⅃⅃Cirrus

optimus+
sound level meters

Optimus+ Red
Sound Level Meters for Noise at Work, Occupational Noise & Vehicle Noise Measurements

VoiceTag™
Audio note recording

AuditStore™
Data verification for your noise measurements

The Optimus Red sound level meters use the very latest digital technology and industrial design to give you the ideal instrument for occupational and industrial hygiene noise measurements.

Applications

- Occupational and industrial hygiene noise evaluations
- Noise at work surveys and noise exposure calculations
- Hearing protection selection using HML or octave band methods
- Machinery noise tests
- Vehicle noise measurements
- Noise ordinance and community noise assessments
- General noise measurements

Key features

- Simple operation with an ergonomic design
- Simultaneous measurement of all workplace noise parameters with additional two "virtual" noise meters
- VoiceTag™ note recording
- AuditStore™ measurement verification
- Latest digital technology with a high-resolution colour display and back-lit keypad
- Measure up to 140dB(A) and 143dB(C) peak with a single measurement range
- Real-time 1:1 octave band filters
- NR & NC values and curves on screen
- Pause and back-erase as standard
- 4GB memory with the option of 32GB
- Long battery life
- Measure up to 170dB with the optional MV:200EH microphone system
- Bluetooth connectivity, compatible with Android and iOS devices

For occupational noise and industrial hygiene, measuring the noise exposure of employees quickly and reliably is essential.

The Optimus Red sound level meter is the ideal instrument for these applications with a clear, high-resolution colour screen, a wide 120dB measurement span (up to 140dB(A) and 143dB(C) peak), and the simultaneous measurement of all available parameters.

There's no setup or complicated configuration needed. Just switch on, calibrate and press start.

It's that simple.

VoiceTag audio recording

Before each measurement is made, you can record a VoiceTag by simply speaking into the microphone.

You can record notes about the measurement location, describe what is being measured or simply store information that may be useful at a later date when analysing your data. What's more? These audio notes can be automtically converted to text-based prompts in the NoiseTools program.

The ideal instrument for any application

With two additional "virtual" noise meters running at the same time, you can meet any noise regulation, guideline or standard.

Whether you need to meet UK and EU regulations, measure to OSHA HC & PEL, MSHA, ACGIH guidlines or any other regulation, an Optimus Red is the instrument to get the job done.

A modern instrument with modern technology

A Bluetooth connection allows you to pair your sound level meter with your Android or iOS mobile device, enabling you to control your instrument remotely. With this feature, you can also see a live feed of the data being recorded and download the overall measurement values.

Simple operation with advanced technology

The Optimus sound level meters have been designed with ease-of-use as the most important feature, to let you get on with measuring and controlling noise effectively and efficiently.

The instruments use the very latest in digital technology and industrial design techniques to make everything as clear and simple as possible.

The high resolution colour screen can be seen in all conditions, and the keypad illuminates automatically in low light.

The case is robust and covered with a tactile finish, so it can be used even if you're wearing safety gloves.

The measurement data is displayed in a clear and simple format along with a real-time noise chart, so that you can see how the noise level vary with time.

All noise parameters are measured simultaneously by the instrument, and with a wide 120dB measurement span, you don't need to worry about choosing the right range. An Optimus can measure up to 140dB(A) and 143dB(C) peak in this single range.

Just switch on, calibrate and you're ready to go.

The perfect solution to help you tackle occupational noise

The Optimus Red sound level meter is the ideal sound instrument for occupational noise and industrial hygiene measurements, as well as for basic noise surveys, and will give you all of the information you need, right at your finger tips.

UK & EU Noise at Work Regulations

If you are working to the UK Control of Noise at Work Regulations or the EU Physical Agents (Noise) Directive, the Leq view gives you the information that you need.

The L_{Aeq} and L_{CPeak} values are measured at the same time, which allows the $L_{EP,d}$ ($L_{EX,8h}$) and the peak action Levels to be determined.

The L_{Ceq}-L_{Aeq} (C-A) value is also measured, which can be used to select PPE using the HML method. L_{AE} is also measured along with L_{ZPeak} for regulations that use this rather than L_{CPeak}.

OSHA,MSHA & other regulations

If you need to meet regulations such as OSHA HC & NC, MSHA HC or ACGIH, the two "virtual" noise meters in the dose view can be quickly configured to provide you with this information.

The quick setup menu on the device gives access to a number of preset functions including OSHA HC & NC, OSHA HC &

ACGIH and MSHA HC & EC.

The custom settings can be used to choose any other setup or configuration that you may need.

