CRYSTAL INSTRUMENTS

EDM 9.1

Engineering Data Management Software Release Notes

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

www.crystalinstruments.com | info@go-ci.com

TABLE OF CONTENTS

RELEASE HIGHLIGHTS 4

Introducing Spider-80Ti for Temperature Measurements (Supports RTDs and Thermocouples) 4

- RTD Non-linear Correction Standard 4
- K-type Thermocouple Measurements and Cold Junction Compensation 4
- Temperature Measurements – User Selectable Sampling, Averages, Range-based Gain Adjustment and Numeric Display 4

Introducing Spider-101i and EDC Software – New Temperature and Humidity Controller Hardware and Software 4

- Equipment Configuration Import/Export 5
- Powerful Account Management on EDC 5
- Run Test in Monitor Mode 5
- Detailed Alarm Detection 5
- Support for Third-party Modules 5
- PID Self Tuning 5

Introducing EDM Cloud – Cloud-based Test Monitoring and Storage 6

- Introducing Crash Control Test in EDM-VCS 6

Introducing Control Null in MIMO Random 6

Introducing Limiting in MIMO Random and MIMO Sine 7

- MIMO Random – Limit 7
- MIMO Sine – Limit 7

Deploying Spiders as a Shutdown Protection System 7

Automatically Convert Time Domain Recordings to Random or Sine on Random Profiles with Post Analyzer (PA) 8

Introducing Rosette Configuration Measurement of Strain Gages 8

- Rectangular Rosettes 8
- Delta Rosettes 8
- Custom Rosettes 8

Spider-80SG Supports IEPE Sensors 9

Introducing In-line Charge Amplifier Support for Spider-80SG & Spider-80SGi 9

Introducing “EDM-Vibration Utilities” Mobile App 9

NEW FEATURES 9

New Features in EDM-VCS Vibration Control Software 9

- Introducing Amplifier Control Software in EDM-VCS 9
- Ability to Analyze Multiple Waveforms to Generate FDS Profile 10
- Introducing New Type of COLA Output for SoR Test 10
- Introducing Variable Sweep Rate of a Sine Tone in SoR 10
- Te & TE Calculations Support MIL-STD-810 Variants (810F, 810G, 810G + CHG1, 810H) 10
- Easily Create Envelope of Imported Spectrum Signal to Create a Random Profile 11

New Features in MIMO Vibration Control Software 11

- Introducing Minimum Energy Option in MIMO Random 11
- Visually Selecting Shaker Table Config in MIMO VCS 11

New General Features 11

- Introducing a Tech Support Log File 11
- Introducing Reports with Signals in Text Format 12
- Introducing the Enhanced Peak Marker Functionality 12
- Introducing Overlay & Comparison of Same Signal from Different Run Folders to a Report 12
- Introducing Peak Hold Average Type in Waveform Editor 12
- Switch Spider Systems with Spider-80SG, Spider-80SGi & Spider-80Ti Front-ends 12
- Specify the Network Adapter for Communication with Spider 13
- Introducing Hardware Self-Test Reminders Feature 13
- Automatically Save Error Code When TEDS Detection Fails 13

Major Improvements 14

EDM Vibration Control Software 14
- Improvements in Random 14
- Improvements in Sine/RSTD/Multi-sine 14
- Improvements in Shock/TTH/SRS/Earthquake Testing/Transient Random 14

EDM MIMO Vibration Control Software 14
- MIMO VCS Profile - Short Label & Long Name 14
- Added Average to the PC Math Signals in MIMO VCS 15

General Improvements 15
- Monitor the Network Traffic 15
- Display FRF Signals in dB with Customized Reference 15
- Report Enhancements - Saving Reports to Customized Locations (including Run Folder) 15
- Auto Download and Auto Export Recordings to Customized Formats 15
- “Open View” Supports Multiple Tabs & Files 16

Software Release History 17

System Requirements 17

Minimum System Requirements: 17

Recommended System Requirements (Minimum for Spider Systems Higher than 16 Channels): 17

Version Compatibility 17

RELEASE HIGHLIGHTS

Introducing Spider-80Ti for Temperature Measurements (Supports RTDs and Thermocouples)

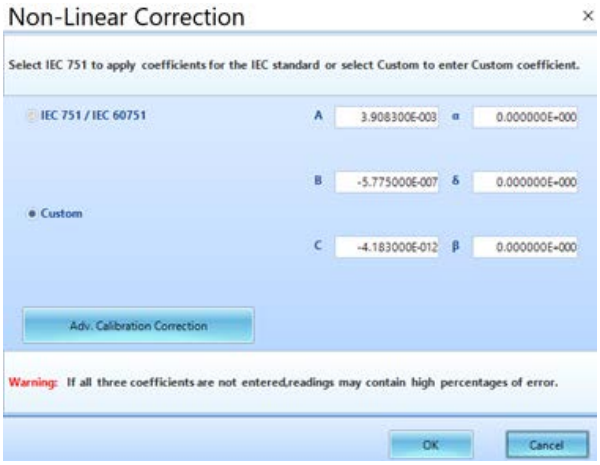
The new EDM 9.1 release and Spider-80Ti hardware supports RTD (PT 100) and thermocouple (k-type) measurements. An individual Spider-80Ti card supports 16 channels of measurements.

RTD Non-linear Correction Standard

EDM 9.1 has built-in non-linear correction for RTD PT 100 measurements which follows the IEC 60751 Standard. This ensures highly accurate measurements from RTD sensors.

Location ID	Measurement quantity	Engineering unit	Sensitivity	Input mode	Non-Linear correction
Tp1	Temperature	°C	N/A	RTD PT100	IEC 751/IEC607
Tp2	Temperature	°C	N/A	RTD PT100	IEC 751/IEC60751 Custom
Tp3	Temperature	°C	N/A	RTD PT100	IEC 751/IEC60751

EDM 9.1 allows users to set custom RTD coefficients for a custom non-linear correction. The A, B and C values can be entered under the custom option.



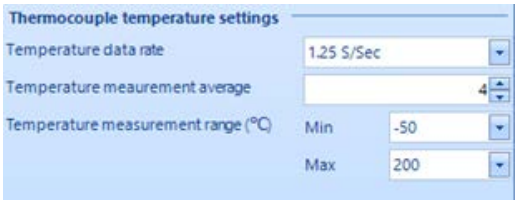
EDM 9.1 also provides advanced linearized offset correction over a range of temperatures under the Adv. Calibration Correction option. This creates a linearized offset correction between the two breakpoint values, further ensuring the accuracy of the calculations.

K-type Thermocouple Measurements and Cold Junction Compensation

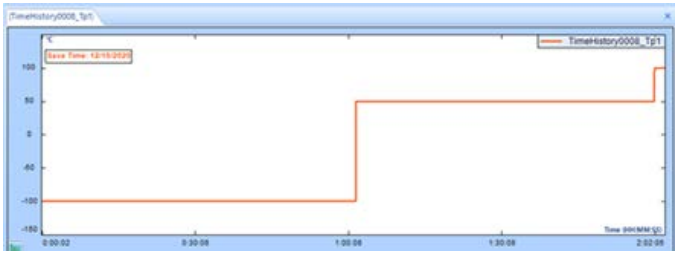
EDM 9.1 and the Spider-80Ti features a built-in cold junction compensation routine that measures the ambient temperature with a high precision temperature sensor. The system uses this information to compensate for not having the cold junction physically at 0°C. The compensation allows the Spider-80Ti to use the NIST coefficients for the K- Type thermocouple measurements and helps EDM 9.1 accurately interpret changes in voltage measurements to the corresponding temperature measurements.

Temperature Measurements – User Selectable Sampling, Averages, Range-based Gain Adjustment and Numeric Display

EDM 9.1 introduces flexibility and options for users to tailor measurements according to an application. Users can set test parameters for temperature measurements independent of any other module present in the Spider system.



The system automatically sets the gain value to improve the accuracy of the measurements based on the temperature range set and expected inputs from sensors. All temperature measurements are recorded as time histories, which allows users to review past data during a current test run while actively collecting new live data. Live data can also be displayed in numeric form.



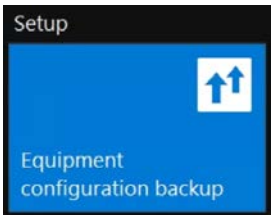
Introducing Spider-101i and EDC Software – New Temperature and Humidity Controller Hardware and Software

The EDM 9.1 release introduces the rugged new Spider-101i controller accompanied with powerful new EDC software. The Embedded Device Controller (EDC) software supports various features for running temperature and humidity chambers.

The Spider-101i is a compact temperature and humidity controller. Featuring an industrial enclosure, the compact and robust Spider-

101i device easily integrates with a temperature chamber.

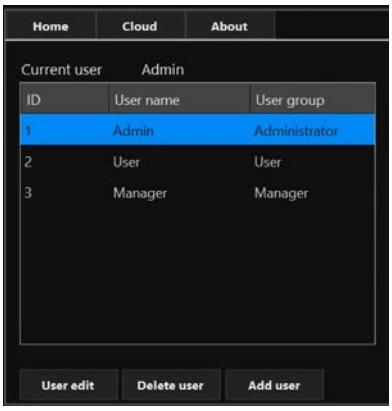
Equipment Configuration Import/Export



Equipment configuration files specific to each chamber can be created and an option to import/export these files is available. The equipment configuration file can be created and easily ported to another system or software for powering up another test chamber with ease.

