PRODUCT DATA

Modular Precision Sound Analyzer — 2260 Investigator™ including BZ 7206 and BZ 7210 Sound Analysis Software

2260 Investigator™ is a battery-operated, hand-held, programmable sound analyzer. Its embedded operating system, based on a PC architecture, is closely integrated with a digital signal processor (DSP) and two-channel microphone conditioning electronics, all together creating a versatile platform for high-quality real-time sound analyses.

Like a personal computer, 2260 Investigator is driven by application software for various tasks. Every 2260 Investigator is shipped with Basic Sound Analysis Software BZ 7210 that makes the instrument into a precision sound level analyzer. Other applications available for 2260 Investigator include:

- Noise Profiles (BZ 7203)
- Building Acoustics (BZ 7204)
- Sound Intensity (BZ 7205)
- Enhanced Sound Analysis (BZ 7206)
- Room Acoustics (BZ 7207)
- FFT Analysis (BZ 7208)

The potent combination of quality hardware and unique application software ensures that 2260 Investigator remains the world's most advanced hand-held sound analyzer.

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2260/BZ 7206/BZ 7210

Brüel & Kjær

USES

- ❍ Comprehensive sound measurements
- ❍ Detailed octave and 1/3-octave band analyses
- ❍ Noise monitoring
- ❍ Appraisal of noise reduction efforts
- ❍ Gathering field-data for further analyses
- ❍ Research and development

FEATURES

- ❍ IEC and ANSI Type 1 sound level meter
- ❍ 6.3 Hz – 20 kHz frequency range in real-time 1/3-octave bands
- ❍ Broadband statistics
- ❍ On-line annotation and data exclusion
- ❍ Control of sound recording on a PC
- ❍ Logging rates down to 1 s
- ❍ Remote operation via modem link
- ❍ Automatic Charge Injection Calibration (CIC) check
- ❍ Spectral statistics*
- ❍ Automatic event logging*
- ❍ Logging rates down to 100 ms*

Introduction and Overview

2260 Investigator™ is a precision sound analyzer based on a unique platform concept. The platform has generous hardware and software specifications (see the specifications pages) creating an extremely flexible instrument to cover all your current and future sound analysis needs. This Product Data describes 2260 Investigator with Basic Sound Analysis Software BZ 7210 (always included with the instrument) and Enhanced Sound Analysis Software BZ 7206 (optional).

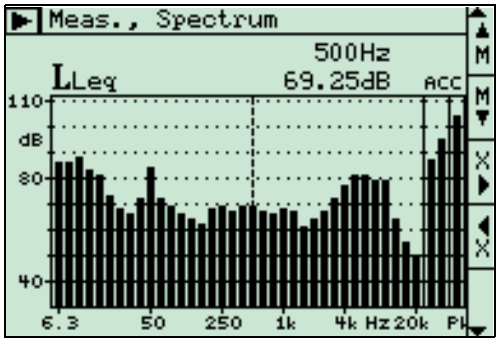

Fig. 1
Real-time 1/3-octave spectrum display

With Sound Analysis Software BZ 7210 or BZ 7206 running, the analyzer becomes a Type 1 sound level meter capable of real-time 1/3-octave frequency analysis with broadband and spectral* statistical distributions. Also included are facilities for sound recording to a PC and automatic Charge Injection Calibration (CIC) for checking the microphone condition. Measurements may be programmed using automatic sequences or timers.

Styling

The slim shape of 2260 Investigator has a purpose beyond good looks: the effect on the sound field is minimised, assuring accurate sound measurements when mounted on a tripod. Fig. 2 shows the effect of the analyzer's casing on frequency response,

*. BZ 7206 only

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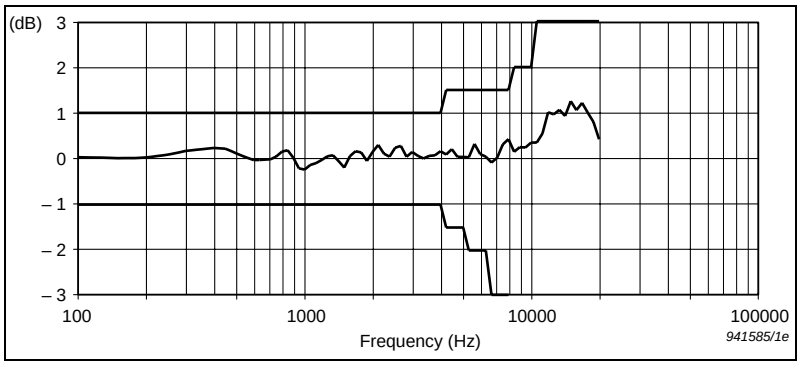
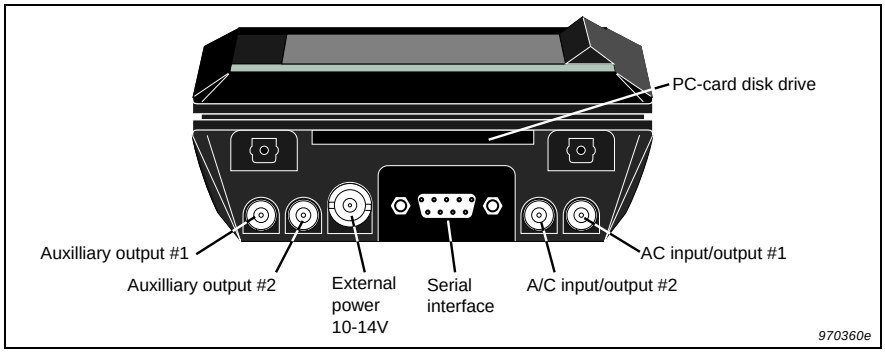
together with IEC Type 1 tolerances (shown as a mask). Notice how well the actual response lies within the maximum allowed for Type 1.

