



Software Summary

Introduction

Software is now available with good performance boosts for the DSP module. Typical FFT speeds in the DiVA module are now as fast if not faster than many dedicated analysers and workstation based systems. A 16 bit version is delivered with the 32 bit version to enable customers to support older instruments free of charge.

The complete Software system comprises in the region of one hundred separate program modules, each dedicated to a particular method of acquisition, data import, data processing or display. In order to simplify the buyer's selection process and ultimately to aid the ease of use of the system, we have split the modules up into logically associated groups known as toolbars. The toolbars described in this document are as follows :-

Base
Tools
Intensity
DSP
Automotive
Custom
Drivers

Requirements

Software is designed to operate with Windows 95/8 or Windows NT.

Further information

There is a full range of data sheets available for each of the modules described here, which contain complete specifications and functional descriptions of each individual toolbar component. If you have installed Software on your PC, either the full version or a demonstration version will suffice, then you will also be able to access the full on-line documentation through the standard Windows help system.

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Base.

LGRAPH (32 bit) a log/Lin and an Integration Differentiation module. Not only does this module enable you to move between displacement, velocity and acceleration it also allows the calculated values to be stored as new objects and so viewed side by side. By linking with the Synchro module from TOOLS it is now possible to understand the dramatic vibro-acoustic effects that often masked by simple viewing data accelerations.

Wave Driver. (16/32 bit) Not new but now much improved, full screen display, Colour spectrogram and most importantly calibration of individual channels rather than the two as a linked pair, the calibration values are retained even when the module is shut down.

USB Support for the economical Data Translation 9804 USB acquisition system gets 16 bit ADC accuracy on 16 channels.

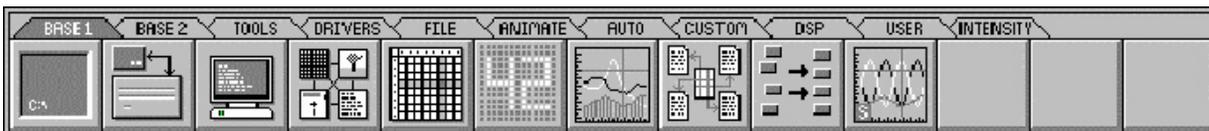
Intensity In the modification module it is now possible to enter a transmission/absorption curves and apply it to given areas.

Viewer A low cost way for data requesters to view and hear their test results without taking a hike to the test lab. The modules in Viewer are simply the most commonly used in BASE and TOOLS.

DiVA The software has been upgraded to allow automatic removal of A weighting where there is an external weighting applied

Base

Overview



The “base” toolbar contains basic program modules that are essential for the provision of a system with basic functionality. It provides essential data viewing facilities for both time and frequency domain data, and a wide range of data import options.

Standard modules

	Operating System	Provides access to an MS-DOS session. This facility is also provided by Microsoft Windows, but is featured on the 2D toolbar so that the operating system can be easily accessed even when running with the Windows Program Manager iconised or hidden.
	File	Provides the basic file access required for saving and loading of all types of native software data objects. Translation from foreign formats such as UFF is also catered for, but is described elsewhere.
	Term	The terminal module provides <i>command line</i> data processing and access to system level information for advanced users. It is used to display asynchronous system error messages when a normal message box would interfere with an operation, and can also be accessed from the programmer's API for use as a debugging aid.
	Exchange	Allows the user to import, and in most cases export data files which are stored in a format other than that used by software, such as those created by other data acquisition and display systems, either in ASCII or Binary form. Exchange also handles Windows system files such as the .WAV files generated by the sound recorder, and can import images stored in popular formats such as TIFF and PCX. The module features an intelligent macro facility which allows the user to perform a manual import whilst having the module remember each step. Subsequent files in the same format can be imported simply by invoking the appropriate macro.



