

ECON

Dynamic Signal Analyzer

Technical Specifications

MI-70XX series



Econ Technologies Co., Ltd.

Overview

Dynamic Signal Analyzer is an all-in-one solution dedicated for data acquisition, FFT based analysis, raw data recording and report generation. It works as an excellent choice for vibration and noise measurement, structural modal test, rotating machinery diagnostics and acoustics. also provides versatile modular software to help test engineers get instant measurement results and automatically generated reports.

Features

- 4, 8, 16 synchronized inputs
 - 1, 2, 4 waveform outputs
 - 300 MHz floating point 32-bit DSP processing
 - 24-bit ADC/DAC
 - Higher than 110 dB dynamic range
 - Voltage, IEPE and TEDS sensor compatibility
 - Built-in battery (option)
-



Hardware		MI-7004	MI-7008	MI-7016
Input Channels		Max. 4	Max. 8	Max. 16
Output Channels(Signal Source)		1	2	4
Resolution		24 bits ADC/DAC		
Dynamic Range		120dB		
Touch Screen Operation		✓		
PC Connectivity		USB 2.0		
Sensor Compatibility		Voltage, IEPE, TEDS		
Control Software		Operating System Windows XP, Windows 7		
Measurement & Analysis Software		MI-7004	MI-7008	MI-7016
Vibration and Noise Analysis		✓	✓	✓
Enhanced Waveform Generator		✓	✓	✓
Data Recorder, Playback and Offline Analysis		✓	✓	✓
Acoustics Analysis		✓	✓	✓
Order Tracking		✓	✓	✓
Modal Analysis		✓	✓	✓
Shock Data Capture		✓	✓	✓
Shaker Performance Verification			✓	✓
Shock/Drop Machine Performance Verification			✓	✓
General				
Electrical powered		88 to 264 Volts 47 to 63Hz	DC 18-24V	
Battery powered		N/A	14.4V 4100mAh 4h	14.4V 8200mAh 4h
Power Consumption (W)		30	40	60
Mechanical	Dimension (mm)	335x255x71	369x290x72	369x290x78
	Weight (Kg)	2.7	3.5	4.4
Environmental	Temperature	41 to 122°F , -10 to 50°C		
	Humidity	20% to 90% RH non-condensing(40°C)		
Regulatory Compliance CE Marking		According to EN 61326-1:2006, EN 61010-1:2001		

System Specifications

I/O Specifications

Inputs

Input Channels: 4, 8 or 16 synchronized of each (synchronizing input)
 Input Connectivity : BNC
 Voltage Range: $\pm 10 V_{PEAK}$
 Input Protection: $\pm 36 V_{PEAK}$ (without damage)
 Sample Resolution: 24-bit(ADC)
 Input Impedance: 220k Ω
 Dynamic range: 120dB (Fs)
 >80dB(According to JJG834-2006)
 Filtering: Independent analog anti-alias filter and 160dB/Octave digital filter for each channel
 Sampling Rate: Up to 204.8kHz, synchronized
 Coupling Mode: channels
 Signal Conditioning: AC, DC, ICP(IEPE)
 Transducer Type: Built-in IEPE sensor power (+24V/+4mA)
 Acceleration, Velocity, Displacement, Force, Flow, Voltage, Sound Pressure, Angular acceleration Etc.
 Amplitude Resolution: 0.2% FS (1V input, ≤ 10 kHz)
 Frequency Accuracy: 0.001%
 THD: 0.001%
 Channel Match: <-100dB (@1kHz, 5 harmonics)
 ± 0.05 dB amplitude, ± 0.5 degree phase (from DC to 20kHz)
 SNR: >100dB(@1kHz, 1V input)
 Channel Crosstalk: <-105dB

Output

Channel Number: 1, 2 or 4 Channels (waveform sources)
 Output Connectivity : BNC
 Voltage Range: $\pm 10 V_{PEAK}$
 Sample Resolution: 24-bit(DAC)
 Output Impedance: 30 Ω
 Output load: MAX.30mA $_{PEAK}$
 Frequency Range: 20kHz (Sine)
 Dynamic r Range: 100dB
 Filter: 160dB/Oct digital filter plus analog filter
 Amplitude Resolution : 0.1% (@1kHz, 1V)
 Resolution : 0.001%
 Frequency Accuracy: <- 95dB (@1kHz, harmonic order number = 5)
 THD: DC, Sine, Square, Triangle, White Noise ,Impulse, Chirp, Pink Noise, Pseudo Random, Burst Random, Shapd Random, Sinusoid, Swept Sine, Swept Log, Multi- Sine (optional)
 Source Type:

Applicatoin Software

Main Applications

- > Dynamic Signal Analysis
- > Shock Measuring Analysis
- > SRS
- > Pulse Analysis
- > Damage Boundary
- > Sound Pressure Analysis
- > Sound Intensity Analysis
- > Sound Power Analysis
- > Modal Data Acquisition
- > Order Tracking
- > Dynamic Stiffness
- > Dynamic Balance
- > Data Recording

Other Options

- > Data Playback and Offline Analysis
- > Self-Calibration
- > Waveform Source
- > Software Development Kit(SDK)
- > Automatic Word or PDF Report Generation
- > Data and File Management
- > Signal Calculator
- > Cursor Indicator
- > MATLAB Interface

Dynamic Signal Analysis

MI-7XXX is able to perform complete analysis of time domain, FFT, auto power spectrum, cross power spectrum, auto correlation, cross correlation, FRF, coherence and histogram result, which will satisfy your requirements in real-time analysis. Up to 204.8 kHz sampling rate covers a wide range of analysis for vibration and acoustic. Averaging and triggering will make your work more effective and you can view test result through various plots, such as orbit plot, polar coordinates and waterfall plots, etc. Detailed specifications are shown below.

