

600 Series

Dynamic Signal Analyzer (DSA)

iOtech®
iotech.com

Common Features

- Dedicated 24-bit, 105.4 kS/s delta sigma ADC per analog input
- Spurious-free dynamic range of 108 dB (typical)
- AC/DC coupling, software selectable per channel
- TEDS support for accelerometers
- Pseudo-differential input
- Total harmonic distortion of -100 dB (typical)
- Channel-to-channel phase matching of <0.12 degrees at 1 kHz
- 8-bit digital IO port
- Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®
- Supported by Vibrant Technology ME'scope software for Modal Analysis (excluding 655u)

640 Models

- USB or Ethernet interface
- 4 analog inputs, $\pm 10\text{V}$ input range ($\pm 60\text{V}$ max without damage)
- 2.1 mA IEPE current source per channel (22V compliance)
- 1.0 Hz high-pass filter
- 24-bit delta sigma DAC analog output
- Analog outputs: sine, swept sine, random, burst, arbitrary
- Analog output signal-to-noise ratio: 100 dB (typical)

650 Models

- USB or Ethernet interface
- 5 analog inputs, $\pm 40\text{V}$ input range ($\pm 60\text{V}$ max without damage)
- 2.1 mA IEPE current source per channels 1-4 (22V compliance)
- 0.1 Hz high-pass filter

652u Model

- USB interface
- 10 analog inputs, $\pm 40\text{V}$ input range ($\pm 60\text{V}$ max without damage)
- 4 mA IEPE current source per channels 1-10 (22V compliance)
- 0.1 Hz high-pass filter

✓
RoHS



✓
RoHS

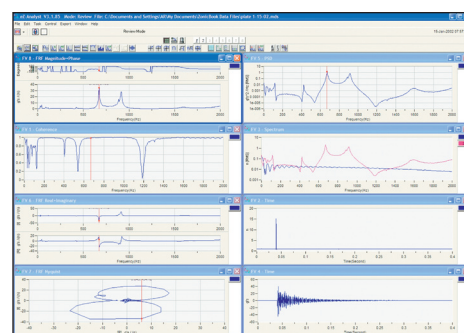


Vibration analysis and monitoring has never been easier than with the 600 Series of dynamic signal analyzers and eZ-Series software

655u Model

- USB interface
- 10 analog inputs, $\pm 40\text{V}$ input range ($\pm 60\text{V}$ max without damage)
- 4 mA IEPE current source per channels 1-10 (22V compliance)
- 0.1 Hz high-pass filter
- 5 temperature channels

Vibration data acquisition, analysis, and monitoring has never been easier than with the IOtech 600 Series of dynamic signal analyzers and eZ-Series software. More than 30 years of engineering experience in vibration measurements have gone into the design of the 600 Series of DSAs. They come in either USB or Ethernet versions for maximum flexibility. The DSA hardware provides signal conditioning and data acquisition, while the eZ-Series PC-based software provides monitoring and analysis functions.



eZ-Analyst software with the 600 Series and your PC makes a real-time, portable vibration and acoustic analysis system

Hardware Overview

The IOtech 600 Series are 24-bit dynamic signal analyzers with USB or Ethernet interfaces to transfer acquired data to the PC in real time. This means that every data sample can reside on a PC's hard drive, which makes effective waveform recreation and post acquisition analysis.

Measurement

The spurious-free dynamic range of the 600 Series analog input is 108 dB. The 24-bit delta sigma ADC provides high resolution

and excellent AC and DC accuracy. All channels are sampled synchronously and provide better than 0.12° of channel-to-channel phase matching at 1 kHz. The extremely low noise floor and extremely low distortion provide the user with high quality test data.

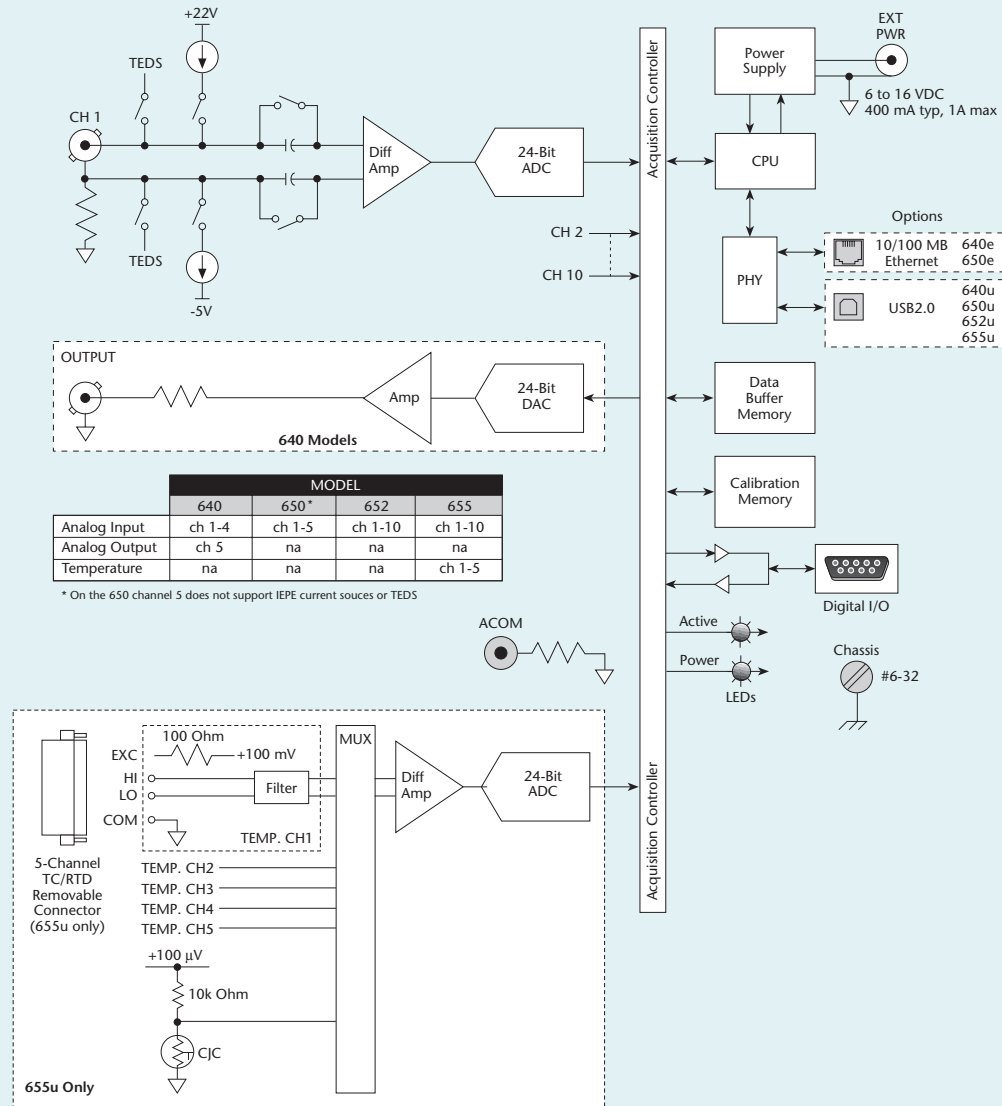
Analog Inputs

The IOtech 600 Series support a variety of analog input types, including Accelerometer, Velometer, Proximity Probe, Microphone, Tachometer, or other voltage input. The 640 model accepts up to $\pm 10\text{V}$ inputs, while the 650, 652, and 655 models can accept up to $\pm 40\text{V}$ inputs. All are rated to withstand up to $\pm 60\text{V}$ maximum without damaging the input. These signals may be either AC or DC coupled.

