



LARSON • DAVIS

MODEL 710 SOUND LEVEL METER NOISE DOSIMETER

① Definitions LEQ

Count on RMS Dist Report.

How can TWA1 be less than Minimum?
Levels below threshold drop 3dB every time doubling.

ver. 2.0 © 1989

Table of Contents

Introduction	1
Seventeen Different Measurements	1
Measurements for Dose 1:	
Measurements for Dose 2:	
Measurements for Leq:	
General measurements:	
Measuring Accuracy	1
Architecture	1
Analog/Digital Features	
Annotated Display	
Printer/Computer Interface	
Rugged Design	2
Security	2
Theft Protection	
Locked Keyboard <i>see page 8</i>	
Data Storage	
Error Messages	
Included Accessories	3
Model 710M	3
Keys and Display Functions	5
Keys	5
ON and OFF Functions	6
Measure and Display Functions	6
Printing Functions	7
Auxillary Functions	8
Customized Functions (ver. 2.0+)	8
Parameter Modification Function	
New Display Function	
Calibration	11
When to Calibrate	11
Procedure Using the CA250,	11
Specifications	13
Acoustical and Electrical	13

Standards Met	13
Environmental	13
Memory Saturation	13
Physical	14
Warranty	14

Appendix A

User 1 Printout	17
---------------------------	----

Appendix B

User 2 Printouts	21
----------------------------	----

Appendix C

Bidirectional Control	31
Connection to an External Device	31
Communications Specifications	31
RS-232Commands	31
Mode Command	
Query Command	
Read Command	
Data and Set Commands	
Print Report Commands	
Sample Programming Statements	33
Programming Precautions	

Introduction

LARSON•DAVIS has combined the latest microprocessor technology with an advanced analog instrumentation circuitry to produce a small, battery operated instrument without sacrificing features or operating accuracy. This manual has been written to help you use the features of the 710 to their fullest.

Seventeen Different Measurements

Designed for routine applications, the Model 710 provides two values of dose, projected dose, and time-weighted average (TWA) simultaneously. A third TWA is available with the L_{eq} function. The convenience of more than one dose at the push of a key allows the user to verify both of OSHA's requirements (80 dB and 90 dB threshold) with one measurement.

Measurements for Dose 1:

- Dose 1
- Projected Dose 1
- Time Weighted Avg 1

Measurements for Dose 2:

- Dose 2
- Projected Dose 2
- Time Weighted Avg 2

Measurements for L_{eq} :

- Integrated Sound Level (L_{eq})
- Sound Exposure Level (SEL)

General measurements:

- Instantaneous Sound Pressure Level
- Maximum rms Level (L_{max})
- Minimum rms Level (L_{min})
- Peak Level, Unweighted
- Total Measurement Time
- Time over 115 dBA rms

- Time over 140 dBL peak
- Number of Overloads
- Battery Life in Percent

Measuring Accuracy

Ambient noise levels in the work place environment can range from very small to very large SPLs over short intervals of time. Noise impulses (caused by pneumatic tools, punch presses, steam valves, explosions, etc.) can instantaneously raise ambient noise levels to very high SPLs.

The dynamic range of a sound level meter is defined as a measure of the dB ratio between the largest and smallest measurable signal within a single range setting. Dynamic range is a key indication of the ability of an instrument to accurately respond to any changes in noise levels, regardless of how impulsive the noise is.

The 710 provides a full 110 dB dynamic range, which eliminates the need for range switches and prevents the loss or inaccurate measurement of data due to overload, under-range, or autorange errors. The dynamic impulse response is so advanced that the energy of a single 1 ms pulse can be accurately captured.

Architecture

A block diagram showing the major analog and digital sections of the Model 710 is shown in Figure 1.

Analog/Digital Features

The frequency response weighting implemented is A-weight. In addition to the Integrating RMS Detector, a separate Linear Peak Detector circuit with 40 dB dynamic range (nominally 113 to 153 dB) is provided to make detailed analysis of impulsive exposure possible.

The detected analog signals are converted to numeric form (as needed by the Digital Processor) by the Analog-to-Digital Converter.