Signal Processing & Analysis

Time Domain: Time Capture, Auto-correlation, Cross-correlation ,Orbit Plot, Oscilloscope, Waterfall
 Frequency Domain: FFT, Auto-spectrum , Cross-spectrum, FRF, coherence, polar plot, octave analysis
 Amplitude Domain: Histogram
 Channel Calculation: Integral, Quadratic Integral, Differential and Quadratic Differential
 Strain Rosette Right triangle,Equilateral triangle,Sector type,Umbrella type

Averaging

Domain: Time domain or Frequency domain
 Types: Exponential, Linear, Peak hold,N frames peak hold
 No. of averages: 1 to 1,000k frames
 Data Reject: Reject data manually; Reject overload data automatically or manually;

Spectrum Analysis

Span: Up to 80000Hz
 Lines: Up to 12800 (MI-7008/MI-7016)
 Up to 3200(MI-7004)
 Window: Rectangle,Hanning,Hamming,Exponential, Bartlett,Welch,Tukey,Blackman,Blackman Maximum,Blackman Minimum, Flat-Top, Kaiser-Bessel

Capture

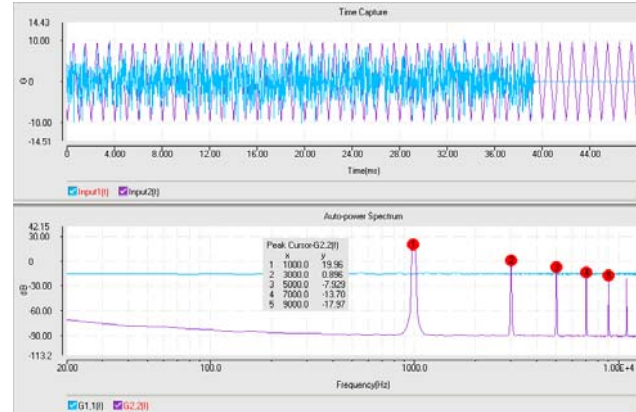
Sampling Frequency: Up to 204.8kHz
 Points: Up to 32768 (MI-7008,MI-7016)
 Up to 8192 (MI-7004)
 Overlap: 12.5%, 25%, 37.5%, 50%, 62.5%, 75%, 87.5%

Triggering

Source: Input channel or no trigger
 Slopes: Positive, negative or bi-polar
 Level: Voltage level within voltage range
 No Trigger Mode: Free run or manual run, time delay is available
 Trigger Mode: Pre-trigger or post-trigger
 Run Mode: Free Run after First Trigger,Manual Trigger Every Frame, Auto Trigger Every Frame

Waveform Source

Type: DC,Sine,Square,Triangle,Impulse,Swept Sine, White Noise, Chirp, Pseudo Random, Burst Random, Shaped Random and Double Sine
 Setup Parameters: Amplitude, Frequency etc.



Real-time signal processing

Measurement Controls

Controls: Start/stop, pause/continue, next frame
 Status Displays: Running time, frames, running status
Data saving
 Save Modes: On-line save and auto save
 Save Contents: Signals and panes
 Signal File Formats: ECON binary/ASCII or UFF binary/ASCII or txt
 Data Export: Excel, MATLAB
 Data Recording: Used for offline analysis

Signal Calculator

Feature: allows you to create custom signals. all signals are calculated displays on line during test
 Operations: add/subtract/multiply/divide, square,

Signal Display

Window Format: Single pane, two pane, four pane, thumbnails
 Display Content: signals, color and line for signal, markers etc.
 Waterfall Display: 3-D or color graph; number and interval of frames can be set
 Cursors: Single or dual with X1, Y1, X2, Y2, power, Δ RMS
 Cursor linkage: Cursors in different panes synchronized moving
 Harmonic Cursor: Marks and auto-calculate THD
 Peak/valley Cursor: Auto-detection and marks

Test Report

Content: Customized, contains parameters, panes etc.
 Report Template: Customized
 Report Format: Word, PDF or Direct printing

Shock Measuring Analysis

You can capture the shock pulses easily and simultaneously when shock or impact event happens via. Besides time domain analysis, you can use shock response spectrum (SRS) to estimate the potential damage due to peak values on different natural frequencies in shock. ISO, MIL-STD-810 and user-defined criterions of tolerance are available.

