CRYSTAL INSTRUMENTS

EDM 8.1

Engineering Data Management Software Release Notes

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

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RELEASE HIGHLIGHTS

Spider-80SG/SGi Supports IEPE

Crystal Instruments' general purpose acquisition device with the capability to support a wide range of sensors using precision excitation voltage in addition to strain gage support now also supports IEPE sensors.

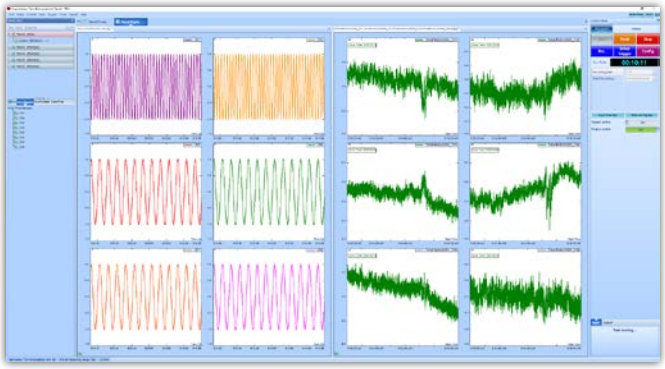
With this additional feature, the Spider-80SG/SGi can be used in all possible applications where any combination standard or non-standard sensors are deployed including the support for strain gages and strain gage based sensors.

A high channel count Spider-80SG/SGi system combined with the features of Variable Sampling Rate can potentially be used for the synchronized data acquisition of many measurement quantities, including static and dynamic quantities.

The Spider-80SG is ideal for a wide range of applications. IEPE accelerometers, MEMS accelerometers, microphones, load cells, pressure transducers, torque sensors, potentiometers, DC based sensors, under water blast sensors, strain gages and strain gage based sensors (to name a few) can be connected using one single device, the Spider-80SG.

Introducing Time Data Acquisition (TDA)

EDM testing software now includes Time Data Acquisition (TDA) software, an intuitive easy-to-use software interface for acquiring, viewing and recording raw time data received from the input channels of any of Spider front-end system. With the help of a variable sampling rate, users can select different sampling rates for each Spider front-end depending on the requirements. Using the time history, static measurements such as strain or temperature and raw time signals can be viewed for the entire duration of the test by continuously saving to the PC in real-time.



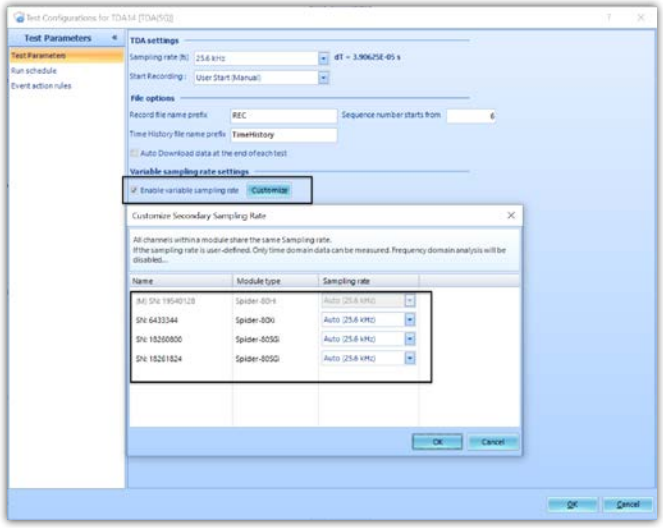
TDA is designed to be a lightweight software application targeting projects that only require time data acquisition without the need for additional processing.

Any need for an additional processing can subsequently be carried over by importing the recorded data into Crystal Instruments' Post Analyzer (PA) software.

While it is a lightweight software application, TDA is equipped with the following powerful features:

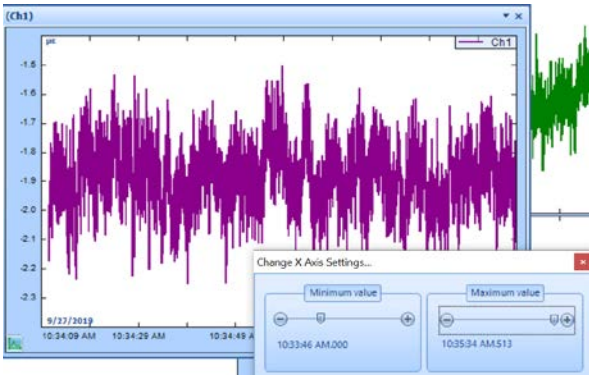
Supports Variable Sampling Rate

When a high channel count system is used, each Spider front-end can be sampled at a different sampling rate. Using this feature, users can conveniently acquire various measurement quantities by connecting different Spider front-ends while keeping the data synchronized. A widely used application requires the acquisition of acceleration data along with strain and temperature. With the help of the Spider-80X/Xi, Spider-80SG/SGi and Spider-80Ti, together with the variable sampling rate, such requirements can be achieved while keeping the data synchronized.



Supports Time History

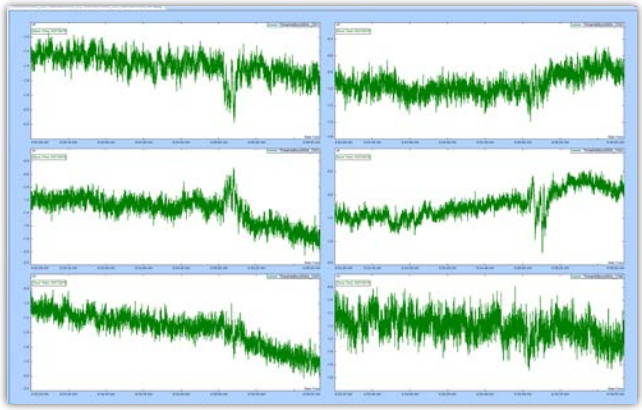
Long duration static measurement tests typically require the user to view the historical data while the test is running. These tests can run for several hours to several weeks.



The sampling rates of these tests are typically under 100 Hz. Time Data Acquisition (TDA) software is equipped with the ability to save these raw time stream signals to the PC when the sampling rate is under 100 Hz. Users can choose a display option called "Time History" that allows the X axis of these signals to increase infinitely, resulting in a live view of the raw time signal for the entire duration of the test. Users can choose to view a smaller duration of live or historical data.

