PRODUCT DATA

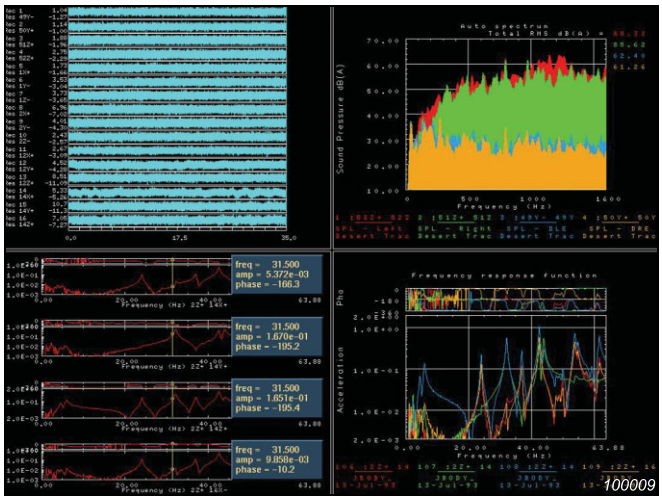
Test for I-deas Stationary Processing — BZ-6005

For collecting stationary data using fixed sampling and post-processing the stored data.

Test for I-deas Stationary Processing software provides test engineers' comprehensive capabilities for collecting realtime data for modal analysis, spectra generation, and time history streaming applications.

Post-processing capabilities provide for the processing of measured time history data stored in disk files into spectra and other frequency domain forms.

The power of the user interface, together with a unique implementation of geometry-based data management tools, maintains a high level of organisation and ease-of-use as real-time displays, intelligent forms, geometry displays, and icons guide the user through the signal analysis process.



General Description

Many electromechanical systems operate at constant or stationary conditions, or at least the operating conditions are fixed for the duration of a test session. Test for I-deas Stationary Processing provides for processing of live measurement data, storing time histories directly to the PC disk, and processing previously stored data as though it were coming in live. Typical results include most combinations of ESD, PSD and linear averaged auto spectra, FRFs, coherence, and cross spectra, as well as auto & cross correlation functions.

To support modal analysis, FRF and transmissibility measurements using one or more shakers, this module also includes SISO, SIMO, MISO, and MIMO routines as well as functionality to setup and control a wide variety of structural excitation signal types.

User Interface

An advanced, Windows®-based user interface includes real-time displays, intelligent forms, geometry displays, and icons. This user interface provides a high level of ease-of-use in setting up and managing the measurement process while minimising the potential for error.

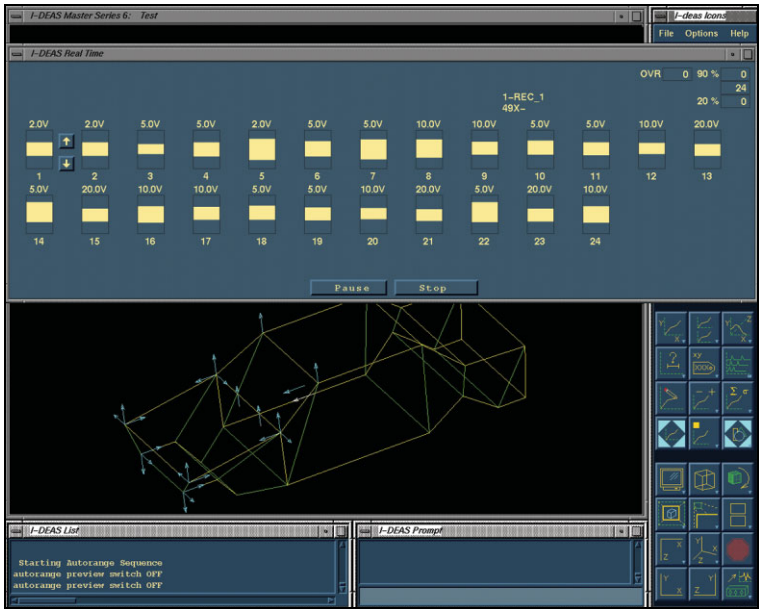


Fig. 1
Example of a stationary measurement interface

Up to 20 channels can be displayed simultaneously to view waveform, frequency, or order content. A time min/max display provides for monitoring up to 90 channels simultaneously. Real-time data can be monitored in a preview mode, as well as during the acquisition process.

Setup conditions and channel organisation are managed using convenient forms that automatically handle the interaction of the various parameters and, depending on the parameters selected, present only choices appropriate for the selected measurement. Special geometry-picking features supplement traditional methods of associating instrument input channels with measurement locations on the test structure. Additionally, geometry-picking features can be used to display measurement results. Results can also be displayed by keying in channel or location identifiers and picking from a list.

