



DNA SOFTWARE

 **LARSON DAVIS**
A PCB PIEZOTRONICS DIV.

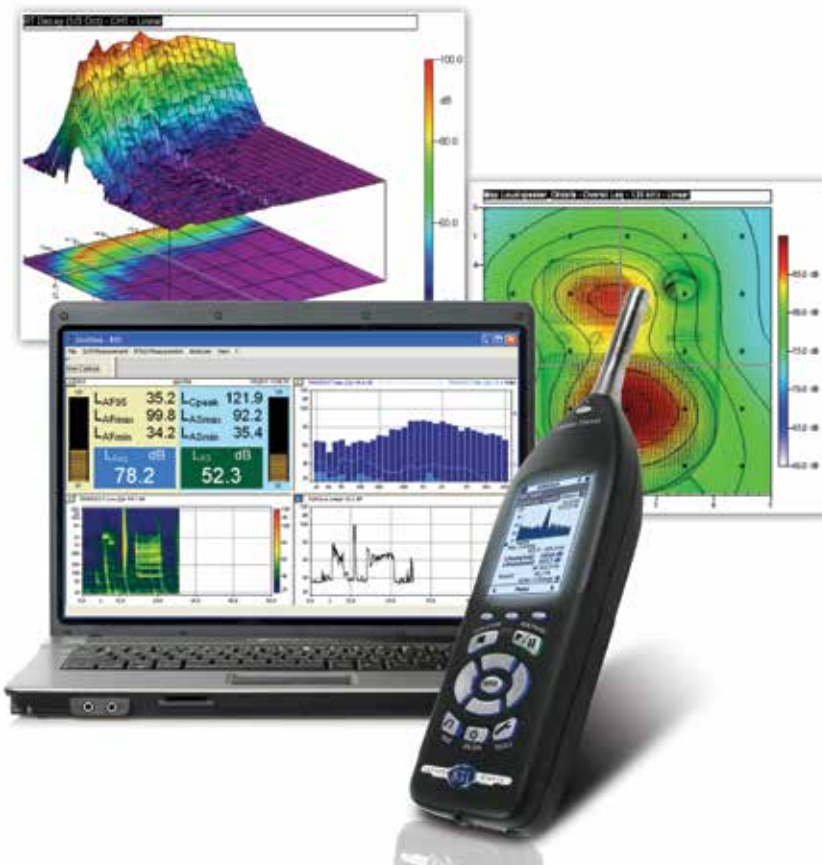
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DNA SOFTWARE

Analyzing noise and vibration data can be difficult. Its not often easy to see the patterns or recognize the nuances of complex data sets. Furthermore, presenting data in a way that is meaningful can be challenging, yet perhaps our most important task.

DNA (Data, Navigation, and Analysis) makes maneuvering through extensive data a simple operation and putting together meaningful reports has never been easier. Some of DNA's many features include:

- Control of Larson Davis Models 831, SoundTrack LxT, HVM100, 720, 812, 820, 824, 2900B, & 3000+.
- Multiple live data displays on the PC screen.
- Stream data directly from analyzer to PC hard drive, including sound files.
- Read stored data files from analyzer or disk.
- Create report templates for easy graphing and printing.
- Organize templates, graphics, and measurements for easy recall.
- Reports can integrate text, graphics, pictures, or embedded objects (OLE 2.0) such as Microsoft Word, Microsoft Excel and .WAV files.



Research and Development

- Building Acoustics
- Sound Power Determination
- Vibration Measurements
- Statistics
- Pass-by
- Sound Intensity
- Simple Point and Shoot
- Transient Capture

Environmental

- Aircraft Noise
- Industrial Noise
- General Surveys
- Transportation Noise
- Community Noise
- Events and Tone

Worker Safety

- Work Place Surveys
- Machinery Noise

SOFTWARE SIMPLIFIED

ONE SOFTWARE PACKAGE FOR UNLIMITED NEEDS

DNA integrates and fully supports all types of measurements made with Larson Davis noise and vibration instrumentation. It replaces the need for several different software applications to achieve what you really want for display, analysis, and reporting of all project measurement data. DNA quickly produces high quality charts, reports, and presentations.