Fig. 2
Effect of the analyzer's casing on frequency response. Mask shows IEC Type 1 tolerances



Inputs and Outputs Available

Fig. 3
The inputs and outputs of 2260 Investigator



Microphone/Input Stage – 2260 Investigator is supplied with a Falcon™ Range ½″ microphone and input stage that conform to IEC and ANSI Type 1 standards. The input stage is able to drive an extension cable of up to 100 m, a valuable feature when a measurement requires remote location of the microphone, for example when using Outdoor Microphone Kit UA 1404.

AC Input/Output – This can act as either an analogue input or output, for example when sending DAT recorded signals into 2260 Investigator for further analysis.

Aux. Outputs – There are two of these, one for each channel. These can be set up independently for use with level recorders, triggering DAT recorders, sound recording in combination with Brüel & Kjær PC-software, or monitoring the microphone signal.

PC-card Disk Drive – By saving measurement files on Flash Memory Card UL 1008 inserted into 2260 Investigator you are able to rapidly transfer your data to a PC fitted with a standard PC-card (PCMCIA) slot.

Serial Interface – 2260 Investigator has an RS–232 standard serial interface that allows data transfer and remote control of the instrument, typically using one of the Type 78xx programs in the PC software suite available from Brüel & Kjær.

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Calibration Features Available

Whenever measuring sound, calibration of the system before and after measurement is an essential part of the process. Basic Sound Analysis Software BZ 7210 has several features to ensure your measurements are reliable.

- **Internal Calibration –** The internal calibration method uses a stable, internal electrical reference signal to directly excite the preamplifier output. The whole measurement chain, except the microphone and preamplifier, is calibrated in this way. By entering the microphone's sensitivity, a very quick and reliable calibration is possible.
- **External Calibration –** The external method requires the microphone to be coupled to a stable reference acoustic sound source, such as Brüel & Kjær's Sound Level Calibrator Type 4231, Pistonphone Type 4228, or the Multifunction Acoustic Calibrator Type 4226. This method calibrates everything in the measurement chain and is recommended for routine calibration in the field.
- **Initial and Accredited Calibration –** Each analyzer "remembers" its initial calibration together with the serial number of its microphone and will report any deviation from this Initial Calibration. An Accredited Initial Calibration is done only at the factory. If you need one, or need to renew the one in your analyzer, contact your Brüel & Kjær representative.
- **Manual or Automatic Charge Injection Check (CIC) –** CIC allows the analyzer to monitor the measurement chain right from the microphone diaphragm (see Fig. 4). When you perform an Internal or External Calibration, a reference CIC is also automatically made and the result stored as a reference. Later you may manually initiate a CIC and compare it to the reference. A stable CIC ratio assures stable operation of microphone, cable, preamplifier and the remaining measurement system.

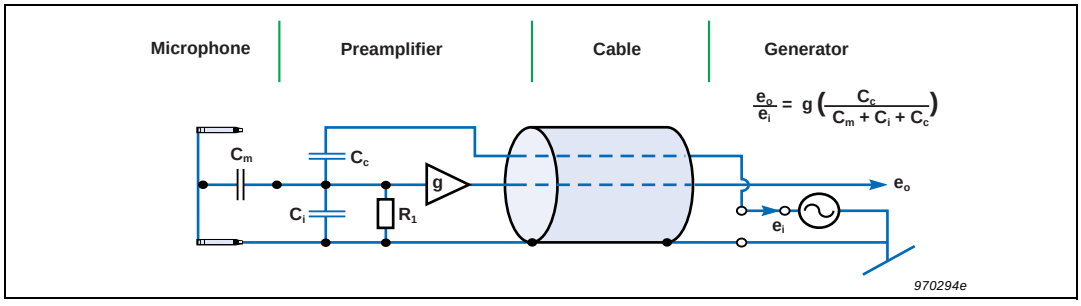

Fig. 4
Charge Injection Check. Capacitor C_c is fed with voltage e_i. The ratio e_o/e_i is constant when g, C_c, C_m and C_i are constant. Changes to any of them will change e_o/e_i, and hence indicate probable changes in calibration

Making Measurements

You can see from the specifications pages that 2260 Investigator can measure an impressive array of discrete, spectral and statistical parameters based on various combinations of time and frequency weightings, filtering, detection of peaks, and so forth. However many parameters you select to measure with 2260 Investigator, they will all be measured concurrently. Serial measurements that are expensive and time-consuming (or downright impossible!) are simply not necessary.

Each parameter can be regarded as a position in a multi-point array continuously being updated. While viewing a spectrum, you can easily see how any of the other parameters are developing, for example, the values of L_N, (broad-band) or L_{Ceq}–L_{Aeq} (an indication of low frequency content). Such analysis techniques are advantageous when the sound source is complex and you need on-the-spot tonal information, for example when choosing hearing-protection aids.