Powerful Account Management on EDC

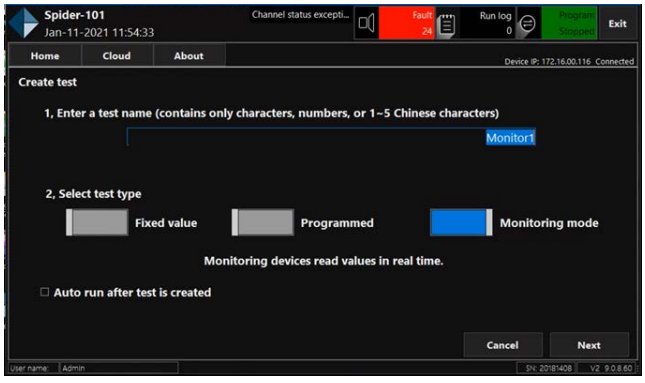
EDC software introduces three levels of account management tiers (Admin, Manager and User).



The tiered approach allows configuration of privileges for user types to ensure a safe operation of the chamber and to avoid user errors.

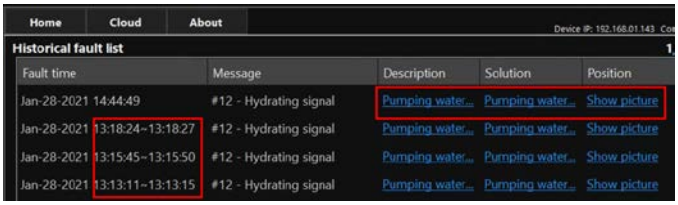
Run Test in Monitor Mode

The Spider-101i and EDC software allows users to run tests in monitor mode.



This option uses the Spider-101i as a data acquisition system to monitor the temperature and humidity of a chamber while an independent controller is used to control the temperature and humidity test.

Detailed Alarm Detection

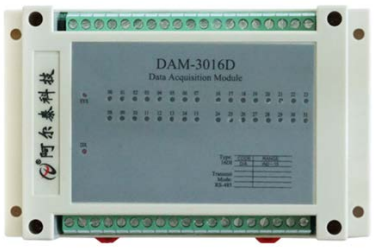


The EDC software records the start and end of an alarm, provides detailed descriptions of the alarm, possible solutions of the alarm and components of the chamber that triggered the alarm. These convenient features included in EDC software allows users to view and address alarms quickly and easily.

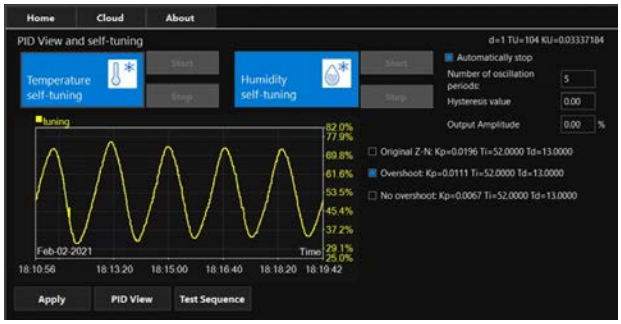
Support for Third-party Modules

EDC supports third-party modules to increase the number of channels for temperature, humidity, and digital inputs. The following modules are supported:

- DAM-3046C: 6 channels for RTD sensors
- DAM-3158A: 8 channels of current or voltage input, for humidity or pressure measurement
- DAM-3016D: 32 channels of digital input



PID Self Tuning

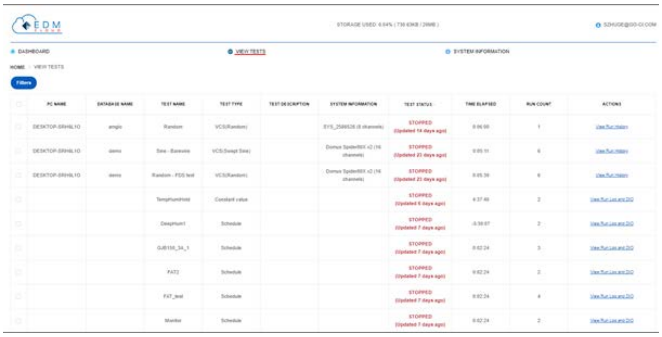


The EDC software has PID self-tuning options for temperature and humidity.

Introducing EDM Cloud – Cloud-based Test Monitoring and Storage

EDM Cloud is a premium web-hosted service provided for users to monitor the status of all vibration tests across multiple Spider controllers. EDM Cloud allows access to multiple users according to their customized account privileges to view the data and status of Spider systems. Lab administrators can simultaneously monitor multiple tests from anywhere in the world using EDM Cloud.

Storage expansion allows users to store all the required data and to share the test status and results with several individuals or groups. Support has been enabled for both EDM vibration tests and EDC temperature/humidity testing.



EDM Cloud allows users to create their own email address accounts and to invite other coworkers to form a team with groups underneath. Tests can be shared amongst members of the same group after configuring the upload parameters in the EDM VCS desktop application. EDM Cloud allows users to save and share several aspects of the test, including Status, Run Log, and Test Reports.

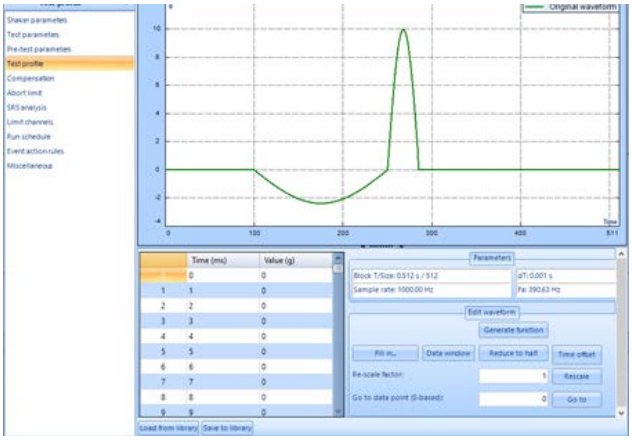
EDM Cloud can also be deployed on local servers within an organization's network. This allows an organization to limit the scope of information exchange and data sharing to users within their network to ensure data security. This feature is useful for monitoring the progress and status of environmental tests with classified information.

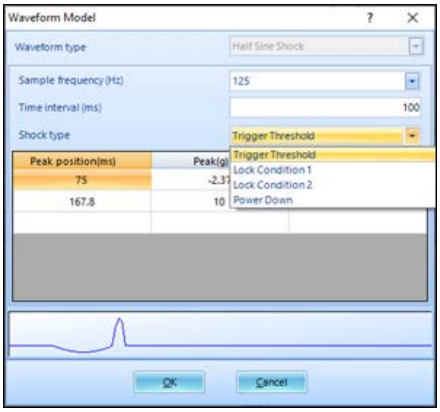
Crystal Instruments will continue investing in EDM Cloud services and will soon provide users with additional data visualization and mobile application features.

Introducing Crash Control Test in EDM-VCS

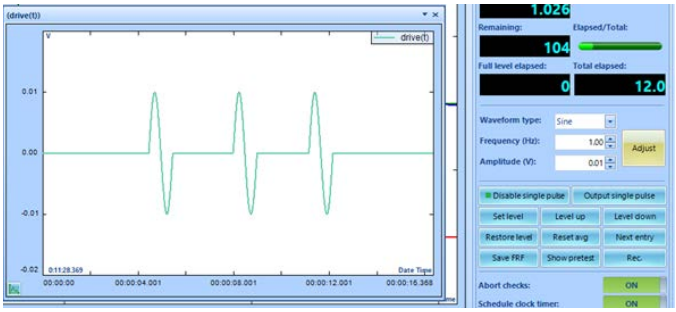
The Crash Control test is a specialized version of TTH catering to vehicular incident testing standards. With the advent of smart vehicle technology, many testing standards have been developed to simulate the conditions of a vehicle suddenly braking or crashing, resembling a high displacement shock pulse.

Crash Control currently supports four hard-coded pulse configurations, based on the Half Sine Shock criteria listed in the Vehicle Incident GB testing standard.





Crash Control is typically performed on a specialized long displacement. Due to the nature of the shock events, the shaker's armature may end up in a different ending displacement than its starting position. In order to accommodate such scenarios, the Crash Control test type also includes a second displacement channel and a manual means of sending pulses to re-adjust the displacement of the shaker back to neutral after each pulse.

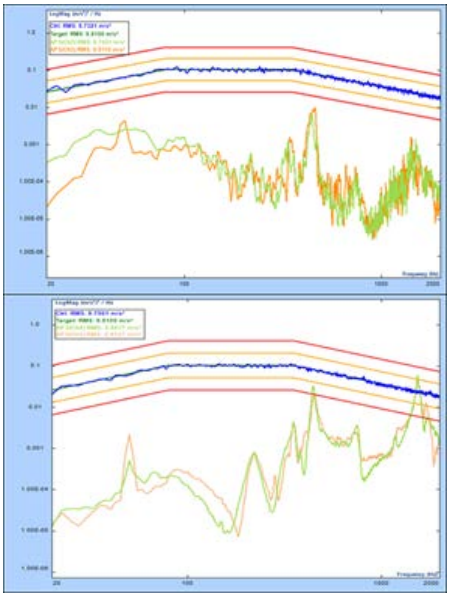


Introducing Control Null in MIMO Random

The Control Null feature allows users to perform single axis or dual axis vibration control tests on a three-axis shaker setup with a simple configuration setup in the software. With this feature, the software nulls the selected directions while maintaining the control in the desired direction(s). Sending the appropriate drives will minimize the target level of vibration for the suppressed direction(s) to achieve lowest possible response. The vibration in the dominant direction(s) will still be under control and executed at the desired target level(s).

