



NOISE-HUB2 SOFTWARE

USER MANUAL

CIRRUS RESEARCH PLC Edition 2.1
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Overview of the Noise-Hub2 software

The Noise-Hub2 software has been designed to work in partnership with the Invictus environmental noise monitors.

Noise-Hub2 allows the user to perform the following:

- Connect to one or more units through Modem, Ethernet or Wi-Fi (depending on unit configuration ordered).
- View live data
- Change unit information, including description.
- Change measurement settings, including time history rate, timers and calendars.
- Set audio record quality and max duration.
- Configure and set audio triggers.
- Set custom Ln's (noise level exceeded percentage)
- Set noise Alert levels
- Set Alarms
- Configure user notification and alarm settings via SMS, Email & Twitter.
- Download measurements
- Create reports
- View and post process downloaded measurements

The following sections describe how the Noise-Hub2 software can be used to configure the Invictus Noise Monitor, download measurements and produce reports.

Installing the Noise-Hub2 software

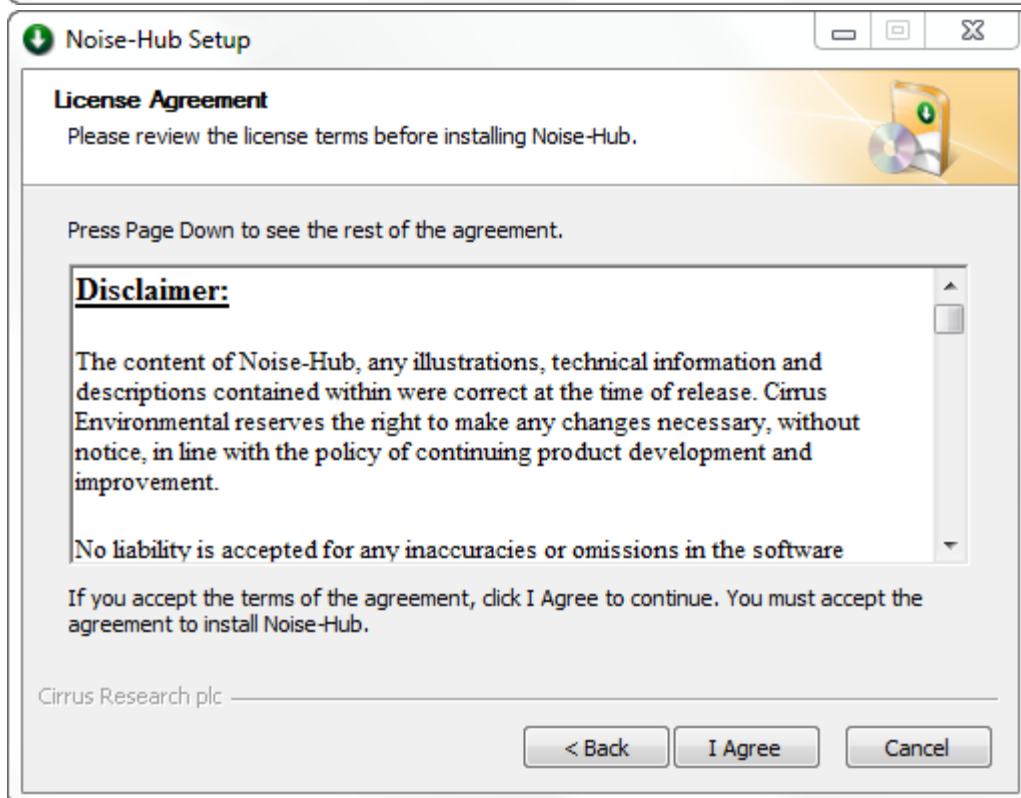
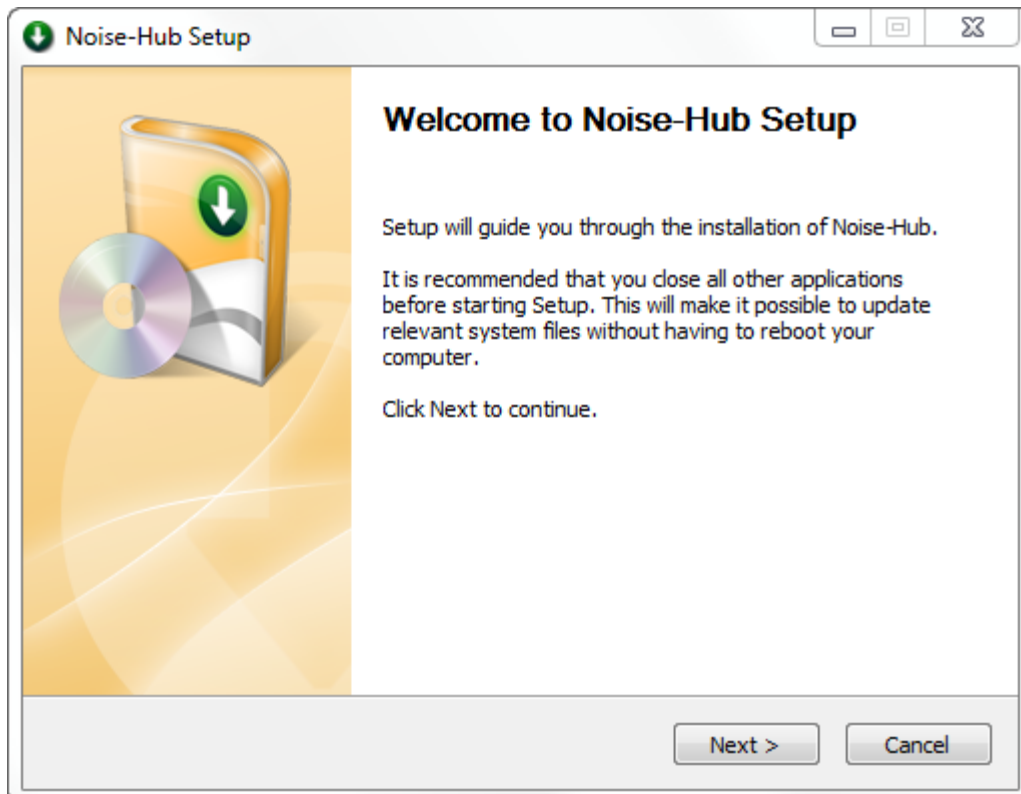
Installing Noise-Hub2

Noise-Hub2 can be installed onto either a stand-alone PC or a server.

Installation of the core files is the same for both options and is covered in the following section.

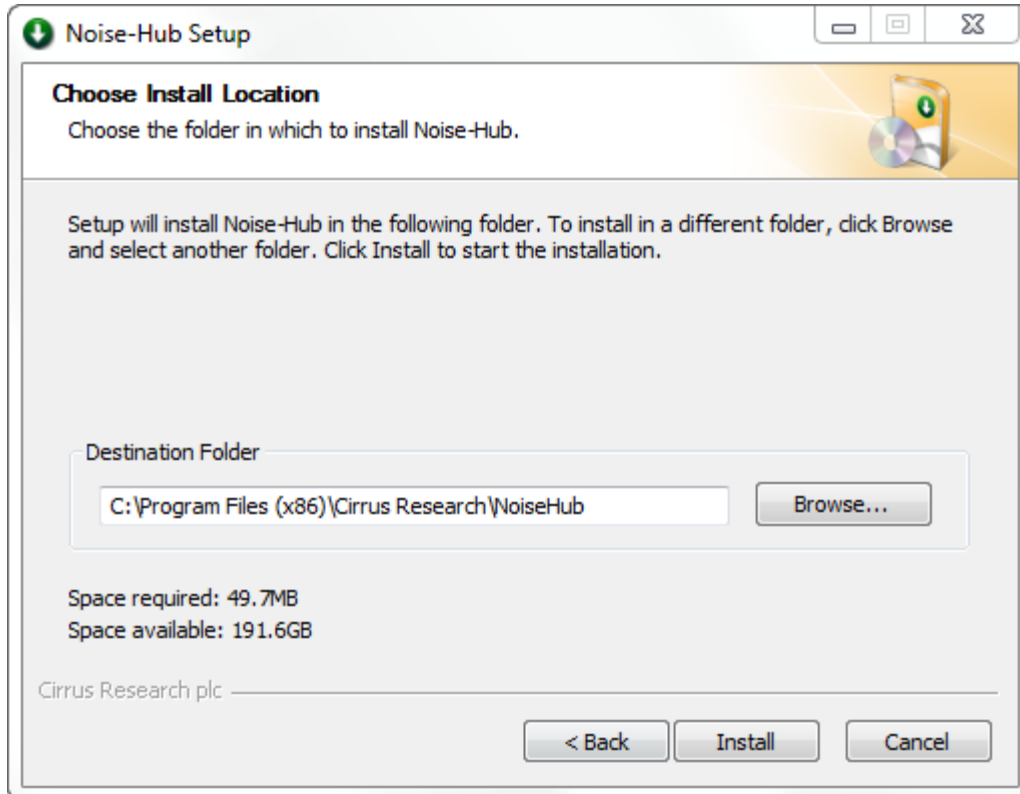
Configuration of the software is carried out the first time it is run and at this point, the choice is available to install Noise-Hub2 as a stand-alone program that can be run as and when required, onto a server where it can run as a service or onto a network client which can connect to a central server.

To install Noise-Hub2, run the installation program and follow each step. You will be required to accept the license agreement and disclaimer before the program can be installed.

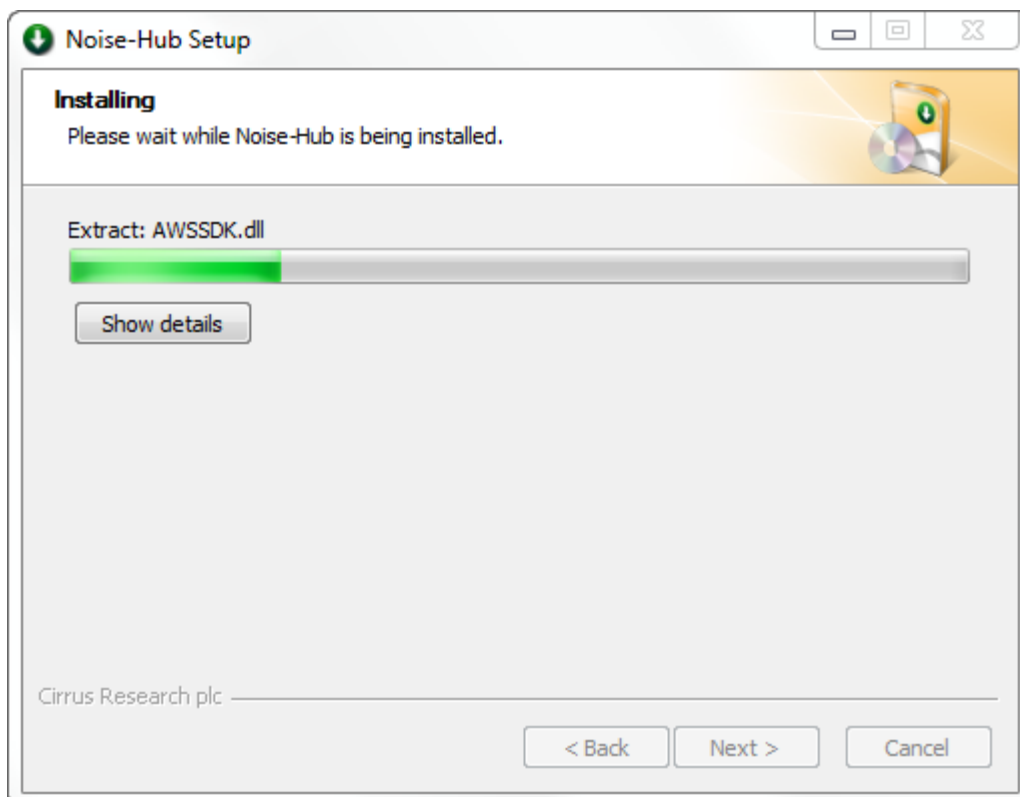


Choose the location required for the installation of the main program files. The database files are stored into the C:\ProgramData\Cirrus Research\NoiseHub Core directory.

When the location for the files has been chosen, click Install and the Noise-Hub2 program.

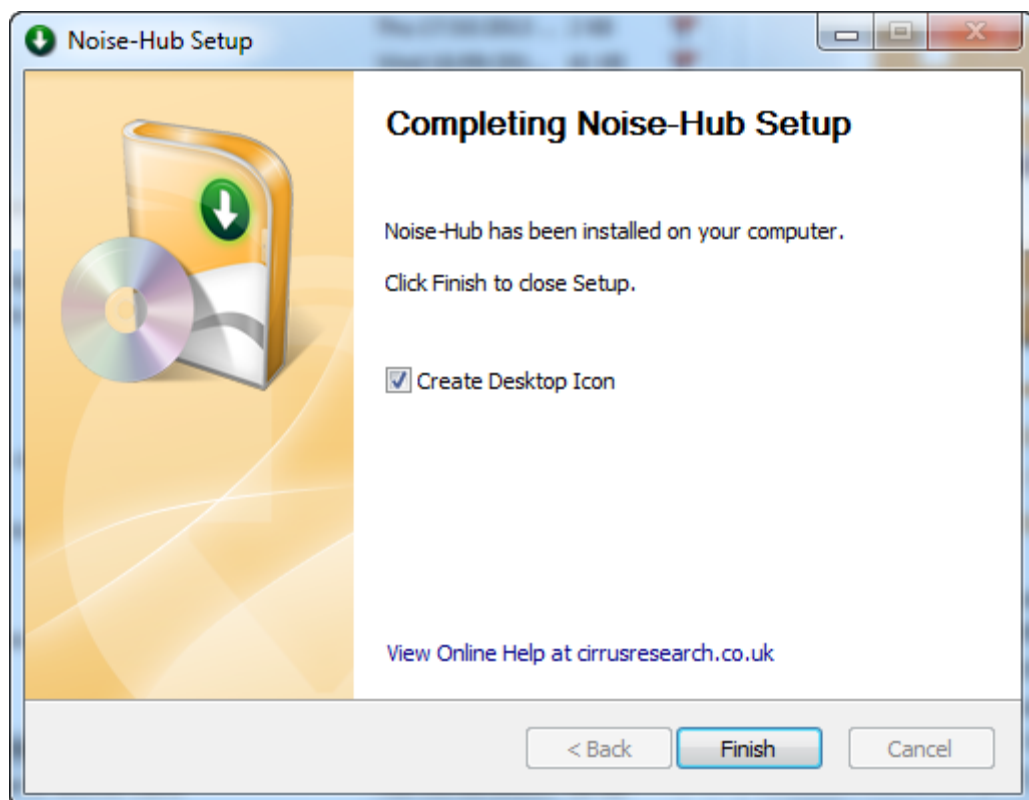


Additional dialogue boxes may appear during the installation as the software.



When the installation is complete, click the finish button.

If the Create Desktop Icon is clicked, a Noise-Hub2 icon will be saved onto the desktop.



Running Noise-Hub2

Running Noise-Hub2

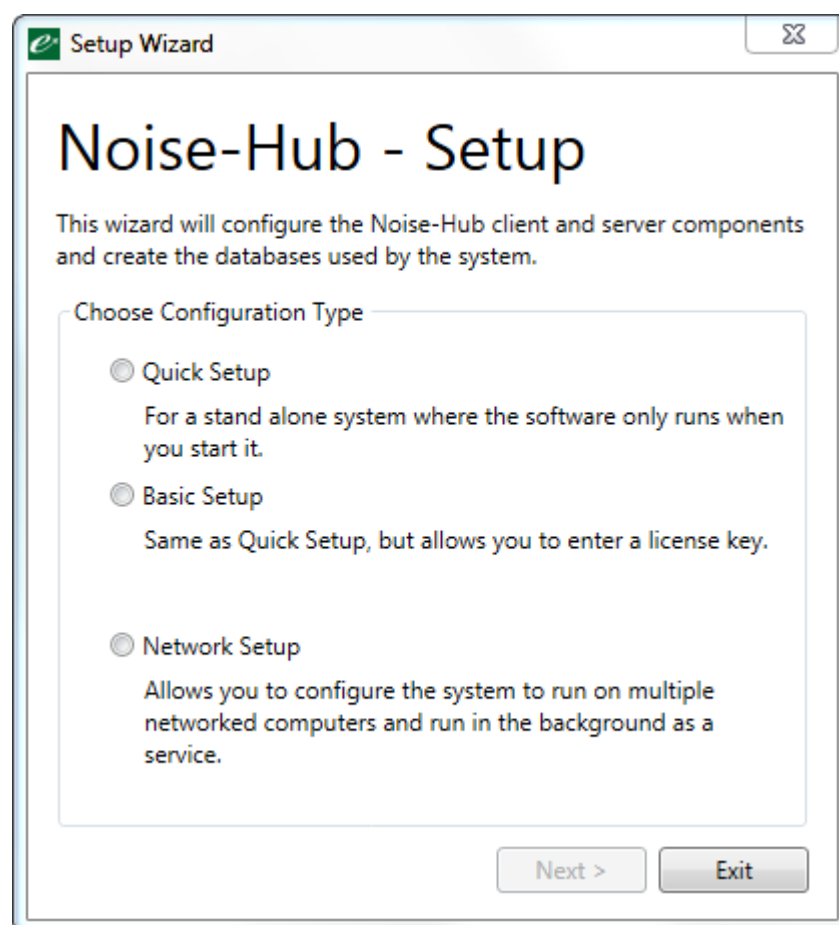
When Noise-Hub2 is first run, the software will go through a configuration process which allows the setup of the software to be chosen.

The options are:

- Quick Setup
- Basic Setup
- Network Setup

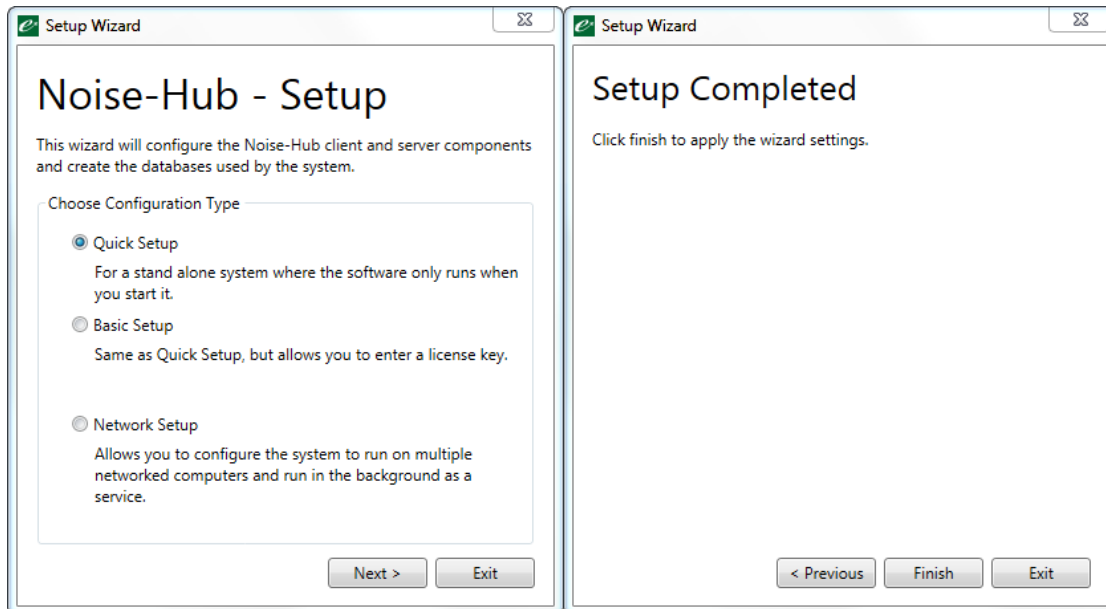
Choose the Network Setup when installing Noise-Hub2 onto a server with local clients

Each of these is covered in the following sections.