	Editor	Allows the creation of new datasets and modification of existing data sets, using a spreadsheet grid type layout. The user can manually modify all aspects of a data object, down to the level of individual values.
	Segment	A high visibility alphanumeric display which can be used to show the results of calculations or even short informational messages. This is useful in custom applications, where for instance, the message could indicate a Go/NoGo decision, or provide a highly legible readout of a test value to an operator.
	Graph	A conventional XY graph plot which can handle up to eight individual or overlaid traces in a number of symbolic and linear styles. There is an overview window for large datasets, and when working with a two-dimensional dataset the user can flip the slicing axis, moving through the opposing slice under cursor control. Typically used to display FFT, octave bands and order plots versus time or frequency/order.
	Note	Allows the user to annotate datasets either in a global notebook for a particular dataset, or by identifying interesting regions within the data, and attaching individual notes to these, to describe the point of interest. Notes made by region are <i>dynamic</i> , and appear when the data focus matches the region of data with which they are associated.
	Sequencer	The sequencer module allows data to be brought in from several different sources with different naming conventions and to be automatically renamed to a user-defined name consisting of a project and test and an automatically incremented offset to identify the data uniquely.
	File Import	A 'control' application for several types of file import such as UFF and PCScan (see below for details). Some of these file types can also be used for exporting software data using this module.
	Sgraph	A conventional XY graph plot which can handle up to eight individual or overlaid traces in a number of symbolic and linear styles. Similar to the 'Graph' module, but optimised for use with time-series data
	Polar	A Magnitude and Phase display for complex data. Automatic translation is provided for datasets which are stored in Real and Imaginary form.
	Plot	Similar to the CONTOUR module, but data values are displayed in their correct position on a Cartesian grid, and not shown relative to their coordinate position in the matrix. Data values are represented in both configurable symbols and colours.
	Map	Permits the display of very large datasets by using a mapping of one screen pixel to each datapoint. Scroll bars allow the user to pan around the image, which can be used to highlight areas of interest for display in other modules.
	Contour	Permits the display of data in the form of a two dimensional contour plot, either in a fast block mode, or as a linearly interpolated map in filled or weather map styles. Contour banding is specified by LEVEL and PALETTE objects associated with a dataset, and can be temporarily overridden by alternative LEVEL or PALETTE objects, to provide a different view of the data.



	View	Shows two-dimensional datasets as surface plots in a number of styles, for instance, using colour contour levels to highlight data banding. Also features the ability to drape one dataset over another, effectively providing visualisation in four dimensions. The data may be viewed from any angle, with or without perspective.
	Waterfall	An isometric display of two dimensional data in the form of a waterfall display, featuring selectable viewing angle, fixed line separation or the plotting of slices in their true positions, and optional hidden line removal. Order cursors are available with suitable source data.
	Table	Allows the creation and modification of data objects which describe contour level intervals and the colours which represent these contour bands.
	QA Mask	Peephole mask analysis of submitted data with multilevel user defined criteria and statistics.
	Waveform	Allows the generation of periodic waveforms of specified frequency, amplitude and phase. The module is designed to offer a simple means of generating sine, square and ramp waveforms with user defined signal to noise ratios, and allows the creation of signal objects having multiple channels and user specified signal parameters. The signals can also have a transformation applied to them, which changes on either a sample by sample or channel by channel basis. For example a sine wave could have a fixed increase/decrease in its frequency on a sample by sample basis, thus generating a chirp signal. The waveforms may also be corrupted by a white noise source which has either a uniform or gaussian distribution, to provide a signal with a known signal to noise ratio.
	DSP lite	A simplified version of the DSP module supplied with the DSP toolbar, which is limited to magnitude and power.
	Wave	A sound card driver which allows the system to read data directly from high quality Microsoft Windows compatible sound cards such as the Turtle Beach Tahiti. The Wave driver allows calibration of imported data. It can also be used to read and write wave files (ie '.WAV') on disk.
	Larson Davis	File based transfer from the Larson Davis 2800 and 3200 series of analysers using ROM Revision 4.xx, and from the Larson Davis 2900 using ROM Revision 4.xx and 5.xx.
	HDF	Allows the system to import data stored in the NCSA/HDF format. The National Center for Supercomputing Applications (University of Illinois) Hierarchical Data Format allows the storage of multidimensional scientific datasets, images, animation sequences and colour palettes. The format is commonly used in scientific applications and is the main system of storage used by some commercial data visualisation tools.
	SDF	The SDF module allows the system to import data stored in the Hewlett Packard SDF format.
	UFF	The UFF module allows the system to import type 58 data records stored in the SDRC and University of Cincinnati Universal File Format .



