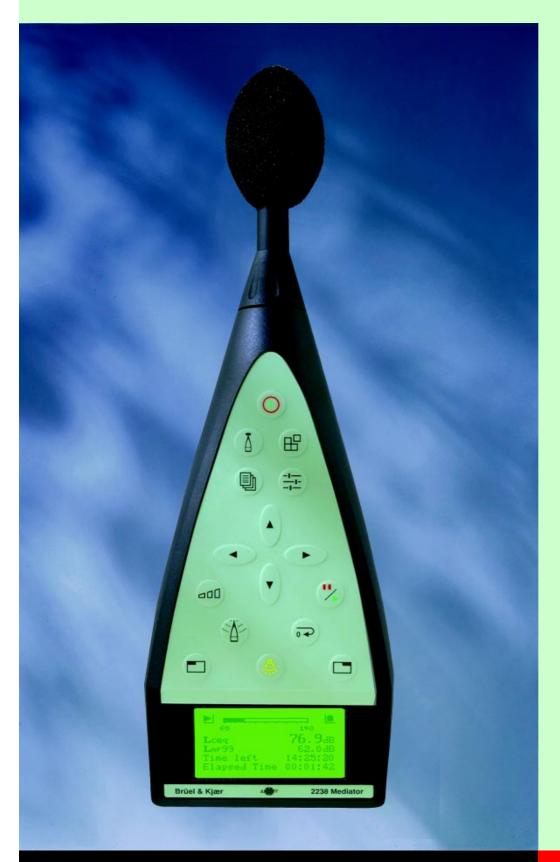# PRODUCT DATA

2238 Mediator with Logging SLM Software BZ 7124

When loaded with Logging SLM Software BZ 7124, the 2238 Mediator becomes a dedicated logging SLM capable of logging up to ten user-selectable parameters in a rich 2 Mbytes of memory. At the same time, it can log two extra signals via the Mediator's external DC inputs.

The logging software also supports input and output triggers, as well as a marking function for distinguishing between different types of noise occurrences in logging files.

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Uses

❍ Investigation of environmental noise (short-term, medium-term and long-term)

❍ Analysis of environmental noise using short-term L_{eq}

❍ Determination of Rating Level (L_r)

Dedicated Logging

Logging SLM Software BZ 7124 focuses the full power of the 2238 Mediator on the task of logging. Working with data provided by the Enhanced SLM Software package (BZ 7125), the logging software lets you select up to ten parameters for logging. In addition, you can log two extra signals through the Mediator's external DC input. This is useful for monitoring wind speed, for example, or logging a DC-converted tally of vehicle pass-by's.

All logged parameters are available for display during measurement. When the measurement ends, the logging file contains the parameter values with a time stamp for each logged period, plus time-stamped markers and calibration data. It is also possible to store overall statistics for the total measurement time.

Flexible Measurements

Logging Interval

For typical applications, where the logging interval is on the order of seconds or minutes, the software supports full logging (ten parameters plus two extra DC signals). In this case the interval can be set to any value in the range of one second to one hour.

For more specialised measurements, the interval can be set to 100 ms. With this set-up, it is possible to log L_{Xeq} (using a 12 ms time constant) and the external DC values.

File Size

On top of providing plenty of memory (a full 2 Mbytes), Logging SLM Software BZ 7124 allows you to store multiple files of "any" size on the Mediator. The only limit is the actual amount of memory that's available. So instead of having to download after every logging, you can make several measurements in the field and then transfer everything over to a PC in one shot back at the office. Or if you carry a laptop, you can bypass the internal memory and load data directly to the PC while measuring.

Trigger Control

As an alternative to setting up a predetermined logging interval, the logging software lets you control measurements with the input trigger. By running a signal from the noise source to the input trigger, for example, you can cause the Mediator to make a logging measurement

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when the source switches on. An output trigger is also available. This signal is output via the Mediator's **Aux 2** socket upon measurement start.

Input/Output

The logging package makes very flexible use of the Mediator's two input/output sockets. For details of the various functions that can be assigned to these sockets, see the specifications.

Built-in Convenience

Four Distinct Markers

Logging SLM Software includes four types of marker for keeping track of various kinds of noise in measurement files. These are activated through keys on the Mediator. When a marker key is pressed during a measurement, a marker is immediately attached to the current data and saved in the file. Markers can be used to highlight anything. For example, you might want to use one kind of marker to indicate areas that are to be deleted during post-processing, and use the remaining three types to indicate specific kinds of events (a truck driving by, a compressor turning on, etc.).