The following results of the MIMO Random with Control null and single shaker random control illustrates the effectiveness of the MIMO Random Control Null feature. The off axes vibration with the control null is suppressed by more than 70%, compared to the

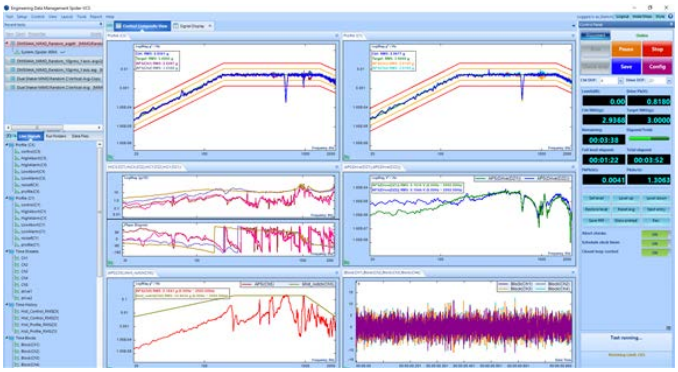
single shaker control case.



Introducing Limiting in MIMO Random and MIMO Sine

MIMO Random – Limit

The limit feature of MIMO Random provides protection for the UUT. Users can set up the limit channel(s) on the DUT with an assigned profile. Once the vibration level on the limit channel exceeds the limit profile, the drives will be notched so that the limit channel vibration will not exceed the limit.



MIMO Sine – Limit

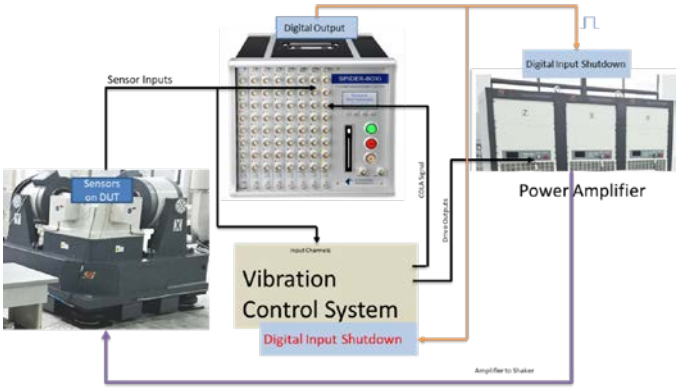
The limit feature of the MIMO Sine provides protection for the UUT. Users can set up the limit channel(s) on the DUT with an assigned profile. Once the vibration level on the limit channel exceeds the limit profile, the drives will be notched so that the limit channel vibration will not exceed the limit.

Deploying Spiders as a Shutdown Protection System

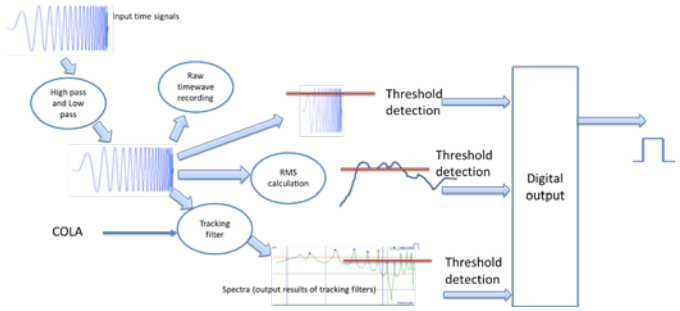
Spiders are reputed as excellent products for vibration control applications. The vibration control system typically runs the control algorithms and takes several milliseconds to respond when an abort condition is encountered. The reaction time to shut down the drive may cause severe damage to the Device Under Test (DUT).

To protect the DUT, a redundant shutdown protection system must be employed to continuously monitor the abort conditions and to abort the shaker/amplifier or the vibration control system within a small fraction of time.

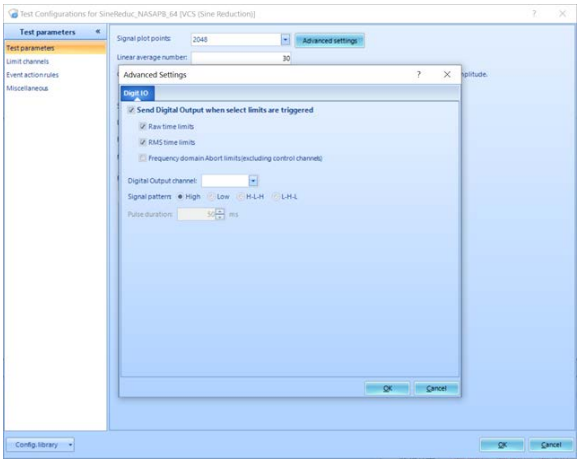
The Spider platform of products can now provide redundant shutdown protection of a shaker system that is running a valuable DUT. The shutdown is achieved in under 10ms for single module systems and under 20ms for high channel count systems.



In addition, the Spider system can be attached as a redundant system to any of the current vibration control systems.



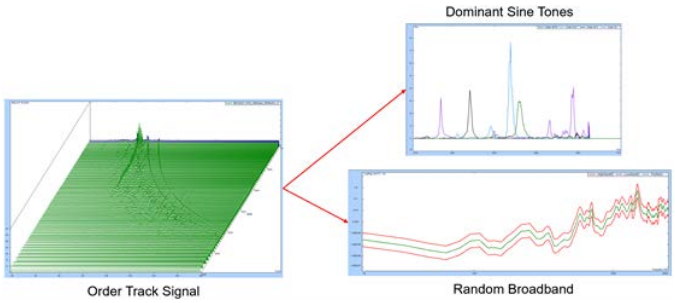
Users can define limits for raw time domain signals, RMS time signals, and frequency signals to trigger abort signals.



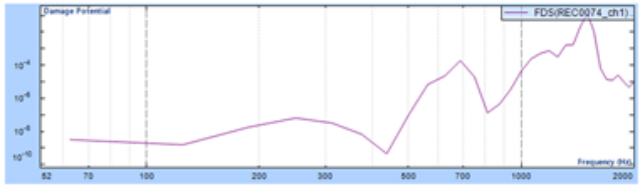
The availability of digital outputs on Spider products with configurable digital output signals enables the rapid communication of abort conditions with the principal vibration control system or the shaker/ amplifier system, providing an ideal shutdown protection system for our users.

Automatically Convert Time Domain Recordings to Random or Sine on Random Profiles with Post Analyzer (PA)

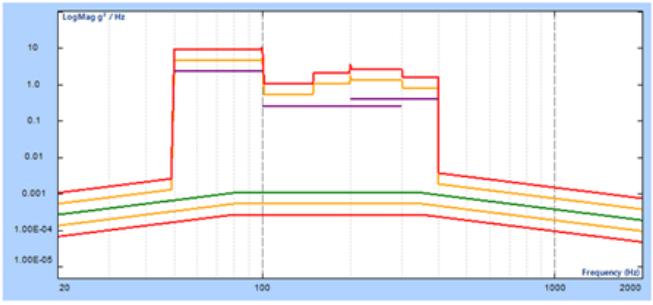
The new PA 9.1 version allows users to capture tach pulses and vibrations from rotating machinery and performs order analysis on the gathered data. Users can choose to further analyze the data to extract dominant sine tones and broadband spectrum.



Users are now able to combine the two spectral signals to create a sine-on-random signal or can use these profiles independently to excite the necessary profiles separately. In addition, users can choose to either use the profile as is or can perform accelerated life testing with FDS (fatigue damage spectrum). Users are allowed to input information about the total expected life of the DUT and the shortened testing time.



Fatigue Damage Potential



Accelerated SOR Profile

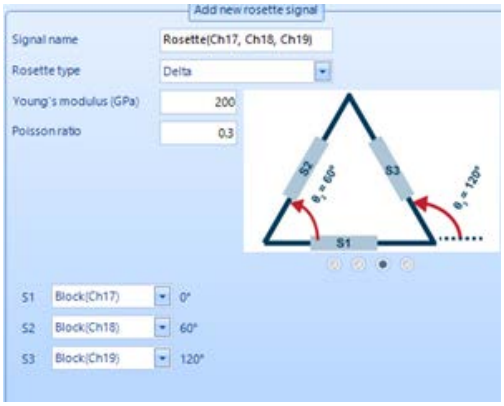
Based on user inputs and the analyzed signal, PA creates an accelerated SOR test profile with the equivalent damage of a total lifetime using the built-in FDS functions. This accelerated profile and its subsequent parameters imports into a VCS test with one click and is ready to run on a shaker.

Introducing Rosette Configuration Measurement of Strain Gages

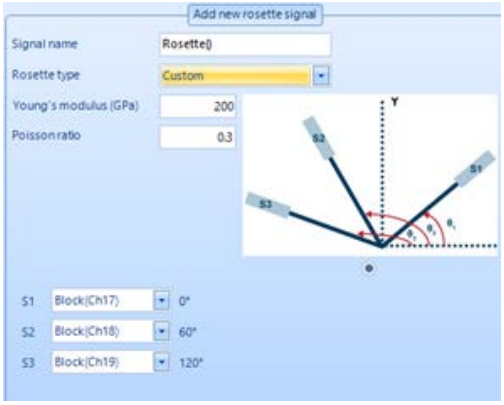
Rosette measurements are vital in strain data acquisition, and the release of EDM 9.1 provides capabilities to measure rectangular, delta or custom rosette configurations. This addition to EDM DSA allows users to measure the complete strain state of a DUT's surface.

Rectangular Rosettes

Delta Rosettes



Custom Rosettes



Various measurements including Principle Stress and Strain, Principal angle, Shear Stress and Strain are calculated from the measurements.

With these options the user can chose the option most convenient to their application and measure the strain on the DUT. The system also calculates the other stress and strain states associated with the measurements.

Spider-80SG Supports IEPE Sensors

EDM 9.1 introduces IEPE measurements on the new Spider-80SG (version 2) front-end. This new feature allows the Spider-80SG (version 2) to virtually support all types of sensors including IEPE Sensors, DC Excitation sensors, MEMS sensors, strain gauges and other ratiometric and bridge-based sensors.

The new Spider-80SG (version 2) has BNC terminals to interface directly with BNC cables or through the breakout box for open wire terminals.

