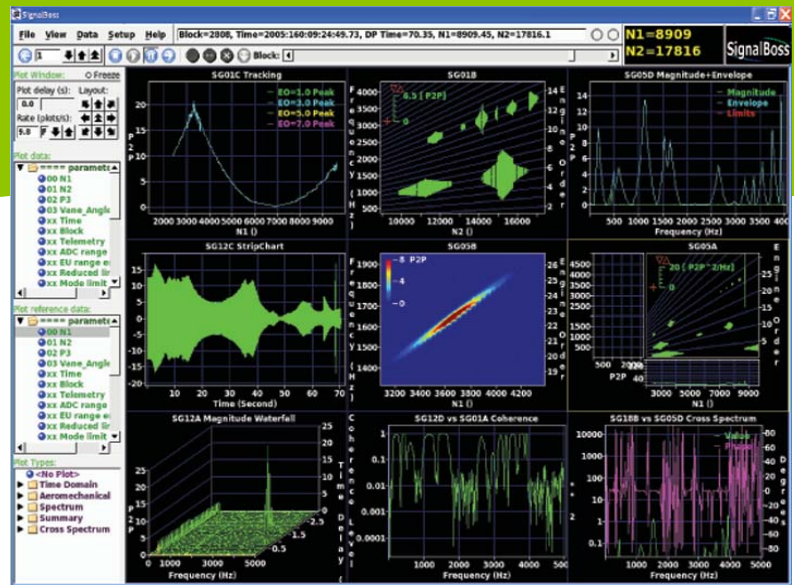


SIGnal Workbench

Dynamic Analysis and Test System

Features

- EDAS SignalBoss data acquisition and test software
 - Analog input control
 - Data recording
 - Data display
 - Post-run analysis
- Concurrent real-time multiprocessor platform
 - Xeon or Opteron processors
 - Configurable data storage
 - RedHawk Linux real-time operating system
- Analog input
 - Up to 256 and higher input channels
 - 32-channel, 24-bit Sigma-Delta cards
 - 64-channel, 16-bit cards
 - 200K simultaneous samples per second
- Signal conditioning
 - 4-channel selectable conditioning modules
 - GUI-programmable current and voltage sources
 - AC and DC coupling
 - Chassis and cabling
- Rackmount cabinet packaging



Concurrent SIGnal Workbench (SIGW) is a high-performance, real-time dynamic data processing and monitoring system for engine, turbomachinery, structural and other vibration test applications. SIGnal Workbench is a complete solution that provides everything needed for high-cycle fatigue testing – a real-time computer system, data acquisition input cards, programmable signal conditioning, cabling and powerful GUI test software for data acquisition control, data management, display and post-test analysis.

Data Analysis and Monitoring Software

SIGnal Workbench systems feature EDAS SignalBoss software, a comprehensive application suite that takes you step-by-step through the testing process. SignalBoss requires minimal training and allows users to quickly begin productive testing and data monitoring. SIGW systems run Concurrent's RedHawk™ Linux® real-time operating system. RedHawk provides the fully deterministic performance needed in high-performance, time-critical test applications.

Users can view any type of time or frequency domain plot in real-time while recording all data digitally. Data produced by SIGW can include digital raw time domain, frequency domain with time domain statistics and compressed peak frequency domain data files. All SignalBoss software set-up and

operation is via point-and-click GUI. Setup can also be performed using comma-delimited command files. Data inputs to the system include analog time domain read in real-time or data direct read from commercially available digital tape formats.

Programmable Signal Conditioning

SIGnal Workbench features individual-programmable signal conditioning modules that provide four channels of configurable transducer interface circuitry on a 3U euro-card. Each channel provides a programmable current/voltage output source and a fault-protected programmable gain amplifier. Selecting the voltage source mode allows the module to be configured as a strain conditioner. All of the functionality required to condition signals from sensors that use 1/4, 1/2 or full bridge transducer configurations are supported in this mode.

Selecting the current source mode allows the module to support transducers that require constant current excitation, such as integrated electronics piezoelectric (IEPE) transducers. Channels can also be configured as instrumentation amplifiers to monitor general-purpose analog input signals. Conditioned signals are driven out of the module by low-impedance, high-speed operational amplifiers. All current and voltage sources are programmable via easy-to-use graphical interface.

Integrated Solutions... Real Benefits



Three shrouded headers on the backplane of a signal conditioning chassis are used to terminate the input and output signals for each module. The first two headers terminate the four input signal connections. The third connector provides the buffered output signals. Outputs can be connected to the high-impedance differential input of SIGW's analog input cards to provide a complete signal conditioning and A-to-D conversion solution. All output is routed through the real panel of the signal conditioning chassis.

Real-Time Data Acquisition Platform

SIGnal Workbench systems include a Concurrent iHawk™ real-time computer platform custom-configured to the needs of your test application. Hard drive storage, memory size and processor performance can be selected in accordance with test run durations and channel count. SIGnal Workbench systems feature one or more 32-channel, 24-bit Sigma-Delta analog input boards supporting a rate of 200 Ksamples per second per channel. Other simultaneous sampling analog input cards are also available. The iHawk computer system, signal conditioning chassis and cabling can be optionally mounted in a 14U or 34U rackmount cabinet.

