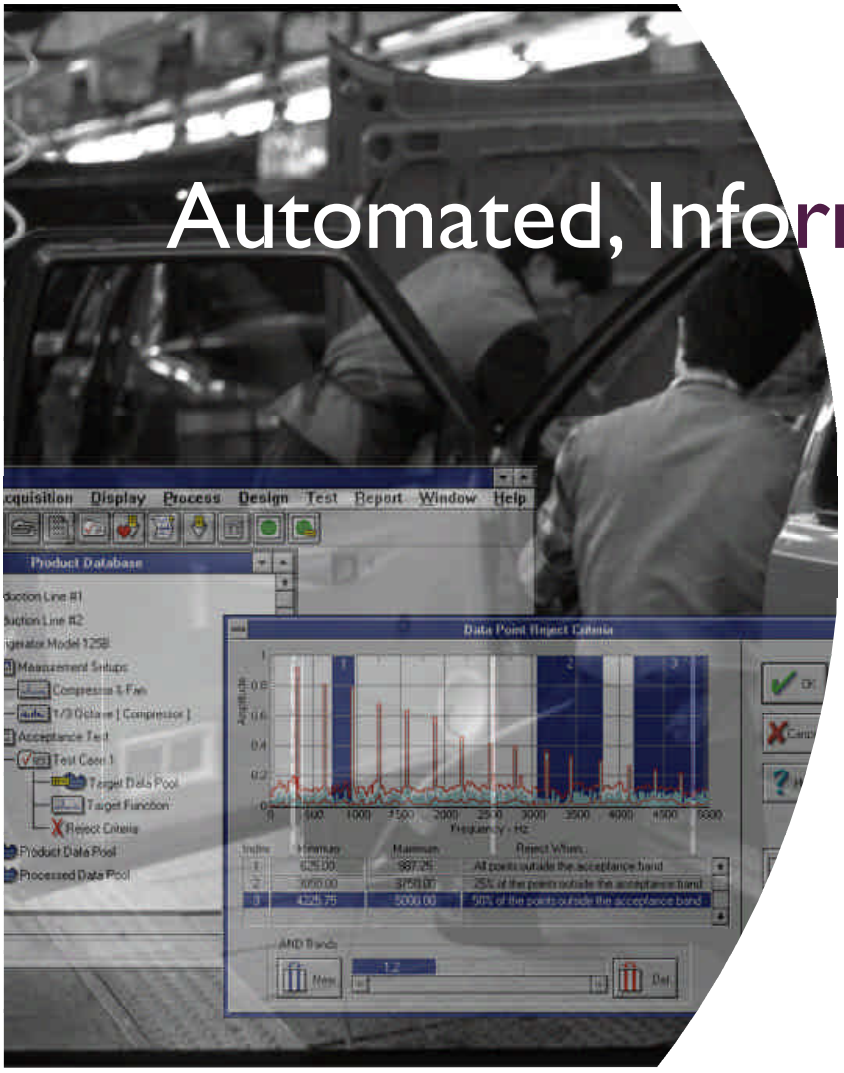
Automated Production Line Testing



Automated, Informed Decisions
with SigQC

Accept or Reject Production Line Units with Noise and Vibration Based Criteria and Failure Mode Identification

Signalysis, Inc.

PRODUCTION LINE QUALITY ASSURANCE
with SigQC

100% Product Testing

Automated Assurance

Many products, from domestic appliances to automotive products, possess intrinsic vibration and sound characteristics that may be used as indicators of mechanical integrity. SigQC responds to the demand among manufacturers to automate a process for accepting or rejecting units on the assembly line based on measured noise and vibration data. SigQC provides a range of statistics, criteria and strategies.

Quality Control

Automated Production Line Model and Serial Number Recognition and Acceptance Test Selection

Wide Selection of Normal Target Data Types and Statistics

Flexible Specification of Acceptance Bands and Rejection Point Criteria

Multiple Pass/Fail Test Criteria

Full Reporting and Pareto Charts

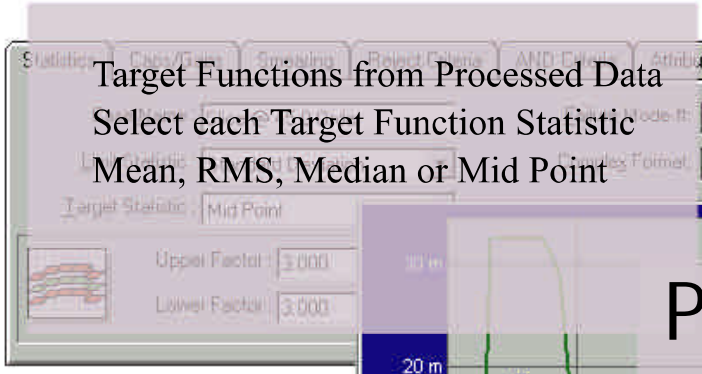
Satisfying
the Manufacturer's demand for
Automated Assurance

Signalysis, Inc.