	Hi-Techniques	The Hi-Techniques module allows the system to import data stored in the HI-Techniques Time Domain Data format.
	WFT	The WFT module allows the system to import data stored in the Nicolet WFT Time Domain Data format.
	QuickVu	The QuickVu module allows the system to import data stored in the TEAC QUICKVU format. The user will require the TEAC software in order to generate the PC files that are then imported into software.
	PCScan	The PCScan module allows the system to import data stored in the SONY PCScan format. The user will require the Sony software in order to generate the PC files that are then imported into software.
	MultiWav	Support for various third party vendor Multichannel forms of the standard .WAV file. Currently supports the 01dB extensions to the wave file format for both import and export.
	OnoSokki	Support for the Ono Sokki CF-4200, CF-5200 CF-6400 and DS-9100 file formats.
	2123/2133	A file translator for the Bruel & Kjaer 2123 and 2133 analysers. The 2123/33 now supports the creation of software intensity objects from the appropriate data sets.
	Famos	Support for the IMC Famos file format (single channel only). This module can both import and export data.
	nCode	Support for the nCode nSoft file format.
	LMS2IDS	Allows the system to import data stored in the LMS Cada-X format. A separate executable created using the LMS User Programming option is supplied to run on the HP workstation. Using this, the user specifies a filter to be applied to the Cada-X database that isolates the required data and writes it to a binary file on the network. If there is no network connection available, then the file can automatically be spanned across a number of floppy disks and reassembled on the PC. software is able to import the resulting binary file directly.
	MEGADAC	Allows the system to import files created by the Optim MEGADAC.
	MEscope	Allows the system to import or export files in the Vibrant Technology ME'scope data block binary file format.
	ITrans	The ITrans driver is a disk based interface to the Brüel & Kjaer 2140 family of analysers, 2143, 2144, 2145, 2147, 2148. Its specific role is to create software intensity objects from the 2144,48 analysers. As well as creating intensity objects it can also create software Matrix objects for the whole 2140 family.

Tools

Overview

The *Tools* toolbar contains program modules, which are used mainly to process, modify or transfer data in some way. There is an extensive range of options available. Tools also contains modules to display and edit animation sequences and single frame images, additional display methods and interfaces to other Windows based software.



Standard modules

	Tools	Provides tools to perform numeric operations on one or more datasets. A list of legal operations is automatically generated to match the characteristics of the datasets that are loaded into the module. Operations are performed through interaction with a series of dialog boxes, which request further information from the user. Alternatively, any or all of the dialog responses may be given a default value, so that the operation can be performed with minimal user interaction.
	Undo	Operations, which affect the values stored in a dataset, may optionally be tracked by this module, which then provides a method to backtrack some or all of the changes, in order to restore the dataset to its original state. This is useful when performing What/If types of calculation, to observe the results of a series of processes whilst at the same time preserving the original data.
	Synchro	Performs synchronisation of up to four datasets, so that cursor movements, zoom operations and rotations can be observed in each. This is useful when comparing test results from different runs, or comparing a result to a fixed reference dataset, since an identical view of each is maintained. Now works with both matrix <i>and</i> signal objects.
	Ravel	Allows a time series dataset to be folded or 'raveled' so that time significant occurrences can be highlighted. For instance, a 36500 point time series representing a hundred samples a day for a year could be raveled into a 365x100 matrix, which when viewed in the CONTOUR module would highlight any daily based repetitions.
	Stats	Displays multiple cursor positions for one or two datasets, and provides statistics based on the relative cursor positions. Also used to display cursor delta values, either between datasets or between two cursors in the same dataset.
	Convolve	Applies a 3x3 convolution kernel to a dataset, so that by selecting the relevant kernel, a dataset could be smoothed, or have a median filter applied, or have horizontal or vertical edges emphasised. A number of standard kernels are predefined, but the user can specify a custom kernel.