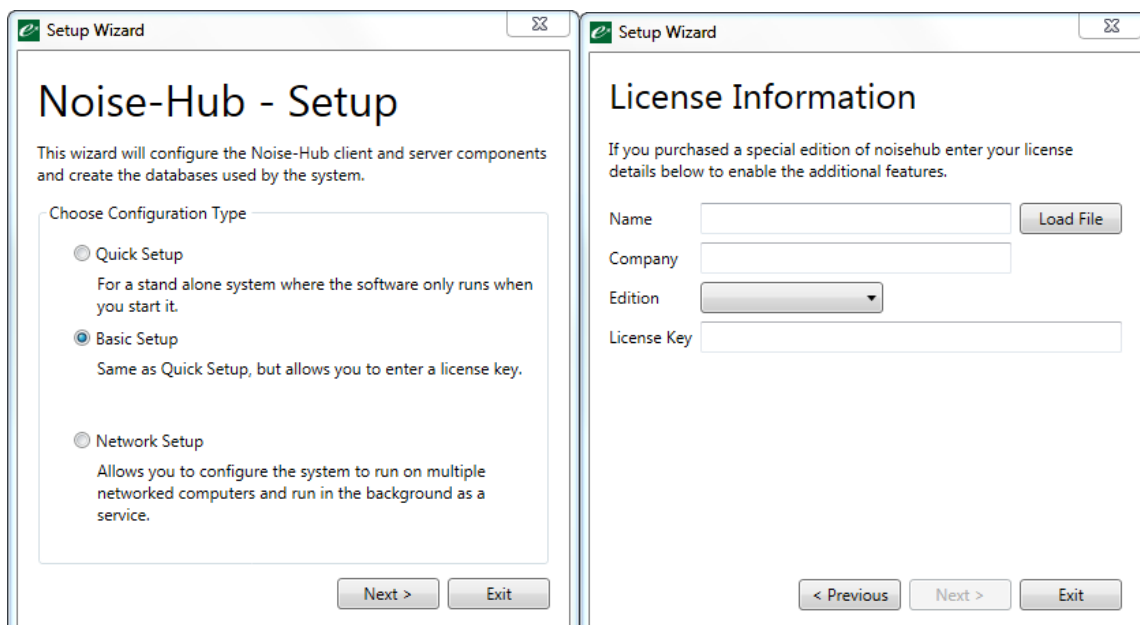
Quick Setup

The quick setup allows the basic version of Noise-Hub2 to be installed. This is a restricted version of Noise-Hub2. For most applications where you have been provided with a license key, use the Basic Setup option.

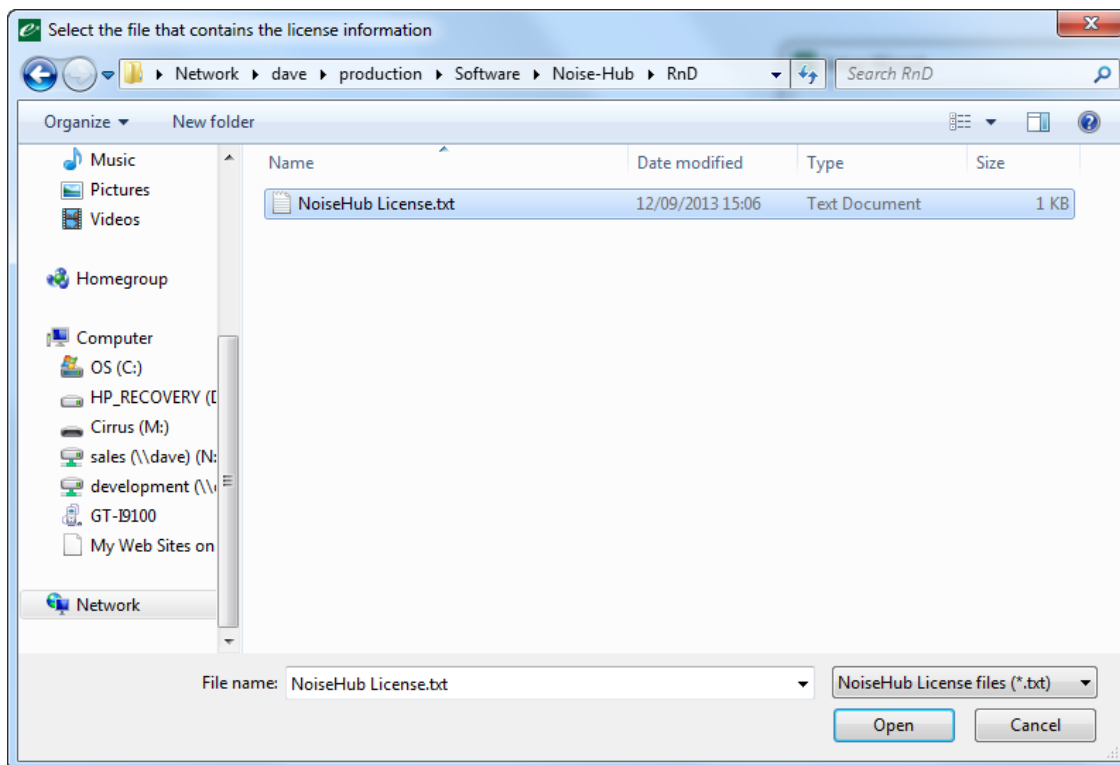


Basic Setup

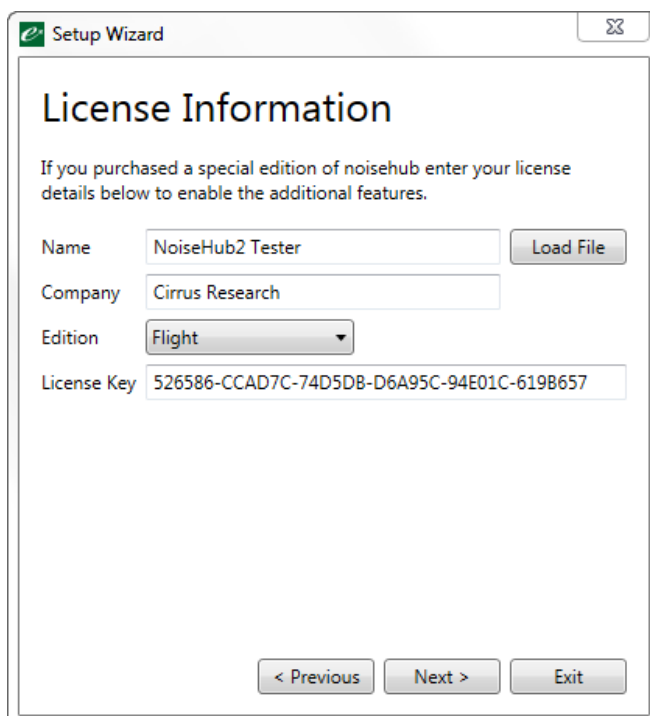
This option allows a license key to be entered, unlocking specific functions and features within the software.



The license key is supplied as a simple text file which can be loaded into the installation program. Locate the file on the installation CD:



When the license key has been loaded, details are shown in the next window:



Click Finish to complete the installation.

Network Setup

The network setup option allows the Noise-Hub2 software to be installed onto a server, allowing remote clients to connect to a central database.

The software must be installed onto a server before the clients are added.

Setting up the Server

From the installation options, choose Network Setup, click Next> and enter the license key information from the file:

The image displays two screenshots of the Noise-Hub Setup Wizard. The first screenshot, titled "Noise-Hub - Setup", shows the "Choose Configuration Type" section with three radio buttons: "Quick Setup", "Basic Setup", and "Network Setup". "Network Setup" is selected. The second screenshot, titled "License Information", shows fields for "Name" (NoiseHub2 Tester), "Company" (Cirrus Research), "Edition" (Flight), and "License Key" (526586-CCAD7C-74D5DB-D6A95C-94E01C-619B657). Both windows have "Next >" and "Exit" buttons.

The following set of options allow the configuration of the Noise-Hub server to be chosen:

- Use Local Server
This enables the Noise-Hub2 server and allows clients to connect
- Run as Background Service
Check this box to run the Noise-Hub2 server as a background service
- Database location
The location of the main database files can be changed from the defaults
- Remote Access Settings
 - Control Port
 - Data Port
 - Webserver Port

These settings determine the ports used to access the Noise-Hub2 server from a client machine. Do not change these settings without information from Cirrus Research plc.

Setup Wizard

Server Setup

☒ Use Local Server ☒ Run as Background Service

Database Location

Remote Access Settings

Control Port

Data Port

Webserver Port

< Previous Next > Exit

Click Next and ensure that the information for the ports are the same.

Setup Wizard

Client Setup

Server Name/IP

Remote Access Settings

Control Port Out In

Data Port

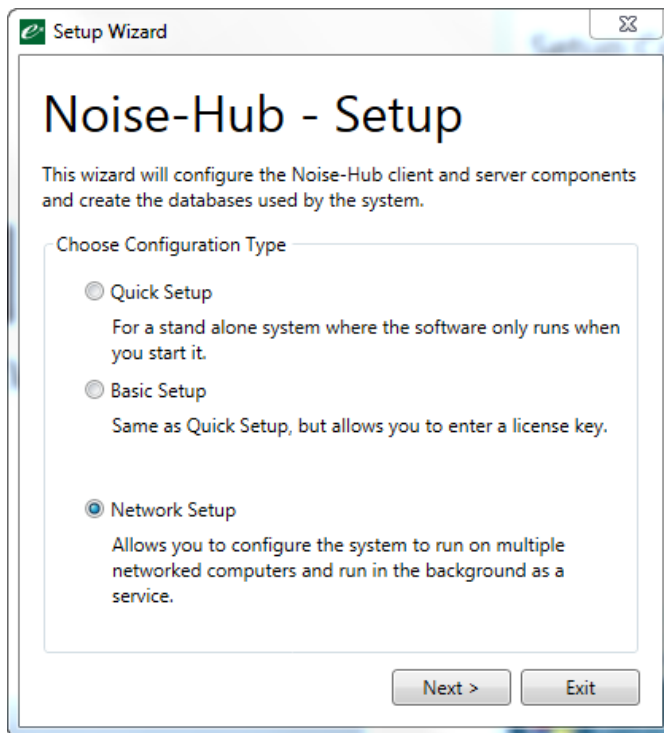
< Previous Next > Exit

The Client Setup is required on the server so ensure that the port numbers the same.

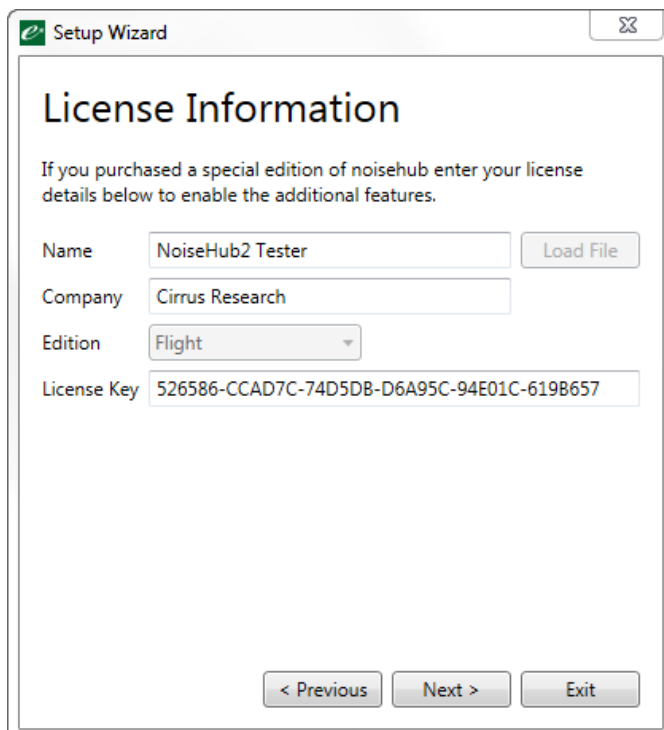
The Server Name/IP is usually left at localhost unless local network protocols require this to be changed. This is the Noise-Hub2 sever that has been installed in the previous step.

Setting up a client on the network

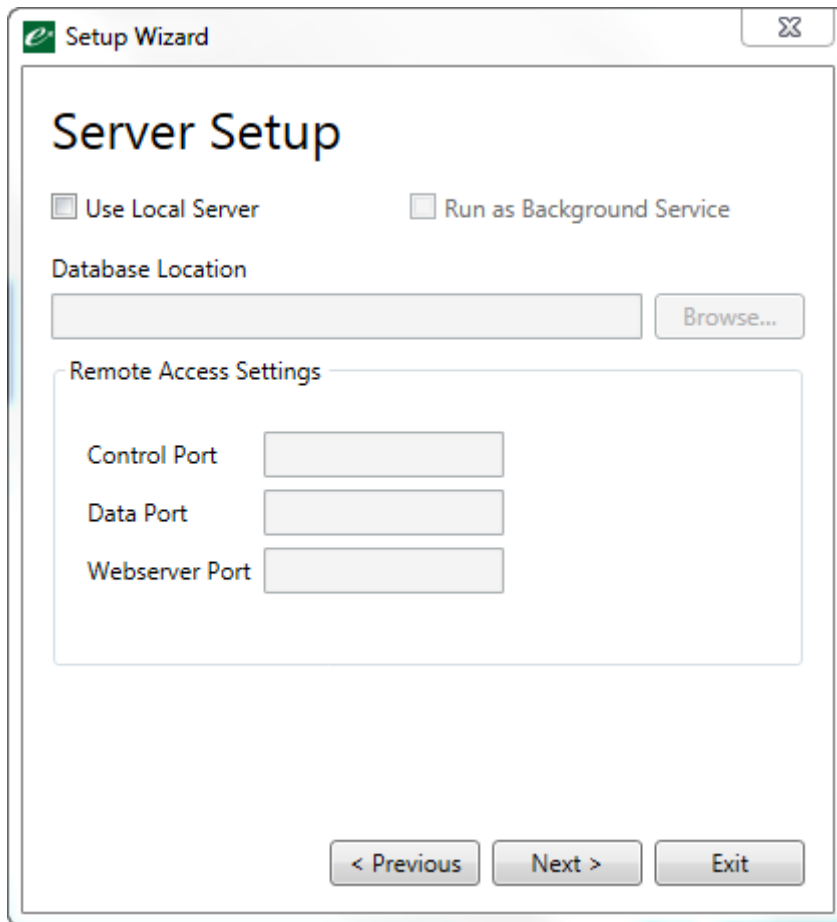
To install a network client to connect to the Noise-Hub2 server configured in the previous section, run the installation program on the client PC and select Network Setup.



Enter the license key information as in the previous sections:



In the next window shown below, ensure that the Use Local Server option is not selected. The other options should not be available.



Click Next.

The next window contains the details of the Noise-Hub2 server installed in the previous section.

You will need either the network name or the IP address of the Noise-Hub2 server and the port numbers used by the server. If these have been changed, for example to allow for remote access, change these as needed.

Client Setup

Server Name/IP: NoiseHub-Server

Remote Access Settings

Control Port Out: 7001 In: 7002

Data Port: 7005

< Previous Next > Exit

Client Setup

Server Name/IP: 192.168.1.342

Remote Access Settings

Control Port Out: 7001 In: 7002

Data Port: 7005

< Previous Next > Exit

Click Next to complete the installation.

Setup Wizard

Setup Completed

Click finish to apply the wizard settings.

< Previous Finish Exit

Noise-Hub2 main screen

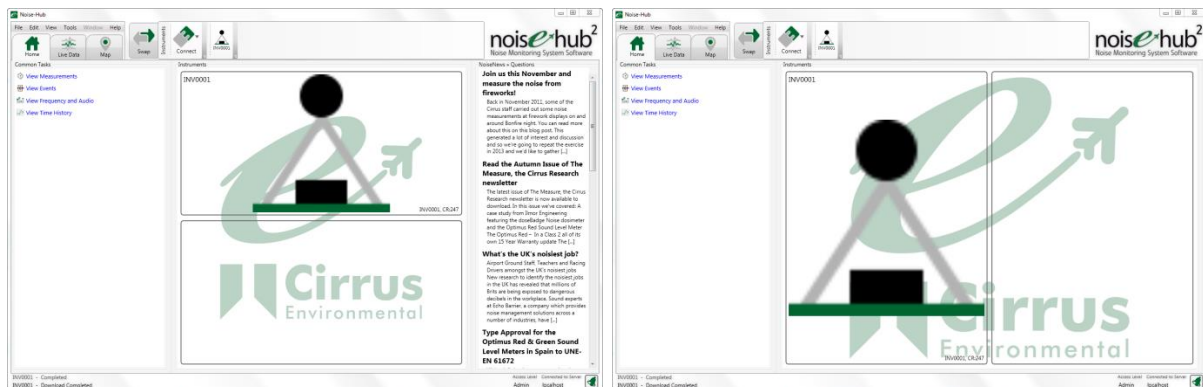
The Noise-Hub2 main screen

The main screen of the Noise-Hub2 software provides quick access to the most commonly used functions.

The Swap button switches between the Instrument and Measurement menus.

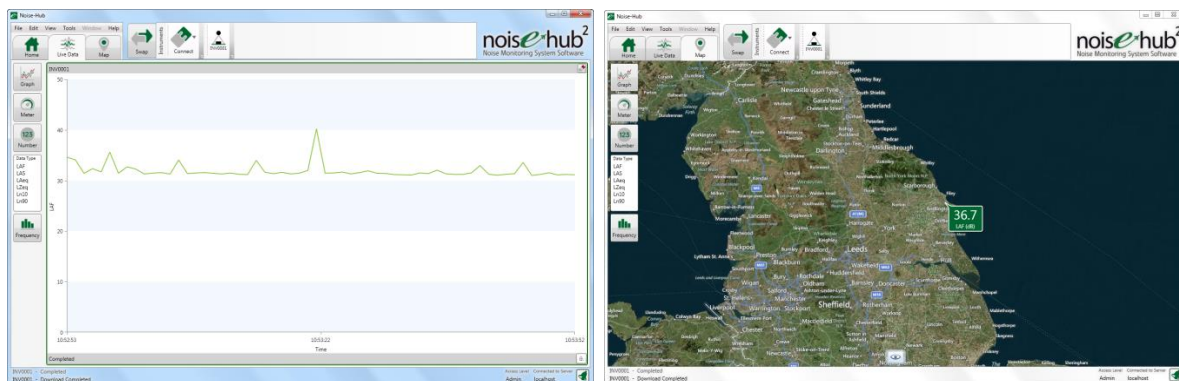
The common tasks window gives quick access to functions such as viewing measurement data. Instruments that have been added to the software are shown in the centre section and news feed is displayed on the right.

The news feed can be hidden by sliding the dividing bar to the right.



When an instrument is connected, the Live Data tab provides a display of the real-time noise levels from the instrument. See the section on Live Data on page 33.

The Map view shows the real-time noise levels from connected noise monitors on a map using the GPS data from the instrument. See the section on Map View on page 33.