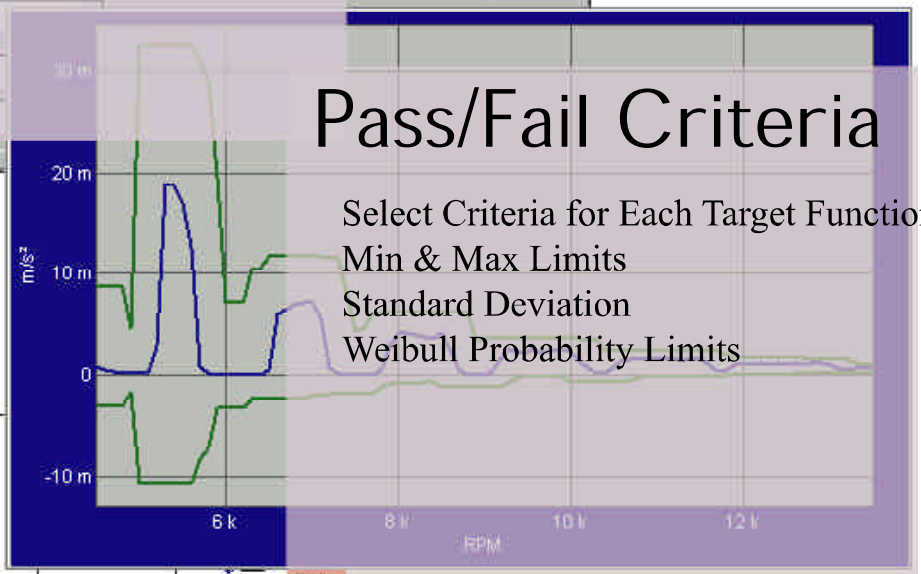
Utilizing a wide range of statistics, criteria and strategies

Target Function

Calculation Methods

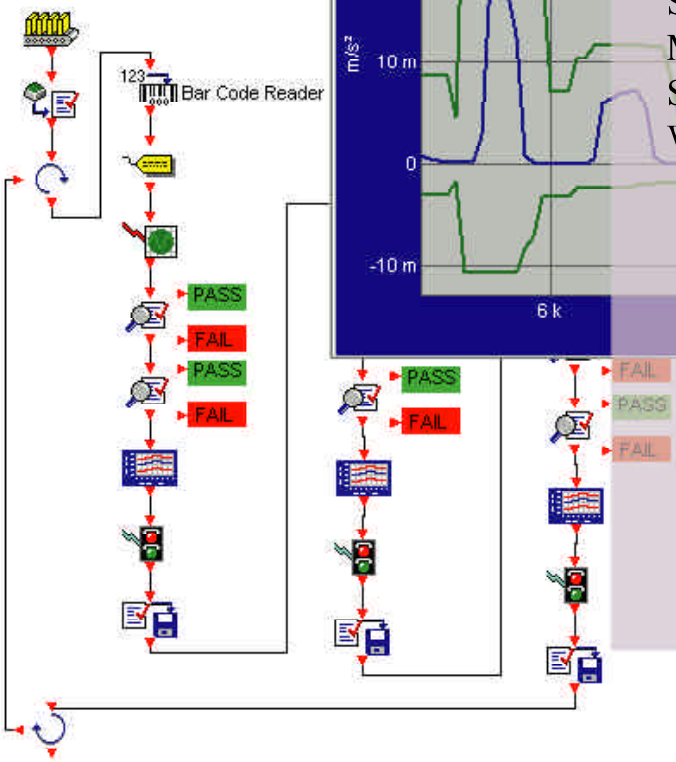


Target Functions from Processed Data
Select each Target Function Statistic
Mean, RMS, Median or Mid Point



Pass/Fail Criteria

Select Criteria for Each Target Function
Min & Max Limits
Standard Deviation
Weibull Probability Limits