Supports Raw Time Recording to Internal Flash and PC

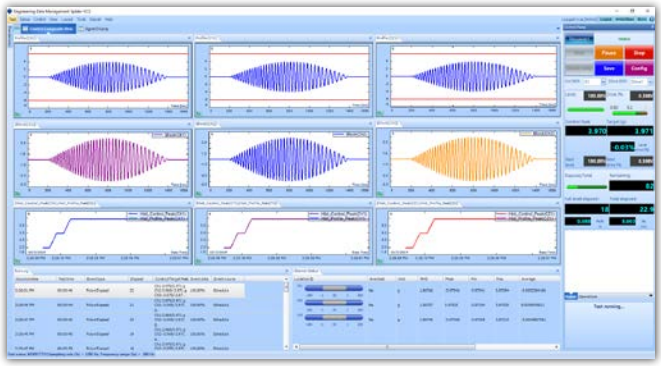
TDA also has the ability to record all the raw time signals for the entire duration of the test or to capture a specific event in the time domain.



Users can save raw time recordings to the internal flash memory, allowing users to operate the Spider system in Black Box mode without an attached PC if necessary. Users can also save the low sampling rate raw time signals to the PC storage space for instant viewing without waiting for the test to stop.

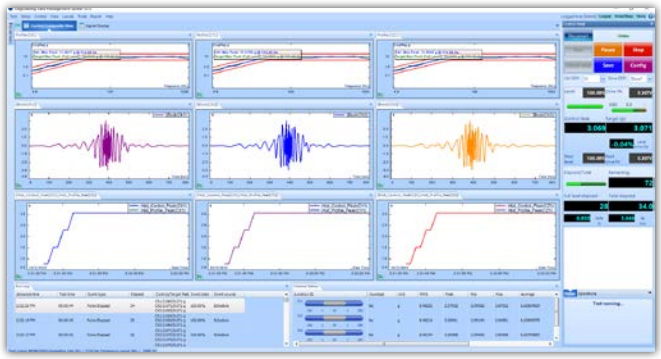
Introducing SRS Control in MIMO VCS

EDM MIMO SRS test is added to the MIMO VCS software suite which already includes MIMO Random Control, MIMO Sine Control, MIMO Shock Control and MIMO Time Waveform Replication control types. The SRS Synthesis module generates short, transient time waveforms from a user-defined SRS profile.



Introducing TTH Control in MIMO VCS

MIMO TTH tests output pre-defined, short duration waveforms. The closed-loop control algorithm ensures that the control signal inputs match the specified waveform shapes. The output is repeated in a set interval.

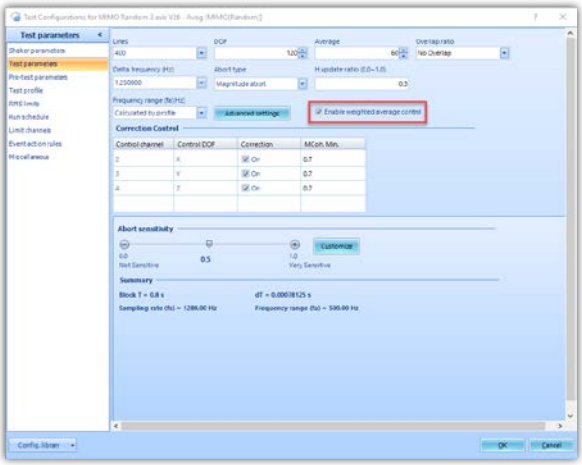


The shape can be any of the usual waveform shapes, such as sinusoidal, triangular, and trapezoidal, or white noise. Pre-stored profiles include: Bellcore Z1 & Z2, Bellcore Z3, Bellcore Z4, (Burst) Sine, Triangle, Chirp, Burst Chirp, White Noise (Burst Random), Sine Beat, Sine Beat (multiple frequency), Door Slam (Ford), Decay sine (linear/angular frequency), and Sine Burst.

A customized waveform can also be added to be used as a profile for the MIMO TTH Test type.

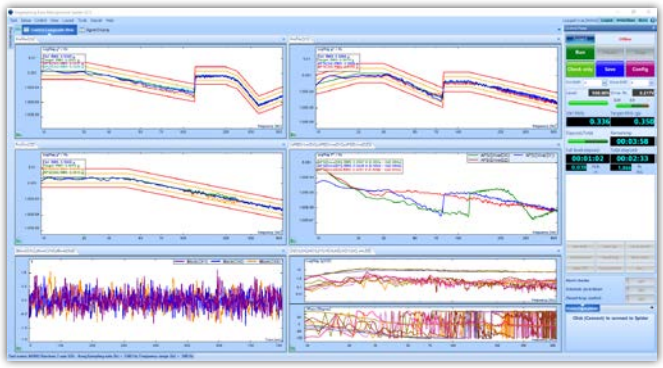
Introducing Average Control in MIMO Random Test

MIMO tests on large test articles often require multiple control channels for each control profile. EDM 8.1 version introduces the option to assign multiple control channels to each control profile.

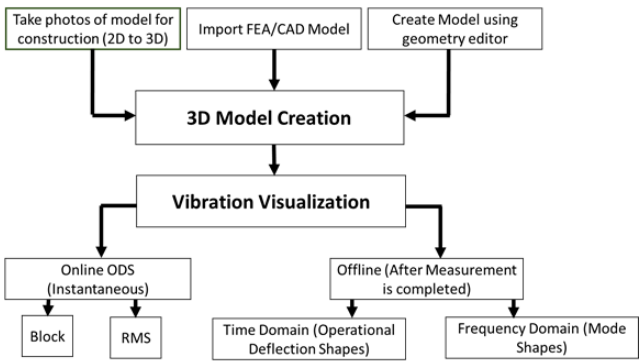


The customized weighted average will be performed on these control channels to compute the averaged control channel for each control profile.

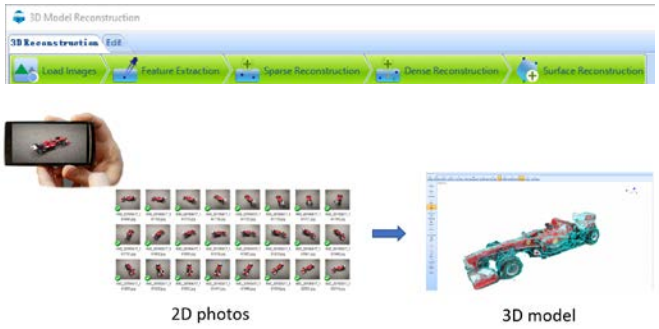
This feature would ensure that different locations of the complex test structure are accurately tested.