Adding instruments to Noise-Hub2

Adding an instrument to Noise-Hub2

The first step when running Noise-Hub2 is to connect an instrument or instruments.

The Invictus noise monitors can be connected via a range of different methods including USB, Cellular Modem, Wi-Fi and Ethernet.

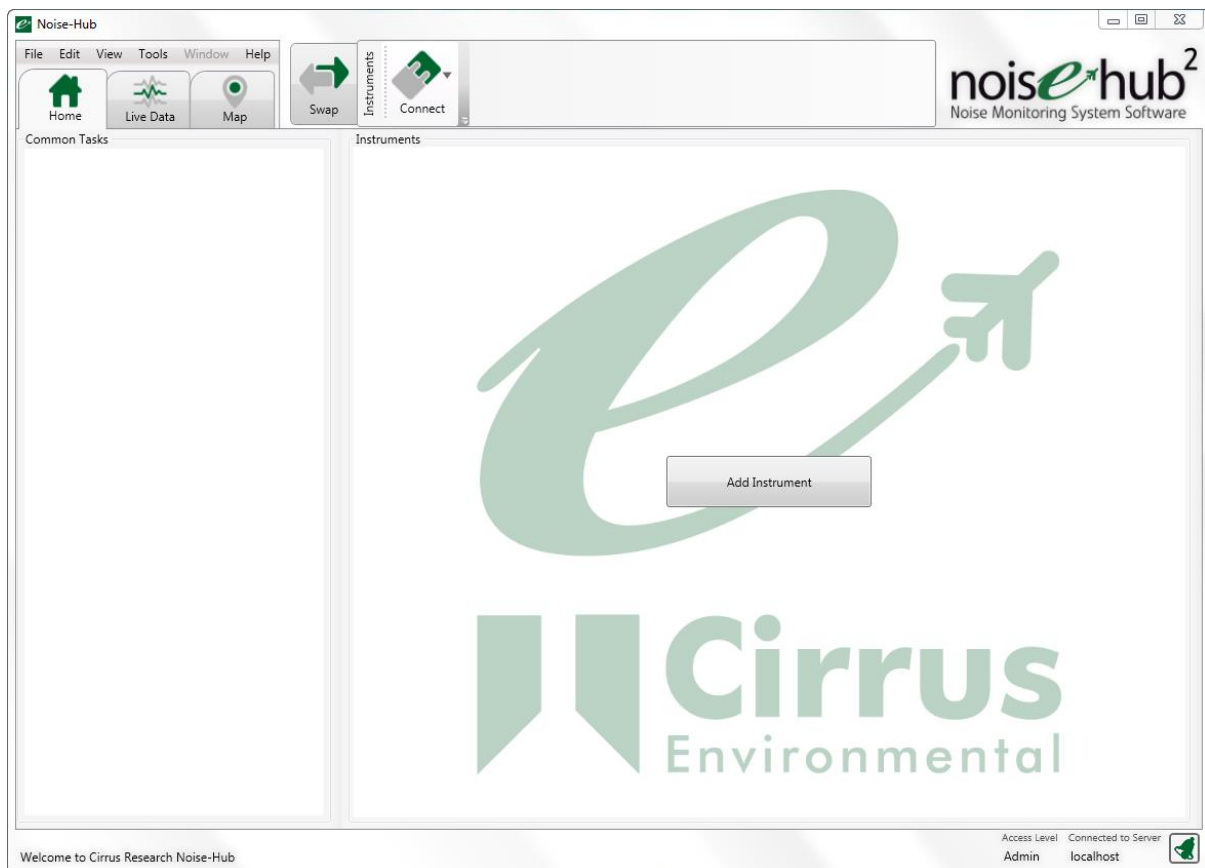
Wi-Fi and Ethernet connections are factory configured. Please contact Cirrus Research plc or your local partner for more information.

Adding an instrument using USB

To add a new instrument using a USB connection, plug the instrument into the PC running the Noise-Hub2 software.

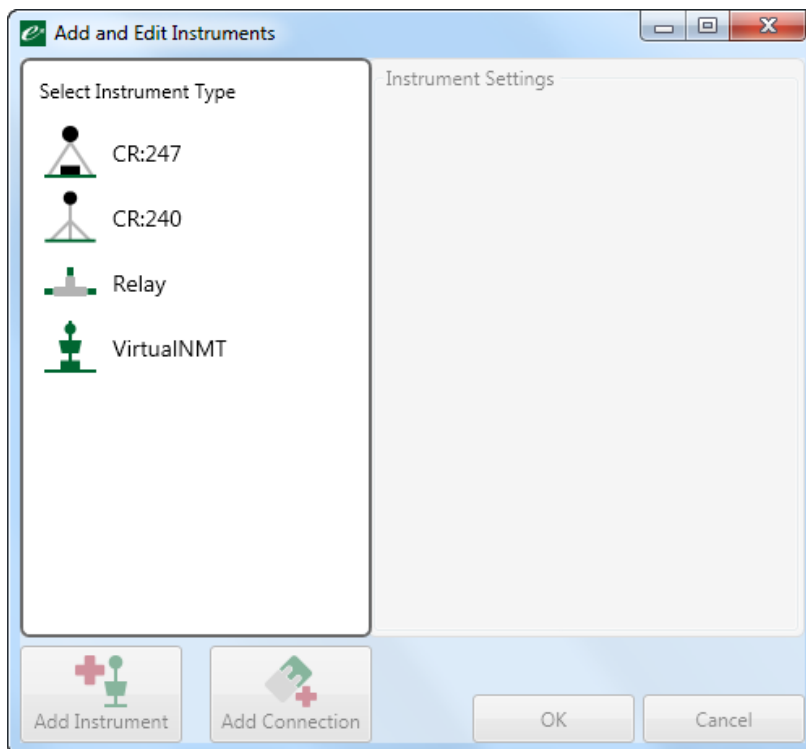
This can be done on either a stand-alone PC, network client or network server.

To add a new instrument, click the Add Instrument box in the middle of the main screen.

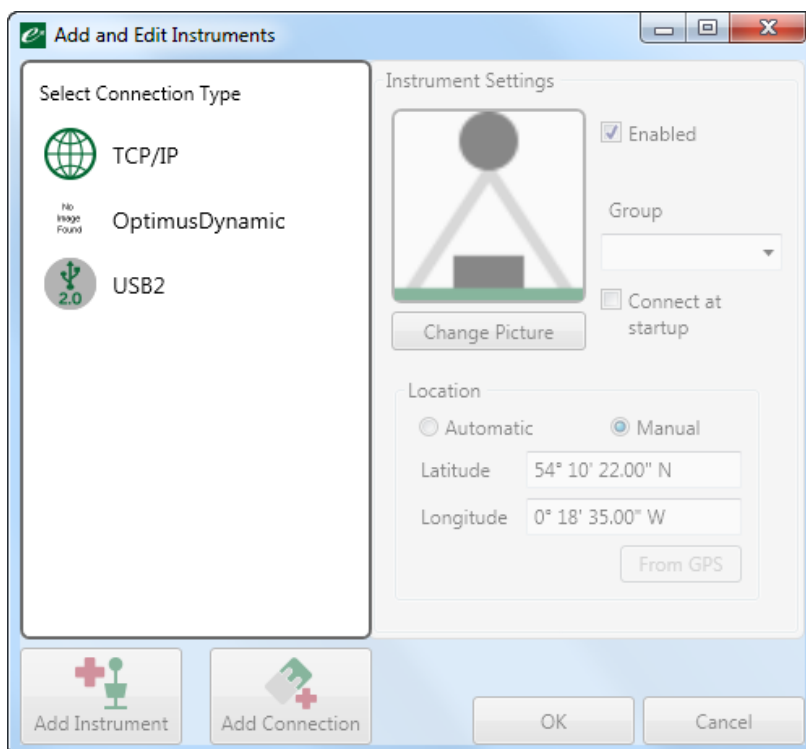


Noise-Hub2 supports the previous generation of Cirrus noise monitors which are known as the CR:240 series.

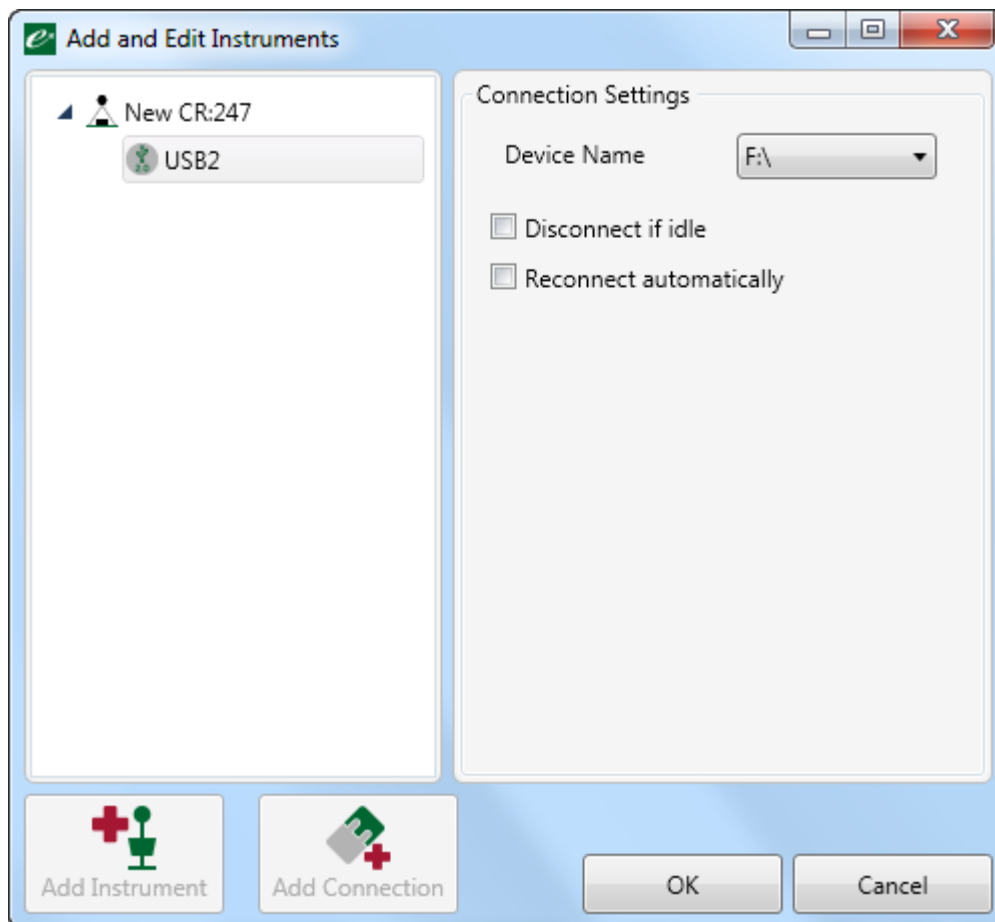
Choose the type of instrument to be connected. In most applications, this will be a CR:247 Invictus.



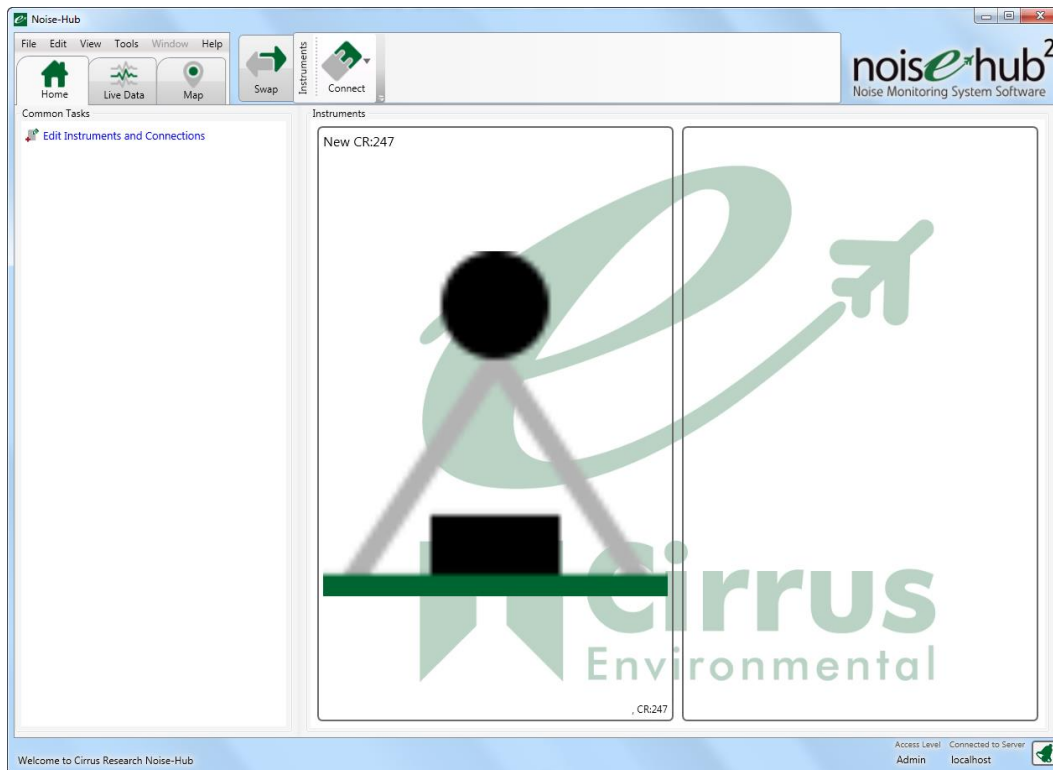
From the next window, choose USB2



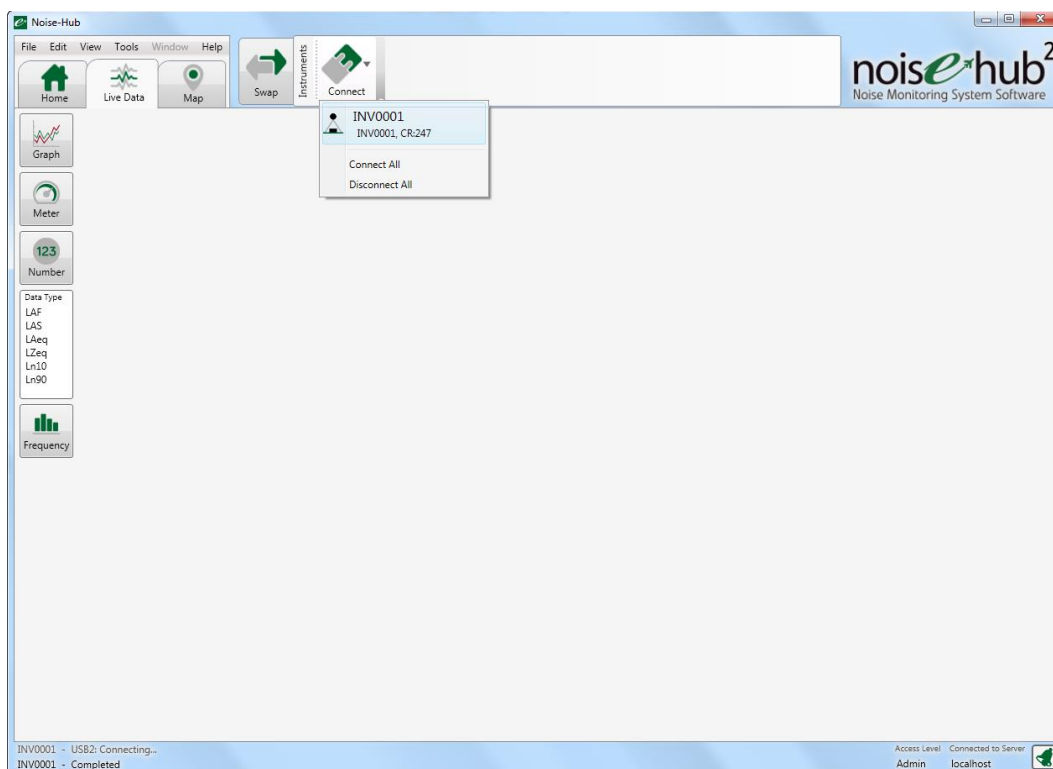
The Invictus instrument appears as a USB mass storage device. In the connection settings, choose the drive letter that corresponds to the Invictus.



Click OK when the setup is complete. On the home screen, the newly added noise monitor will appear.



To connect to the new instrument, click the Connect button at the top of the screen and choose the new instrument which is identified by its name and serial number.

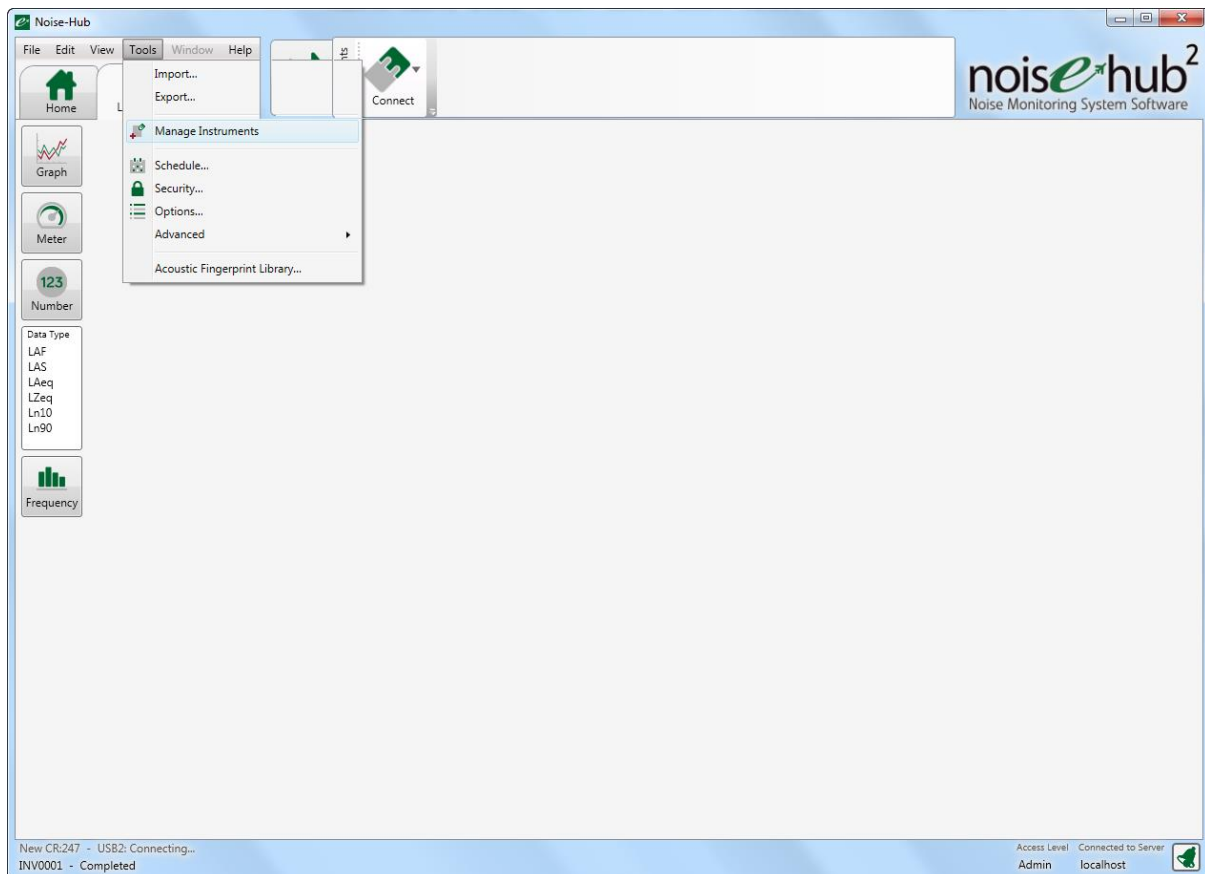


Adding an instrument using a modem connection

The Invictus noise monitor can be connected to the Noise-Hub2 software over a 3G/GPRS data connection using the internal modem.

