Cirrus Environmental

Invictus

Noise Monitoring Systems

The Invictus Noise Monitor

The next generation of noise measurement instruments

Invictus
Noise Monitoring Systems

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The next generation of noise measurement instruments

The Invictus is a range of next generation environmental noise measurement instruments from Cirrus Environmental.

Available as either a portable instrument, ideal for short and medium term measurements, or an installed system designed for long term measurements, all of advanced features of the Invictus are available on all versions, allowing any noise monitoring application to be covered.

Using the very latest technology, the Invictus is simple to set up and deploy whilst providing a full and comprehensive range of noise measurement parameters.

A single 120dB measurement range, automatic calibration, noise event detection, in-measurement audio recording and calendar based measurement control are just some of the highlights available on all Invictus instruments,

In-measurement noise event detection with audio recording, SMS, Email & Twitter alerts allows the Invictus to be the core of an effective noise measurement, monitoring and management system.

Integral to the Invictus system, the Noise-Hub^2 software allows data to be downloaded from the instrument, measurement reports created and data analysed.

Noise-Hub^2 can be installed onto a PC, Server or used from a web interface, allowing data access from any web browser on any device including tablets and smart phones.

The Invictus also supports weather measurements and outputs for video recording systems.

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Applications

A noise monitoring system for any situation

Construction & Demolition Projects
Wind Farm Noise Measurements
Noise Impact Assessments
Planning Applications
Traffic & Transport Noise
Mining & Quarrying
Airport Noise Management & Monitoring
General Aircraft Noise
Power Generation
Motor Racing Circuits & Motorsport Noise Monitoring
Product Development & Testing
Firing Ranges
Noise Compliance Monitoring

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Applications

A noise monitoring system for any situation

Applications for the Invictus Noise Monitors

Cirrus Environmental has supplied noise monitoring systems for use across a wide range of applications, with each system built around the Noise-Hub2 software.

By adding a noise monitor, or noise monitors, and a range of options, the system can be tailored to each individual application and location.

Below are some examples of recent installations.

Airport Noise Monitoring System

A noise monitoring system for an airport comprises four fixed and one portable noise monitor, each of which is connected to a central PC running Noise-Hub2 via a 3G/GPRS modem.

The Noise-Hub2 software automatically downloads the measurement data each night and produces measurement reports by email.

The system also includes weather sensors at two of the locations, with the data integrated into the measurement reports automatically.

The system can display live noise levels on a web page allowing external parties to access the noise measurement data.

Flight data is matched to the noise measurements and the noise events correlated automatically within Noise-Hub2.

Manufacturing Site Noise Monitoring System

This system comprises a number of fixed noise monitors, connected via WiFi, to a cental server running the Noise-Hub2 web interface.

The system provides automatic reporting of both live and historical noise levels and integrates weather measurements at one of the noise monitoring locations.

The system uses the LAN/WAN feature of Noise-Hub2 to allow users from remote sites to login and view the noise measurement data.

Construction Noise Monitoring System

The construction noise monitoring system uses the Noise-Hub2 web interface to give the site operators a quick and simple way to access live noise levels occuring on the construction site.

The Noise-Hub2 software is hosted on a server in a secure data centre with communications between the software and the noise monitors made over a robust 3G/GPRS connection.

Portable noise monitors are used to allow the monitoring locations to be changed as the project progresses. GPS data is stored with the noise measurement information and the locations displayed on a map along with live noise levels.