600 Series

General Information

600 Series Block Diagram



Signal Conditioning

The 600 Series supports software selectable AC or DC coupling, and automatically connects the 2.1 mA (640, 650), or 4 mA (652u, 655u) current source with AC coupling for integrated electronic piezoelectric (IEPE) sensors. All models also supply the current source with a 22V compliance voltage at the input terminals for biasing the IEPE sensors.

All models can be programmed to select IEPE sensors and read sensor calibration information using Transducer Electronic Data Sheets (TEDS). The software can automatically connect to the sensors' EEPROM memory, and retrieve their data sheet. Additional advantages include detecting over-voltage and open or shorted inputs for IEPE sensors.

Source Output

The 640 model contains one programmable analog output channel that generates continuous or swept sine-wave signals, as well as random, burst, and arbitrary signals. A programmable 24-bit, delta sigma DAC and an internal amplifier stage drives these output signals at 93 kS/s. In addition, it can operate while receiving analog input data. The software synchronizes the signals between the ADC and the DAC within the unit. The analog output signal can drive audio or shaker table amplifiers and can be used for noise, vibration, and harshness (NVH) testing with a typical signal-to-noise ratio of 100 dB.

600 Series

General Information & Specifications

Power

The 640u and 650u models draw power from either the USB source (PC or USB hub) or an external power source. The 640e, 650e, 652u, and 655u must use external power, either user supplied, or with the included universal AC/DC power adapter. All models may also be powered from a regulated external 5W supply ranging from 6 to 16 VDC.

PC Connection

The 600 Series DSA comes in two interface versions: one connects to the PC through a 10/100BaseT Ethernet interface, and the other uses a USB 2.0 port.

The 600 Series Ethernet version, the 640e or 650e models, also may be attached to a sufficient wide-band network. The data bandwidth is a function of the analysis rate, number of spectral lines, Nyquist factor, and the number of signals being measured. When measuring continuous signals over multiple channels, however, it is recommended to use a dedicated Ethernet or USB connection between the 600 Series DSA and the PC to ensure the data transfer is not interrupted.

Software Overview

Four end-user software packages are available for the 600 Series, each tailored to a particular type of vibration measurement and analysis application. Select the packages that best suit your application, and add additional packages as your requirements evolve. These packages support analysis rates from 20 Hz to 40 kHz.

eZ-Analyst provides throughput data recording and multiple channel vibration analyses. Time Waveform, Spectrum, Waterfall, FRF, Cross, Transfer Function, Coherence, and Octave analyses are provided. Data acquisition and storage can be triggered based on events or scheduled. Direct export to the most accepted Modal Analysis packages.

eZ-TOMAS is a highly sophisticated, yet easy-to-use tool for the monitoring and analysis of single or multiple machines, which allows the user to assess the reliability and operation of his process, and the critical machines pertaining to his process. Notification of faults are displayed locally, but can also be sent via text message or email, allowing the user to be notified of any problem regardless of his location.

eZ-Balance is used to balance rotating machinery with up to seven planes. A Toolkit, which includes Split Weight calculations, supports the balance process. The vibration vectors and correction weights are displayed on polar displays. Time and Spectrum plots show the detailed vibration measurements during the balance process.

eZ-NDT* is used in production applications to determine the quality of production products. Resonance Inspection provides a measure of quality. Spectral limit criteria can be learned by comparing known good and bad samples. Production rates of one part per second are supported.

* Not compatible with 652u and 655u models

Specifications

General Specifications

Environment

Operating Temperature

640u, 650u, 652u, 655u: -40° to 60°C

640e, 650e: 0° to 50°C

Humidity: 0° to 95% RH, non-condensing

Vibration: IEC 60068-2-64

Shock: IEC 60068-2-27

Ingress: IP 40

Power Supply

Maximum Power Draw

640e, 650e: 4.2W

640u, 650u: 2.5W

652u: 3.5W

655u: 4.7W

Required Supply Voltage

640e, 650e: 6.5 to 16 VDC

640u, 650u, 652u, 655u: 6.0 to 16 VDC

Power Jack: Barrel type; 5.5 mm O.D., 2.5 mm I.D.

PC Communication

640e, 650e: 10/100BaseT Ethernet

640u, 650u, 652u, 655u: USB 2.0

Dimensions

640, 650: 142.2 mm W x 180.3 mm D x 38.1 mm H (5.6" x 7.1" x 1.5")

652u, 655u: 276.9 mm W x 169.8 mm D x 30.5 mm H (10.9" x 6.7" x 1.2")

Weight

640, 650: 0.7 kg (1.5 lbs)

652u, 655u: 1.2 kg (2.7 lbs)

Warm-Up: 10 minutes to rated specifications

Analog Specifications

Analog Measurements

ADC Converter Resolution: 24 bits

ADC Converter Type: Delta-Sigma per channel

Sample Rates: Up to 105,468 samples per second

Sample Rate Accuracy: ±50 ppm

Channels

640: 4 input channels

650: 5 input channels

652u, 655u: 10 input channels

Input Connector: 1 BNC per channel

Input Impedance	640	650/652u/655u
High to ground	200k Ohm 130 pF	800k Ohm 120 pF
Low to ground	1k Ohm	1k Ohm
High to low	201k Ohm	801k Ohm

Input Coupling: DC, AC, or AC + IEPE; software programmable per channel basis

High-Pass Filter (Cutoff)

640: 1.0 Hz

650, 652u, 655u: 0.1 Hz

Input Ranges

640: ±10V peak

650, 652u, 655u: ±40V peak

Input Protection

BNC Shell to BNC Center: ±60V max without damage

BNC Shell to Earth Ground: ±5V max without damage

Over-Range Indication: Software

Low-Pass Filter: Software programmable per channel

Type: Anti-aliasing hardware 3-pole 360 kHz, software selectable FIR filter. Any unwanted signals above 27 MHz are lost in the noise floor of 64k FFT.

600 Series

Specifications

655u TC Measurement Uncertainty (1 sigma °C, Ambient 23°C, ±15°C, exclusive of TC wire error)													
TC Type	Measured Temperature (°C)												
	-200	-100	0	100	200	300	400	600	800	1000	1200	1400	1600
B	–	–	–	2.94	1.84	1.48	1.49	1.14	1.10	1.05	1.02	1.04	1.03
E	0.91	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.90	0.92	–	–	–
J	0.92	0.89	0.88	0.88	0.88	0.89	0.89	0.90	0.90	0.92	0.94	–	–
K	0.95	0.89	0.88	0.88	0.89	0.89	0.90	0.91	0.92	0.94	0.96	–	–
N	1.02	0.91	0.89	0.89	0.89	0.89	0.90	0.91	0.92	0.93	0.95	–	–
R	–	–	1.18	1.04	1.04	1.03	1.01	0.99	2.01	1.01	1.01	1.03	1.05
S	–	–	1.18	1.12	1.04	1.03	1.01	1.03	1.02	1.02	1.04	1.06	1.07
T	0.95	0.90	0.88	0.88	0.88	0.89	0.89	–	–	–	–	–	–
RTD Measurement Uncertainty (1 sigma °C, Ambient 23°C, ±15°C, exclusive of RTD error, assumes 4-wire RTD)													
RTD	0.20	0.21	0.24	0.28	0.29	0.40	0.48	0.66	0.92	–	–	–	–

Amplitude Accuracy

	640	650/652u/655u
AC at 1 kHz	±0.07 dB typ ±0.12 dB max	±0.1 dB typ ±0.15 dB max
DC	±(0.05% of reading + 2 mV)	±(0.2% of reading + 15 mV)

