SPIDER-20

WIRELESS DYNAMIC SIGNAL ANALYZER AND DATA RECORDER

CRYSTAL INSTRUMENTS

WWW.CRYSTALINSTRUMENTS.COM

FEATURES

WEIGHS ONLY 18 OUNCES

BUILT-IN WI-FI

6 HOUR BATTERY LIFE

4GB FLASH MEMORY

FOUR INPUT CHANNELS

ONE TACHOMETER CHANNEL

PC INDEPENDENT

iPAD COMPATIBLE

SELF-CONTAINED

YOUR FIELD TESTING SOLUTION

Spider-20 is a compact yet powerful dynamic signal analyzer and digital data recorder. It provides four 24-bit precise high-fidelity input channels, and a unique software-selectable tachometer-input/signal-source output channel (all using conventional BNC connectors). Each input is individually programmable to accept AC or DC voltage or output from an IEPE (ICP) sensor with built-in electronics.

Spider-20 is a diminutive 5.3 x 4.3 x 1 inch tool weighing only 18 ounces. It has only three push-button controls and five LED status indicators. This little powerhouse can run over 6 hours on its internal rechargeable battery which can be replaced in field with a backup battery. It can also record data on its built-in 4GB flash memory at the simple push of a button.

Spider-20 communicates with the world through its built-in Wi-Fi interface. Use your iPad to setup and view or record time histories as well as perform spectrum analysis or measure Frequency Response and Coherence functions. Link the Spider-20 to your laptop or tablet running Windows and enjoy the full repertoire of functionality provided by our EDM (Engineering Data Management) software including 1/nth Octave acoustic functions, Order Tracking for rotating machinery, Shock Response Spectra for drop testing, or Digital Filtering for special purpose analysis.

Transfer measured data to truly massive storage space using the EDM Cloud server. EDM can be used to program your Spider-20 to perform a custom measurement or measurement sequence at the touch of its START button, making it an unintimidating and user-friendly tool. No computer, tablet or phone is required; just use your thumb and your Spider-20 operating in Black Box mode. Use our flexible Automated Schedule and Limiting software to turn this Spider into an intelligent unattended monitor capable of responding to data conditions or networked instructions, notifying you of significant conditions via e-mail.

COMPLETE SUITE OF SIGNAL ANALYSIS FUNCTIONS RUNNING ON PC:

Long waveform recording with scope display

Transient capture with Accept/Reject

Auto and cross spectra, Coherence and FRF

Histogram and statistics

1/1, 1/3, 1/6 and 1/12 Octave Filters and sound level meter

Order tracking

Tacho, phase and orbit

Real-time digital filters

Real-time math operations

Swept Sine testing

Shock Response Spectrum (SRS)

Automated limiting test, with scheduling, testing log,

alarm check

Arbitrary waveform output

Sensor calibration

System front-end calibration
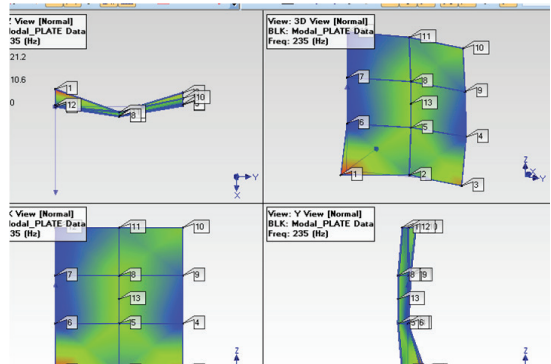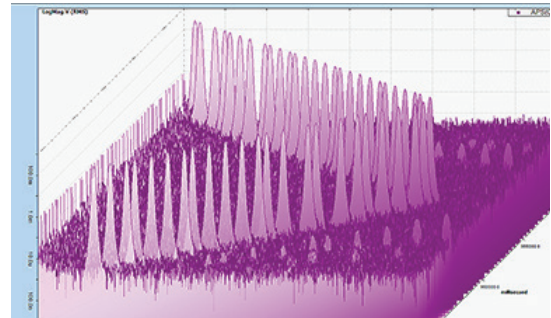
Crystal Instruments EDM (Engineering Data Management) software is designed for a wide range of vibration and shock testing.