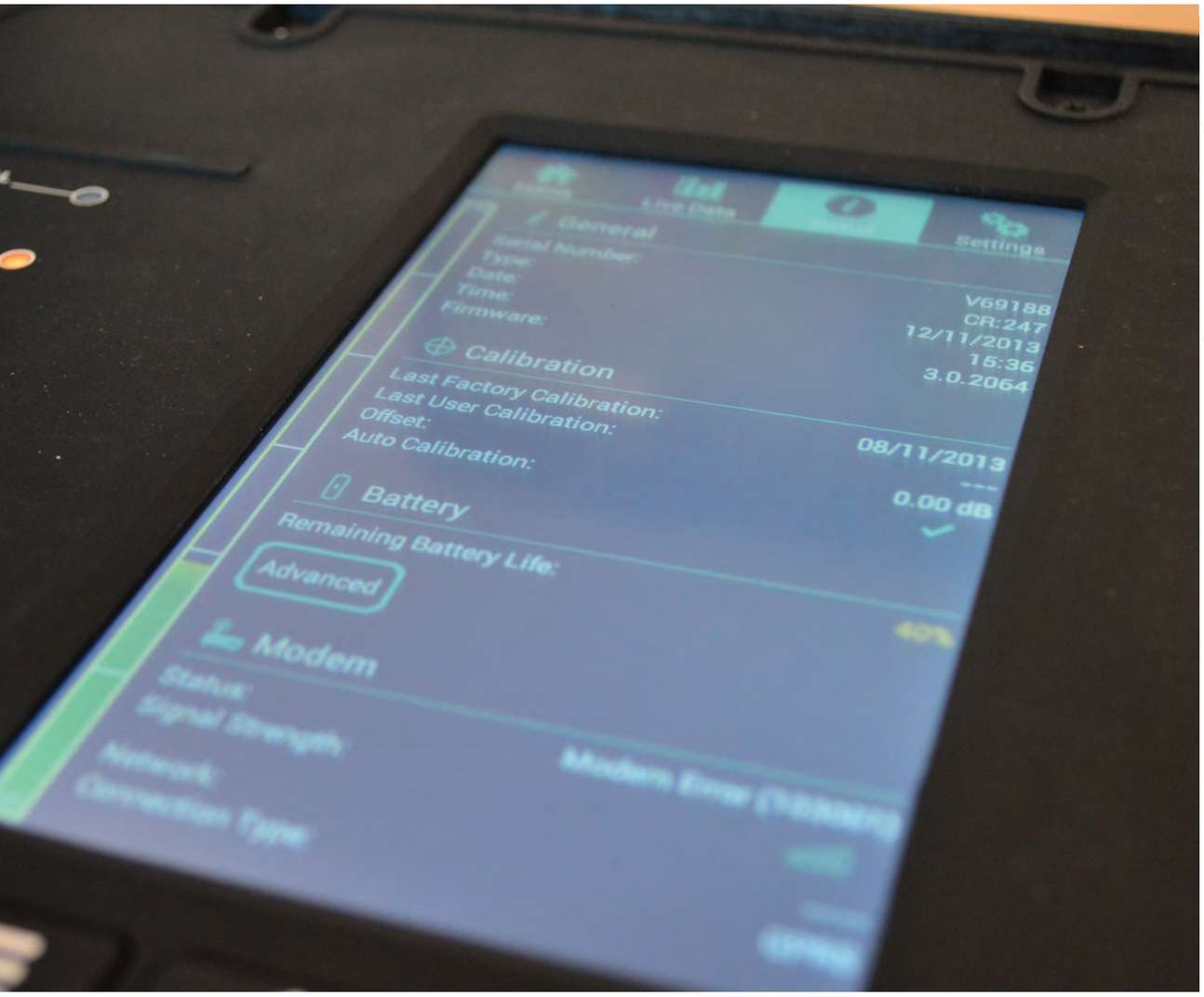
Motorsport Noise Monitoring System

The Motorsport noise monitoring system uses the networking functions in Noise-Hub2 to allow data to be shared across a LAN/WAN to give a number of users access to both live and historical noise data.

Four permanent noise monitors are connected via dedicated cables to the central server which provides both live alerts when preset levels are exceeded as well as historical data for reporting.