Measurement Control

The logging software uses the Mediator's real-time clock to support pre-programmed measurement control. It is possible to set up a complete measurement in advance with a start time, stop time and all measurement details (range setting, logging rate, etc.).

Automatic "Time Remaining" Check

During measurement set-up, Logging SLM Software displays the maximum possible measurement time, based on the number of parameters selected, the logging rate, available memory and other relevant settings. This value is automatically updated as you make your set-up selections.

Specifications 2238 with BZ 7124

Specifications apply to the 2238 Mediator fitted with the supplied microphone and preamplifier and running the following software:
- Basic SLM Software (supplied as standard with each 2238 Mediator)
- Logging SLM Software BZ 7124

STANDARDS:
Conforms with the following:
- IEC 651 – 1979 Type 1 I, EN 60651 Type 1 I
- IEC 804 – 1985 Type 1, EN 60804 Type 1
- Draft IEC 1672 / EN 61672 – April 1997 Class 1
- ANSI S1.43 – 1983 Type S1

SUPPLIED MICROPHONE:
Type 4188 Prepolarized Free-field $1/2''$ Condenser Microphone
Nominal Sensitivity: – 30 dB
Frequency Range: 8 Hz – 16 kHz ± 2 dB
Capacitance: 12 pF

MICROPHONE PREAMPLIFIER:
ZC 0030
Extension Cables: Available in lengths of 3 m and 10 m

MEASURING RANGES:
Linear Operation Range: 80 dB, adjustable to give full-scale readings from 100 to 140 dB in 10 dB steps
Max. Peak Level: 3 dB above full scale reading
Upper Limit (RMS) for Crest Factor = 10: 17 dB below full scale reading

DETECTORS:
Simultaneous detection of RMS and Peak with independent frequency weightings

Specifications (cont.)

RMS: Three simultaneous exponential time weightings (Fast, Slow, Impulse) and a linear averaging detector. Selectable frequency weighting A, C or Lin

Peak: Selectable frequency weighting C or Lin

Overload Detector: Monitors all the frequency weighted channels

Exchange Rate: 3 dB. In addition, 4 or 5 dB can be selected

Criterion Level: Can be set to OFF or in the range 70 – 140 dB

Threshold Level: Can be set in the range 0 – 120 dB

DISPLAY:
128×64 dot matrix display with backlight

Measurement Display: Range and quasi-analogue bar, plus four measurement parameters that can be freely selected from all available parameters during measurements

CALIBRATION:
Can be performed using Sound Level Calibrator Type 4231 or Multifunction Acoustic Calibrator Type 4226. Initial calibration is stored for comparison with later calibrations

Calibration History: 20 latest calibrations

MEASUREMENTS:
The available measurement parameters are listed below. RMS and Peak measurements run in parallel with individual frequency weightings

Symbol Key:
V: Frequency weighting C or L
X: Frequency weighting A, C or L
Y: Time weighting F, S and I
Z: Time weighting F and S
Q: Exchange rate = 4 or 5 dB

Detector 1	Detector 2
RMS	RMS
Stored	
L_{Xeq}	L_{Xeq}
L_{XIeq}	L_{XIeq}
L_{XYmax}	L_{XYmax}
L_{XYmin}	L_{XYmin}
L_{T5}	
L_{Tm5}	
$L_{Aep,d}$	
L_{AE}	
E_A	
L_{XZavQ}	
$L_{XYN,T}$	
Overload%	
Underrange%	
Elapsed Time	
Instantaneous (display only)	
L_{XYInst}	L_{XYInst}
L_{XYp}	L_{XYp}

(continued)	
Detector 1	Detector 2
RMS	Peak
Stored	
L_{Xeq}	L_{Vpkmax}
L_{XIeq}	Number of peaks
L_{XYmax}	
L_{XYmin}	
L_{T5}	
L_{Tm5}	
$L_{Aep,d}$	
L_{AE}	
E_A	
L_{XZavQ}	
$L_{XYN,T}$	
Overload%	
Underrange%	
Elapsed Time	
Instantaneous (display only)	
L_{XYInst}	L_{Vpk}
L_{XYp}	

Note 1: When both detectors are set to RMS, it is not possible to select the same frequency weighting for the two detectors.