EDM is available in English, Japanese, Simplified Chinese, Traditional Chinese, and Russian.
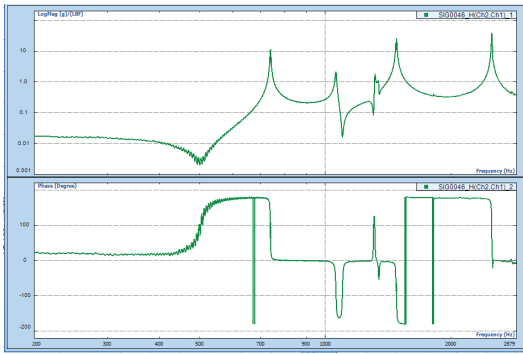
Frequency Response Function (FRF)

The Spider-20 performs FRF analysis, a function which computes the structural response to steady-state osciliatory excitation. An important application of dynamic signal analysis is characterizing the input-output behavior of physical systems. With linear systems, the output can be predicted from a known input if the fequency response function of the system is known.
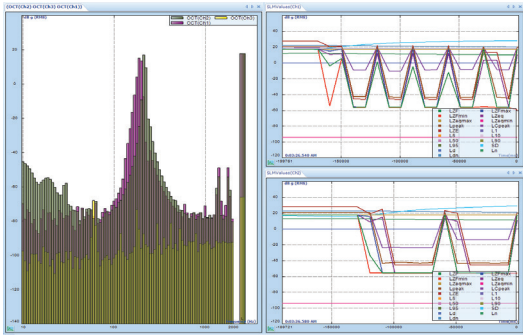

Octave Analysis and Sound Level Meters (SLM)

Both octave filter and sound level meters are implemented based on high precision real-time filters. FFT spectral analysis, octave analysis and sound level meter analysis can be executed at the same time.
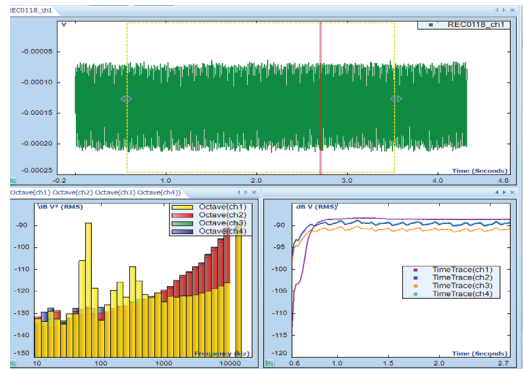

Time Waveform Recording

In addition to saving spectral data, the Spider-20 has the ability to record time wave form data. Raw time wave form data from an array of different sensors is displayed and recorded at sampling rates of up to 102.4 kHz. On the fly processing is also available with different data conditioning modules applied to the raw incoming time streams. Data conditioning includes algebraic functions (addition, subtraction, multiplication, and division), digital filtering, integration, differentiation, calibration, and other math operations applied to the continuous incoming time streams.
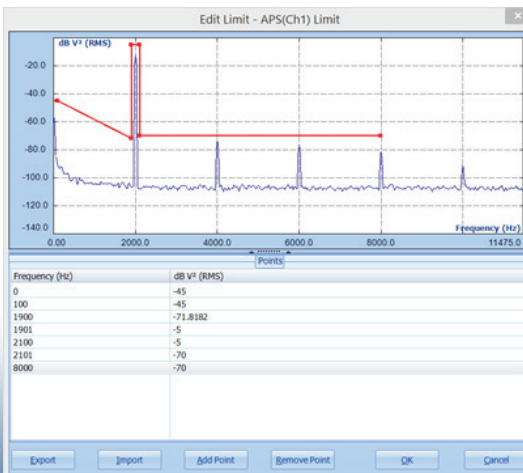

Automated Schedule and Limiting Test

Automated limit test function allows the Spider front-end to conduct automated limit checking for time or frequency signals. The function is supported in both PC tethered mode and Black Box mode. Limiting signals are designed using the EDM software on the host PC. There are four elements in a limiting test: signals being tested, upper or lower limits applied, testing schedule, and testing log.
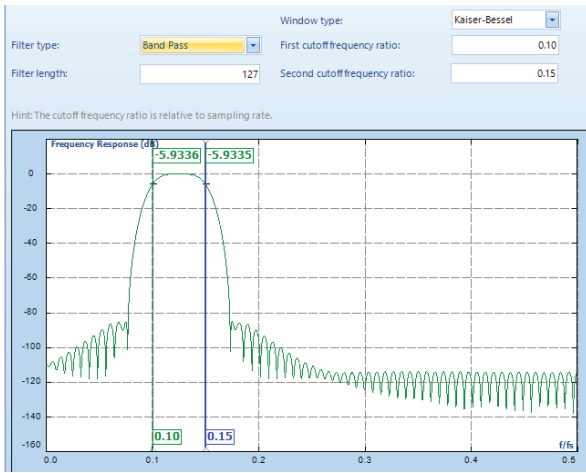
Real-Time Digital Filters