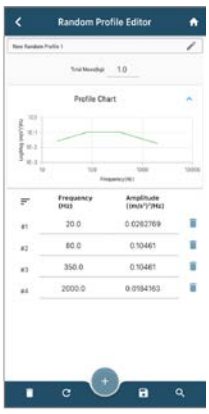
Introducing In-line Charge Amplifier Support for Spider-80SG & Spider-80SGi

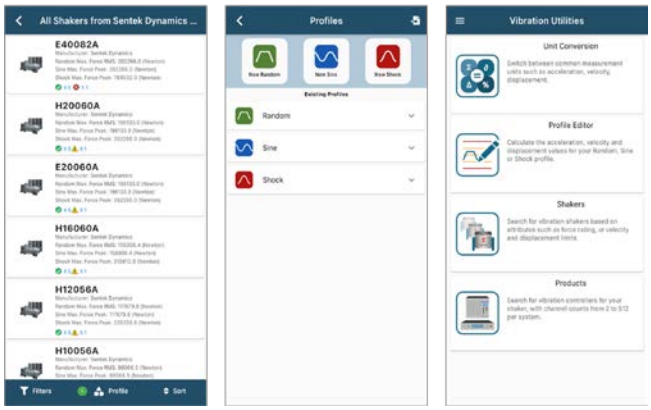
EDM 9.1 enables the Spider-80SG and Spider-80SGi to use in-line charge amplifiers to support charge sensors. Users can enable this input mode by navigating to ***Setup->Input Channels->Input Mode*** from the drop-down menu to select ***In-Line Charge Converter.***

	On/Off	Location ID	Measurement quantity	Engineering unit	In-Line charge converter sensitivity	Sensitivity	Power supply	Input mode
16	On	Ch16	Acceleration	g	2 mV/pC	4903.32500 (pC/g)		In-Line Charge Converter
17	On	Ch17	Acceleration	g	2 mV/pC	4903.32500 (pC/g)	2.5V	In-Line Charge Converter
18	On	Ch18	Acceleration	g	2 mV/pC	4903.32500 (pC/g)	2.5V	IEPE
19	On	Ch19	Acceleration	g	2 mV/pC	4903.32500 (pC/g)	2.5V	AC-Differential
20	On	Ch20	Acceleration	g	2 mV/pC	4903.32500 (pC/g)	2.5V	DC-Differential
21	On	Ch21	Acceleration	g	2 mV/pC	4903.32500 (pC/g)	2.5V	In-Line Charge Converter
								Bridge based Sensor

Introducing "EDM-Vibration Utilities" Mobile App

Crystal Instruments in partnership with our sister shaker company Sentek Dynamics announces the release of the Vibration Utilities mobile app on iOS and Android. This app provides calculation features for sizing your vibration profile (Random, Sine or Shock) and searches through our catalogue of shakers and controllers for the best fit.





Enter your vibration profile into the Vibration Utilities app to calculate the projected force, acceleration, velocity, and displacement needs. Add in the mass of the test object and the app will search through its catalogue of shakers for the most appropriate one. Attributes such as the shaker force rating, velocity and displacement limits, and armature mass will be accounted for in the calculation.

NEW FEATURES

New Features in EDM-VCS Vibration Control Software

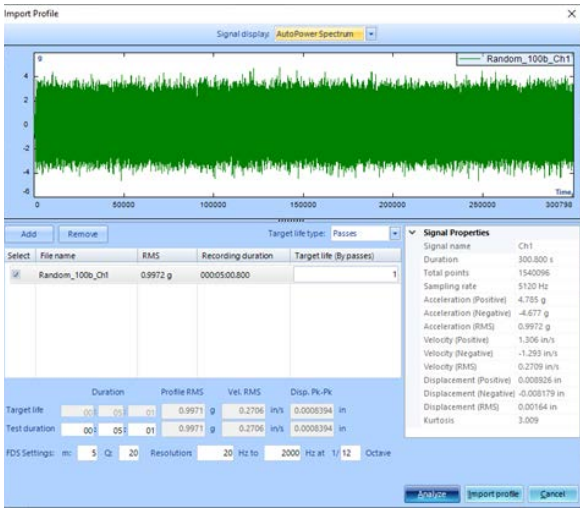
Introducing Amplifier Control Software in EDM-VCS

The amplifier control software is designed for specific Sentek Dynamics amplifier models. It features a flexible display, a user-friendly UI, and an interlock feature to prevent or stop the controller from running when the amplifier is not in an operating state.

Ability to Analyze Multiple Waveforms to Generate FDS Profile

The ***Analyze from Signal*** option under the ***Test Profile*** page opens a dialog to analyze and import a previously recorded time stream using Fatigue Damage theory. It is useful for calculating a Random PSD containing the same fatigue damage levels as the time stream, with an additional feature to extrapolate the testing time duration to a lifetime duration.

At a high level, the time domain signal data is processed into a Random PSD spectrum. It then converts the spectrum into Damage Potential using criteria proposed by Henderson and Piersol 95. Multiple time waveform recordings can be combined together, and then the final spectrum can be scaled.

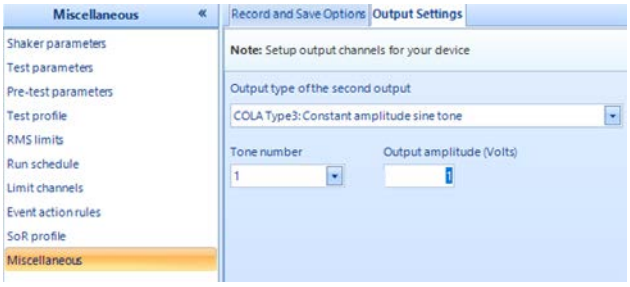


Given the length of the recording (Record file), EDM can replicate the signal to simulate a lifetime of environmental stress (Target life), in the desired testing time span of (Test duration).

$$\frac{RMS_{Test}}{RMS_{Life}} = \left(\frac{T_{Life}}{T_{Test}}\right)^{1/m}$$

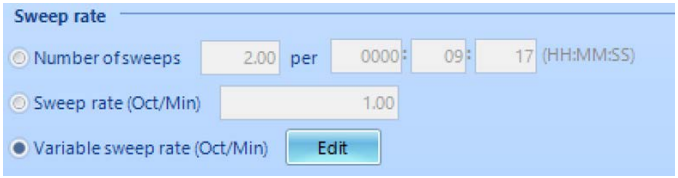
Introducing New Type of COLA Output for SoR Test

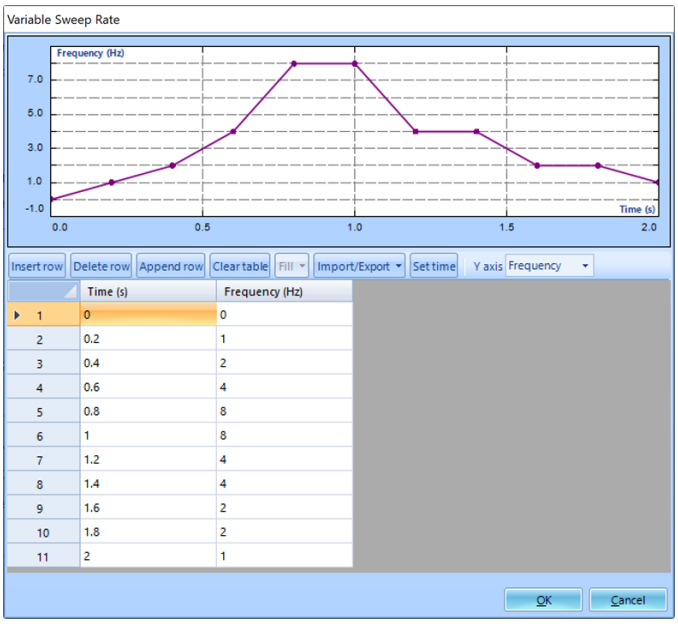
A sine wave with constant amplitude and frequency following any of the sine tones of an SoR test.



Introducing Variable Sweep Rate of a Sine Tone in SoR

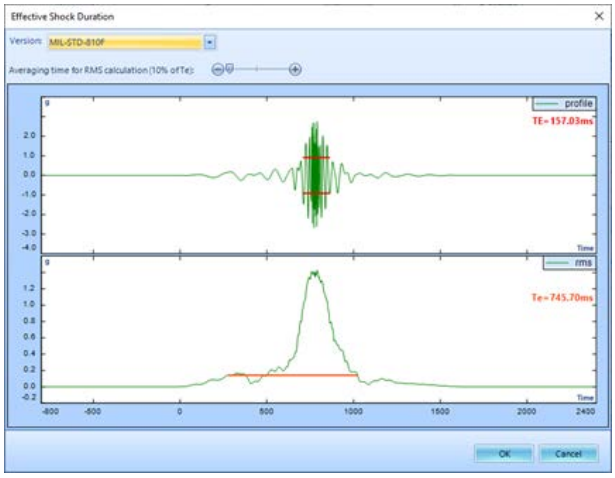
Variable sweep rate of each tone in a SoR profile is introduced in the EDM 9.1 release.





This feature helps users accurately simulate the rotating speed of a real-world object with sweep speed that is typically variable.

