Random Acoustic Control

Option 2560-9436

Technical Specifications JAGUAR Systems

Control Methods

Control loop	Patented adaptive control algorithm with separate control loops dedicated to controlling the shape of the drive spectrum and overall RMS level; optimized for control speed and stability. The exponential averaging used in the control loop supports a wide range of acoustic reverberation times.

Control Performance

Dynamic range	Greater than 80 dB.
Output	Single output is pure Gaussian noise with smoothing filters and choice of Kaiser-Bessel or Half-Sine windows. Drive signal may be split via an external cross-over network (not supplied) to drive multiple horns.
Equalization accuracy	Control to within $\pm$ 1.0 dB for a flat reference spectrum with 120 DOF and 90% statistical confidence ("closed wire").
Loop time	Less then 1.2 seconds typical for 4 control channels, 4 new frames per loop, 10000 Hz BW, 1600 lines, 4 spectrum averages and 120 DOF (dependent on host model).

Reference Spectrum

Definition	Easily defined by a combination of up to 100 frequency breakpoints (frequency value, PSD value) and slopes (dB/octave values).
Units	Use EU label to support common units such as Pascal^2/Hz or psi^2/Hz for acoustic spectra or enter directly in dB SPL (displays OASPL). You may also use g^2/Hz or $(m/s^2)^2$/Hz for acceleration. Uses V^2/Hz for drive spectra.
Alarm and abort limits	Independent positive and negative alarm and abort tolerances for each breakpoint.
Frequency ranges	DC to 50, 80, 100, 200, 400, 500, 800, 1K, 2K, 4K, 5K, 10K and 20K Hz.
Frequency resolution	1/n octave spacing (select n from 1 to 24). Control loop uses FFT spacing of 100, 200, 400, 800, 1600 or 3200 lines depending on the specified lowest 1/n octave frequency.
Re-scale reference	Automatic re-scale of the reference spectrum to achieve desired overall RMS level.

Control Parameters

Multiple channel control	1 to all available channels may be selected for control (maximum 98). Control strategies include average, minimum or maximum. For average, you may designate whether or not a channel is removed from the averaging process when a control signal loss is detected.
Limit profiles	Supports drive limiting based on limit profiles entered via features described under Reference Spectrum. Overrides control, if needed.
Mode of operation	User (manual) interaction during a test or automatic "hands-free" operation.
Test duration	User defined up to 999:59:59 (h:m:s).
Degrees of freedom	User defined from 8 to 10,000.
Output level control	Automatic or manual (step up/down/full level).

Startup Parameters

Equalization start level	Selectable from -30 dB to 0.0 dB.
Initial test level	Selectable from equalization level to 0.0 dB.
Time at initial level	Off or timed in seconds or loops (0 to 10,000).
Level increment	0.1 to 10 dB.
Pre-stored drive startup	Skip equalization by selecting drive from previous test data (in memory). May also be used for resumed tests.

Safety Features

Loop check drive	Selectable maximum; 10 to 3300 mV RMS.
Alarm/Abort RMS	RMS limit in EU or dB with choice of DOF.
Alarm/Abort FFT lines	Number or percent of FFT lines or number of 1/n octave bands within specified range.
Control signal loss	Automatic detection with "drop-out" feature.
Manual abort	Graphical and keyboard abort buttons.
Drive signal clipping	None, 2.5 to 6 sigma or 1 to 10 Volts.
Startup/shutdown rates	Independent selections; 0.1 to 50 dB/sec.

Test Automation

Microphone Calibration	Uses analyzer mode to calculate channel sensitivities for selected microphones.
Level scheduling	User defined levels, time at level, transition time to reach the level and number of cycles.
Test scheduling	User defined sequence of up to 100 independent tests run automatically.

Channel Setup

Channel type	Control, auxiliary (measurement) or limit.
Transducers	Microphone or accelerometer (for auxiliary).
Coupling	Select AC, DC or ICP with 24V supply.
Sensitivity	0.000001 to 1,000,000 mV/(Units).
Loop check	Select as enabled or disabled (each channel).
Labels	Up to 45 characters (2 labels each channel).
Import sensor table	Import from ASCII spreadsheet file or other applications.

On-Line Displays

Simultaneous displays	Up to 25 windows, each with up to 4 grids.
Waveforms per grid	Up to 4 (up to 400 on 100 grids).
Auxiliary monitor	Optional second monitor for test displays.

On-Line Analysis

Spectral functions	Control, reference, monitor, auxiliary, error and limit PSD may be displayed with FFT or 1/n octave spacing. The drive, H(f), coherence and limit number selections are displayed only with FFT spacing.
Spectra averaging	Auxiliary measurement channels processed with linear or exponential averaging and user defined DOF (separate from control loop).
Cursors	X and Y value readout, peak search, trace tagging and multi-window locked positioning.
X-scaling	Linear, log or log-1/n for 1/n octave display.
Y-scaling	Linear, log or dB (ref) for acoustic displays. Automatic or fixed scale.

Analyzer Mode Acquisition

Functions acquired	Spectra (PSD) acquired in non-control mode. Also used for microphone calibration.
Averaging	Select linear or exponential average and the desired DOF with 1/n octave or FFT spacing.

Host Data Storage & Review

Setup & format	Automatic timed (any level) or timed at full level or manual mode. Binary files of narrow-band data (published format) converted to UFF or Matlab formats.
Playback	Scan forward or backward through the entire test data file, with adjustable delay.
Test overlay	Select files from multiple tests for overlay.
Annotation	Test name, test time & level for each record.

Documentation

Test summary	Documented post-test summary; easily printed or incorporated into documents using standard word processing software.
Message log	Text file records all system status messages that were displayed during the test.
Automatic & batch plots	Automatic plot generation at test completion. Plot modes for sending all displays to the printer with single or multiple grids per page. Automatic conversion to UFF & Matlab format

Throughput Disk (TPD)

General description	Supports 1-6 drives for storing all time domain data to disk during a test. Data may be replayed to recreate spectral test displays or may be replayed via Signal Analysis to also view time domain data. See separate TPD data sheet.

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