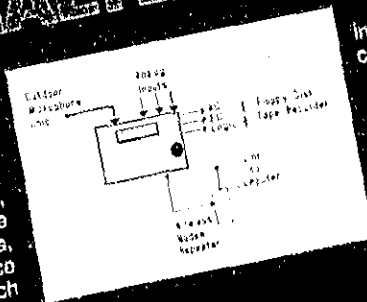


On a Network...
In Your Hand...

THE 870 ENVIRONMENTAL NOISE ANALYZER

The 870 Environmental Noise Analyzer is the smallest, lightest, most powerful battery powered instrument available for the statistical analysis of noise, vibration and other signals. With 115 dB dynamic range, dual statistical processors provide short and long term Log, SEL, L_ne, limo histories, reports of exceedance events and interval data, and much more. With all this power and flexibility, storage and recall capability of up to 10 complete instrument setups makes this instrument a charm to use.



To learn more about this unique instrument, circle inquiry card to receive a detailed brochure.



**LARSON-DAVIS
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Model 870 Precision Environmental Noise Monitor

Features and Functions

- 115 dB dynamic range for error free measurements.
- Impulse measuring range greater than 118 dB.
- Meets Type 0 and Type 1 standards worldwide including ANSI S1.4, IEC 651 and IEC 804.
- A and C weighting plus 16 user selectable bandwidths. Frequency range from 1 Hz (0.1 Hz unweighted peak) to 35 kHz (70 kHz optional with slightly reduced dynamic range).
- Triple detectors provide simultaneous rms, weighted-PEAK and unweighted-PEAK measurements.
- FAST, SLOW, and IMPULSE time constants for rms detector.
- Dual statistical signal analyzers have been designed into the 870. One analyzer stores a complete set of all long-term historic data. A second resettable statistical analyzer allows the operator to focus on shorter term events without interruption to long-term data gathering.
- Includes four channel general purpose data logger interface for devices measuring windspeed, wind direction, temperature, humidity, barometric pressure etc. Calibration, scaling and data inhibit functions are available for each channel.
- Built-in 25 hr battery, external battery or ac operation.
- Accumulates four different histories: Exceedances, Intervals, Short period Time History and Level Histogram.
- Sampling periods are user selectable from 32 samples per second to 42 minutes with memory capacity of up to 64,000 samples (standard) or 250,000 samples (optional).
- Selectively creates special exceedance reports when signal levels rise above a user-set threshold and if the event duration is within a user-set time window (settable max and min).
- Each special exceedance report contains date and time of event, duration, event L_{eq} , SEL and rapid sample time history during the event.
- System automatically activates audio tape recorder when signal level rises above user-set threshold.
- System can automatically activate alarms during signal exceedance.
- Direct interfaces for printers, digital data recorders, analog tape recorders, computers, modems, and optional floppy-disk drives.
- Real-time printout of data during actual measurements.
- RS-232 computer interface standard. Optional HP-IL interface.
- Stores ten complete instrument setup registers, each with a descriptive name tag.
- Access to all data via keyboard, printer, or computer is allowed during ongoing data accumulation.
- Quartz clock/calendar system for time/date annotation and automatic time scheduled operation.
- Interfaces with optional Model 900 series preamplifiers and accessories.
- Interfaces with optional Model 2100 weather-proof outdoor microphone system for use in harsh environments and permanent installations.
- Militarized stainless-steel case with optional weather-tight enclosures.
- 4-line, 160 character alphanumeric and graphics display. Visible in direct sunlight.
- Small size: 2 x 9 x 6 1/8 in (h x w x d)
Lightweight: 3.75 lb, including batteries.
- EMI and RFI protected.
- 2-year warranty program.

Applications and Uses

- Statistical analysis of noise, vibration, and other signals
- As a Type 0 or Type 1 precision integrating sound level meter
- Aircraft and airport noise monitoring
- Traffic survey instrument
- Industrial noise monitor
- Community noise
- Employee noise exposure analysis
- Measurement of sonic boom, artillery, blast noise, automatic weapon fire, and other highly impulsive noise events
- Data logging vibration monitor using accelerometers
- Seismic and ground motion analysis using geophones

The Model 870 is a precision sound level meter that meets IEC 804 and ANSI S1.4 specifications for Type 0 accuracy when used with an appropriate microphone. It will meet A- or C-weighted, or unweighted noise measurement requirements anywhere in the world. In addition, the 870 contains features that insure better and more accurate measurements for a variety of situations. Some of these features are as follows:

115 dB Dynamic Range

A-Weighted Dynamic range of 115 dB not only simplifies measurements but virtually eliminates the age old problem of data outside the measurement range. With no range controls to set, sound level meter overloads and under-ranges are avoided. This assures valid measurements over the entire operating range. While such a large dynamic range may not always be needed for assessing the risk of hearing loss, such a range is essential for community and environmental noise, assessment of nonauditory effects, and studies on annoyance. This large range is also essential for accurate statistical analysis.