The Invictus Noise Monitor

Features & benefits of the Invictus noise monitors



The Invictus Noise Monitor

The next generation of noise measurement instruments

Features

- Colour touch screen interface simplifies set up and deployment
- Simultaneous measurement of all parameters
- Noise event detection with in-measurement audio recording, SMS, Email & Twitter alerts
- Live audio playback via the Noise-Hub2 software
- IEC 61672-1:2002 Class 1 performance
- 120dB measurement range in a single span
- Full weather protection with dual-skinned windshield
- 32GB data storage as standard
- Multi-frequency calibration with microphone performance verification
- Optional 1:3 Octave Bands from 6.3Hz to 20kHz with Tonal Noise Detection
- GPS location information stored with each measurement
- 3G, GPRS, Wi-Fi, Ethernet (LAN) & Radio Modem communications
- Option of weather measurements integrated with noise data
- Noise-Hub2 software for PC, Server & Web
- Optional output stream for integration with video recording systems
- External power input for long term operation

High performance in a simple package

The Invictus has been designed to provide the very highest levels of performance whilst being simple and straight forward to deploy.

Meeting the requirements of IEC 61672-1:2002 for a Class 1 instrument, the Invictus features the Cirrus Acoustic Fingerprint noise detection technology as well as a multi-frequency microphone calibration and performance verification system.

All versions of the Invictus use a common core that provides simultaneous measurement of all available parameters, time and frequency weightings.

In addition, the Invictus instruments can measure 1:3 octave bands from 6.3Hz to 20kHz with Ln values for each frequency band.

Simple configuration & Deployment

The user interface to the Invictus is simple and straight forward. A large colour touch screen gives access to the settings and configuration of the instrument as well as showing the current status of communications, calibration, battery level and other important data.

All of the measurement settings can be viewed and updated directly on the instrument allowing the Invictus to be used across a range of applications.

The high resolution 7” colour touch screen on the portable instruments allows for rapid deployment as well as for checking the status of signal strength, GPS lock, memory capability and calibration data.

All of the Invictus instruments support multiple communications paths such as USB, 3G/GPRS Modem, LAN and WiFi.

The Invictus Noise Monitor

Pro-active Noise Management

Advanced measurement control with the Invictus Calendar

No two noise measurement applications are the same and when it comes to monitoring and managing noise levels, there can often be complex requirements in terms of levels and times that must be met.

The new Calendar function in the Invictus allows the instrument to be programmed to meet the most complex requirements quickly and easily.

This function allows different measurement durations, triggering templates and alerts to be set up for different times of the day and different days of the week.

As a simple example, an Invictus can be configured to measure every hour between 7am and 7pm and every 15 minutes between 7pm and 7am Monday to Friday. At weekends the measurements can change to be 1 hour across the whole 24 hour period when the site is not working.

The Invictus can have up to 6 separate time conditions per day, with different conditions for each day of the week.

The triggering templates used to create SMS, Email or Twitter alerts and to control audio recordings can be different within any of these periods giving you complete control over the measurement data, noise limits and triggers used throughout the week.

Special conditions can also be applied to take account of, for example Bank Holidays, unusual events where the standard noise limits and requirements are not suitable.

Pro-active noise management with the %Noise feature

In many applications, triggering alerts when a noise event has occurred can be an effective way to monitor and manage noise from a project. However, it can also be very effective to know when the noise from a project is approaching a preset limit.

For example, a construction project may have a specific daily noise limit and the Invictus can be configured to alert relevant parties when a pre-set percentage of that limit is reached (e.g. 80% of the permitted daily level). This allows for pro-active noise management to occur for the rest of the working period so that the overall permitted level is not breached.

The % Noise function runs independently of the other noise measurements in the Invictus and provides a further tool to effectively monitor and manage noise levels.

The Invictus Calendar and the %Noise function are key features that allow users to effectively monitor and manage noise from complex projects.

By combining an Invictus with the Noise-Hub2 software, you can configure an effective monitoring strategy to manage noise levels from projects of any size.

Advanced features as standard

Live audio & noise event detection

Live audio from the Invictus

The Invictus noise monitor can stream live audio back to the Noise-Hub2 software or to the Noise-Hub Community web portal, allowing the actual noise to be listened to in real time.

The can be used in conjunction with the noise event detection in the Invictus.

For example, the live audio can be listed to as and when alerts are send from the noise monitor, allowing a site manager to verify what is causing the problem and to deal with it quickly and effectively.

