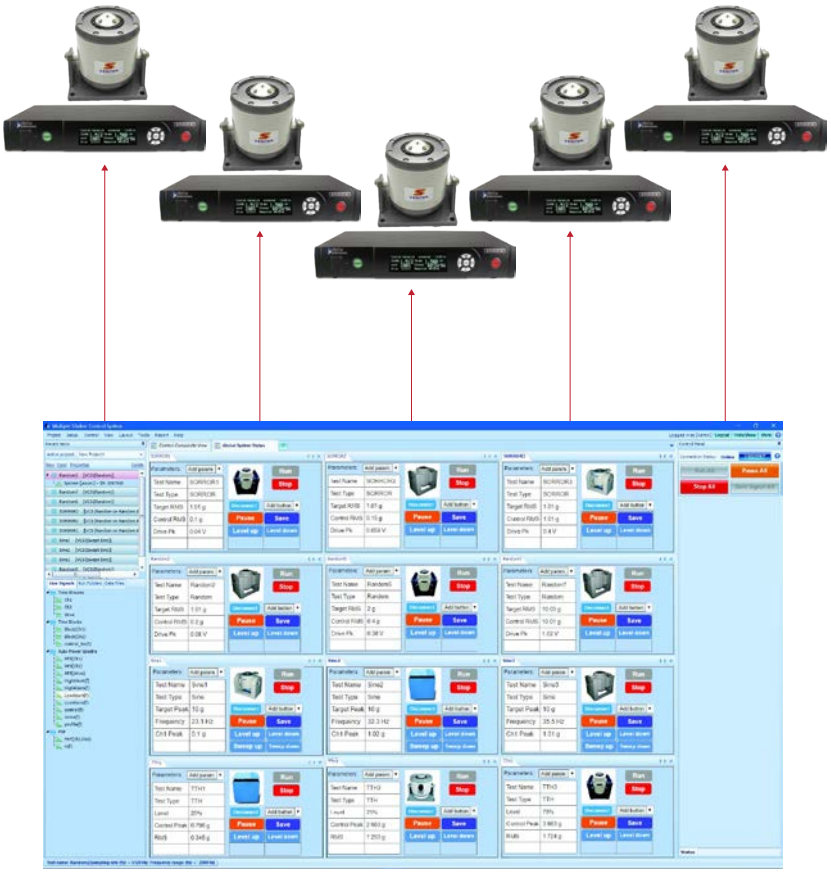
CRYSTAL INSTRUMENTS

Multiple Shaker Control in EDM Software

Application Note 034



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Overview

Multi-shaker control (MSC) is a unique feature offered by Crystal Instruments EDM Software versions 7.0 and above. The EDM MSC function enables users to view and monitor multiple shaker tests from one PC station. Users can observe testing status, view individual signals from different shaker systems, and send commands to each controller from one centralized application. The MSC feature is especially useful for production applications, resulting in increased efficiency and a simplified control process. Up to 12 controllers can be accessed simultaneously. (Figure 1.1, Figure 1.2, and Figure 1.3)

Users have an option to view the composite plot, test status, or both.

MSC Highlights

- Run different test types independently
- Custom status display
- Custom individual command panel
- Common commands for all tests
- Robust tolerant design

MSC Main Menu

After connecting to the controllers, users can choose from the controller list to create a project/test or configure/run different tests based on each controller selected. In MSC, the available menus are Project, Setup, View, Layout, Tools, Report, and Help.

Project Menu

The purpose of this menu is for creating, opening, saving, and configuring projects and tests. Each project contains up to eight tests. Each test is conducted by an independent shaker controller. Tests are always created under a project and managed by a project. For example, if a user decides to run two sine tests and four random tests with six shakers simultaneously; a new project must be created, with six new