Amplitude -3 dB: 0.49 x sample rate

Amplitude Flatness: ±0.05 dB typ ±0.10 dB max DC to 20 kHz

Total Harmonic Distortion: -100 dB typ 1 kHz, -97 dB typ 10 kHz

SFDR Including Harmonics: 108 dB typ DC to 50 kHz

SFDR (@ -60 dB): 128 dB typ DC to 50 kHz

Channel-to-Channel Crosstalk: <100 dB at 1 kHz

Channel-to-Channel Phase Matching

640e, 640u: <0.04°/kHz + 0.08°

650e, 650u, 652u, 655u: <0.06°/kHz + 0.1°

Common Mode Rejection Ratio

640e, 640u: -70 dB typ -55 dB max at 1 kHz

650e, 650u, 652u, 655u: -56 dB typ -41 dB max at 1 kHz

Wideband Noise

Analysis	Typical Noise (µV rms)	
Frequency (Hz)	640e, 640u ¹	650e, 650u, 652u, 655u ²
20	2.4	11
50	3.5	15
100	4.6	20
200	6.2	26
500	9.0	37
1000	12.0	48
2000	16.0	62
5000	23.3	89
10000	31.1	116
20000	41.4	151
40000	55.1	197

1. 640e, 640u: maximum noise @ ≤50°C = 1.4x; @ >50°C = 1.6x
(where x is the typical value given in the above table)

2. 650e, 650u, 652u, 655u: maximum noise @ ≤50°C = 1.4x; @ >50°C = 2.1x
(where x is the typical value given in the above table)

IEPE Bias Source

640, 650 (Channels 1 to 4)

Current: 2.1 mA, 22V compliance (on/off software programmable per channel)

Impedance: >255k Ohm

652u, 655u (Channels 1 to 10)

Current: 4.0 mA, 22V compliance (on/off software programmable per channel)

Impedance: >255k Ohm

IEPE Fault Detection Thresholds: <1V (short), >20V (open)

IEPE Fault Indication: Software indicator, per channel

Analog Temperature Measurements (655u only)

ADC Converter Resolution: 24 bits

ADC Converter Type: Delta-Sigma

Sample Rate: 200 msec per conversion

Channels: 5

Input Range: ±100 mV

Offset Voltage: ±5 µV

Offset Drift: Zero

Gain Uncertainty: ±0.05%

Gain Drift: 0.005%/°C

Input Impedance: Each input to analog ground, 100M Ohm

Open Sensor Detection Current: 50 nA

Common Mode Range: ±10V

Common Mode Rejection Ratio: 150 dB typ

Maximum Voltage (without damage between inputs): ±5V DC or
5V peak-to-peak AC

Maximum Voltage (without damage from earth ground to input): ±17V DC
or 34V peak-to-peak AC

Maximum Voltage (without damage from RTD excitation high to earth
ground or high to RTD excitation low): ±3V DC or rms AC

Channels may be of mixed type, different TC types, and/or RTD

Cold Junction Sensor Accuracy

Ambient Temperature Range (°C)	Max Error (±°C)
-40 to -20	±1.0
-20 to 0	±0.8
0 to 10	±0.4
10 to 45	±0.2
45 to 60	±0.8

RTD

Type Supported: PT100, alpha = 0.00385

Excitation: 100 mV through 100 Ohm

Accuracy: ±0.2°C; exclusive of RTD error, assumes 4-wire connection

Connections: 2, 3, and 4 wire

Calibration Note: Factory calibration of 652u and 655u was conducted with the units in a standard upright position, with the chassis cover clear of other devices and/or objects. For 655u thermocouple calibration, 5-22 AWG wires were used. For maximum accuracy, all five channels should be populated with 22 AWG thermocouples; different gauge sizes and number of thermocouples will increase errors; however the measurements will still be within the specified accuracy. To meet the accuracy specifications, the temperature connector's plastic shell must be installed. Slowly changing ambient temperatures cause immeasurable errors, but drastic, rapid changes may require some time for the unit to stabilize.

600 Series

Specifications & Ordering Information



Analog Output (640 only)

Channels: 1
Signal Connection: BNC
Frequency Range: DC to 45 kHz (-3.0 dB)
Frequency Accuracy: ± 50 ppm
DAC Resolution: 24 bit
DAC Update Rate: 93.75 kS/s
DAC Type: delta sigma
Total Harmonic Distortion: 1 kHz; -96 dB typ
Total Harmonic Distortion + Noise: 1 kHz; -87 dB typ
Amplitude Settings: 0 to 7V p-p
Amplitude Accuracy at 1 kHz: ± 0.05 dB typ ± 0.12 dB max
Amplitude Flatness (DC to 20 kHz): ± 0.02 dB typ ± 0.1 dB max
SNR (DC to 20 kHz): 100 dB typ 90 dB max
Maximum Load: 1k Ohm (50 Ohm with external power)
Waveform Modes: Sine, swept sine, random, burst, arbitrary
Output Impedance: 50 Ohm

Tachometer Inputs

Any analog input channel may be used as a tachometer input

Digital I/O Lines

Channels: 8 digital I/O, programmable as inputs or outputs on a line by line basis
Ports: 1 x 8-bit; each bit is programmable as input or output
Power-Up Mode: Inputs pulled low
Connector: DB9 female
Input Modes: 2 programmable input modes: asynchronous, under program control at any time relative to analog scanning; synchronous with analog scanning
Input Protection: -0.6 and +5.6V
Input Levels
Low: 0 to +0.8V
High: +2.0V to +5.0V
Input Pull-Down Resistor: 10k Ohm
Synchronous Sampling: 105,468 Hz max
Output Voltage Range: 0 to +3.3V, may be pulled up to +5V
Output Resistance: 100 Ohm
Output Levels
Low: <0.8V
High: >3.0V with no load
Output Timing: Outputs are always written asynchronously

Ordering Information

Description	Part No.
Ethernet-based dynamic signal analyzer	640e
Ethernet-based dynamic signal analyzer for rotating machinery and maintenance	650e
USB-based dynamic signal analyzer	640u
USB-based dynamic signal analyzer for rotating machinery and maintenance	650u
10-channel, USB-based dynamic signal analyzer	652u
10-channel, USB-based dynamic signal analyzer, with 5 temperature channels	655u

Accessories & Cables

Handle for 652u or 655u	HA-210-5-BK
High-speed USB cable, 1 m.	CA-179-1
External power supply, 90 to 264 VAC; requires additional cable	TR-2U
USA version	CA-1
European version	CA-216

Software (DASYLab drivers included)

Real-time vibration and acoustic analysis software	eZ-Analyst
Rotating machine monitoring and analysis software	eZ-TOMAS
Remote access and control client for eZ-TOMAS	eZ-TOMAS Remote
Machine balancing software	eZ-Balance
Resonant inspection software	eZ-NDT
Lite version, includes all drivers; comes without analysis, limited module count, and one Layout Window	DASYLab LITE
Basic version, includes all drivers; comes with all standard modules (except Signal Analysis and Actions), and one Layout Window	DASYLab BASIC
Full version, includes all drivers; comes with all standard modules, 200 Layout Windows, and Control Sequencer	DASYLab FULL
Pro version, includes all drivers; includes Full version plus all add-on modules (without third-party modules)	DASYLab PRO
Run-time license for DASYLab	DASYLab RUNTIME

BUY NOW!