Vibration Visualization: Introducing 3D Model Reconstruction from 2D Images Produced by Cameras

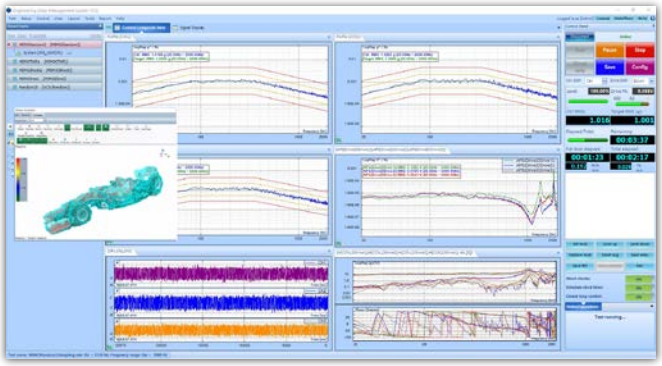


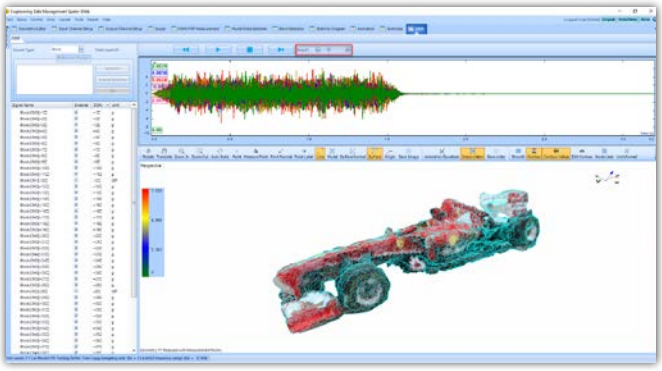
Building a 3D model of any structure is vastly simplified with the introduction of this feature. Any camera (including cellular phone cameras) can be used to capture pictures of an object from various angles and to use them to create a 3D model of the structure.



This feature utilizes the advanced technology of 2D to 3D reconstruction to provide a simple solution for the challenges of creating 3D geometric models from convoluted test structures. The imported images are matched to extract the features and a 3D model of the structure is constructed after the point and surface reconstruction processes are completed. This approach not only saves time and effort for the user, it also provides an accurate model with great simplicity.

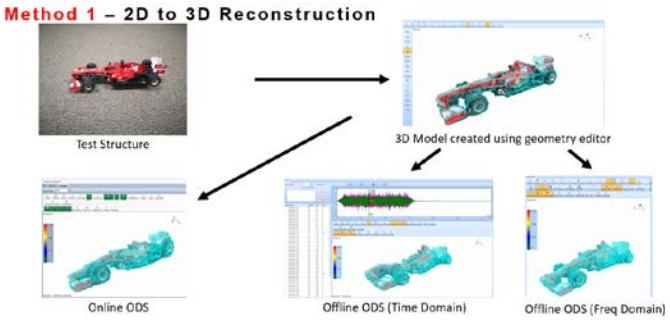
The reconstructed model can be exported and used along with Crystal Instruments' Modal Analysis software, Vibration Control software or Dynamic Signal Analysis software.





When used in combination with the vibration visualization feature of EDM software, animations representing a test object vibration on a shaker can be visualized.

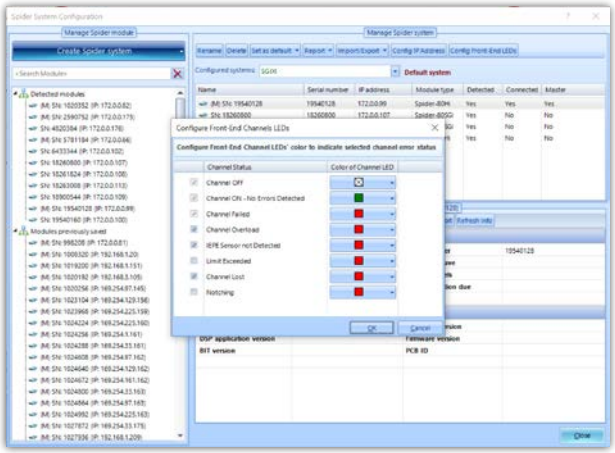
Vibration visualization is not only useful in real time (Online ODS) where a user can see the instantaneous deformation of the structure, but is also helpful after the completion of measurements (Offline ODS). The measured data can be analyzed and visualized to observe the test structure's vibration in both the time and frequency domain.



Configurable Error Status on Front-end LEDs

The Spider-80Xi platform of devices (i.e. Spider-80Xi, Spider-80SGi and Spider-80Ti) have built in LEDs for each channel.

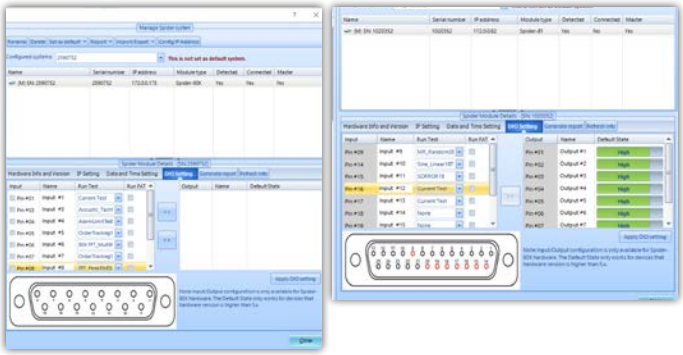
With the 8.1 version, users can customize LED indicators to display specific error messages in addition to the error messages displayed on the EDM screen. When used along with the powerful Black Box mode of Spider systems, any anticipated error message can be identified even without a connected PC to the monitoring Spider system.



When Spiders are deployed in a high channel count system, channels with issues can be identified with ease. A range of error messages that could be optionally displayed using the LED indicators, including Channel Lost, Limit Exceeded, Notching, Overload, IEPE sensor failures, are available. These configurations are available on all EDM modules including EDM-VCS and EDM-DSA.

Assign and Run a Customizable Test with Each Digital Input

Users can configure multiple tests and run a specific test when a specific digital input is received during several automated vibration control tests.

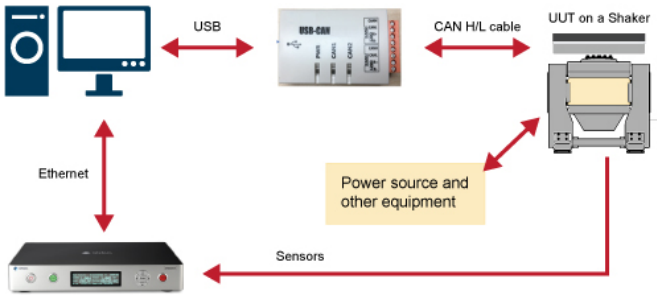


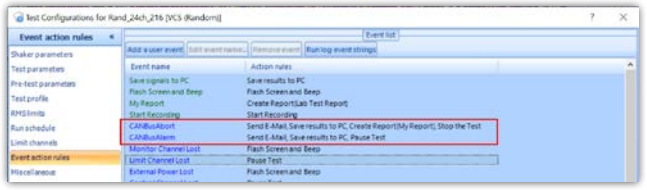
EDM 8.1 introduced a feature included in all the software modules including Vibration Controller and Dynamic Signal Analysis software. Users now have the ability to assign a specific test to each digital input. When the input is received, the test automatically runs.