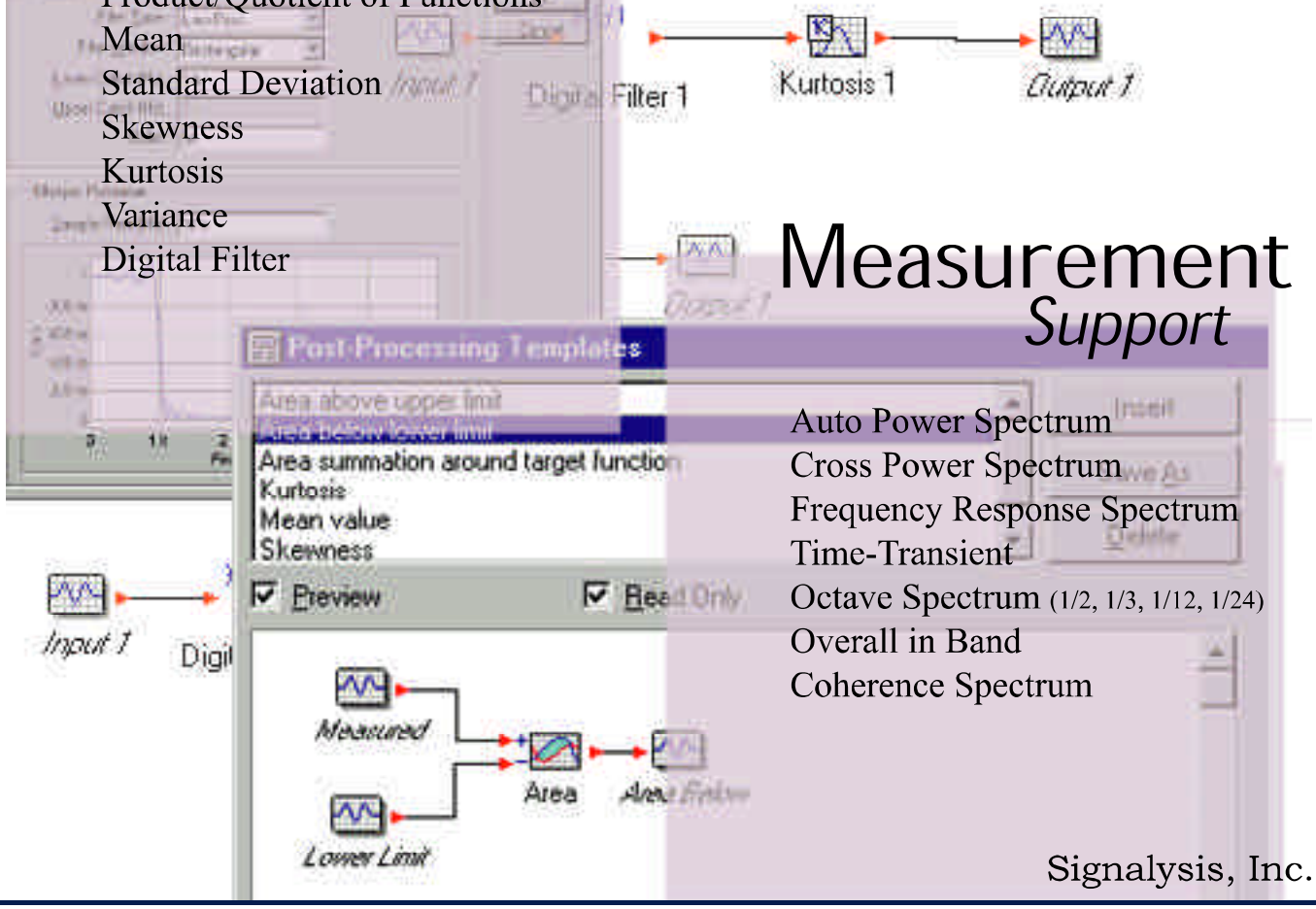
Product Line Features

Digital Input Trigger
Manual Trigger
Multi or Single Product Lines
Custom Data Storage Options
Operator Pass/Fail Indication

The SigQC Pass/Fail Criteria is based on data obtained from various sources. Data sources can be measured directly using spectrum analyzers, "plug-in" data acquisition cards, digital signal processors and other types of data acquisition devices. In addition to the standard data acquisition sources, SigQC supports post-processing data sources. A post-processed data source is the result of a mathematical equation or algorithm. Post-processed algorithms are easily programmed by dragging and dropping the available post-processing options to form an equation. The result of the equation becomes available in the list of data sources in the Acceptance Test Wizard.

