



EDM 9.1

Engineering Data Management Software Release Notes

EXPERIMENTAL MODAL ANALYSIS (EMA)



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 EDM Cloud – Cloud-based Test Monitoring and Storage	4
Introducing Playback Analysis in Modal Analysis	5
Introducing Orbit Plots in Modal Analysis	5
New Features in EDM-Modal	5
• Added Suggested Trigger Level and Block Size	5
• Introducing Test Sequence in Modal Analysis	5
• Optimization of Online Visualization Capabilities	5
• Automatic Pole Selection	6
• Optimization of Testing Plan	6
New General Features	6
• Introducing a Tech Support Log File	6
• Introducing Reports with Signals in Text Format	6
• Specify the Network Adapter for Communication with Spider	7
• Automatically Save Error Code When TEDS Detection Fails	7
Major Improvements	7
EDM Modal	7
• Auto Rotate 3D View	7
• Output Waveform Display	7
• Safety Feature for Shaker Output	7
• Recording Enhancement	8
• Double Hit Detection Optimization	8
General Improvements	8
• Display FRF Signals in dB with Customized Reference	8
• Report Enhancements - Saving Reports to Customized Locations (including Run Folder)	8
Software Release History	9
System Requirements	9
Minimum System Requirements:	9
Recommended System Requirements (Minimum for Spider Systems Higher than 16 Channels):	9
Version Compatibility	9

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.

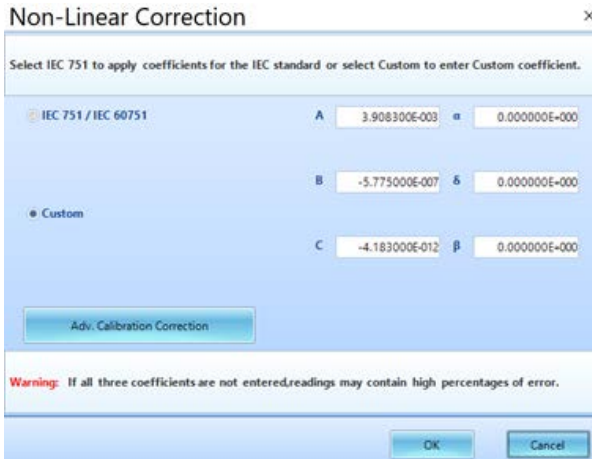


RTD Non-linear Correction Standard

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.

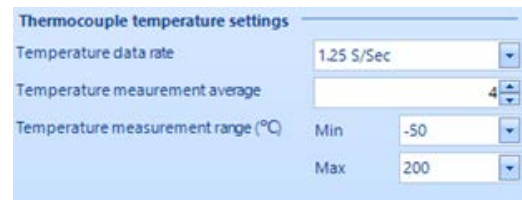
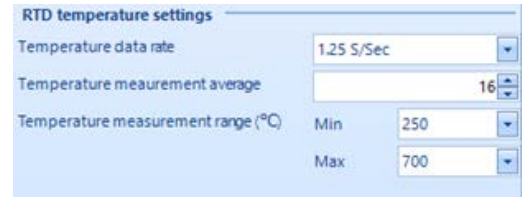
K-type Thermocouple Measurements and Cold Junction Compensation

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

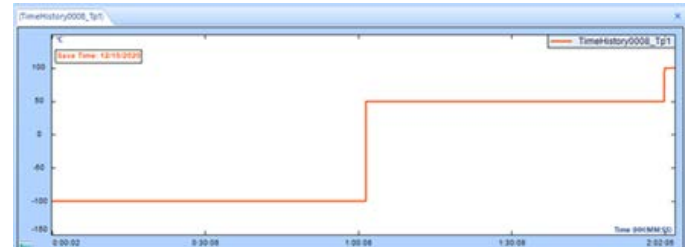
coefficients for the K- Type thermocouple measurements and helps EDM 9.1 accurately interpret changes in voltage measurements to the corresponding temperature measurements.