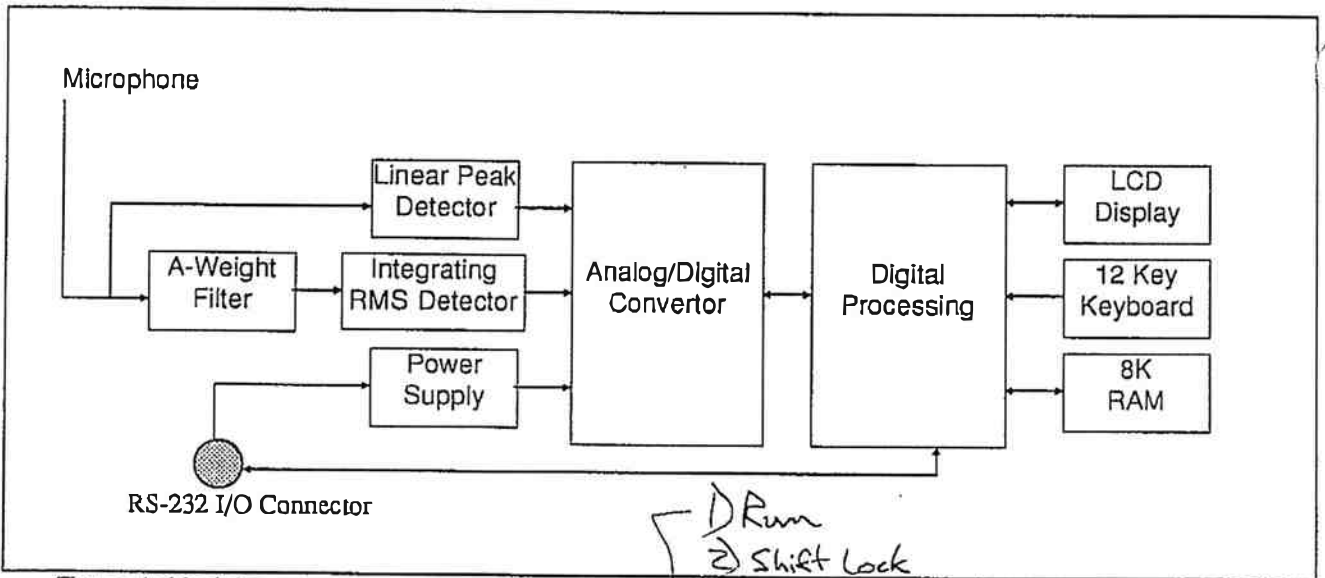


Figure 1: Model 710 Block Diagram

Annotated Display

LARSON-DAVIS designed a mistake-proof liquid crystal display for data readouts which shows the function key pressed along with the parameter value and proper units. Errors due to pushing the wrong button and misunderstanding what the display represents are virtually eliminated. For example, see Figure 2 which shows a "DOSE 2" value of 38.9% for measurement two.

Printer/Computer Interface

The 710 has an RS-232 port which allows downloading to a printer for a neatly formatted one-page report or to a computer for data filing and customized reporting.

Rugged Design

With its sealed keyboard and rugged case design, the 710 can perform well in harsh environments. Tested at very high and low temperatures and humidity, it is certified to hold its superb accuracies in extreme conditions.

All electronic circuits are completely enclosed with noise-reducing copper shields, which enable the 710 to measure very low sound pressure levels. The copper shields also minimize EMI and RFI radiation influences allowing its use in power plants and other high radiation areas. UL intrinsic safety certification is an option available.

1) Run
 2) Shift Lock
 3) enter 4 digits
 4) push SLM or other key

Security
 5) To unlock push 4 digits

Theft Protection

Embedded in the memory of each meter is the company name, the meter's serial number, and the software revision level. These are printed on all reports to identify product ownership and to deter theft or product misuse.

Locked Keyboard

See Page 8

The 710 keyboard can be locked by pushing the "LOCK" key and entering 4 numbers. The keyboard will be inoperative until these same few numbers are again entered.

With the four lock numbers flashing the 710 will lock in the mode of the next key pressed and stay there until the lock sequence numbers

Data Storage

Measured values are stored in virtual memory for several months or until the operator performs an intentional reset. Data will even survive low batteries and battery changes.

Many safeguards to prevent memory loss have been designed into the 710:

- (1) The battery display label will flash when the battery is low;
- (2) the operator can check the battery's condition by pressing the BATT key;
- (3) a capacitor maintains RAM during battery change; and
- (4) the 710 automatically goes into the power-off state when a new battery is installed.