Shock Measuring and Analysis (SMA) takes ideal time waveform as the standard, for example, ideal half-sine pulse, ideal saw tooth pulse and ideal trapezoidal pulse; it is used for shock equipment which can generate ideal pulse and require the pulse measured from UUT on the table of shock equipment to be in the tolerance band of the ideal pulse according to the test standard.

Detailed specifications are shown below

Test Types

Based on classical shock(Half-sine wave,final peak saw-tooth wave, trapezoidal wave), apply to equipment which could generate ideal pulse; it costs the shock pulse signal come within standard tolerance range from test by the middle of experiment table; contains shock test and Impact test

Other Analysis

SRS analysis, SR demo, rotation shock analysis, force & distortion analysis, FFT analysis

Ideal waveform

Waveform: Half-sine, trapezoid, terminal peak saw tooth
 Standard: GB, GJB, ISO, MIL810, User defined
 Tolerance: According to each standard
 Auto-match: the acquired data matches ideal waveform
 Comparison: compare acquired data with ideal waveform

RRS

SRS Type: Primary, Residual, Composite
 Resolution: 1/1, 1/2, 1/3, 1/6, 1/12, 1/24 octave analysis
 Parameters: Damp coefficients and Q, lower/upper/reference frequency

SRS Definition: Calculate SRS automatically from ideal waveform or set RRS manually, and the tolerance can be set
 Comparison: Compare measured SRS with RRS

SR

Channel: Choose one input signal
 Display: Dynamic, 3D, 3D-Loop, Single frame
 Damping ratio: User-defined
 Stimulate: Max Amplitude, Min Amplitude
 Response: Max amplitude, Min Amplitude, Current Frequency

Rotation shock analysis

Channel: Choose one input signal
 Radius: User-defined
 Analysis: Peak, Pulse width, Velocity change calculate

Force & Distortion analysis

Channel: Choose one input signal
 Type: Time, Time force, Force & Distortion, Time & Distortion
 Analysis: Force peak, Distortion peak, Shock velocity, Shock height, Materials weight, Theoretical energy, input energy, Losing energy, Absorbent energy, Resilient energy, Efficiency
 Force & Distortion Parameters: Range, Height, Initial Velocity, Weight (User-defined)

Transient Capture

Sampling Frequency: Up to 204.8kHz
 Acceleration Range: Up to 10,000gn
 Pulse Duration: 0.1 to 1,000ms
 Sampling Time: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 4000, 7000, 10000, 13000, 16000, 20000ms
 Direction: Positive, Negative



Transient Capture

Filtering

Filters: Low-pass and high-pass filters
 Set different filters for each channel
 Low-pass Filters: Set different filters for each channel
 High-pass Filters: Set cutoff frequency or filter rate
 Enable or disable

Triggering

Source: Input channel (Auto Trigger Every Frame) no trigger (Free Run)
 Slopes: Positive, negative or bi-polar
 Level: 1 to 99% of ideal waveform
 Trigger Mode: Pre-trigger or post-trigger
 Remove DC: Enable or disable
 Remove Noise: Enable or disable, set remove noise degree

Measurement Controls

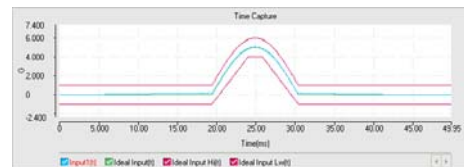
Controls: Start/stop
 Status Displays: Current Frame, Total Frames, Running status

Data saving

Save Modes: On-line save and auto save
 Save Contents: Signals and panes
 Signal File Formats: ECON binary/ASCII, txt, or UFF binary/ASCII
 Data Export: Excel, MATLAB etc.
 Data Recording: Used for offline analysis
 Playback: Replay shock waves manually

Test Report

Content: Customized, contains parameters, panes etc.
 Report Template: Customized
 Report Format: Word, PDF or Direct printing



SRS analysis

SRS

You can capture the shock pulses easily and simultaneously when shock or impact event happens. Besides time domain analysis, you can use Shock Response Spectrum (SRS) to estimate the potential damage due to peak values on different natural frequencies in shock.

SRS takes reference SRS as the standard; it is used for shock equipment that can generate pulse according to the reference SRS and requires the SRS measured from UUT on the table of shock equipment to be in the tolerance band of the reference SRS.

Detailed specifications are given below.

Other Analysis

FFT,SR demo, rotation shock analysis, force & distortion analysis

SRS Profile

- SRS Type: Composite SRS
- Resolution: 1/1, 1/2, 1/3, 1/6, 1/12, 1/24 octave analysis
- Parameters: Damp coefficients and Q, lower/upper frequency
- Profile Definition: Setup frequency, amplitude, lower/upper tolerance
- Comparison: Compare measured SRS with SRS profile

Transient Capture

- Sampling Frequency: Up to 204.8kHz
- Acceleration range: Up to 10,000gn
- Sampling Time: Customized, limited by SRS profile
- Sampling Number: Customized
- Direction: Positive, Negative

