CRYSTAL INSTRUMENTS

EDM 10.1

Engineering Data Management Software Release Notes

DYNAMIC SIGNAL ANALYSIS (DSA)
REMOTE CONDITION MONITORING (RCM)
POST ANALYZER (PA)

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TABLE OF CONTENTS

RELEASE HIGHLIGHTS

EDM Cloud and EDM Mobile App

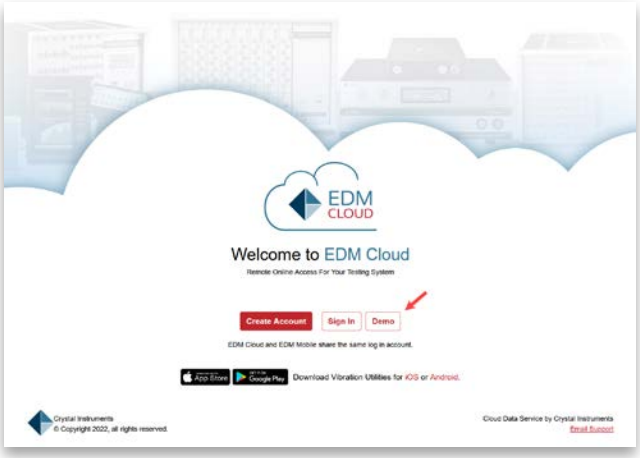
EDM Cloud service is introduced with the EDM 10.1 Release. EDM Cloud allows users to view a test status remotely through a web browser, mobile app, or a combination of both. Multiple devices and users are allowed to simultaneously login.

EDM Cloud and EDM Mobile will be provided free of charge for an introductory period ending on March 31, 2023, for all users.

Demo from Web Browser

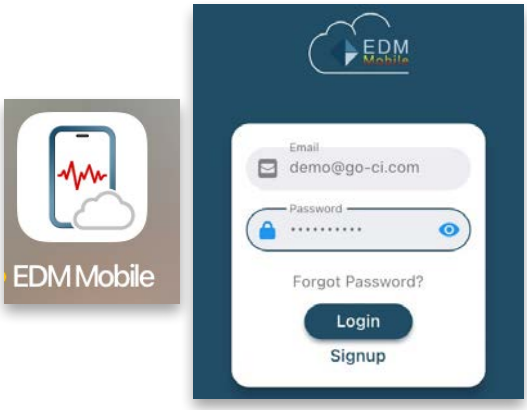
All users are invited to try out EDM Cloud service features from a web browser or mobile phone app.

Access EDM Cloud from a web browser: https://cloud.go-ci.com/. Click on “Demo” and enter demo@go-ci.com in the email field.



Demo from EDM Mobile App

Users can download the EDM Mobile app for iOS or Android. Enter demo@go-ci.com in the email field and “Spider-80X” in the password field to try out the EDM Mobile app.

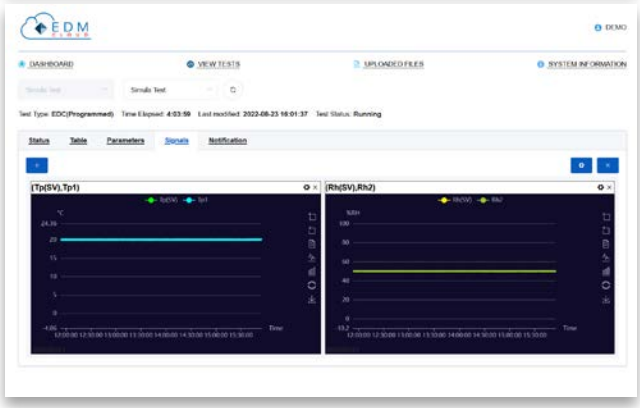


EDM Cloud allows users to upload the status of current tests or upload run logs of historic tests to the cloud.

Multiple user accounts can share access to uploaded data, including live or historic test statuses.

Supported Modules

EDM Cloud supports vibration testing and THV (temperature/ humidity/vibration) testing.



EDM Supports SQLite

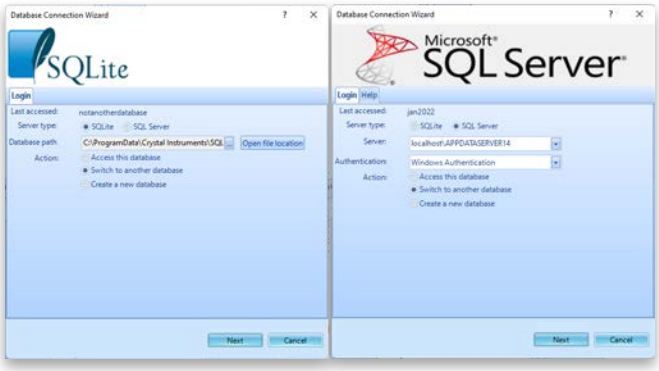
EDM 10.1 supports SQLite - a small, fast, self-contained, and reliable database engine. SQLite provides a seamless installation process and is a light-weight application. EDM reliability is further improved, and speed is increased even on computers with limited resources.

Combined with the support of SQL Server, EDM now supports the two most popular database engine forms. Users now have the choice to install and use SQLite and/or SQL Server according to their application needs.

SQLite comfortably fulfills all the capabilities required by EDM and provides a similarly fully featured experience as the existing SQL Server.

Crystal Instruments highly recommends the use of SQLite for a majority of users due to the easy installation, fast trouble-free performance, and lack of limitations.

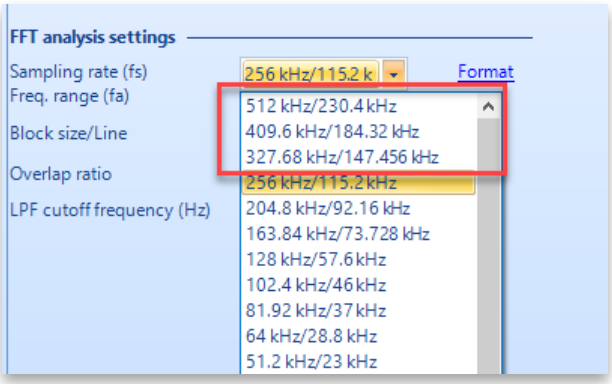
Users can create databases in either SQLite or MSSQL and migrate existing databases from one database engine to another.



512 kHz Sampling Rate for Spider-80Hi, Spider-80Ci and Spider-20HE

Users now have the ability to sample and record as high as 512 kHz on the Spider-80-Hi, Spider-80Ci, Spider-20HE, and Spider-20i.

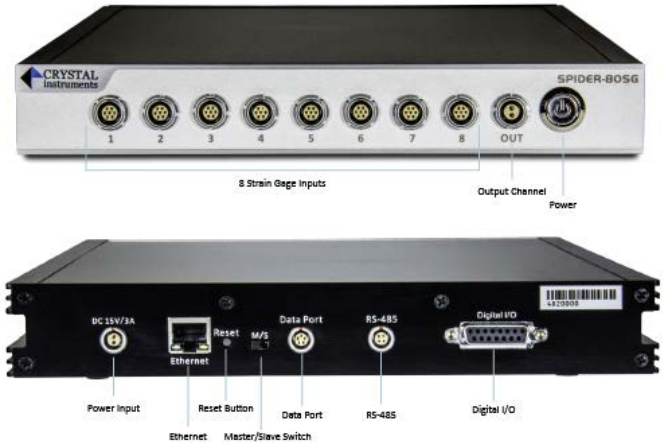
This high sampling rate allows the updated Spider hardware to capture high frequency shock and transient events. The combination of EDM 10.1 and one of the high sampling Spider modules provides three additional sampling rates at 512 kHz, 409 kHz, and 327 kHz.



Spider-80SGi V2 Supports 512 kHz Sampling Rate

EDM 10.1 upgrades the Spider-80SGi to sample and record data at rates of up to 512 kHz. The high sampling rate is essential to capture high frequency shock and transient events. The Spider-80SG/SGi can interface with a multitude of sensors ranging from MEMS, ratiometric, DC, AC and IEPE sensors.

The combination of a high sampling and compatibility with a wide range of sensors such as accelerometers, strain gauges, load cells, bridge-based sensors, and more positions the Spider-80SG as an ideal general purpose data acquisition system for any testing need.

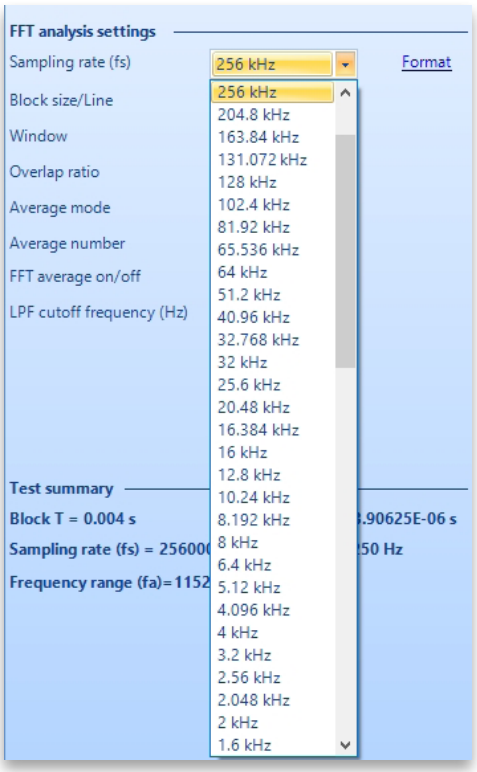


65536 (216) Hz Sampling Rate - Supports 1 Hz Frequency Resolution

Several applications including some legacy applications require a frequency resolution of 1 Hz for optimal data comparisons with historic data. This requires a sampling rate at a power of 2.