Te & TE Calculations Support MIL-STD-810 Variants (810F, 810G, 810G + CHG1, 810H)



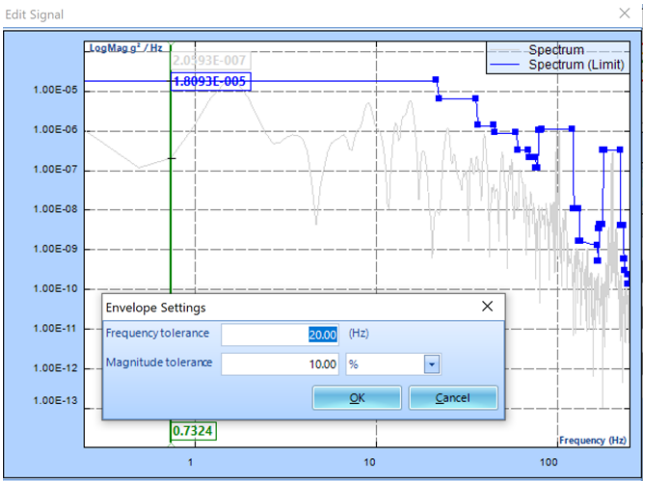
Te and TE are two standards for measuring the length of a shock pulse, dictated by MIL-STD-810. The exact methods of calculation depend on the version of the standard, as shown below:

	Te	TE
MIL-STD-810H MIL-STD-810G + CHG1 MIL-STD-810G MIL-STD-810F	Te is defined from the zero crossing for the first measurement acceleration "above the instrumentation noise floor" until the perceived termination of the shock. The minimum length of time containing the RMS time history amplitudes above 10% of peak RMS amplitude. The averaging time for the RMS computation is 10-20% of Te	The minimum length of time containing any time history magnitudes above |A_pk| / CF |A_pk| is the shock peak magnitude CF is the Crest Factor, in small intervals over the duration Te, (e.g. Te / 10). It is the maximum computed value across all intervals. Crest Factor is the ratio between peak / RMS. The minimum length of time containing any time history magnitudes above |A_pk| / 3

As both versions of the MIL-STD-810 definition are slightly open-ended, the user will need to provide some calculation parameters to calculate an exact number for both Te and TE.

The general calculation approach in both cases is to display a plot of both the pulse time waveform, and a frame-by-frame processed version of the pulse (calculating either the RMS or Crest Factor, depending on the MIL-STD-810 version). Both plots are then analyzed to derive the Te and TE estimates.

Easily Create Envelope of Imported Spectrum Signal to Create a Random Profile

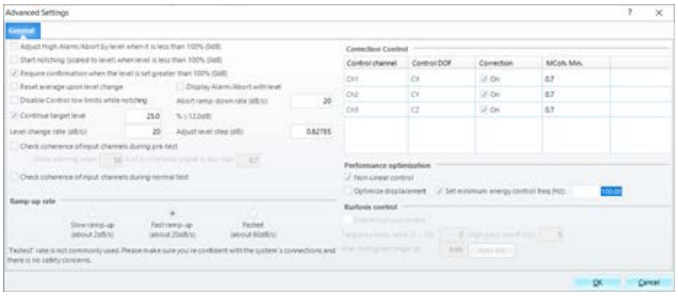


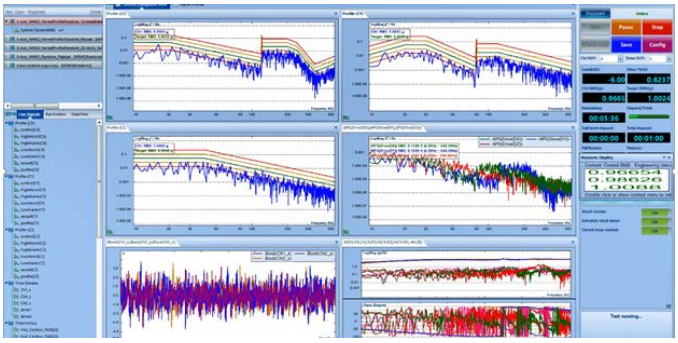
A random profile is now be easily generated using an existing spectrum signal.

New Features in MIMO Vibration Control Software

Introducing Minimum Energy Option in MIMO Random

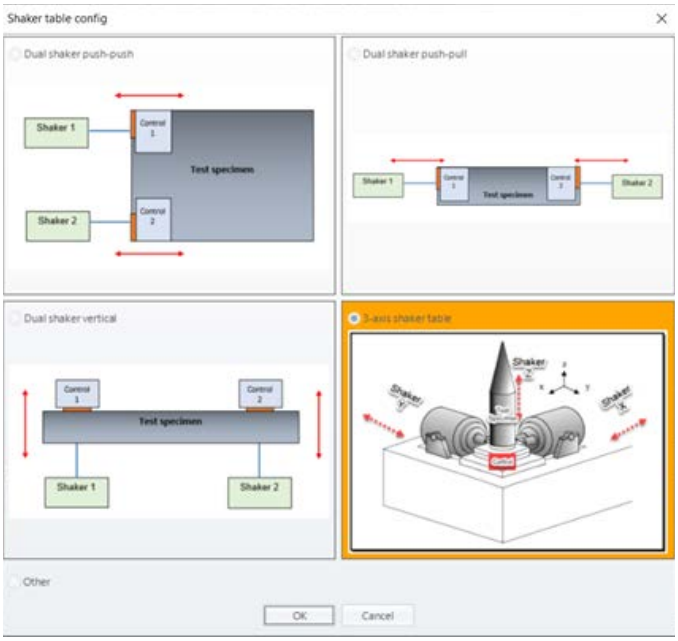
The minimum energy option of MIMO Random aids in handling the nonlinearity of a shaker table to result in a fast convergence of control.





Visually Selecting Shaker Table Config in MIMO VCS

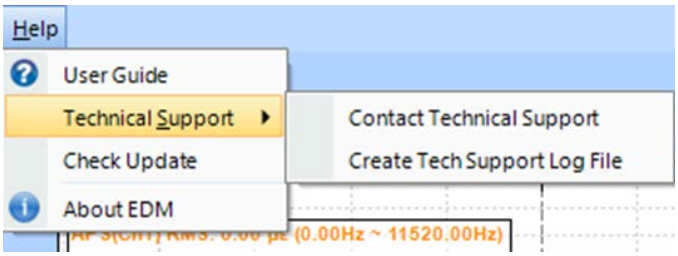
For each MIMO control type, the addition of a shaker table configuration selection window provides users with help to visually select from the available configurations. The test configuration is much easier and allows users to select from a list of pre-configured sets (e.g., push-push, push-pull, 3-axis, etc.)



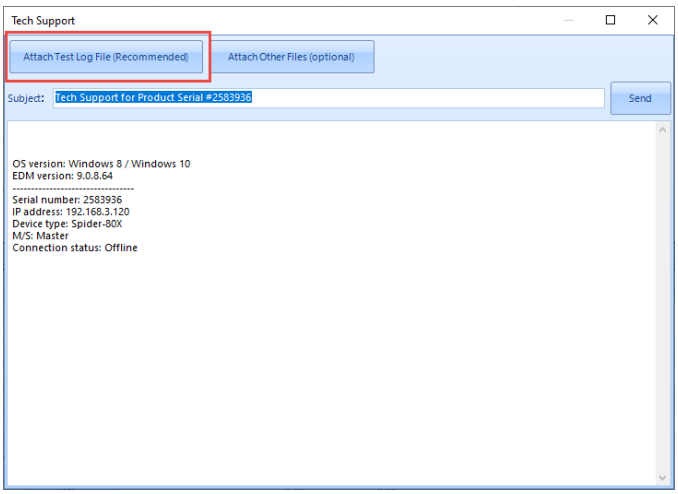
New General Features

Introducing a Tech Support Log File

Providing excellent technical support is a primary goal at Crystal Instruments. Software enhancements are developed to enhance and simplify technical support for users and technical support staff to understand and quickly resolve issues.



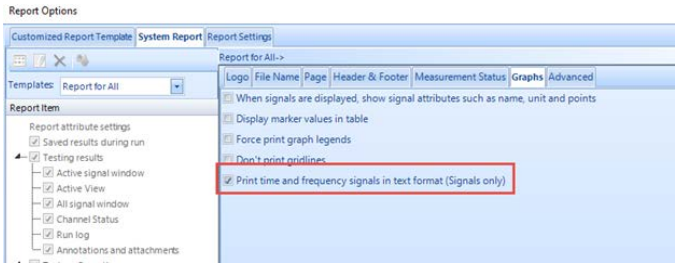
A newly added feature allows users to pack all the important data necessary for technical support. With one click, users can send essential PC information, crash logs, and application logs along with test and user settings through EDM software.



An automated email can send out with the test log file to enable quick and efficient technical support.

Introducing Reports with Signals in Text Format

Reports (Word/PDF/XML) can now consist of signals in text format in addition to the supported graphically formatted reports.