SR

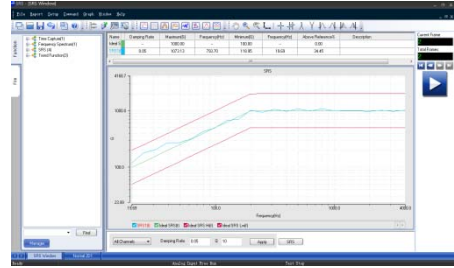
Same as Shock Measuring Analysis

Rotation shock analysis

Same as Shock Measuring Analysis

Force & Distortion analysis

Same as Shock Measuring Analysis



Transient Capture and SRS analysis

Filtering

- Filters: Low-pass and high-pass filters
Set different filters for each channel
- Low-pass Filters: Set cutoff frequency or filter rate
- High-pass Filters: Enable or disable

Triggering

- Source: Input channel (Auto Trigger Every Frame) no trigger(Free Run)
- Slopes: Bi-polar
- Level: Acceleration level
- Trigger Mode: Pre-trigger or post-trigger
- Remove DC: Enable or disable

Measurement Controls

- Controls: Start/stop
- Status displays: Running time, frames, running status

Data saving

- Save Modes: On-line save and auto save
- Save Contents: Signals and panes
- Signal File Formats: ECON binary/ASCII ,txt or UFF binary/ASCII
- Data Export: Excel, MATLAB
- Data Recording: Used for offline analysis
- Playback: Replay shock waves manually

Test Report

- Content: Customized, contains parameters, panes etc.
- Report Template: Customized
- Report Format: Word, PDF or Direct printing

Pulse Analysis

You can capture the shock pulses easily and simultaneously when shock or impact event happens. And besides time domain analysis, you can use shock response spectrum (SRS) to estimate the potential damage due to peak values on different natural frequencies in shock.

Pulse Analysis is used for shock equipment that generates non-ideal and stochastic pulse.

Detailed specifications are given below.

Other Analysis

SRS analysis, SR demo, rotation shock analysis, force & distortion analysis

Transient Capture

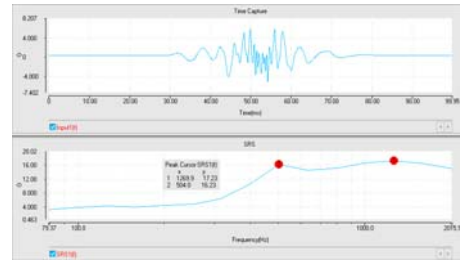
- Sampling frequency Up to 204.8kHz
- Acceleration range Up to 100,00gn
- Sampling time Customized, limited by frequency range of SRS analysis
- Sampling number Customized
- Direction positive, reverse

SRS Analysis

- SRS type Composite SRS
- Resolution 1/1,1/2,1/3,1/6,1/12,1/24 octave analysis
- Parameters Damp coefficients and Q, lower/upper/reference frequency

Filtering

- Filters Low-pass and high-pass filters
Set different filters for each channel
- Low-pass filters Set cutoff frequency or filter rate
- High-pass filters Enable or disable



Transient Capture and SRS analysis

Triggering

- Source Input channel (Auto Trigger Every Frame)
no trigger(Free Run)
- Slopes Bi-polar
- Level Acceleration level
- Trigger mode Pre-trigger or post-trigger
- Remove DC Enable or disable

Measurement Controls

- Controls Start/stop
- Status displays Running time, frames, running status

Data saving

- Save modes On-line save and auto save
- Save contents Signals and panes
- Signal file formats ECON binary/ASCII or UFF binary/ASCII
- Data export Excel, MATLAB
- Data recording Used for offline analysis
- Playback Replay shock waves manually

Test Report

- Content Customized, contains parameters, panes etc.
- Report template Customized

Damage Boundary

Damage Boundary test refers to ASTM D3332-99 standard and the program test critical velocity change shock and critical acceleration shock to determine the damage boundary of the products. Damage Boundary test can determine the shock fragility of the products. This fragility information may be used in designing shipping containers for transporting products and improving product ruggedness. Detailed specifications are given below.

Other Analysis

SRS Analysis, SR Demo, Rotation Shock Analysis, Force & Distortion Analysis, FFT

Critical Velocity Change

Test Pulse: Half-sine, trapezoid, saw tooth etc.
 Pulse Width: Set accord with ASTM D3332-99 standard
 Test Program: Setup the test starting and increment of Critical Velocity Change shock test
 Vc Calculation: Setup the ratio of last shock

Critical Acceleration

Test Pulse: Half-sine, trapezoid, saw tooth etc.
 Pulse Width: Set accord with ASTM D3332-99 standard
 Test Program: Setup the test starting and increment of Critical Acceleration shock test
 Ac Calculation: Setup the ratio of last shock

SRS Analysis

SRS Type: Primary, Residual, Composite
 Resolution: 1/1, 1/2, 1/3, 1/6, 1/12, 1/24 octave analysis
 Parameters: Damp coefficients

Transient Capture

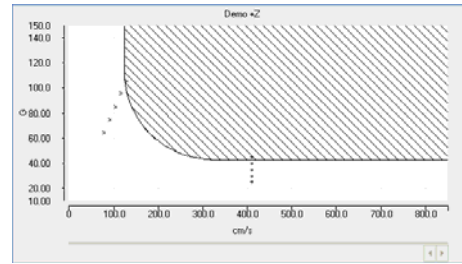
Sampling Frequency: Up to 204.8kHz
 Acceleration Range: Up to 10,000gn
 Sampling Time: Auto-match with test pulse of Critical Velocity change shock test and Critical Acceleration shock test