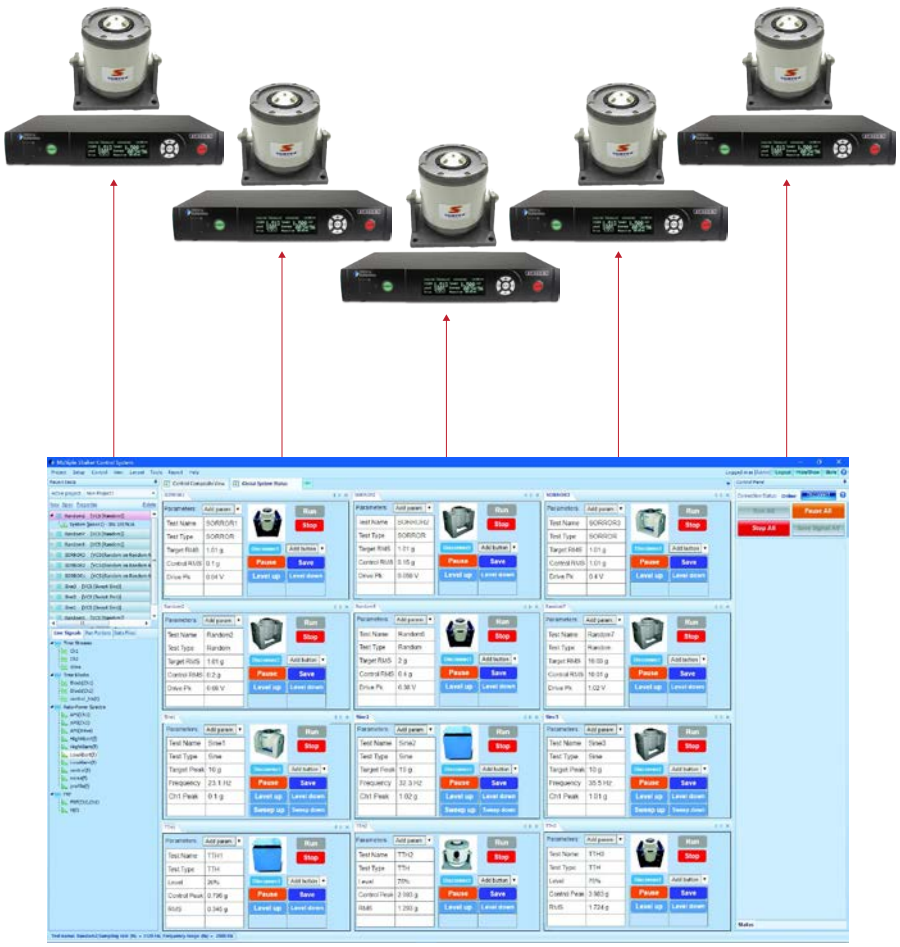

Figure 1.1 MSC Schematic Diagram

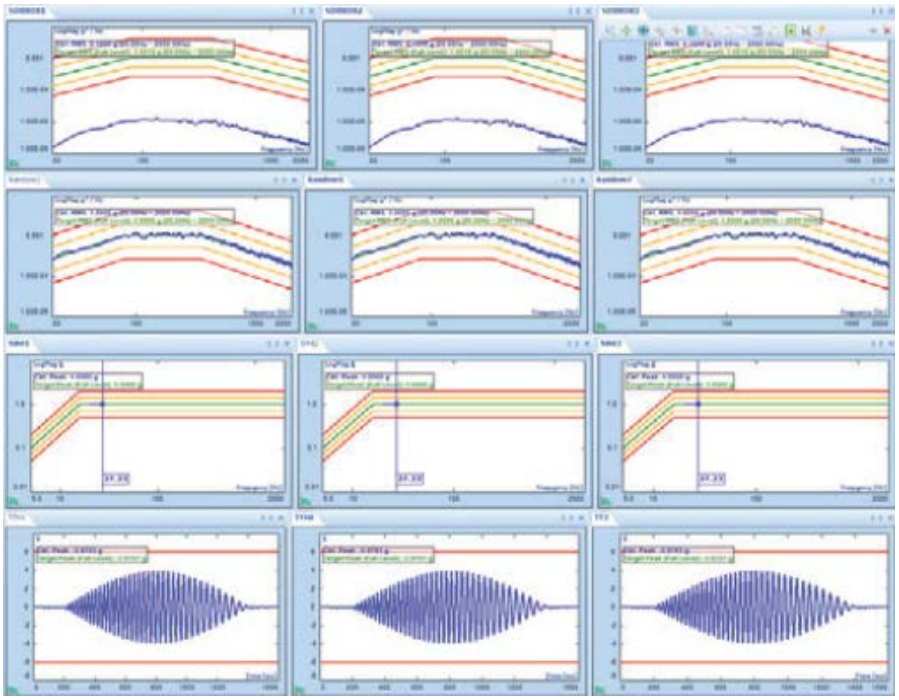

Figure 1.2 View Composite from 12 Shakers

tests under the project. (Figure 1.4)

A test is a collection of configuration settings and acquired data. Each test operates in one mode, such as Random Control, Swept Sine Control, or Dynamic Signal Analysis. EDM stores test data (e.g., signals,) in ATFX format by default in the Run Folder. Users can also choose to save measured data to the internal flash memory of front-end hardware.

New Project starts the New Project dialog box and allows users to create a new project with a specific project name, description, and directory.
Save Project As allows users to save a current project and all tests under the project as a file on a disk. There are two options to save a project: "With the run folder" saves all previous test data along with the project and tests. "Without the run folder "saves only the project and tests while discarding previous test data.

Open Project allows user to browse from a disk to open a project file.

Delete Project deletes database records only, it will not delete any local files.

Add New Test starts the New Test dialog box and allows users to create a new test based on manufacturing settings or a preconfigured test template.

Add/Edit Existing Test allows users to open an existing test from the database or browse test files from a disk. If a user opens a test file from a disk with a duplicated name in the database, the software will prompt the user with an option to load the test and overwrite the existing one in the database.

Save Test will save changes to the database. When exiting EDM, the contents of the database will

Figure 1.3 Four Tests with Combined View

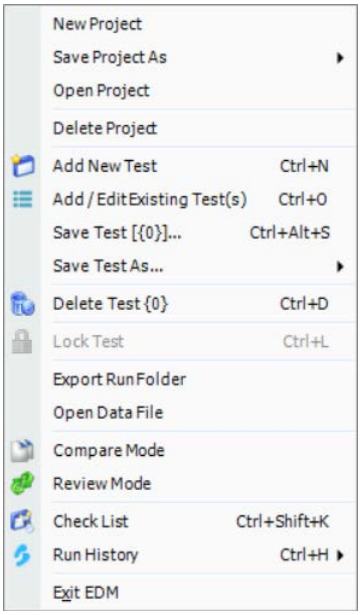

Figure 1.4 Project Tab