Noise event detection with the Invictus

As well as the overall noise measurement data, the Invictus uses an advanced system of rules and templates to detect specific noise events and to report these back to the user.

These templates can be as simple or as sophisticated as needed and are built on the unique Cirrus Acoustic Fingerprint technology.

When a template is triggered, the Invictus will store noise data for the source along with data from any other connected sensors.

At the same time, the instrument can trigger an audio recording with pre and post trigger options. The pre-trigger can be configured anywhere from 10 seconds to 15 minutes.

The quality of the audio recordings can be adjusted to provide either maximum fidelity, useful for later analysis, or maximum storage when the audio recordings will be used simply to identify the source.

An alert can be sent via SMS, Email or Twitter to any number of contacts to inform them that a noise event has occurred.

This can be used to great effect to inform site managers when construction noise is over preset limits and can help prevent noise complaints. The live noise data can then be viewed through a smart phone or tablet and immediate action taken.

The different detection templates and rules are configured from within the Noise-Hub2 software or via the web portal.

Templates can be configured using a combination of level, rate of change or tonal noise rules with a range of advanced options available to allow the rules to be adjusted to meet each different location or noise source.

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High performance as standard

Expandable and upgradable

Dual layer windshield

The Invictus has a dual-layer 200mm windshield with each layer treated with a hydrophobic coating.

This allows the Invictus to be used for applications such as wind farm noise measurements (for example ETSU R97) as well as for noise measurements in all weather conditions.

The Invictus automatically detects that the windshield is fitted and makes the corrections required to ensure that the Invictus meets the requirements for a Class 1 instrument with the windshield fitted.

Automatic calibration

To ensure continuing compliance and to allow for automatic, remote calibration of the instrument, the Invictus is fitted with an electrostatic actuator system.

This uses an advanced design to provide a wide range frequency signal that allows the Invictus to not only verify the overall level, but also to check the frequency response of the entire system.

Internal & external power

The portable Invictus instruments have an internal battery pack that will power the instrument for 7 days.

For longer operation, external power can be connected, typically from a 12v battery or similar.

For a permanent installation, power is usually supplied from a mains supply but where is this not available, the Invictus can be powered by other sources such as a solar power panel.

Communications options

In many applications, the Invictus will be used away from the Noise-Hub2 software.

To allow measurement data to be downloaded remotely, the Invictus instruments support a range of communications options. These include Modem (3G/GPRS), WiFi and Ethernet (LAN). Measurements can also be downloaded locally over USB.

In addition to these communications options, every Invictus is fitted with a GPS receiver, allowing measurements to be stamped with the exact location. The GPS signal is also used to set the time and date within the instrument ensuring measurement accuracy.

Integrated weather measurements

There are many applications where the weather can affect the noise measurements and having information about the climatic conditions alongside noise measurement can be very useful.

The Invictus instruments can be used with an optional external weather sensor package. The weather sensors are connected directly to the Invictus which logs the data alongside the noise measurements.

The standard weather measurement package allows for the measurement of windspeed, wind direction, relative humidity. air temperature, barometric pressure and rainfall.

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noise·hub² Noise Monitoring System Software

At the heart of the Invictus

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noise-hub2
Noise Monitoring System Software

At the heart of the Invictus

Overview

Noise-Hub2 provides you with a modern, sophisticated, clear and straight forward platform for communicating with single or multiple noise monitoring terminals.

Whether you need a single noise monitoring terminal, a portable solution or a complete, integrated modular management system with an unlimited number of noise monitoring terminals and different users, Noise-Hub2 allows us to deliver, install and commission a total easy-to-use package.

The design of the Noise-Hub2 software allows Feature Packs to be added which expand the functions and features available to the user(s). Noise monitors can be added at any time and the Noise-Hub2 software has been designed to communicate with both the current and future ranges of noise monitors from Cirrus Environmental.