This feature enhances the capabilities of EDM software and Spider hardware to better suit the requirements for combined testing. Users can easily configure EDM to run a specific test automatically when the chamber reaches a desired temperature.

VCS/THV Testing Supports Integration with CAN bus

VCS/THV testing is integrated with CAN bus to monitor the status of a UUT. The controller reacts instantly to an unstable or dangerous status.



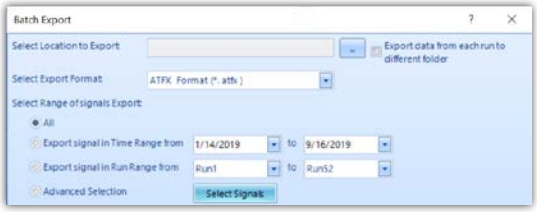


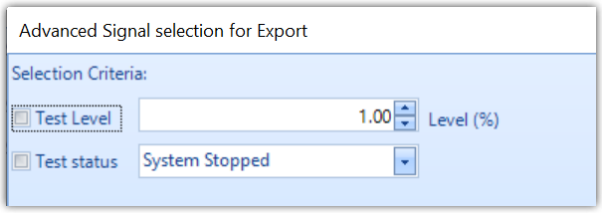
Introducing Batch Export of Signals

A new feature to search, select, and export a portion of or all signals is introduced in the 8.1 release.

Several options to customize the signals for export are available, including the selection of signals within a time range or the selection of signals from specific runs.

Test level and test status are important factors when analyzing signals from a VCS test. Advanced selection gives users an option to export signals at a pre-defined level or at a pre-configured test status.





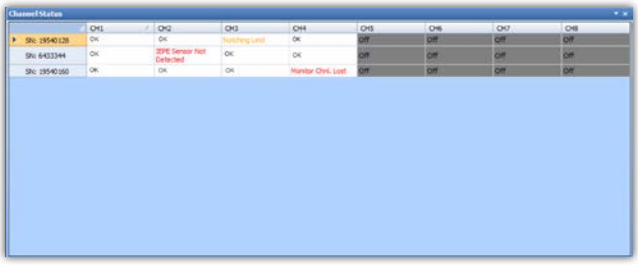
The user can customize the format of exported signals to open them using other tools and software.

Users can now conveniently export their signals of choice from several runs using this feature now made available in all EDM modules including EDM-VCS and EDM-DSA.

Revamped Channel Status View

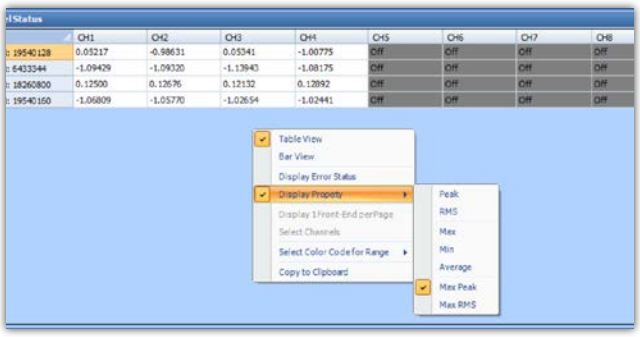
The Channel Status view received a major upgrade in the 8.1 release.

Error status messages including “Monitor Channels Lost”, “Limit Exceeded” and “Notching” are now easily identified.



With the capability of Spider front-ends to combine up to a 1024 channel count system, this feature makes it easier to view the error message on channels.

Combined with the configurable error status on the LED screens, the detection and correction of specific errors which result due to incorrect connections, bad cables or bad connectors can easily be identified and addressed.



In addition to the introduction of a user-friendly error status display, several convenient options to determine the channel statistics have also been introduced.

Max. Peak and Max. RMS, for example, would keep track of the maximum Peak and RMS values for the entire test duration. These values greatly help in determining if any channel was overloaded during any point during the test. When reported, the error status messages or overload issues that were overlooked during a test are easily identified.

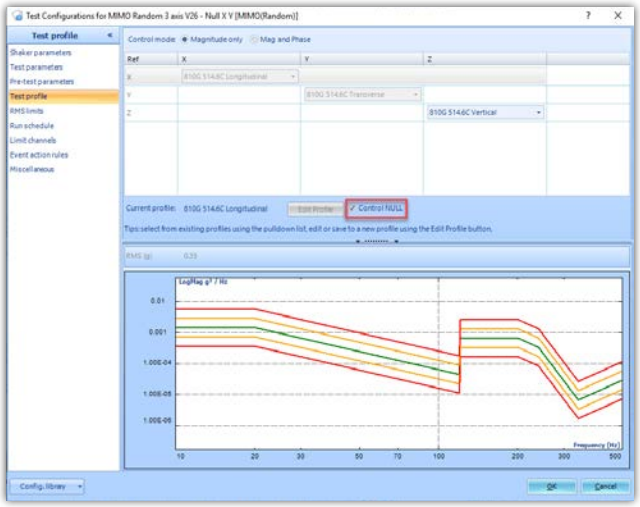
NEW FEATURES

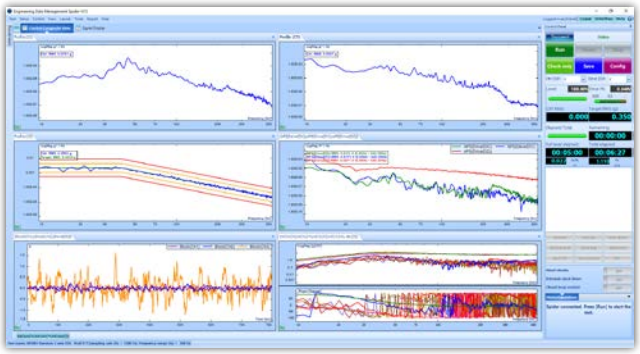
New Features in EDM Vibration Control Software

Introducing Control NULL in MIMO Random Test

In a multi-axial or multi-DOF vibration testing, it is often required to ensure that one of the DOF or one of the axes is not subject to vibrations.

The addition to Control NULL feature will facilitate such scenarios. This feature also allows the user to run a single axis control test in a multi-axis shaker configuration. This saves the hassle of tweaking the hardware setup by just enabling a simple parameter in the configuration settings.

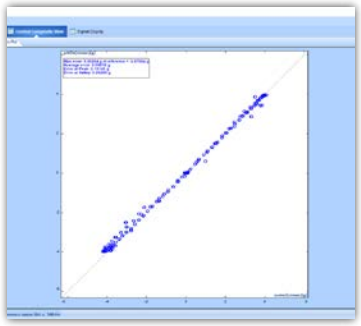




Enabling this feature would ensure that the vibrations for a particular control profile are minimized and are controlled in order to maintain a low level of vibrations close to noise floor for the duration of the test.