SR

Same as Shock Measuring Analysis

Force & Distortion analysis

Same as Shock Measuring Analysis



Damage Boundary

Triggering

Source: Input channel (Auto Trigger Every Frame) no trigger(Free Run)
 Slopes: Bi-polar
 Level: 1 to 99% of test pulse of Critical Velocity Change shock test and Critical Acceleration
 Trigger Mode: Pre-trigger or post-trigger
 Remove DC: Enable or disable

Filtering

Filters: Low-pass and high-pass filters
 Set different filters for each channel
 Low-pass Filters: Set cutoff frequency or filter rate
 High-pass Filters: Enable or disable

Measurement Controls

Controls: Start/stop, next shock, damage
 Status Displays: Current Frame, Test Time, Running status
 Save Modes: On-line save and auto save:
 Save Contents: Signals and panes
 Signal File: ECON binary/ASCII, txt, or
 Formats: UFF binary/ASCII
 Data Export: Excel, MATLAB

Test Report

Content: Customized, contains parameters, panes etc.
 Report Template: Customized
 Report Format: Word, PDF or Direct printing

Rotation shock analysis

Same as Shock Measuring Analysis

Acoustic Analysis

Acoustic analysis offers sound pressure and sound power analysis from field to lab. It provides 1/n octave filter functions compliant with ANSI S1.11-1986 criterion, and A, B, C, D or linear weighting are available.

Sound pressure analysis

Conforms Standard

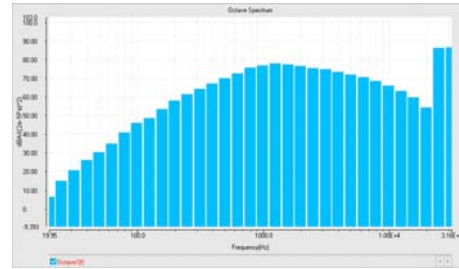
- IEC 61672-1 (2002-05) Class 1
- IEC 60651(1979) plus Amendment 1(1993-02) and Amendment 2(2000-10) Type 1
- IEC 60804 (2000) Type 1
- IEC 61252 (1993) plus Amendment 2000
- IEC 61260(1995-07) plus Amendment 1(2001-9) Class 0
- ANSI S1.4-1983 plus ANSI S1.4A.1985 Amendment Type 1
- ANSI S1.43-1997 Type 1
- ANSI S1.11-2004, 1/1-octave Bands and 1/3-octave Bands Class 0

Signals	Time domain, FFT, Auto power spectrum Octave
Analysis	Instantaneous Sound Level, Equivalent Sound Pressure Level, Day-night Equivalent Sound Pressure Level, Sound Exposure, Sound Exposure Level, Noise Dose,

Calibrate sound sensitivity by acoustic calibrator

Resolution	1/1,1/3,1/6,1/12,1/24 octave analysis
Lines	Up to12800(MI-7008/MI-7016) Up to 3200(MI-7004)
Frequency range	From 10Hz to 20,000Hz
Weighting	A, B, C, D and Linear
Window	Rectangle, Hanning, Hamming,Blackman, Flat-Top
Detector	RMS detector and peak detector
Averaging	Exponential, Linear, Peak hold
Level histogram	Defines level segment

Occupational health parameters	Exposure Time, Reference Time, Threshold Level, Criterion Level, Peaks Over Level, Exchange Rate and so on
LdenPeriods parameters	Day Start, Evening Start, Night Start, Evening Penalty, Night Penalty
Percentile Level	Setup Percentile



1/3 octave acoustic analysis

Sound power analysis

Analysis Content

Signals Time domain, FFT, Auto power spectrum, Octave

Analysis Parameters

Resolution	1/1,1/3,1/6,1/12,1/24 octave analysis
Lines	Up to12800(MI-7008/MI-7016) Up to 3200(MI-7004)
Frequency range	From 50Hz to 6300Hz
Weighting	A, B, C, D and Linear
Window	Rectangle, Hanning, Hamming, Blackman, Flat-Top
Averaging	Linear
Run mode	Free Run without trigger (set whether delay), Free Run after first trigger (define trigger level)

Sensor Calibration

Calibrate sound sensitivity by acoustic calibrator.

Sound Power Parameters

Standard	ISO 9614-1:1993 ISO 9614-2:1996
Type	6mm,12mm,50mm
Probe space	Ball,Hemispheroid, Parallel plane, User-defined
Surface type	Ball, Hemisphere, Parallel Plane, and User Defined
Test process	Setup test sequence; local test is available
Availability	Sound change value(by time), Sound pressure-Sound power value, Sound power measurement negative value, Sound non-uniformity value.

Noise Recognition

Measure sound power part on the plane, draw colorful sound power chart, position noise from which part of object.