Filtering and Finite Analysis Software Options

SIGW's optional DataDetective bulk data screening software can scan large volumes of electronic vibration data files and catalog peak response information. Results can be assigned to modes, ratioed to other locations and compared to limits. Scanned electronic data files can be produced by a SIGnal Workbench system or by other systems using custom file translators. DataDetective produces and interfaces to a database that can be sorted, filtered and exported to other application formats such as comma separated (CSV) or MATLAB formats. Each entry in the database is linked directly with the file that produced the entry. This permits the user to immediately call up the parent data file and examine responses more carefully. Files are viewed interactively by clicking on the entry in the database.

SIGnal Workbench's optional GageMap is a user-friendly software tool that simplifies interaction with finite element models for test planning, model verification and test data analysis. GageMap makes it easy to extract finite element data for direct comparison to experimental measurements.

Specifications

iHawk Real-Time Computer System

- 1 to 4 Xeon or Opteron dual or quad-core CPUs
- Up to 128 GB memory
- 1 to 8 SAS/SATA disk drives with optional RAID
- Custom storage solutions available
- High-resolution graphics options

Analog Input Cards

32-channel 24-bit Delta-Sigma Board

- 32 differential 24-bit analog input channels
- Delta-Sigma converter per channel with linear phase digital antialias filtering
- Sample rates from 2 KSPS to 200 KSPS per channel
- Software-selectable input ranges: $\pm 2.5V$, $\pm 5V$, $\pm 10V$
- 256 K-sample FIFO buffer
- Synchronous operation; All channels clocked simultaneously
- Internal sample rate generator
- Hardware sync and clock I/O for multiboard synchronization
- Low phase skew; typically less than 0.1-degree with $F_{sig} < 0.35 * F_{samp}$
- DMA engine supports both block-mode and demand-mode transfers
- Low power consumption. 12 Watts typical. Only +5VDC required from PCI bus.
- 100dB dynamic range; 93 dB SINAD
- On-demand autocalibration ensures DC offset precision as well as AC performance
- Integrated DC/DC conversion and regulation of precision internal supply voltages

64-channel, 16-bit Simultaneous Sampling Board

- 64 analog inputs with dedicated 200 KSPS 16-Bit ADC per channel
- True simultaneous sampling of all inputs; Minimum data skew
- Sampling rates to 200 KSPS per channel (12.8 MSPS aggregate rate)
- 64 single-ended input channels; optional 32-channel configuration available
- Selectable differential processing simulates differential operation of channel pairs
- Input ranges: $\pm 10V$, $\pm 5V$, $\pm 2.5V$, $0/+5V$, $0/+10V$; software-selectable
- Hardware sync I/O for multiboard operation
- 256-Ksample FIFO data buffer
- Selectable data packing supported by sync marker
- 2-channel DMA engine supports block-mode and demand-mode transfers
- Sampling controlled by internal rate generator, by software trigger or externally
- Internal autocalibration of all channels; on-demand
- Complete software-configuration; no field jumpers

Signal Conditioning Card

General Characteristics

- Gain range: 1 to 128
- Frequency response: DC to 100K Hz
- Gain accuracy: $\pm 0.05\%$
- Linearity: $\pm 0.01\%$
- Stability : 50 ppm °C
- Input noise: 10 uV RMS
- Input protection: 125 V
- Input type: Differential

- Output range: $\pm 10 V @ 5 mA$
- Output impedance: 50 Ω
- Short circuit protected: Yes

Bridge Completion

- Configuration: Full, Half, Quarter
- Auto balance: Yes, programmable
- Completion resistance: 120 Ω or 350 Ω
- Accuracy: 0.1 %, 5 ppm °C

Low Pass Filter

- Type: R - C
- Cut off frequency: 50 Hz

Current Excitation

- Type: Programmable constant current
- Range: 1 to 20 mAmps
- Accuracy: 0.05 %
- Compliance: 24 Volts
- Stability: 10 ppm °C

Voltage Excitation

- Type: Programmable constant voltage
- Range: mV to 10 Volts
- Accuracy: 0.02 %
- Output channels: 20 mAmps
- Stability: 10 ppm 1 °C
- Short circuit protection: Yes

Calibration Source

- Type: Local or remote shunt resistor
- Internal shunt resistors: 100K Ω , 200K Ω , 400K Ω
- Accuracy: 0.1 %, 5 ppm 1 °C

EDAS SignalBoss Software

Real-Time Processing Features

- Digital filtering
- Fast fourier transform (FFT)
- Tracked order filtering.
- Overall amplitude calculation
- Integration and differentiation
- Plots
 - Auto-Spectrum (FFT)
 - Time Series (O-Scope)
 - Strip Chart
 - Time Series Orbit (Lissajous)
 - Rotational Speed
 - Campbell
 - Z-mod (Intensity)
 - Waterfall
 - Tracked Order
 - Overall Amplitude
- Data display
- Alarming and limit checking

Off-Line Processing Features

- Spectral reprocessing and composite plot
- Transfer functions
- Time-domain amplitude interpolation
- Maneuver editing
- Hard-copy output
- Report-ready digital plots
- Batch processing
- Acoustic processing

Data Recording

- Local data storage w/RAID
- Raw time series or spectral domain file format
- Sony SIR-1000 read capability



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