synchronize automatically to the testing file on disk. In other words, the test will always be saved. All changes made will be saved.

Save Test As allows users to save a test under a different name.
Delete Test will delete the test file from the database and the disk. Users will be asked if they want to delete associated data files.

Lock Test will lock a test in the database to prevent accidental deletion. A locked test can be unlocked afterwards.

Export Run Folder will export all signals from the current run folder to a directory.

Open Data File will allow users to

browse from the disk and open data files.

Check List opens the summary of critical parameters for review. Users have the option to preview this dialog box before each test.

Run History opens a dialog box showing recent runs in various categories. It is the most efficient method to view prior tests in a chronological order. The Run History window includes all tests' information in each run, such as the test name, start/end time, duration, test description, run log, and saved files. (Figure 1.6)

When there are a large number of tests with various types, users enter the test name in the search box to find and view tests. Click the test name hyperlink or open test hyperlink to open a currently selected test.

Exit EDM will exit the software. If a test is still in progress, the software will ask the user to stop the test first and then exit. When EDM exits, all changes to all the tests are automatically saved.

Setup Menu

This menu is used to setup all test related parameters such as channel tables and test configurations. The purpose of these sub-menus is the same as described in typical VCS tests. (Figure 1.7)

Test Configuration opens a tabbed dialog box and allows the user to set up all testing parameters.

Engineering Units allows the user to set up the EU as global parameters or only for the currently opened test.

Input Channels opens the channel setup dialog box.