Please note that the SIM card must provide a public IP address. Details of the SIM card requirements are available from Cirrus Research plc or your local partner.

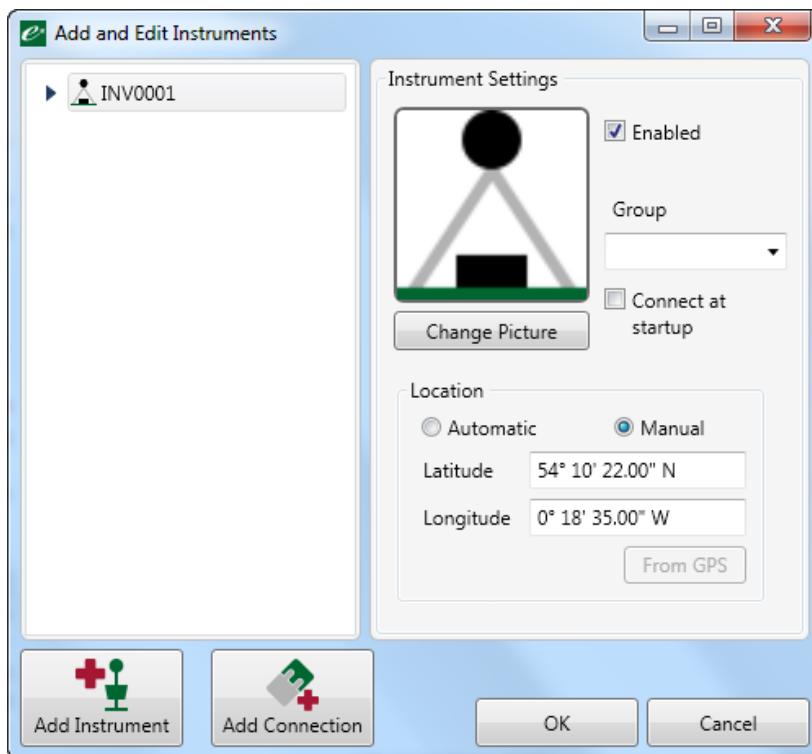
To add a new instrument using a modem, click Tools, Manage Instruments from the main menu.



Click Add instrument to add a new instrument or Add Connection to edit an existing instrument.

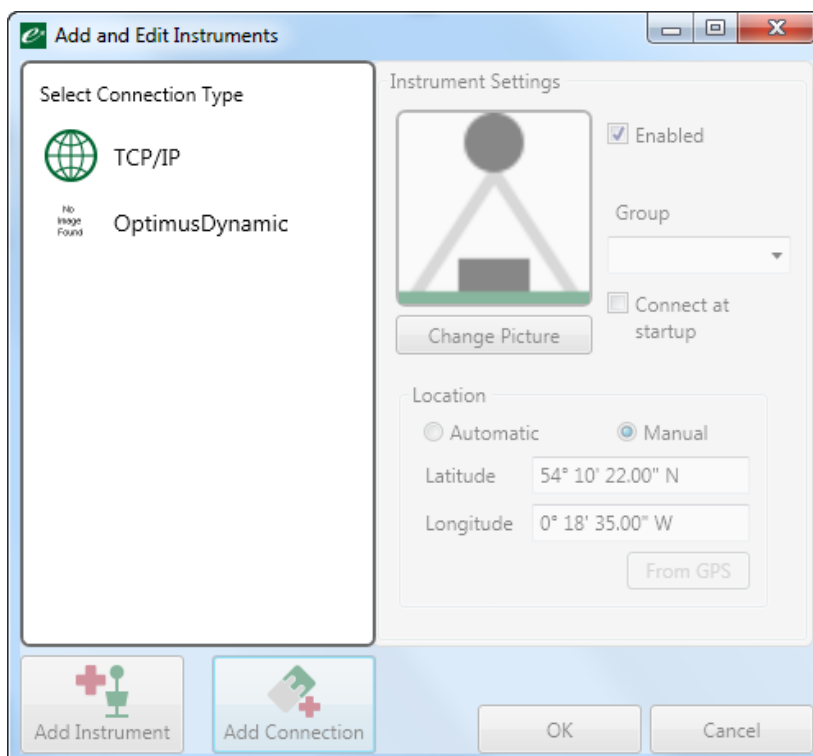
In this example, we will add a new modem connection to the existing Invictus noise monitor INV0001.

Click the Add Connection button.



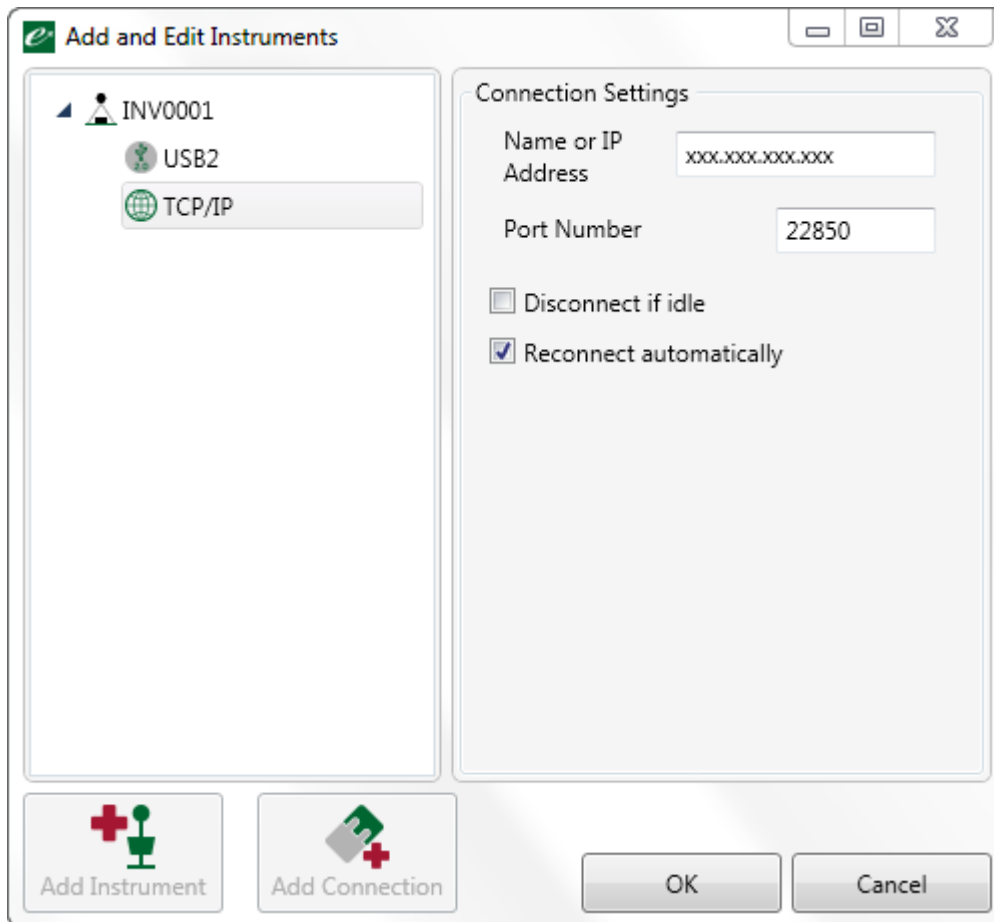
To add a modem connection, the TCP/IP connection is recommended. The Optimus Dynamic connection is available for future use.

Click the TCP/IP option:



The IP address of the SIM card should be entered into the box shown. This information will be available from the SIM provider and must be for a public IP address.

The port number should be left as 22850 unless you have specific information that the port number is different:



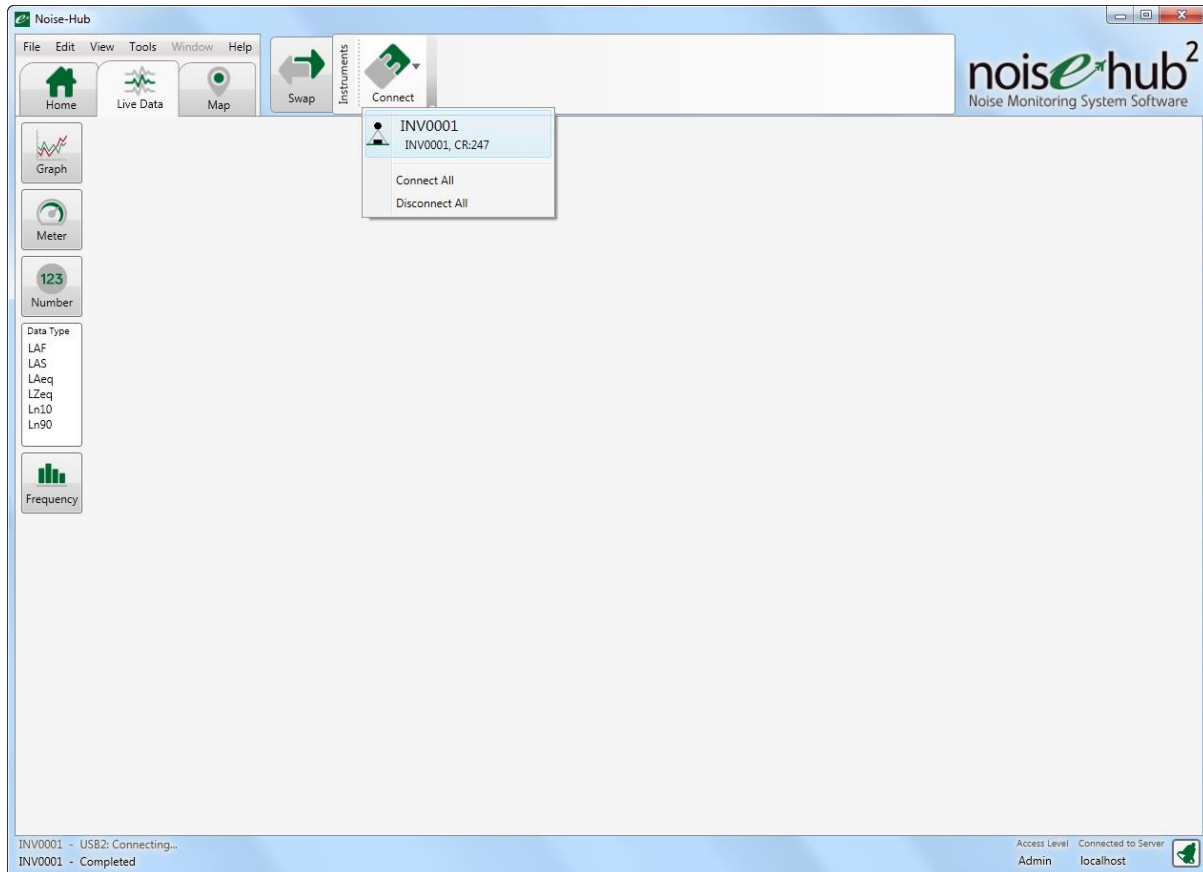
Click the OK box to complete the process.

This instrument can now be connected to via the modem.

Connecting to an instrument

Connecting to the instrument

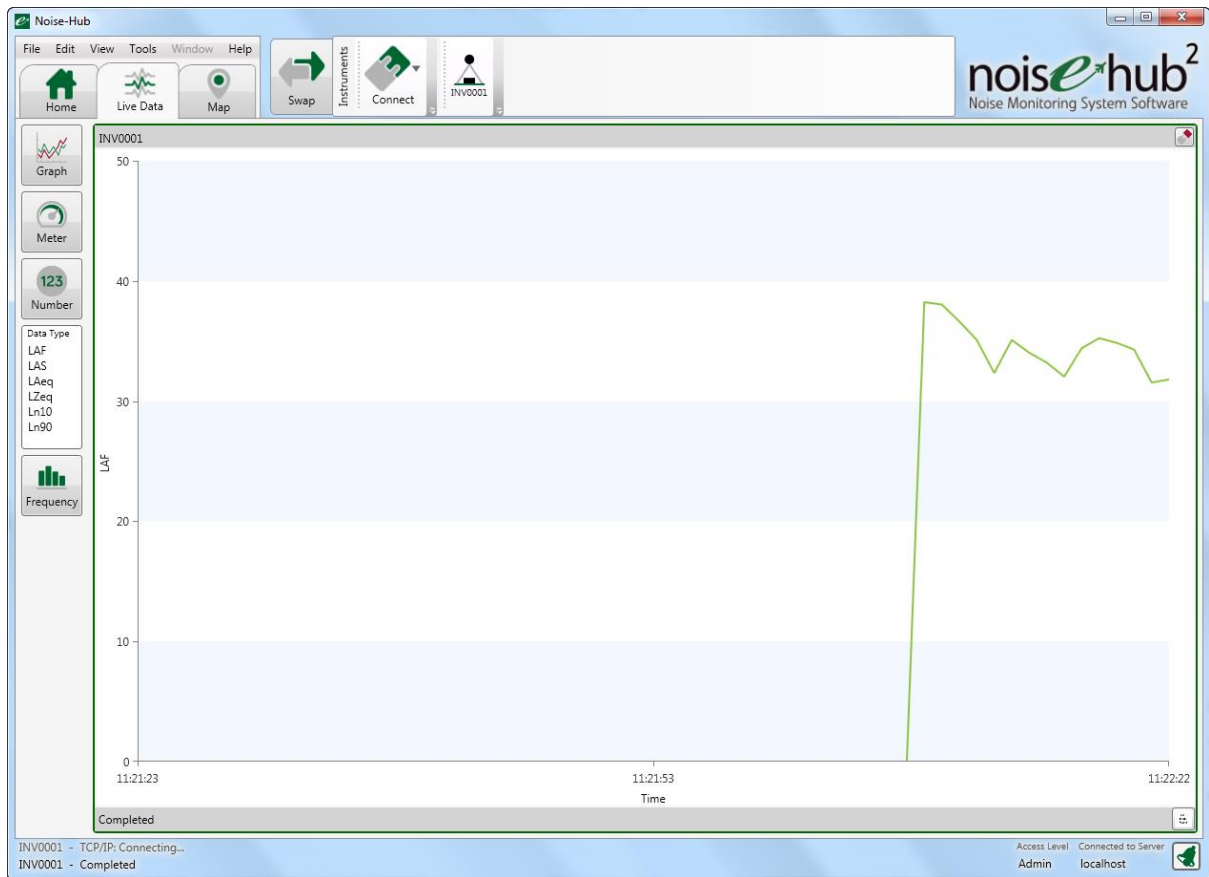
To connect to an instrument, click the Connect button at the top of the screen and choose the instrument required. If more than one instrument is available, they will be listed by serial number.



The Noise-Hub2 software will attempt to connect to the noise monitor using whatever communications method has been configured.

The status of the connection process is shown at the bottom of the screen.

When the instrument is connected, the live noise levels from the instrument will be shown on the screen.



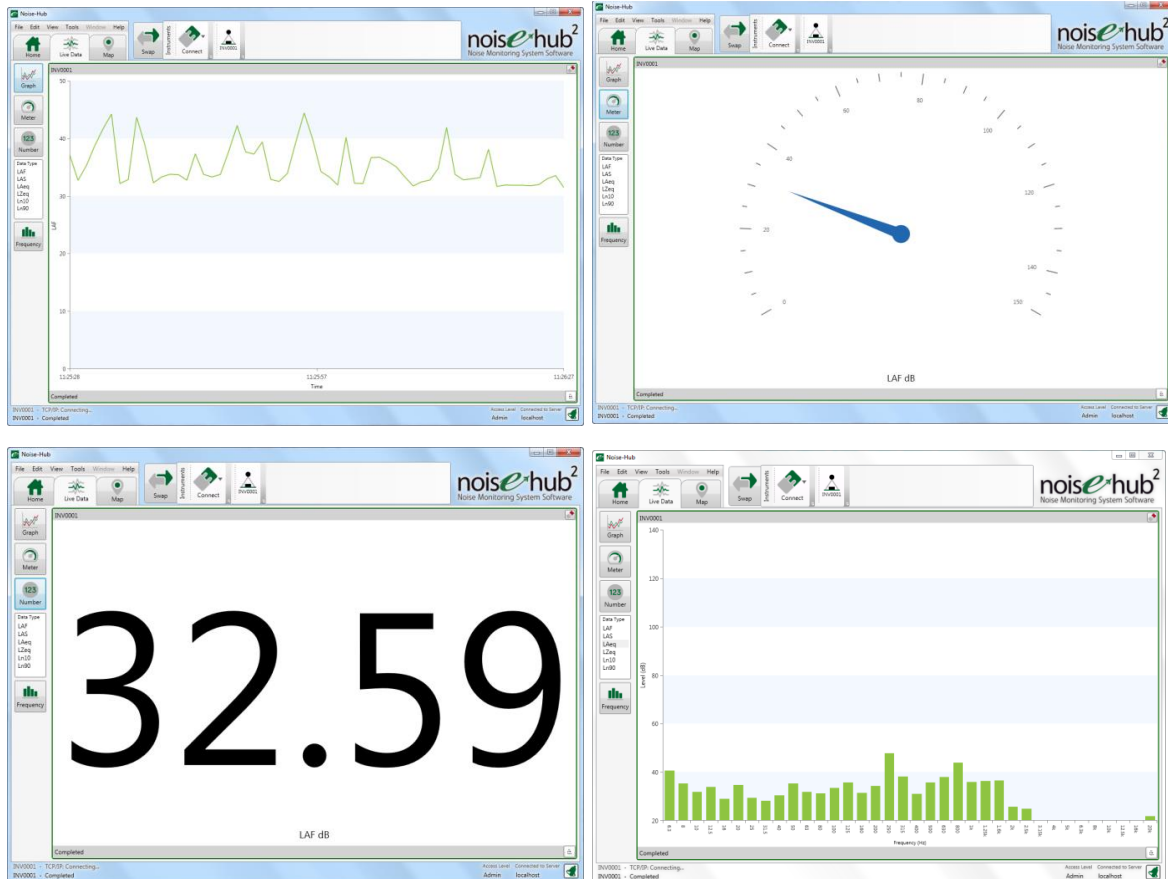
Viewing live data

Viewing live data

The Noise-Hub2 software can display live noise levels from any number of connected noise monitors.

This can be shown as either a line graph, a dial, a number or where available, 1:3 octave bands. For the graph, dial and number, the data type being displayed can also be chosen from the list shown.

To choose the type of data shown, click the data types on the left side of the main screen.