Introducing Cross-plot (Scatter Pot) in Vibration Control Software

Cross-plots are used to plot peaks from two different channels or between the profile and the control. It is a convenient tool to easily identify the error between the Profile and the Control signals.

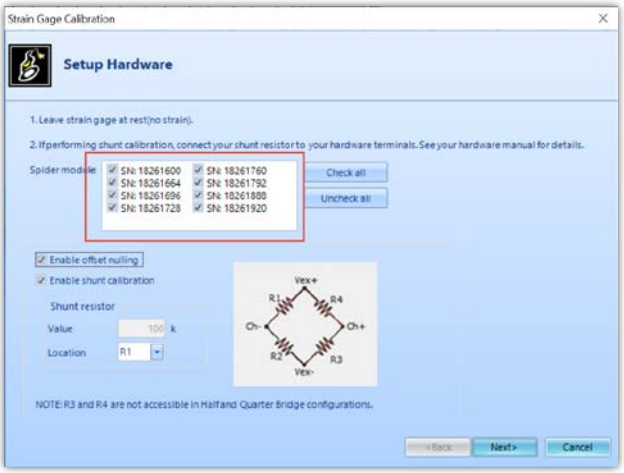


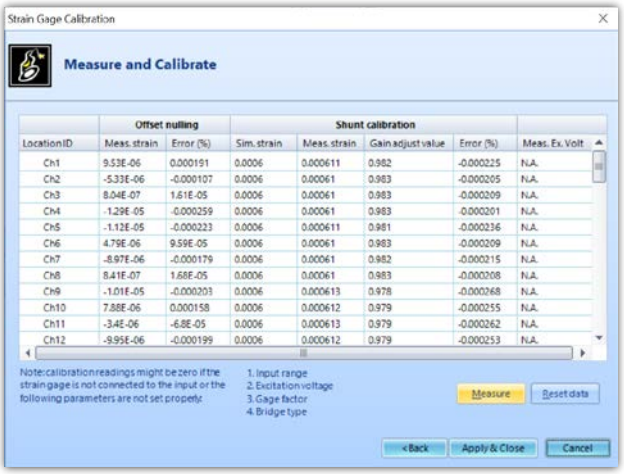
Cross-plot are greatly helpful in all the time based vibration control tests including Shock and TTH tests but are a necessity to analyze Time Waveform Replication (TWR) test. The accuracy of the control at different amplitudes can be easily understood by the amount of scatter in these plots. When all the points are perfectly aligned with the diagonal line this signifies the control to be extremely close to the profile.

With the 8.1 release, cross-plots can also be saved to be viewed at a later time or cross-plots can also be generated using the time history signals available in the EDM-VCS software.

Simultaneously Calibrate Multiple Strain Gage Modules in a System

The new EDM 8.1 version allows users to simultaneously calibrate multiple strain gage units within a system.

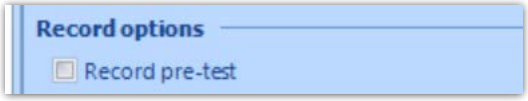




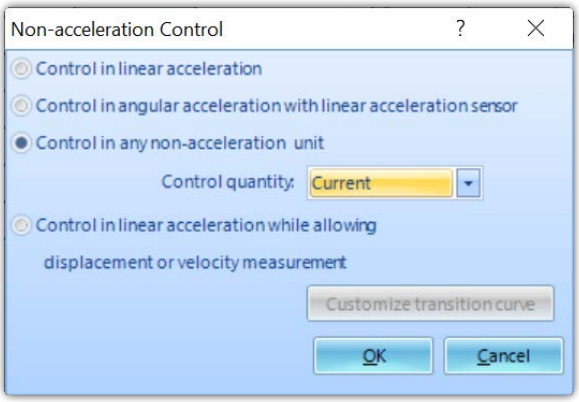
Any configuration can be used for a channel and any number of Spider-80SG/SGi units within a system can be calibrated together.

Start Recording Before Pre-test

For the applications that need recording of input channels to capture the transients when the amplifier turns on, an option to enable recording the input channels starting at pre-test has been added in the 8.1 release.



Current as a Control Quantity



EDM-VCS can be used to control current in applications where a controlled current is required

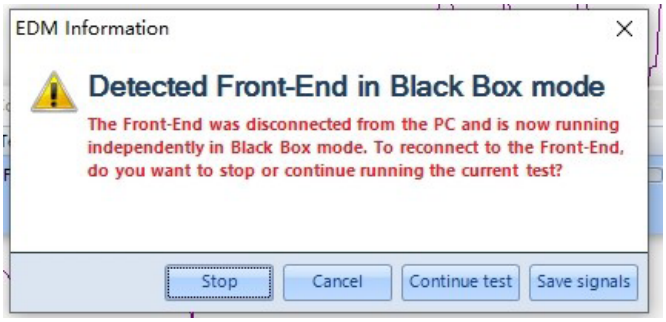
New General Features

Re-connect to the Spider Without Stopping a Test

Events such as a system crash or automatic restart due to a software update on the user's computer or an unreliable network connection breaks the connection between the computer and the Spider while the test is in progress.

With the help of the Black Box mode equipped in all Spider front-ends, the Spider system can continue to acquire signals or continue to control the shaker according to the test schedule.

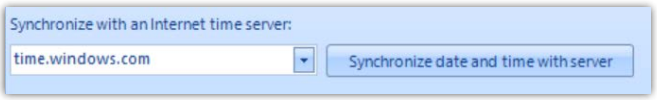
When the user's computer is operating normally again, it is often necessary to view live signals on the EDM software interface and to generate reports using the saved signal data.



This new feature provides users the ability to Save Signals, which enables users to create a report at a convenient later time or to continue re-establishing a broken connection to view live signals.

Synchronize Spiders to Time on a Server on the Internet or a Local LAN

EDM 8.1 provides users with the ability to synchronize the time of Spider systems with a server time located on the internet or a local LAN.

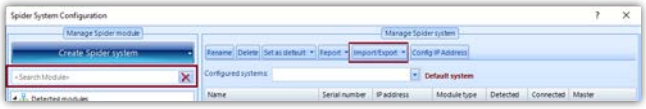


This enables the Spiders to operate independently of the time on the connected PC and provides the capability to always use the most authentic time.

Spiders running on PCs with incorrect times can introduce incorrect time stamps on the raw time recordings and signals that are saved to internal storage. Using a server time not only enables a smooth transition to run the Spider systems using different PCs, but it also ensures the accuracy of time stamps.

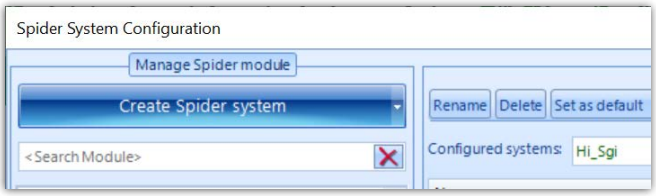
Ability to Import / Export Spider Configurations

Spider configurations can now be moved around different PCs or across different EDM modules.