Measured Signals opens the measured signal dialog box.

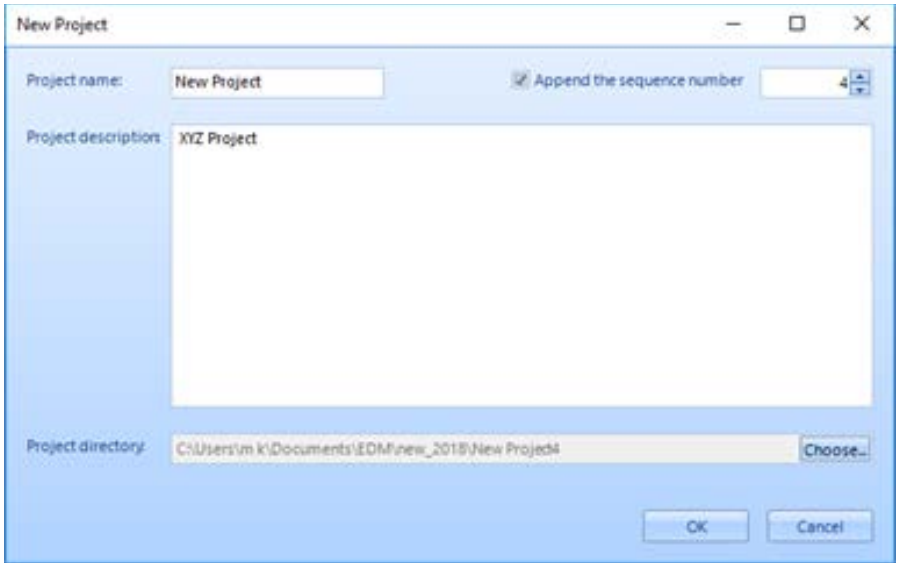

Figure 1.5 Create a New Project

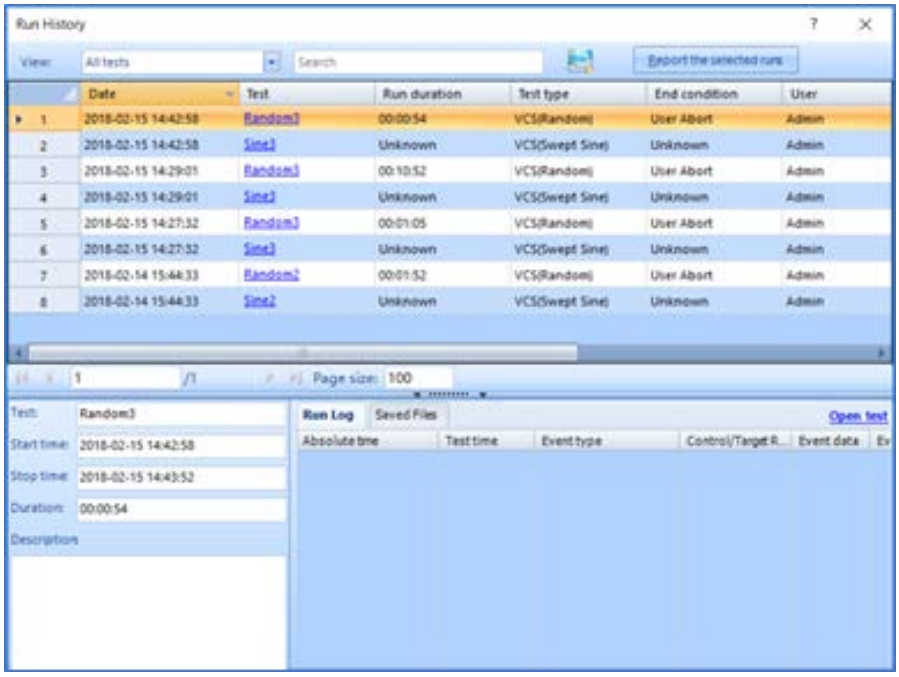

Figure 1.6 Run History

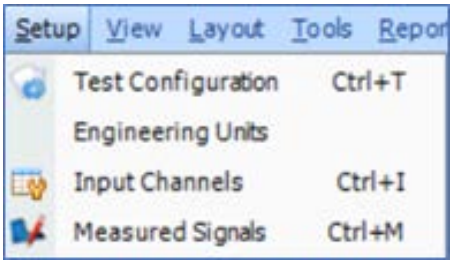

Figure 1.7 Setup Tab

Measured signals are signals that can be displayed or stored.