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Viewing and Display

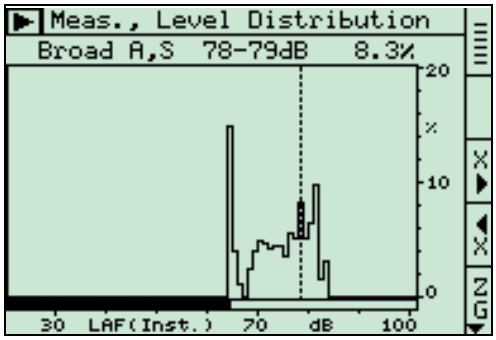

Fig. 5
A level distribution display snapshot showing the current statistics during a measurement

2260 Investigator's real-time digital signal processor (DSP) allows you viewing access at any time to all the parameters measurable. During measurement, or when a set of measurements are in the memory, you can view the data in a number of ways. Spectral data (in octave or 1/3-octave bands) and statistical data (level and cumulative distributions) can be displayed graphically, complete with display zoom and cursor facilities.

When you've made your measurements, you can store the final results in a file to view them later on the analyzer, or examine them further using one of the 2260 platform's extensive range of PC-based software packages.

Markers

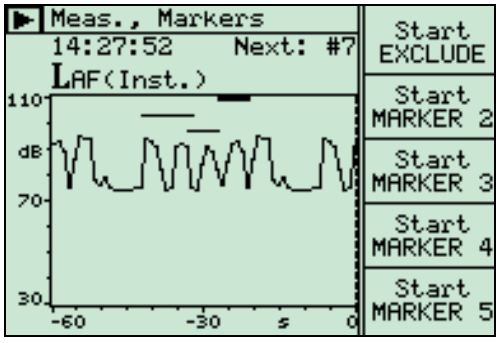

Fig. 6
2260 Investigator screen showing three of the markers

Marker "soft" keys allow you to identify specific measurement conditions. There are four markers plus an "EXCLUDE" marker. You can name these marker keys to aid in identifying what type of condition is present. For BZ 7206, the marker duration can be edited on-screen up to one minute after the occurrence has taken place. The markers are saved at the same time as your measurement data and, if sound recording is activated, a .wav file is saved on your PC (see below).

The markers can be seen on a PC when the data has been transferred to Noise Explorer Type 7815, Evaluator Type 7820 or Protector Type 7825. Markers can be selected in any order and for any duration. You can set all the markers to finish automatically after a pre-defined time or set to continue until you stop each one.

PC Sound Recording

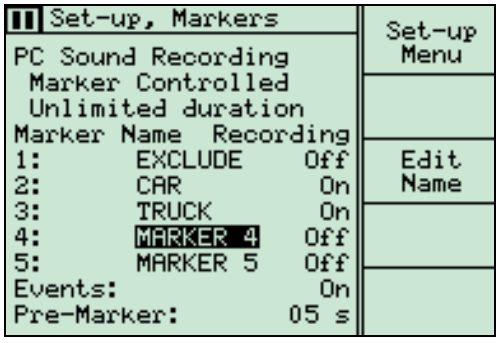

Fig. 7
The "CAR" and "TRUCK" markers have been tagged to start sound recording when they are active

To be sure of what had caused a marked event, you can record sound directly onto your PC's hard drive using Noise Explorer Type 7815, Evaluator Type 7820 or Protector Type 7825. These allow 2260 Investigator to control sound recording on the hard disk while making measurements. The only limit to duration is the size of the hard disk. There is a 60 s sound buffer in the PC to permit editing of markers up to 1 minute after the occurrence has taken place (BZ 7206 only).

Sound recording can be tagged to one or more markers (see Fig. 7). Recordings are time stamped and stored as .wav files. After transferring the measurement data from 2260 Investigator to Type 7815/20, the data are automatically merged with the sound recordings. The sound recordings are then marked in the profile display of Type 7815/20/25 and can be replayed.

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DAT Recording

You can also use the DAT recording facility offered by 2260 Investigator, where the microphone's signal is fed directly to tape. 2260 Investigator can remotely trigger the DAT to start and stop recording. From stand-by mode, the DAT recorder starts recording within 1–2 s.

DAT recording can be set to occur only during an event or during the entire measurement.

Logging

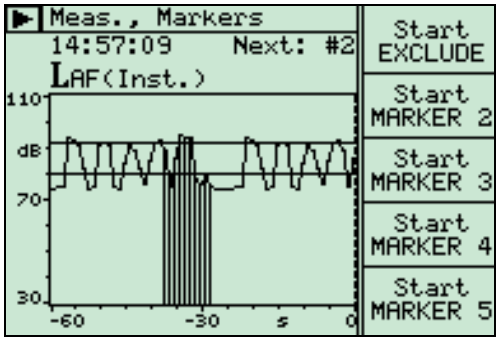

Fig. 8
BZ 7206 screen showing a logged profile with an event

You can start single measurements manually or automatically repeat sequences of a single measurement. You can also select "Logging" or "Event Logging" (BZ 7206 only) Logging allows 2260 Investigator to measure background sound levels using a set of defined parameters. For BZ 7206, if triggered by an event, another set of parameters can be defined for the duration of the event (event logging). In this way you can have a higher resolution record of the noise levels during the event.

Event Threshold in BZ 7206

To prevent transients causing a large number of events, a time limit (in 1 s intervals) can also be imposed on the threshold. For an event to be "logged" it must exceed the threshold for more than the time limit. To ensure that the start of the event is not missed, measurement data is also delayed. Events can also be triggered remotely via the RS–232 interface (by sending the appropriate start/stop command), by using a remote control connected to 2260 Investigator, or by pressing a "soft" key.