Once you've chosen the setup you need, it will be stored so each time you use the meter, you will have the information you need to the correct regulations.

For the two "virtual" noise meters, the L_{AVG}, TWA, % dose and estimated % dose are displayed.

Octave band filters for noise control and selecting hearing protection

The C & D variants of the Optimus Red also feature real-time octave band filters, which will measure the noise in 10 different frequency bands.

The octave band measurement is made at the same time as the other measurements and includes the overall level in each band, along with a time history of the bands across the measurement period.

NR & NC values & curves on-screen

The D variant adds NR & NC values and curves to the 1:1 octave band measurements.

This information can be useful in checking the performance of HVAC systems and noise levels in rooms.

Basic noise nevel measurements

The Optimus Red instruments can also be used for basic noise measurements where only the sound level is required, such as community and noise ordinance enforcement, and the testing of fire and emergency alarms.

Vehicle noise monitoring

Using the remote control button, vehicle noise measurements can be taken as per ISO:5130 and § 29 StVZO.

Class 1 & Class 2 performance

Where precision measurements are needed, Class/Type 1 instruments are available as well as general purpose Class/Type 2 instruments.

Data logging & PC download

If there is a need to record and download measurements to a Windows PC, data logging is available with the B, C & D varients of the instrument.

These units are supplied with our licence-free NoiseTools software and a USB data cable to allow the measurement information to be downloaded.

NoiseTools software

The NoiseTools software package gives you a quick and simple way to download, analyse and report your noise measurement information.

The initial summary screen shows you the most commonly used information and, through simple icons, gives you access to detailed measurement data. You can simply print the summary screen to get a quick measurement report.

For advanced users, each and every function measured by the instrument is available for review and analysis, and the data can be exported for further use.

VoiceTag audio recordings can be played back for reference and are automatically stored with the measurement data; they can also be converted into text notes at the push of a button. Where octave band data is available, this information can be used by the program to calculate the level of required protection, from a range of hearing defenders and ear plugs.

To help you keep your noise measurement data organised and easy to find, NoiseTools allows each measurement to be

allocated to people, places and projects.

Measurements can be sorted or grouped by any parameter, person, place or project and measurement reports created quickly and easily.

AuditStore data verification

AuditStore™ is a new technology that helps to ensure that your noise measurement data is valid and trustworthy. AuditStore allows the user to verify measurements that have been downloaded to the NoiseTools software against a secure data store within the instrument.

Each time you make a measurement with your Optimus, a selection of the overall data is stored into separate and secure memory that is independent of the main memory card.

This data contains essential information about the measurement such as the time, date and duration, the L_{Aeq}, Peak(C) and L_{AFmax}, L_{A10} & L_{A90} (where available) and the overload indication.

In addition to the noise measurement data, information about the last calibration is also stored. The AuditStore data can be downloaded from the instrument when required, which allows for the measurements to be checked against the AuditStore.

The NoiseTools software will check that the measurement information held in the main database and displayed on the screen matches the values within the AuditStore secure memory.

NoiseTools will display verification symbols if the information matches, a unique feature which will be useful in any legal proceedings.

Instrument range & measurement kits

The Optimus Red comprises A, B, C and D variants, each of which can be specified as either Class 1 or Class 2. All of the instruments can measure sound level functions plus Lmax and Lmin with all frequency and time weightings.

The A variants measure integrated noise levels such as Leq and LAE, C-A, peak sound pressure and come with the virtual noise meters for OSHA/MSHA/ACGIH.

The B variants provide the same functions as above but with the addition of data logging, so that measurements can be downloaded to NoiseTools. VoiceTag audio recording is also available on B variants.
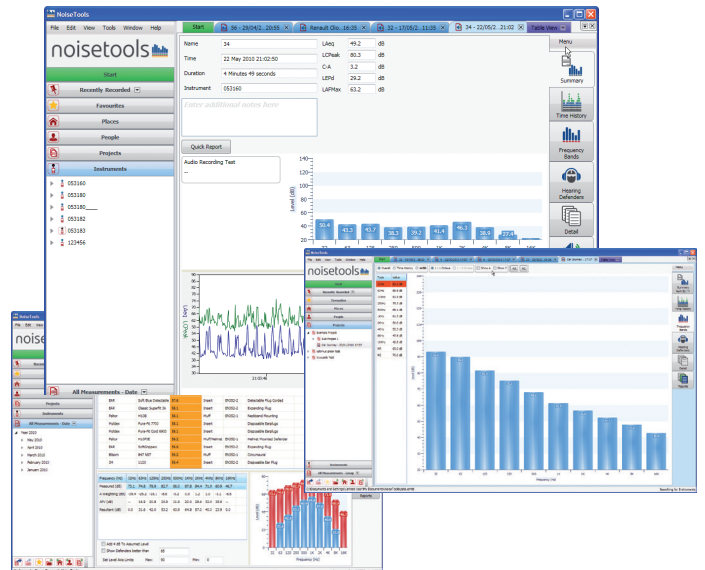
The C variants add real-time octave band filters to the functions of the B models, which can be used for the selection of hearing protection.