Adjustable Measurement Range

A variety of precision microphones are available with different sensitivities allowing the measurement of very small signals below 15 dBA, to signals as large as 200 dBA SPL. With the 115 dB dynamic range of the Model 870, possible measurement ranges could be 15 to 130 dBA SPL up to 85 to 200 dBA SPL, for example. Signals as small as those found in quiet wilderness areas to closed-in blast testing can be measured accurately

110 dB Pulse Range

This large pulse range assures the accurate measurement of *all* types of sounds. Noise from punch presses, stamping machines, etc., will be properly measured regardless of the background noise level or reverberation time of the work area. Many of the existing sound level meter products in the market create significant measurement errors because of their limited crest factor capability and their limited dynamic range.

Measures True RMS of Very Short Impulses

For a single 250 Ω s pulse (one cycle of a 4 kHz sine wave) the error is less than 0.5 dB, even when the background noise is 110 dB less than the amplitude of the measured pulse. The performance of the 870 represents a significant technological breakthrough in the accurate measurement of impulsive sounds. This capability ensures that normally difficult tests such as measuring the energy of a rifle shot in a quiet open field can be properly performed.

Flexible Features

The Model 870 contains the many features necessary to ensure that the instrument will provide quality measurements for many years. The software oriented design ensures that changing needs can never make the 870 obsolete. In addition, these features make the model 870 system adaptable to solving a large variety of sound measurement problems. Some of the key features that provide this flexibility are:

A, C and Linear Frequency Weighting

A, C, and Linear weightings are provided. C-weighting provides the data necessary to optimally use the Noise Reduction Rating (NRR) of hearing-protectors as well as giving the user some indication of when low frequency noise is a problem. The C-weighting can also be used for sonic booms. Linear weighting can be used for artillery measurements and other impulsive measurements.

Preselector filters

Bandwidth capabilities of the 870 extend from 1.0 Hz (0.1 Hz unweighted peak) to 35 kHz, spanning numerous measurement tasks from vibration and infrasound to ultrasound frequency ranges. To accommodate a variety of input transducers and measurement ranges, operator selectable high-pass and low-pass filters provide choices of 1, 5, 20, or 100 Hz for the low frequency cutoff; and 1, 16, 25, or 35 kHz for high frequency cutoff.

Use of the frequency preselector will allow optimization of transducers and the dynamic range and provides the ability to reject unwanted signals.

Overall/Current Data Accumulations

While the overall data is accumulated, a separate accumulator for the current measurements can be read and reset. The current accumulator can be used to measure LMAX, LMIN, Integrated Level, SEL, Dose and Projected Dose for time periods that are but a part of the overall measurements.

Multiple Detector modes

The Model 870 provides a full compliment of detector modes for the thorough analysis of all types of sounds. While the Slow detection mode is the currently used standard for most noise measurements, all output parameters of the 870 can be measured in terms of Fast or Impulse detection modes.

Using two parallel peak detection systems, weighted and unweighted, the 870 simultaneously takes both weighted and linear peak readings. The integrated level and peak samples can be stored simultaneously in a time history file and other reports. This enables the direct measurement of the true crest factor for any noise type.

3, 4, 5 or 6dB Exchange Rates

For the dose and integration measurements, four user selectable exchange rates are available which cover any current or projected need. Overall measurements can have different exchange rates from current measurements.

Criterion Levels and Threshold Levels Adjustable

These levels are adjustable in 1.0 dB steps anywhere in the measurement range. While many industrial measurements will use the 80 dB threshold and 90 dB criterion, many special applications are now feasible. For example, one might measure the contribution of sound above a 115 dB threshold to a daily Dose. Setting a 90 dB criterion level and a 115 dB threshold level would provide the percent of dose contributed by exposure of levels above 115 dB as seen below. These adjustments can also be made after the data is taken.