Unattended Monitoring and Remote Access

Fig. 9
Outdoor Gear Type 3592

For noise monitoring in out-of-the-way places, Outdoor Gear Type 3592 offers security and weather-protection for 2260 Investigator. The modular system consists of a weatherproof case, outdoor microphone kit, microphone extension cable, microphone tripod or mast, sealed lead-acid battery, charger for battery, DAT recorder (not supplied by Brüel & Kjær), and cables for interconnection.

Safe and dry in its robust, heat reflecting, bright yellow case, the analyzer will operate unattended for more than 3 days. For longer periods, the battery can be changed without interrupting measurements. You can also save yourself a site visit by using the landline or wireless modem dial-up facility to collect your results. The Type 3592 case has a space for the modem/mobile phone, and is transparent to radio waves.

Evaluator Type 7820 software on your PC controls the communication process and allows measurement files to be downloaded directly to your PC's hard disk, thus freeing space for more results.

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Building Acoustics

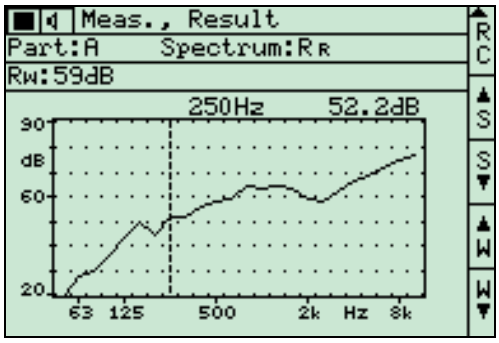

Fig. 10
Building partition measurement results showing a Sound Reduction Index spectrum, R, and Weighted Sound Reduction Index, R_w. Both parameters are calculated by 2260

For building acoustics measurements, choose 2260 Investigator with Building Acoustics Software BZ 7204. When your measurements are complete, you can, for example, immediately see the sound reduction index or the reverberation decay curve on the analyzer's screen. For workplace noise reduction and the determination of room corrections, choose Reverberation Time Software BZ 7207. For more in-depth analysis and comprehensive reporting, choose Qualifier™ Type 7830 software which is dedicated to working directly with data supplied by BZ 7204 and BZ 7207.

Sound Intensity

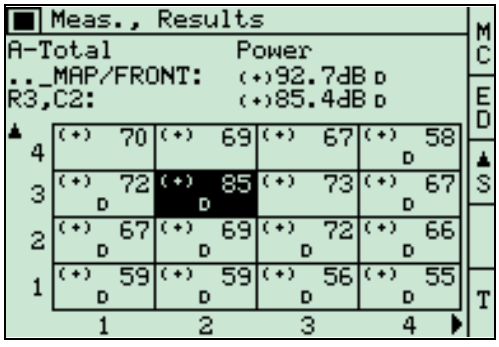

Fig. 11
Sound power measurement results for a 4 × 4 grid

BZ 7205 software is dedicated to measuring sound intensity and calculating Sound Power. Install this application in your 2260 Investigator, mount the probe, and you have a complete sound intensity measuring system that is truly portable. And because the intensity probe is an integral part of the instrument, there are no wires to get tangled up when measuring in out of the way places. The on-screen display guides you through, for example, the required measuring grid, and if there is any uncertainty about the validity of a measurement, BZ 7205 software will prompt you to redo it without jeopardising the rest of the total measurement.

FFT Analysis

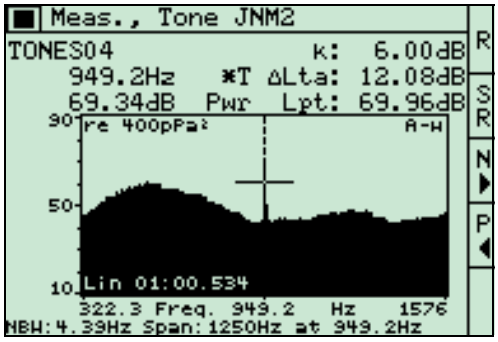

Fig. 12
A tonal assessment of an FFT spectrum using the built-in JNM2 algorithm. The most prominent tone has been found at 949.2 Hz

Use BZ 7208 software in your 2260 Investigator for sound or vibration FFT analysis when investigating machinery, for troubleshooting, pure tone investigation, product development, quality control and building vibration analysis. This unique, hand-held FFT analysis system gives you single-channel, real-time operation (no data loss) with internal and external triggers. You can measure transient and continuous signals with a maximum frequency span of 20 kHz (minimum 156 Hz).

There are 429 lines (better than 50 Hz resolution at 20 kHz span), and you can zoom down to better than 0.5 Hz resolution. You can see FFT autospectra, Lin or A-weighted, and compare a measured spectrum to stored reference spectra. PC software is also available for analysis, reporting and archiving.

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Data Management and Reporting

For comprehensive data management and reporting, consider 2260 Investigator together with one of following dedicated PC-software packages:

- Type 7815 Noise Explorer – data viewing software
- Type 7820 Evaluator – data viewing and calculation software
- Type 7825 Protector – software for calculation of Personal Noise Exposure
- Type 7830 Qualifier – software for viewing and calculation of airborne sound insulation, impact sound insulation and reverberation time

All of the packages allow you to transfer relevant measurement data, using PC-cards or serial interface, from 2260 Investigator to the PC. Moreover, with Evaluator you also have the ability to use a dial-up modem as part of the serial link – ideal for long-term monitoring jobs in out of the way places.