REAL-TIME DISPLAY MODE DUAL MODE

DNA displays and controls measurement data on a PC in real-time, while maintaining access to all of the instruments measurement and analysis functions.

Unique to DNA is its capability to use the LD instrument as data acquisition front-end while at the same time and in parallel the instrument can store data locally.

WYSIWYG

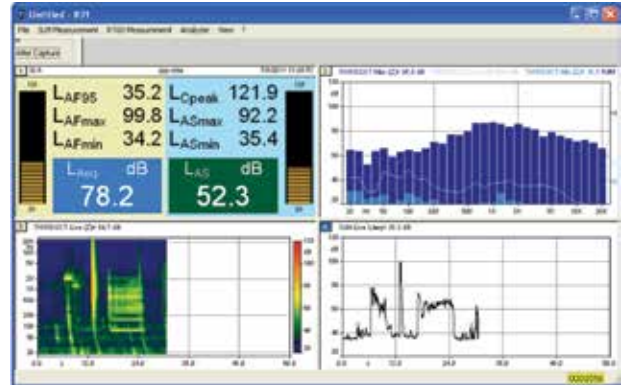
DNA is what-you-see-is-what-you-get software. You place, resize, and manipulate graphical objects, images, graphs, text, and other types of objects on a page. What you see displayed on the screen remains unchanged on the printed report.

(NOTE: Refer to the Microsoft Word: Print Layout View.)

MEASUREMENT ORGANIZATION

DNA saves all measurement-related files as elements of a project file. Project files can contain measurement data, page descriptions, images, audio files, etc. All data are organized in a tree structure (like Windows Explorer). In addition, DNA allows you to drag & drop any object onto project reports.

The dual view of the data allows for an immediate flip from graphical view to tabular view of the measurement or processing data. Using the F2 (graphical) or F4 (tabular) toggle, you can verify your measurement values or export them to Microsoft Excel for example.



LD Instrument	DNA Driver	USB	Serial	TCP/IP
Models 831	SWW-DNA-831	✓	✓	
SoundTrack LxT	SWW-DNA-LXT	✓		
HVM100	SWW-DNA-HVM	✓	✓	
Model 812, 820, 870	SWW-DNA-SLM	✓	✓	
Model 712, 720	SWW-DNA-720	✓	✓	
Series 824	SWW-DNA-824	✓	✓	
2-ch: 2800, 2900, 3000, 3200	SWW-DNA-2800	✓	✓	✓

GRAPHICS

For each graph, you can control the plot size, scaling of each axis, grid lines, bar graphs, overlaying, linear and log scales, EU, integration / differentiation and unit conversion (eg dB to physical units). Cursors can be synchronized over different graphs. Dual cursors can zoom or make a local evaluation of the data.

Any combination of graphs and objects (even an entire document) can be saved as a template. In addition, you can perform cumulative distribution versus time and for each frequency band, percentile Ln versus time and frequency; frequency versus time, speed, distance or rpm; order analysis, RT-60, etc.

