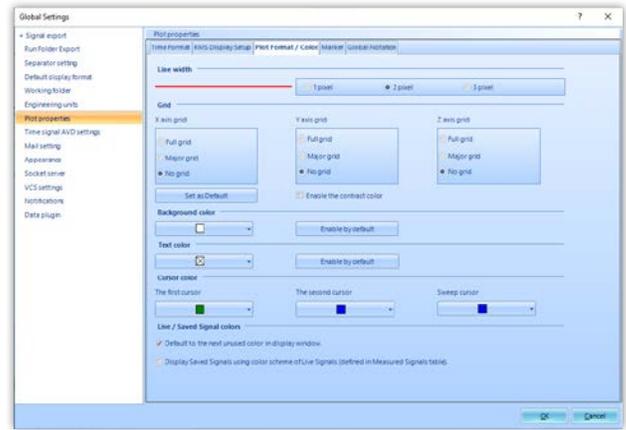
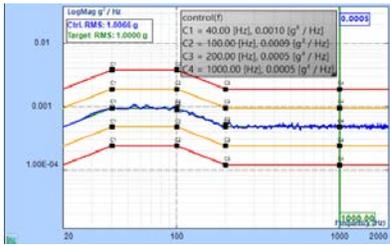
In certain tests, signals are frequently saved. In these cases, frequent notifications to the user are distracting.

EDM 9.0 allows users to disable a selection of notifications in EDM-VCS and EDM-DSA.

**Customizable Font Size of Marker Text in EDM Display and Report**

EDM 9.0 allows customizable font sizes for markers (peak markers, harmonic markers, etc.) on the display as well as on the report.



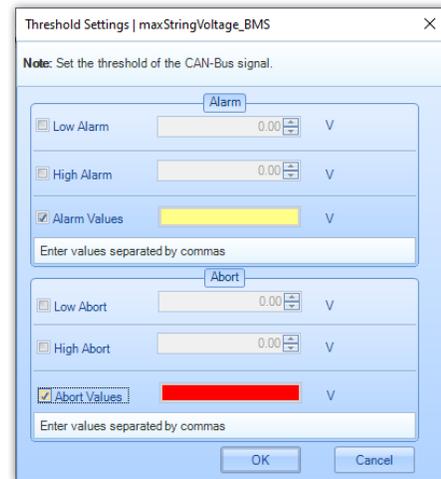


To accommodate all cases, users can select the signal coloring scheme for saved and live signals.

## CAN bus Improvements

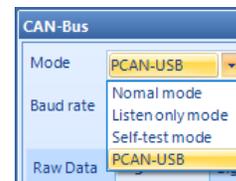
### Improved Alarm and Abort Functionality for CAN bus Signals

CAN bus alarm and abort support for matching specific CAN bus values (instead of high/low limits)



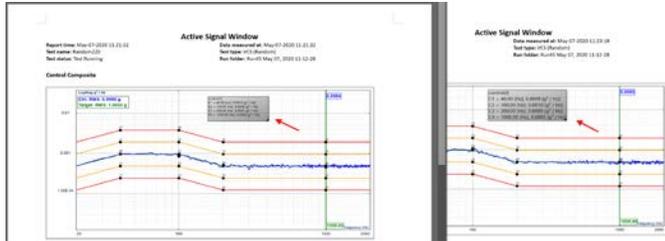
### Support to PCAN USB Adapter

EDM 9.0 VCS module now supports Peak Systems – PCAN USB Adapter.



### Search Feature Added to CAN bus Signals

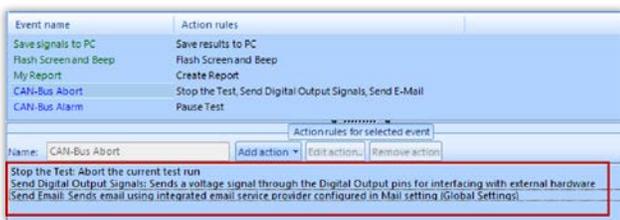
CAN bus: added search feature for easy filtering of desired signal name.



This allows the user to have an optimized size and maintain visibility without hiding data.