For complete product specifications, pricing, and accessory information, call 1-888-714-3272 (U.S. only) or visit iotech.com/600series.

eZ-Analyst

Real-Time Vibration & Acoustic Analysis Software

iOtech®
iotech.com

Features

- Real-time FFT analysis
- Easy-to-use graphical user interface provides fast setup
- Field expandable from 8 to 56 channels
- Supports four separate tachometer channels
- 3D Color Waterfall Spectrum Display
- Order Normalization and Order Tracked Plots
- Multiple Plot Overlays
- View all functions simultaneously in eight display windows with up to 16 data overlays in each window
- Export your data to Excel, ME Scope, SMS Star, UFF type 58 ASCII or Binary, and RPC III
- Wide selection of real-time analysis features, including integration/differentiation, synchronous averaging, and much more
- Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®

eZ-Analyst software from IOtech adds real-time continuous and transient data acquisition in the Time, Frequency, or Order domain to 600 Series, ZonicBook/618E, and WaveBook/516E systems. Today's eZ-Analyst is the compilation of over 10 years of continuous software development and customer inputs that results in the most versatile vibration analyzer available.

eZ-Analyst is operated through a series of easy setup windows that display only the information important to your test. Acquisition configuration involves selection of the desired acquisition parameters from easy-to-use menus.

Configuration

eZ-Analyst features a familiar Windows®-style graphical user interface, making it easy to configure the hardware with simple fill-in-the-blank configuration screens. Selectable hardware parameters include channel selection, channel type (either response or reference), range, auto-ranging, triggering, and more. Configurations can be saved and recalled for future use, making it simple to change from one test to another.

Windowing. eZ-Analyst includes Hanning, Blackman Harris, Flat Top, Exponential with variable decay, and no window for response channels. Additionally, Rectangular and Cosine Taper Windows are provided for reference channels.

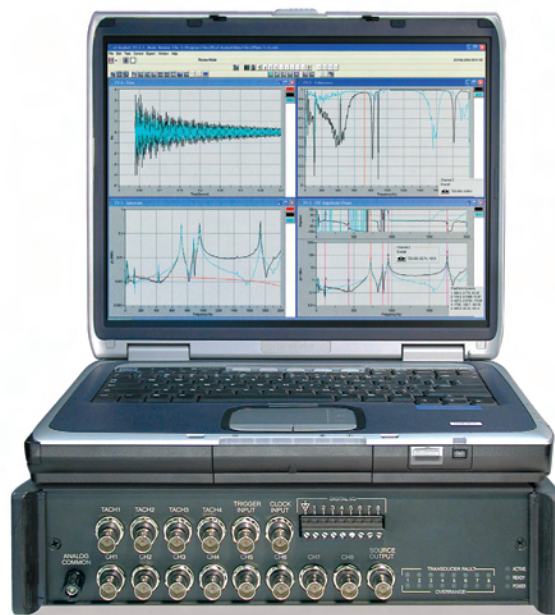
Averaging. Linear, Exponential, Peak Hold, and Time Synchronous

Resolution. eZ-Analyst offers resolution from 64 to 25,600 Spectral lines

Frequency Range. From DC up to 100 kHz*

Sample Rate. User selectable from 2.56, 5.12, or 10.24** times the frequency range selected to help in acquiring that elusive transient

Channels. Minimum of 8 to a maximum of 56 in increments of 8

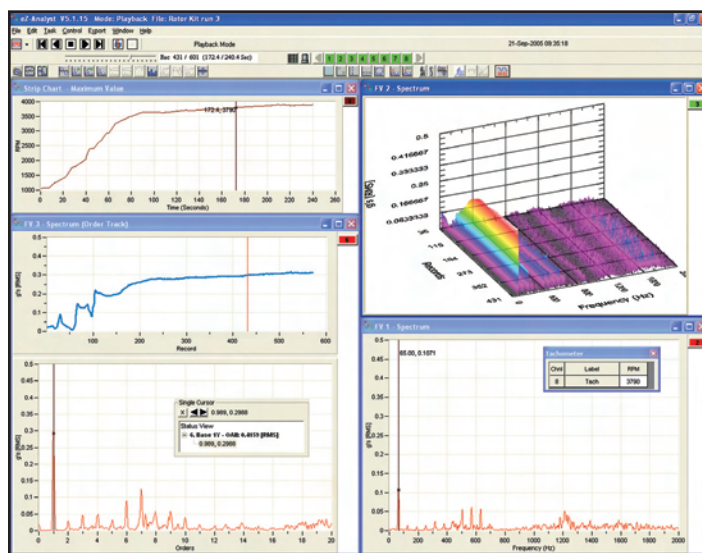


The ZonicBook with eZ-Analyst system is a complete vibration data acquisition and analysis package

Triggering. Any active channel may be used as an acquisition trigger, which is adjustable on level, slope, and pre or post delay as a percentage of the time window

Tachometer. Four independent inputs for RPM measurements

MIMO. Any number of active channels can be set as reference channels making MIMO (Multi Input Multi Output) testing easy and convenient



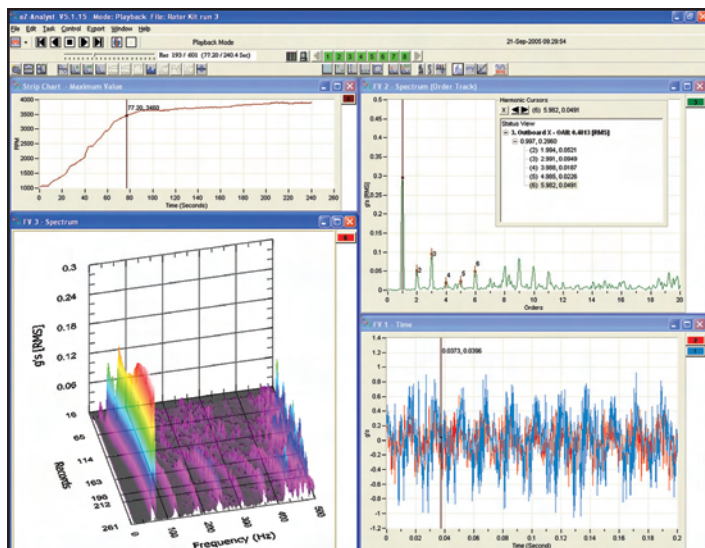
Waterfall, RPM Strip Chart, Frequency Spectrum, Order Normalized Spectrum, and Order Track Strip Charts are all available with complete flexibility during acquisition

* Maximum bandwidth determined by number of active channels and sample rate

** Sample rates apply to only the ZonicBook

eZ-Analyst

General Information



Complete display flexibility with a MDI style interface



The analyzer's acquisition setups are easily and quickly configured

Display

eZ-Analyst allows the user to establish any combination of displays up to a maximum of 8 separate display windows and 16 data traces within each window for unparalleled versatility. Each display set up can be saved for instant recall providing the user with unlimited display flexibility.

3D Color Waterfall Spectrum Display

eZ-Analyst now includes a powerful 3D Color Waterfall Display to augment its already powerful spectrum display capabilities. Each Spectrum window added to the eZ-Analyst display screen can have its own 3D Waterfall with unique configuration settings. The new eZ-Analyst Waterfall displays include the following capabilities:

- Latitude and Longitude display rotations
- 3D Plot cursor to display the value at a specific X, Y, and Z plot coordinate
- Configurable number of Spectrum records
- Automatic tracking of scale and axis changes made to the Spectrum display
- Spectrum record decimation
- Averaged Spectrum record tracking
- 3D display of Spectrum Single, Dual, Harmonic, Sideband and Free Form cursors
- Highlighted spectrum of current record in playback mode
- Six custom definable 3D plot rotation context menu presets for customized waterfall views
- Individual control of 3D surface plot and cursor trace transparency
- Auto and Log scaling capability
- Choice of three color modes for 3D surface plot

Order Normalized & Tracked Plots

View both Frequency and Order domain information at the same time. The user can specify any combination of orders, up to a maximum of 20 orders per display window while also viewing the order normalized and/or frequency domain plots. This feature may be selected while viewing real-time or post processed data without the restriction of defining your display prior to running your test.