Logged Data Logic (LDL) Function

The Model 870 provides the capability to perform "what if" analysis on data stored in memory. Using an exclusive "Logged Data Logic" (LDL) the basic data generated by the 870 for Dose, SEL and Integrated measurements can be re-evaluated with mathematical exactness using new threshold limits, new criteria or different exchange rates in any combination. Even though prior data taken by the

870 used a particular threshold, criterion and exchange rate, the *same* data base can be *accurately* retabulated for any new combination of threshold, criterion and exchange rate. The LDL function can be used while running.

For environmental noise, the most likely threshold to change is the threshold contribution of aircraft noise. For example, Leq can be computed using several different values of threshold.

With the LDL Function, data taken by a Model 870 and stored in external data banks can be reloaded into a 870. Re-evaluation against a new standard or a newly proposed law can be performed without retaking the data. This feature alone can save several man-years of effort if legal requirements or standards change. The LDL Function is a mathematically exact method and should not be confused with less accurate statistical approximation techniques.

Supports Various Microphone Options

The Model 870 can be used with any Larson-Davis microphones and 900 series preamps, as user selected polarization voltages of 0, 28, or 200 Vdc are available.

Measured And Calculated Data

The 870 provides an impressive array of measured and calculated data in a variety of formats. Data which are always provided include the following:

- Leq, SEL, Noise Dose and Projected Dose calculated independently by both the overall and the current statistical analyzers. Each uses its own values of Threshold, Criterion and Exchange Rate.
- LMIN, LMAX, LPEAK and LUNWEIGHTED PEAK, with date and times of each, as calculated independently by both the overall and current statistical processors.
- Leq, Ldn, CNEL
- Six selected values of Ln
- Counts of the number of times the measured levels have exceeded preselected exceedance levels of RMS1, RMS 2, Peak and Unweighted Peak.
- For each of the three A/D inputs, the average and extreme values, and the number of times the preset exceedance levels were exceeded.

Multiple History Formats

Each of the following detailed data outputs can also be selected as required:

- The first output is a Statistical Profile of the noise levels (Ln) from 1 percent to 99 percent in one percent increments.
- The second output is a Simple Time History in which up to 64,000 samples of the series integrated levels, or 32,000 samples of the period integrated level and simultaneous peak level can be stored using a basic unit. The total number of samples can be increased significantly with optional expanded memory. The sample period can be set from 1/32 of a second to 42 minutes.
- The third output is an Exceedance History in which each time the noise level exceeds a preset RMS or peak level, the Time, Duration, SEL, Integrated Level, Maximum Level, and Peak Level of the event are all saved. In addition to these values, a simple time history of an user adjustable period length can be selected. This simple time history starts ten samples before the exceedance event occurs and provides a profile of the SPL during the event. Thus, a profile of one-half second samples of an aircraft flyover can be measured.
- The fourth output is an Interval History in which the measurement period/interval can be set from one minute to over ninety-nine hours. For each interval the maximum, average, and peak levels are provided. Additionally, six Ln levels for each interval are available with the Interval History measurement.

Enhanceable

The Model 870 provides many features that give the instrument the ability to be specially tailored to almost any sound measurement need. These features are:

Direct Peripheral Compatibility

Built into the software of the Model 870 is a set of commands that will allow the direct download of measured data from the 870 to ASCII, EPSON, IBM, HP ThinkJet and HP LaserJet printers.

Data can also be sent directly from the 870 to a tape drive memory unit such as an inexpensive audio cassette recorder. Data files can be automatically read from the cassette drive by the 870 for further data display and analysis. A computer is not required for data printout or data storage.

Fully Programmable and Computer Compatible

The 870 can communicate directly with external computers via the RS-232 interface provided standard. This computer hookup can serve to program all the measurement modes of the 870, provide real-time data measurement, or serve to transmit the stored data into a central computer file for immediate use or later analysis. The Baud-rate is programmable and can be set from 300 to 19200 baud.

