

Press Release

Spider-81: the 4th generation vibration controller



Santa Clara, CA – Release Date: May 1, 2010

Spider-81 is a highly modular, distributed, scalable vibration control system developed by Crystal Instruments. It represents the fourth generation of vibration control systems because of its advanced technology not seen in the current generation.

DSP Centralized Architecture

Unlike traditional controllers that rely heavily on an external computer for real-time operation, Spider is the first controller that directly integrates the time-synchronized Ethernet connectivity with embedded DSP technology. This strategy greatly increases the control performance, system reliability and failure protection of the controller. It also allows large number of channels to be configured without sacrificing system performance.

Latest Hardware Design

Spider-81 modules have voltage, charge and IEPE inputs which are ideal for shock, vibration and acoustic measurement or general purpose voltage measurement. The internal flash memory stores test configuration data for controlling up to hundreds of channels simultaneously and stores real-time analysis data. Multiple output channels provide various signal output waveforms that are synchronized with the input sampling rate. A bright LCD displays testing status info. Ten monitoring connections on each unit can be used to read the signals of analog inputs and outputs. The front panel has a dozen function buttons. There are built-in isolated digital I/O and RS485 serial ports to interface with other hardware. Emergency contact switch can be installed to control the immediate shutdown.

Simple Network Connection

Ethernet connectivity allows the Spider-81 to be physically located far from the host PC. This distributed structure greatly reduces the noise and electrical interference in the system. One PC can monitor and control multiple controllers over the network. Since all the control processing and data recording are executed locally inside the controller, the network connection won't affect the control reliability. With wireless network routers, the PC can easily connect to the Spider remotely via Wi-Fi.

Time Synchronization between Multiple Modules

The Spider-81 is built on IEEE 1588 time synchronization technology. Spider modules on the same network can be synchronized with up to 100 ns accuracy, which guarantees ± 1 degree cross-channel phase match up to 20 kHz. With such unique technology and high-speed Ethernet data transfer, the distributed components on the network truly act as one integrated system.

Black-Box Mode: Run without PC

The Spider-81 can be executed in *Black Box Mode* which allows it to operate without a PC. In this mode, a PC is used only to configure the control system before the system starts operation and to download data after the test is complete. During the test, the controller can be operated according to a preset schedule or from a variety of external devices, such a control pendant, a Wi-Fi enabled PDA, or an iPad.

On-Board LCD Display

Each Spider-81 is equipped with a bright front-panel LCD that displays system status and test information. Real-time status such as control RMS or sweeping frequency can be instantly viewed.

Designed for High Reliability

Spider-81 is the very first vibration control system designed for fail-safe operation even in the event of network or power loss. A backup battery allows the controller to continue to function and save status information if it loses power. Advanced safety routines allow sensor failures to be detected within milliseconds. The Spider-81 hardware passed strict environmental tests including EMI, temperature, drop shock, sine and random vibration. The system was built tough to withstand the rigors of the testing environment and for long-lasting durability. The unique floating ground design reduces the ground loop problems in the installation.

Designed for High Accuracy

Using a patented technology, Spider-81 is the first vibration control system that achieves 130 dB input dynamic range. Each measurement channel can detect signals as small as 6 μ V and as large as 20 V. This completely eliminates the need for the input range or gain settings found on traditional controllers.

Designed for High Control Performance

By using enhanced control algorithms and a simplified DSP architecture, the feedback loop time of Sine and Random control are all greatly reduced. A reduced control loop time gives much better capability of resonance search and dwell or control for a structure with high Q resonances. It also provides faster responses for better safety protection.

Ease of Use

The Spider-81 software is further improved at the user interface level. More graphic guidance, wizards, and tools are added to make setup a snap. The interface has been rearranged to make it more logical and more useful. Event-Action Rules, Abort-Sensitivity, and numerous other new concepts are introduced in the software to simplify operation. Searching through a large number of tests is easy with keywords.

ASAM-ODS Data and File Model

ASAM is an international organization that is supported by more than 150 companies in the testing and measurement industry. Spider-81 is fully compliant with the ASAM-ODS data and file model. With ASAM-ODS, the engineering unit, user control, testing article description and data exchange of Spider-81 are all governed by the ASAM standard. The Spider-81 data can be read by the software of LMS, B&K, BBM, and many other providers.

Integrated with Dynamic Signal Analysis

Spider-81 is integrated with general signal analysis functions including time stream recording, transient capture, FFT, auto-power spectra, and transfer function analysis. Multiple Spider-80 DSA modules can work together with Spider-81 VCS module as one integrated system.

About Crystal Instruments Corporation

Located in the Silicon Valley, California, Crystal Instruments (CI) is an engineering firm focused on data acquisition, dynamic signal analysis and measurement data management. With strong experience creating embedded and DSP systems for structural testing, product evaluation, algorithm implementation and application software programming, CI's products and technology are in use today by many of the world's leading companies, industrial providers and government agencies.