The effort required to build Spider systems in each PC is now reduced. The Spider systems can be exported or imported without the need to export or import the whole database.

In addition, an option to search through available Spider systems is also introduced. Users can configure high channel count systems into multiple Spider systems by using different channels in each system. Searching through and modifying Spider systems is much simpler now through the implementation of this new search feature.



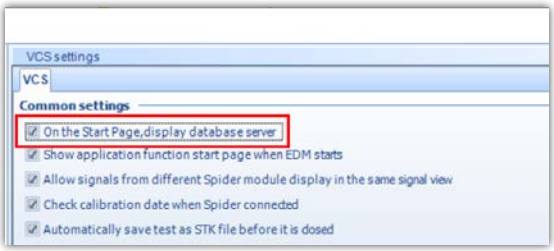
A re-arranged layout also simplifies the configuration and enhances usability by hiding the options not frequently used in the Spider system.

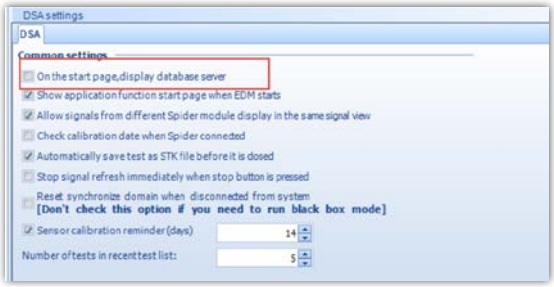
Directly Open Test Files from Windows Using the Desired Software Module

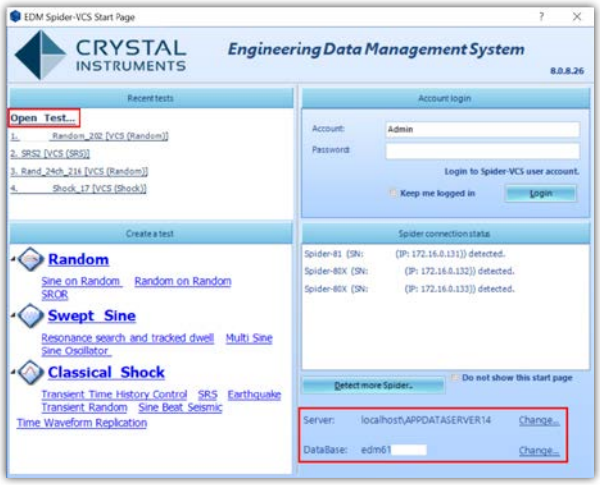
Users can select a specific EDM module when opening an .stk file.

Ability to View and Modify Database Settings on the Home Page

Advanced users who use EDM's ability to have several databases now have the option to open a specific database or a specific SQL Server instance directly from the home page.







This option, available in both EDM-VCS and EDM-DSA, can be enabled from the Global settings.

Ability to Browse and Open a Test File from the Home Page

The list of tests displayed on the home page is very limited. To provide users with the ability to open any test from the home page, EDM 8.1 introduces an "Open Test…" option. All EDM modules now provide users the ability to browse the list of tests and open test files from the home page.

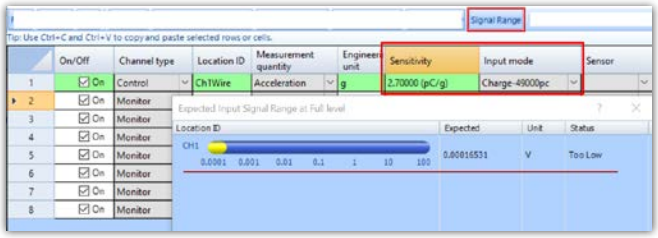
Copy/Paste Window Display Settings

A convenient option to copy and use display settings from one window to a new window is introduced in the EDM 8.1 release. Options to copy or paste are available from the right-click menu of a display window, under Display Settings.

MAJOR IMPROVEMENTS

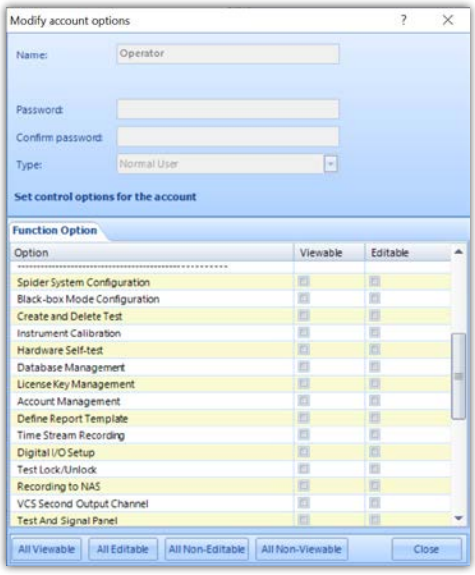
EDM Vibration Control Software

Estimate the Input Signal by Sensitivity, Input Mode, Input Range and the Profile



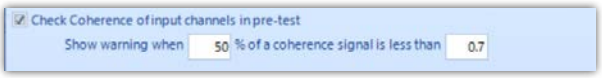
Expanded List of Options to Customize Account Privileges

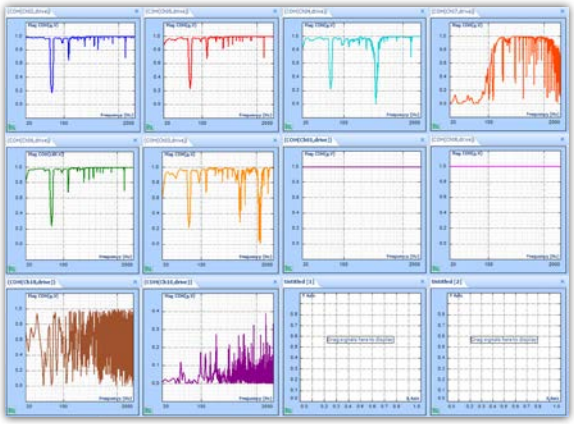
Several new options have been added to the account options feature to provide users the ability to customize account privileges in greater detail.



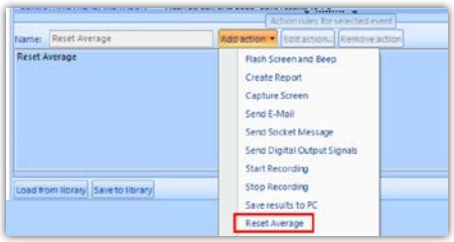
Random

- An option to check the connection status of all input channels in pre-test.