Programmability provides great flexibility, enabling you to customise the software to meet specialised application requirements. Icons provide fast cursor-picked access to commands, command strings, and program files. Standard icons are included and customised icons can be conveniently established.

Spectra, Time History and Sine Measurements

A number of multi-channel measurement results can be acquired: time history, time average; auto-/cross-spectra, auto-/cross-correlation, FRFs, coherence or multiple coherence; principal response, and single reference step sine and sine reduction. DAC output of arbitrary waveforms is supported in addition to signal source output.

Instrument and Channel Setup

The menu leads the user through a logical progression of forms to set up the measurement conditions. The relationships between input channels, measurement locations, and transducers are conveniently assigned and managed using tables, and as appropriate, picked from a geometric image of the test structure.

Result Displays

Standard format displays are available for inspecting processed results prior to storing on disk. Measurement results can be displayed using either geometry cursor picking or keyboad entry.

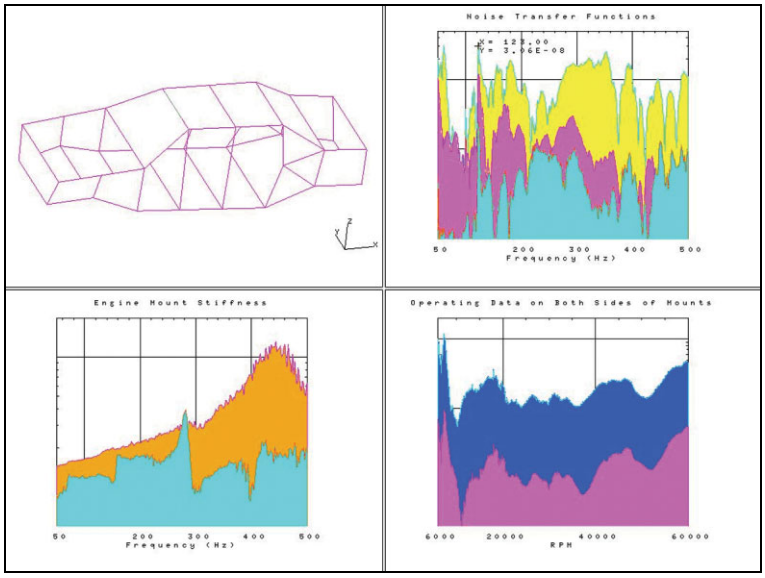


Fig. 2
Example of a stationary post-processing interface

Fast Displays

The same real-time displays available in Test for I-deas Standard Measurements module are provided for efficient inspection of time history data files. Up to 20 channels can be displayed simultaneously to view waveform and frequency content. The following fast displays are provided: time, windowed time, time and windowed, spectra, time and spectra, and min/max level.

Spectra Post-processing

A full range of standard single- and multiple-input spectra calculations are provided for stationary data applications.

Sine Post-processing

Sine sweep data in the form of time histories can be post-processed to obtain response and phase vs. frequency results. A reference channel is used to determine the frequency of the response and provide the phase reference.

Results Graphing

Special standard format displays are available for quickly inspecting processed results prior to storing on disk. These displays supplement those available in the Test for I-deas Core Test software. Results can be displayed using either geometry cursor-picking or keyboard entries.

Principal Response

This capability provides a quantitative method of identifying independent sources in operating or excitation data. The number of sources of excitation and the coherent response for each source are calculated.

Shock Response

Shock response is calculated from time history base accelerations using any portion of the time history, including primary, residual, composite, maximax; relative displacement and absolute acceleration; frequency range; linear, log, third octave, octave, points per octave; damping range; and 3D graph showing results over a range of damping values.

Maximum Entropy Method

The maximum entropy method is a recent parametric technique best suited for short segments of broadband data. Since the frame size and number of spectra lines are independent of each other, much higher frequency resolution with smaller frame sizes can be achieved compared to classical FFT methods.

- Live measurements
- Live-equivalent offline measurement processing from ATI
- Geometry-based “next measurement” picking
- Bank channel switching
- Synchronous source and DAQ start with transient allowance
- Multiple impact rejection during modal impact testing

PREREQUISITE
Test for I-deas Core Test BZ-6000

Real-time Displays

Up to 20 channels can be displayed simultaneously to view waveform and frequency content. A min/max display provides for monitoring up to 90 channels simultaneously. Real-time data can be viewed in preview mode and during acquisition process

DISPLAY TYPES
- Waterfall (frequency-based)
- Time
- Windowed time
- Time and windowed
- Spectra
- Time and spectra

Stationary Measurements

MEASUREMENT
Geometry-based features to aid in associating input channels with measurement location on test structure
Commands: Icon-based, standard and customisable