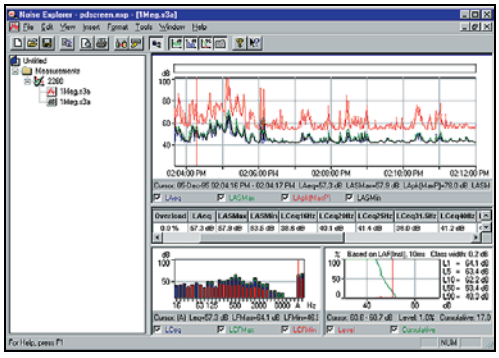

Fig. 13
A typical Noise Explorer screen showing profile, spectrum and statistical displays of measurement data

Noise Explorer, Evaluator, Protector and Qualifier all support a wide range of user-definable graphic and tabular displays. Graphs and tables can be imported into standard Windows applications such as word processors and spreadsheets. Additionally, Noise Explorer, Evaluator and Protector are able to be controlled by 2260 Investigator, via the serial link, to produce time-stamped sound files stored on the PC. The analogue sound signal from 2260 Investigator is input via the PC's sound card.

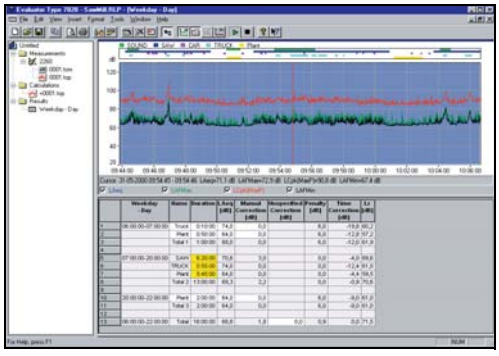

Fig. 14
A typical Evaluator display. The table shows Rating Level calculation results based on marked parts of the measured profile

Evaluator Type 7820 has built-in calculation algorithms that allow you to produce compound sound level figures from several contributions (as shown in Fig. 14), some perhaps with impulse or pure tone penalties, according to which measurement standard you choose, for example ISO 1996, DIN 45 645, TA Lärm, NF S 31-010, BS 4142.

Protector Type 7825 calculates noise exposure according to ISO 9612.2. For situations where only workpoint noise measurements are available, Protector can combine these measurements with a profile of a person's movements simulating their personal noise exposure.

Qualifier Type 7830 can further post-process and document your airborne, façade, impact or reverberation-time measurements made with Type 2260. With Qualifier it is possible to manually adjust data used in calculations, for example, to change levels or reverberation times. The results can be observed immediately.

Direct Printing and Export

When directly connected to a printer, for example Portable Printer Type 2322, you can print data graphically or numerically just as it appears on the 2260 screen.

Moreover, 2260 Investigator can output data (via its serial interface) to a spreadsheet format, so that you can easily import your measurements into a spreadsheet for further processing and presentation in reports.

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Compliance with Standards

CE, C-Tick	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive. C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand.
Safety	EN 61010–1 and IEC 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use. UL 3111–1: Standard for Safety – Electrical measuring and test equipment.
EMC Emission	EN/IEC 61000–6–3: Generic emission standard for residential, commercial and light industrial environments. EN/IEC 61000–6–4: Generic emission standard for industrial environments. 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. **Note:** The above is only guaranteed using accessories listed in this Product Data sheet.
EMC Immunity	EN/IEC 61000–6–1: Generic standards – Immunity for residential, commercial and light industrial environments. EN/IEC 61000–6–2: Generic standards – Immunity for industrial environments. EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements. **Note:** The above is only guaranteed using accessories listed in this Product Data sheet.
Temperature	IEC 60068–2–1 & IEC 60068–2–2: Environmental Testing. Cold and Dry Heat. Operating Temperature: < 0.5 dB, –10 to +50 °C (14 to 122 °F) Storage Temperature: –25 to +70 °C (–13 to 158 °F)
Humidity	IEC 60068–2–3: Damp Heat: 90% RH (non-condensing at 40 °C (104 °F)). Effect of Humidity: < 0.5 dB for 30% < RH < 90% (at 40 °C (104 °F) and 1 kHz)
Mechanical	Non-operating: IEC 60068–2–6: Vibration: 0.3 mm, 20 m/s^2, 10–500 Hz IEC 60068–2–27: Shock: 1000 m/s^2 IEC 60068–2–29: Bump: 1000 bumps at 250 m/s^2
Calibration	Initial factory calibration traceable in conjunction with ISO 9001.

Specifications – 2260 Investigator with BZ 7210 or BZ 7206

Specifications apply to 2260 Investigator fitted with the supplied microphone and input stage, and running BZ 7210 or BZ 7206

STANDARDS
Conforms with the following:
- IEC 60651 (1979) plus Amendment 1 (1993–02) and Amendment 2 (200–10), Type 1
- IEC 60804 (2000–10) Type 1
- IEC 61672–1 (2002–05) Class 1
- DIN 45657 (1997–07)
- IEC 61260 (1995–07) plus Amendment 1 (2001–09), Octave and 1/3-octave Bands, Class 0
- ANSI S1.4–1983 (R 1997) plus ANSI S1.4A–1985 Amendment, Type 1
- ANSI S1.43–1997 Type 1
- ANSI S1.11–1986 (R 1993), Octave and 1/3-octave Bands, Order 3, Type 0–C, Optional Range

