A complete PC based electroacoustic analyzer package for measuring loudspeaker systems ...

... at a completely affordable price!
A complete and affordable analyzer system that provides quality data suitable for real electroacoustic engineering purposes. The LMS system provides a vast array of powerful computer based features which are specifically focused on the unique requirements of loudspeaker development and QC production testing. Whether your application is professional audio, consumer stereo, car stereo, or contract installation, LMS is the perfect tool for development and testing of loudspeaker systems. No other measurement package today provides as many outstanding features and capabilities at such an incredible price!

LMS is a swept sine wave analyzer for PC computers and consists of an ISA full length PC slot card, connector interface cables, the Windows® based application software, and includes a calibrated M31 microphone. LMS can be used for production QC testing of loudspeakers, engineering/development of loudspeakers, and a wide array of general purpose electroacoustic measurements.

Unlike FFT type analyzers, LMS provides log resolution of frequency data points, while still maintaining the ability to gate signals for quasi-anechoic SPL measurements! Since LMS measures frequency response directly, very little CPU overhead is required since there is no complex FFT transform to solve.

The rich graphical user interface provides a host of features which greatly enhance the ease of operation and power of the system.

Unlike other analyzer software, LMS contains a Curve Library architecture. Up to 50 curves can be stored in each library. Multi curve display was not an after thought in LMS, it was built-in from the ground up. This also provides tremendous power and flexibility for post processing operations. Many applications require multi curve data to perform various tasks, such as multiplying two curves together, using two impedance sweeps for generating speaker parameters, etc. The Curve Library makes all of this possible and more.

All of the LMS hardware features can be controlled and modified through the Analyzer Parameters dialog. The analyzer control parameters can also be saved to disk as QuickSet files, and recalled later to immediately reset all of the control panel parameters. The user can save and retrieve previous setups for any number of favorite test measurements. Sweeps can be taken over any frequency range from 10Hz to 100kHz. Any number of data points can be measured from 2 to 800.

Eight data measurement modes are supported: • Volts • SPL • Impedance • RT60 • Inductance • Capacitance • Polar Volts • Polar SPL

All graphics are designed on an artboard in true WYSIWYG fashion. The screen display is identical to the printed output. The user has full control over many of the design elements of the artwork including fonts, colors, and line styles. Custom graph documentation is also provided for project name, person, and company. Note and comment areas are also included in the graph layouts. Full high resolution color printing is supported through any standard Windows® printer driver.

The LMS system will also generate a TTL pulse which can be used to control external switching of test fixtures, or direct polar plot sweeps using stepper motor driven turntables. For production testing applications the LMS software can be controlled by user written Macro programs. The LMS Macro programming language allows for messages to be written to the screen to prompt operators, control test sweeps, run utilities, control printing of graphs, export data, and conduct Pass/Fail tests.
### Processing Operations
The Processing menu provides mathematical functions, data processing functions, and other specialized curve processing capabilities which can be applied to measured data or imported data. Smoothing, scaling, splicing, phase generation and math operations give the user complete control over the measured data without the need for using external data processing programs.

### Utility Operations
LMS provides a rich set of utilities for manipulating data and graphics. Numerical data can be imported and exported from the program as simple ASCII text files. The graphic artwork can be exported as either vector or raster image files in many different formats including: BMP, TIF, PCX, PNG, EPS, AI, PDF, WMF, EMF. A powerful Curve Capture utility can distill numerical curve data from raster images. These can be pictures from books, manuals, or scanned images of plotter output. The Curve Editor utility allows you to graphically create your own curves, or edit the data of any curve in the library.

### Speaker Parameter Derivation
This dialog provides five different methods of generating speaker parameters. Moreover, the parameters generated can be produced for two different models: Standard or LEAP. The numeric parameters can be printed, saved to a file, or copied to the clipboard.

Full optimization of the model parameters to the original impedance curves is provided for maximum accuracy. Native unit conversions are provided for all parameters. For example, an edit field for length can convert and display Inches, Meters, Feet, etc.

The dialog also provides the means to generate impedance curve simulations based on the derived parameters. This allows for easy viewing and comparison of the model to the actual measured impedance data.

### Scale Parameters
The Scale Parameters dialog consists of two principal groups of controls: Horizontal Scales and Vertical Scales. This powerful dialog enables plotting of curve data in almost any possible manner. A different scale is defined for each type of curve units. The horizontal panel provides control over the frequency, time, or angle unit scales. The vertical panel controls a wide variety of different types of unit scales.

### Macro Programming Language
For production applications where repetitive testing is required, the LMS system provides macro programming capability. The LMS commands allow custom messages to be displayed on the screen, utilities to be run like compare, and of course graph display or printing of the sweep data curves. A custom macro editor is also provided which features syntax highlighting and color printing.
System Hardware

The LMS PC card contains a low distortion sine wave oscillator, dual state variable tracking filters, mic preamp, and gated peak/average level detection circuitry. A line level output is provided, along with a balanced line input, and a direct powered microphone input. Any of four sources can be selected for measurement, and external microphone preamps can be supported by response calibration. The basic frequency range of the system spans 10Hz to 100kHz and features a dynamic range of 90dB equivalent to 16bit digital audio.

The high resolution of the system allows up to 200 log-spaced frequency data points to be taken per decade of frequency. This is equivalent to one data point per pixel on the screen.

The filters allow many different types of measurements to be made. The filters can be set for FLAT, LowPass, HighPass, BandPass, and BandReject responses. The accuracy and flexibility of the LMS analyzer rivals systems costing many times more, and is certainly far easier to setup and operate for both novice and experienced users alike.

The LMS hardware will run on virtually any computer which provides a full length ISA bus slot. For laptop use, the PAC4 can provide this external slot capability, and interface to the computer using a serial COM port for communication.