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 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.

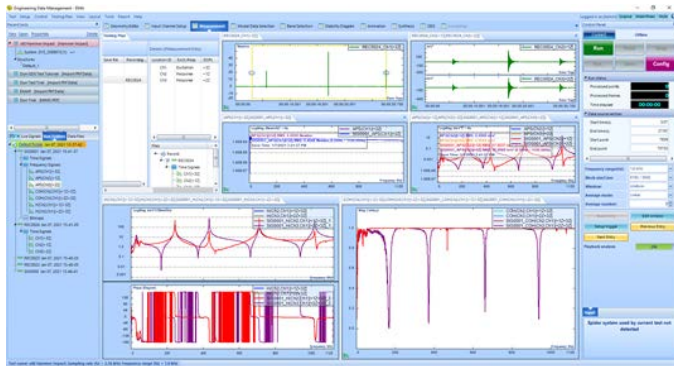
ID	EXTENSOR NAME	TEST NAME	TEST TYPE	TEST DESCRIPTION	SYSTEM INFORMATION	TEST STATUS	TIME ELAPSED	NUM COUNT	ACTION
DECATOP-000001-01	amp1	Resonance	VCS/Resonance	070_000001-01 (Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-02	amp1	Block Resonance	VCS/Block Resonance	070_000001-02 (Block Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-03	amp1	Resonance	VCS/Resonance	070_000001-03 (Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-04	amp1	Block Resonance	VCS/Block Resonance	070_000001-04 (Block Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-05	amp1	Resonance	VCS/Resonance	070_000001-05 (Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-06	amp1	Block Resonance	VCS/Block Resonance	070_000001-06 (Block Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-07	amp1	Resonance	VCS/Resonance	070_000001-07 (Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-08	amp1	Block Resonance	VCS/Block Resonance	070_000001-08 (Block Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-09	amp1	Resonance	VCS/Resonance	070_000001-09 (Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report
DECATOP-000001-10	amp1	Block Resonance	VCS/Block Resonance	070_000001-10 (Block Resonance)	Equipment 10 (Hammer)	Completed	00:00:00	1	View Test Report

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.

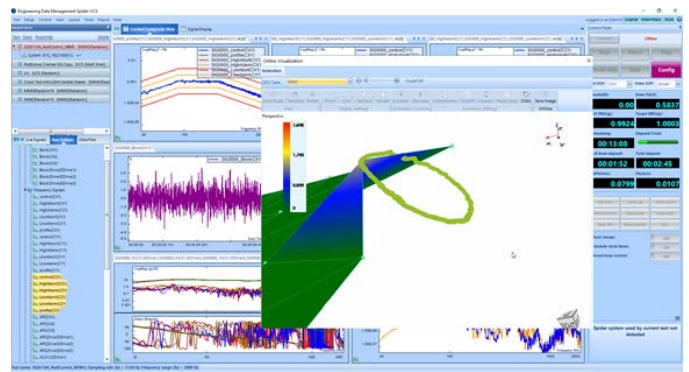
Introducing Playback Analysis in Modal Analysis

In EDM 9.1, a playback analysis feature has been added which allows the user to import recorded time signals and process these modal measurements to obtain the related frequency domain signals. This feature allows the user to carry out all the field measurements in a single go before post-processing and analyzing the measured data on a lab PC. This is available in the Hammer Impact, MIMO FRF and Operational Modal Analysis test types to support ambient excitation data and experimental data obtained through hammer impact or shaker excitation. This feature makes the modal measurements easier, faster, and simpler for the user.