Multiple Plot Overlays

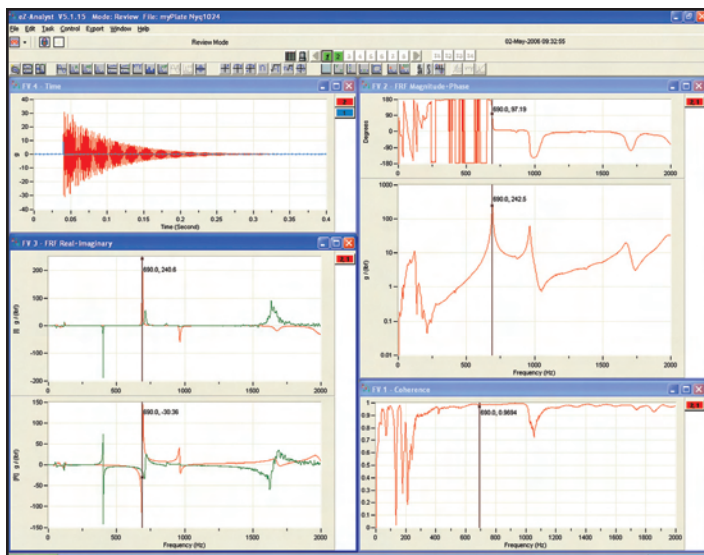
This new feature allows you to quickly compare current test measurements to previously acquired data and expected results. eZ-Analyst can directly import and overlay Microsoft® Excel® data while acquiring current test data in real time. This feature allows setting up test criteria by importing previously acquired or user-generated data into the real-time display plots. Up to 15 separate plot overlays can be imported, allowing you to analyze real-time data against multiple test criteria. You can compare test results and quickly determine whether the test measurement meets acceptance criteria.

In addition to the 3D Waterfall display, a new 2D Frequency/Order Slice display has been added to eZ-Analyst's analysis toolbox. The cursors that appear in the main Spectrum can also be seen in a 2D Frequency/Order Slice Strip Chart that plots the values under the cursors over time.

With eZ-Analyst's flexible display configuration capability, you can view the Spectrum, 3D Waterfall, 2D Frequency Slice or order track displays individually, or you can vertically tile any two of these displays into the same window.

eZ-Analyst

General Information & Ordering Information



Compare current and pre-acquired data in the same display window

Display Windows. Up to 8 with 16 data traces per window in either real-time or post analysis

Functions. Available display functions include Time, Spectrum, Order Spectrum, Order Track, Auto Spectrum, Waterfall, PSD, FRF (Magnitude, Phase, Real, Imaginary, Nyquist), Cross Spectrum, Coherence, Octave, Third Octave, Transfer Function (Inertance, Mobility, Compliance, Apparent Mass, Impedance, Dynamic Stiffness), and Averaged Time

Cursors

All cursors are selectable as independent of display window or locked for automatic tracking of frequency.

Single. Cursor displays Time or Frequency with amplitude and overall amplitude

Dual. Cursors display Time or Frequency with band overall

Harmonic. Displays fundamental and harmonics with the number of harmonics user selectable; harmonic markers have fine tuning

Side Band. Displays center frequency with $\pm$ delta frequency

Peak. Displays peak amplitudes with user-selectable number of cursors; user-selectable threshold level sorted by amplitude or frequency

Free Form. User-selectable number of cursors that can be placed at any location on the data display

Export Data

UFF. Universal file format 58 ASCII or Binary

ME Scope Modal. Vibrant Technologies ME Scope native format

STAR Modal. Spectral Dynamics STAR native format

EXCEL. Microsoft® Excel®

RPC III. For road simulation

Record/Playback Data

eZ-Analyst allows the user to record real-time data to the computer hard drive while viewing the data. The data is saved on the computer hard drive as a contiguous time data file and can then be played back and analyzed. The acquisition hardware does not have to be connected to the computer to perform this function. Data can be recorded at maximum bandwidth, and the file size is only limited by the available space on the hard drive. During playback, all display functions are available to the user. Additionally, the user may select any percentage (0% to 99%) of overlap processing during playback.

Waveform Output (640 Models Only)

Allows several different types of waveforms including random, burst random, sine swept sine square waves as well as arbitrary waveforms from file. You can change the type of waveform, its signal level, DC offset, and for square waves, the duty cycle. Changes to these controls can be made while the waveform output is running. Burst on/off times are also selectable as well as sweep times for swept sine wave types. You can configure your waveform to output continuously, in a burst or to repeat. In addition, ramp up on start and ramp down on stop can be programmed to allow smooth transition of test equipment such as shaker tables. The waveform output feature also enables data capture on output start events so that analyzer data frames can be captured at the start of every waveform output sequence.

Configuration

From the eZ-Analyst menu or toolbar, you bring up the waveform output dialog and make your selection of the type of waveform you want to generate. You can choose from several types of static waveforms and swept waveforms. Or you can import data from a text file or eZ-Analyst Time History file to create an arbitrary waveform.

Predefined static waveform types include: Sine, Square, Triangle and Random; and provide settings for Offset, Amplitude, Frequency, and for Square waves Duty Cycle.

For Swept waves you can choose from: Sine, Square, Triangle and Chirp; and utilize settings for Offset, Amplitude, Start Frequency, End Frequency, Log/Lin sweep, and Sweep direction. You can also add an optional Amplitude ramp up at the start of your waveform, or an Amplitude ramp down at the end of your waveform.

Ordering Information

Description	Part No.
Real-time vibration analysis and recording software for the 600 Series, ZonicBook/618E, and WaveBook/516E operating under all 32-bit versions of Windows®	eZ-Analyst

Note: eZ-Analyst is included with the ZonicBook/618EZA package.

BUY NOW!

For complete product specifications, pricing, and accessory information, call 1-888-714-3272 (U.S. only) or visit iotech.com.

eZ-TOMAS & eZ-TOMAS Remote

Rotating Machine Monitoring & Analysis Software

iOtech®
iotech.com

eZ-TOMAS Features

- Rotating Machinery Analysis: Time Waveform, Orbit, Spectrum, Waterfall, Polar, Bode, Shaft Center Line, and Trend displays
- Transient and Steady State rotating machinery analysis
- Easy-to-use graphical user interface and multiple project configurations provide fast setup
- Up to 50 kHz Analysis Frequency, with up to 25,600 lines of resolution
- Supports up to 56 channels
- Overall, spectral amplitude, and phase gauges with peak hold indicators
- Spectral limit checking, with output relays and alarm event logging
- Limit sets for specific RPM ranges
- Event data storage based on user defined triggers, with automatic backup
- Machine and Bearing Fault analysis and limit checking
- Save/Recall display setups with up to 8 display windows, and multiple overlays
- Integration and differentiation for acceleration, velocity, and displacement inputs
- Harmonic, Sideband, and Peak cursors for time waveform and spectrum displays
- Statistical analysis report with automatic limit generation
- Generate production test cell reports
- OPC support for gauge data
- Export data to Excel®, UFF Type 58 Binary, or ASCII format
- Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®