Acoustic Analysis**Sound Intensity Analysis****Analysis Content**

Signals Time domain, FFT, Auto power spectrum,
Octave

Analysis Parameters

Resolution 1/1,1/3,1/6,1/12,1/24 octave analysis

Lines Up to 12800(MI-7008/MI-7016)

Up to 3200(MI-7004)

Frequency range From 10Hz to 20000Hz

Weighting A, B, C, D and Linear

Window Rectangle, Hanning, Hamming, Blackman,

Flat-Top

Detector RMS detector and peak detector

Averaging Exponential, Linear, Peak hold

Sound Power Parameters

Standard ISO 3745:2003

GB/T 32524.1-2016

Surface type Ball, Hemisphere, Parallel Plane, and User

Defined

Test process Setup test sequence; local test is
available

Sensor Calibration

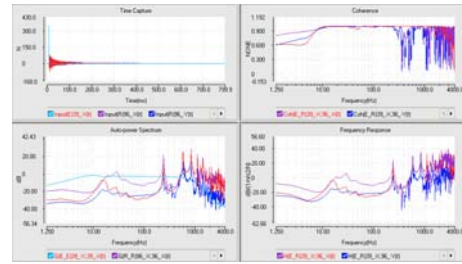
Calibrate sound sensitivity by acoustic calibrator.

Modal Data Acquisition

This tailored module is available for both impact hammer and shaker excitation. With flexible triggering and a graphically adjustable Force/Exponential window, it is easy to set up and acquire data using an impact hammer. For shaker excitation, a variety of source waveforms, including shaped random and burst-random, pseudorandom, and chirp, can provide the optimal signal for the best FRF measurements. Moreover, this module supports various data saving formats which are compliant with popular modal packages.

Analysis

- FRF/Coherence: Between excitation and response channels
 - Spectrum Analysis: auto power spectrum, cross power spectrum
 - Excitation: From impact hammer or shaker excitation
 - Sampling Frequency: Up to 204.8kHz
 - Frame Size: Up to 32768(MI-7008,MI-7016)
 - Specified Window: Up to 8192(MI-7004)
Force/Exponential window, set different windows for each channel
 - Modal Coordinate: Set number, direction, window for each point
 - Auto-increment: Auto-calculate numbers of next group
 - Data Reject: Reject data manually Reject overload data automatically
 - Playback Analysis: Replay data frame one-by-one, re-edit and select data
- Triggering**
- Source: Input channel or no trigger
 - Slopes: Positive, negative or bi-polar
Voltage level within voltage range
 - Level: Free run or manual run,
time delay is available
 - No trigger Mode: Pre-trigger or post-trigger
 - Trigger Mode: Free Run after First Trigger,
 - Run Mode: Manual Trigger Every Frame,
Auto Trigger Every Frame



FRF Data Acquisition for Modal

Pre-Experiment

- DAQ: Amplitude, Pulse duration, Outside data
- Wave parameter: Amplitude, Pulse duration, Duty cycle, AVG
- Basis Reference: Twice hammer amplitude precents, Pulse Duration

Averaging

- Domain: Frequency domain
- Types: Exponential, Linear, Peak hold, N frames peak hold

Filtering

- Low-pass Filters: Set cutoff frequency or filter rate

Measurement Controls

- Controls: Start/stop, pause/continue, next frame
- Status Displays: Current Frame, Test Time, Running status

Data Saving

- Save Contents: Time Capture, FFT, Coherence Function, Correlation, FRF and Power Spectral Density
- Save Formats: ECON binary/ASCII, txt or UFF binary/ASCII
- File Formats: Save the file according to single signal, signal type or test point

Compatibility

Compatible with Modal Genius, ME 'Scope

Order Tracking

MI-7XXX can help you rapidly and easily isolate and diagnose vibration and noise problems in rotating machinery by waterfalls and spectrograms analysis. An advanced digital re-sampling method provides better tracking performance when the RPM changes rapidly. The order range is up to 320 orders, with order resolution as high as 1/32 of an order.

RPM

RPM channel: 1 ~ 3 channels
 Pulse per rev.: 1~10000
 RPM range: Up to 120000RPM (MI-7008/MI-7016)
 Up to 50000RPM (MI-7004)

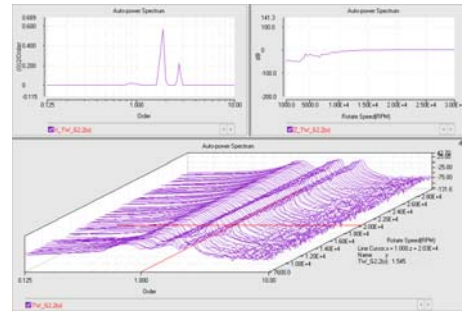
Transmission ratio: 0.01 ~ 100

RPM accuracy: 0.02%

Min. pulse width: 0.05 ms

Order Analysis

Method: Based on FFT estimate
 Order span: 6 ~ 320 (MI-7008/MI-7016)
 6~80 (MI-7004)
 Order resolution: from 1 to 1/32 in 6 stages



Order Tracking in waterfall view

Run Mode

Triggering source: RMP channel or no trigger
 Order tracking: RPM tracking or time tracking
 Mode: Run-up, Run-down, Run-free
 Cycle testing: Allows to reject data in reverse run mode