The D variants add NR & NC values and curves directly on the instrument display.

Specifications and a selection chart are available on the following page.

Complete measurement kits are available for the Optimus instruments, which contain the instrument, an acoustic calibrator, a windshield, cables, batteries and other accessories. The measurement kits contain all of the accessories needed to carry out a thorough noise survey.

Specifications

Applicable standards[1]
IEC 61672-1:2013 Class 1 or Class 2[1]
IEC 61672-1:2002 Class 1 or Class 2 Group X[1]
IEC 60651:2001 Type 1 I or Type 2 I
IEC 60804:2000 Type 1 or Type 2
IEC 61252:1993 personal sound exposure meters
ANSI S1.4 -1983 (R2006), ANSI S1.43 - 1997 (R2007), ANSI S1.25:1991
IEC 61260:1996 & ANSI S1.11-2004
DIN 45657:2005-03

Microphone
Class 1 MK:224 pre-polarized, Class 2 MK:216 pre-polarized

Microphone preamplifier
MV:200/MK:229 removable preamplifier (all versions)

Total measurement range:
20dB to 140dB RMS single range
Noise floor: <18dB(A) Class 1, <21dB(A) Class 2

Frequency weightings
RMS & peak : A, C, & Z measured simultaneously
Frequency bands: 10 octave bands (31.5Hz to 16kHz, C & D variants)

Time weightings
Fast, Slow & Impulse measured simultaneously

Display
High resolution display. Ambient light sensor and illuminated keypad

Memory
4GB (B, C & D Versions), 32GB factory fit option

AuditStore
Measurement verification data stored in secure memory

Time history data rates (global settings)
10ms, 62.5ms, 100ms, 125ms, 250ms, 1/2 sec, 1 sec, 2 sec (user selectable)

VoiceTag audio recording (B, C & D versions)
Up to 30 seconds of audio notes with each measurement

Integrators
Three simultaneous "virtual" noise meters. Integrator 1 is preset to Q3 for Leq functions. Integrators 2 & 3 can be configured with the following:
Exchange rate: 3, 4 or 5 dB
Threshold: 70dB to 120dB (1 dB steps)
Time weighting: None or Slow
Criterion level: 70dB to 120dB (1 dB steps)
Criterion time: 1 to 12 hours in 1 hour steps

Integrator quick settings
EU, OSHA HC & OSHA NC, OSHA HC & ACGIH, MSHA HC & MSHA EC, Custom 1 & Custom 2

Measurement control
Pause & back erase with user selectable duration

Dimensions
Size: 283mm x 65mm x 30mm
Weight: 300gms/10oz

Batteries
4 x AA alkaline

Battery life
Typically 12 hours with alkaline AA
Typically 20 hours with lithium AA non-rechargeable
Battery life is dependent upon the battery type, quality and screen brightness

Connections
USB Type B to PC
AC & DC output via ZL:174 (2 x Phono, 1m)
Multi-pin IO for external power via ZL:171 cable (2.1mm socket)
External power: 5v-15v via MultiIO socket via ZL:171 cable (2.1mm socket)

Tripod mount
1/4"Whitworth socket

Case
Material: high impact ABS-PC with soft touch back and keypad

Environmental
Temperature: Operating -10°C to +50°C, storage -20°C to +60°C
Humidity: Up to 95% RH non-condensing

Electromagnetic performance
IEC 61672-1:2002, IEC 61672-2:2003, IEC 61672-1:2013 & IEC 61672-2:2013
Except where modified by EN 61000-6-1:2007 & EN 61000-6-1:2007

Language options
English, French, German, Spanish. Other language options may be available

Software support
NoiseTools download, configuration and analysis software supplied as standard. Compatible with Microsoft Windows 7, 8 & 10 (32bit & 64bit)

Bluetooth
BLE compatible with Anrdoid and iOS devices
Cirrus mobile applications available from Google Play and the App Store