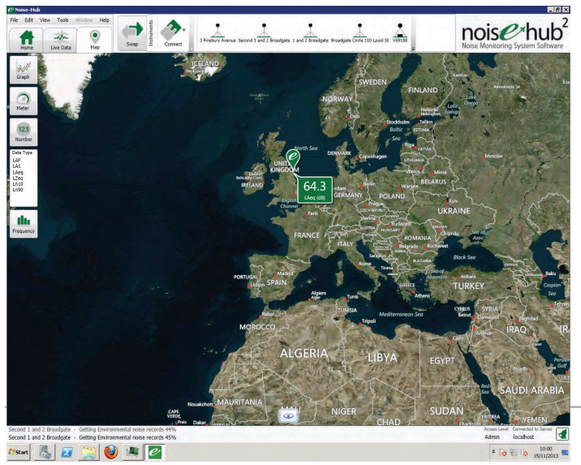
Future technology may add new capabilities to the noise monitors and Noise-Hub2 has been designed to be able to integrate these seamlessly.

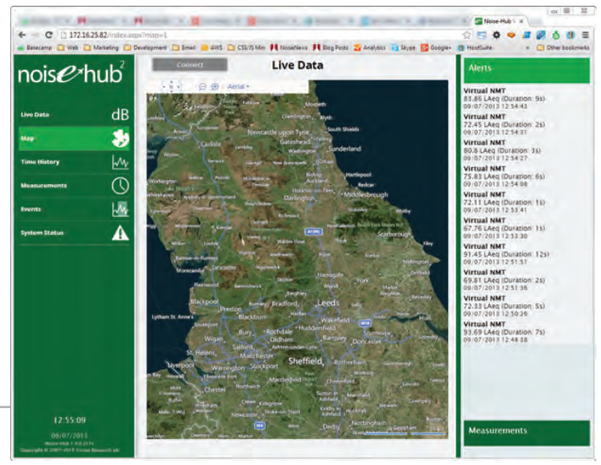
Noise-Hub2 can be run on a single desktop PC, on a server or as a web service, allowing remote access to live noise data and downloaded measurement information.

Noise-Hub2 also allows data from weather measurements to be downloaded from the Invictus as well as supporting additional data sources such as flight information.

Key features of Noise-Hub2

- Configure remote noise monitors with advanced calendar based measurement control
- Automatic, scheduled download of measurement data
- Comprehensive suite of reporting & configuration tools
- Automatic reporting by email direct to your inbox
- Noise event & measurement alerts by email, SMS & direct to your smartphone
- Web interface for remote viewing & reporting
- Real time online noise monitoring with proactive noise management features
- Live noise data over the web with live audio streaming*
- Integrates with all versions of the Invictus noise monitor*
- Multi-user permission levels
- Leasing & purchase options available





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noise-hub2
Noise Monitoring System Software

At the heart of the Invictus

Desktop, Server or Web based noise monitoring

Noise-Hub2 can be configured to meet the exact needs of any noise measurement and monitoring application.

For a simple system, the software can be installed onto a desktop PC.

Where support for multiple users and PC's is needed, Noise-Hub2 can be installed onto a server with clients accessing the data across a LAN or WAN connection. The Noise-Hub2 installation on the server can be configured to download measurement data automatically from any connected noise monitor. Data can be viewed via the integrated web server with different levels of user access available.

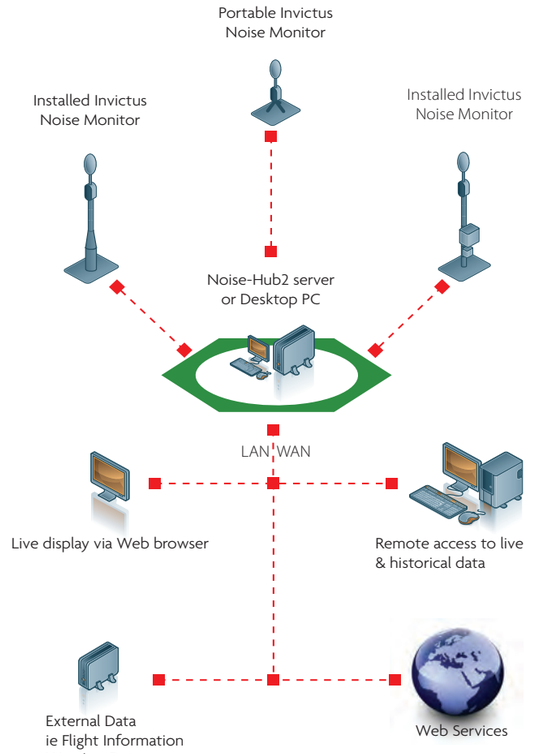
For a completely web based solution, Noise-Hub2 can be installed onto a remote server and the measurement data viewed via a web browser.