Note 2: Time weightings F, S and I are available simultaneously.

Note 3: If the Aux 1 or Aux 2 socket is used for input, the signal(s) can be displayed and logged.

Note 4: Values for statistics are sampled 40 times a second and are derived from the signal on Detector 1 with a preselected time weighting (F, S or I). The class width is 0.5 dB. Seven percentiles ($L_{XYN,T}$) are available during measurement at user-selectable levels (1% – 99%). A complete level distribution is stored.

INHERENT NOISE LEVEL:
This is due to the combination of electrical noise and microphone thermal noise at 20° C (68° F). Typical values with supplied microphone of nominal sensitivity (in dB):

Weighting	Electrical noise (2238)	Thermal noise (4188)	Combined Noise
"A"	14	14.5	17.4
"C"	17	13.2	18.5
Lin. 5 Hz – 20 kHZ	22	14.2	23

MEASUREMENT CONTROL:
Manual control, or pre-set measurement time with automatic storage of measurement

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Specifications (cont.)

Measurement Sequences:
The Mediator can be set up to make a sequence of individual logging measurements (up to 99) in immediate succession
Timers
The Mediator supports a total of four timers which allow set-up of measurement start times up to a month in advance

MEMORY:
2 Mbytes. Up to 500 measurements can be stored, including time stamp, complete set-up and calibration data

SERIAL PRINTER:
Measurement data can be printed on Portable Printer Type 2322 or on an IBM Proprinter-compatible printer

Aux 1 SOCKET:
Connector: 2 pin LEMO. Can be used as an AC output or a DC input for an external signal
AC Output Signal:
Range-adjusted AC output, unweighted or with the frequency weighting selected on RMS detector 1. Short-circuit protected
Output: 1 V RMS corresponding to full-scale indication
Max. Load: 10 kΩ || 1nF
Output Impedance: Typically 100 Ω
DC Input:
Voltage Range: 0 to 4 V (max. –1 to 6 V)
Resolution: 5 mV (800 steps)

Aux 2 SOCKET:
Connector: 2 pin LEMO. Can be used as a DC output, a DC input for an external signal, a trigger input or a trigger output
DC Output Signal:
DC version of the signal on RMS detector 1 (Fast, Inst). Short-circuit protected
Output: 0 to 4.0 V DC (50 mV/dB)
Update Rate: 160 times per second
Max. Load: 10 kΩ || 1nF
Output Impedance: Typically 100 Ω
DC Input:
Voltage Range: 0 to 4 V (max. –1 to 6 V)
Resolution: 5 mV (800 step)
Trigger Input:
Voltage Range: 0 to 4 V (max. –1 to 6 V)
Trigger Level: $\cong 2$ V
Trigger Output:
Level: 4 V
Duration: Throughout measurement

CLOCK:
Real-time (calendar)

SERIAL INPUT/OUTPUT:
Conforms to EIA/TIA 574 (RS232), coupled as Data Terminal Equipment (DTE). Cable is supplied with the 2238 Mediator
Connector: 9-pin D-type male
Baud Rates: 4800, 9600 and 19200. (38400 and 115200 for file transfer)
Word Length: 8 bits, no parity, 1 stop bit
Handshake: XON/XOFF, hardwired, modem

SETTLING TIME:
From Power On: < 10 s

ENVIRONMENTAL EFFECTS:
Storage Temperature: –25 to +60° C (–13 to +140° F)
Operating Temperature: –10 to +50° C (14 to 122° F)

Effect of Temperature: < 0.5 dB (–10 to +50° C)
Effect of Humidity: < 0.5 dB for 30 % < RH < 90 % (at 40° C, 1 kHz)

CE	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive.
EMC Emission	**EN 50081–1:** Generic emission standard. Part 1: Residential, commercial and light industry. **EN 50081–2:** Generic emission standard. Part 2: Industrial environment. **CISPR 22:** Radio disturbance characteristics of information technology equipment. Class B Limits. **FCC Rules, Part 15:** Complies with the limits for a Class B digital device.
EMC Immunity	**EN 50082–1:** Generic immunity standard. Part 1: Residential, commercial and light industry. RF immunity implies that sound level indications of 45 dB or greater will be affected by no more than 0.5 dB. **EN 50082–2:** Generic immunity standard. Part 2: Industrial environment. RF immunity implies that sound level indications of 60 dB or greater will be affected by no more than 0.5 dB.
	These levels of immunity are 14 dB better than required by IEC 1672.