Modes of Operation in Page Layer Mode

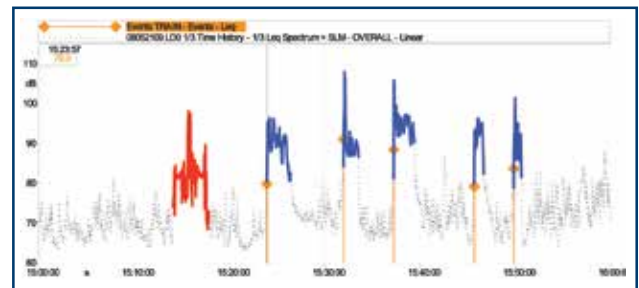
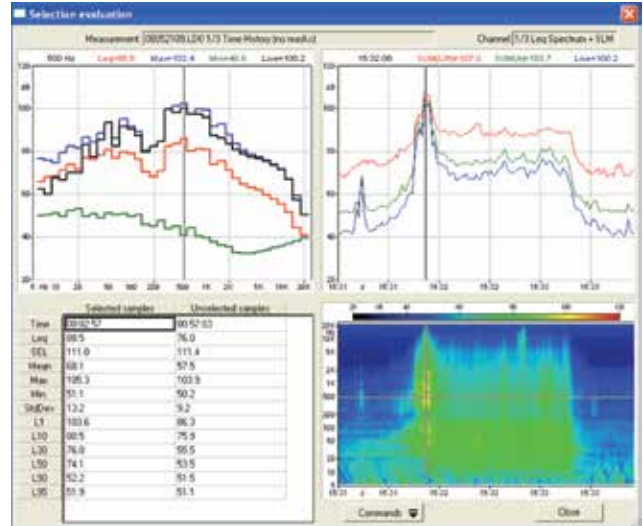
- Graph – control the contents of the graph
- Object – control the location and size of the graph on the page

This is complemented by the Global layer – defines the background common to all pages. Cfr Header & Footer in Microsoft Word or master slide in Microsoft Powerpoint.

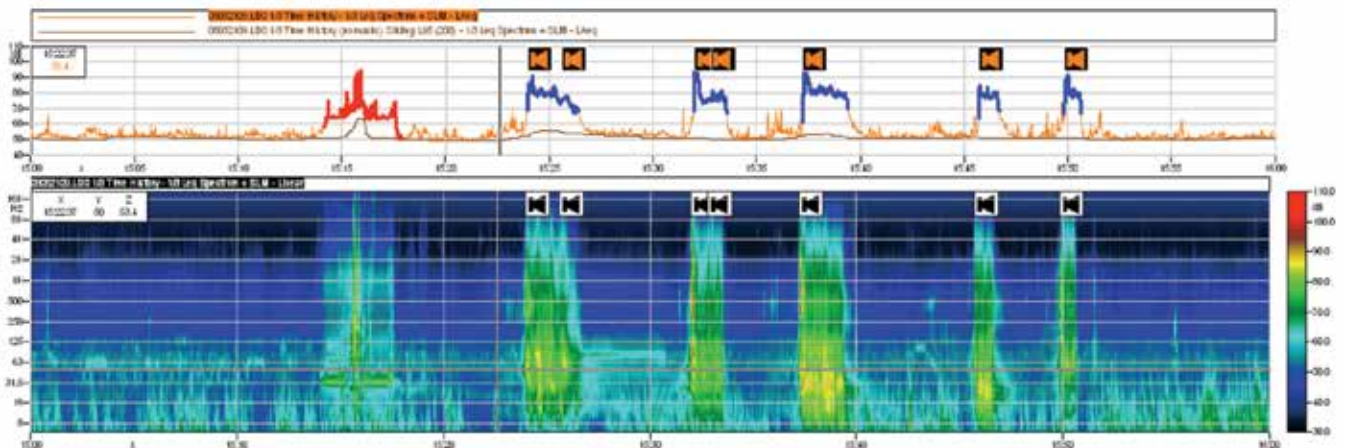
The major benefit of this working principle is the direct access to data visualization without having to check the print preview.

Graphics

- Management of graphics, numerical tables, comments, dynamic markers, digital photos, and video clips
- Direct import of image files as metafile WMF and EMF or bitmap as DIB or BMP
- X, Y, and Z axis definable as linear or logarithmic with selectable values, or using autoscale
- Single or multiple cursors synchronized among the displayed graphs



Time history in dotted line overlaid with the “train” events in blue and the garbage truck in red. The start of each train event is marked.



DATA POST-PROCESSING

DNA calculates functions including all mathematical operations from data blocks, spectra, multi-spectra, levels versus time, engine revolution or speed, and more. Levels of selected spectral bands can be modified or canceled, both in frequency and in time domain, for data matrix or multi-spectra. Several weighting curves are included with the software.