Waterfall Analysis

Types: RPM, Time
 Display: 3-D or color graph
 Averaging : Exponential, Linear, Peak hold

Range and Image resolution

Users define max/min RPM,RPM range and RPM tracking time

Dynamic Stiffness

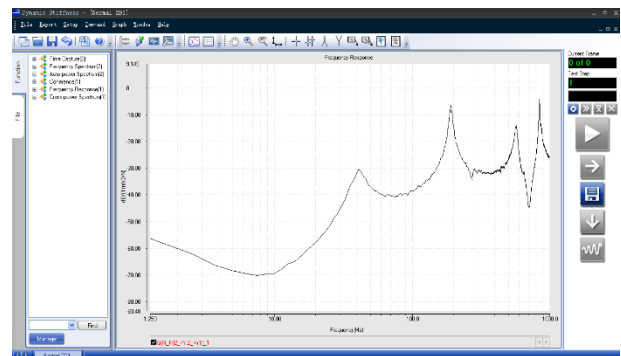
This module is available for both impact hammer and shaker excitation to test the Dynamic Stiffness, Apparent Mass, Inheritance and Impedance of the products. These results can effectively forecast the problem of dynamic characteristic and provide vital evidence for structure modification.

Test Content

Dynamic Stiffness, Apparent Mass, Inheritance and Impedance
 Program the measurement steps by setting total test points and point per step, to mark the measurement performed in sequence.

Analysis

Excitation: From impact hammer or shaker excitation
 FRF type: H1, H2
 Sampling frequency: Up to 204.8kHz
 Frame size: Up to 32768 (MI-7008/MI-7016)
 Up to 8192 (MI-7004)
 Window: Force window, Force-Exponential window, set different windows for forced and response channels
 Data Reject: Reject data manually, Reject overload data automatically
 Playback analysis: Replay data frame one-by-one, re-edit and select data



Triggering

Source: Input channel or no trigger
 Slopes: Bi-polar
 Level: Voltage level within voltage range
 No trigger mode: Free run or manual run
 Trigger mode: Pre-trigger or post-trigger
 Run mode: Free Run after First Trigger
 Manual Trigger Every Frame
 Auto Trigger Every Frame

Averaging

Domain: Frequency domain
 Types: Exponential, Linear, Peak hold,N frames peak hold

Filtering

Low-pass filters: Set cutoff frequency or filter rate

Measurement Controls

Controls: Start/stop, pause/continue, next frame
 Status displays: Running time, frames, running status

Dynamic Balance

This module is available for both impact hammer and shaker excitation to test the Dynamic Stiffness, Apparent Mass, Inertance and Impedance of products. These results can effectively forecast the problem of dynamic characteristic and can provide vital evidence for structure modification.

RPM

RPM channel: 1 channels
 RPM range: 30 ~ 30,000RPM
 RPM accuracy: 0.01%
 Min. pulse width: 0.05 ms

Profiles

Method: Single-plane Balancing, Two-Plane Balancing.
 Process: Test-mass method, Influence factor method
 Influence Factor: Save or Leading-in

Sampling Parameters

Sampling channel: RPM channel, Vibration channel
 RPM Trigger: User-defined
 Voltage: Up to 96kHz
 Sampling frequency: Up to 8192
 Frame size: Linear
 Frequency Average: 0.2Hz, 1Hz, 5Hz, none filters

Filtering

Band-pass filters:

Measurement Controls

Controls: Start/stop, pause/continue, next frame,
 Status displays: nextgroup.
 Running time, frames, running status, running RPM

Test Status

Status display: Dynamic balance windows automatically display imbalance status, imbalance vibration, test-mass information, influence factor, offset imbalance distribution
 Test report: Visual build test reports and save, also can be edit

Data Saving

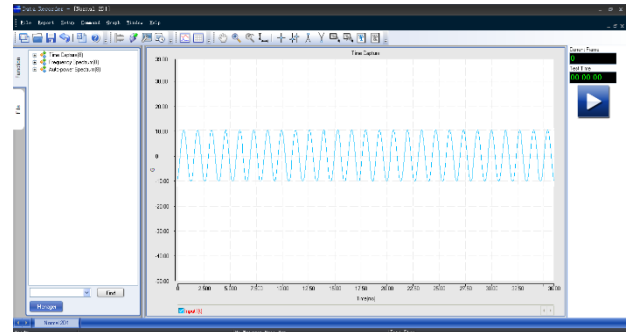
Save modes: On-line save and auto save
 Save profiles: Time, Frequency, Power spectrum, Frequency response function
 Signal file formats: ECON binary/ASCII, txt, or UFF binary/ASCII
 Save contents: Signals and panes

Averaging Level

Accuracy level: Between G0.4 with G4000 in 11 stages, user-defined
 Able to imbalance: Automatic decide by defined accuracy level
 Imbalance distribution: Distribute by average distance between two test planes and the centroid