SUPPLIED MICROPHONE
Type 4189: Prepolarized Free-field ½″ Microphone
Nominal sensitivity: –26 dB ±1.5 dB re 1 V/Pa
Capacitance: 14 pF (at 250 Hz)

INPUT STAGE
ZC 0026
Extension Cables: Up to 100 m in length between the input stage and the Type 2260 can be driven by the input stage

MEASURING RANGES
Linear Operating Range: 80 dB adjustable to give full-scale readings from 80 dB to 130 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
Passive Attenuation: Microphone attenuator ZF 0023 (included) effectively increases all full-scale readings by 20 dB

OCTAVE AND 1/3-OCTAVE BAND FILTERS
Octave Band Centre Frequencies: 8 Hz to 16 kHz
1/3-octave Band Centre Frequencies: 6.3 Hz to 20 kHz

DETECTORS
Parallel detectors on every measurement:
A-weighted broad-band detector channel with three exponential time weightings (Fast, Slow, Impulse), one linearly averaging detector and one peak detector
C- or L-weighted (switchable) as above for A-weighted
Octave and 1/3-octave band filters, pre-weighted either A-, C- or L-, each with a detector channel containing one linearly averaging detector and one exponentially averaging detector switchable between Slow or Fast
Overload detector which monitors the overload outputs of all the frequency weighted channels

INHERENT NOISE LEVEL
(Combination of electrical noise and microphone thermal noise at 20°C). Typical values with supplied microphone of nominal sensitivity:

Weighting	Electrical Noise (2260)	Thermal Noise (4189)	Combined Noise
"A"	12.3 dB	14.6 dB	16.6 dB
"C"	14.0 dB	15.3 dB	17.7 dB
Lin. 5 Hz–20 kHz	19.2 dB	15.3 dB	20.7 dB
Lin. 3 Hz–20 kHz	26.4 dB	15.3 dB	26.7 dB

CORRECTION FILTERS
Sound Incidence: Built-in filters for correction of frontal/random sound incidence
Windscreens: Built-in filters for correcting the influence of Protective Cover UA 1236, and Windscreens UA 0459 and UA 0237

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MEASUREMENTS
V = frequency weightings C or L
X = frequency weightings A, C or L
Y = time weightings S, F
N = number
M = set level

For Display and Storage (Broadband)

Start Date	Start Time	
Stop Date	Stop Time	Measurem. No.
Elapsed Time	No. of Pauses	Overload %
Underrange %	$L_{Apk(MaxP)}$	$L_{Vpk(MaxP)}$
#Peaks A>M	# PeaksV>M	$L_{AE(ASEL)}$
L_{Aeq}	L_{Veq}	L_{AIm}
L_{VIm}	$L_{Veq-LAeq}$	$L_{AIm-LAeq}$
L_{ASTm3}	L_{AFTm3}	L_{AITm3}
L_{VSTm3}	L_{VFTm3}	L_{VITm3}
L_{ASTm5}	L_{AFTm5}	L_{AITm5}
L_{VSTm5}	L_{VFTm5}	L_{VITm5}
L_{ASMax}	L_{AFMax}	L_{AIMax}
L_{ASMin}	L_{AFMin}	L_{AIMin}
L_{VSMax}	L_{VFMax}	L_{VIMax}
L_{VSMin}	L_{VFMin}	L_{VIMin}
L_{XYN1}	L_{XYN2}	L_{XYN3}
L_{XYN4}	L_{XYN5}	$L_{AEP,d}$
Distribution	Cumulative Distribution	
Event No.*	Event Sample No.*	

For Display and Storage (Octave or 1/3-octave Bands)

L_{Xeq}	L_{XYMax}	L_{XYMin}
L_{XYN1}*	L_{XYN2}*	L_{XYN3}*
L_{XYN4}*	L_{XYN5}*	
Level Distribution*	Cumulative Distribution*	

Only for Display as Numbers or Bargraphs (Broad-band)

$L_{AS(SPL)}$	$L_{AF(SPL)}$	$L_{AI(SPL)}$
$L_{VS(SPL)}$	$L_{VF(SPL)}$	$L_{VI(SPL)}$
$L_{AS(Inst)}$	$L_{AF(Inst)}$	$L_{AI(Inst)}$
$L_{VS(Inst)}$	$L_{VF(Inst)}$	$L_{VI(Inst)}$
L_{AST3}	L_{AFT3}	L_{AIT3}
L_{VST3}	L_{VFT3}	L_{VIT3}
L_{AST5}	L_{AFT5}	L_{AIT5}
L_{VST5}	L_{VFT5}	L_{VIT5}
$L_{Apk(Peak)}$	$L_{Vpk(Peak)}$	

For Storage During Logging (Broadband)
Nothing *or*
All parameters *or*
All parameters without statistics *or*
6 Major Parameters:

L_{Aeq}	$L_{Cpk(MaxP)}$	(or $L_{Lpk(MaxP)}$ if L is selected)
L_{AFMax}	L_{Ceq}	(or L_{Leq} if L is selected)
L_{AFMin}	L_{AIm}	

For Storage During Logging (Spectrum)
Nothing *or*
All parameters *or*
All parameters without statistics* *or*
L_{eq} (pre-weighting A, C or L as selected)

Only for Display as Numbers or Spectra (Octave or 1/3-octave Bands)