- Cut & paste between sequences acquired in the time domain
- Measurement recalibration and level modification in frequency and time domain
- Search function for events, pure tones and impulses
- Spectrograms and 3D graphics (waterfall)
- Mathematical functions, masks in time and frequency domain, automatic identification of the events, tonal components, etc.
- Creation of the curve family as ISO-NR, ISO-2633, Isophonics ISO-226, etc.
- Weighting curves
- Statistics on the overall value and per frequency band, also in FFT

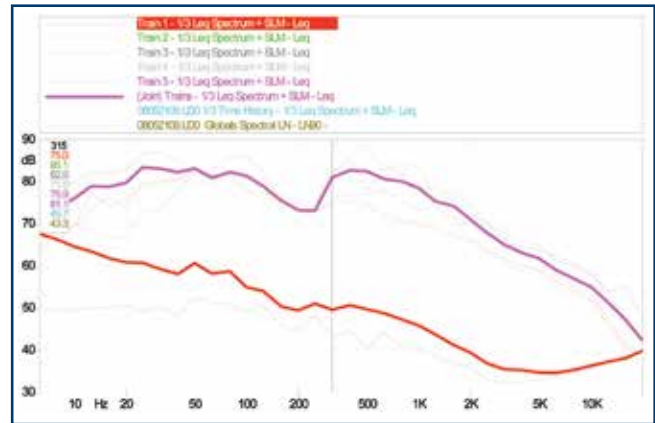
DATA INPUT

- Search function for events including marker positioning and multi-marker, pure tone, and impulses
- Arithmetic operations on measurements and data management
- Marker for data exclusion or modification including related spectra
- Data files for waveforms, statistics, frequency analysis in 1/1, 1/3, 1/12, 1/24 octave and FFT with any kind of spectral resolution, crossspectra, module, phase, real and imaginary part, spectrum, multispectra, harmonic orders, meteorological signals, voltage, current, etc
- Measurement file with icons (Measurements Organizer) with Drag and Drop functions for quick selection

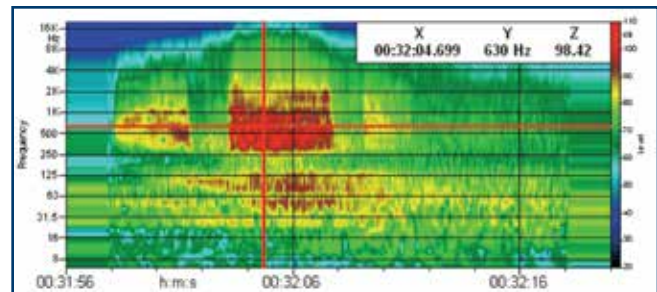
OPTIONAL MODULES

DNA can be expanded to meet your measurement needs with the following modules:

- Events tracking: PNL and PNLT event time history and EPNL event, TRAIN 6-22 and 22-6 processing
- 3D color mapping
- Optimized mapping using OpenGL, requires DNA Mapping
- Industrial Hygiene
- Building Acoustics, allows calculation of transmission loss and sound insulation calculations.
- Direct Store and File Audio option storing directly on a computer bypassing instrument memory
- Order tracking capabilities



The spectra for each train events are plotted next to the average train event and overlaid with the residual noise (after removal of the garbage truck) and the L90 spectrum of the hour.



Using the Model 831 event spectrum at 20 msec the spectrogram shows distinctly the horn being blown twice (higher frequencies [250 ~ 2 kHz]) and the rail/wheel interaction in the lower frequency octave bands [20 ~ 125Hz].