Post-Processing *Options*

Area Above/Below Two Functions
Sum/Difference of Functions
Product/Quotient of Functions
Mean
Standard Deviation
Skewness
Kurtosis
Variance
Digital Filter



Measurement *Support*

Auto Power Spectrum
Cross Power Spectrum
Frequency Response Spectrum
Time-Transient
Octave Spectrum (1/2, 1/3, 1/12, 1/24)
Overall in Band
Coherence Spectrum

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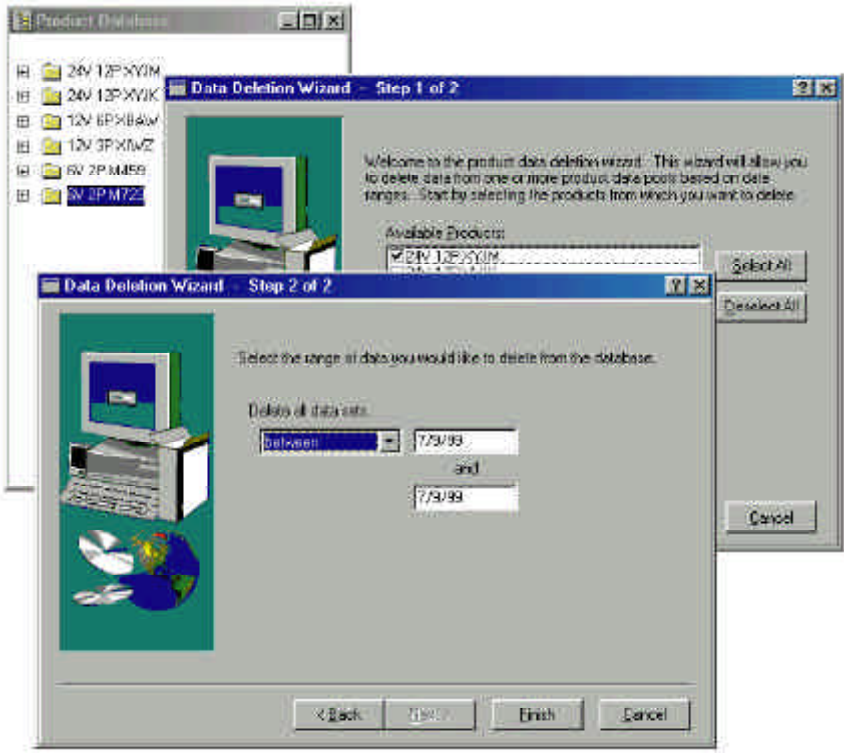
Database Management

Easily and efficiently organize data using a multitude of data storage options, including: storage of accepted data sets, rejected data sets, data based on shift time, and data based on lots. The Programmable Logic Controller signals SigQC when to store data through the operator-controlled panel view option.

The SigQC data repository is integrated with the RAIMA Velocis(TM) Data Server and optimized for speed and data integrity. In the world of production where cycle time is comparable to gold, SigQC delivers the fastest product on the market. As with any database, it is important to have a wealth of data management tools to maintain the database. On a production line where a new set of data is generated every 2 seconds, 24 hours a day, 365 days a year, it is important to have flexibility.



Although disk space is inexpensive, it is not unlimited. With SigQC you can limit the size of the database to a number of days, weeks, months or years. This, along with the available storage rules, provides you with complete control over your data.

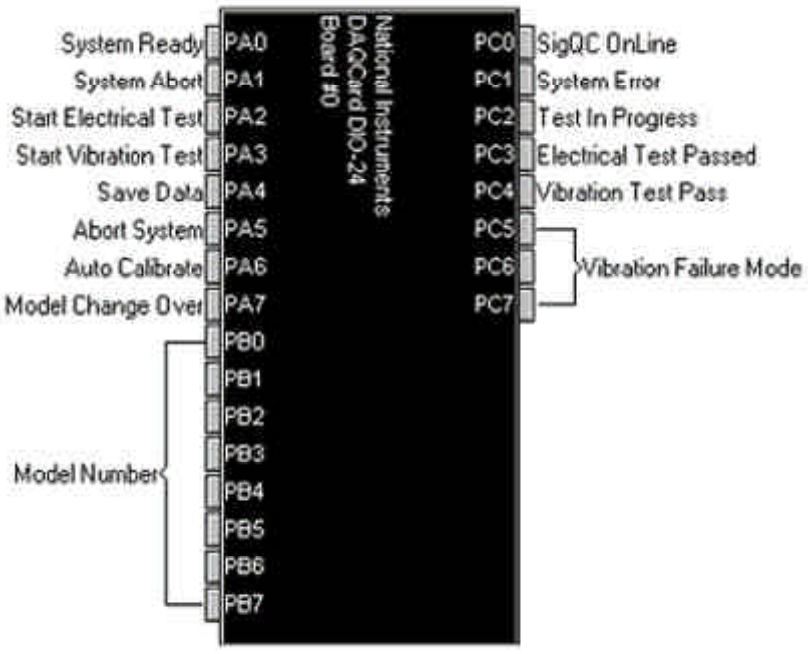
All database files are kept in a single folder, allowing for simple archiving of the database. Archiving the database, coupled with the database depth management capabilities, provides an easy and sure-proof means of maintaining a library of *all* data for *all* parts without jeopardizing down time. No more embarrassing loss-of-data moments.