Measurement functions[2]
CR:162A & CR:161A
Displayed functions
L_{XY}, L_{XYMax}, L_{XYMin}, L_{Xeq}, L_{CPeak}, L_{ZPeak}, L_{Ceq}–L_{Aeq}, L_{XE}
Graph of short L_{Aeq}, L_{CPeak}
Integrators 2 & 3: TWA, dose%, est dose%
Measurement run time

CR:162B & CR:161B
Displayed Functions
L_{XY}, L_{XYMax}, L_{XYMin}, L_{Xeq}, L_{CPeak}, L_{ZPeak}, L_{Ceq}–L_{Aeq}, L_{XE}, L_{Aleq}
Graph of short L_{Aeq}, L_{CPeak}
Measurement run time
Integrators 2 & 3: TWA, dose%, est dose%

Stored functions
L_{XYMax} & time history of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}
Time history of L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Aleq}
Integrators 2 & 3: L_{AVG}, TWA. %dose
Time history of L_{AVG}

CR:162C & CR:161C
Displayed functions
L_{XY}, L_{XYMax}, L_{XYMin}, L_{Xeq}, L_{CPeak}, L_{ZPeak}, L_{Ceq}–L_{Aeq}, L_{XE}, L_{Aleq}
Graph of short L_{Aeq}, L_{CPeak}
Measurement run time
Integrators 2 & 3: TWA, dose%, est dose%
Real-time octave band filters

Stored functions
L_{XYMax} & time history of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}
Time history of L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Aleq}
Integrators 2 & 3: L_{AVG}, TWA. %dose
Time history of L_{AVG}
Octave bands: overall L_{eq} & L_{eq} time history for each band
Measurement run time
Time & date of measurement start

CR:162D & CR:161D
Displayed functions
L_{XY}, L_{XYMax}, L_{XYMin}, L_{Xeq}, L_{CPeak}, L_{ZPeak}, L_{Ceq}–L_{Aeq}, L_{XE}, L_{Aleq}
Graph of short L_{Aeq}, L_{CPeak}
Measurement run time
Integrators 2 & 3: TWA, dose%, est dose%
Real-time octave band filters
NR & NC values & curves

Stored functions
L_{XYMax} & time history of L_{XYMax}
L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}
Time history of L_{Aeq}, L_{Ceq}, L_{Zeq}, L_{CPeak}, L_{ZPeak}, L_{APeak}, L_{Aleq}
Integrators 2 & 3: L_{AVG}, TWA. %dose
Time history of L_{AVG}
Octave Bands: Overall L_{eq} & L_{eq} Time History for each band
NR & NC values & curves
Measurement run time
Time & date of measurement start
where x=A ,C ,Z; y= F, S, I
Other functions may calculated by the NoiseTools software and displayed on download.

Notes
1. Please contact Cirrus Research plc for details of the standards and approvals that are available on specific instrument types.
2. For details of the displayed and stored parameters, please refer to the optimus user manual for full specifications.

All specifications, features and values are typical and are subject to change without notice.

Instrument Selection

Function/ Instrument	Class 1	Class 2	Sound Level Functions	Leq/Peak Functions	TWA/Dose Functions	Data Logging	Pause & Back Erase	AuditStore	VoiceTag Note Recording	1:1 Octave Band Filters	NR & NC Curves on screen	Software Support	Measurement Kit	Bluetooth*
CR:162A		✓	✓	✓	✓		✓						CK:162A	✓
CR:161A	✓		✓	✓	✓		✓						CK:161A	✓
CR:162B		✓	✓	✓	✓	✓	✓	✓	✓			✓	CK:162B	✓
CR:161B	✓		✓	✓	✓	✓	✓	✓	✓			✓	CK:161B	✓
CR:162C		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	CK:162C	✓
CR:161C	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	CK:161C	✓
CR:162D		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CK:162D	✓
CR:161D	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CK:161D	✓

* Bluetooth low-energy

Standard accessories
The Optimus sound level meters are supplied, as standard, with the following accessories:
User manual
Certificate of Calibration
USB data/power cable
Windshield
NoiseTools software DVD (requires B, C or D variant to download measurements)

Measurement kits
The Optimus sound level meters are available as a complete measurement kit with the following accessories:
Optimus sound level meter
CR:514 Class 2 or CR:515 Class 1 acoustic calibrator
UA:237 90mm windshield
CK:300 carrying case
User manual and Certificates of Calibration
USB data/power cable & NoiseTools software DVD (requires B or C variant to download measurements)

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15 YEAR WARRANTY

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ISO 9001 Quality Management
ISO 14001 Environmental Management
FM 531001   EMS 552104

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