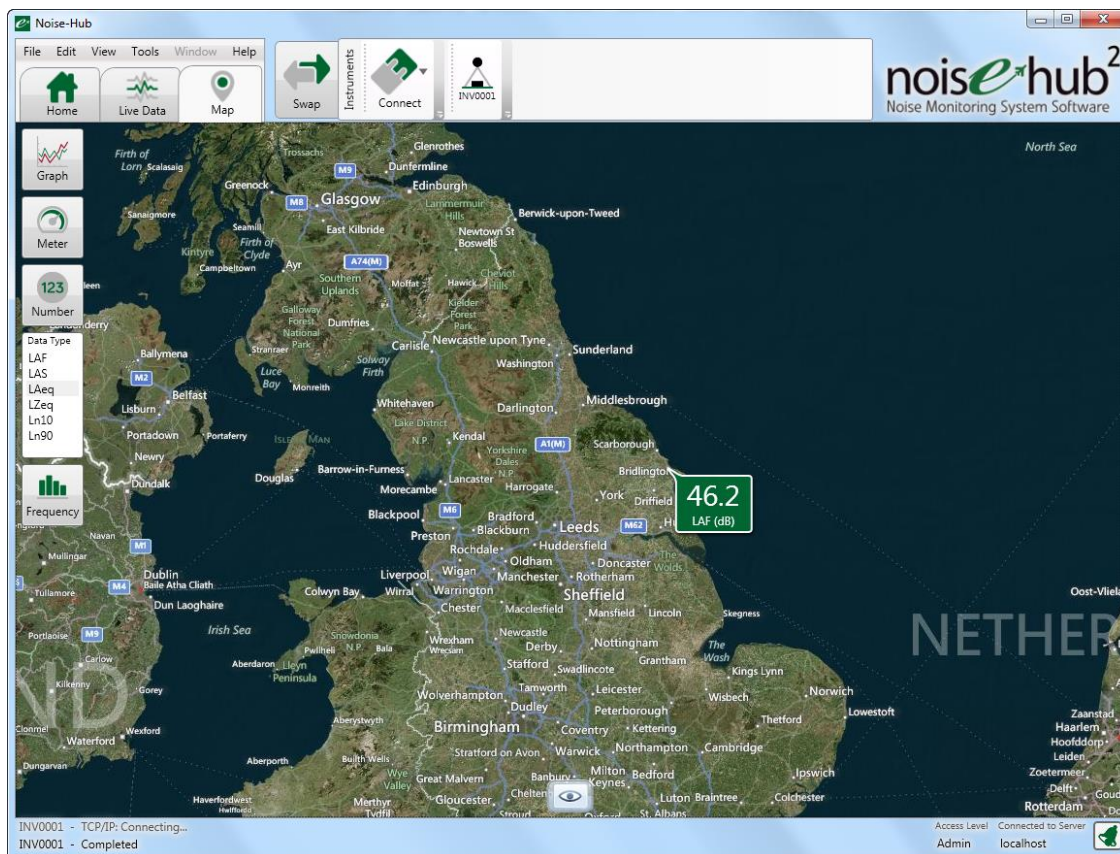
Viewing live noise levels on a map

The live noise levels can also be shown on a map. The Invictus noise monitors include a GPS system which provides an accurate location of the instrument.

When the Map option is selected, the software will show the current live noise level on a map.

This map can be zoomed and panned and switched between map and satellite views.

Click the eye symbol at the bottom of the screen to change the display type.



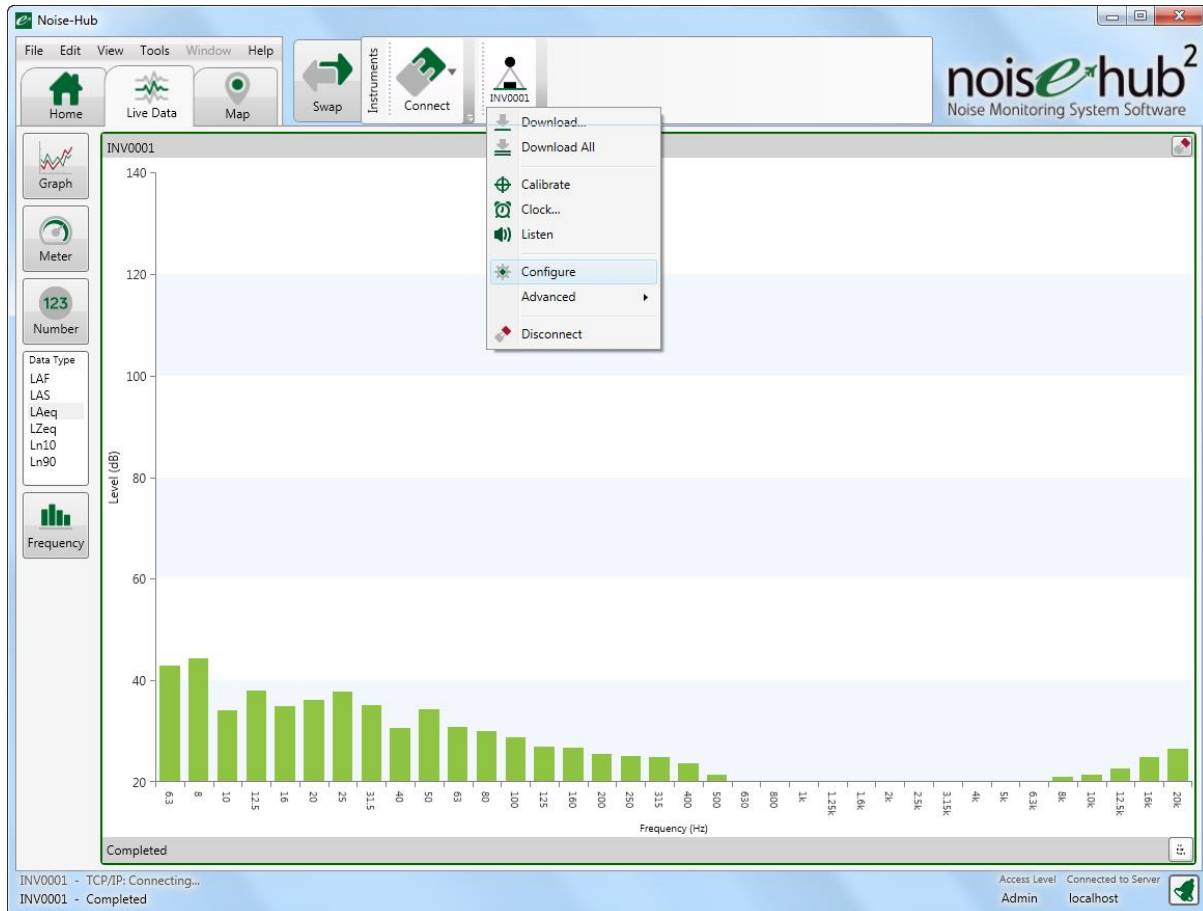
Configuring the Invictus from Noise-Hub2

Configuring the Invictus from the Noise-Hub2 software

The main configuration of the Invictus noise monitor is carried out from within the Noise-Hub2 software.

Certain functions and options may not be available depending upon the specification of the instrument and the license key data in the Noise-Hub2 software. Options that are not available will not be able to be selected.

Connect to the instrument and from the menu, select the instrument and choose the Configure option.



The configuration options are:

- Storage
- Audio
- Ln
- Communications
- Miscellaneous

Configuring measurements

The Invictus noise monitors provide a wide range of acoustic measurement parameters and these are controlled by the measurement control system.

The instrument stores two types of acoustic data, time history and overall measurements.

Time history is data which is stored over short periods of time, typically 1 second, whereas overall measurements are stored over longer periods, typically 15 minutes or 1 hour.

Both of these data stored run at the same time and can be viewed when the information is downloaded to the Noise-Hub2 software.

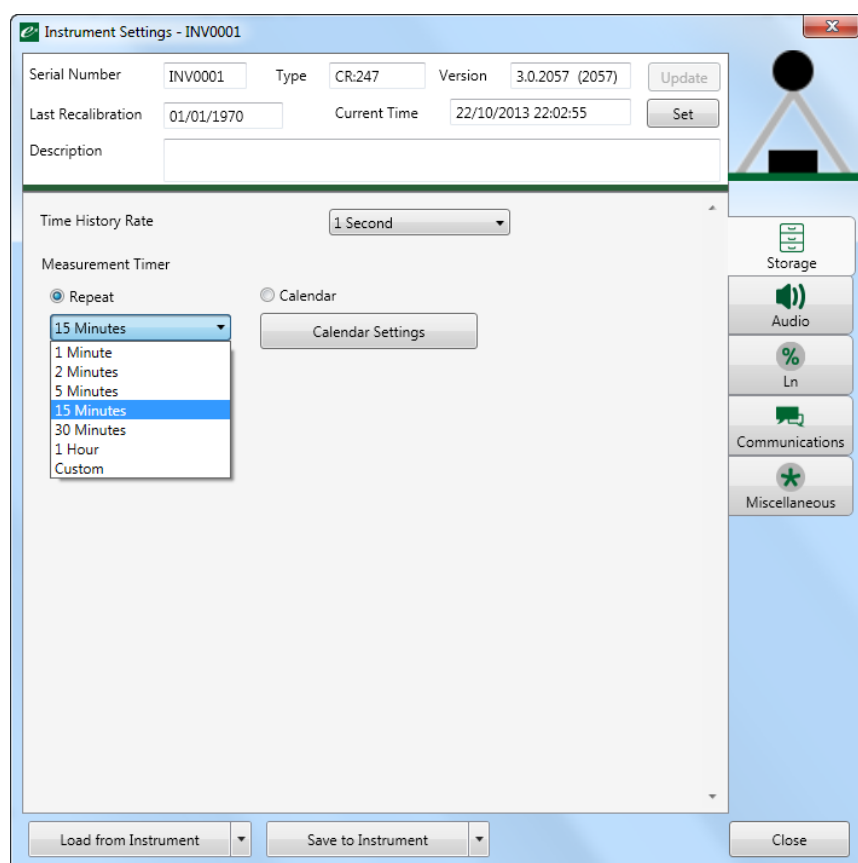
Configuration options are available for both types of measurement data as described in the following sections.

Time history data rate

Measurements are stored as both time history samples and overall measurement data.

The rate at which the time history data is stored can be selected from the Time History Rate list.

If any changes are made, click the Save to Instrument button to load the new settings into the connected instrument.



Overall measurements

Overall measurements are managed by the measurement control system.

This allows measurements to be made using either a simple repeating timer or using an advanced calendaring system.

Repeat timer

To use the simple repeat timer, check the Repeat Timer button and choose the measurement duration required.

Press the Save to instrument button to load the settings into the Invictus instrument.

The screenshot shows the 'Instrument Settings - INV0001' window. At the top, there are fields for 'Serial Number' (INV0001), 'Type' (CR:247), 'Version' (3.0.2057 (2057)), 'Last Recalibration' (01/01/1970), and 'Current Time' (22/10/2013 22:02:55). Below these are buttons for 'Update' and 'Set'. A 'Description' field is also present. The 'Time History Rate' is set to '1 Second'. Under 'Measurement Timer', the 'Repeat' radio button is selected, and a dropdown menu is open showing options: '1 Minute', '2 Minutes', '5 Minutes', '15 Minutes' (highlighted), '30 Minutes', '1 Hour', and 'Custom'. The 'Calendar' radio button is unselected, and a 'Calendar Settings' button is visible. On the right side, there is a vertical toolbar with icons for 'Storage', 'Audio', 'Ln', 'Communications', and 'Miscellaneous'. At the bottom, there are buttons for 'Load from Instrument', 'Save to Instrument', and 'Close'.

Calendar-based measurements

The second option for controlling measurements is the Calendar.

This system allows measurements to be changed depending upon the day of the week and the time of the day.

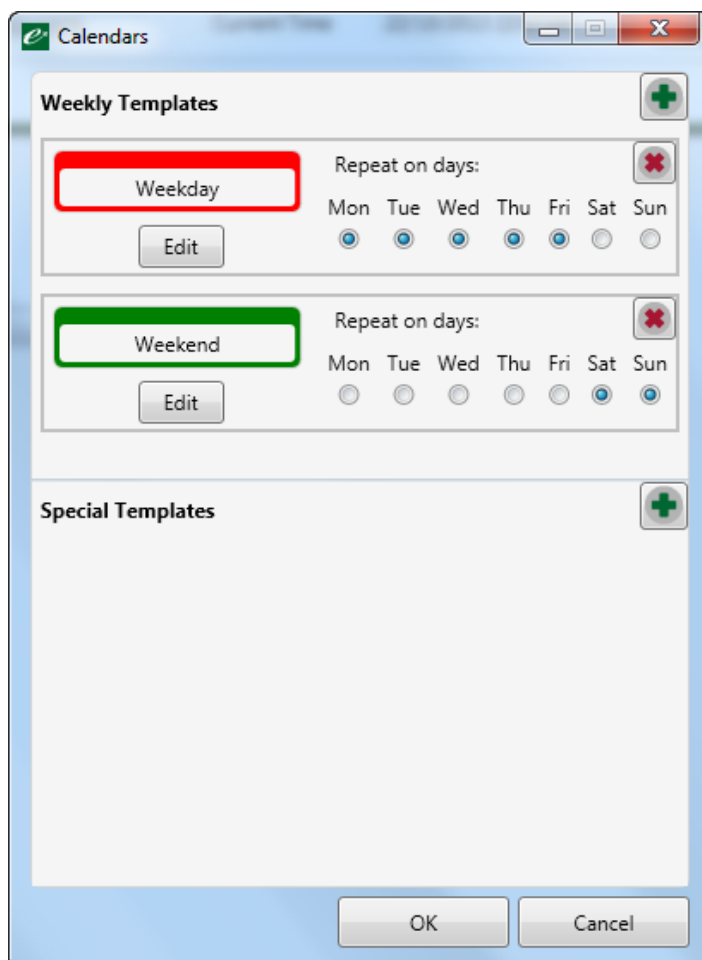
The calendar also allows the instrument to stop recording data at certain times as well as changing the triggers that are active at any time.

An example of where this can be used is in the measurement of noise from a construction site.

Different noise limits and measurement durations may be in force on different days and the calendar system allows these requirements to be handled in the instrument, removing the need to post-process the measurement data.

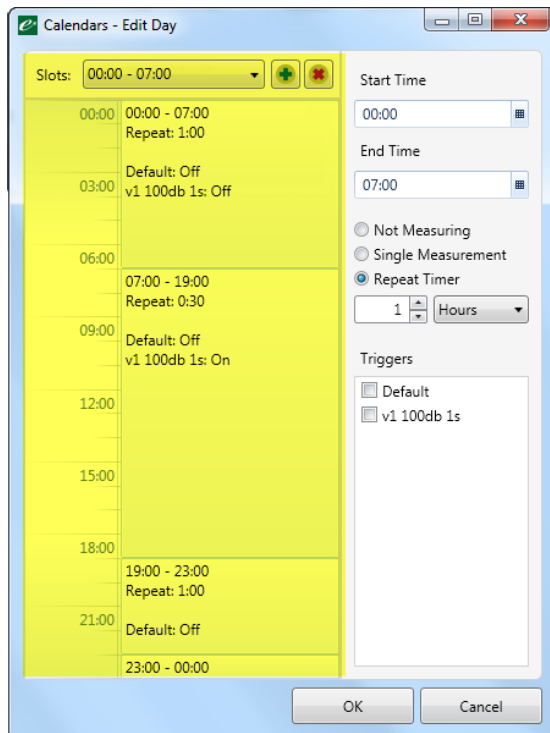
The calendar system also allows special templates to override existing settings. This can be used, for example, to change the settings on bank holidays or where special conditions exist.

The calendar is split into weeks with different settings for weekdays and weekends as shown below.

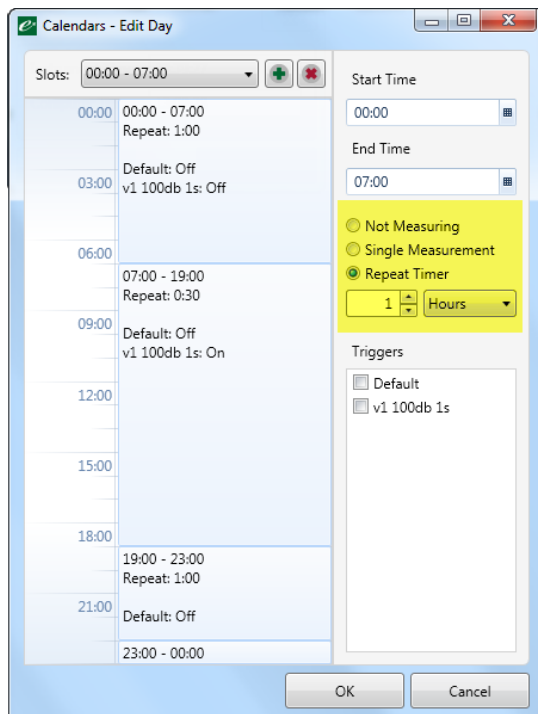


The Edit box below shows the different options:

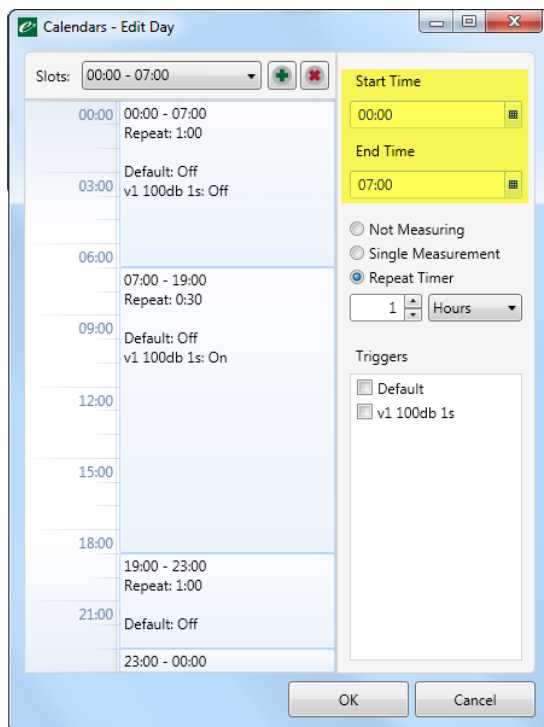
The slots are shown in the left hand panel. Slots can be added or deleted using the + and x buttons.



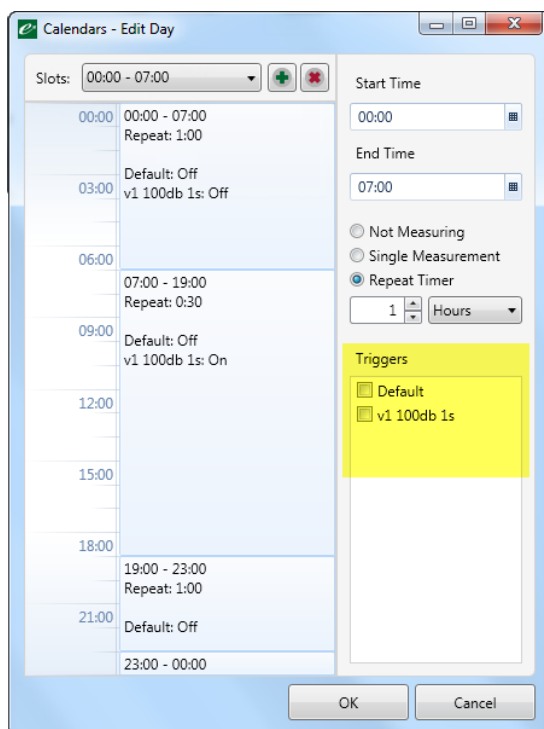
Within each time slot, timers can be set to either Not Measuring (the instrument will store no data), Single Measurement or Repeat Measurement.