Crystal Instruments introduced a new sampling rate of 2n for all Spider and CoCo hardware to support multiples and fractions of 1 Hz frequency resolution.

With 1 Hz frequency resolution, the frequency domain signals will have integer frequencies on the X-axis enabling spectral analysis for integer frequencies.



With the introduction of 65536 Hz (216) and its derivative sampling rates, frequency resolutions of 0.125 Hz, 0.5 Hz, 1 Hz, 2 Hz, 4 Hz, etc. are supported to allow spectral analysis at integer frequencies.

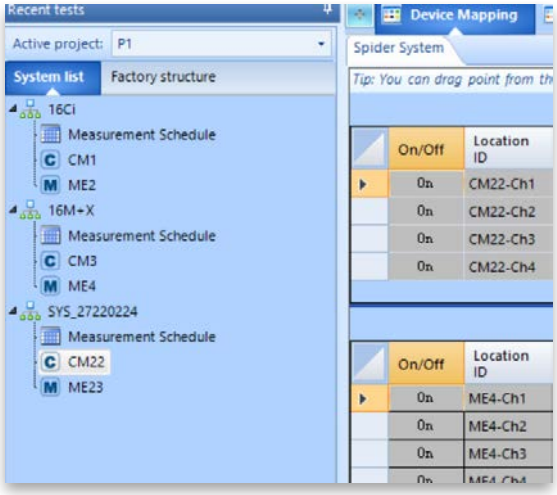
Together with three other sampling banks of 102.4 kHz, 81.92 kHz and 64 kHz, Crystal Instruments products now support at least 72 different and unique sampling rates.

Remote Condition Monitoring for Predictive Maintenance with permanently mounted Spider modules.

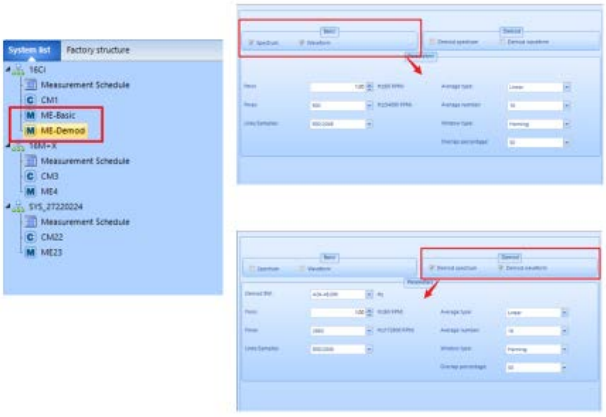
Spider systems can be located within a facility or deployed remotely to simultaneously monitor equipment health or structures.

Continuous monitoring with auto alarms and notifications can conveniently monitor health and provide alerts for unusual and potentially catastrophic events.

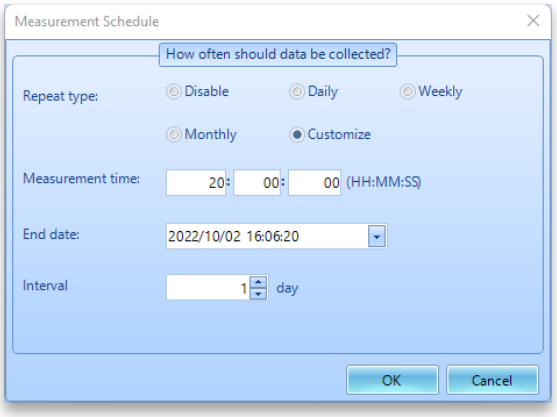
In addition, periodic data collection with multiple sets of parameters facilitates early diagnosis of potential failures that aid in reducing the downtime of critical equipment.



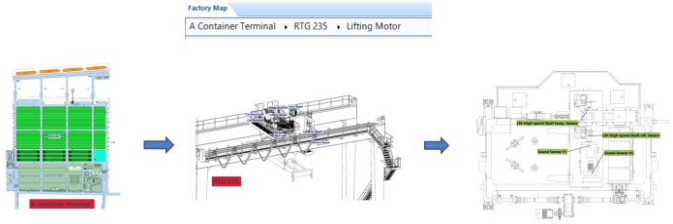
Measurement entries can be individually configured, and any number of measurement entries are allowed on each Spider system.



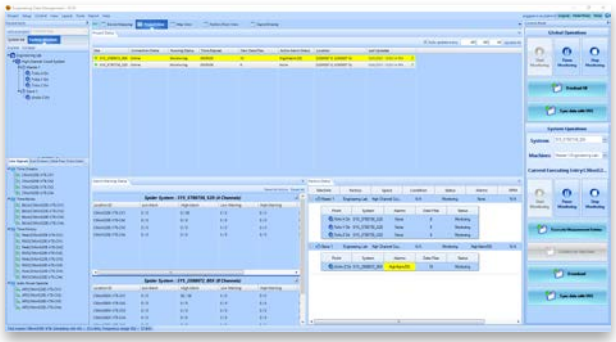
Measurement entries can be executed or repeated according to the needs and requirements of an application.

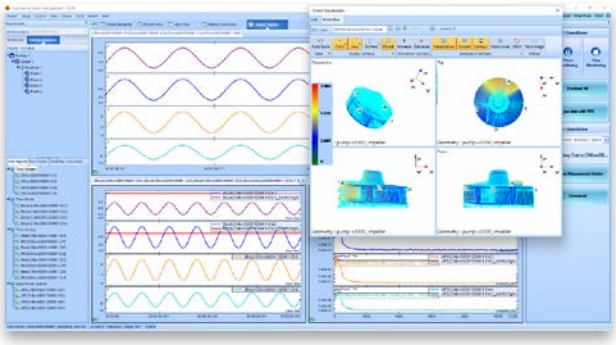


A completely customizable hierarchy of Factory -> Space -> Machine -> Points can be created to monitor vibrations on structures.



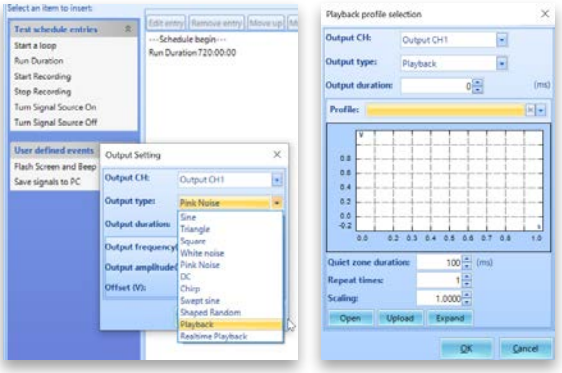
A quick overview of the RCM project is located in the Project View tab. This includes a complete overview of different test statuses running on individual Spider systems.





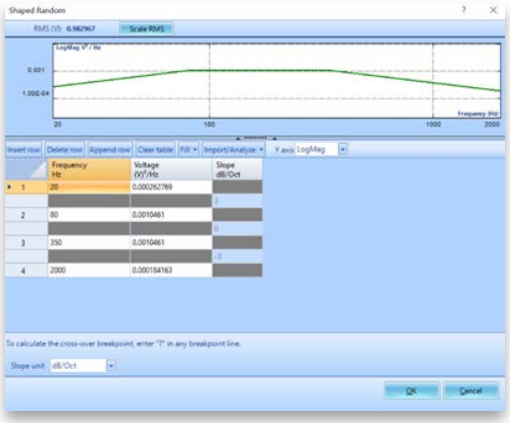
Shaped Random and DSA Playback Output in Run Schedule and DSA Black Box Mode

EDM 10.1 DSA now provides Playback and Shaped Random Output types when creating an entry in the Run Schedule. A profile window appears when Playback Output is selected. Users can browse for a time recording pulse to play on repeat or to add as a Run Schedule entry.



Shaped Random Setup

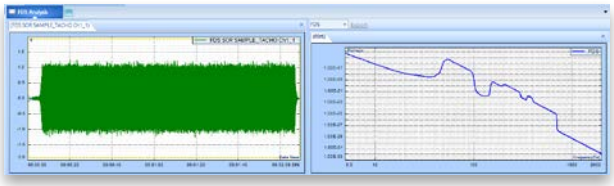
A profile breakpoint table will appear for Shaped Random output types. The profile may be added to the Run Schedule as well.



This outputs a custom waveform or Shaped Random while the Spider system is running in the Black Box mode.

Create Mission Profile Analysis and Sine on Random (SOR) Profile in PA - Fatigue Damage Spectrum (FDS)

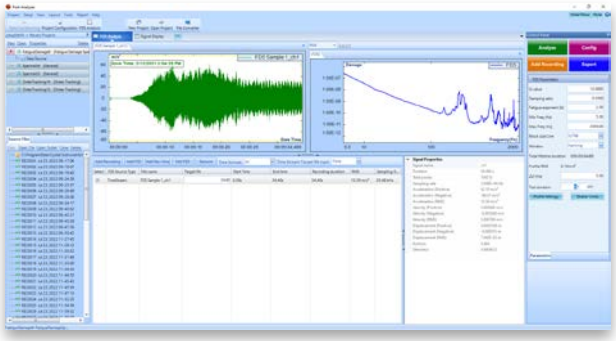
PA - FDS allows users to import raw time waveform data from field testing under multiple conditions and build a combined mission profile. Then based on the expected number of life hours (or cycles), the lifetime damage can be calculated. A new accelerated PSD can then be developed with an equivalent damage potential as the original life cycle but at a fraction of the necessary testing time.