Networking and Synchronous Data

The versatile unit allows a network of 870s to effectively compete with a large microphone array with respect to both cost and performance. The 870 contains a calendar and a real-time clock in each unit, which can be set by keyboard or by remote computer within one tenth second accuracy. This allows making simultaneous measurements by a network of 870s. The data from each unit could be read into a computer at the end of the measurement period and comparatively analyzed. Thus perimeter data can be captured simultaneously in both space and time by several 870s. The 870 has a unique daisy chain capability which allows 125 Model 870s to be connected to the same RS232 port on a computer. One of the key advantages of this approach is that a costly communication system can be avoided, making the overall system very portable and adaptable.

To avoid a mix-up each unit has its own digitally coded serial number which can be read out from the keyboard or through a computer.

Optional 256K RAM

The Model 870 comes standard with 64K of RAM for data storage. This will support approximately 2000 exceedance events, or 2000 interval reports, or 30,000 simple history reports, or some combination of these. This is enough standard memory capacity to capture all the events of a typical airport for several days. In addition, the user will have the ability to store history data at either a one decibel resolution or at a one tenth decibel resolution. The benefit of the 1 dB resolution is that the number of history samples can be doubled.

If additional memory is still needed, the Model 870 can be upgraded with optional memory to 256K RAM. This option provides more than 4 times the memory capability of the 64K standard unit. Examples of the power of this extra memory are almost 3 days or 1 sec samples can be stored, a week of airport events, or almost 6 months of 4 minutes Leq's.

Easy To Use

With as many features present in the Model 870, a user might worry about the device being unduly complex. Yet it is very easy to learn and use for the following reasons:

Setup Registers

The Model 870 has been designed to allow the operator to customize and optimize all instrument features for each particular type of measurement application. To prevent having to reselect instrument functions when different types of measurements are performed, the 870 provides 10 separate setup registers to allow instant recall of all instrument functions. Only three keystrokes are required to configure for a totally different measurement! Each menu provides space for the operator to enter a descriptive title for the instrument setup such as the following:

- 1) AIRPORT NOISE ANALYSIS
- 2) SONIC BOOM TEST
- 3) COMMUNITY NOISE
- 4) TRAFFIC SURVEY

Alphanumeric Display and Keyboard

The four line, 40 character per line, display provides a data readout in plain English. The Model 870 provides a clearly annotated display, showing all pertinent measurement information simultaneously. Graphic capabilities of the display provides an annotated thermometer style bargraph (1 dB resolution) with simultaneous 0.1 dB numeric readouts. Elapsed time is always presented on the LCD with the Dose and Equivalent Level measurements. This elapsed time provides positive feedback to the operator that the Dose measurement has started and is in process. In addition, a symbol of a animated person is always visible in any mode when data is being accumulated.

Keyboard layout provides a generous array of function keys and full alpha numeric capability to permit easy access to instrument setups and data. A rotary pulse generator (RPG) on the keyboard allows rapid access to all instrument functions as well as all stored data. Data may be accessed on-line even during system operation. Keyboard functions allow direct interface to peripheral equipment such as tape recorders, printers, and external memory devices during or following data taking.

Auxiliary Inputs and Outputs

The Model 870 has been designed to communicate with it's surroundings. There are three general input channels and four output channels.

The three input A/D channels read 0-5v and allow signals from anemometers, thermometers, rain gauges, etc, to be recorded and acted upon. A threshold at which time data

collection will pause or continue can be set for each input. Also, each interval report and exceedance report will contain the extreme values of each input channel. The interval report has minimum and average values.

The output channels consist of AC out, DC out, and a pair of logic lines that can be used to turn external devices (such as a tape recorder) on or off. Tape recorders can be selectively and conditionally activated by the logic lines so that only desired acoustic signals are recorded. The DC and AC outputs have gain controls. The output logic line can be triggered by an exceedance report, a start of an interval report for a variable length of time, or by one of the DC inputs being exceeded. The logic line can also reflect the R/S state.

Battery Life

During measurements, the expected life, using the internal batteries, is more than 25 hours. With continuously powered memory, the 870 can be stored for months with the various modes selected, without memory loss. In addition, a battery change can be made without loss of mode selection or data. Thus the 870 needs to be programmed from the keyboard only once in most normal situations.

Tamper Protected

The keyboard and display can be set by the user to not respond to keyboard signals unless a special alpha-numeric access code is used. This prevents accidental or intentional keyboard input.

Automatic ON/OFF For Both Time and Date

A timer feature is provided to allow the user to set up to two start times, two stop times, the start date and the stop date. Three modes allow for a single data run, one data run per day or two data runs per day.