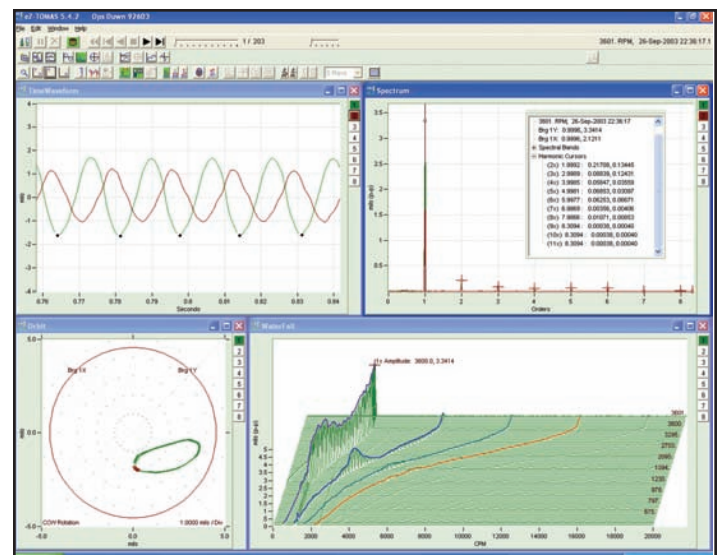
View Time-Domain, Spectrum, Waterfall, and Trend simultaneously on one screen with eZ-TOMAS

eZ-TOMAS Remote Features

- Provides remote monitoring, analysis, and control of multiple eZ-TOMAS systems
- Remote Real Time and Historical Spectral Analysis and Displays
- Configurable real-time Gauge Displays
- Multiple eZ-TOMAS Remote users can simultaneously monitor an eZ-TOMAS system

eZ-TOMAS is a highly sophisticated, yet easy-to-use tool for the monitoring and analysis of single or multiple machines, which allows the user to assess the reliability and operation of his process, and the critical machines pertaining to his process. Notification of faults are displayed locally, but can also be sent via text message or email, allowing the user to be notified of any problem regardless of his location.

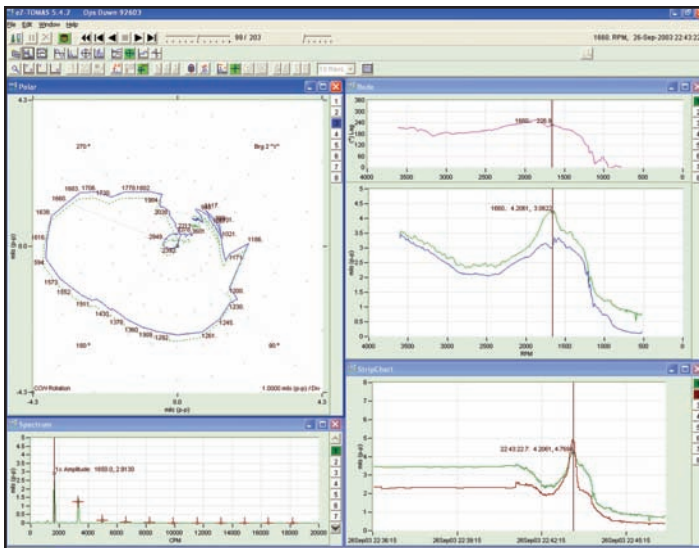
eZ-TOMAS has built in an extensive set of data displays, allowing the user to view data in a variety of formats, and virtually eliminate any potential for errors in the diagnoses of potential problems.



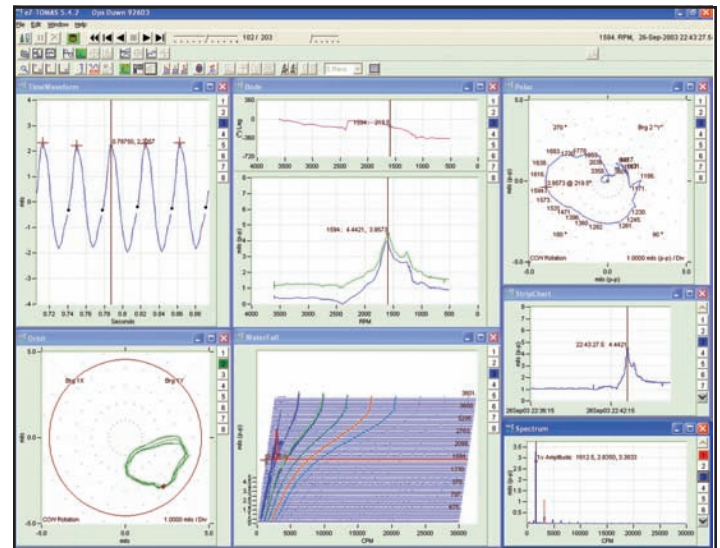
Machine Shutdown Transient is captured and analyzed

eZ-TOMAS & eZ-TOMAS Remote

General Information



Polar, Trend, and Spectral Displays provide rotating machinery analysis



Up to eight display windows with overlays for each window

Continuous Monitoring. eZ-TOMAS automatically stores data based on time or change in machine condition such as speed, vibration level, and alarm condition. A circular FIFO file, with automatic backup, records the data. If an alarm condition occurs, eZ-TOMAS can automatically notify you.

Analysis Tool for Rotating Machine. You can display and analyze historical data while eZ-TOMAS continues to collect, monitor, and store data. Displays include Waterfall, Spectrum, Bode, Orbit, Time Waveform, Shaft Center Line, and Trend displays.

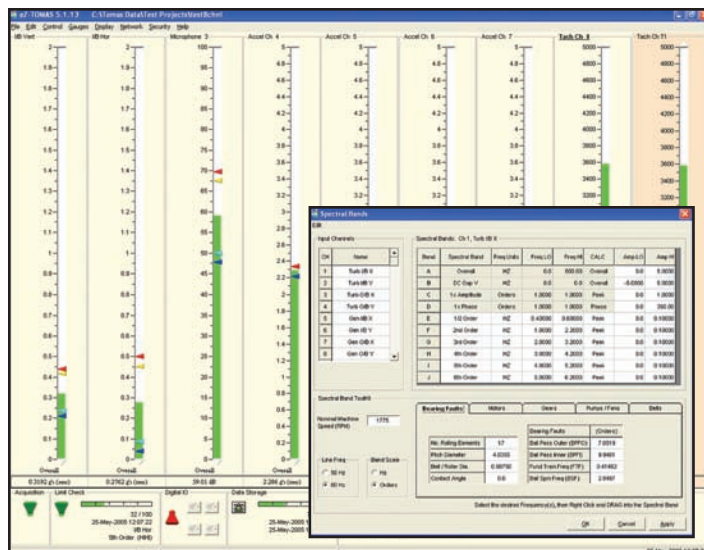
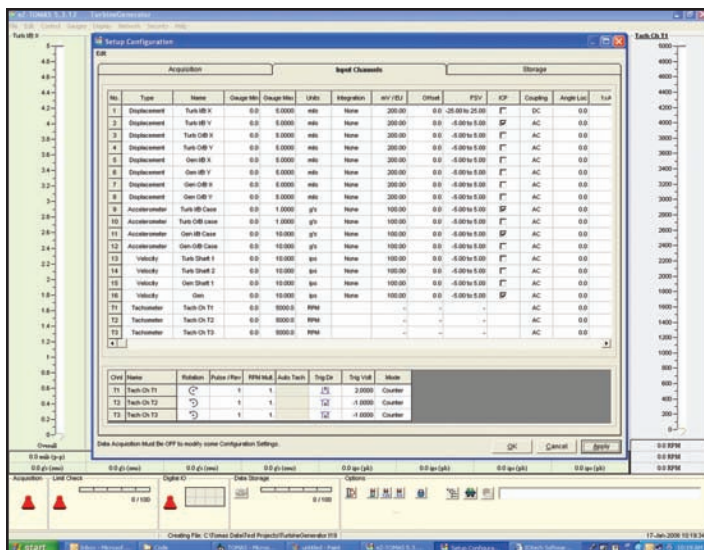
Portability. The ZonicBook or 600 Series, and notebook PC running eZ-TOMAS, can be easily moved from machine to machine with very short setup times. Use it to reduce downtime, improve data collection, and troubleshoot problems, while maximizing inventory utilization by intelligently projecting down time for parts replacement. With minimal training, you can set up eZ-TOMAS, start monitoring, perform data reduction, and prepare reports all in the same day.