Introducing Orbit Plots in Modal Analysis

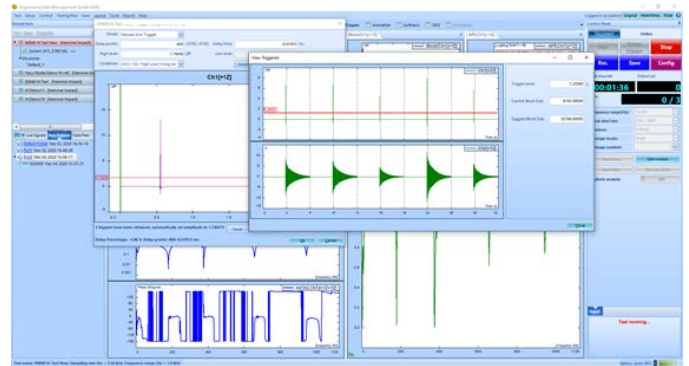
This feature helps users observe the phase and magnitude relationship between the different directions. The time data from the different accelerometers can be used to trace an orbit plot. If the magnitude of the response is the same in all directions with a phase difference of 90 degrees in any of the two directions, then a circular trace is obtained as shown below. Similarly, if the magnitudes are different, the circle would be elongated into an ellipse. This feature is provided in EDM Modal, VCS and DSA software.



New Features in EDM-Modal

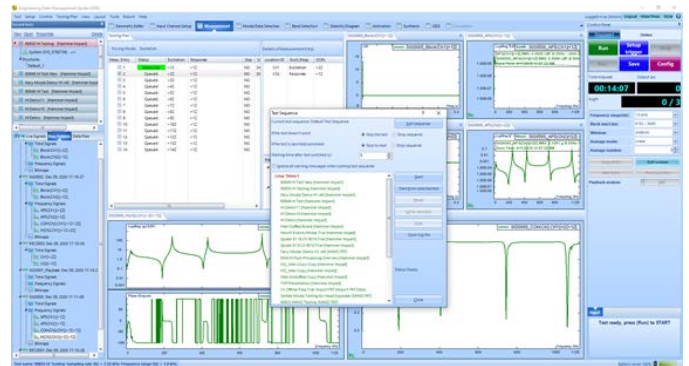
Added Suggested Trigger Level and Block Size

Setting an appropriate trigger level with a manual arm trigger guides the user in avoiding measurements triggered by noise. This feature helps in prevent the setup of higher-level triggers. By averaging a few impact measurements, the software suggests an appropriate trigger level for the modal test. The block size suggestion observes the response decays and suggests an appropriate block size to help users avoid implementing windows. These user-friendly suggestions help with modal hammer impact testing in EDM Modal.



Introducing Test Sequence in Modal Analysis

The test sequence in EMA software can be used to run different tests lined up by the user. This helps users execute different modal tests that have been setup experimentally without any manual operation. The test sequence can also be used to loop the different tests. This feature can be used to test the reliability and stability of high channel count systems for long hours of operation.



Optimization of Online Visualization Capabilities

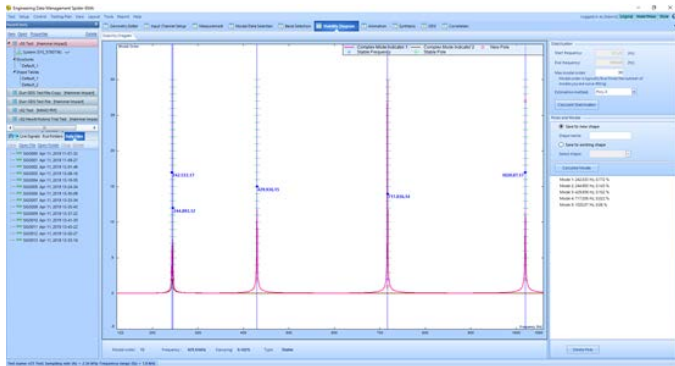
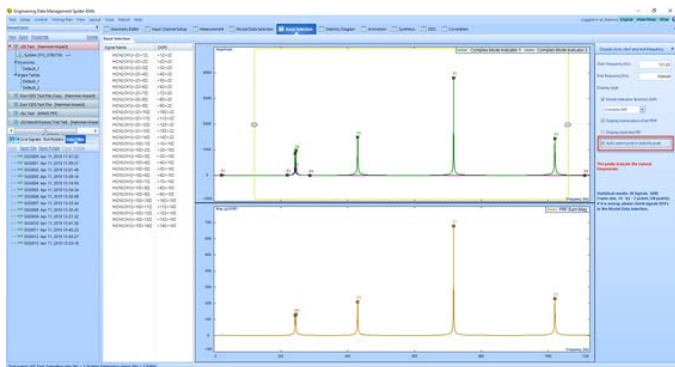
The online visualization feature in the EMA suite has been optimized to guide the user while executing the test in real-time. This feature offers the ability to animate decimated time signals, block signals