Serviceable

Rugged

A specially shielded metal case with sealed keyboard typify the extra rugged construction of the Model 870. Temperature and humidity stability are excellent. In addition, the measurement microphone and cable connections are designed to take the heavy use of the industrial setting.

Memory Usage

The 64 K RAM (expandable to 256 K) is used to store data for the Run/Stop Log, and the Daily, Interval, Time and Exceedance Histories. The Histogram data use a sep-

Model 870

arate memory, and does not affect the amount of available memory. The History memory usage is as follows:

1 - Run/Stop Log

16 bytes per RUN, STOP, PAUSE, CONT or MARK

2 - Daily History

65 bytes/day (or per STOP)

3 - Interval History

This report can be formatted to be with or without the six preselected Ln values, and with or without data from the three A:D inputs. The interval period is selected as hours and minutes.

A:D DATA	Ln's	
	WITH	WITHOUT
WITH	61	43
WITHOUT	52	34

Table 1: Bytes per Interval Record

4 - Time History

When formatting the Time History, one selects the resolution to be either 0.1 dB or 1.0 dB, and chooses to retain both the integrated level and peak for each period, or only the integrated level. The period may be 10.0, 1.0 or 1/32 second, and integer multiple of these, up to a multiplier of 255. For example, with a UNIT setting of 10 seconds, and a period of 180, a new sample will be produced every 1800 seconds or every 30 minutes.

DATA RETAINED	RESOLUTION	
	0.1 dB	1.0 dB
INTEGRATED LEVEL & PEAK	4	2
INTEGRATED LEVEL ONLY	2	1

Table 2: Bytes per Period

5 - Exceedance History

This report can be formatted to be with or without exceedance time histories, and with or without data from the three A:D inputs. The actual amount of memory used for a time history will depend upon the sample period and the exceedance duration. The ten samples occurring prior to the exceedance are stored in addition to those occurring during the exceedance, up to a maximum of 128. The sampling period is set as n/32 seconds, where n is an integer between 1 and 255. The resolution is always 1.0 dB.

A:D DATA	TIME HISTORY	
	WITH	WITHOUT
WITH	46-164	36
WITHOUT	40-158	30

Table B-3: Bytes per Exceedance

Setup

For a specific measurement project, select those histories which are required, then choose the formatting parameters (interval period, time history period and resolution, whether or not to have Ln's, A:D input data, etc.) such that the total memory requirements do not exceed the available memory.

Model 870/870M Specifications

Unless otherwise noted, tests were made using an 870 with a 35 kHz upper frequency. A 2541 microphone and a 900B pre-amp were connected to the 870 by a cable to meet S1.4 and IEC 804 specifications.

Input

Maximum Input Voltage
6 Vrms

Maximum Usable Input Voltage
± 3.7 Vrms @ 3% THD

Noise floor (18 pF, 2540 mic)

A-weighting	29.0 typ 32 max dB SPL
C-weighting	27.0 typ 30 max dB SPL
Flat (1 Hz - F _{co})	32.0 typ 35 max dB SPL

Noise floor (18 pF, 2541 mic)

A-weighting	18.0 typ 21 max dB SPL
C-weighting	16.7 typ 20 max dB SPL
Flat (1 Hz - F _{co})	21.2 typ 24 max dB SPL

Input Impedance (1 kHz)

A-weighting	4.5 kΩ
C-weighting	6.0 kΩ
Flat	6.0 kΩ

Microphone Polarization
0, 28, and 200 V

Input Amplifier

Frequency Weighting

A- and C-weighting to meet ANSI S1.4
1983, IEC 651, and IEC 804 (Type 0)

A-weighting with 16 kHz low pass

C-weighting with 16 kHz low pass

Flat

High-pass filters: 1, 5, 20, and 100 Hz (-3 dB)

Low-pass filters: 1, 16, 25, F_{co}
F_{co} = 35 kHz or 70 kHz optional

Flatness: ≤0.2 dB

4 Hz to 16 kHz (F_{co} = 35 kHz)

4 Hz to 40 kHz (F_{co} = 70 kHz)
Filters are 18 dB/octave

Dynamic range (noise floor to 3% THD,
3.7 Vrms)

A-weighting	115 dB
C-weighting	116 dB
Flat	112 dB

Detectors

RMS

Response

Fast, Slow, Impulse

Crest factor

50 dB (one 10 kHz cycle integrated for
10 s)