Setup

A logical procession of forms are provided to set up the measurement

SAMPLING
For time or frequency domain measurements – a form addressing all the interdependent sampling parameters including number of spectral lines, maximum and minimum frequency, frame size, and Δt is used

AUTORANGE
Sets the percentage of the sampling frame or sets the percentage overhead (buffer zone beneath the full-scale limit)

SETUP MANAGEMENT
Multiple instrument setups can be stored and recalled

SYSTEM SHUTDOWN
Allowable levels can be set on one or more input channels. If the input signals exceed these levels, the signal sources can be shut down. After each frame is sampled, the shutdown limit is checked on a frame-by-frame basis

CHANNEL CONFIGURATION AND UPDATING
A convenient table sets up the number of response and reference channels and the method of updating the channels, including manual keyboard entry of the next set of measurement locations and moving transducer locations by picking from a geometric image, coordinate trace input for automatic updating; and virtual channel table for use with scanner hardware
Channel Table: The user sets up key parameters:
- Input channel number
- Measurement coordinate and description
- Input voltage range
- Voltage or charge mode
- Coupling
- Transducer sensitivity
- Min/max level

dB format for spectra display of sound measurements

Triggering

TRIGGER SOURCES
Manual, channel, external and source signal

TRIGGERING METHODS
- Free run
- First frame
- Every frame
- Optional delays: pre-trigger and post-trigger

Windows

Hanning, flat top, exponential and impact

Averaging Methods

Stable, exponential and peak hold (overlap processing supported). Time history and spectra analysis results are displayed with advanced XY and XYZ graphics

TRANSDUCER TABLES
A table defining each transducer type, serial number, and calibration information can be stored and linked to the setup conditions. Can be exported to ASCII file for later import

TRACKING
Enables management and retrieval of data from multiple runs of the same set of measurements. An attribute is automatically added indicating which groups of data were acquired during the same measurement

ACOUSTIC WEIGHTINGS
Can be applied and documented with the data both for situations in which the acoustic weighting is applied externally or using specific front-end features

SIGNAL SOURCES
For outputting signals to drive exciters. Source signals include multiple output random and burst random, step sine, as well as others depending on the specific data acquisition system being used

Calibration

The following types of transducer and front-end system calibration procedures are supported:
- Drop calibration
- Mass calibration
- Microphone calibration
- Reference calibration

In addition, a front-end hard-ware calibration can be done, depending on the specific front-end hardware, correct amplitude, and phase variations

Results

- Time average
- Auto-/cross-spectra
- Auto-/cross-correlation
- Frequency response function (FRF)
- Coherence
- Reciprocity
- Multigraph formats (multiple FRFs, reciprocity, FRF & coherence, FRF, spectra & coherence)

Test Log

A test log can be written to a Test for I-deas Relational Data Manager table providing complete documentation of all the test conditions including overall setup, sources setup, channel assignments, and transducer assignments

Stationary Post-processing

SOURCE CONTROL

- Fixed sine
- Random
- Burst random
- User-defined or imported waveform
- Shutdown on excess level, any channel

Setup

A series of intelligent forms aid you in defining the signal analysis processing parameters, including number of spectral lines and frame size

Post-processing Methods

SPECTRA POST-PROCESSING

Single-input processing includes time average and spectra including:

- Half-peak
- Peak
- RMS
- PSD
- ESD
- Auto- and cross-spectra
- Auto- and cross-correlation
- Auto-spectra
- H1, H2 or Hv with optimal scaling (a special noise reduction matrix provides improved accuracy)
- Frequency Response Function
- Coherence

Multiple-input processing includes the above results, as well as:

- Partial power spectra
- Partial coherence
- Multiple coherence
- Reference-to-reference coherence

SINE POST-PROCESSING

Sine sweep data in the form of time histories can be post-processed to obtain response and phase vs. frequency results. A reference channel is used to determine the frequency of the response and provide the phase reference

Results

The following results can be displayed:

- Time streaming to ATI
- Triggered and free-run time average
- Triggered and free-run autospectrum average
- Triggered and free-run linear spectrum average
- Auto- and cross-spectra
- Auto- and cross-correlation
- FRF (SIMO, MIMO, H1, H2, Hv)
- Coherence
- Reciprocity

The following special multigraph formats are also available:

- Multiple FRF
- Reciprocity
- FRF
- Coherence and FRF
- Spectra
- Multiple Coherence

The spectra browser provides convenient features for viewing spectra in terms of narrow band, octave, 1/3-octave, 1/n-octave, and with A, B, and C acoustic weightings

Ordering Information

BZ-6005-F Test for I-deas Stationary Processing

SERVICES

M1-6005-F Annual Software Maintenance and Upgrade Agreement
M2-6005-F Annual Software Maintenance and Upgrade Agreement

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TRADEMARKS
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