EVENT TRACKING

This module focuses on traffic sectors like airplanes and trains. For airplanes it calculates the Perceived Noise Level (PNL), Perceived noise level corrected for tone (PNLT) and the Effective Perceived Noise Level with a correction for tone and duration (EPNL)

PNL L_{PN}

PNLT L_{PNLT}

EPNL L_{EPN}

$$L_{EPN} = L_{PNmax} + 10 \log(t_{10}/20) + F(\text{dB})$$

L_{PNmax} = maximum L_{PN} during flyover

t_{10} = duration in seconds during which $L_{PN} > L_{PNmax} - 10 \text{ dB}$

F = pure tone correction, usually + 3dB

For trains it distributes the train event SPL in the 6-22 or 22-6 daily periods giving the Leq contribution of the train noise to the overall noise.



The search event window will allow to select the extra parameters for PNL and TR functions.

ARCHITECTURAL ACOUSTICS

The Architectural Acoustics module of DNA focuses on the sound transmission loss calculation according to ISO and ASTM standards.

- Reverberation Time (RT-60) data can be imported or tuned if the original decays per octave are available, including support for the backward Schroeder Integration method). Typical standards are ISO 3382-2, ISO 354
- Absorption Coefficient calculation based on ISO 354, 11654 or ASTM E2235
- ISO 140 & ISO 717 for adjacent rooms, building façade and floor transmission loss
- ASTM Standards E90, E336, E966, E492, E1007 and classification standards E413, E1332 and E989

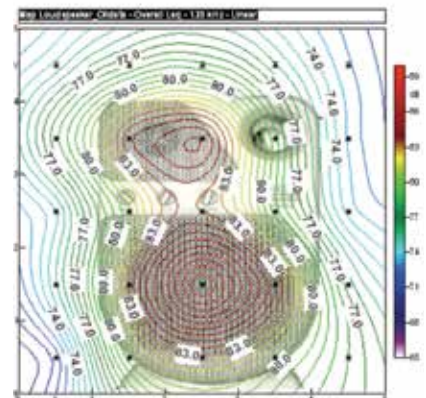
Leveraging the powerful DNA Graph Template concept, DNA allows you to plug your measured data directly in the appropriate template to go to the recommended graphical representation of the results. DNA will also average the transmitting, receiving or background levels.



MAPPING

The mapping function serves to plot equal level contour data, usually called ISO-lines. For a better graphical representation, you can add the (faded) picture of the object or the room.

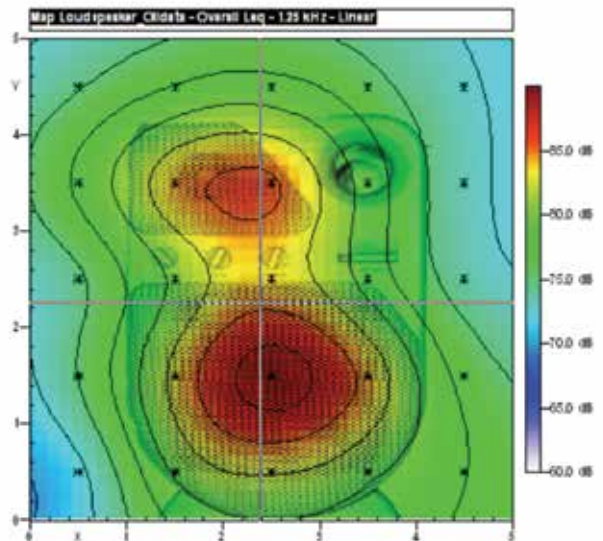
- A factory floor survey combined with mapping gives an acoustic floor plan.
- Combine with acoustic intensity measurements.
- Use with overall, octave or FFT data.