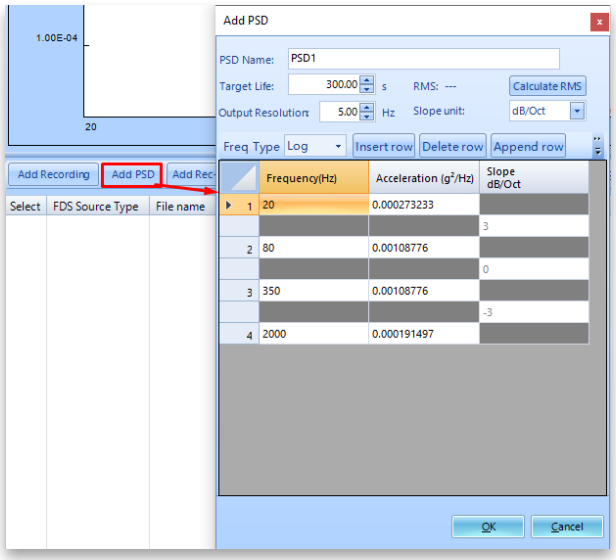


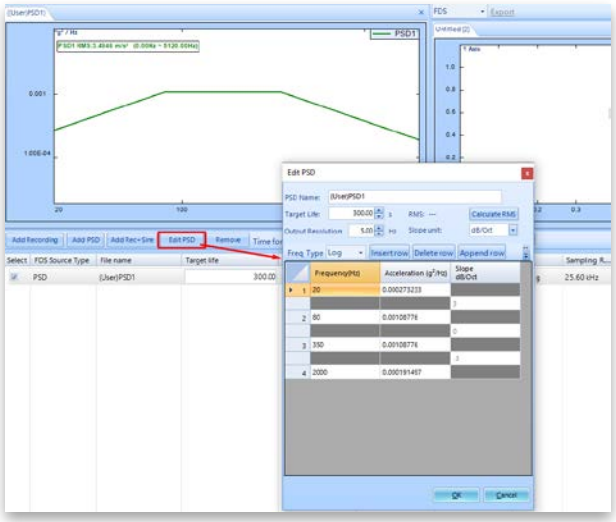
Fatigue Damage Spectrum – Mission Profile Analysis

PA 10.1 allows users to add multiple time recordings, PSDs, and sine tone profiles to generate custom Random or Sine-on-Random profiles based on recordings taken from the field.

Fatigue Damage Spectrum theory is applied to convert time domain recordings into frequency domain plots with the equivalent amount of damage. Mission parameters including different weights for different load cases can be added to provide a complete assessment of the total lifetime damage accumulated by a DUT, which can be time accelerated to provide an equivalent damage assessment in a shorter time frame using FDS.





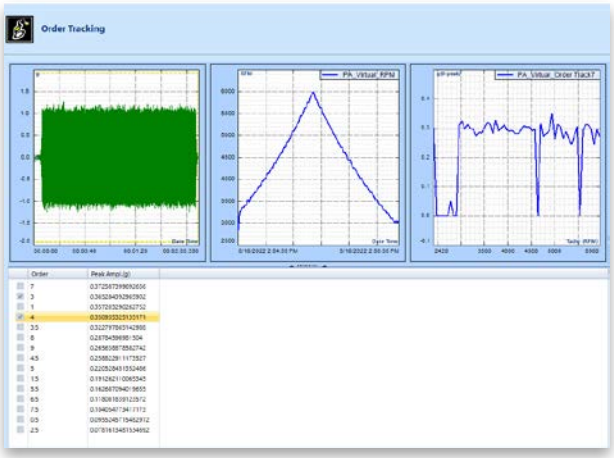


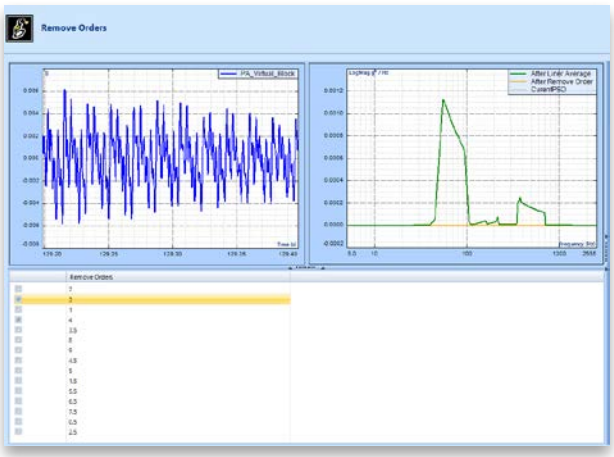
FDS Sine-on-Random - Extracting Sine tones from Sine-dominated broadband signals

PA now has the ability to extract Sine tones from a broadband signal with the help of a Tachometer. Most signals obtained from rotating machinery will have Sine tones and harmonics from periodic elements. FDS cannot be directly applied on these Sine dominated broadband tones as this would misrepresent the true damage imparted to the DUT.

The PA 10.1 FDS feature allows users to filter out Sine tones using an advanced order tracking filter. This produces a signal with an independent sine tone and another with just the broadband. FDS algorithms are used to calculate damage from the two sources and is time accelerated to produce an equivalent lifetime damage. The

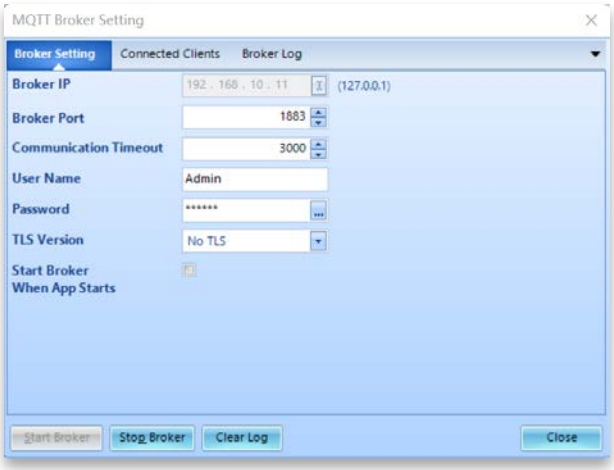
resulting accelerated PSD is combined with Sine tones and results in an SOR profile to run on a shaker.

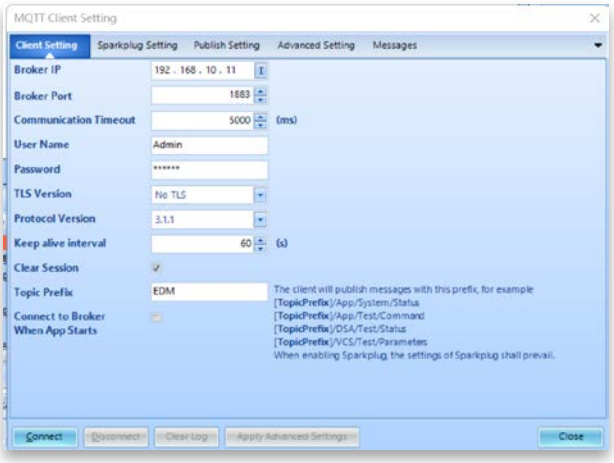




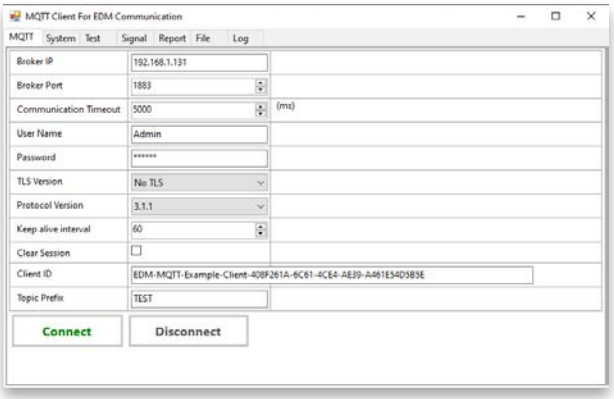
Monitor & Control EDM with MQTT IoT Messaging Protocol

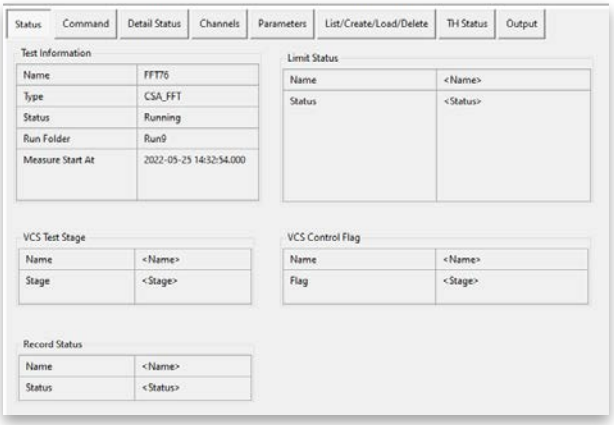
MQTT IoT is an OASIS standard messaging protocol designed for a lightweight publish & subscribe messaging network that connects to remote devices for data viewing and control. The implementation of MQTT in EDM allows users to monitor the status of environmental tests (vibration, temperature, humidity) running in EDM VCS, monitor measurements taken in EDM DSA, and even remotely run a test. This new messaging protocol will replace Socket Messages in EDM.

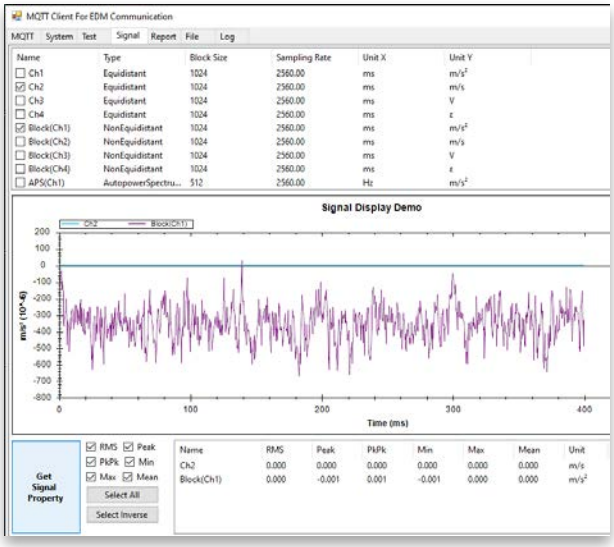




The screenshots below are from an MQTT example program that can connect to an EDM MQTT network to remotely run tests and view data.