$L_{XY(SPL)}$	$L_{XY(Inst)}$

SAMPLING FOR STATISTICS
The octave or 1/3-octave Band level Distribution*, Cumulative Distribution* and statistics L_{XYN1-5}* are based on sampling L_{XY}(Inst.) every 100 ms into 1 dB wide classes over a range of 80 dB
The broad-band Level Distribution, Cumulative Distribution and Statistics L_{XYN1-5} are based upon sampling $L_{XY(Inst)}$ every 10 ms into 0.2 dB wide classes over 80 dB

* BZ 7206 only

FAST LOGGING (BZ 7206 only)
Broadband $L_{AF(Inst.)}$ may be stored every 100 ms during background logging and/or during event logging

CALIBRATION
Initial calibration is stored for comparison with later calibrations.
Acoustic: Using Multifunction Acoustic Calibrator Type 4226, Pistonphone Type 4228 or Sound Level Calibrator Type 4231
Electrical (internal): Uses internally generated electrical signal combined with a keyed-in value of microphone sensitivity.
Initial calibration is stored for comparison with later calibrations
CIC (Charge Injection Calibration): Injects internally generated electrical signal in parallel with microphone diaphragm.
Reference CIC ratio is stored for comparison with later CIC
- A reference CIC is done automatically during External or Internal calibration and stored for later comparison with a new CIC
- A manual CIC can be done whenever no measurement is in progress
- An automatic CIC can be part of a logging measurement, where the CIC repetition rate can be set to be up to 4 times in a 24 hr. period.
- An automatic CIC starts at a "logical" break in a measurement sequence, shortening the following measurement period by 15 s

MEASUREMENT CONTROL
Measurement Types:
Manual – manually controlled single measurement
Automatic – with pre-set measurement time from 1 s to 100 hours in 1 s steps (BZ 7210 only)
Sequence – repetition of a single measurement up to 9999 times (results stored with or without statistical data). Measurement time selectable from 1 s to 100 hours in 1 s steps (BZ 7206 only)
Logging – a single measurement with a selectable duration of 1 s to 100 days in 1 s steps. Logging duration divided into logging intervals of 1 s to 100 hours in 1 s steps
Logging with Events – as *Logging*, but with the ability to measure a different set of parameters and timebase when an event trigger is recognised (BZ 7206 only)
Elapsed Time:
When not in Logging mode, elapsed time resets/starts and pauses/continues according to the respective command. In Logging Mode, elapsed time continues in real-time, regardless of pauses in a measurement

TRIGGERS (BZ 7206 only)
Four types of event trigger are available:
- *Level* – monitors $L_{AF(Inst)}$ every 1 s. Event triggered when $L_{AF(Inst)}$ exceeds the set level for set period (both user-defined for 1 dB/1 s increments)
- *Softkey* – using < Start Event > and < Stop Event > softkeys
- *External* – +5V on pin 9 of serial interface
- *Remote* – start and stop commands sent over the serial interface

All triggers can have pre- and post-trigger time intervals of up to 15 s (in 1 s increments) allocated to them

GPS DATA
A position can be attached to a measurement job by inputting data from a GPS (Global Positioning System) receiver via the Serial Interface
Receiver Standards Supported: NMEA 0183 ver. 2.20, optional corrected to Differential GPS using RTCM 104 ver. 2.1
Baud Rate: 4800 bps

TIMERS
Up to nine independent timers can be specified. Each timer "wakes-up" the analyzer at a specified date and time and initiates a measurement in accordance with pre-defined set-ups. Timed measurement can be repeated up to 999 times. Timers from different software applications can be mixed.

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BACK ERASE

Up to the last 15 s of data can be erased.

MARKERS

One data exclusion marker and four user-definable markers for on-line annotation of sound categories heard during the measurement (logging only)

Markers can be edited, while measuring, up to 60 s after the sound is heard (BZ 7206 only)

CONTROL OF SOUND RECORDING

Sound recording (.wav files on a PC using 7815, 7820 or 7825) can be controlled from 2260 via RS-232 interface and Aux output connected to the sound card on a PC

Markers and Events (BZ 7206 only) can be used to control recording on a PC

MEASUREMENT DISPLAYS

SLM: One main and five secondary parameters can be specified plus one analogue bar with zoom facilities

Cumulative Distribution for one of the octave bands (BZ 7206 only) or 1/3-octave bands (BZ 7206 only) or broad-band plus one analogue bar

Level Distribution for one of the octave bands (BZ 7206 only) or 1/3-octave bands (BZ 7206 only) or broad-band. Class width can be specified. Also with one analogue bar. Zoom facilities provided

Profile: The last 15 s of $L_{AF(Inst)}$ plus one analogue bar for manual or measurement sequence type or the last 60 s with markers for logging measurements

Spectrum: Octave or 1/3-octave band spectrum + two broad-band bars plus one peak bar. Zoom facilities provided.