Test parameters
Frame#: 298
Block Size/Line: 1024 / 450
Average number: 8
Frequency range (fa): 23 kHz
Window: Hanning
Sampling Rate (fs): 51200 Hz
Average mode: Exponential

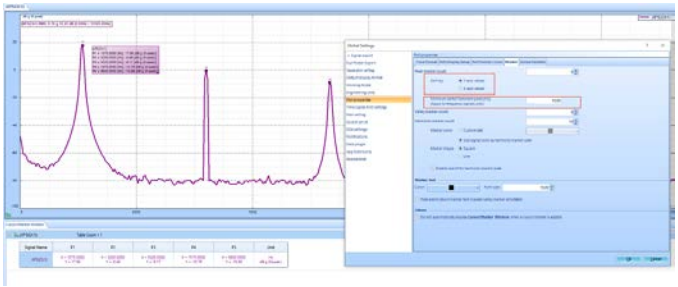
(OCT(Ch1),OCT(Ch2),OCT(Ch3),OCT(Ch4), etc.[8])

Signal Name	OCT(Ch1)	OCT(Ch2)	OCT(Ch3)	OCT(Ch4)	OCT(Ch5)	OCT(Ch6)	OCT(Ch7)	OCT(Ch8)
X:Frequency (Hz)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)	Y:Mag Pa (RMS)
1.0000E+001	6.9769E-005	8.3740E-005	1.2857E-004	5.3250E-005	7.7018E-005	8.8052E-005	1.2833E-004	8.0374E-005
1.2500E+001	7.1571E-005	8.4793E-005	7.9915E-005	9.8765E-005	9.9772E-005	8.0579E-005	1.0239E-004	1.0655E-004
1.6000E+001	7.6875E-005	6.3278E-005	9.4665E-005	8.1185E-005	8.6545E-005	8.7863E-005	8.6236E-005	9.1559E-005
2.0000E+001	6.7992E-005	6.9317E-005	1.3044E-004	8.5704E-005	8.0008E-005	1.0030E-004	7.6000E-005	7.5440E-005
2.5000E+001	8.1437E-005	8.0335E-005	1.0324E-004	9.0098E-005	8.8643E-005	7.1335E-005	9.0805E-005	1.1561E-004
3.1500E+001	8.5949E-005	1.0534E-004	9.7519E-005	1.1277E-004	1.3213E-004	9.6525E-005	1.0815E-004	1.0016E-004
4.0000E+001	7.6134E-005	1.0011E-004	8.7693E-005	8.5186E-005	9.5179E-005	9.4383E-005	1.0553E-004	1.0753E-004
5.0000E+001	1.1617E-004	1.0581E-004	1.1950E-004	1.1981E-004	1.0767E-004	1.2049E-004	1.0091E-004	1.1027E-004
6.3000E+001	4.3070E-004	4.2256E-004	4.1593E-004	3.5091E-004	2.8844E-004	2.8028E-004	2.4400E-004	3.3043E-004
8.0000E+001	1.0164E-004	1.0491E-004	1.1543E-004	1.1322E-004	1.0601E-004	8.9435E-005	1.0678E-004	8.8418E-005
1.0000E+002	1.0857E-004	1.0976E-004	1.1859E-004	1.2524E-004	1.2958E-004	1.0270E-004	1.1018E-004	1.0128E-004
1.2500E+002	1.2343E-004	1.0987E-004	1.1591E-004	1.3109E-004	1.1316E-004	9.8287E-005	1.3443E-004	1.1958E-004
1.6000E+002	4.9558E-004	1.1488E-004	1.2502E-004	1.2254E-004	1.2819E-004	1.2487E-004	1.3003E-004	1.2044E-004
2.0000E+002	7.5609E-004	1.2390E-004	1.3864E-004	1.4025E-004	1.2331E-004	1.2377E-004	1.3329E-004	1.1944E-004
2.5000E+002	3.0604E-004	1.3975E-004	1.4454E-004	1.5586E-004	1.4627E-004	1.5326E-004	1.3969E-004	1.4325E-004
3.1500E+002	1.2906E-003	1.4696E-004	1.6357E-004	1.6735E-004	1.5132E-004	1.6193E-004	1.6066E-004	1.5208E-004
4.0000E+002	1.3692E-003	1.6230E-004	1.7475E-004	1.7399E-004	1.6562E-004	1.6858E-004	1.7204E-004	1.7417E-004
5.0000E+002	1.1566E-003	1.7372E-004	1.8578E-004	1.8414E-004	1.9952E-004	1.8755E-004	1.8414E-004	1.8685E-004
6.3000E+002	8.7960E-004	1.9438E-004	2.0643E-004	2.0561E-004	2.0340E-004	2.0837E-004	2.1058E-004	2.0671E-004
8.0000E+002	4.5974E-004	2.1835E-004	2.2879E-004	2.3447E-004	2.2874E-004	2.3516E-004	2.2880E-004	2.3381E-004
1.0000E+003	9.0615E-004	2.5085E-004	2.6574E-004	2.5768E-004	2.5312E-004	2.6790E-004	2.4998E-004	2.4709E-004
1.2500E+003	9.1835E-004	2.9166E-004	3.0804E-004	2.8169E-004	2.8502E-004	2.8301E-004	2.8297E-004	2.7916E-004
1.6000E+003	7.4060E-004	3.1963E-004	3.4011E-004	2.9852E-004	3.1469E-004	3.1120E-004	3.0495E-004	3.0375E-004
2.0000E+003	7.2891E-004	3.6026E-004	3.5775E-004	3.3581E-004	3.4697E-004	3.7333E-004	3.3461E-004	3.6148E-004
2.5000E+003	7.6283E-004	3.9627E-004	4.0532E-004	3.8454E-004	3.8721E-004	4.2125E-004	4.1139E-004	3.6880E-004

For signals such as SRS or octave, it is convenient to print the report in the text format for easier reading and to run automated scripts when needed.

Introducing the Enhanced Peak Marker Functionality

The EDM 9.1 release significantly upgrades the Peak Marker function.

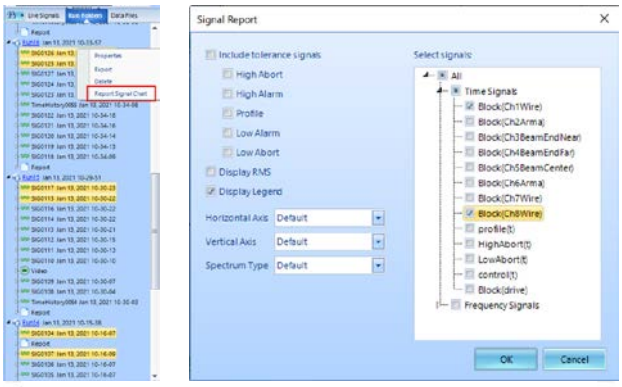


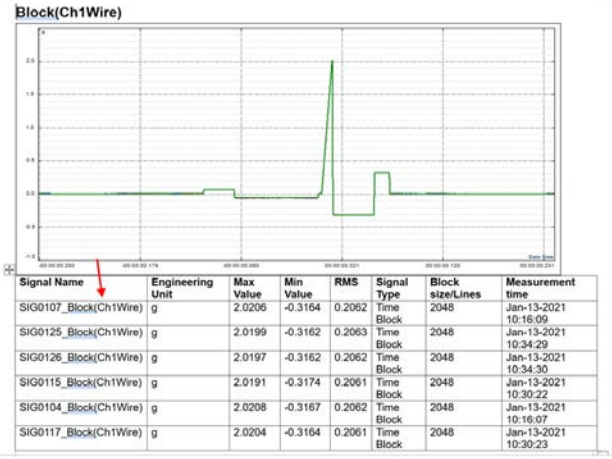
Options are available to pick peak markers with respect to the amplitudes or time/frequency axis. This feature greatly customizes the selection of peaks, especially on a spectrum, where either the peaks of amplitude or the peaks in the low frequency zone are of interest.

In addition, an option is also available to define a delta f between the detection of peaks. This successfully avoids the detection of peaks caused by noise and points to peaks of interest.

Introducing Overlay & Comparison of Same Signal from Different Run Folders to a Report

EDM 9.1 introduces a convenient way to overlay the same signal of the same channel from multiple run folders and allows users to create a report.





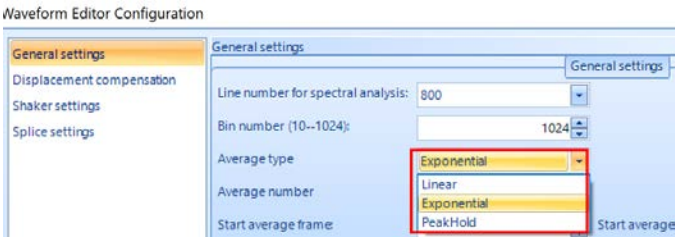
Signal Name	Engineering Unit	Max Value	Min Value	RMS	Signal Type	Block size/Lines	Measurement time
SIG0107_Block(Ch1Wire)	g	2.0206	-0.3164	0.2062	Time Block	2048	Jan-13-2021 10:16:09
SIG0125_Block(Ch1Wire)	g	2.0199	-0.3162	0.2063	Time Block	2048	Jan-13-2021 10:34:29
SIG0126_Block(Ch1Wire)	g	2.0197	-0.3162	0.2062	Time Block	2048	Jan-13-2021 10:34:30
SIG0115_Block(Ch1Wire)	g	2.0191	-0.3174	0.2061	Time Block	2048	Jan-13-2021 10:30:22
SIG0104_Block(Ch1Wire)	g	2.0208	-0.3167	0.2062	Time Block	2048	Jan-13-2021 10:16:07
SIG0117_Block(Ch1Wire)	g	2.0204	-0.3164	0.2061	Time Block	2048	Jan-13-2021 10:30:23

This feature is primarily helpful in the VCS tests to conveniently view the difference between the same signal during multiple runs.

It is also helpful in DSA to create a report for the changes in the signal from different runs on different products.

Introducing Peak Hold Average Type in Waveform Editor

Peak hold average type is introduced in the Waveform Editor.



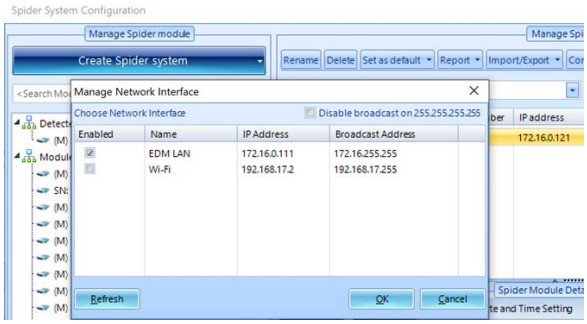
This feature allows users to compute the spectrum of a given time stream using the peak hold average.

Switch Spider Systems with Spider-80SG, Spider-80SGi & Spider-80Ti Front-ends

The introduction of the new Spider-80Ti and the current Spider-80Xi and Spider-80SGi modules allow various combinations of systems to use. The new EDM 9.1 software allows users to seamlessly transition between Spider systems with ease and automatically updates the input channel settings. This helps users run old or existing tests with new capabilities such as temperature measurements.