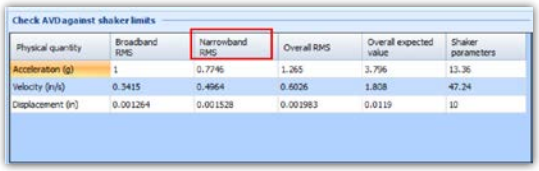




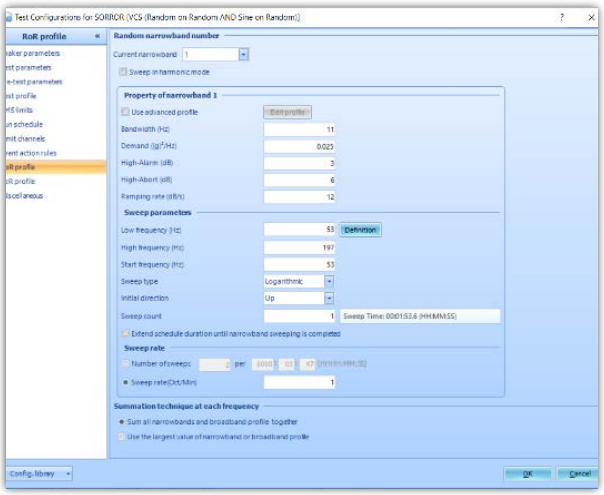
- “Reset Average” is added to the action list of event-action rules for users to add to a test schedule or a system event to perform a reset average.

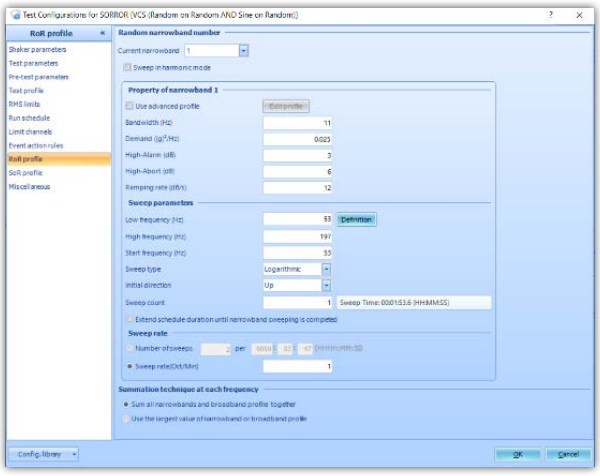


- In SoRRoR, the RMS limits of the profile include narrowband and sine tones turned on in a test schedule. Not all defined narrowband and sine tones are included.

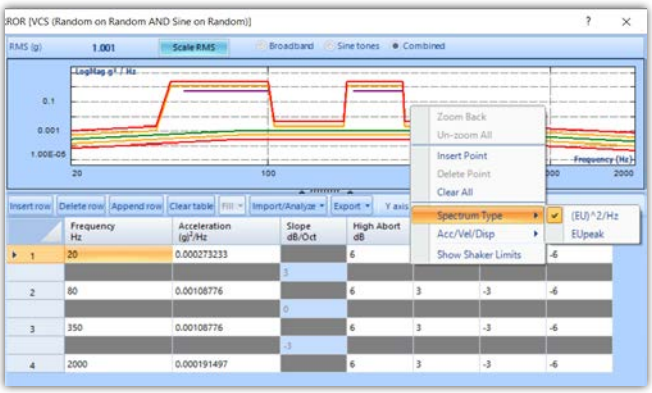


- The display sweep time of a sine tone in SoR and a narrowband in RoR





- Switch the spectrum type for sine tone and broadband in the Random profile editor.

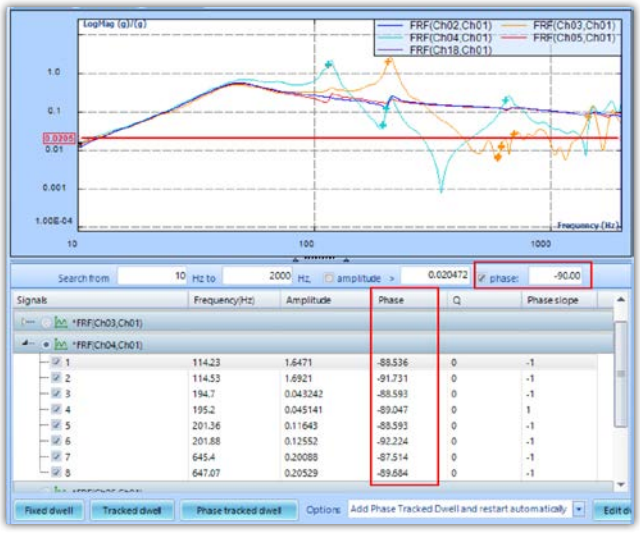


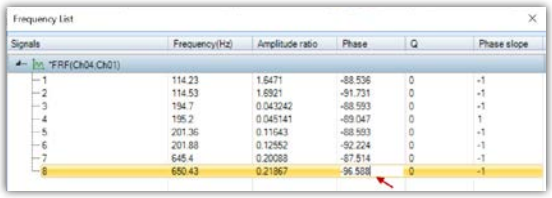
- Random Control Composite Window: RMS of signals is calculated from the whole range. Frequency range is not displayed. This is different from other types of display windows.

- Includes SoR profiles in the report.

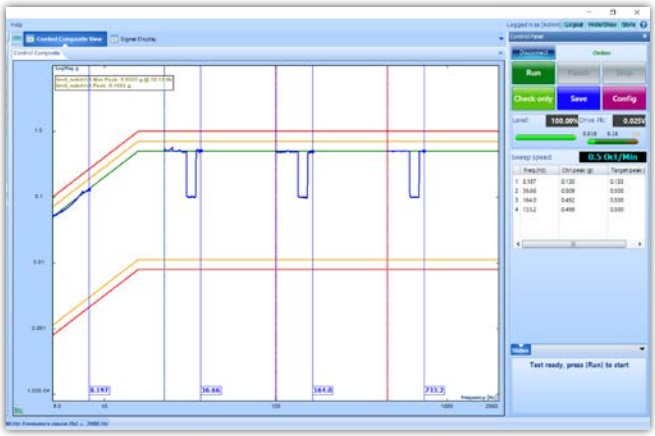
Sine/RSTD/Multi-sine

- Search for frequencies with a specified phase for phase tracking. Users can also modify the frequency list before tracking starts.