The four graphical displays also have cursor read-out facilities

CIC: Periodic CICs viewed during or after a measurement

STORAGE SYSTEM

Internal Hard Disk: 32 Mbyte for application software, user set-ups and data

External Memory Card for store/recall of measurement data (SRAM or SanDisk ATA Flash Cards)

MS-DOS® compatible file system (from ver. 3.3)

SERIAL PRINTER/OUTPUT

Set-ups and measurement data can be printed on an IBM® Proprinter® (or compatible), Portable Printer Type 2322 or 2318. The formats can be screen dumps, tables or graphs

Measurement data can be output in spread sheet format or as a binary file for post processing on a PC

HELP AND USER LANGUAGES

Concise context-sensitive help throughout in English, German, French, Italian, Spanish, Czech

CLOCK

Back-up battery powered clock. Accuracy better than 1 minute per month

DISPLAY

Type: Transflective back-lit LCD 192 × 128 dot matrix with internal temperature compensation

INPUT STAGE CONNECTION

Connector: 10-pin LEMO

AUX. OUTPUTS (2 independent)

Can be set to:

L_{AF}(Inst.): 0 to 4 V DC signal updated every 100 ms

Reference: 4 V square-wave for output calibration

Meas. Status for triggering external devices during measurements (including SONY TCD–D7/D8 and TCD-D100 DAT)

Signal from amplified frequency weighted signal (A, C/L)

Event from amplified frequency weighted signal (A, C/L) during events only

Event Status: as Meas. Status, but only during events (BZ 7206 only)

Limited Event Status: as Event Status, but with a maximum specified duration (1 s to 100 mins.) (BZ 7206 only)

AC INPUTS/OUTPUTS(2)

As Output: Buffered, unweighted microphone signal

Output Impedance: 2 × 200 Ω

Maximum Load: 47 kΩ ‖ 200 pF (Short-circuit protected)

As Normal Input: Alternative to microphone input

As Hand-arm Vibration input: For use with 3-channel Human Vibration Front-end Type 1700 – indication of a_{hw} in m/s^2 in the Spectrum display

As Whole-body Vibration Input: For use with 3-channel Human Vibration Front-end Type 1700 – indication of a_{wx}, a_{wy}, a_{wz} and a_v in m/s^2 in the Spectrum display

Connector: 3-pin LEMO (balanced input)

SERIAL INPUT/OUTPUT

Conforms to EIA ITIA 574 (RS 232), coupled as data terminal equipment (DTE)

Connector: 9-pin D-type male

Baud Rates: 1200, 2400, 4800, 9600, 19200, 38400, 115200

Word Length: 8 bits, no parity or stop bits

Handshake: None, XON/XOFF, RTS/CTS

PCMCIA INPUT/OUTPUT

Computer with PCMCIA/JEIDA standards release 1.0.

SETTLING TIME

From Power On: approximately 35 s

BATTERIES

Type: 6 × LR14/C-size 1.5 V alkaline

Lifetime (at 20°C): 5 to 9 hours continuous

EXTERNAL DC POWER SUPPLY

Voltage: regulated or smoothed 10 to 14 V, max. ripple 100 mV

Power: 3.5 W, current: 300 mA, Inrush current: 1000 mA

Socket: ∅5.5 mm with ∅2.1 mm pin (positive)

WEIGHT AND DIMENSIONS

1.2 kg (2.6 lb.) with batteries

375 × 120 × 52 mm (14.8 × 4.7 × 2.0″)

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Ordering Information

Type 2260	Modular Precision Sound Analyzer including Basic Sound Analysis Software BZ 7210
Type 2260 F	Modular Precision Sound Analyzer with Enhanced Sound Analysis Software BZ 7206
BZ 7206	Enhanced Sound Analysis Software

Accessories included with the Modular Precision Sound Analyzer

BZ 7210	Sound Analysis Software
Type 4189	Prepolarized Free-field 1/2″ Microphone
ZC 0026	Input Stage
ZF 0023	20 dB Capacitive Attenuator
AO 1442	9-pin to 25-pin PC or serial printer interface cable
UA 1236	Protective Cover
UA 0237	Large Round Windscreen
DH 0696	Wrist Strap
KE 0342	Shoulder Bag (with room for 2260 and 4231)
6 × QB 0009	1.5 V LR 14/C size alkaline cells

Optional Accessories

CALIBRATION

Type 4226	Multifunction Acoustic Calibrator
Type 4228	Pistonphone
Type 4231	Sound Level Calibrator (fits in KE 0342)
2260 CAI	Accredited Initial Calibration of Type 2260
2260 CAF	Accredited Calibration of Type 2260

INTERFACING

Type 7815	Noise Explorer – data viewing software
Type 7820	Evaluator – data viewing and calculation software
Type 7825	Protector – software for calculation of Personal Noise Exposure
Type 7830	Qualifier – software for viewing and calculation of airborne sound insulation, impact sound insulation and reverberation time
Type 2322	Portable Printer
UL 1008	32 Mbyte ATA Flash Memory Card

MAINS POWER SUPPLIES

ZG 0386	EU Version
ZG 0387	UK Version
ZG 0388	US Version

MEASURING

Type 3592	Outdoor Measuring Gear (see Product Data BP 1744)
AO 0440	AC input/output cable
AO 0441	3 m Microphone Ext. Cable
AO 0442	10 m Microphone Ext. Cable
AO 0522	Headphones Adaptor
AO 0543	2260 to Jack Cable
AO 0586	Cable from 2260 to Audio input on a PC
AQ 1698	Cable for 12 V Supply
AQ 1700	Remote Control Cable for SONY TCD – D7/D8
KE 0371	Carrying Case for 2260 and accessories
QB 0051	12 V Battery
UA 0459	Small Round Windscreen
UA 0587	Tripod
UA 0801	Small Tripod
UA 1317	Microphone Holder
UA 1404	Outdoor Microphone Kit
ZG 0404	Battery Charger, 100 – 240 V AC
ZH 0631	Event Hand-switch

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