Specify the Network Adapter for Communication with Spider

EDM 9.1 introduces a new feature that allows users to specify the network adapter at which a Spider is located.

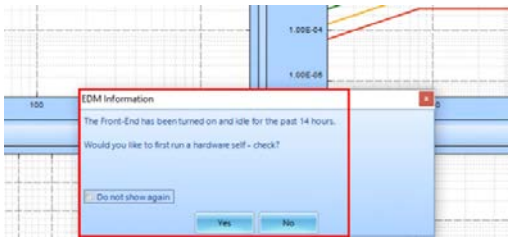


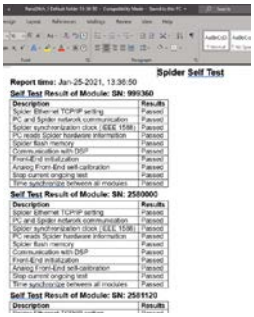
This selection allows network traffic to be routed using the selected adapter. When multiple adapters are present on a computer, EDM typically selects the default adapter or the adapter with the highest priority metric.

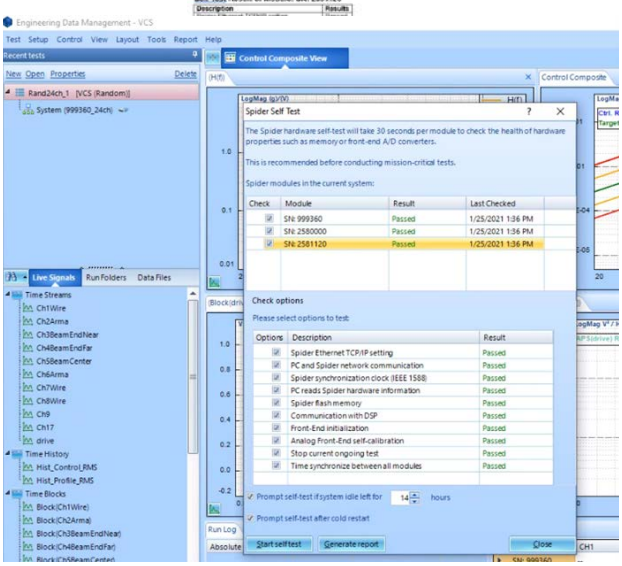
With this introduction, users can select a non-default network adapter while other apps on the PC use the default network adapter for communication, which allows internet applications and EDM to run seamlessly.

Introducing Hardware Self-Test Reminders Feature

Users should ideally perform a hardware self-test on a Spider unit after it has been idle for a very long time. There are also times when it is important to perform a hardware self-test on a Spider after a cold start.







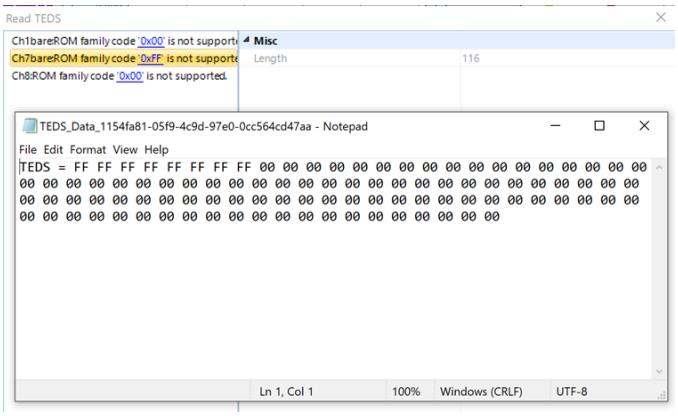
A hardware self-test ensures that all components of the hardware are working well and ensures the accuracy of the measurements. Minor drifts in the ADCs are also corrected to ensure highly accurate measurements.

This new feature helps users identify scenarios where a hardware self-test is needed and performs the hardware self-test upon a user's input.

Automatically Save Error Code When TEDS Detection Fails

The TEDS feature in EDM is provided for sensors with TEDS capabilities. The automatic detection of sensitivity reduces the user's time to configure the input channel setup.

TEDS detection can fail due to a variety of reasons. This new feature in EDM automatically creates a text log to represent the channels that failed along with the error code.



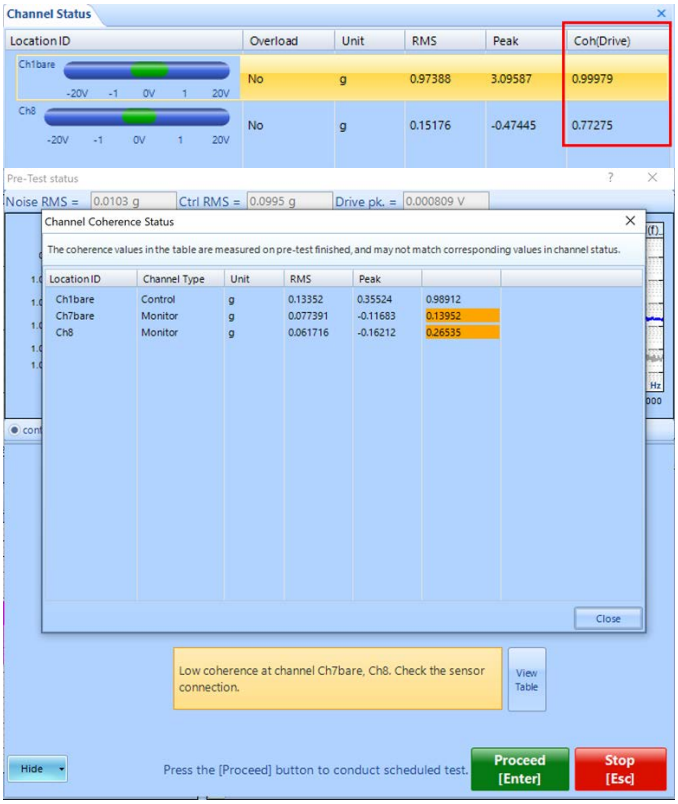
In a high channel count system setup, this convenient feature helps users identify the failed channels and take necessary actions.

MAJOR IMPROVEMENTS

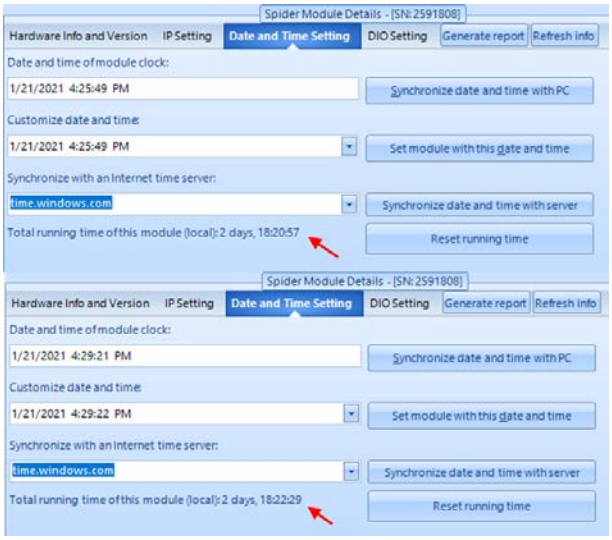
EDM Vibration Control Software

Improvements in Random

Coherence indicators for all input channels in Random/MIMO Random tests are displayed in the channel status from pre-test to the end of the test. A summary is shown at the end of pre-test to ensure the user has a clear picture of each channel status.

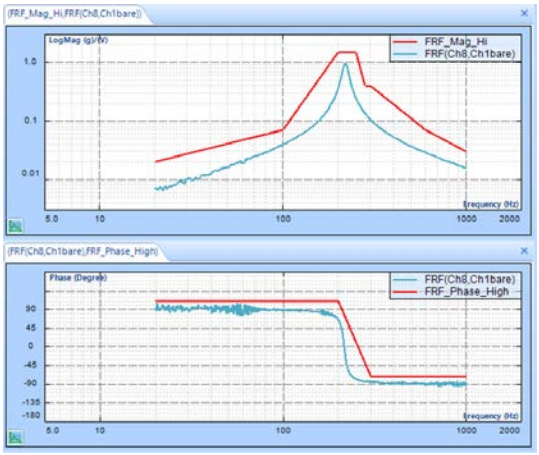


Record of Spider module running time



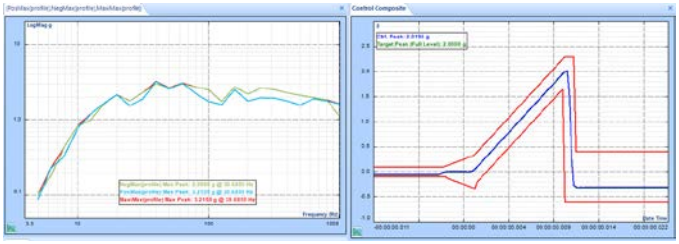
Improvements in Sine/RSTD/Multi-sine

User defined signals in Sine. Now supports spectrum, coherence, and FRF signal types. Allows customizable limits for visual comparison.