View Menu

View Menu is used to add display windows. Display Windows are

windows used for displaying data under the Signal Display tab(s) in the main EDM window. This data can be from recorded files or real-time acquisition in the time domain or frequency domain. EDM provides a set of default windows to display standard data types such as time streams, blocks, and frequency spectra. Custom window templates with user-defined combinations of displayed signals can be defined using the Save Active Window as User Defined command. These custom templates are listed at the bottom of this menu. (Figure 1.8)

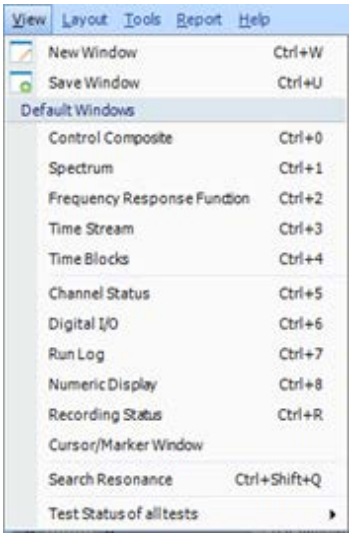

Figure 1.8 View Tab

Layout Menu
The Layout menu contains commands for opening and closing signal display tabs. The current layout of tabs can also be saved and opened. Each of these tabs contain one or more display windows that are opened using the View Menu above. Commands are provided to arrange display windows in the current tab. (Figure 1.9)

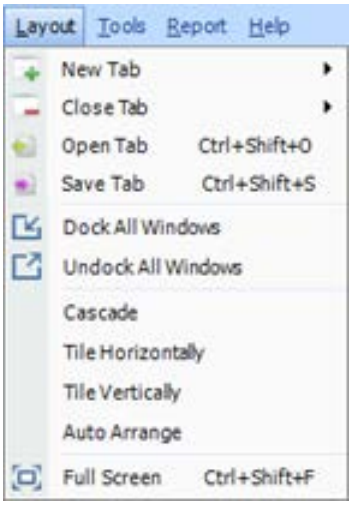

Figure 1.9 Layout Tab

Tools Menu
This menu contains commands for general EDM functions. Included commands are hardware configuration and calibration, database functions, switching EDM Working Mode, opening License Manager, and opening the Global Settings window. (Figure 1.10)

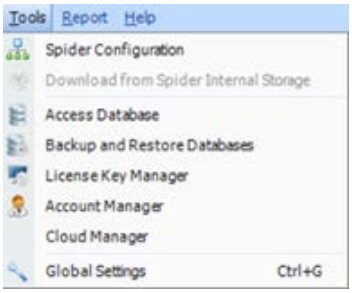

Figure 1.10 Tools Tab

Report Menu
This menu contains commands to generate a wide range of testing reports, including test data, parameters, and users' notes. (Figure 1.11)

To create a report template, select the (Define Template) menu command.

Hardware System Configuration
Multiple Spider front-ends are configured respectively for multiple shakers using EDM MSC software. Configure a system in the Spider System Configuration window by selecting the Spider Configuration option from the Tools menu. (Figure 1.12)

Create a New Project and New Tests
Click **Project->New Project** to create a new project (as shown in Figure 5). The user can specify a project name and description for their reference. The project directory is the location a project is saved to on the local disk. This is also the root folder for newly saved test files and data files.

Click OK to finish creating the new project. The New Test Wizard will begin running immediately to guide users to create a new test under the newly created project. If additional time is required to create a new test, press the cancel button to finish creating the project without any tests. Users can create new tests later by clicking the New Test button. (Figure 1.13)

There are three types of VCS tests currently supported in EDM-MSC. Additional VCS testing methods will be added in future releases.