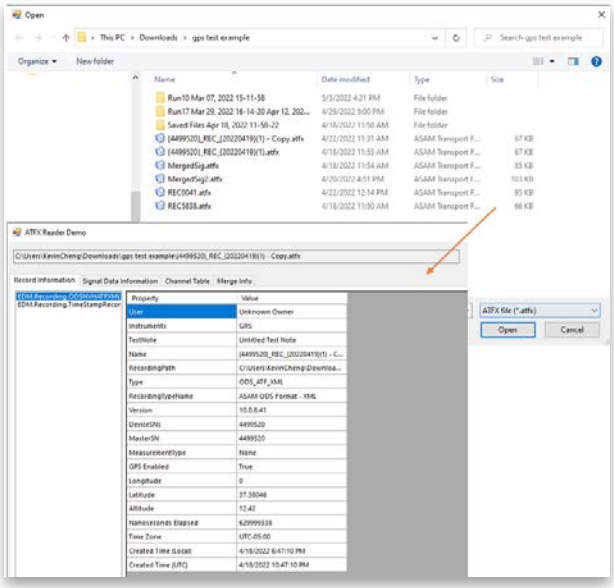


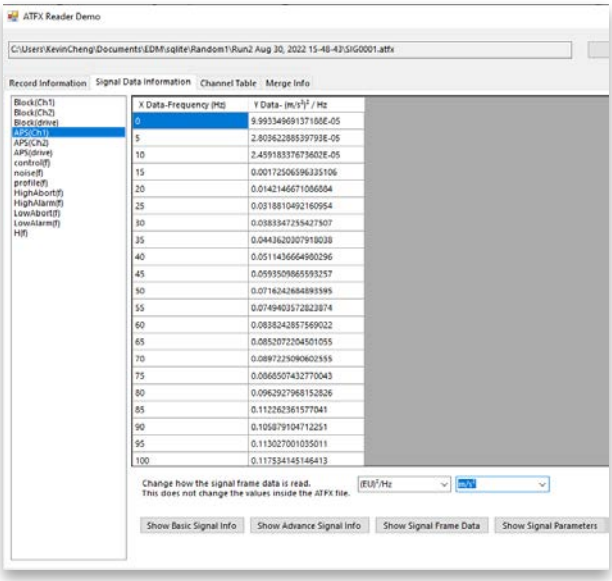


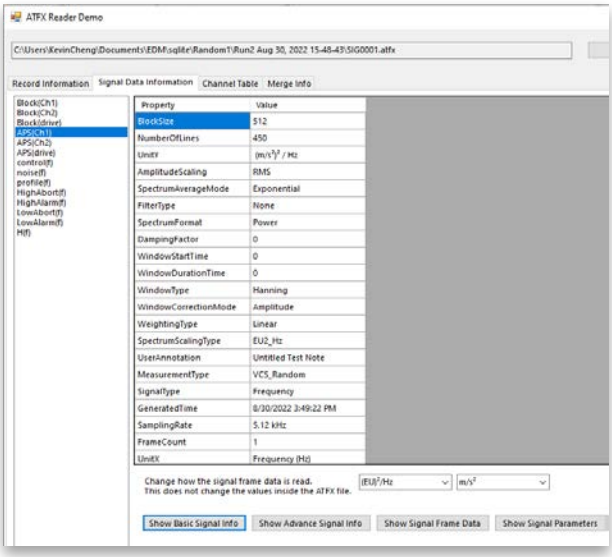
CI Data File Reader

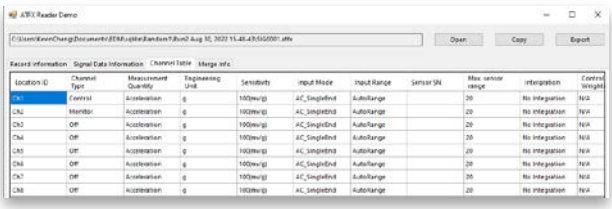
The CI Data File Reader API provides end-users with a streamlined file reading and browsing library to decode ATFX, TS and GPS files. Users can integrate the API with their own custom developed application. Crystal Instruments currently supports Windows-based programs, ideally written in C#. The same API also supports Python, MatLab and LabView.

The API offer methods and object calls to obtain data from an ATFX file, such as obtaining the DateTime with nano seconds elapsed or obtaining the saved frame data of a signal. This application also allows users to read any of the signals, time, or frequency in other engineering units (EU). Users can also read frequency domain signals in other spectrum types.







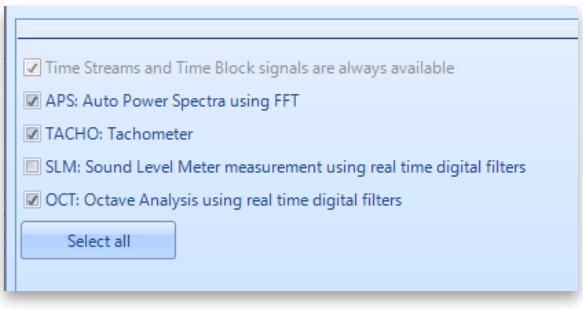


NEW FEATURES

New Features in EDM Dynamic Signal Analysis

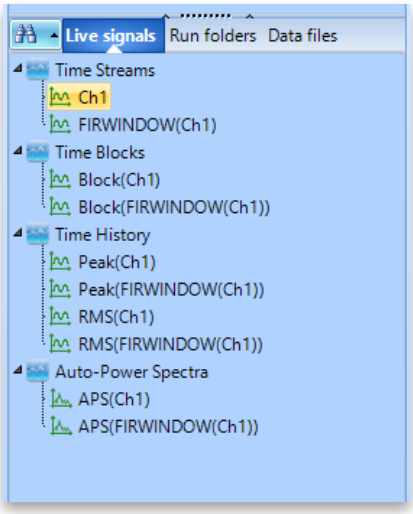
DSA – Octave Analysis supports Tach and RPM Signals

EDM 10.1 allows users to import RPM and tach-based signals in tandem with acoustic data to study and co-relate the effects of speed and RPM in acoustic measurements.



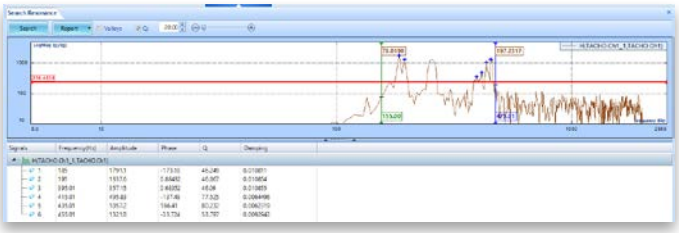
Time History Signals on Filtered Signals

EDM 10.1 introduces a feature to compute statistics-based signals on filtered time signals. This feature expands user capability for computing signals according to specific use cases and reduces the need for post processing signals.



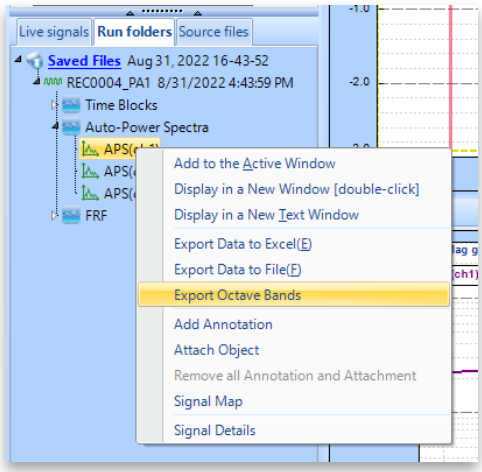
Search Resonance for Saved FRF Signals

This powerful new feature allows users to search for resonance in live or post processed FRFs. Users can define specific parameters for the resonance search such as a high level frequency range and Q factor. Users also have the choice of looking for peaks or valleys. Once the desired peaks are located, a quick one-click operation can export the results to a Microsoft Word file.



Export APS Signals as Octave Spectrum

EDM 10.1 allows users to export single or multiple APS frames as Octave Spectrum. Right-click on an APS signal to select Export Octave Bands.

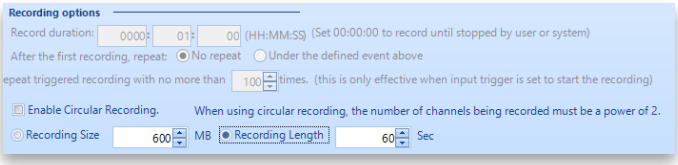


Run Folder Statistics in EDM-DSA

Further functionality is added across the entire EDM software package with a new Run Folder Statistics window. Users can view the location, size, and file tree of all Run Folders in a particular test with the simple click of a button.

Define and Allocate Circular Buffer in Time

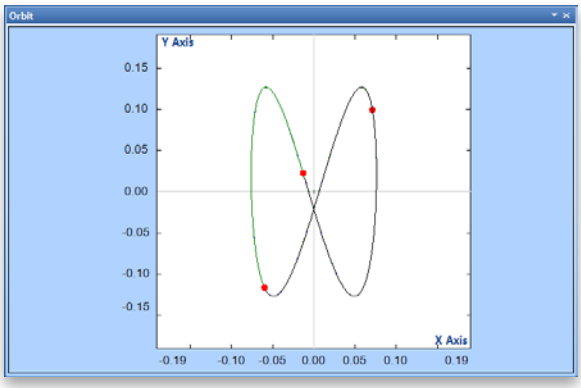
Users can now configure Circular Recording in terms of time. This allows users to capture a post-trigger without specifying the recording memory size.