Pulse range

3 dB greater than dynamic range

Single pulse response

<0.5 dB error (four 4 kHz cycles at top
of measurement range)

Log linearity

±0.3 dB error over measurement range

Low frequency error

-1 dB at 2.5 Hz

Weighted Peak

Rise time 25 μs

Unweighted Peak

Accuracy ±0.5 dB

Rise time 12.5 μs

Dynamic range 80.0 dB at 1 kHz

Frequency range 0.15 Hz - 70 kHz (-3 dB)

Sample Rate (all three detectors) 32 Hz

Output

AC

Gain (adjustable) -6 to 40 dB (ref. to input)

Resistance 600 Ω

(A- and C-weighting and high-pass and
low-pass filters affect AC output)

DC

Gain (adjustable) 0.001 to 1.0
 Scale (full clockwise) 26 mV/dB
 Resistance 600 Ω

Power Supply

Internal Supply (user replaceable)
 Six alkaline AA batteries (9 V)
 Operating time 25 hr
 Memory retention 9 mo
 One lithium battery (3 V)
 Memory retention
 1 mo min, 100 days typical

External Supply 7 to 15 V at 80 mA

Environmental

Temperature
 Operating temperature
 <0.3 dB error -25 to 60 °C (-13 to
 140 °F)
 Note: Display is hard to read below -
 5 °C.
 Storage temperature
 -35 to 75 °C (-31 to 167 °F)

Humidity
 ≤ 0.3 dB error with 0 to 90% humidity at
 40 °C (104 °F)

Vibration
 An acceleration of 2 m/s² at 900 Hz will
 raise the noise floor 4 dB (A-weighting).

Magnetic Field
 80 A/m (1 Orsted) at 60 Hz will produce a
 nominal 30 dB SPL reading.
 (A, C, and flat weighting)

Microphone Extension Cable

No correction needed for cables ≤ 200 m.
 200 meter cable has < 0.1 dB loss when
 driven to 2.3 Vrms at 20 kHz.
 800 meter cable has < 0.1 dB loss when
 driven to 2.3 Vrms at 16 kHz.

Operational

Integrated Level Saturation 4.26 yr

Stabilization Time

10 or 50 s, depending on setup. Display shows an
 "S" at the upper right while the instrument is stabi-
 lizing.

Resolution

Current SPL 0.03 dB
 Level measurement 0.1 dB
 Dose measurement 0.01%
 Elapsed time 0.1 s

Keyboard (870 only)

36 multifunction physical keys
 4 cursor control
 3 edit
 10 numeric
 A-Z, a-z, and 17 other characters (69)
 12 function
 6 control

Display (870 only)

160 character, high contrast LCD
 40 characters per line, four lines
 Full ASCII alpha-numeric 0.22 in character
 height

Bar graph (870 only)

Quasi-analog, 117 dB range
 Bar graphs available for the following:
 1. SPL with Lmin, Lmax, TWA, and Lpk
 2. Time History
 3. Exceedance Time History

Run Time Display

Format: hhhh:mm:ss

Real-time Clock

24 hr format: hh:mm:ss

Calendar

100 yr (1989 to 2088)
 Format example: Mon 15Jan1992

Auto Run/Stop Timer

Three modes: Block, 1 per day, 2 per day

Data Communication

Two RS-232C interfaces
 8 bit ASCII, No parity, 1 Stop bit
 Baud Rate: 300, 600, 1200 . . . 19,200
 Addressable (1 to 127 on one computer)

Calibration (using the LARSON-DAVIS CA250)

Angle of incidence: 0°
 Sound Pressure Level 114.0 dB at 250 Hz
 Calibration automatically changes

from A- to C-weighting to accommodate 250 Hz calibrators. No change is made when in C or Flat.
 Range: 88 dB (lowest to highest sensitivity)
 The date and time of last calibration check and change are stored.

Measurements Displayed

Leq, L₉₀, L₅₀, L₁₀, L_{avg}, L_{eq} (24), Excd
 Leq, background Leq, L_{dn}, CNEL, SEL, SPL, ...
 L_{min}, L_{max}, L_{pk}, L_{wpk}
 Dose and Projected Dose (0.01% to 99999%)
 Choice of six L_n values
 Exceedances: TWA, L_{max}, L_{wpk}, and L_{pk}
 Overloads
 Occurrence Time for L_{min}, L_{max}, L_{pk}, L_{wpk}

Daily Community Noise

Hourly average noise level (HNL)
 automatically starts on the hour
 (partial values annotated)
 Day-night Average Sound Level (L_{dn}),
 Community Noise Exposure Level
 (CNEL), and 24 hr Average Noise Level
 (Leq 24) all calculated and stored
 each midnight.