Overlay of the speaker and the iso-loudness curves at 12.5 kHz

CORE DNA	
SWW-DNA	Core DNA Software and dongle (USB) for evaluation and reporting of data downloaded from the Larson Davis instruments, requires an instrument driver.
Real-Time Instrument Control, Acquisition and Data Download (instrument driver)	
SWW-DNA-SLM	Instrument driver provides instrument control, setup, live display, data translation, and data download for the Larson Davis Models 812, 820, 870 sound level meters.
SWW-DNA-2800	Instrument driver for instrument control, setup, live display, data translation, and data download for the Larson Davis Models 2800, 2900, 3000+, 3200.
SWW-DNA-720	Instrument driver for instrument control, setup, live display, data translation, and data download for the Larson Davis Models 712 & 720.
SWW-DNA-824	Instrument driver for instrument control, setup, live display, data translation, and data download for the Larson Davis system 824 sound level meter.
SWW-DNA-831	Instrument driver for instrument control, setup, live display, data translation, and data download for Model 831 sound level meter.
SWW-DNA-LXT	Instrument driver for instrument control, setup, live display, data translation, and data download for the SoundTrack LxT sound level meter.
SWW-DNA-HVM	Instrument driver provides instrument control, setup, live display, data translation, and data download for the Model HVM100.
Advanced Processing	
SWW-DNA-REMOTE	DNA software for monitoring a remote location when using 820, 824, 870, 831, LXT. Uses modem connection for communication and data download
SWW-DNA-EV	DNA option for events tracking: PNL and PNLT event time history and EPNL event, TRAIN 6-22 and 22-6 processing
SWW-DNA-MAP	DNA option for 3D color mapping
SWW-DNA-MOG	DNA option for optimized mapping using OpenGL, requires DNA Mapping
SWW-DNA-IY	DNA option for Industrial Hygiene
SWW-DNA-BA	DNA software Building Acoustics, allows calculation of transmission loss and sound insulation calculations
SWW-DNA-DS-FA	Direct Store and File Audio option storing directly on a computer bypassing instrument memory. Includes CBL134 for downloading audio files
SWW-DNA-TRK	Adds order tracking capabilities to the DNA software
Multi User	
SWW-DNA-D-RTA1	Extra Dongle for Multi User of 2800, 2900, 3000+ (USB)
SWW-DNA-D-RTA2	Extra Dongle for Multi User of SLM 824 / 831 (USB)
SWW-DNA-D-RTA3	Extra Dongle for Multi User of SLM 824, 2800, 2900, 3000+ (USB)
SWW-DNA-D-SLM	Extra Dongle for Multi User of SLM 812, 820, 870 and HVM (USB)

SPECIFICATIONS	
Operating System Requirements	MS Windows®: XP Pro SP3, Vista Business Sp1 and Win 7 in 32-bit version and Win 7 in 64-bit.
Graphic Modules	
Graph models	XY-Graph, Time History, Spectrogram, Ln distribution
Tables	Numeric table, marker table, event table, exposure table (IH)
Axis control	Autorange, units (SI and user units), scale factors, log and lin
Graphic Objects	
Types	DNA Graphs and tables, text, drawing objects, pictures, media files
Size	Manual, snap to grid
Location	Manual, snap to grid
Alignment	Horizontal, vertical and distribution
Copy & Paste	For all graphic objects
Export	As bitmap, as metafile





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Larson Davis offers a full line of noise and vibration measurement instrumentation such as Class 1 and 2 sound level meters, outdoor noise monitoring systems, personal noise dosimeters, human vibration meters, audiometric calibration systems, microphones and preamplifiers, and data analysis software. Instrumentation is used in community and environmental noise monitoring, measurement of building acoustics, managing worker exposure to noise and vibration, and various automotive, aerospace, and industrial applications. Larson Davis is a division of PCB Piezotronics, Inc., a wholly owned subsidiary of MTS Systems Corporations.

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MD-0473 revNR 1219



MTS Sensors, a division of MTS Systems Corporation (NASDAQ: MTSC), vastly expanded its range of products and solutions after MTS acquired PCB Piezotronics, Inc. in July, 2016. PCB Piezotronics, Inc. is a wholly owned subsidiary of MTS Systems Corp.; IMI Sensors and Larson Davis are divisions of PCB Piezotronics, Inc.; Accumetrics, Inc. and The Modal Shop, Inc. are subsidiaries of PCB Piezotronics, Inc.