Real-time digital filters are applied in the data conditioning phase. The user designs the filter model with a graphic design tool provided and uploads the filter design parameters to the front-end for real-time calculation. The graphic design tool draws the filter performance in vertical axis with dB unit and horizontal axis in relative frequency.
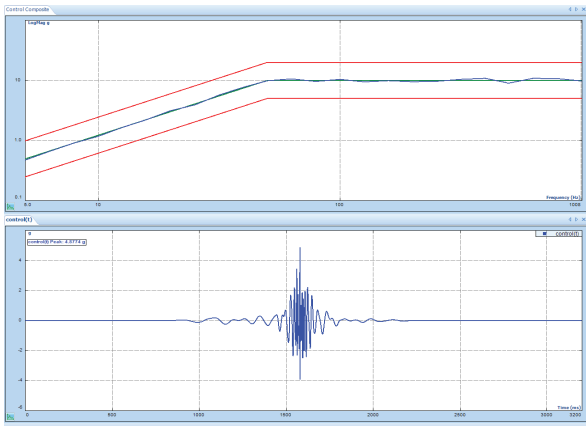
Shock Response Spectrum (SRS) Analysis

Compute the SRS for all channels using maxi-max, maximum negative, and maximum positive analysis techniques. A reference profile is available.
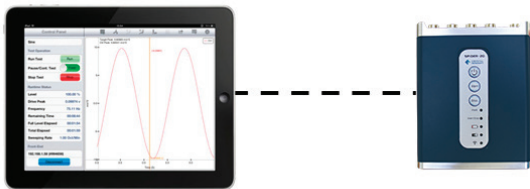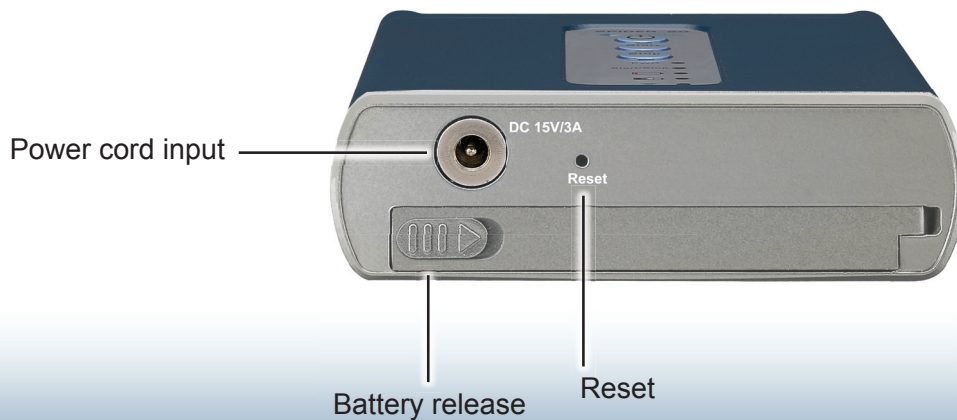
iPad Application for DSA

The EDM App for iPad by Crystal Instruments is available from the Apple App Store. The EDM App allows access to the Spider-20 front-end when operating in Black Box mode. Users will be able to access a preloaded test on their iPad to run and control the Spider-20 as long as they are within the range of a wireless network. The EDM app can also create and edit tests on the iPad. The display window can show one signal or multiple signals and users can print or email screen shots.

Spider-20 HARDWARE DIAGRAM

Four input channels

Tachometer-input/
Output channel

Power

Start test

Stop test

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PWR — Power indicator

Start/Stop — Start/Stop indicator

Low battery indicator

Charging indicator

Wi-Fi indicator
(Indentifies a
Wi-Fi connection)

Four input channels

Tachometer-input/
Output channel

OUT   CH1   CH2   CH3   CH4

GND — Ground

Power cord input

DC 15V/3A

Reset

Battery release

Reset

APPLICATIONS

Machinery Diagnosis

Four inputs and a tachometer channel are the perfect size for many machinery monitoring tasks. Simultaneously measure two perpendicular proximity probes or horizontal and vertical bearing cap accelerations at both ends of a machine. Record this along with a 1/rev tachometer during startups and shutdowns to plot waterfalls and Campbell diagrams identifying resonances, critical speeds and unusual forcing functions. Use the same signal inputs to balance the machine. Place accelerometers on either side of a coupling to aid alignment.