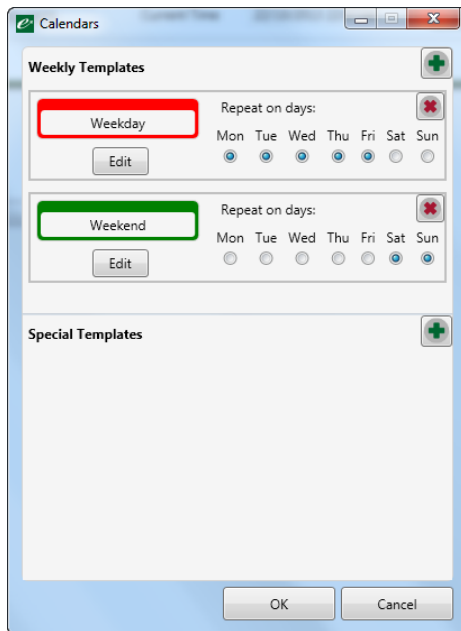
The start and end time of a measurement slot can be adjusted manually or changed by dragging the controls handles on the sections.



The available triggers are shown in this box. Any or all triggers can be enabled during any time period.

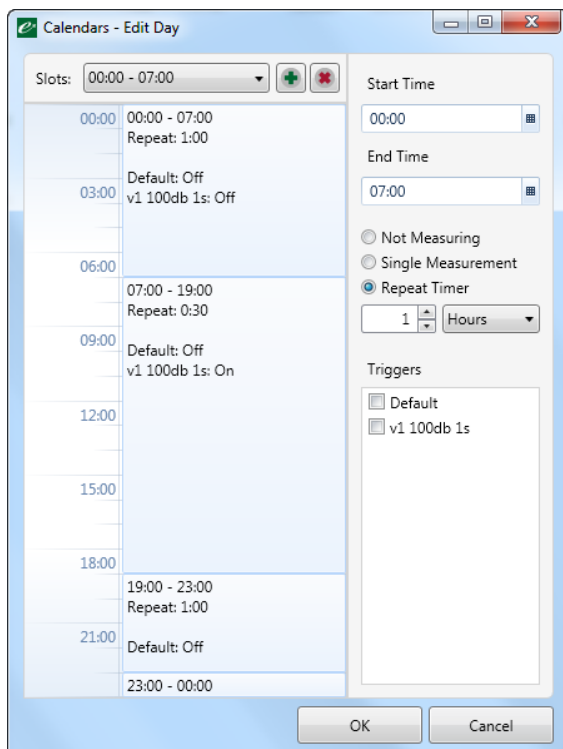


To edit the settings, click the Edit button below the appropriate section.



In this example, the weekday settings Edit has been clicked. The measurements are set as follows:

1. 00:00 - 07:00 Repeat 1 hour measurements with trigger templates switched off
2. 07:00 - 19:00 Repeat 30 minute measurements with trigger v1 100dB 1s switched on
3. 19:00 - 23:00 Repeat 1 hour measurements with trigger templates switched off



To change any settings, click on the time period and adjust the settings in the right hand side options. For example, click the v1 100db 1s Trigger to enable it between 07:00 and 19:00:

Calendars - Edit Day

Slots: 07:00 - 19:00

| Time | Configuration |
|-------|----------------------------------|
| 00:00 | 00:00 - 07:00 Repeat: 1:00 |
| 03:00 | Default: Off v1 100db 1s: Off |
| 06:00 | |
| 09:00 | 07:00 - 19:00 Repeat: 0:30 |
| 12:00 | Default: Off v1 100db 1s: On |
| 15:00 | |
| 18:00 | |
| 21:00 | 19:00 - 23:00 Repeat: 1:00 |
| 23:00 | Default: Off |

Start Time: 07:00

End Time: 19:00

☐ Not Measuring
☐ Single Measurement
☒ Repeat Timer

30 Minutes

Triggers

- ☐ Default
- ☒ v1 100db 1s

OK Cancel

Adding a new measurement period

To add a new time slot, click the + button and a new period will appear. In this case, the new period is 05:00 - 06:00.

Change the settings for this slot as required and click OK.

The screenshot shows the 'Calendars - Edit Day' window. On the left, a list of time slots is displayed. The slot '05:00 - 06:00' is selected and highlighted. To the right of the list, the settings for the selected slot are shown. The 'Start Time' is set to 05:00 and the 'End Time' is set to 06:00. Under the 'Repeat' section, the 'Repeat Timer' option is selected with a value of 15 minutes. In the 'Triggers' section, both 'Default' and 'v1 100db 1s' are checked. At the bottom of the window are 'OK' and 'Cancel' buttons.

| Slot | Start Time | End Time | Repeat | Triggers |
|---------------|------------|----------|----------------------------------|----------------------|
| 00:00 | 00:00 | 05:00 | Repeat: 2:00 | |
| 03:00 | | | Default: Off v1 100db 1s: Off | |
| 05:00 - 06:00 | 05:00 | 06:00 | Repeat Timer: 15 Minutes | Default, v1 100db 1s |
| 06:00 | 06:00 | 19:00 | Repeat: 1:00 | |
| 09:00 | | | Default: Off v1 100db 1s: Off | |
| 12:00 | | | | |
| 15:00 | | | | |
| 18:00 | | | | |
| 19:00 - 23:00 | | | Repeat: 2:00 | |
| 21:00 | | | Default: Off | |
| 23:00 - 00:00 | | | | |

Special Templates

The special template option allows different conditions to be applied to individual days. This can be used for bank holidays where a lower noise limit may be in force or where there will be some specific activity taking place.

Special templates override any currently active templates.

To add a special template, click the + button and choose the date.

Click Edit to adjust the measurements and templates for the specific day.

Calendars

Weekly Templates

Weekday Repeat on days: ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri ☐ Sat ☐ Sun

Weekend Repeat on days: ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☒ Sat ☒ Sun

Special Templates

Special 1 Use on dates: 31/10/2013

OK Cancel

Calendars - Edit Day

Slots: 00:00 - 07:00

| | |
|-------|----------------------------------|
| 00:00 | 00:00 - 07:00 Repeat: 1:00 |
| 03:00 | Default: Off v1 100db 1s: Off |
| 06:00 | 07:00 - 19:00 Repeat: 1:00 |
| 09:00 | Default: Off v1 100db 1s: Off |
| 12:00 | |
| 15:00 | |
| 18:00 | 19:00 - 23:00 Repeat: 1:00 |
| 21:00 | Default: Off |
| 23:00 | 23:00 - 00:00 |

Start Time: 00:00

End Time: 07:00

☐ Not Measuring
☐ Single Measurement
☒ Repeat Timer

1 Hours

Triggers

☐ Default
☐ v1 100db 1s

OK Cancel

Audio recording

The Invictus instruments support audio recording during measurements.

The recording of audio is controlled by the triggers which are configured in the Acoustic Fingerprint Library option.

The audio recordings can be stored using one of three different formats:

- Compressed Quality
- Standard Quality
- Studio Quality

These are described in the Invictus User Manual.

The Max Audio Duration limits the amount of time of any one audio recording. This can be useful to limit the amount of storage space used.

The Audio Pre-Trigger Time specifies the amount of duration of audio stored from before the trigger was activated.

The Audio Triggers section allows user configuration of the triggers in the instrument.

If any changes are made, click the Save to Instrument button to load the new settings into the connected instrument.

The screenshot shows the 'Instrument Settings - INV0001' window. At the top, there are fields for 'Serial Number' (INV0001), 'Type' (CR:247), 'Version' (3.0.2057 (2057)), 'Last Recalibration' (01/01/1970), and 'Current Time' (22/10/2013 22:03:51). Below these are 'Update' and 'Set' buttons. A 'Description' text area is also present. The main section contains 'Audio Quality' (Standard Quality), 'Max Audio Duration' (Unlimited), and 'Audio Pre-Trigger Time (s)' (10 Seconds). The 'Audio Triggers' section lists 'Default' and 'v1 100db 1s', both with 'Enabled' checkboxes and red 'X' icons. An 'Acoustic Fingerprint Library' button is next to them. On the right, a vertical sidebar has icons for 'Storage', 'Audio', 'Ln', 'Communications', and 'Miscellaneous'. At the bottom, there are 'Load from Instrument', 'Save to Instrument', and 'Close' buttons.

Ln values

The Invictus noise monitor provide 2 sets of 7 Ln values, each of which can be independently configured to meet any noise measurement standard, regulation or guideline.

The data type, data rate, time and frequency weighting of each set can be adjusted and user defined Custom Ln values added.

If any changes are made, click the Save to Instrument button to load the new settings into the connected instrument.

Instrument Settings - INV0001

Serial Number: INV0001 Type: CR:247 Version: 3.0.2057 (2057) **Update**

Last Recalibration: 01/01/1970 Current Time: 22/10/2013 22:03:57 **Set**

Description:

Set 1

Data Type: **SPL** Data Rate: **1/16 Second** Time Weighting: **Fast** Frequency Weighting: **A**

Custom Lns

L 1.0 **+** **-**

Set 2

Data Type: **SPL** Data Rate: **1/16 Second** Time Weighting: **Fast** Frequency Weighting: **A**

Custom Lns

L 1.0 **+** **-**

Load from Instrument **Save to Instrument** **Close**

Storage **Audio** **Ln** **Communications** **Miscellaneous**

Advanced communication options

The Invictus instruments support a wide range of communications methods. These settings can be adjusted to suit specific application requirements.

These settings should not be changed unless specific information has been provided by Cirrus Research plc.

If any changes are made, click the Save to Instrument button to load the new settings into the connected instrument.

The screenshot shows the 'Instrument Settings - INV0001' window. At the top, there are fields for 'Serial Number' (INV0001), 'Type' (CR:247), 'Version' (3.0.2057 (2057)), 'Last Recalibration' (01/01/1970), and 'Current Time' (22/10/2013 22:04:03). There are 'Update' and 'Set' buttons. Below this is a 'Description' field. The main area is divided into two columns. The left column has 'Optimus Cloud' settings, including 'Dynamic Server' (dynamic.optimus-cloud.co.uk), 'Notification phone numbers' (e.g. +447777123456), and a 'Configure Email and Twitter' button. The right column has 'External Connections' with 'COM A' set to 'Terminal' and 'COM B' set to 'Weather'. Below these is 'Advanced Modem Settings' with fields for 'APN', 'APN Username', 'APN Password', 'Firewall IP' (0.0.0.0), and 'Firewall NetMask' (0.0.0.0). On the right side of the window is a vertical toolbar with icons for 'Storage', 'Audio', 'Ln', 'Communications', and 'Miscellaneous'. At the bottom are buttons for 'Load from Instrument', 'Save to Instrument', and 'Close'.

| Field | Value |
|----------------------------|-----------------------------|
| Serial Number | INV0001 |
| Type | CR:247 |
| Version | 3.0.2057 (2057) |
| Last Recalibration | 01/01/1970 |
| Current Time | 22/10/2013 22:04:03 |
| Dynamic Server | dynamic.optimus-cloud.co.uk |
| Notification phone numbers | e.g. +447777123456 |
| COM A | Terminal |
| COM B | Weather |
| APN | |
| APN Username | |
| APN Password | |
| Firewall IP | 0.0.0.0 |
| Firewall NetMask | 0.0.0.0 |

Advanced instrument settings

The Advanced instrument settings allows the user to change the Tonal noise detection settings, the time of automatic calibration, to trigger an acoustic calibration and to determine what, if any, alerts are sent by the instrument over the modem connection.

Instrument Settings - INV0001

Serial Number: INV0001 Type: CR:247 Version: 3.0.2057 (2057) [Update]
Last Recalibration: 01/01/1970 Current Time: 22/10/2013 22:04:08 [Set]
Description: [Text Field]

Tone Detection

Type: Improved

Threshold (6.3-25Hz): 18 dB
Threshold (31.5-125Hz): 15 dB
Threshold (160-400Hz): 8 dB
Threshold (500Hz-10kHz): 6 dB
Threshold (12.5-20kHz): 6 dB

Automatic Calibration

Time 1: 00:00:00
Time 2: 12:00:00
Time 3: [Empty]
Time 4: [Empty]
[Acoustic Calibration]

Notifications

Source:

- ☒ Preamplifier Disconnected
- ☒ Preamplifier Tilted
- ☒ Windshield Removed
- ☒ Low Battery
- ☒ External Power Disconnected
- ☒ Case Opened
- ☒ Calibration Failed
- ☐ Check Microphone

Send via...:

- ☒ SMS
- ☐ Email
- ☐ Twitter

[Load from Instrument] [Save to Instrument] [Close]

Storage
Audio
Ln
Communications
Miscellaneous

Tone Detection

The Invictus instruments can provide tonal noise detection using either the ISO 1996-2:2007 Simplified Method or the Cirrus Improved Method as described in Cirrus Research plc Technical Note 32, Tonal Noise Detection with the Optimus Green Sound Level Meters.

The options allow the levels used for the tonal noise detection in the different frequency bands to be adjusted.

Notifications

System notifications can be sent from the Invictus instrument to users by SMS, Email or Twitter. Check the boxes for the required notifications.

The Advanced Communications option contains the details of the SMS numbers, Email address(es) and Twitter accounts to which the alerts will be sent.

Automatic Calibration

The Invictus can be programmed to calibrate itself automatically using the built-in electrostatic actuator. This allows the system to ensure that the measurements being made are accurate and to ensure that the system is operating as expected.

The calibration can be carried out at up to 4 different times per day. Enter the required times into the boxes available. Times should be entered in 24 hour format (HH:MM).

Acoustic Calibration

The acoustic calibration button allows a manual calibration of the instrument using an acoustic calibration.

Follow the instructions displayed on screen to complete the manual calibration process.

If any changes are made, click the Save to Instrument button to load the new settings into a connected instrument.

Calibrating the Invictus from within Noise-Hub2

Calibrating the Invictus from within Noise-Hub2

Calibration of the Invictus can be triggered from within Noise-Hub2. This can be either an acoustic calibration using the option in the previous section or using the electrostatic actuator that is built into the MK:180 outdoor microphone.

To start an automatic calibration, select Calibrate from the instrument menu as shown below.



If the windshield assembly is not fitted, the calibration system will not start and an error message will be shown.

Downloading measurements to Noise-Hub2

Downloading measurements to Noise-Hub2

Measurements can be downloaded from a connected noise monitor manually or automatically using the scheduled download function. Please note that the scheduled download function may not be available in limited version of the Noise-Hub2 software.

Manually downloading measurements

To manually download measurements, click the instrument and select either Download or Download All.

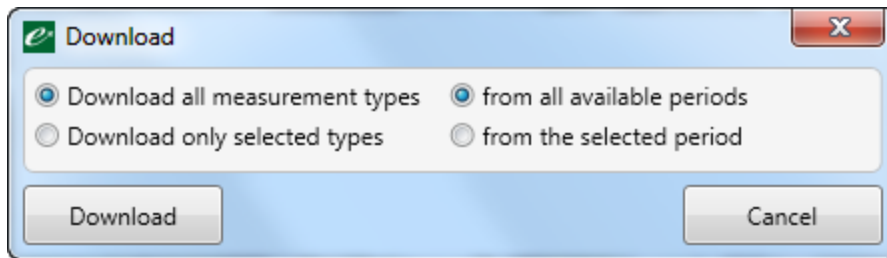


Download selected measurement data

It may not be necessary to download all of the measurement data from the instrument. If the instrument is connected over a modem, it may take some time to download all of the time history data and audio recordings.

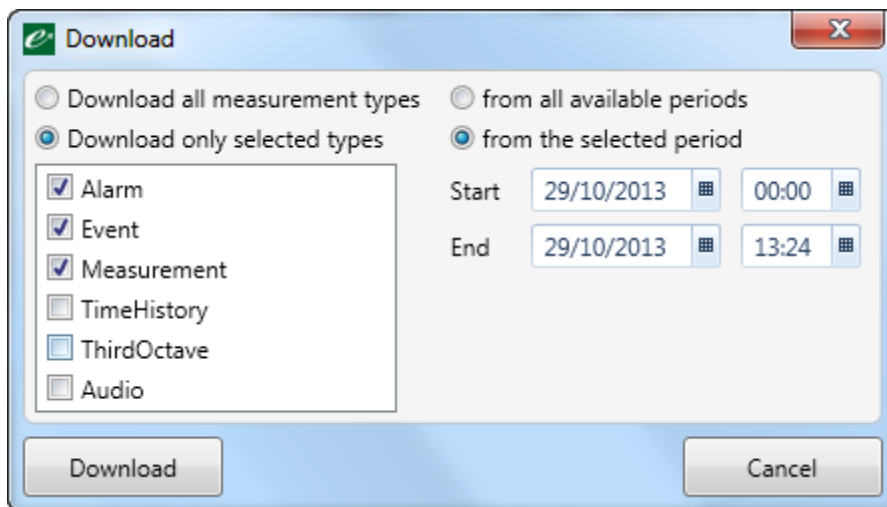
Using the Download selected measurements option allows the type of data to download to be selected.

When the Download option is chosen, a set of options is available as shown below:



At this point, it is possible to choose to download all available data from the instrument.

Selecting **Download only selected types** or from the **selected period** will open the following selection box. Choose the measurement types required or the time period for the measurements and press the Download button.



Download all measurement data

Selecting Download All will retrieve all available measurement data from the instrument and store it into the measurement database.

The status of the current download is shown at the bottom of the main window.

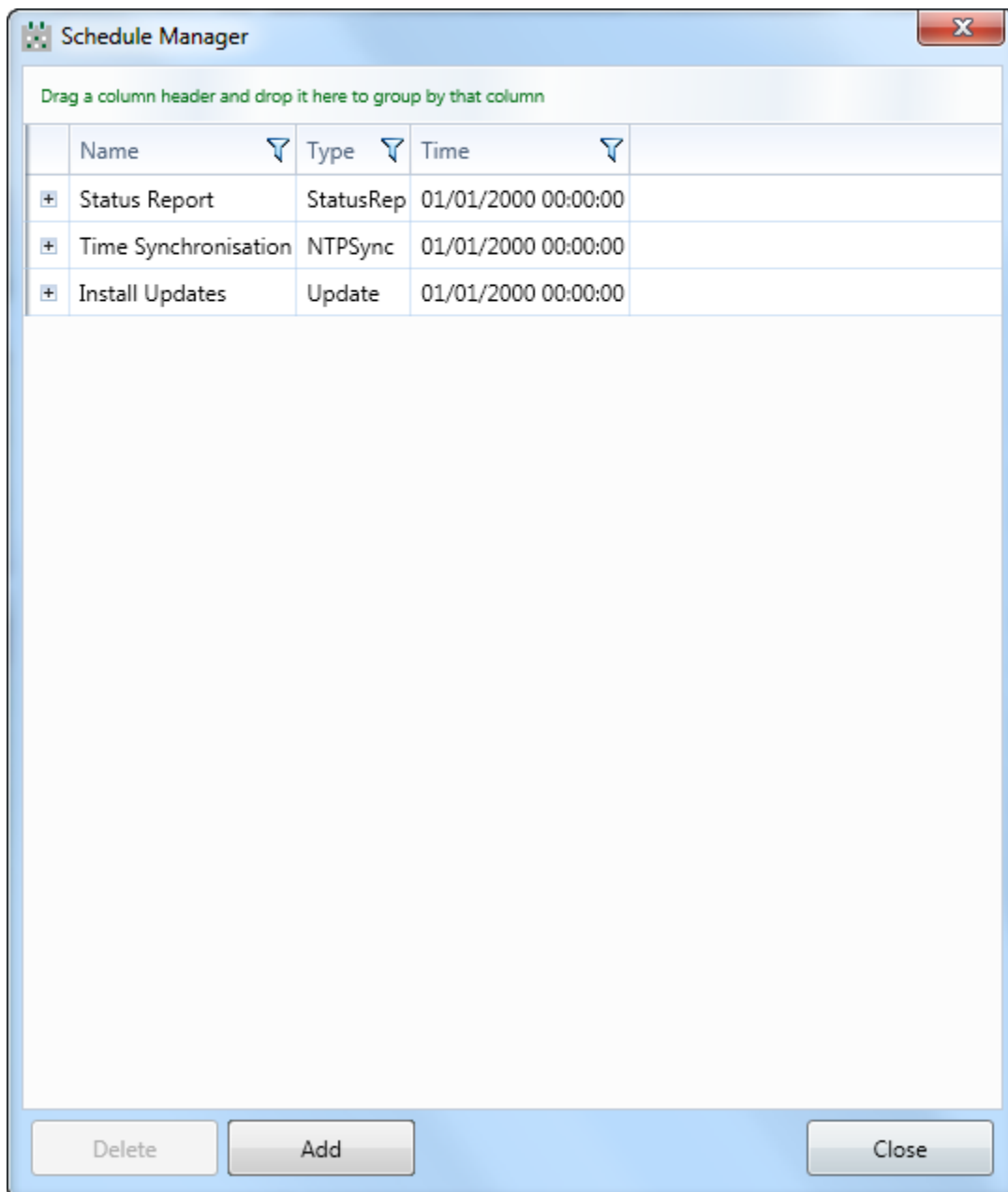
Scheduling automatic downloads

The Noise-Hub2 software can download measurement data automatically from instruments, storing the information into the database, ready for analysis and reporting.