Acquisition

- **Hardware:** ZonicBook/618E, 600 Series, or WaveBook/516E
- **Analysis Range:** From DC up to 50 kHz
- Up to 25,600 spectral lines for high resolution
- **Channel Coupling:** AC, AC with IEPE, or DC
- **Channel Input Range:** From 25 mV to 25V
- **Windowing:** Hanning, Flat Top, Blackman Harris
- **Multiple Tachs:** Up to 32 dedicated tach channels for phase reference
- **Input Channel Types:** Displacement, Velocity, Acceleration, Pressure, Tachometer, and other sensors
- Input channels can be order normalized to any tachometer input
- **Averaging:** Peak Hold, Linear, or None

eZ-TOMAS & eZ-TOMAS Remote

General Information



Easy configuration of all channels

Limit checks on up to 10 user defined and 4 dedicated parameters for each channel

Storage

- Event driven FIFO circular files change in Time, RPM, Vibration levels, or Alarm Condition
- **User Defined FIFO Size:** Up to 225,000 time waveform records per input channel
- View or Export historical data while monitoring is active
- Automatic backup of FIFO file

Data is stored in a FIFO file based on a change in machine condition or absolute time. Examples of machine condition include RPM, vibration level, and alarm status. A User Snapshot feature provides the ability to manually trigger data storage. You can also specify that eZ-TOMAS only store data while the machine is operating within machine speed range. These features allow you to record the vibration condition of your critical machine, and quickly review that information.

Limit Checking

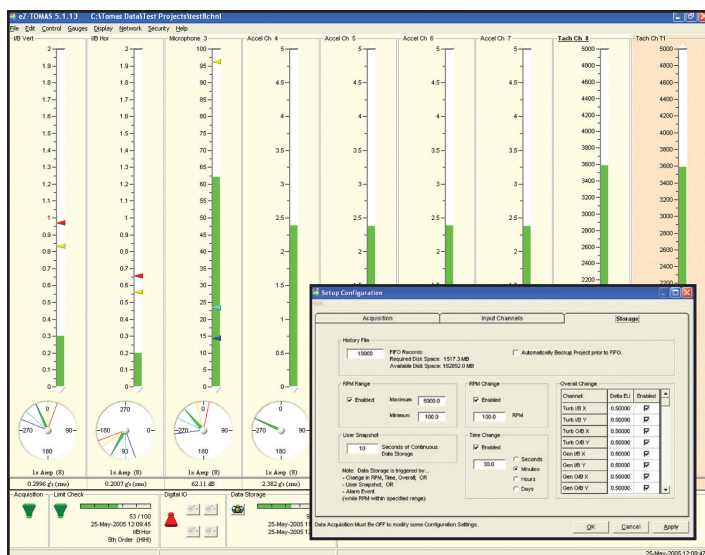
- Two High and two Low alarm Set Points can be defined for multiple RPM ranges
- Set Points can be entered manually, or generated automatically based on historical operating conditions
- Spectral Set Points can be specified for Machine and Bearing Fault frequencies
- Alarm Event Recognition can be delayed to reduce false alarms
- Alarm Events are logged with Date/Time stamps
- Email and Text Messaging can be sent on Alarm Event
- Output relays can be triggered on Alarm Events

eZ-TOMAS continuously limit checks the acquired data. If the vibration level exceeds a limit set point, the event and vibration level is recorded in the Alarm Log. The vibration data surrounding the alarm event is also stored in the FIFO file.

Like all other eZ-TOMAS features, Limit Checking is user configurable. Two (2) High and two (2) Low limits can be defined for each spectral band. You can use the Statistical Report feature to automatically generate limits based on the historical operation of your machine. This method can be a powerful tool in quickly determining machine health changes.

eZ-TOMAS & eZ-TOMAS Remote

General Information



Unparalleled event capture parameters are easily configured

Rotating Machine Displays & Reports

- Gauge displays with status indication and peak hold indicators
- Vertical gauges for overall and spectral amplitude
- Circular gauges for spectral phase
- Up to 8 plot windows, with up to 8 overlays per window
- **Display Formats:** Spectrum, Waterfall, Time, Orbit, Polar, Bode, Trend, and Shaft Center Line (SCL)
- Order normalization and order tracking
- Harmonic, Sideband, and Peak Cursors on Time Waveform and Spectrum displays
- Statistical reports with minimum, average, maximum, and deviation calculations
- Runout compensation for Polar and Bode displays
- Integration and Differentiation of acceleration, velocity, or displacement inputs
- Baseline and Limit overlays
- Bearing clearance circle overlay for Orbit and SCL displays
- Save and Recall your preferred data displays
- Production test cell reporting using Microsoft® Excel®

The gauge displays allow you to quickly determine the real-time vibration levels and status of your rotating machine. The Peak Hold indicators show maximum excursions for all spectral bands.

Simply double click on a gauge to open a display window. You can then analyze vibration condition using real-time and/or Historical data. Predefined plot setups allow you to streamline the reporting process.

OPC Support

eZ-TOMAS includes ability to write its gauge values as OPC (OLE for Process Control) tags. OPC enables components of industrial automation systems to communicate with each other. Third party OPC clients can connect to eZ-TOMAS to read its gauge values. eZ-TOMAS OPC support provides the ability to:

- Publish gauge values as OPC tags
- Set OPC process name
- Set OPC tag names
- Enable/disable OPC server update during acquisition
- Monitor OPC status (via icons) in eZ-TOMAS

eZ-TOMAS Specifications

Acquisition Features

- Data collected from displacement, velocity, accelerometers, tachometers, and process probes
- Vibration data is referenced to up to eight tachs
- AC or DC coupled
- User-defined spectral bands (peak, overall, or phase values in a user-defined spectral band recorded over time)

Processing Characteristics

Analysis Frequency: From DC up to 50 kHz, all input channels synchronously sampled at the analysis rate times the Nyquist factor

Spectral Resolution: From 200 to 25,600

FFT Windows: None, Hanning, Flat Top, 3 Term Blackman Harris

Integration: Single and double integration

Averaging: Linear, peak hold indicators, or none

Storage Features

- **FIFO Design:** User specified size to 225,000 records per channel
- Storage triggered on change in RPM, time, overall vibration, or alarm
- Storage enabled within an RPM range
- Continuous data storage can be user or alarm triggered
- Automatic backup FIFO file

Limit Checking Features

- Two (2) High and two (2) limit set points per spectral band
- Limit set points can be specific to multiple RPM ranges
- Alarm log records alarm events
- Output relays allow user control when event occurs
- Color status indication is shown on the gauge panels

Display & Report Features

- Gauge displays provide indication of current spectral band information and status
- **Display Formats:** Time, Spectrum, Waterfall, Orbit, Bode, Polar, Trend, and Shaft Center Line
- Integration and differentiation of acceleration, velocity, and displacement inputs
- Up to 8 display windows, each window supports up to 8 traces
- Statistical reports provide minimum, maximum, average, and deviation values
- Plot setups can be saved and recalled
- Baseline and limit set points can be overlaid