- Random
- Sine on Random/Random on Random (SoR/RoR)
- Swept Sine

The next screen asks users to name the test and to select a Spider system for the test. (Figure 1.14)

After the first test is created, the following main screen of the MSC test will be shown as below. (Figure 1.15)

This screen is divided into five (5) parts. On the top is the menu and toolbar section. On the left side are two sections: recent test list and the signal list. On the right side is the test control. The middle section includes the signal display, status window, and control commands.

Users have the option to add test state items, control commands, or upload shaker images for each test. (Figure 1.16)

Users can continue to create more tests by clicking on **Project->New Test**. After multiple tests are added, the main page of the MSC test will be displayed as below. (Figure 1.17) Since each test has its own signal display window and control panel, the screen size allocated to each test is decreased when there are more tests. It is highly recommended to use a large-size computer monitor with a high-resolution display for the best viewing experience. (Figure 1.17)

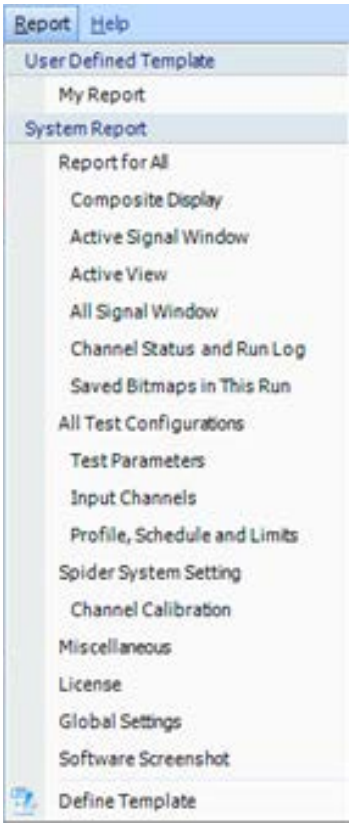

Figure 1.11 Report Tab

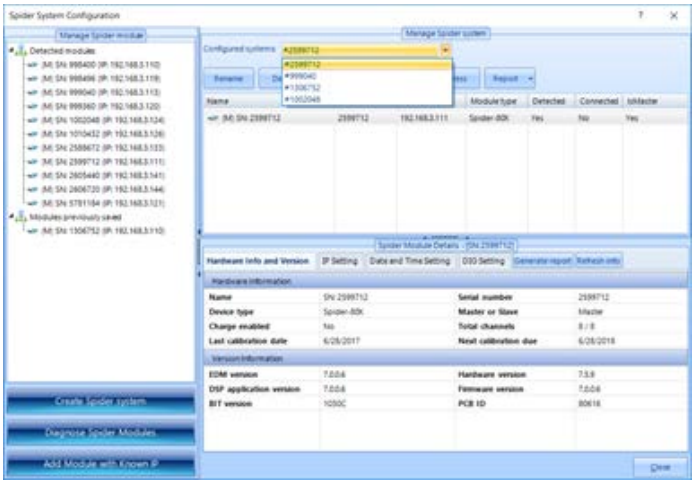

Figure 1.12 Create Spider Systems for MSC

Recent Test List/Signal List
The Recent Test section on the left side displays tests recently finished under each active project. The Signal List shows Live Signals, Run Folders, Data Files of a specific test.

Main Control Panel
The main control panel provides access to the same actions for all tests. The function buttons under the main control panel apply to all tests under the current project. (Figure 1.18)

Connect All: connect to all

controllers under the current project. Un-detected devices will not be connected. This button will only connect to detected devices.

Disconnect: disconnect from all controllers under the current project.

Run All: start running all the tests.

Stop All: stop running all the tests.

Save Signal All: save the signal of each test to its own run folder.

Config: open the test configuration window. For details on how to configure a test, please refer to the Random and Sine chapters of this manual.

Individual Control Panel and Display

In each test window, there is a signal display, status, and control panel as shown below. (Figure 1.19)

The function buttons on this control panel only apply to this specific test and does not affect other tests. Only the buttons on the main control panel will apply to all tests. Some of the following function buttons are specific to a random test and/or sine test. Therefore, not all buttons will be shown on the control panel of each test.