and provides an orbit display. Using this data to visualize the deformation of a structure in an online test assists the user in optimal measurement point selection for the unit under test.



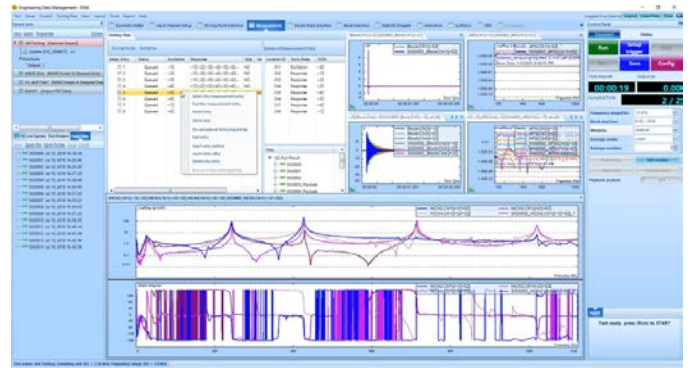
Automatic Pole Selection

The user obtains the modal characteristics of the unit under test by curve-fitting the measurement FRFs. Choosing a stable pole helps in ensuring that the chosen mode has a stable frequency, stable damping, and a stable mode shape. This process could be tricky for a new user as there are a few parameters to setup. The new feature of automatic pole selection in EMA suite makes this process significantly easier by automating the procedure. The modes with stable poles are identified by the software and automatically chosen to display the natural frequency, damping and mode shapes.



Optimization of Testing Plan

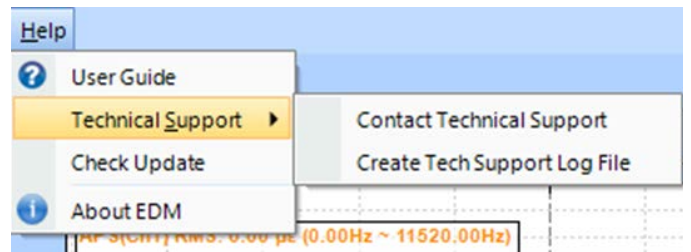
Measurements acquired online and those that are recorded and imported for post processing are automatically loaded into the testing plan and associated with their respective measurement entries. The recorded time signals can be opened for post processing and the associated post analysis signals will be automatically saved to the corresponding measurement entry.



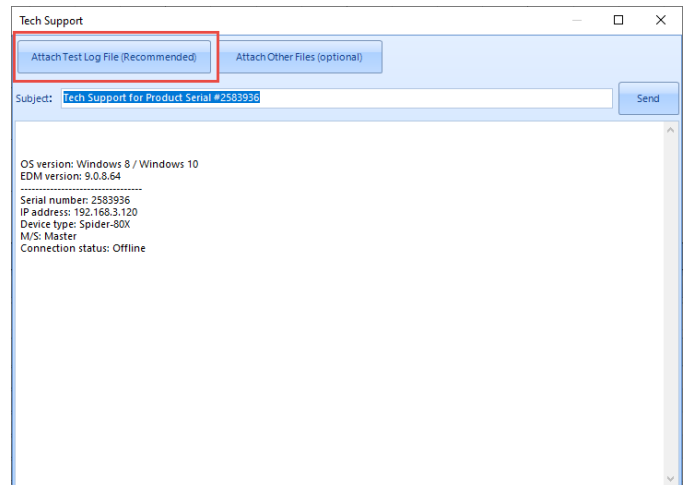
New General Features

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.