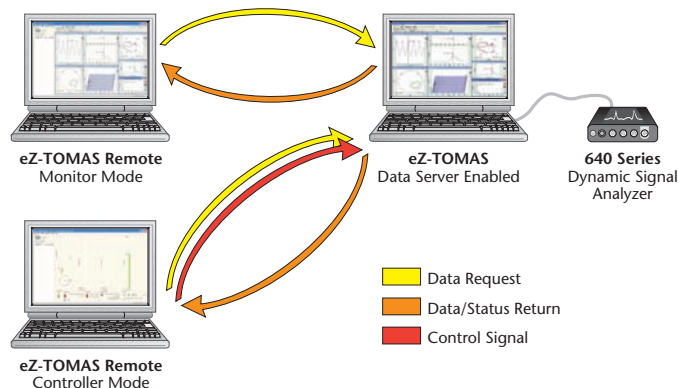
eZ-TOMAS & eZ-TOMAS Remote

General Information & Ordering Information



eZ-TOMAS Remote Overview

eZ-TOMAS Remote software allows you to remotely monitor and/or control eZ-TOMAS applications through client/server architecture. The server, an eZ-TOMAS application, interacts with the hardware, and is typically at a remote location, relative to one or more clients (eZ-TOMAS Remote).



eZ-TOMAS Remote can be used to monitor and/or control multiple eZ-TOMAS applications

eZ-TOMAS Remote, frequently referred to as the client, communicates with eZ-TOMAS via TCP/IP. Several clients can run simultaneously to monitor an eZ-TOMAS application. In addition to monitoring and controlling eZ-TOMAS applications, you can create unique plot setups that are local to eZ-TOMAS Remote. In other words, you can create custom setups that exist only at the client.

A single eZ-TOMAS Remote client can control multiple eZ-TOMAS servers. As indicated in the figure above, when connected to a server, eZ-TOMAS Remote has two modes of operation:

- Monitor mode
- Controller mode

Monitor Mode

Monitor mode allows you to view data from an eZ-TOMAS application. You can view gauges and plots; and the data viewed can be live or historical.

Controller Mode

A client may be enabled as a controller for a server if eZ-TOMAS is configured to permit such control. Control is restricted to a single controller at a time. The controller mode allows you to control every aspect of the acquisition state for an eZ-TOMAS application. While in the controller mode you can:

- Configure an acquisition
- Set Limits
- Configure Digital I/O
- Start and stop acquisitions
- View gauges and plots
- *and more...*

Ordering Information

Description

Rotating machine monitoring and analysis software
for 600 Series, ZonicBook/618E, and WaveBook/516E
Remote access and control client for eZ-TOMAS
Automation module with 8 relay outputs

Part No.

eZ-TOMAS
eZ-TOMAS Remote
NDTRelay2

Note: eZ-TOMAS is included with the ZonicBook/618EZT and ZonicBook/618EZAT packages.

BUY NOW!

For complete product specifications, pricing, and accessory information, call 1-888-714-3272 (U.S. only) or visit **iotech.com**.

eZ-Balance

Machine Balancing Software

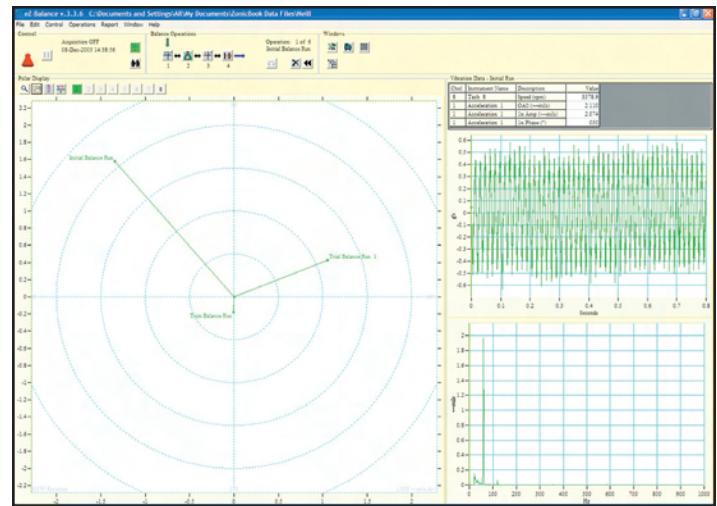


Features

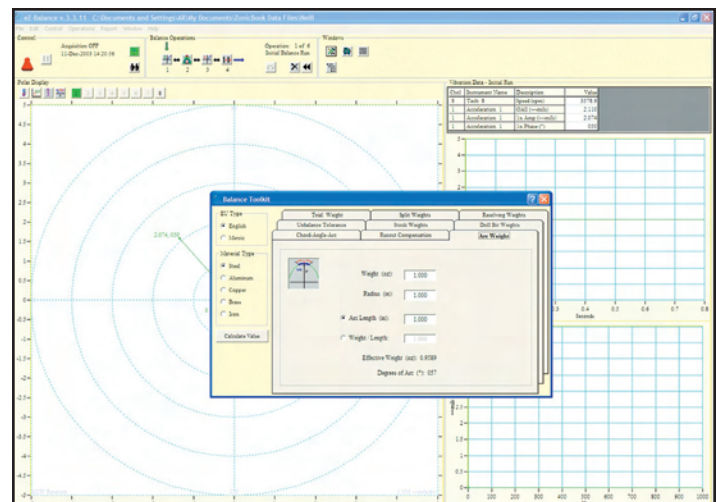
- Multiplane trial and trim balancing
- Polar, time, and spectral displays
- Computes and stores influence coefficients for future trim balancing
- Vibration data can be collected by the 600 Series or ZonicBook, or entered manually
- Balancing toolkit
 - Trial weight calculations
 - Weight splitting
 - Centrifugal force
 - Stock weights
 - Weight removed
 - Unbalance tolerance
- Balance solution can be based on multiple response points
- Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®

Balance rotating machinery with eZ-Balance and the 600 Series or ZonicBook/618E. The combination of the 600 Series or ZonicBook/618E with eZ-Balance provides a powerful system for multi-plane (up to 7 planes) balancing applications. eZ-Balance computes the optimal balance weights and their locations, based on vibration data collected from the 600 Series or ZonicBook/618E. The data is displayed in a convenient Polar plot that indicates the magnitude and phase of the unbalance as well as time and spectrum data.

eZ-Balance determines a balance solution by calculating the change in vibration condition based on adding trial weights. The balance process is a series of well defined steps. The initial trial run is used to measure the *as-found* vibration condition. The machine is shutdown and a trial weight is added. The balance run measures the effect of the trial weight and a trial solution is calculated. A trim run is then performed to confirm the results of the trial solution. Accelerometers, velocity probes, or displacement probes may be used to measure the vibration level at each balance plane. A tachometer measures the rotation speed and provides a phase reference.



Polar, spectrum, and time displays showing progress of each balance run



Powerful toolkit for computing balance weights

Specifications

Input Bandwidth: DC to 20 kHz for 8-channel ZonicBook/618E;

DC to 40 kHz for 4-channel 600 Series

Spectral Lines: 200 to 25,600

FFT Windows: None, Hanning, Flat Top, 3 Term Blackman Harris

Integration: Single and double integration, selectable low-frequency cutoff

Averaging: Linear

Ordering Information

Description

Machine balancing software for the 600 Series and ZonicBook/618E

Part No.

eZ-Balance

BUY NOW!

For complete product specifications, pricing, and accessory information, call 1-888-714-3272 (U.S. only) or visit iotech.com.