Please note that this function requires the Noise-Hub2 software to be running.

To configure the automatic download function, click the Tools menu and select Schedule. The Schedule Manager will open as shown below.

Several preset functions are available although as default, these are disabled.



To add the scheduled download function, click add.

In the box, enter a name such as Download measurements and from the Schedule Task Type select Download.

Choose the Recurrence and choose the days and time of day for the download to be carried out.

Choose the measurements to be downloaded at the scheduled times.

Schedule Wizard

Schedule Name:

Schedule Task Type:

Recurrence: ☐ Once Only ☒ Daily ☐ Monthly

☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday ☒ Friday ☒ Saturday ☒ Sunday

Date and Time:

☐ Run Program on Completion

Instruments

- ☒ INV0001

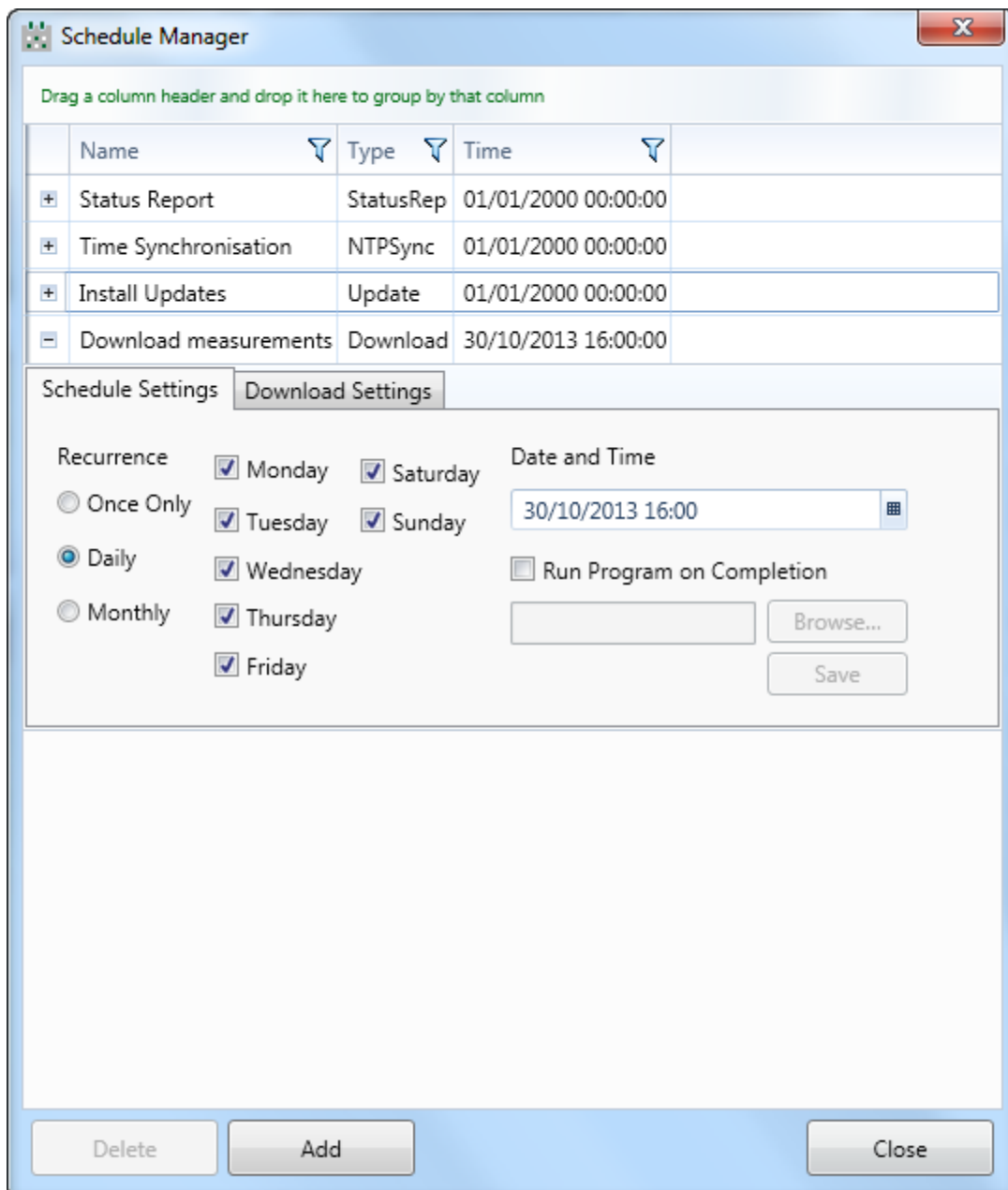
Measurement Type

- ☒ Alarm
- ☒ Event
- ☒ Measurement
- ☒ TimeHistory
- ☒ ThirdOctave
- ☒ Audio

Additional Actions

- ☒ Set Clock
- ☐ Email On Completion
- ☐ Attach Results

When the selection is complete, click Add and the schedule will be added to the list.



To verify that the configuration is correct, click the + next to the scheduled download to expand the selection.

Click Close to exit the Schedule Manager.

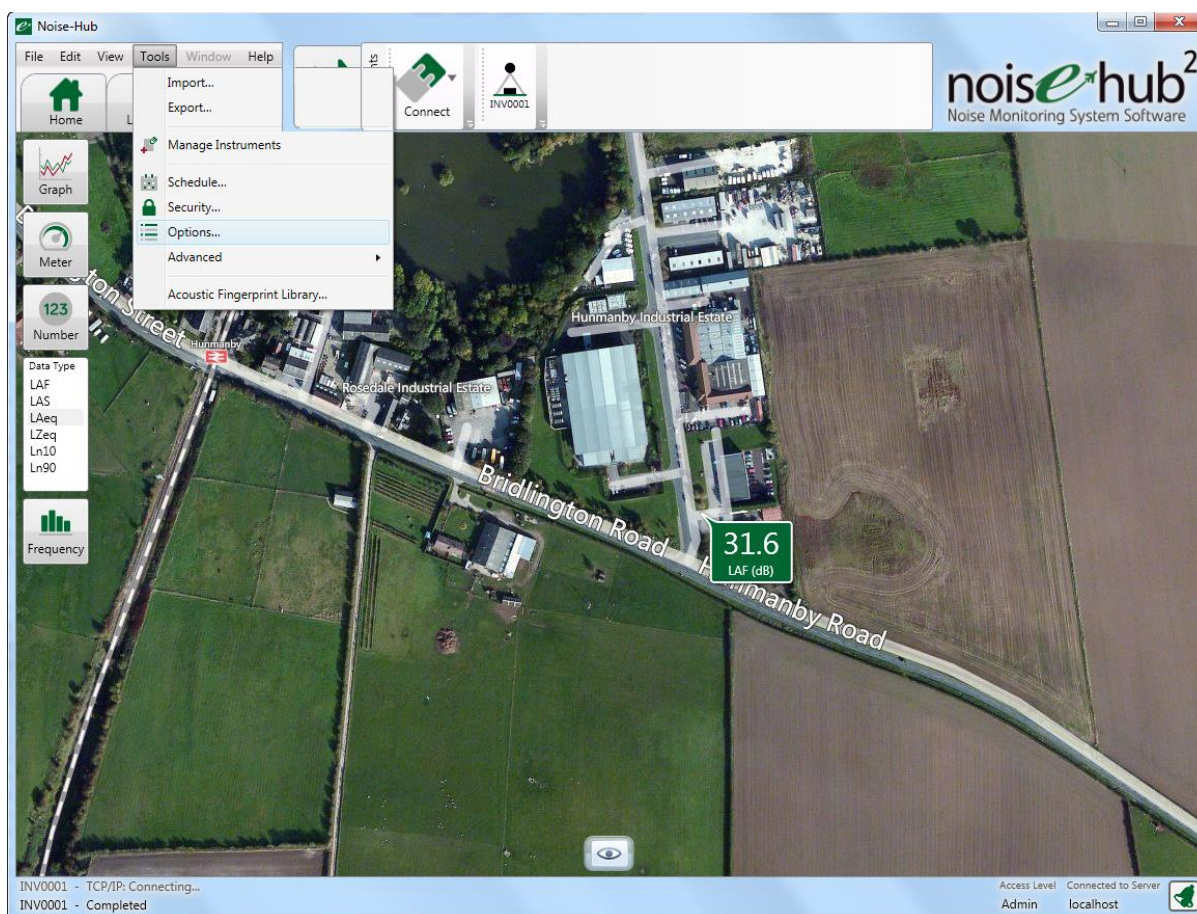
Creating alerts from within Noise-Hub2

Creating alerts from within Noise-Hub2

The software can be configured to send alerts and alarms when certain conditions are met, such as when the noise exceeds a preset level. Alerts can be sent by email or SMS and can be displayed on the screen.

Please note that the Noise-Hub2 software must be running for this function to be available.

To enable the alerts, click the Tools menu and select Options.



Select the instrument to be used for the alert

Adjust the Detection Settings using the Threshold, Threshold (High) and Minimum Duration options.

In the example below, the noise level must exceed 70dB and not fall below 80dB for 5 seconds.

Select the Notification Settings to change how the Email and SMS alerts are sent. Default templates are provided and additional templates can be added. Please contact Cirrus Research plc or your local partner for more information.

The Actions box allows multiple email addresses and SMS numbers to be added. To add a new email or SMS number, enter the information into the Email Address or Phone Number boxes and press the green +.

The information will be shown in the Notifications to send box.

The red X button can be used to remove email addresses or phone numbers from the list. Highlight the information to be removed and press the red X button.

The screenshot shows a dialog box titled "Level Notifications" with a close button (red X) in the top right corner. The dialog is divided into several sections:

- Instrument:** A dropdown menu showing "INV0001".
- Detection Settings:** Three numeric input fields with up/down arrows:
 - Threshold: 70.0
 - Threshold (High): 80.0
 - Minimum Duration: 5
- Notification Settings:**
 - Email Template:** A dropdown menu showing "Default".
 - ☒ Send as HTML
 - SMS Template:** A dropdown menu showing "Default".
- Actions:**
 - ☒ Send Notification
 - ☐ Store and Display Alert
- Notifications to send:** A list box containing:
 - Email: alert@email.com
 - SMS: 1234 5678A red X button is located to the right of this list box.
- Email Address:** A text input field with a green plus button to its right.
- Phone Number:** A text input field with a green plus button to its right.

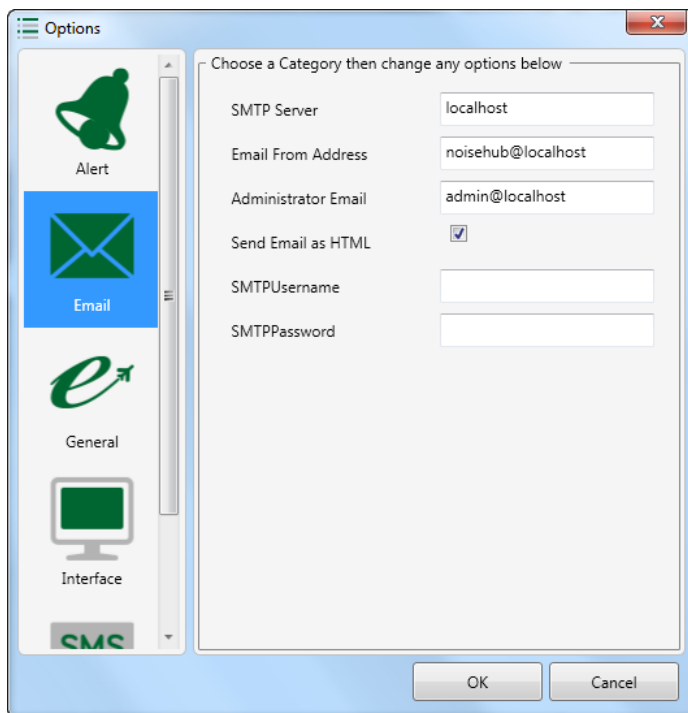
At the bottom of the dialog are "OK" and "Cancel" buttons.

Configuring the Email & SMS settings

To allow email and SMS alerts and other information to be sent from within the Noise-Hub2 software, additional services may be required.

Email

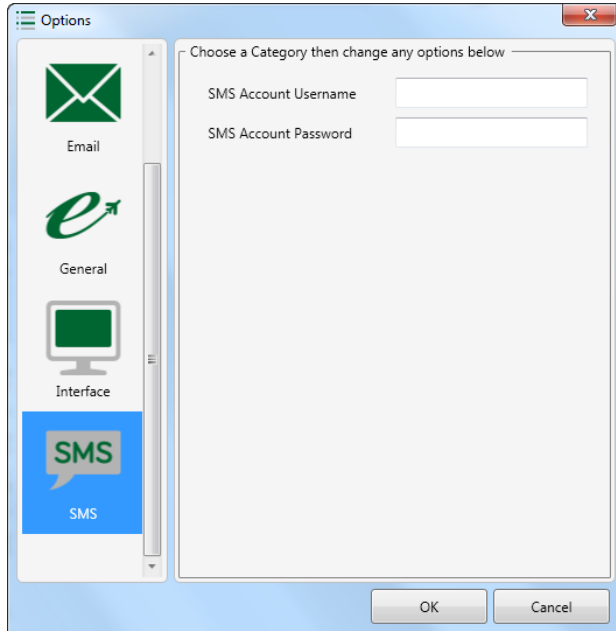
To send email alerts and notifications, the email server information should be entered into the Tools, Options, Email window as shown below.



SMS

To allow alerts and notifications to be sent by SMS, the system must be configured with details from a FastSMS account.

Enter the account information into the window as shown below.

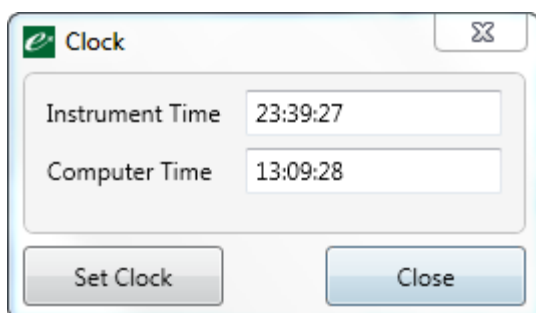
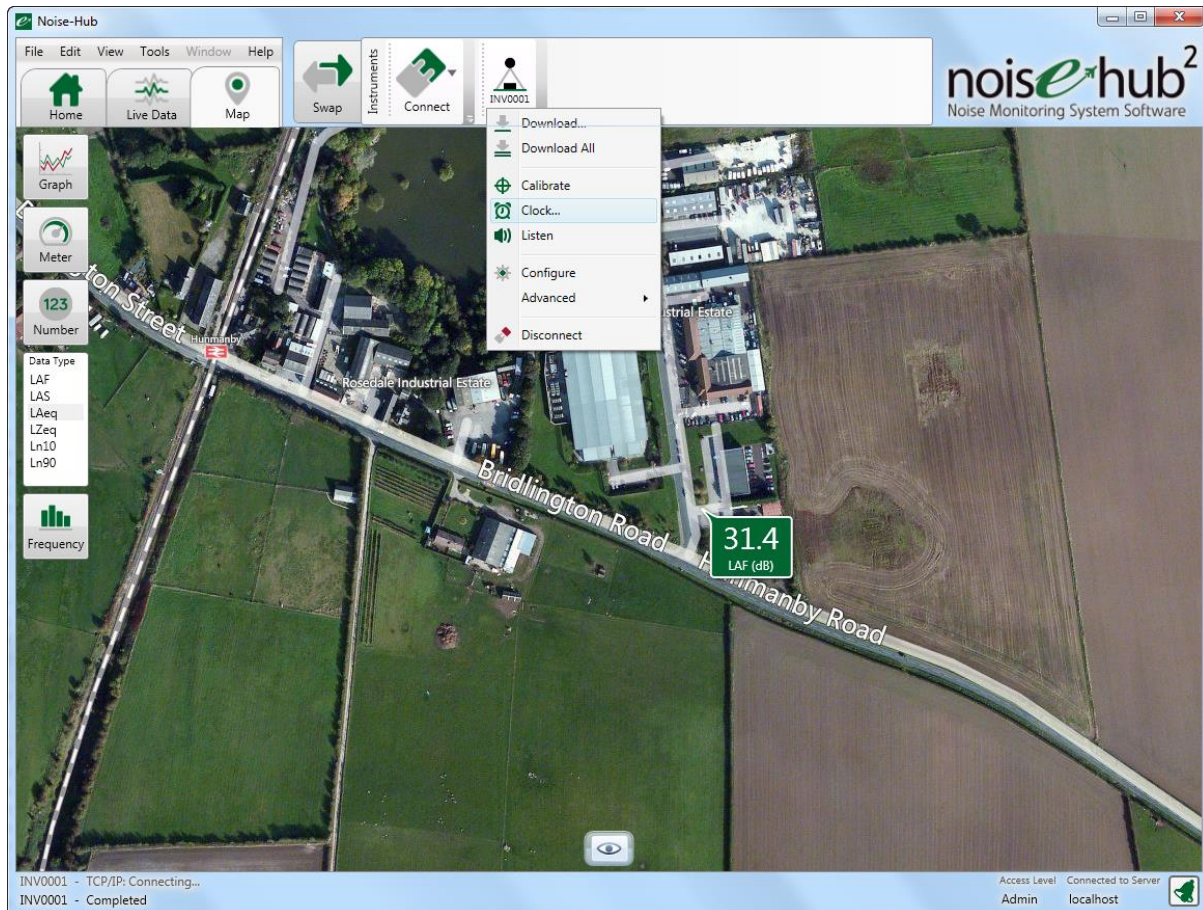


Setting the instrument clock

Setting the instrument clock

The Invictus noise monitor uses a GPS module to set the time and date of measurements.