	Report	Permits the creation of multi page reports using images output from the display modules and text, which is either extracted from data objects or typed in directly or both. The module allows the creation of a template or boilerplate which may be used to produce the same output for differing datasets, making it ideal for the production of routine test reports.
	Text	This module is used to display text data that is embedded within a data object. It is also used to prepare the text for inclusion in a report template, and allows the substitution of various known quantities, such as the objects name or size into a fixed position within a report.
	Grid	Used only in conjunction with the Report module, this application can be used to print a table of data values into a section of a page.
	Script	Allows the creation or execution of a simple script, consisting of command line instructions that would normally be typed directly at the TERM module prompt. Scripting is kept deliberately simple here, since complex tasks are far better implemented as Visual Basic extension modules or by using the Programmer's API for major projects.
	Weight	Allows acoustic datasets to be weighted (and unweighted) by applying Lin, A, B, C, D or user specified weights over the whole of the dataset, either as a summation value or by applying the weights directly to the source data. The template used to describe user weightings can be specified directly from source data or from data resulting from a statistical analysis of a large number of datasets.
	Pick	Allows the extraction of subsets and identification of matrix based data matching user defined criteria such as picking all values in a dataset above/below a given threshold.
	Database	The software Project Database stores information about the data objects in the software system. The user can also create his own fields to store with that of an object's. Powerful queries can be posed to the database to track down specific data objects. Once you have the records of the objects you want you can view them in full, archive, delete or load them into the system.
	Laminate	Allows multiple single matrices (i.e. spectra) from different data objects to be joined (laminated) together into a single object.
	OGraph	Display method for use with full and/or third octave band data. Similar to the 2D Graph module, but with labels based on octave band center frequencies and the (optional) ability to display summation bars.
	Splice	Allows animation sequences or FILMS to be edited on the desktop. Results of the edit can be observed immediately in the ANIMATE module.
	Animate	Permits the variable speed playback of animation sequences generated by display modules such as VIEW and GRAPH.
	Frame	An image viewer that permits the display of FRAME objects (pictures) generated by any of the IDS/software display modules, for instance, VIEW or CONTOUR. Useful for arranging a series of data slides for presentation purposes. Minimal image processing is also available.



	XLDriver	Permits software to create live DDE links datasets to sheets within Microsoft Excel, so that changes either in software or in Excel are reflected immediately in the other application. Full bi-directional support.
	Campbell	Campbell diagram display
	LLGraph	Specialised display which allows the user to flip between Log/Linear format without changing the base dataset. The module is planned to support a number of specialised 'on the fly' transforms and comparison methods in future releases

Intensity

Overview

The *Intensity* toolbar contains modules used in conjunction with Acoustic Intensity and Sound Power analysis projects.