Note: The above conformance is guaranteed only when using accessories listed in this Product Data sheet.

BATTERIES:
Four 1.5 V LR6/AA alkaline cells
Lifetime (at room temperature): Typically > 8 hours

EXTERNAL DC POWER SUPPLY:
Voltage: regulated 7 to 14 V
Power: approximately 120 mA at 7 V

WEIGHT AND DIMENSIONS:
460 g (with batteries), 257 × 97 × 41 mm

LANGUAGE:
Each instrument is loaded with English, German, French, Italian and Spanish text. You can select any of these languages at any time

Additional Specifications for 2238-C-002 (version with filter set installed)

With the filter set installed, $^1/_1$-octave bands and $^1/_3$-octave bands can be selected as frequency weightings for the RMS detectors

STANDARDS:
Conforms with the following:
- EN 61260/IEC 1260 (1995) Octave and $^1/_3$-octave Bands Class 1
- ANSI S1.11-1986 Octave and $^1/_3$-octave Bands, Order 3, Type 1D

MEASURING RANGES:
Two Additional Ranges: Full-scale readings of 80 and 90 dB

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Specifications (cont.)

OCTAVE AND $^1/_3$-OCTAVE BAND FILTERS:
Nominal Octave Band Centre Frequencies: 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz and 8 kHz
Nominal $^1/_3$-octave Band Centre Frequencies: 20 Hz, 25 Hz, 31.5 Hz, 40 Hz, 50 Hz, 63 Hz, 80 Hz, 100 Hz, 125 Hz, 160 Hz, 200 Hz, 250 Hz, 315 Hz, 400 Hz, 500 Hz, 630 Hz, 800 Hz, 1 kHz, 1.25 kHz, 1.6 kHz, 2 kHz, 2.5 kHz, 3.15 kHz, 4 kHz, 5 kHz, 6.3 kHz, 8 kHz, 10 kHz and 12.5 kHz

BATTERIES:
Lifetime (at room temperature):
With filter selected: Typically > 6 hours

Ordering Information

Type 2238 – C – 001:
2238 Mediator sound level meter with Basic SLM Software, Enhanced SLM Software BZ 7125 and Logging SLM Software BZ 7124
Type 2238 – C – 002:
2238 Mediator sound level meter with Basic SLM Software, Enhanced SLM Software BZ 7125 and Logging SLM Software BZ 7124, plus $^1/_1$-octave and $^1/_3$-octave filter set

Accessories Included:

Type 4188:	Prepolarized Free-field $^1/_2$″ Condenser Microphone
ZC 0030:	Microphone Preamplifier
AO 1386:	9-pole Cable with 25-pole Adaptor (for computer and serial printer)
KE 0323:	Shoulder Bag
UA 1236:	Protective Cover
QB 0013:	4 Alkaline Batteries

Optional Accessories

Type 7815:	Noise Explorer™ Software
Type 7825:	Protector™ Software
Type 7820/21:	Evaluator™ Software
Type 4231:	Sound Level Calibrator
Type 4226:	Multifunction Acoustic Calibrator

Type 2322A:	Portable Printer (European version)
Type 2322B:	Portable Printer (UK version)
Type 2322C:	**Portable Printer (US version)**
UA 1251:	Tripod
UA 0237:	Windscreen (90 mm)
AO 0560/0409:	Microphone Extension Cable (10 m)
AO 0561/0408:	Microphone Extension Cable (3 m)
UA 1254:	Microphone Cable Holder (for tripod)
UL 0064:	Interface Module (serial to parallel converter)
AO 0403:	LEMO to BNC Cable (output/input cable)
ZG 0386:	Power Supply (European version)
ZG 0387:	Power Supply (UK version)
ZG 0388:	Power Supply (US version)
KE 0325:	Carrying Case (with insert for sound level meter, Calibrator Type 4231, Portable Printer Type 2322 and Tripod UA 1251)

Upgrades:

2238 MUF:	$^1/_1$-octave/$^1/_3$-octave Filter Set
BZ 7123:	Frequency Analysis Software (requires 2238 MUF filter set)

Services Available with Delivery:

2238 CAF:	Accredited Calibration
2238 CAI:	Accredited Initial Calibration
2238 CAP:	Accredited Calibration with Precalibration

Brüel & Kjær reserves the right to change specifications and accessories without notice

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