### Expanded Details in Event Action Rules

Event action rules are a powerful component of EDM which provides users with a pseudo programming ability to configure actions towards specific system events or user defined events.



EDM 9.0 includes more details for each event to provide users with a more user-friendly, approachable, and intuitive tool.

### Support to TEAC – TAFFmat Data Format

EDM 9.0 supports exporting files to the TAFFmat data format which is utilized by TEAC data recorders.

### Improved PC Resources Check

EDM 9.0 introduces an advanced PC check to ensure that the available RAM and processor speed meets the minimum requirements to efficiently run EDM software.

### Share Global Settings with Systems on LAN

EDM installed on multiple computers on the same LAN can share the same global settings stored in a central place. Requires editing the global config file.

### Improved Signal Color Setting for Saved Signals and Live Signals

Different applications or different users require different display requirements. In certain applications, reviewing the same signal over the course of time is essential while in other applications comparing the signals from two different channels is more essential and requires the same coloring scheme used for live signals.

## SOFTWARE RELEASE HISTORY

Dates of software releases:

Type	Release	Exact Version	Release Date
Release	EDM 4.2	CI 4.2.0.3	2/28/2014
Patch	EDM 4.2.0	CI 4.2.0.14	7/2/2014
Release	EDM 5.0	CI 5.0.0.2	11/27/2014
Patch	EDM 5.0.1	CI 5.0.1.3	2/27/2015
Release	EDM 5.1	CI 5.1.0.6	8/12/2015
Release	EDM 6.0	CI 6.0.0.1	5/19/2016
Patch	EDM 6.0.2	CI 6.0.2.9	8/9/2016
Release	EDM 6.1	CI 6.1.0.4	2/7/2017
Patch	EDM 6.1	CI 6.1.0.27	8/22/2017
Release	EDM 7.0	CI 7.0.0.6	2/1/2018
Patch	EDM 7.1	CI 7.1.0.7	7/19/2018
Release	EDM 8.0	CI 8.0.0.1	2/2/2019
Release	EDM 8.1	CI 8.1.0.1	11/13/2019
Release	EDM 9.0	CI 9.0.0.4	6/5/2020

## SYSTEM REQUIREMENTS

### Minimum System Requirements:

- **Operating System Support:** Windows 7 SP1 or higher
- **Operating System Type:** 32-bit or 64-bit
- **Processor Speed:** 1.5 GHz Dual-Core x86
- **RAM:** 4 GB
- **Available Storage Space:** 10 GB

### Recommended System Requirements (Minimum for Spider Systems Higher than 16 Channels):

- **Ethernet Speed:** at least 1 Gbps Ethernet port on the computer
- **Network Cables:** provided by Crystal Instruments
- **Operating System:** Windows 10, 64-bit
- **Processor:** Intel Core i7, 2.0 GHz or Higher
- **RAM:** 8 GB DDR3 1600 or higher
- **Available Storage Space:** 10 GB or higher
- **Spider-HUB Firmware Version:** 2.0.5.17 or higher

## VERSION COMPATIBILITY

Product and Software Version	Firmware Versions
<b>Spider-80X/80Xi/80Hi/80Ci</b>	
EDM Testing 9.0.0.x	9.0.0.x
<b>Spider-81 (v7.x)</b>	
EDM Testing 9.0.0.x	9.0.0.x
<b>Spider-81B (v7.x)</b>	
EDM Testing 9.0.0.x	9.0.0.x
<b>Spider-80SG/SGi</b>	
EDM Testing 9.0.0.x	9.0.0.x
<b>Spider-20/20E/20HE/20H/20i</b>	
EDM Testing 9.0.0.x	9.0.0.x

Product and Software Version	Firmware Versions
<b>CoCo-80</b>	
EDM 6.0.2.x	4.0.x
<b>CoCo-70X</b>	
EDM Testing 9.0.0.x (EDM CoCo for DSA)	1.8.x
Vibration Diagnostic System 1.4.2.x	1.8.x
<b>CoCo-80X/90X</b>	
EDM Testing 9.0.0.x (EDM CoCo for DSA)	1.8.x