Connect: connect to the controller of the current test. If the device is not detected, this button will be grey out

Run: start running current test

Stop: stop running current test

Set Level: change the current target output level to a specified value, as a percentage of the test profile

Level Up: increase the current output level by 10%

Level Down: decrease the current output level by 10%

Figure 1.13 Create a New Test

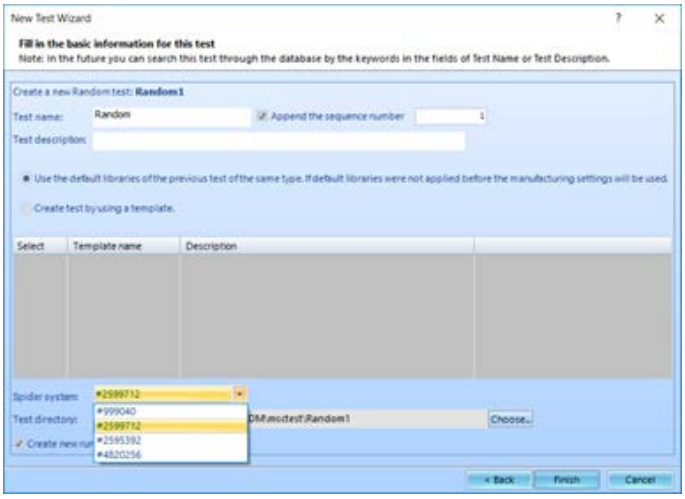

Figure 1.14 The Wizard for a New Random Test

Figure 1.15 Random Test

Restore Level: restore the current output level to the level set by the current schedule entry

Reset Average: reset all averages to zero

Hold Sweep: the sweep in progress at the current frequency

Sweep Up: begin sweeping in the direction of increasing frequency

Sweep Down: begin sweeping in the direction of decreasing frequency

Release Sweep: resume the sweep set by the current schedule entry

Set Frequency: dwell at a specified frequency

Next Entry: end the current test stage and move to the next schedule entry

Pause: pause the test

Save Signal: save the signal to the run folder

Custom Display
Users can choose to display one or both the control composite and test status for high counts of tests. This is accomplished in the **View** menu (View-> Test Status of all tests). (Figure 1.20)

Custom Command List
Users can also choose to display or remove selective commands: right-click to remove a command or click Add… to add a command. (Figure 1.21)

Instant Warning and Notifications
During testing, warning messages or notifications will display in each test section. A warning message such as user abort, Lost Ctrl Ch will display at the top of the test status list. Notifications such as save will display in a floating window as shown below. (Figure 1.22)

Figure 1.16 Select Shaker Photo for a Test

Figure 1.17 Create Four Tests

Figure 1.18 MSC Control Panel

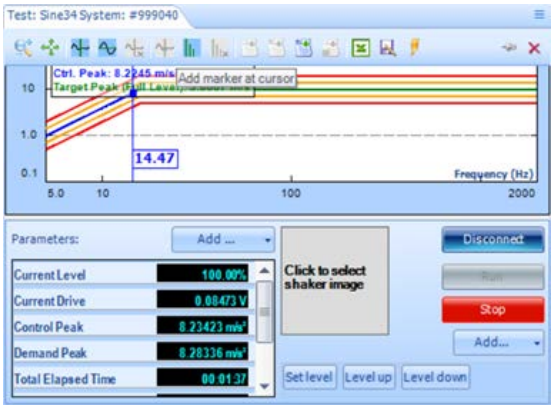

Figure 1.19 Control Panel for test

Manipulate a Test

To change the configuration of one test or to download saved data from internal memory, the specified test should be made active first. To change the configuration, users should first stop the current test. (Figure 1.23)

Generate Reports

After a report template is created, users may generate the report for all tests with one-click. (Figure 1.24)

Figure 1.20 Display Test Status Only (Four Tests)