Programmable Parameters

Detector
 Weight
 Microphone polarization
 Exchange rate
 Criterion
 Threshold
 Six values of L_n, displayed at one time
 Six L_n values measured
 RMS exceedance threshold
 Peak exceedance thresholds
 Two alarm dates
 Four alarm times
 Three alarm modes

Nonacoustic Inputs

Three linear inputs can be scaled and annotated.
 Exam.: wind-speed, temperature, and humidity
 8 bit A/D conversion (±1 bit)
 0 to 5 V input range
 Each exceedance report measures the extreme values of each channel
 Each interval report measures the average value and two extreme values of each input.
 Pulse counter input for windspeed.

Halt line

Four modes: pause, run/stop, run, and alarm

Nonacoustic Outputs

Heater control for LARSON-DAVIS 2100
 (open collector, 0 to 20 V, 100 mA max)

Calibrator ON/OFF control for LARSON-DAVIS 2100 (0 to 5 V through a 10 kΩ resistance)

Two general purpose logic output lines to indicate exceedances or to turn on a cassette tape recorder (open collector, 0 to 20 V, 100 mA max).

Additional Features

Internal temperature sensor

Direct report printing to serial printers

Automatic Power-off on low battery or after 12 min in STOP mode to preserve data

Powerful Logged Data Logic (LDL) function to recalculate data with new Threshold, Criterion, and Exchange Rate

Physical

Size 6½ x 2 x 9 in

Weight 3 lb, 12 oz

Options

Memory upgrade to 256K history RAM Opt. 22

Accessories Included

Soft side carrying case	0970.0006
Two battery holders	0285.0009
Six Duracell™ "AA" alkaline batteries	0255.0005
Two spare fuses	2415.0011
Two ½ in phone plugs (ac/dc out)	1145.0007
Preamp 5 pin jack	1145.0009
Male 15 pin "D" connector (A/D)	1175.0007

Male 15 pin "D" connector housing	1175.0008
Operators manual	1870.01
ac/dc adaptor, 9 Vdc, 500 mA	0195.0003
Calibration tool	6485.0003

Accessories Available

Microphones	
1/4 in free-field	2520
1/4 in random incidence	2530
1/2 in free-field	2540
1/2 in free-field high sensitivity	2541
1/2 in random incidence	2559
1/2 in random incidence high sensitivity	2560
1 in free field	2570
1 in pressure response	2575
Preamplifiers	
1/2 in	9008
1/4 in	9108
Adapters	
1 in mic to 1/2 in preamp	AD020
BNC connector to 1/2 in preamp	AD010
Microdot connector to 1/2 in preamp	AD015

Outdoor Accessories

Microphone Kit	2100K
Painted steel environmental housing	2171
Weather sensors	2140, 2141, 2142
Power systems	
AC	2175
Solar panel	2176

Other Accessories

Calibrator, 114 dB at 250 Hz	CA250
Hard-shell case	Opt 50
Hard-shell case, battery, and charger	Opt 51

Cables

Direct input	CB001
For IBM PC-XT™ w/daisy-chain	870-C01
For IBM PC-AT™ w/daisy-chain	870-C02
For IBM PC-XT™	870-C03
For IBM PC-AT™	870-C04
For RS-232 printer	870-C05
Microphone extension (xxx = length)	ECxxx
Microphone cable "T"	AD060

Warranty

LARSON•DAVIS warrants this product to be free from defects in material and workmanship for two years from the date of original purchase.

During the first year warranty period, LARSON•DAVIS will repair or, at its option, replace any defective component(s) without charge for parts or labor if the unit is returned, freight prepaid, to an authorized service center. The product will be returned freight prepaid.

During the second year warranty period, there will be no charge for replacement parts provided the product is returned to a LARSON•DAVIS repair facility.

Product defects caused by misuse, accidents, or user modification are not covered by this warranty.

No other warranties are expressed or implied. LARSON•DAVIS is not responsible for consequential damages.