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

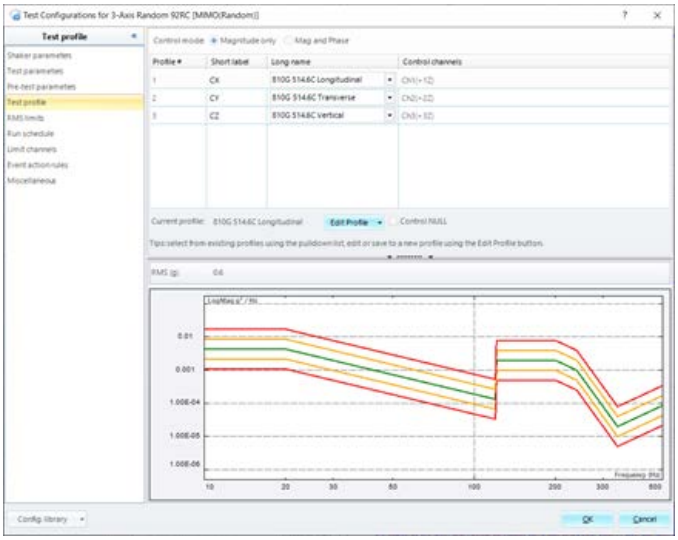
The EDM 9.1 release includes the SRS analysis of shock profiles



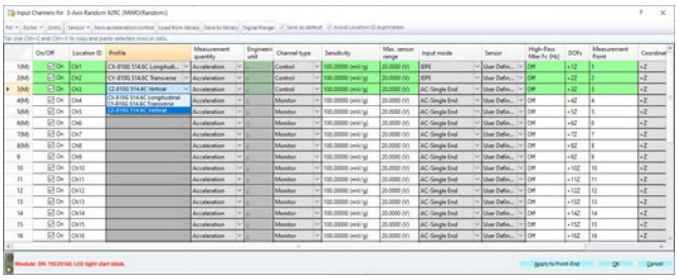
EDM MIMO Vibration Control Software

MIMO VCS Profile - Short Label & Long Name

The use of short label and long name (profile name) simplifies the assignment of a profile to the control channel. The short label defines one of the control labels, while the long name shows the profile name selected for this control. The control channel illustrates its assigned physical channel.

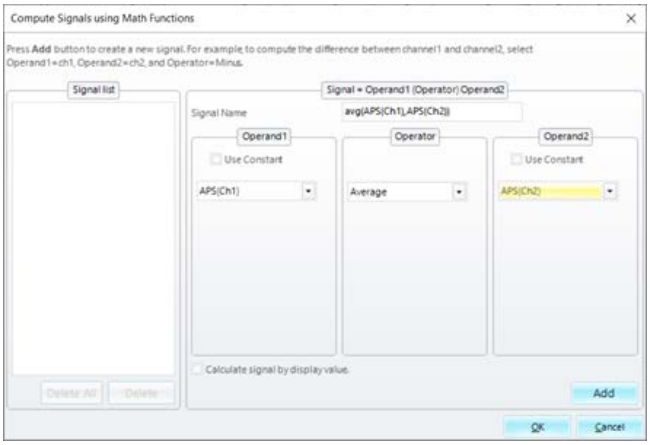


The assignment of the control label and profile is simple and straightforward, text is entered into the “Profile” column of the input channel table.



Added Average to the PC Math Signals in MIMO VCS

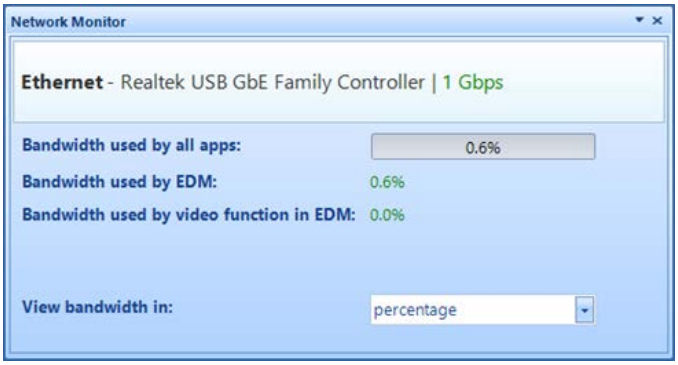
PC math signals in EDM MIMO VCS now includes average. Users can select the operands of either time or spectrum and select the average as the operator when the averaged signal is required.



General Improvements

Monitor the Network Traffic

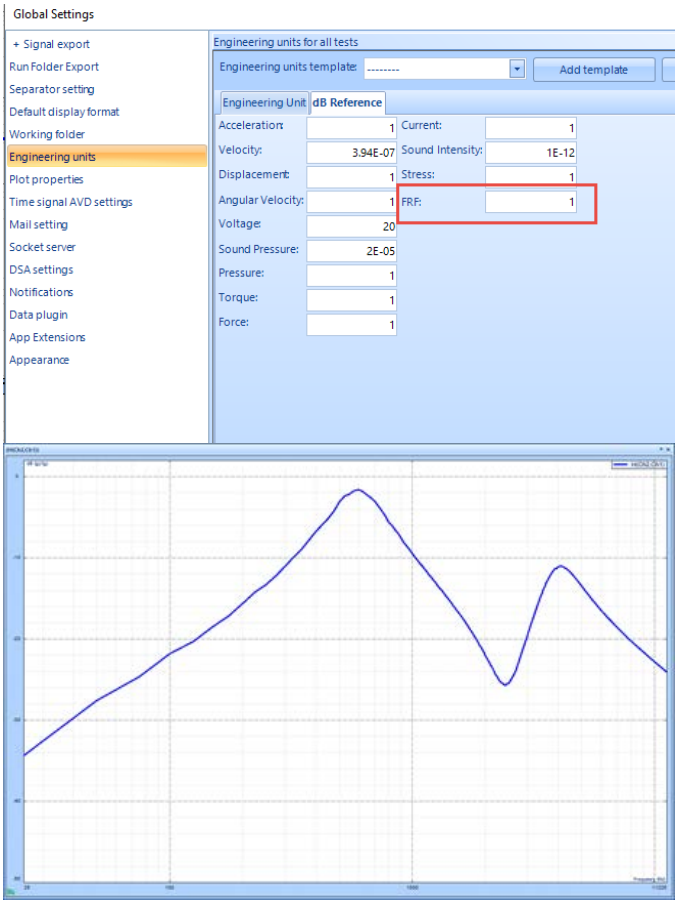
Users can monitor network traffic on EDM 9.1



This feature allows users to monitor the network traffic and ensure that sufficient bandwidth is available for EDM to communicate with the Spiders. When the bandwidth gets low, it is advisable to close other programs to ensure seamless communication and a clear display of data transmitted to EDM.

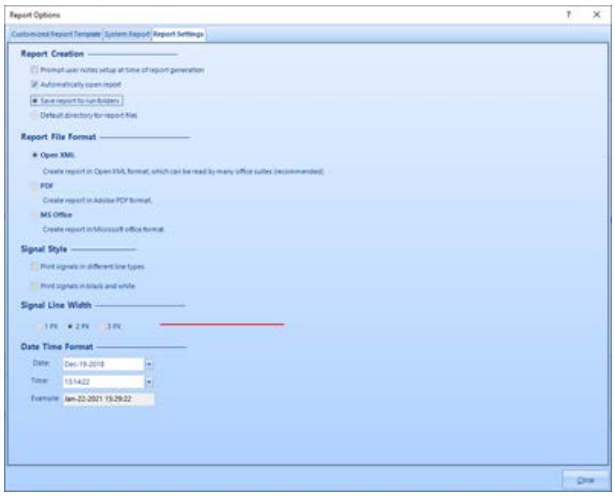
Display FRF Signals in dB with Customized Reference

Users can now display FRF Signals in dB with a customized dB reference.

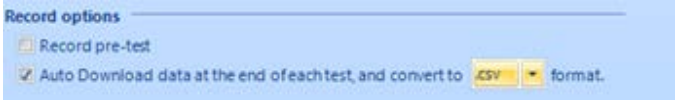


Report Enhancements - Saving Reports to Customized Locations (including Run Folder)

Location to automatically save reports is easily customized and includes option to save report to the Run Folder.



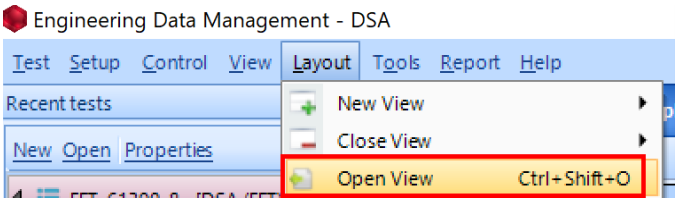
Auto Download and Auto Export Recordings to Customized Formats



The option to automatically download time stream recordings at the end of a test and to auto export to a user selected format is now available across all EDM software modules.

"Open View" Supports Multiple Tabs & Files

Open View in EDM now allows users to open multiple files or tabs.



This allows users to conveniently configure and save multiple display tabs and then open them in a different test type.

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
Release	EDM 9.0	CI 9.0.0.4	06/05/2020
Release	EDM 9.1	CI 9.1.0.0	02/03/2021

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/80Hi/80Ci	
EDM Testing 9.1.0.x	9.1.0.x
Spider-81 (v7.x)	
EDM Testing 9.1.0.x	9.1.0.x
Spider-81B (v7.x)	
EDM Testing 9.1.0.x	9.1.0.x
Spider-80SG/SGi	
EDM Testing 9.1.0.x	9.1.0.x
Spider-20/20E/20HE/20H/20i	
EDM Testing 9.1.0.x	9.1.0.x

Product and Software Version	Firmware Versions
CoCo-80	
EDM 6.0.2.x	4.0.x
CoCo-70X	
EDM Testing 9.1.0.x (EDM CoCo for DSA)	2.0.x
Vibration Diagnostic System 1.4.2.x	2.0.x
CoCo-80X/90X	
EDM Testing 9.1.0.x (EDM CoCo for DSA)	2.0.x

© 2021 Crystal Instruments Corporation. All Rights Reserved. 02/2021 | www.crystalinstruments.com | info@go-ci.com

Notice: This document is for informational purposes only and does not set forth any warranty, expressed or implied, concerning any equipment, equipment feature, or service offered or to be offered by Crystal Instruments. Crystal Instruments reserves the right to make changes to this document at any time, without notice, and assumes no responsibility for its use. This informational document describes features that may not be currently available. Contact a Crystal Instruments sales representative for information on features and product availability.