Figure 1.21 Add or Remove a Command

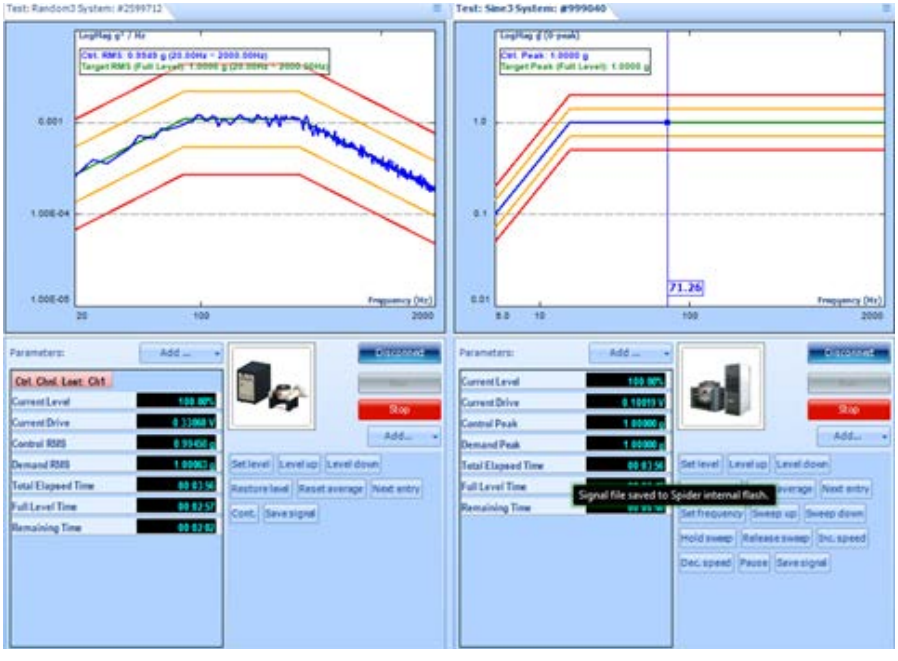

Figure 1.22 Warning/Notification Display

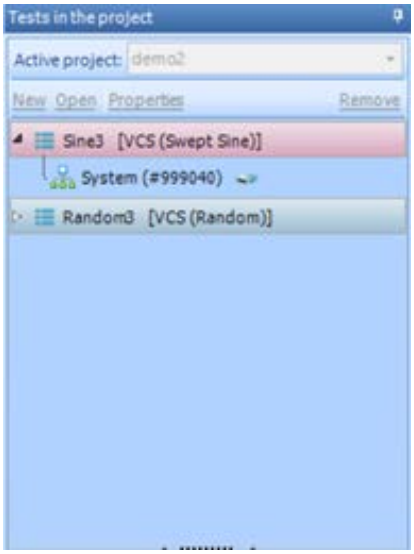

Figure 1.23 Active Test Atop (Sin3)

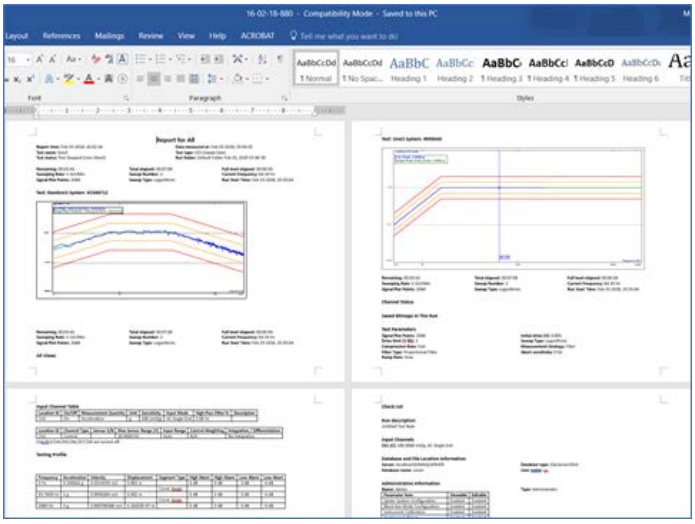

Figure 1.24

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