New Features in Post Analyzer

Orbit Plots in PA

Users can now view Orbit Plots in PA FFT and Order Tracking tests.



New General Features

Improved Time Format Display

All EDM modules support four precision levels on the time axes: Seconds, Milliseconds, Microseconds, and Nanoseconds.

The precision options are available for both relative and absolute time displays.

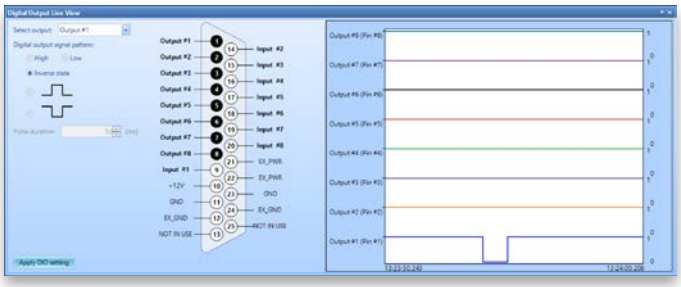
This improves the time display down to nanoseconds on displayed signals.

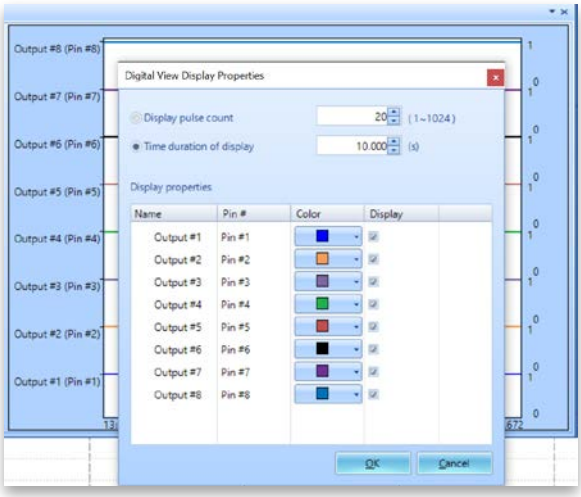
The improved Time Display allows users to display time streams in Absolute or Relative Time. Absolute Time allows users to display time streams in PC Local or UTC format.

Digital Output Live View

Digital Outputs now offers a live view in the EDM signal display. This feature allows users to:

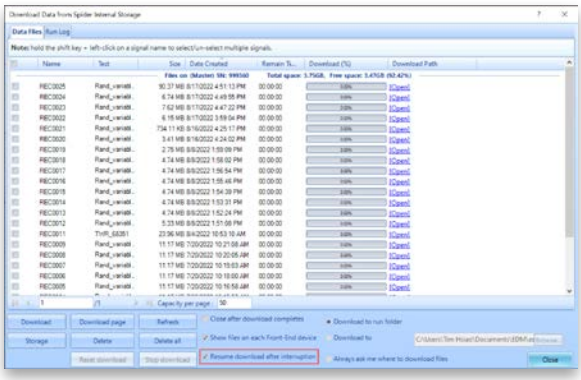
- Display all pin numbers of the DB connector
- Display the current state of each digital output pin
- Display the state of each digital output pin over a given duration
- Manually set the output pulse or state of a digital output pin
- Set the display duration and color of each digital output signal





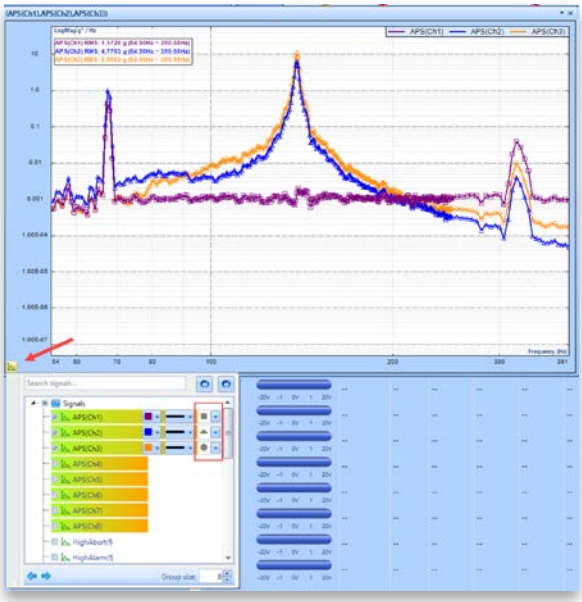
Data Download - Pause and Resume

Users can now pause and resume during data download to easily download large data files in multiple sessions.



Display Signal Symbols

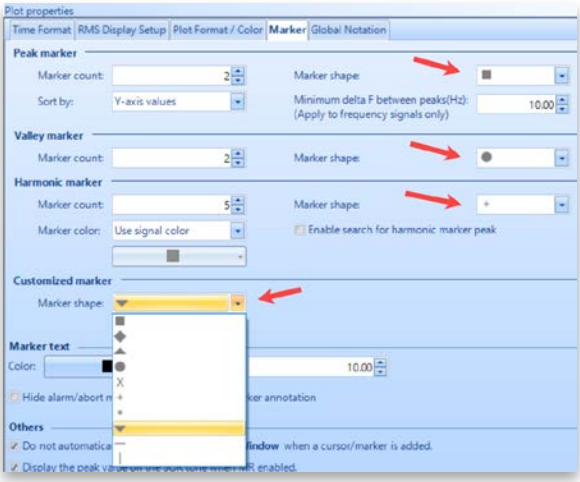
Users can select an available symbol to label a displayed signal.

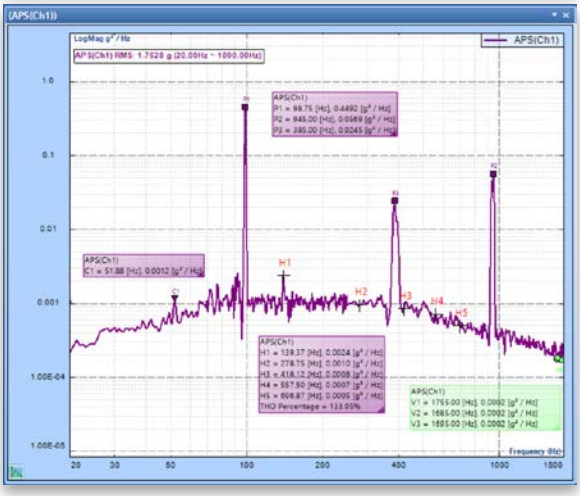


Customize Symbols for Markers

Users can select the shape of various markers including customized, peak, or harmonic markers.

This feature provides an easy visual differentiation of markers.

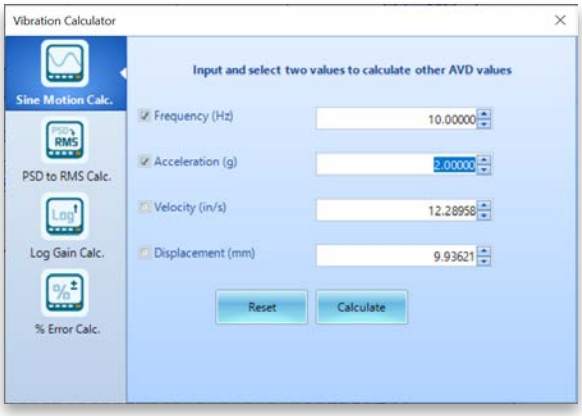




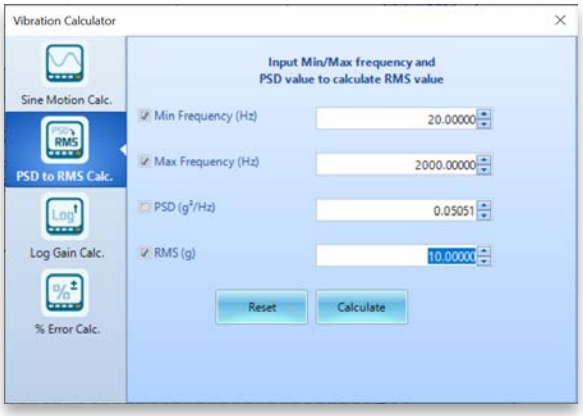
Vibration Calculator

The Vibration Calculator tool is available in EDM 10.1 as an EDM extension. This tool is accessible from the “Setup” menu and can perform various calculations as listed below:

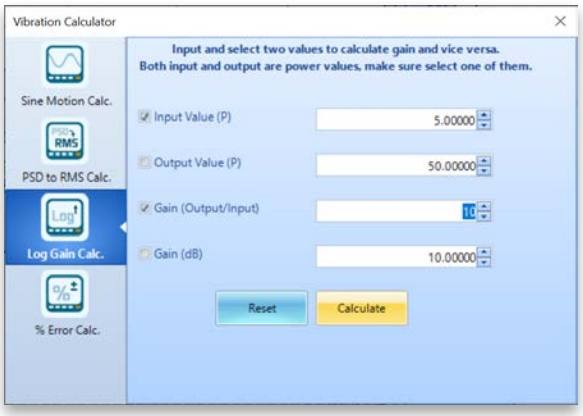
Sine Frequency/A/V/D Calculator



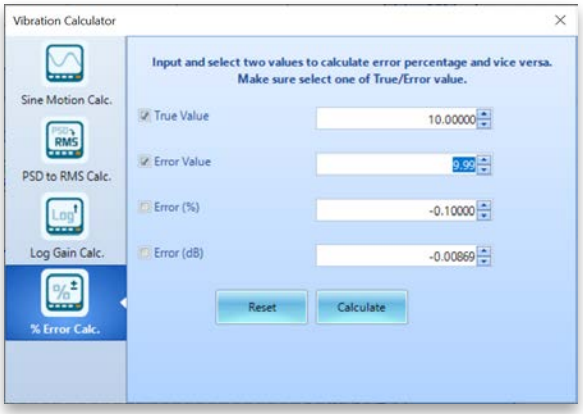
Random PSD/RMS Calculator



Gain Calculator

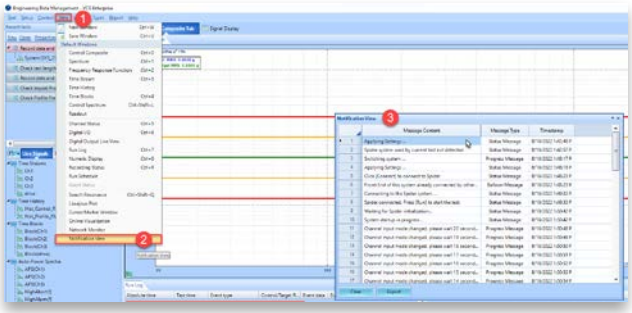


Error Calculator



View Past Pop-up Notifications

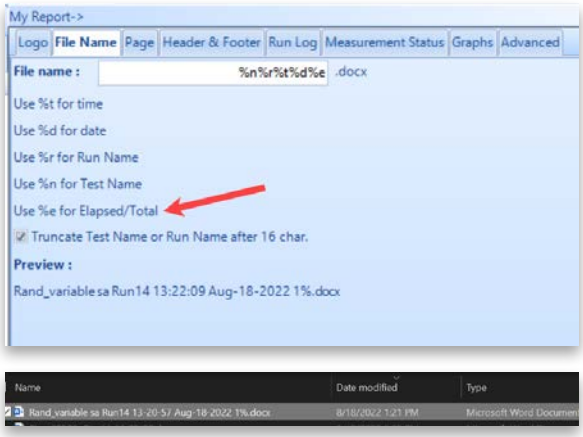
Users can now view all past pop-up notifications for a current DSA, VCS, or TDA test in the new Notification View window. This list of messages can be exported as an Excel worksheet.



Add Test Progress to Report Filename

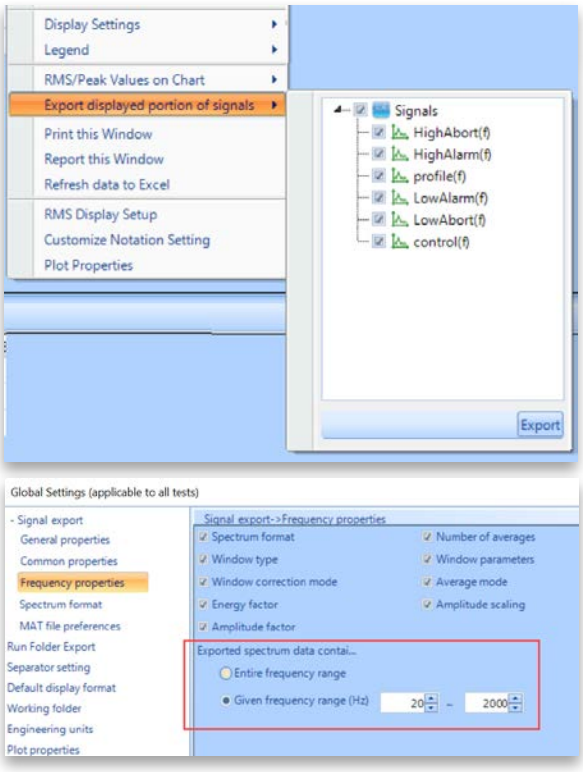
When generating multiple reports during a test, users will find it helpful to insert the test progress into the filename.

This new feature allows users to select and insert the elapsed time into the report filename.



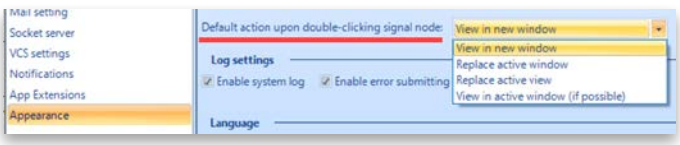
Export data within specified frequency range

Export signal data only within a specified frequency range or only within the display range.



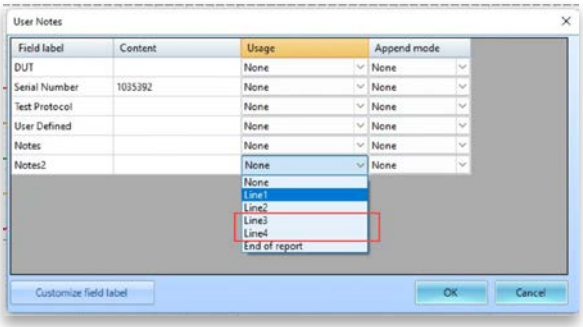
Customize double-click on signals

Users can designate the double click on a signal to perform a selectable function as shown in the following screenshot.



Add Additional Notes to Report Option

Users can now add and define several lines of text to the test report.

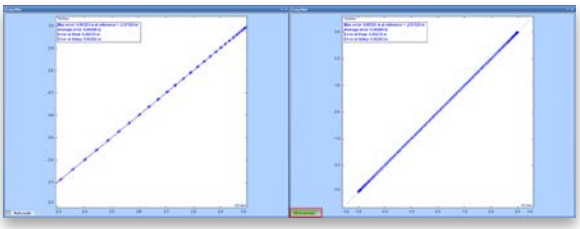


MAJOR IMPROVEMENTS

EDM Dynamic Signal Analysis

Improvements to Cross Plot in EDM-DSA

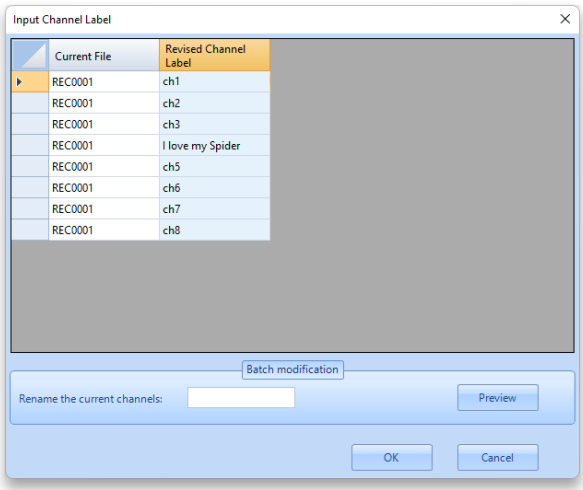
Users can auto scale the Cross Plot and connect the data points to obtain a more complete view of the data.



Post Analyzer

Rename PA Signals

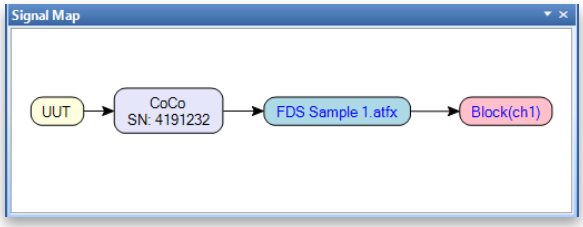
Users can rename PA Signals from the Setup menu using the Input Channel Label wizard. The signals related to each input channel will be modified once the name of the input channel is reconfigured.



Signal Map View in PA

The Signal Map feature allows users to trace each signal to the exact related hardware and Unit Under Test (UUT). This allows for accurate record-keeping during post-processing of signals originating from multiple front-ends.

This feature is especially useful when using the new signal merge function to synchronize data from multiple units and compute signals as a function of data collected from both units. Users can look at the signal map of final computed signals and backtrack to the precise source and instrument used to collect the original data.

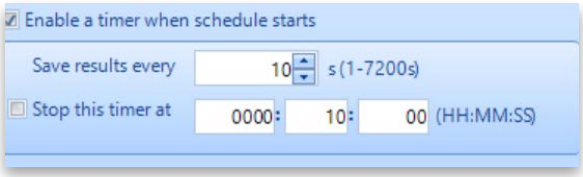


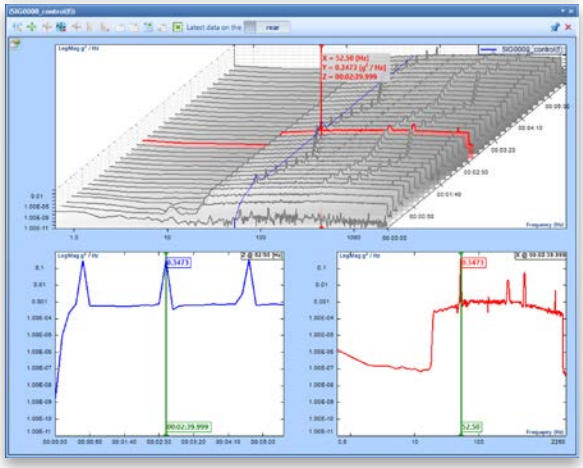
General Improvements

Improved 3D Waterfall Display

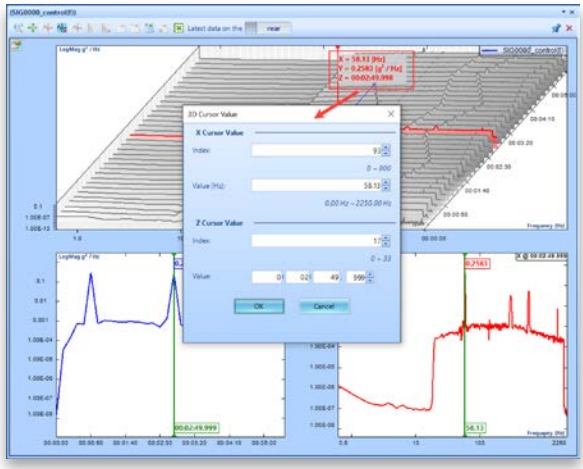
3D Waterfall Display is improved in the EDM 10.1 release.