PLC Communications

The SigQC interface to Programmable Logic Controllers (PLC) is designed for easy user configuration. Currently there are two methods of communicating with a PLC: through Digital I/O (contact closures) and RS232 Serial Communications.

When using RS232 Serial Communications, an input/output command set is defined using the RS232 Configuration Panel. There are special SERIAL communication steps available in the production line sequence.

Digital I/O Configuration Panel



When using Digital I/O, the system is configured through the Digital I/O configuration panel. Simply point and click on the input or output and define the meaning of a high or low level. I/O bits can be grouped to make up a binary value (this is useful when defining model numbers or failure modes). The Digital I/O setup is used in the production line sequence for controlling the selection of model number, start/stop acquisition, pass/fail, output of failure mode, etc.

Your customers deserve the best, and Signalysis will help you deliver

SigQC's versatility allows it to be open when it comes to data acquisition systems. Currently we support Zonic, National Instruments, Diagnostic Instruments, and Bruel & Kjaer hardware.

The SigQC System can be added to any existing end-of-line test stand, saving you from additional manufacturing costs and installation/integration time.

With SigQC you can be online and performing sound and vibration production tests in just weeks.

SigQC provides not only a Go/NoGo signal but can identify most failure modes and tag the part for later rework, thereby reducing waste.

With SigQC you will reduce warranty claims by catching defective parts before they are shipped to customers.

Cost-Efficient Methods

The interface from SigQC to Programmable Logic Controllers (PLCs) simplifies setup and integration, allowing you to get the test stand up and running in record time. A single SigQC system can control multiple production lines, and our system keeps the retrofit market in mind. You can easily add sound and vibration acceptance testing to your existing test stands, giving you what you need when you need it.

User-Specific Options

The Reject Criteria Identification dialog allows users to specifically define the frequency and amplitude characteristics of failure modes. The in-depth statistical analysis capabilities allows the user to determine the variance associated with failure modes of the tested part. Reject parts can be labeled with specific failure modes for later rework. Production test results are exported to Statistical Process Control.

Powerful, Automatic Capabilities

SigQC will manage an unlimited number of product models and maintain a complete set of Acceptance Tests, Reject Criteria and boolean rule sets for every model to be tested. Simple drag-n-drop PLC interface command sets can be programmed to load new product model profiles using inputs from the PLC.

Go/NoGo determination may be based on as much or as little data as necessary. In a complex transmission test, as many as 2,500 individual pieces of data may be checked to determine pass/fail. In a simple bearing test, it could be as little as five pieces of data. In each case it is automatic.

The SigQC online failure detection algorithms have been optimized for speed. We don't jeopardize cycle time.

SPECIFICATIONS

Data Sources

Auto Power Spectrum
Cross Power Spectrum
Frequency Response Spectrum
Coherence Spectrum
Time-Transient
1/1-Octave Spectrum
1/3-Octave Spectrum
1/12-Octave Spectrum
Process Measurements

Reporting Features

Reports on Historical Database
Probability Density
Production Control Charts
Pareto Analysis
Statistics
Histograms
Cumulative Probability Functions

Post-Processing Data Sources

Kurtosis
Skew
General Statistics
Multi-Production Line Option
Bandpass Filtering
Area Above or Below Limit

Target Function Calculations Methods

Target Functions from Processed Data
Select from all Available Data Types
Multiple Target Functions
Select Each Target Function Statistic
Mean, RMS, Median or Mid Point

Product Line Features

Digital Input Trigger
Bar Code Scanning
Manual Trigger
Multi or Single Product Lines
Custom Data Storage Options
Operator Pass/Fail Indication
Custom PLC Interfaces
Database Export

Pass/Fail Criteria

Select Criteria for Each Target Function
Min & Max Limits
Standard Deviation
Mid Point Standard Deviation

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Formed in 1987, and later incorporated, Signalysis continues to bring practical engineering and math analysis tools to scientists and engineers. Our consulting services assist with problem solving in laboratory and field testing environments.

Signalysis provides specific customer-based problem solving solutions to the engineering, scientific, industrial and environmental communities.

Our SigCLASS library of scientific algorithms and graphing routines is the cornerstone of our solution-providing products.

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