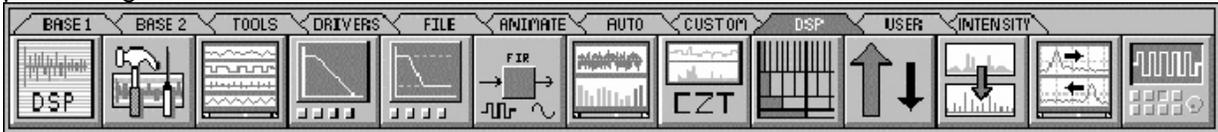
Standard modules

	Project	The supervisory module where intensity data is classified, ordered and reordered. The frequency range of interest can be selected as a subset of a loaded dataset, which affects the indicated sound power and displays. The job part and area values are displayed here, and the whole job or a specified part can be recalculated on command.
	IGraph	Displays calculated job or part summary spectra or actual area spectra as a conventional plot, with a corresponding quality spectrum for each. Numerous options such as pressure envelope and spectrum display method are available. Facilities are provided to scroll through areas, and cursor through frequency bands, both movements being dynamically linked to the other intensity modules.
	Tree	This module provides a quick overview of the parts and areas within an intensity data object that allows their contribution to be assessed at a glance. Dynamic linking once again permits extremely rapid assessment of a dataset.
	Face	Allows the dataset to be viewed as a single cubic face, represented as a block or smoothed contour map. Dynamically linked scrolling allows the selection of the face and frequency band, and an automatic film generation option allows flexible viewing options. The face datasets can be converted to a matrix with a single command, allowing them to be interpreted using the non-intensity modules.
	Box	Displays a rotatable 3D view of the parallelepiped surrounding the test subject, with dynamically linked scrolling through the frequency bands.
	Rank	Displays dataset ranking on a frequency or part/area basis. Dynamic linking allows the rapid identification of major contributors and their consequent highlighting in other modules gives an extremely powerful data navigation tool.
	Multimap	Permits the display of an entire set of frequency based contour maps for a specified part. Allows rapid visual identification of maxima and minima, and dynamic linking once again identifies the relevant band in the other modules.
	Tools	A set of toolboxes which will allow weighting and mathematical operations (similar to those provided in the standard toolbox) on or between compatible intensity datasets, enabling the user to perform comparative judgments between tests.
	What/If	Displays the intensity dataset in a tabular format, on a per frequency band basis, optionally indicating the area, part and job sound power values. Other values of interest such as particle velocity, SPL and direction can also be configured for display in the same grid. The module allows for the flexible modification of values or blocks of values and the subsequent recalculation for the purposes of ascertaining experimentally what improvements might be made in overall sound power.

DSP

Overview

The *DSP* toolbar contains an extensive range of modules dedicated to time domain data processing.



Standard modules

	DSP	<p>Provides a wide range of DSP operations for time domain signal objects. The module allows calculations to be performed on signal objects which contain single or multiple data channels, and supports total signal power measurements, magnitude and log magnitude, power spectrum estimation, cepstrum, auto and cross correlation, transfer function magnitude, impulse response estimation, coherence and complex datasets.</p>
	FiltDes	<p>In many applications such as audio processing there is often a need to perform some form of filtering operation on a dataset, in order to extract useful information. For example, a sine wave may be easily extracted from wide band noise by the use of a narrow band-pass filter that is centred at the sine wave frequency. The filter design module allows a user to design various types of Finite Impulse Response (FIR) filters that may be used with the FIRfilt module to filter datasets. With FiltDes you can design various types of FIR filters using either the Windows or Equiripple design methods. Currently FiltDes supports design of Low-pass, High-pass, Band-pass, Band-stop, Wide band and narrow band differentiators and Hilbert Transformers.</p>
	Gfilt	<p>Allows the design of FIR filters by graphical defining the required characteristic. The characteristic is specified by simply dragging the defining vertices with the mouse. Currently Gfilt supports the design of Low-pass, High-pass, Band-pass and Band-stop filters. This module is designed to complement FiltDes by providing a fast and more user friendly design method.</p>
	FIRfilt	<p>Allows filtering operations to be performed on a signal. The module performs the linear convolution of any two sequences of data; the actual filtering operation to be performed being dependent upon the coefficients of the filter impulse response. Different filtering operations may be generated by use of the FiltDes module and then used by this module to filter different signals. The module allows convolution of an input signal with a filter having a nonrecursive impulse response. It also allows convolutions to be performed on multichannel data objects, which contain real data in a $1r \times Nc$ or $Nr \times 1c$ format, with a time axis attached to the row or column containing the N values. The module performs nonrecursive signal convolutions using either a direct implementation of the convolution sum, or by use of the Fast Convolution technique known as Overlap and Add.</p>
	Trace	<p>The trace module displays two-dimensional plots of signal object data as amplitude vs time. Multiple channels are displayed one below the other in linked windows which may be panned left and right to view large datasets. The user can display and print plots of signal object data, view multiple channels simultaneously, zoom in on areas of interest and view them in more detail, and play the data through a suitable Windows compatible soundcard. Sections of data in the trace module may be highlighted between cursors which identifies them for further processing by other DSP processes, such as the octave or Wavelet modules.</p>