The Noise-Hub Community is available for customers who prefer not to install Noise-Hub2 themselves.

This cloud based service allows measurement data to be downloaded automatically, with alerts, reports and measurement data available directly through a secure web portal.

All of the triggering, alerting and proactive noise management features of Noise-Hub2 are available through this service which can be configured and scaled to meet the needs of any application.

For further details of the Noise-Hub Community server, please contact Cirrus Environmental.



Invictus
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Support for your noise monitoring system

Service, Calibration & Support Services

At Cirrus Environmental we take great pride in our high standards of Service, Support & Calibration and our processes, procedures and policies are backed by our ISO 9001:2008 Certification.

bsi. ISO 9001 Quality Management
FS 562109

Our in-depth knowledge of our noise measurement instruments, software and systems enables us to guide users through the operation of the equipment and rapidly solve any technical problems as well as allowing us to offer a wide range of Service, Support & Calibration options. Our noise monitoring systems are typically supplied with some form of maintenance and support package and we can offer three standard packages, each of which can be tailored to meet the needs of each client or installation.

Silver
Basic Maintenance Package

- Full annual scheduled maintenance and recalibration
- Unlimited technical support by telephone and email during office hours
- Remedial maintenance on-site, with parts and labour provided at no extra cost
- Includes frequently-replaced parts such as microphones, windshields and batteries
- Back-to-base repairs for component failures

Gold
System Assurance & Basic Maintenance Package

- Scheduled contact with noise monitors
- Data integrity and diagnostics verified according to a comprehensive checklist
- Corrective actions are carried out immediately including on-site maintenance
- Includes Silver Basic Maintenance Package
- Full scheduled maintenance and recalibration

Platinum
Data Management, System Assurance & Basic Maintenance Package

- Scheduled data download
- Data sent securely via email, download, hardcopy or USB/CD
- Secure, encrypted data storage
- Includes all benefits of the Silver & Gold packages
- Full annual scheduled maintenance and recalibration

Outside of the UK, we work with carefully selected local strategic partners to provide the highest level of backup and support, ensuring that your noise monitoring and measurement system continues to operate year after year..

Whether you need a simple annual calibration for your equipment or a comprehensive backing and support package, there is an option to suit your project.

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The Invictus Noise Monitor

Specifications

Specifications & Measurements	
Standards	IEC 61672-1:2002 Class 1 1:3 Octave Band Filters to IEC 61260
Microphone	External weatherproof MV:180 with 10m cable. Weatherproof with windshield fitted Electrostatic actuator with multi-frequency verification system
Windshield	Dual layer 200mm windshield with hydrophobic coating
Total Measurement Range	20dB to 140dB RMS Single Range
Noise Floor	< 18dB(A)
Frequency Weightings	RMS: A, C, & Z Measured Simultaneously Peak: A, C, & Z Measured Simultaneously 6.3Hz to 20kHz for 1:3 Octaves
Time Weightings	Fast, Slow & Impulse Measured Simultaneously
Display	High resolution 800×480 pixel 7" resistive touch screen
Keypad	Illuminated keypad
Memory	32GB Compact Flash
Data Storage	Up to 512 Days (at 1 second time history)
Time History Data storage	10ms, 62.5ms, 125ms, 250ms, 1/2 sec, 1 sec, 2 sec (User selectable)
Measurement Control	Calendar: Up to 6 time slots per day, fully customisable for each day of the week Repeat Timers: User selectable duration between 1 minute to 23 hours
Power	Internal: 4 x Internal 9.6V 10000mH NiMh battery packs. External: 12v-15v DC
Connections	Microphone COMMS A COMMS B RF – SME Connector GPS – SME Connector Mini-USB Compact Flash Battery charge 2.5mm DC Socket
Language Options	English, French, Spanish, German, Chinese
Software Support	Noise-Hub[2]
Communications Options	Remote: Modem (3G/GPRS) Wifi Ethernet Local: USB
Weather Measurement (Option)	Ultrasonic Wind speed, Wind Direction, Humidity. Temperature, Pressure, Tip bucket Precipitation
Video OSD (Option)	Option to enable analogue video (CCTV etc) to be stamped with live LAF value and instrument description.