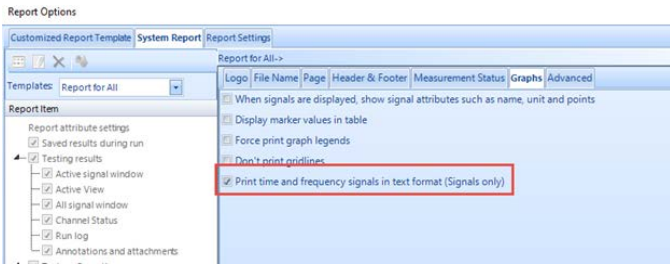
A newly added feature allows users to pack all the important data necessary for technical support. With one click, users can send essential PC information, crash logs, and application logs along with test and user settings through EDM software.



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.



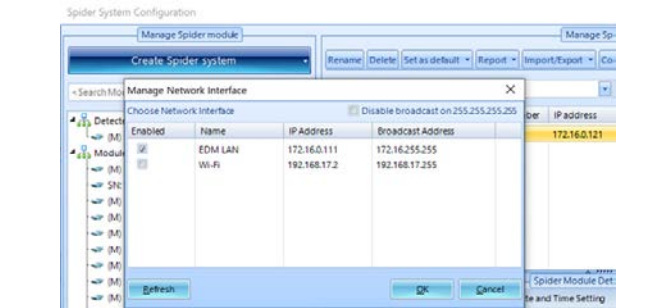
Test parameters
 Frames: 298
 Block Size/Line: 1024 / 450
 Average numbers: 8
 Frequency range (fa): 23 kHz
 Window: Hanning
 Sampling Rate (fs): 51200 Hz
 Average mode: Exponential

[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)	YMag (RMS)	Pa	YMag (RMS)	Pa	YMag (RMS)	Pa	YMag (RMS)	Pa
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	8.0979E-005	1.0239E-004	1.0655E-004
1.6000E+001	7.6879E-005	6.3278E-005	9.4665E-005	8.1185E-005	8.6545E-005	8.7863E-005	8.6236E-005	9.1595E-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	1.5864E-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	1.5886E-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	1.8689E-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.

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.



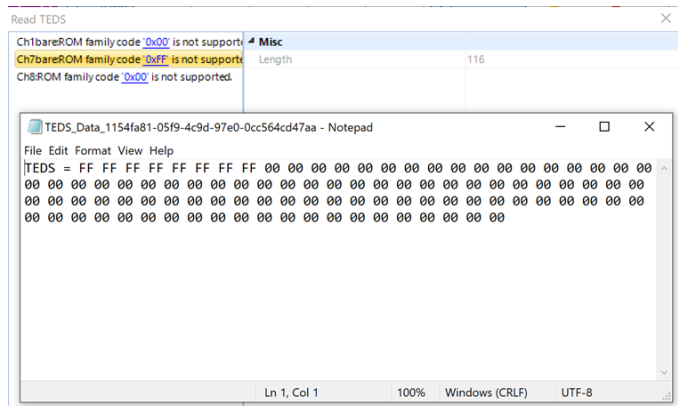
This selection allows network traffic to be routed using the selected adapter. When multiple adapters are present on a computer, EDM typically selects the default adapter or the adapter with the highest priority metric.

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.

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.