- Synchronized display updates in 3D Plot and Slice Plots.
- Synchronized Zoom feature is introduced in 3D Plot and Slice Plots.
- Users can manually set the Z-axis range.



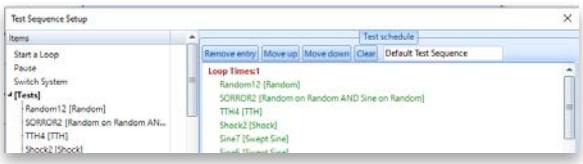


- Users can manually specify the cursor value for any axes.



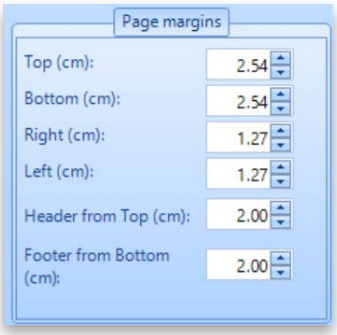
Clear in Test Sequence

The Test Sequence provides a Clear function to clear out all tests that populated the schedule by default.



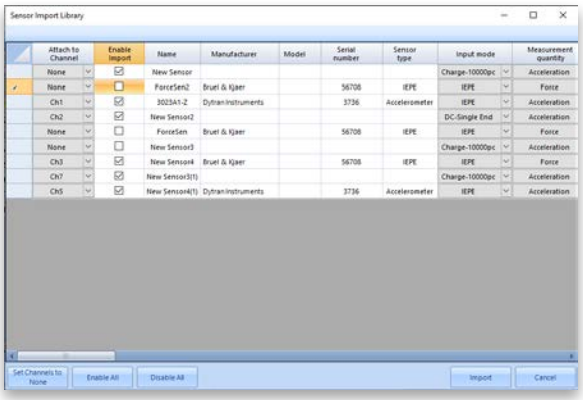
Improvements to Margins in Report

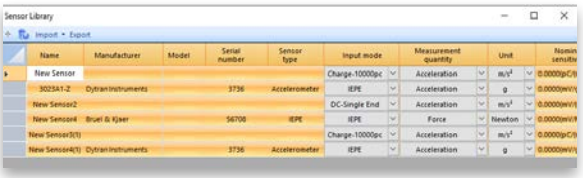
Users can set up page margins for content, header, and footer of a report template.



Enhanced Import of Sensor Data from Excel

An improved process for importing sensors to an Input Channel is introduced.

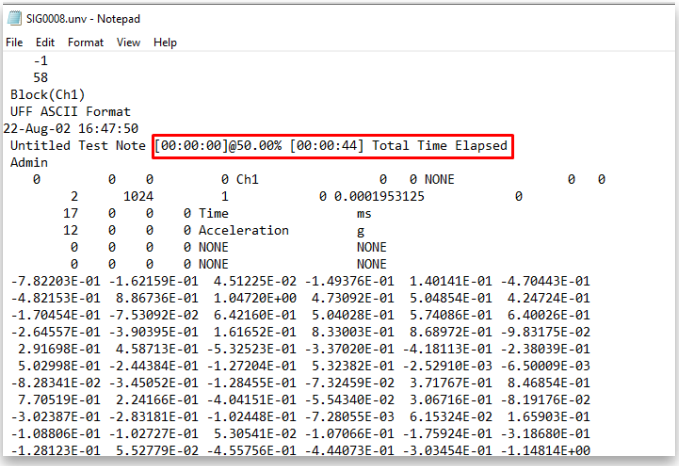


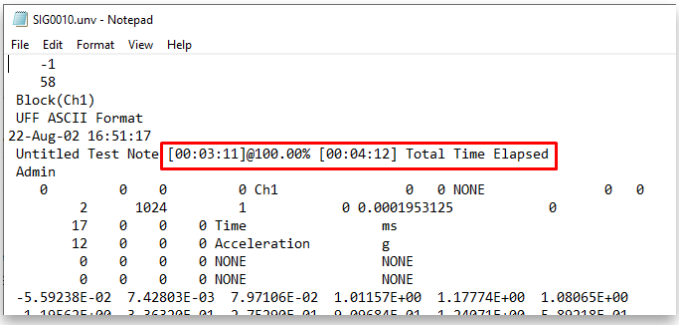


	On/Off	Measurement quantity	Engineering unit	Sensor
1	On	Acceleration	g	3023A1-Z
2	On	Acceleration	g	New Sensor2
3	Off	Force	LBF	New Sensor4
4	Off	Acceleration	g	User Defined
5	Off	Acceleration	g	New Sensor4(1)
6	Off	Acceleration	g	User Defined
7	Off	Acceleration	g	New Sensor3(1)
8	Off	Acceleration	g	User Defined

Add Time Elapsed at Full Level & Start of Test Run to UFF, UNV files

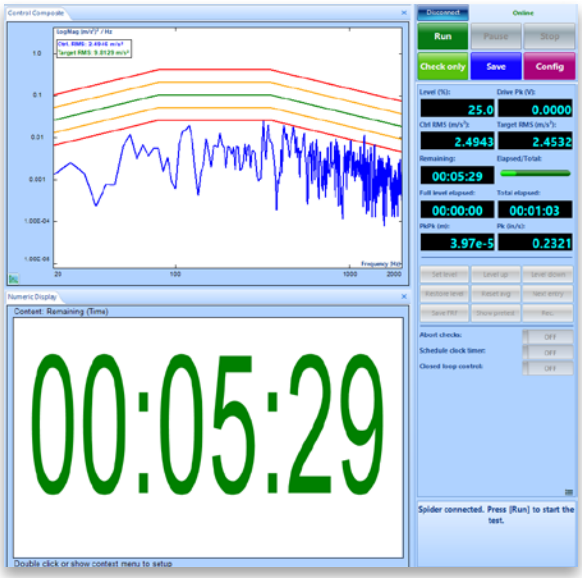
UFF and UNV files now appends the time elapsed at full level and total run time when exporting a signal.





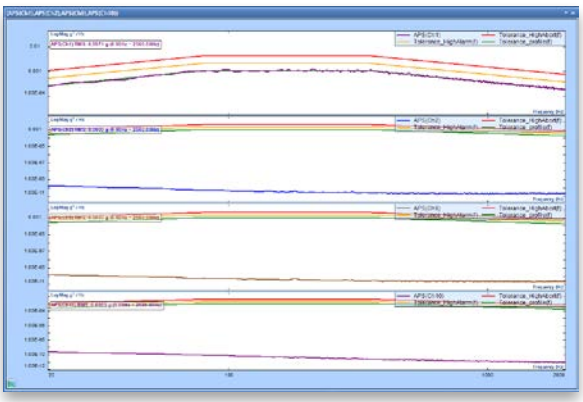
Numeric Display Improvements - Remaining Test Time

Numeric Display now displays the remaining test time.



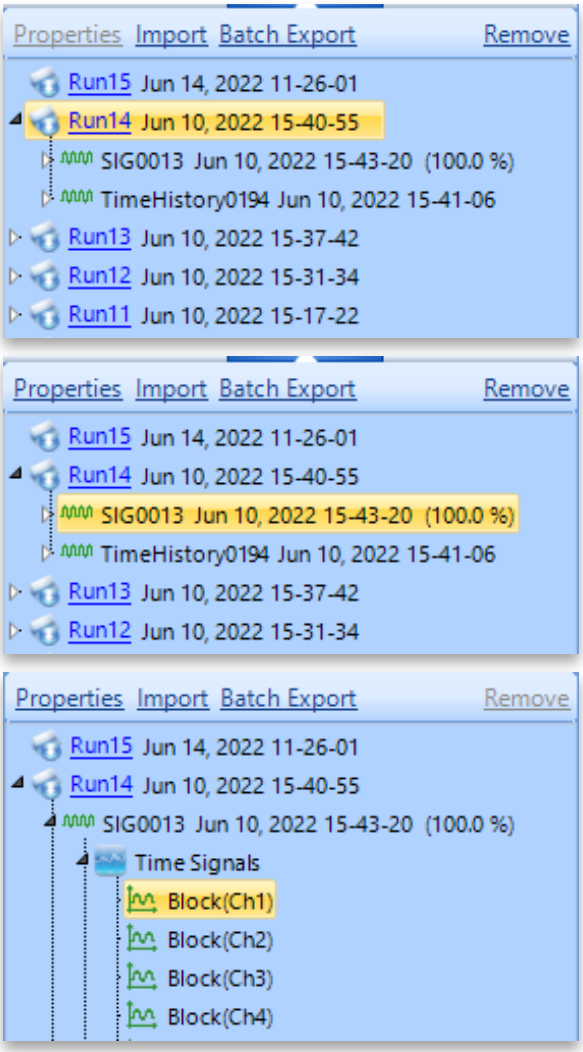
Individual Tolerance Signals for Stack Plots

Stack plot graphs can display their own tolerance signals.



Improved Run Folder Options Accessibility

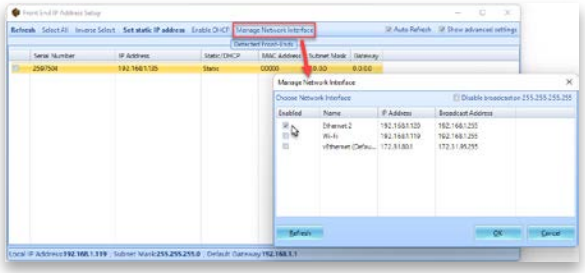
The Run Folder below Recent Tests displays commonly used options to view a Run Folder or Signal Properties, and further options to import, export and remove from view.