Specifications & Measurements	
Overall	LXYMax & Time History of LXYMax LXYMin LAeq, LCeq, LZeq, LCPeak, LZPeak, LAPeak, LAleq Time, date & duration of measurement GPS location data
Time History	LAeq, LCeq, LZeq, LCPeak, LZPeak, LAPeak, LAleq
1:3 Octave Bands	Overall Leq & Leq Time History for each band 14 Ln values per 1:3 octave band Tonal Noise Detection in 1:3 Octave Bands
Ln Values	28 independent statistical values Up to 14 1:3 Octave Bands statistical values
Weather Measurement (Option)	Wind Speed, Wind Direction, Temperature, Humidity, Pressure, Rainfall
Acoustic Fingerprint Triggering	Up to 5 triggers, based on Level, Rate of Change or Tone with minimum duration Triggering of audio recording or notifications
Audio Recording	Compressed 8kHz, 8bits Standard 16kHz, 16bits (lossless) Studio 96kHz, 32bits (lossless)
Notifications	SMS, Email or Twitter (Depending on modules selected)
Live Audio Listen	Live audio listening of compressed audio
Predicted Leq triggers	Shows % of dose and predicted exposure if level maintained
Event measurements	Triggered recording of small measurements (up to 5 min) with LAeq time history, 1:3 Octave bands spectrum and overall values
Ln Values	2 sets of 14 independent statistical Ln values: 7 preset to L1.0, L5.0, L10.0, L50.0, L90.0, L95.0 & L99.0 7 user defined Ln values 1 set of 14 independent 1:3 Octave Bands statistical Ln values 7 preset to L1.0, L5.0, L10.0, L50.0, L90.0, L95.0 & L99.0 7 user defined Ln values
Alarms	Preamplifier disconnected Preamplifier tilt Windshield removed Low battery power External power disconnected Case open Compact Flash card failure Calibration failure Microphone fault
AuditStore	For each measurement, the following data is stored onto an independent, nonvolatile memory for use with the AuditStore function Start Time, Duration, LAFMax, LAeq, LCPeak, L10, L90, Overload, Calibration data, Diagnostic information
GPS	Global positioning for accurate time synchronization and location

All specifications are subject to change without notice.

About Cirrus Environmental

Cirrus Environmental provides a range of noise measurement instruments, software and support packages that enable our customers to effectively monitor, manage and control their environmental noise.

We can offer advice and support on all aspects of monitoring, evaluating and managing noise, including downloading data and report preparation if required.

Our managed noise monitoring solutions can even remove the need for customers to install any software themselves, instead accessing their data via a simple web interface.

Our solutions are built from a combination of noise measurement instruments that are suitable for either short, medium or long term installation with measurement data either downloaded locally, remotely over the latest in communications technology or via a Noise-Hub2 web server.

In addition to these systems, Cirrus Environmental can also offer a range of noise measurement instruments that can be integrated alongside other sensors and monitoring equipment.

Whether the need is for a comprehensive data set or a simple 4-20mA signal, Cirrus Environmental can offer a solution for systems integrators and OEM suppliers.

Backed by over 40 years experience in the design, manufacture and installation of noise monitoring instruments, Cirrus Environmental is ideally placed to offer a solution that is both cost effective and practical.

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