	Octave	Provides a simple interface from which to perform octave and fractional-octave band analysis. The module operates on signal (time domain data) objects and produces a matrix of time vs octave-band centre frequency, in 1/1, 1/3, 1/6, 1/12, 1/24, 1/48 and 1/96 forms. It allows the user to define which section of a signal is to be analysed as well being able to specify the analysis bandwidth. The output of each of the octave filters is essentially a bandlimited time-domain signal. In order to detect the peak signal values, several envelope detectors are provided. The user may choose between exponential or linear detectors.
	ChirpZ	The ChirpZ module allows spectral analysis to be performed on multichannel signal objects. The module allows analysis to be performed over the entire signal duration or over specified sections that are described by the cursor's positions. The Chirp-Z Transform (CZT) eliminates many of the restrictions of the Fast Fourier Transform (FFT), including the necessity that, N, the number of samples in the sequence be a power of 2. The FFT evaluates the z transform of a signal at equidistant points around the unit circle and therefore analysis results in spectral components that extend from 0Hz up to the sampling frequency. The CZT is more flexible in that it allows a more general contour to be defined in the z-plane. The CZT module included in the software package allows a user to perform frequency analysis over a user defined frequency range. For example, consider a 2048-point sequence sampled at 10kHz. Using FFT analysis with 2048 points the resulting spectrum would have a resolution of 4.88Hz and would extend from 0Hz to 10kHz. With the CZT the analysis is much more flexible. For example it is possible to analyse a signal over a defined frequency range such as 1000Hz to 2000Hz using 2048 points. This results if a spectral resolution of 0.488Hz over the analysis bandwidth.
	Wavelet	The Wavelet module allows multiresolutional analysis to be performed on multichannel signal objects using the complex Morlet wavelet. The module allows analysis to be performed over the entire signal duration or over specified sections that are described by the cursor's positions. The module concentrates upon the application of the Wavelet Transform (WT) to the time-frequency analysis of discrete signals. The WT is a direct alternative to the short-time Fourier transform (STFT) provided by the DSP module. The WT is ideal for the analysis of non-stationary and transient signals, since it is able to transform a signal into a joint time-frequency domain. Unlike the STFT, which uses a time and frequency resolution dependent upon the shape and length of a window function, the WT uses a variable window function. This provides a fine time resolution at high frequencies and lower time resolution but higher frequency resolution as the frequency decreases; a form of multiresolution analysis. These variable window length characteristics are therefore best suited to the analysis of signals containing short high-frequency components and extended low-frequency components.
	Resample	The Resample module allows the sample rate of signal objects to be changed by an integer amount. A Butterworth or Chebyshev lowpass filter can be selected as the interpolation or decimation filter. The user can select an interpolation or decimation factor of up to 50.
	Align	This module allows two signal objects (with the same sample rate) to be viewed one above the other with scrollbars to slide the traces left or right. Events (such as peaks) can be aligned either manually or automatically before creating a new dataset from the overlapping data areas.



	DSP Toolbox	Provides a wide range of DSP operations for time domain objects. This module is an enhancement to the existing DSP module but offers a much wider range of functions and a new wizard style interface. FFT based functions now include a range of averaging modes such as Linear and exponential as well as the ability to trigger the FFT based on the level of a reference channel. Zoom FFT's are supported and noise bandwidth correction can be applied. FFT's up to 256K may also be performed. Other functions, which can be performed using this module, include time reversal, envelope extraction and a range of mathematical and trigonometric operations.
	OctFFT	Synthesises 1/1 octave or 1/3 octave data from FFT datasets. This module uses the response of a nth order Butterworth prototype where the order is selected by the user.