Selecting the Network Adapter on Front End IP Address Setup

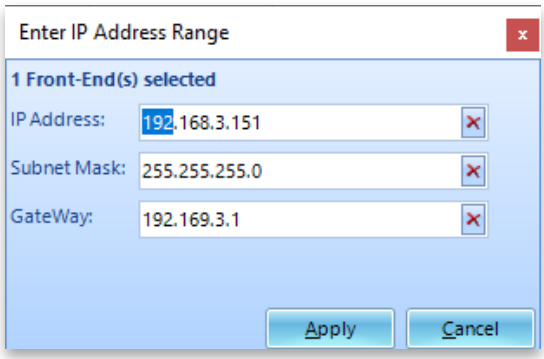
The Spider Configuration's Manage Network Interface feature to improve EDM-Spider connectivity is added to the Front-End IP Address Setup program. This streamlines the first-install Spider

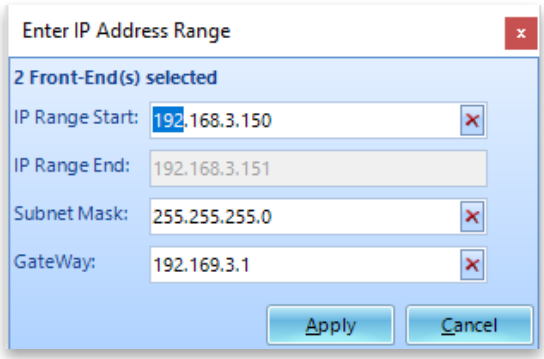
configuration by allowing users to select the network adapter on which the Spiders are available before EDM is even opened.

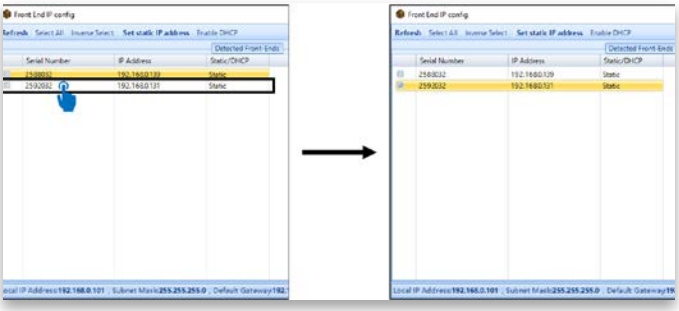


Front-End IP Address Tool Configuration Improvements

Front-End IP Configuration Tool provides an improved user interface to set up Spider device IP addresses and to select Spider devices.

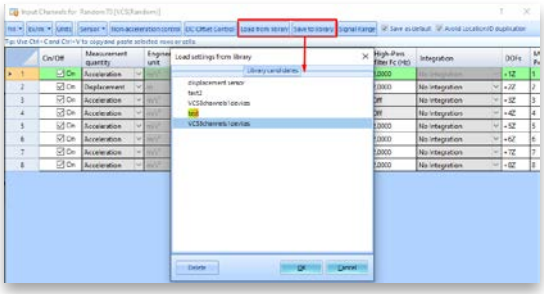


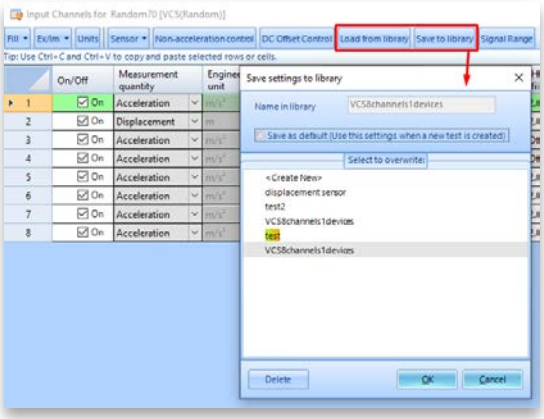


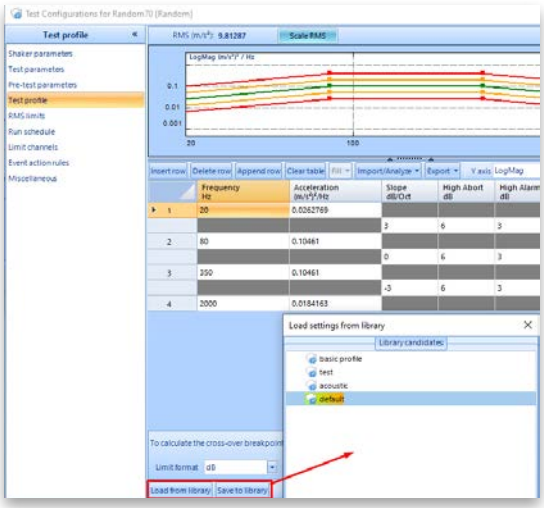


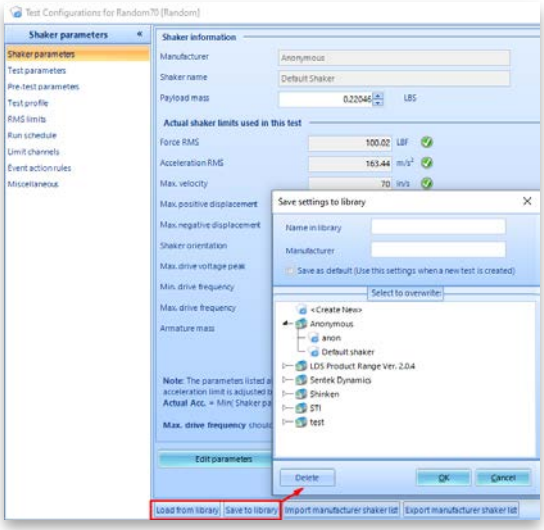
Improvements to Save/Load from Library Feature

Improved user interface to save or load from the library in EDM VCS.



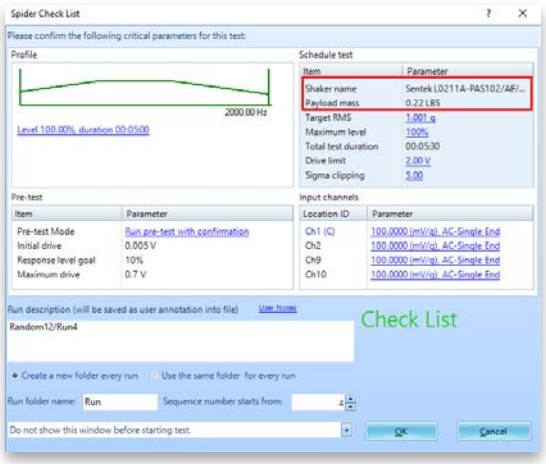






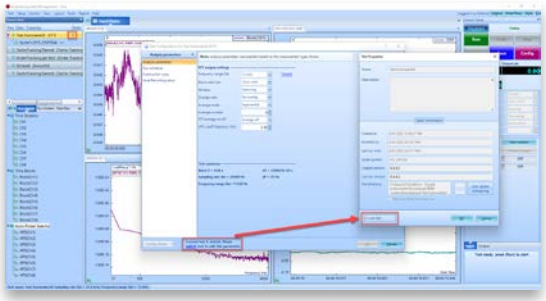
Checklist Includes Shaker Information

The test checklist displayed before a run now includes the Shaker Manufacturer, Shaker Name and Payload Mass information.



Test Locked Warning

A warning is generated if there is an attempt to change a locked test. To unlock and edit a test, select the hyperlink in the warning and unlock the test.



EDM Installation and Initial Setup Convenience

EDM 10.1 makes the user installation process as easy as possible and includes general updates and stronger default passwords to comply with newer trends in IT policy. These general improvements reduce the total number of steps required by new users to start testing with Crystal Instruments products.

SOFTWARE RELEASE HISTORY

Dates of software releases

Type	Release	Exact Version	Release Date
Release	EDM 4.2	CI 4.2.0.3	02/28/2014
Patch	EDM 4.2.0	CI 4.2.0.14	07/02/2014
Release	EDM 5.0	CI 5.0.0.2	11/27/2014
Patch	EDM 5.0.1	CI 5.0.1.3	02/27/2015
Release	EDM 5.1	CI 5.1.0.6	08/12/2015
Release	EDM 6.0	CI 6.0.0.1	05/19/2016
Patch	EDM 6.0.2	CI 6.0.2.9	08/09/2016
Release	EDM 6.1	CI 6.1.0.4	02/07/2017
Patch	EDM 6.1	CI 6.1.0.27	08/22/2017
Release	EDM 7.0	CI 7.0.0.6	02/01/2018
Patch	EDM 7.1	CI 7.1.0.7	07/19/2018
Release	EDM 8.0	CI 8.0.0.1	02/02/2019
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
Release	EDM 10.0	CI 10.0.0.2	10/26/2021
Release	EDM 10.1	CI 10.1.0.1	09/09/2022

Type	Release	Exact Version	Release Date
Release	VDS 1.2	VDS 1.2.0.6	02/08/2019
Release	VDS 1.3	VDS 1.3.0.6	10/10/2019
Release	VDS 1.4	VDS 1.4.2.16	07/06/2020
Release	VDS 1.5	VDS 1.5.0.4	10/16/2020
Release	VDS 1.6	VDS 1.6.0.1	04/09/2021
Release	VDS 1.7	VDS 1.7.0.6	10/27/2021

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 10.0.0.x	10.0.0.x
Spider-81 (v7.x)	
EDM Testing 10.0.0.x	10.0.0.x
Spider-81B (v7.x)	
EDM Testing 10.0.0.x	10.0.0.x
Spider-80SG/SGi	
EDM Testing 10.0.0.x	10.0.0.x
Spider-20HE/20i	
EDM Testing 10.0.0.x	10.0.0.x

Product and Software Version	Firmware Versions
CoCo-80	
EDM 6.0.2.x	4.0.x
CoCo-70X	
EDM Testing 10.1.0.x (EDM CoCo for DSA)	2.0.x or above
CoCo-80X/90X	
EDM Testing 10.1.0.x (EDM CoCo for DSA)	2.0.x or above

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