Machine/Process Monitoring

Load a custom monitoring program employing our Automated Schedule and Limiting software and leave your Spider-20 to monitor speed and four dynamic inputs. Upon detecting an alarm-level limit (in the time or frequency domain), it can send you an email reporting the finding and make an immediate recording for more detailed analysis. For longer stays, leave the accessory AC power unit plugged in. This allows Spider-20 to draw power (6 Watts, maximum) from any 100 to 240 VAC (50/60 Hz) power line. Alternatively, you can provide a battery backup of 15 VDC (±10%) for more remote applications.

Modal Analysis

Four signal inputs allow you to measure a force and three accelerations. Use a fixed tri-axial accelerometer or up to 3 separate reference accelerometers and a force-transduced hammer to perform impulse studies (with redundant measurements). Alternatively, turn on the output channel and let the Spider drive a shaker with random noise while you rove a tri-axial around the structure, measuring 3 degrees of response freedom at a time. Switch the shaker drive to a sinewave at a detected resonance frequency to do a quick hand-and-ear mode shape analysis on the spot.

Acoustic Studies

Add an ICP microphone and your iPad becomes a full function sound level meter. Add 3 more and it becomes a multi-channel, multi-function sound level recorder and analyzer. Take the Spider-20 on the road or in the air to record interior noise signatures during full-spectrum vehicle operation. Make and monitor pass-by measurements from the vehicle. Validate all of your recordings in-place on your tablet or laptop before returning to base.

Vehicle Dynamics

Record speed and four DC-coupled accelerometers to fully document chassis handling characteristics. Record any combination of acceleration, displacement, strain and sound to characterize annoying operational periods. Monitor engine and driveline vibration on your remote screen during road tests, whether you are the driver, a passenger or a standing observer.

Spider-20 PRODUCT SPECIFICATIONS

Analog Input Channels
Input Channels: 4
Coupling: AC, DC, IEPE (ICP®)
Input Range: ±0.1V, ±1V, ±10V
Input Dynamic Range: 100 dBFS
Sampling Rate: 0.48 Hz to 102.4 kHz, with 54 stages
Maximum Useful Bandwidth: 46.08 kHz

Tachometer Input Channel
Tachometer Input Channel: 1
Connector Type: isolated BNC (shared with the Analog Output)
Configuration: Tachometer or Output function selected by software
Shaft RPM Range: 3/N – 300,000/N RPM

Analog Output Channel
Output Channels: 1
Output Range: ± 10 Volts

DC Power Input
Connector Type: 5.5mm Jack connector (on rear panel)
Voltage: 15 VDC (±10%)

Indicating LEDs
Power, Start/Stop, Battery, Wi-Fi and Charging

Network Communication
Type: Built-in Wi-Fi router
Compliance: IEEE 802.11a/b/g/n; dual-channel; 2.4 & 5 GHz band 802

Power Specifications
Power Supply: interchangeable battery with DC charger interface
Battery Hours: 6 hours or longer in full operation
Power Consumption: less than 6W

Environmental Specifications
Enclosure 135mm x 109mm x 32.5mm
Weight: 0.56kg
On-Board Flash Memory: 4GB

ORDERING INFORMATION

All Spider-20 front-ends include the following accessories: BNC cable (1), power adapter, battery, grounding cable, external battery charger, and User's manual on CD.

S20-P02	Spider-20 Front-end: Two 24 bit IEPE/Voltage inputs enabled, One 24 bit output, BNC connectors, built in Wi-Fi connection, and Black Box engine. EDM App the FFT mode (DSA-37) is included.
S20-P04	Spider-20 Front-end: Four 24 bit IEPE/Voltage inputs enabled, One 24 bit output, BNC connectors, built in Wi-Fi connection, and Black Box engine. EDM App the FFT mode (DSA-37) is included.
S20-2CH	Add Two additional input channels to Spider-20.

SUPPORTED SOFTWARE APPLICATIONS
EDM Dynamic Signal Analyzer
DSA Mode Software (PC-based)

DSA-10-C08	FFT Spectral Analysis
DSA-11-C08	Octave Filter Analysis and Sound Level Meters
DSA-12-C08	Real-Time Order Tracking and Order Analysis
DSA-13-C08	Swept Sine Analysis
DSA-20-C08	Time Waveform Recording
DSA-24-C08	Automated Schedule and Limiting Test
DSA-25-C08	Real-Time Digital Filters
DSA-27-C08	Shock Response Spectrum (SRS) Analysis
Spider-CAL	Spider Instrument Calibration Software

EDM App for iOS (iPad-based)

DSA-37	FFT Dynamic Signal Analysis

To find a distributor near you, please visit our website.