Automotive

Overview

The *Automotive* toolbar contains modules which are of specific interest in automotive applications.



Standard modules

	RPMTools	The RPMTools module allows operations to be performed on RPM matrix data, including the order normalisation and extraction of particular orders and the separation of run-up and run-down data.
	Loudness	Performs the ISO532B Zwicker loudness calculation on third octave data-sets. Results may be calculated using either a free or diffuse field model and stored in either Phons or Sones.
	SQMetric	This module calculates three sound quality metrics based around the Composite Rating of Preference (CRP). These metrics are Speech Interference Level (SIL), Spectrum Balance (SB) and the CRP. The CRP and the SB both require a tach channel from which to compute the machine firing frequency. The metrics operate on full-octave data-sets but third octave data can be used as long as the frequency bands are present to generate the full-octave bands.
	SQImpulse	This module operates on time domain data and allows Saliency and Kurtosis calculations to be performed. These metrics are used to determine the impulsiveness of sounds.
	Articulation Index	Permits calculation of the articulation index using three different methods.

Optional modules

	Kalman Filtering	The Kalman filter module is designed to track signals, with a known structure, that have been buried in noise. Noise refers to any signals that are of a different unknown structure when compared to the tracked signal. The Kalman filter is ideally suited to the analysis of rotating machines where it is necessary to track a signal, which is harmonically related to the machine rotation. The unique advantage of this approach over others is that the filter is able to produce a value for the tracked signal for each time sample in the recording. Thus a time history of a particular order can be extracted from the overall signal. This allows the order functions to be edited, their levels changed and allows sound quality what-if games with the reconstructed signals. Because a data point is derived for each time sample of the original signal the order histories can be played through any PC equipped with a sound card.
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	<p>Order Tracking</p>	<p>In rotating machines, spectral displays are often required which use cycles per revolution of a reference shaft (orders), instead of the normal frequency (Hz). Generating displays of orders as opposed to frequency used to require the use of tracking filters to sample the data at fixed rotation angles. It is now possible to sample the data using a constant sample rate and then use a digital order tracking technique, called "Computed Order Tracking" to re-sample the data at constant shaft angle increments. Linear interpolation is used to estimate the signal levels at the particular shaft angles.</p> <p>The Order module implements a non real-time version of the digital order tracking technique, which permits a recording of a machine transducers and tach signals) to first be made on tape and then be sampled into the PC for processing.</p>
	<p>Passby Display</p>	<p>The passby display module is custom designed for users who measure vehicle passby noise using (at present) either a Larson Davis 2900 or 3200 analyser or the Bruel & Kjaer 2145 Vehicle Signal Analyser. Data can also be imported from any system where FFT or fractional octave data is available where that data has been stored in increments of time and where each spectrum has the corresponding ground speed supplied. Tachometer information is not required but will be used if supplied. The display shows a versus distance or versus time contour map for each side of the test vehicle path, and in common with all software modules has live cursor links to the corresponding 2D graphs and spectrum displays. The 2D graphs feature level, speed, acceleration, tach and throttle position, and each trace has user definable acceptance bands to confirm for instance that the speed when crossing the test area threshold was within acceptable limits. One or two channels can be viewed simultaneously, either for a single dataset, or as a comparison between two datasets. There are options for various display window combinations, such as left only, right only, and right and left combined, but even more significant is the inclusion of a compare mode, that allow rapid side by side comparison of test runs. Multiple datasets may be closely analysed in overlaid displays.</p>
	<p>Engine Test</p>	<p>The Engine Test System is an extension of the standard software system that permits the automated acquisition, analysis and display of engine test data in conjunction with the Larson Davis 3200 eight-channel analyser. It is also possible to customise this module to perform variations on the basic test theme, or to use an alternative front end to acquire the data.</p>
	<p>Head</p>	<p>Decoding of data held in the Head Acoustics format</p>
	<p>Angle Domain</p>	<p>Editing suite which allows cut and paste waveform synthesis and auditioning in the angle domain</p>
	<p>DiVA</p>	<p>Customised in-vehicle analysis system – tailored to end user's specific requirements</p>

Custom

Overview

The *Custom* toolbar contains specialised modules which are either part of a complete customised system, or which do not easily fit into any of the other toolbar categories.