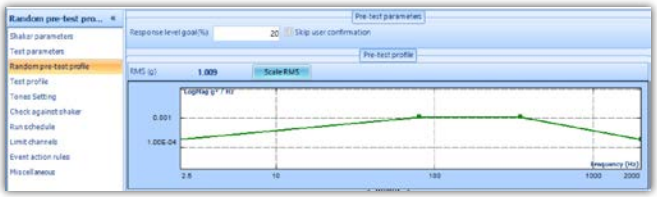




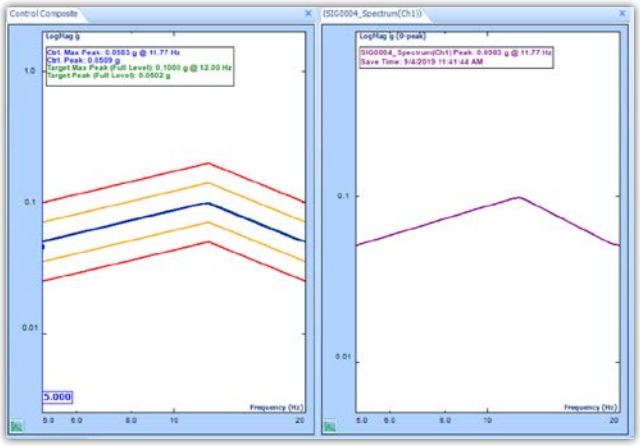
- Notching in multi-sine control



- Skip pre-test user confirmation in multi-sine

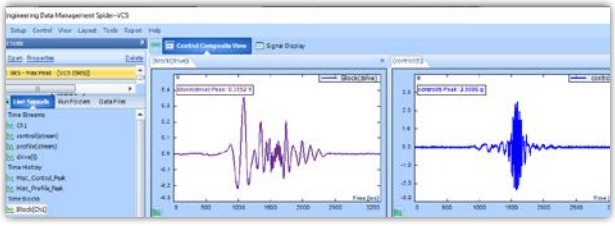


- Display maximum peak of saved sine spectrum and display both the current and maximum peak of live sine spectrum



Shock/TTH/SRS/Earthquake Testing/Transient Random

- An option to skip noise measurement in TTH pre-test
- Display peak values of time signals in SRS



- Includes the octave and damping ratio when creating the TTH sine beat

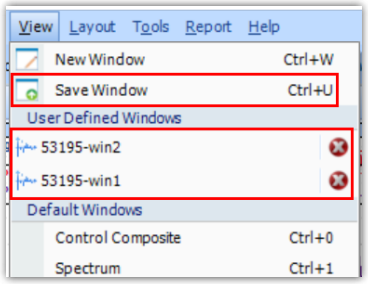
TWR

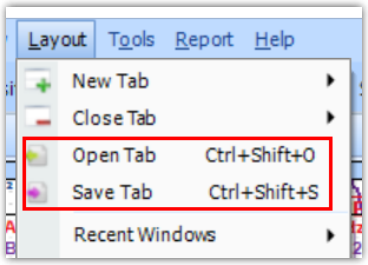
- Improved profile import in EDM TWR (with Waveform Editor)
- Import multiple signals in a file as TWR profiles

General Improvements

"Save Tab" and "Save Window as User-defined" Preserve Display Settings.

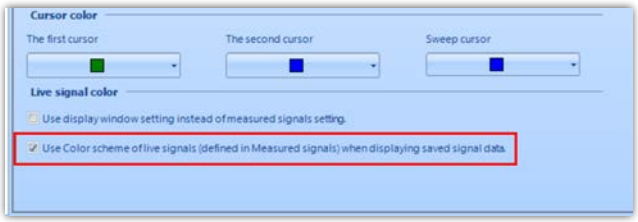
Opening a tab or opening a user-defined window will restore the display settings and signal display.

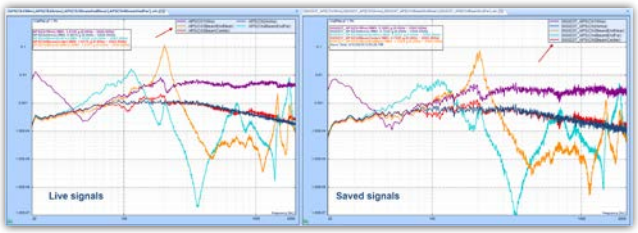




Users Can Extend Color Scheme of Live Signals to Saved Signals

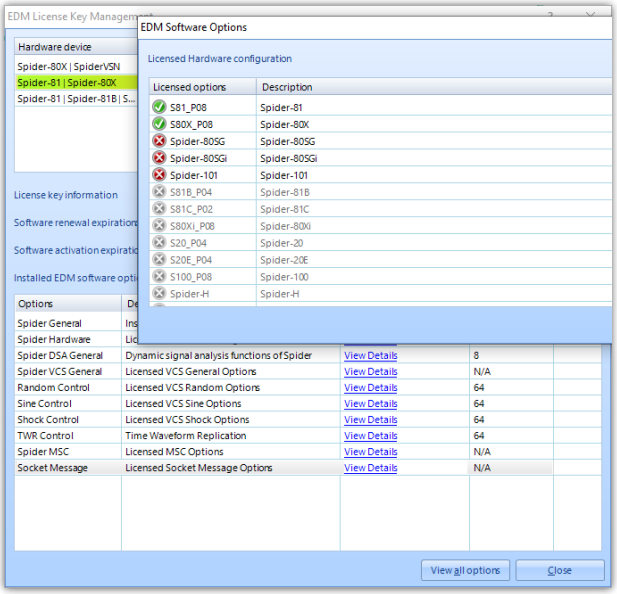
At times, comparing the data from channels over multiple runs is necessary. However, for most other times, the comparison between different channels for various runs finds more use. To help the latter scenario, an option to extend the color scheme of live signals has been extended to the saved signals.



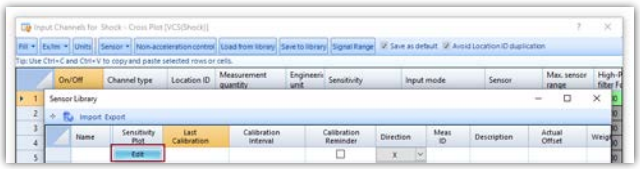


Available in all EDM modules, this feature can be enabled or disabled depending on the type of signal data that needs to be compared.

Color Icons in License Key Manager



Sensitivity Plot Added as Property of Sensor Library



Bug Fixes and Performance Enhancements

- Add signal names in the error message for duplicated FRF signals in Measured Signals Setup
- "Next Entry" action can be triggered by DIO

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	2/02/2019
Release	EDM 8.1	CI 8.1.0.1	11/13/2019

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
Spider-80X/80Xi	
EDM Testing 8.1.0.x	8.1.0.x
Spider-81 (v7.x)	
EDM Testing 8.1.0.x	8.1.0.x
Spider-81B (v7.x)	
EDM Testing 8.1.0.x	8.1.0.x
Spider-80SG/SGi	
EDM Testing 8.1.0.x	8.1.0.x
Spider-20/20E	
EDM Testing 8.1.0.x	8.1.0.x

Product and Software Version	Firmware Versions
CoCo-80	
EDM 6.0.2.x	4.0.x
CoCo-80X/90X	
EDM Testing 8.1.0.x (EDM CoCo for DSA)	1.6.x

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