Data Recording

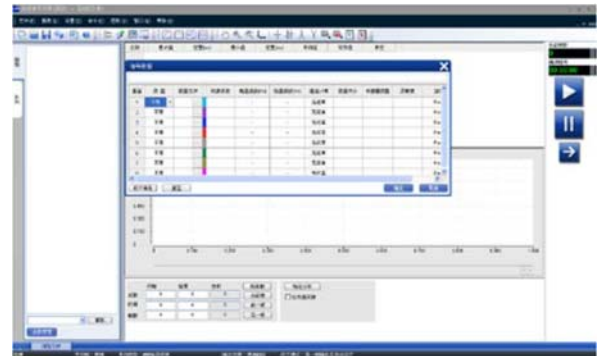
Recording channel: Option
 Data Format: ECON binary or text txt
 Online Show: All channels of the time history
 Recording capability: At 192kHz sampling frequency to ensure seamless recording of all channels
 Channel status: including voltage magnitude and overload
 Post-processing: In the offline analysis (Offline Analyzer) software for analysis



Playback and Offline Analysis

MI-7XXX provides over 8M sample/sec transmission rate based on USB 2.0 to any PC. It can record and transmit all channels' raw data rapidly and continuously to a USB equipped PC. When you are back to your office or lab, you can playback all the data in PC hard disk and take further analysis as well as real-time analysis. Playback analysis software can run on any computer without analyzer, all analysis content and analysis parameters just like on-line functions.

Format: ECON ASCLL(dar),X-Y ASCLL(txt), Y only ASCLL(txt)
 Data: From Data recording or initial data
 Wave Design: Delete,intercept,insert,format conversion
 Batch Conserve format: Able



Post Processing

Using the provided interface function call using the stored data files into MATLAB for processing and display, signal data can also be directly output to an Excel spreadsheet.

Ordering Guide

Dynamic Signal Analyzer Hardware

Item	Part. NO	Description
1	MI-7004-2	Dynamic Signal Analyzer Front End: 2 voltage/IEPE/TEDS analog input channels
2	MI-7004	Dynamic Signal Analyzer Front End: 4 voltage/IEPE/TEDS analog input channels
3	MI-7008-4	Dynamic Signal Analyzer Front End: 4 voltage/IEPE/TEDS analog input channels
4	MI-7008	Dynamic Signal Analyzer Front End: 8 voltage/IEPE/TEDS analog input channels
5	MI-7016	Dynamic Signal Analyzer Front End: 16 voltage/IEPE/TEDS analog input channels
6	MI-70EX01	One extra enabled analog input channel to existing analyzer front end
7	MI-70EX02	One extra enabled analog output (waveform generator) channel to existing analyzer front end
8	MI-70EX03	Rechargeable lithium battery
9	ACC-7000	Accessories (1 pcs/copy for each system): DC 9~36V power adapter and cable, USB cable, software installation CD, user manual, ex-works calibration certificate
10	CAL-02	Calibrating Equipment(5 BNC)
11	CAL-03	Calibrating Equipment(9 BNC)
12	CAL-20	Calibrating Equipment ,Keysight 34461A Digital Voltmeter

Ordering Guide

Measurement & Analysis Application Software

Item	Part. NO	Description
1	7711	Dynamic Signal Analysis
2	7711-01	Standard Waveform Generator for all enabled output channels
3	7712	Data Recorder
4	7711U	Playback And Offline Analysis
5	7721	Acoustics Sound Pressure Analysis
6	7722	Acoustics Sound Power Analysis
7	7723	Acoustics Sound Intensity Analysis
8	7731	Order Tracking
9	7732	Balancing
10	7741	Modal Data Acquisition
11	7741U	Offline Modal Signal Data Analysis
12	7743	Dynamic Stiffness Analysis
13	7751	Shock Data Capture
14	7751-01	Pulse Analysis
15	7751-02	SRS Analysis
16	7752	Shock Response Spectrum (SRS)
17	7753	Damage Boundary
18	7751-U	Shock Response Spectrum (SRS),offline function
19	7751U-01	Shock Pulse Analysis,offline function
20	7751U-02	SRS Analysis,offline function
21	7752U	Shock Response Spectrum (SRS),offline function
22	7751U-01	Pulse Analysis,offline function
23	7700	Software Development Kit (SDK)
24	70CAL	Self-Calibration Software
25	G380	Modal Genius

About Us

ECON is a leading designer and manufacturer of instruments and equipment for test and measurement, headquartered in Hangzhou, China.

With more than 10 years experiences, ECON is also a comprehensive solution supplier for Vibration Test, Vibration and Noise Measurement and Analysis, Structural Model Test, Transducer Calibration, and Environmental Reliability Test.

- Leading role in design and manufacturing of instrument and equipment for test and measurement in China
- A global sales and marketing network.
- Over 2,000 instruments installed worldwide: China-Mainland, Taiwan, Europe, USA, Russia, Mid-east, India, Korea, Japan.....
- Customers among Aerospace, Aviation, Automotive, Electronics, IT & Computers, Packaging, transportation, Institutes and Universities.....
- 70 employees, with an experienced and innovative R&D Team.
- A subsidiary company specialized in environmental test service.

ECON is supplying products, solution and service to customers under support of our local partners and sales representatives. Also ECON is looking forward to more global partners for promotion in their area.



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