Standard modules supplied on this toolbar

There are no standard modules for this toolbar.

Optional modules

	Sound Quality	Direct to disk recording and sound quality analysis including waveform editing suite, complete with Pentium PC, 2GB disk and all interfaces - the configuration includes the Base, Tools and DSP toolbars
	Torsional Vibrometry	A self-contained test system for performing laser vibrometry tests using any Torsional Laser Vibrometer which has TTL outputs. It offers various types of analysis tests and logical management of the results. The acquired data can either be post processed by the application itself or exported to software. All the test results produced by the module are logged into a database that can be interrogated to find specific information quickly. The database also manages series of tests.
	DWT	Fast discrete wavelet transforms using real orthogonal wavelets. Provides multi-resolution time-frequency analysis that is especially useful for transient and non-stationary signals. Adaptive algorithm picks the best wavelet packet basis for the analysed signal. Other bases are: wavelet basis and fixed level basis. 17 one-dimensional wavelets are available including Coifman, Daubechies and Haar. Complete with "Wizard" for easy use.
	VXI	Support for Hewlett Packard VXI
	Hydra	Configurable real-time, long term monitoring system intended for the measurement of noise, vibration, strain, temperature, pressure etc. The module as uses in a wide range of applications, for instance Civil Engineering.
	Paladin	Automated squeak and rattle - production line defect analysis

Drivers

Overview

A driver is a customised program written especially for a particular device that allows the software software running on the computer to communicate *directly* with the acquisition hardware. The driver provides the communications capability required in order to allow software to *talk* to the instrument, controlling its setup and functionality and requesting data to be transferred across the link. Having transferred the data, the driver then creates a suitable data object to hold the data in computer memory so that that it can interact with the rest of the modules in the software system. If required, the data object is subsequently stored to disk in a special format native to software, and can then be recalled at a later date, without the need for any further interaction with the acquisition device. *The significant difference between a driver and a translator is that a driver generally communicates directly with some piece of hardware, whereas a file translator (for instance SDF or UFF) merely converts a disk data file.*



Standard modules supplied on this toolbar

There are no standard modules for this toolbar.

Optional modules

	Larson Davis	Direct interaction and control (RS232c on 2800 and 2900, and RS232c or IEEE-488 on 3200) and file based data transfer from the Larson Davis 2800 and 3200 series of analysers using ROM Revision 4.xx, and the Larson Davis 2900 using ROM Revision 4.xx and 5.xx. The remote control facility permits easy control and configuration of the analyser. The setup can be changed through the use of a series of configuration dialogs in order the meet a particular set of requirements, and then saved as a binary object like a normal software dataset. Later they can be used to reconfigure the analyser with a simple drag and drop operation. You can keep a number of setups on disk, load them into the software data window and set up the instrument simply by dragging the setup object over the instrument driver icon and dropping it. Ideally the IEEE interface should be used for optimum speed, but the remote control facilities will also work with the RS-232c interface, albeit at a slower pace.
	HDAT	DAT tape driver module that allows the system to perform Tape Transport Control, Monitoring and Data Retrieval from HEIM multi-channel DAT tape recorders and replay units. Real time data transfer and control is SCSI-2 based.
	Open Layers	A generic driver which is compatible with all Data Translation Open Layers boards. Data Translation provides a large range of acquisition cards that will satisfy virtually all data acquisition requirements. The driver allows the importation of time data directly into an software object, and will also allow the play back of signals via the Open Layers board. When recording data, both time domain and FFT representations of the input signals are available. Triggered acquisition is also supported.
	Oros	An OROS FFT Analyser to allow data from the OROS OR25 range of boards to be captured into software. Specific support is available for the 2 Channel, 4 Channel and 8-14 Channel versions of the OR25 board.