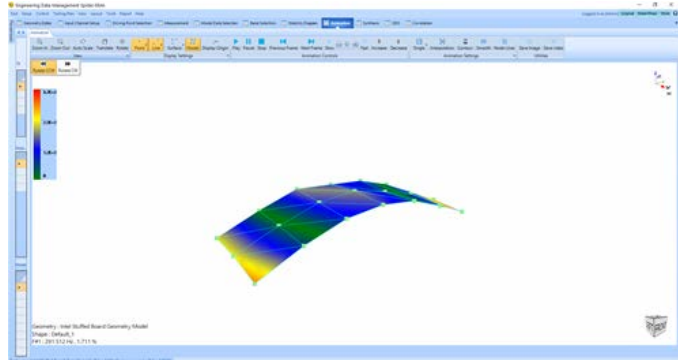
TEDS detection can fail due to a variety of reasons. This new feature in EDM automatically creates a text log to represent the channels that failed along with the error code.



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

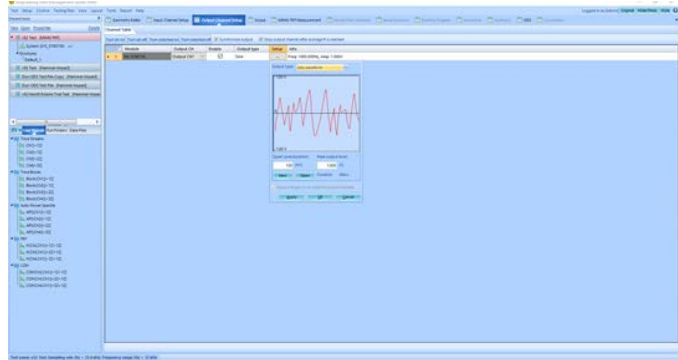
MAJOR IMPROVEMENTS
EDM Modal
Auto Rotate 3D View

The 3D geometry can automatically rotate in clockwise or counterclockwise directions to provide views of mode shapes in different orientations.



Output Waveform Display

The MIMO FRF and MIMO Sine testing suite uses modal shaker excitation to execute the modal analysis of a unit under test. The output waveform display guides the user in visualizing the output excitation type chosen for the experimental modal test.



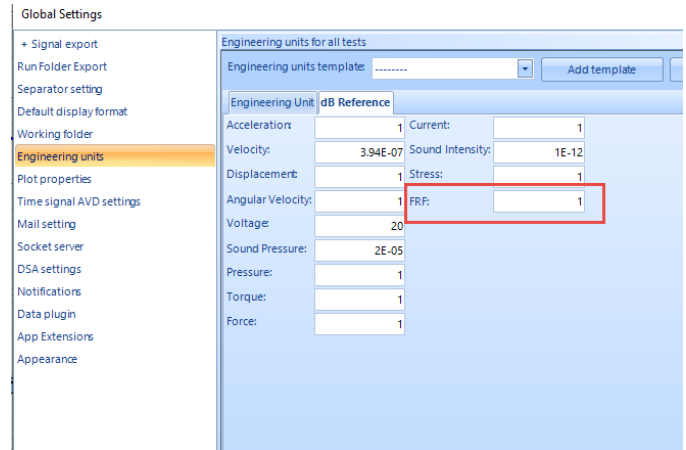
Safety Feature for Shaker Output

This safety feature is available in the MIMO FRF and MIMO Sine testing suites to ensure that the output excitation does not exceed the drive limit during a modal test.

General Improvements

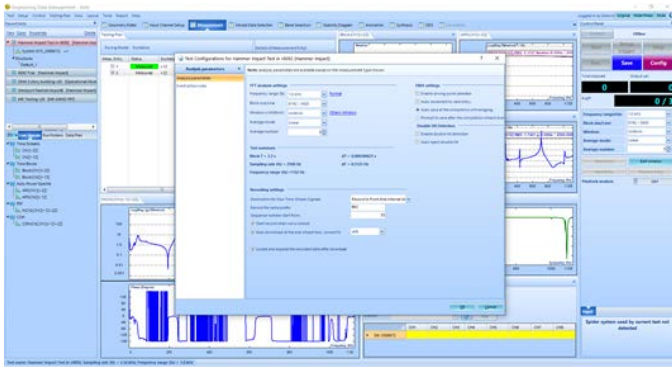
Display FRF Signals in dB with Customized Reference

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



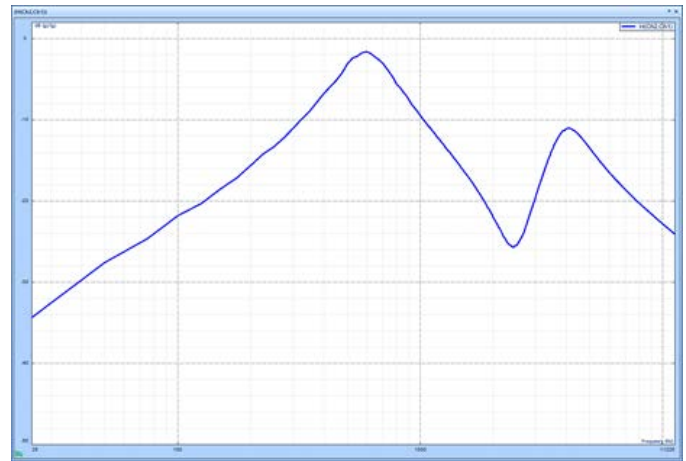
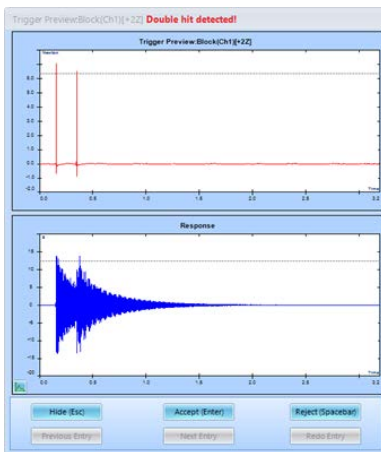
Recording Enhancement

The user can automatically record, download, and view recorded signals at the completion of a modal test. These recorded signals can be opened for playback analysis in post-processing.



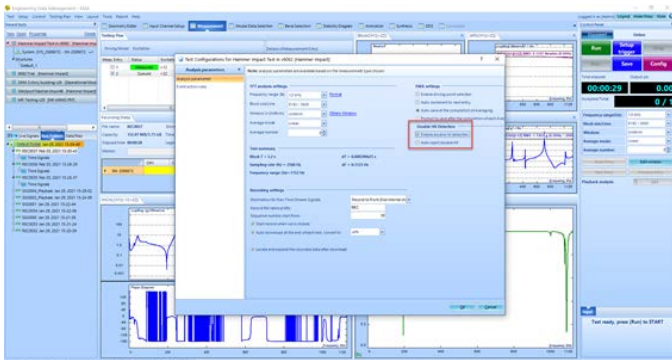
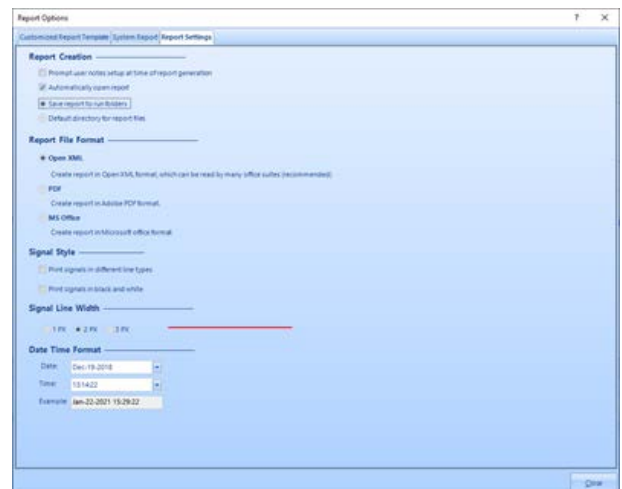
Double Hit Detection Optimization

The detection and auto-rejection for double hits with modal impact hammers is enhanced to optimize the modal measurement process.



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.



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