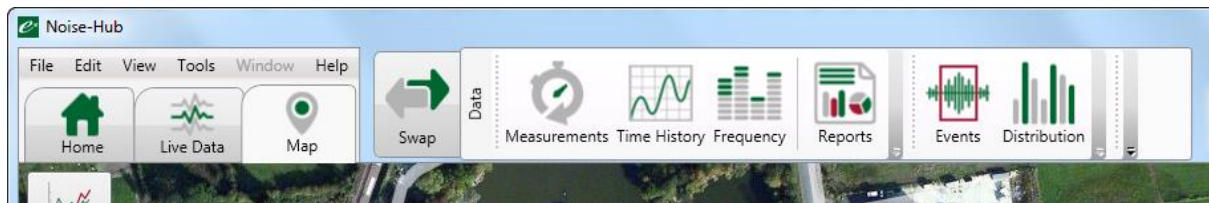
If the GPS system is not operating or the instrument is located where a GPS signal cannot be found, the time and date in the instrument can be set manually from the Instrument, Clock menu as shown below.



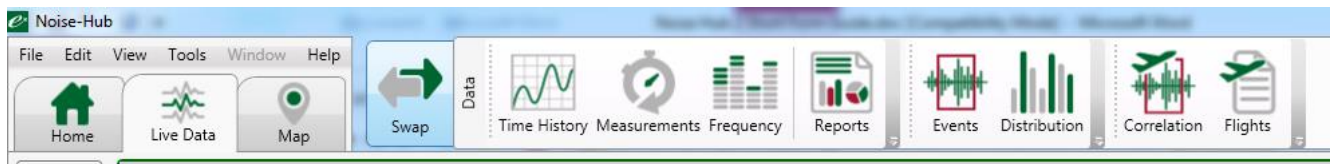
Viewing measurement data

Viewing measurement data

To view the measurement data, switch from the live data view to Measurement view using the Swap button on the main menu bar.

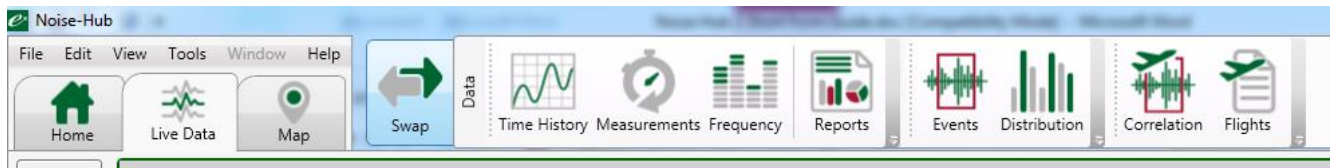


Depending upon the license key, certain measurement reports may not be available such as distribution, correlation and flights.



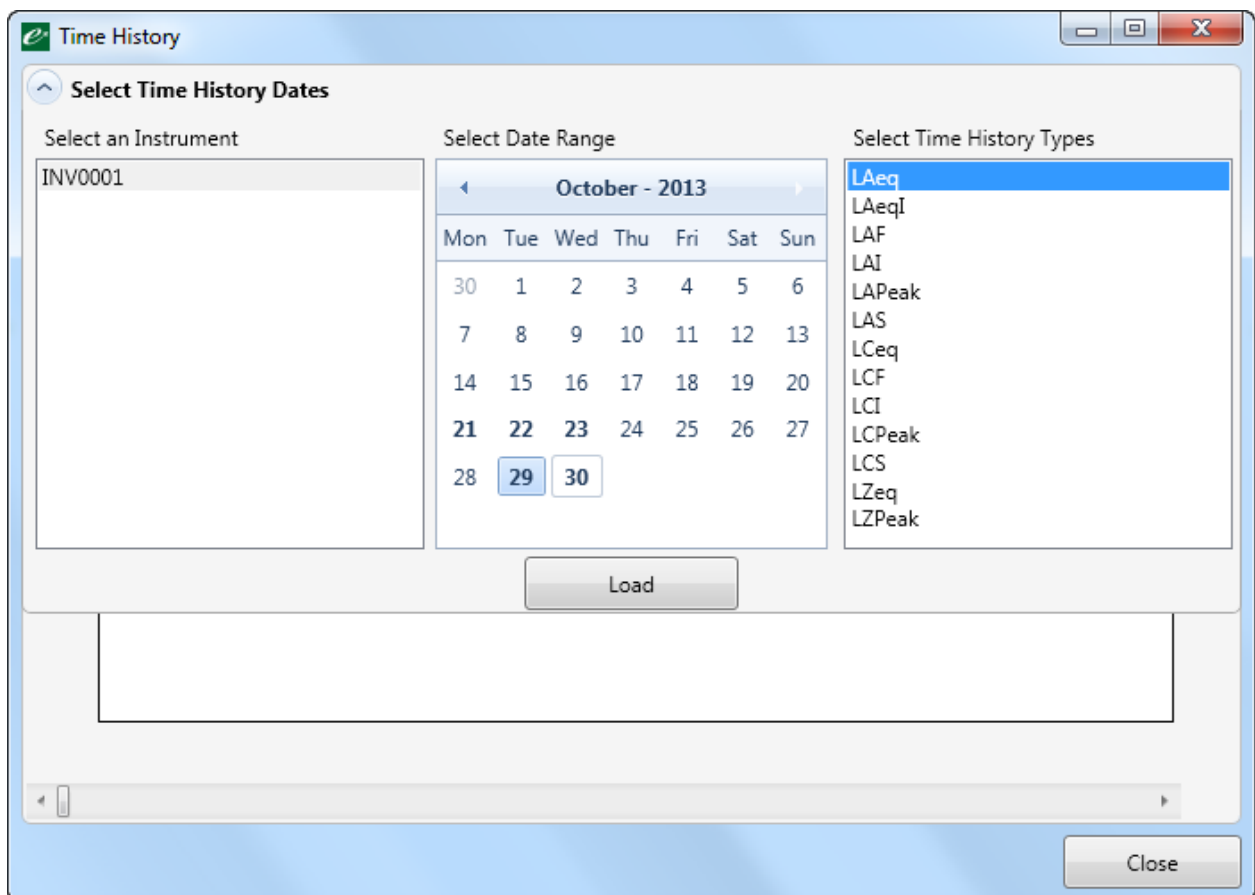
Viewing time history data

To view the Time History data, click the Time History button on the menu bar.



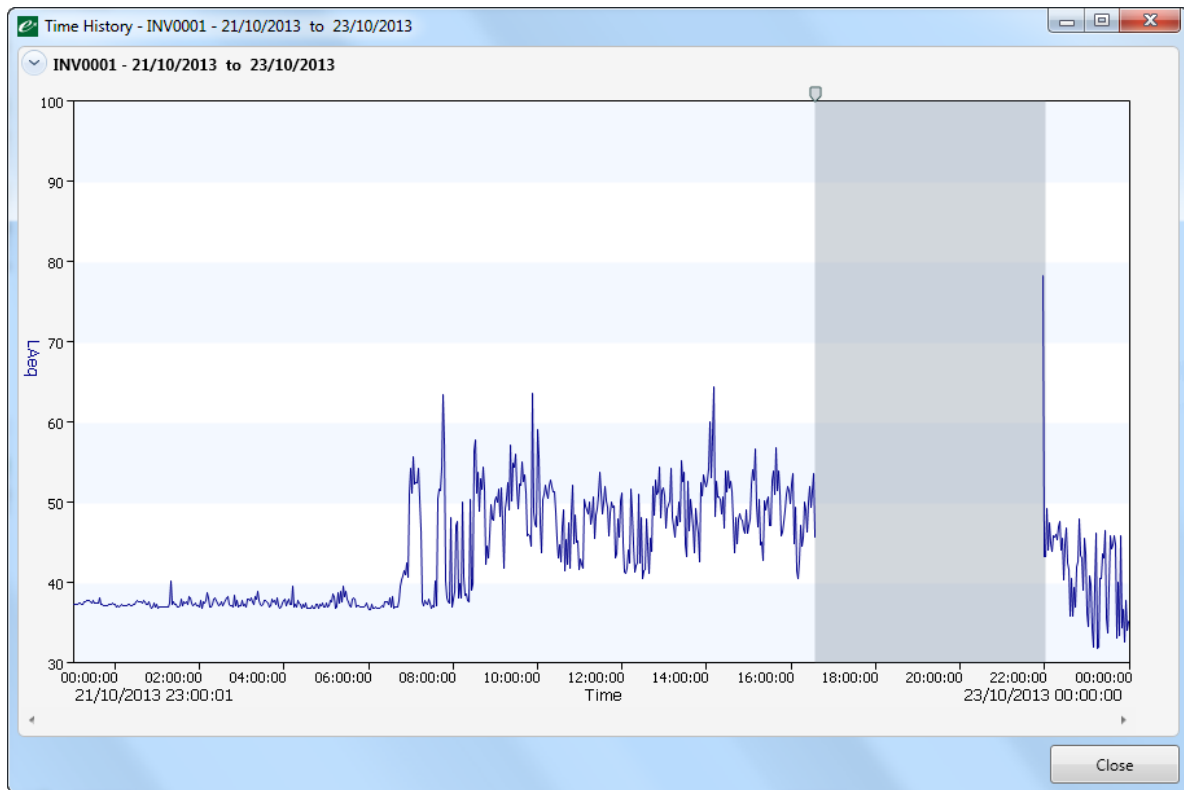
From the window, select the instrument, the date range and the time history data type to be displayed.

Where measurement data is available, the dates will be highlighted.

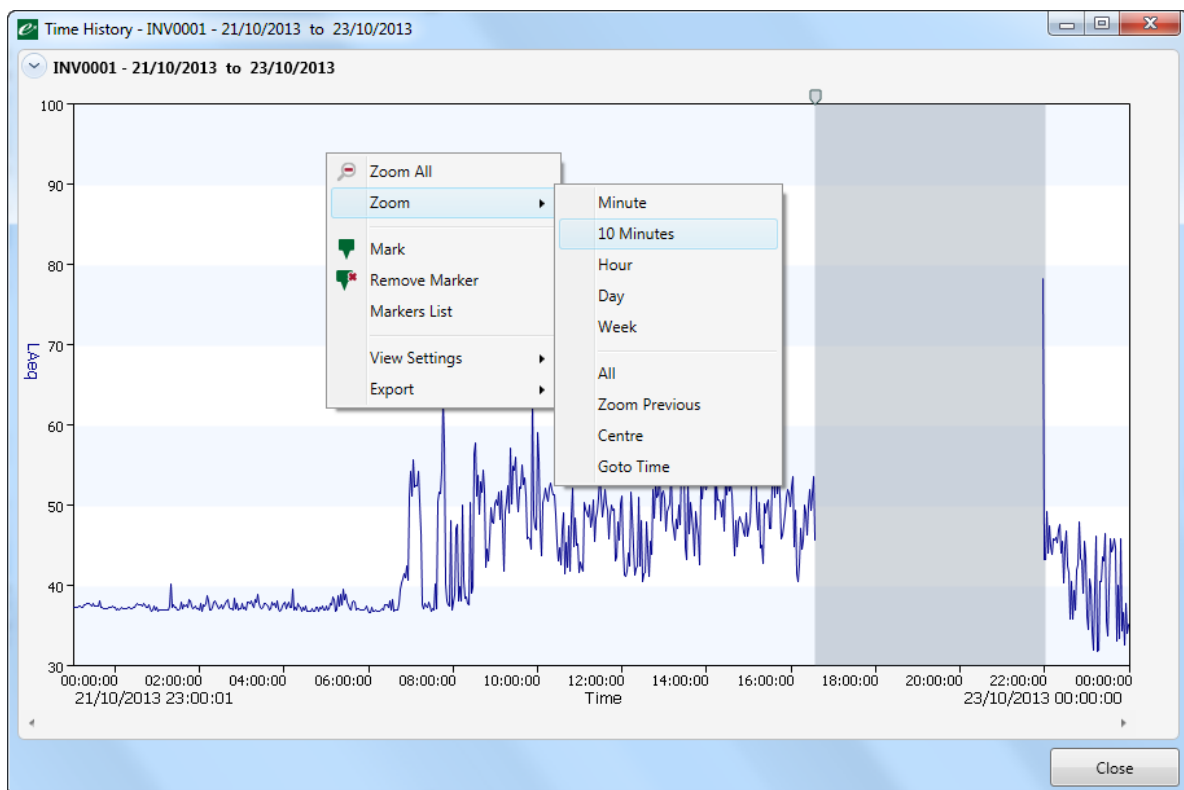


Once these have been selected and the 'Load' button pressed a detailed graph view of the selected period will appear.

Where grey sections appear in the graph, this indicates that the instrument was not measuring at that time and no data is available.



The mouse right click function allows zooming to preset durations. The mouse wheel can also be used to zoom in and out of the graph.

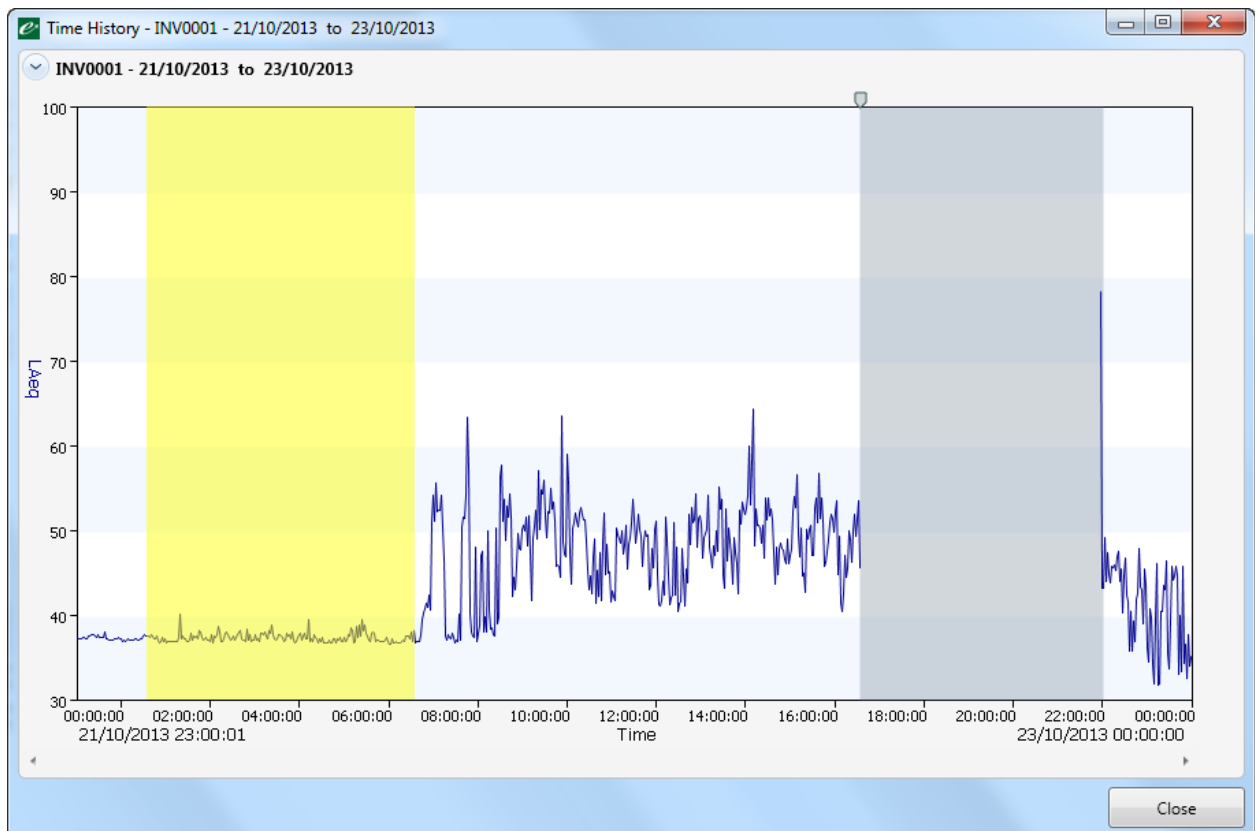


Marking time history data

The time history data can be marked with colour to indicate specific events or activities. The time history data will also be marked automatically when triggers have been activated.

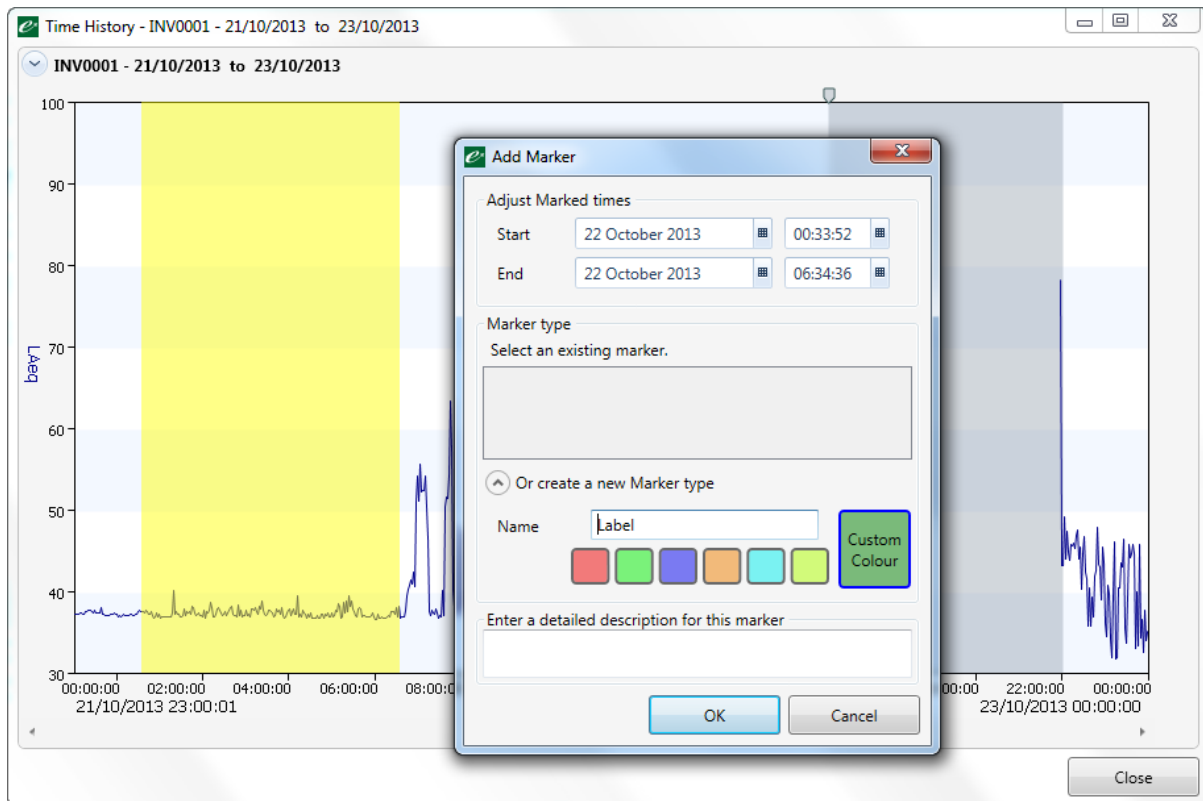
Any number of markers can be added and each marker can be named for later reference.

To add a marker, drag the cursor over the section to be marked, right click with the mouse and choose Mark. Enter the colour and name of the marker.

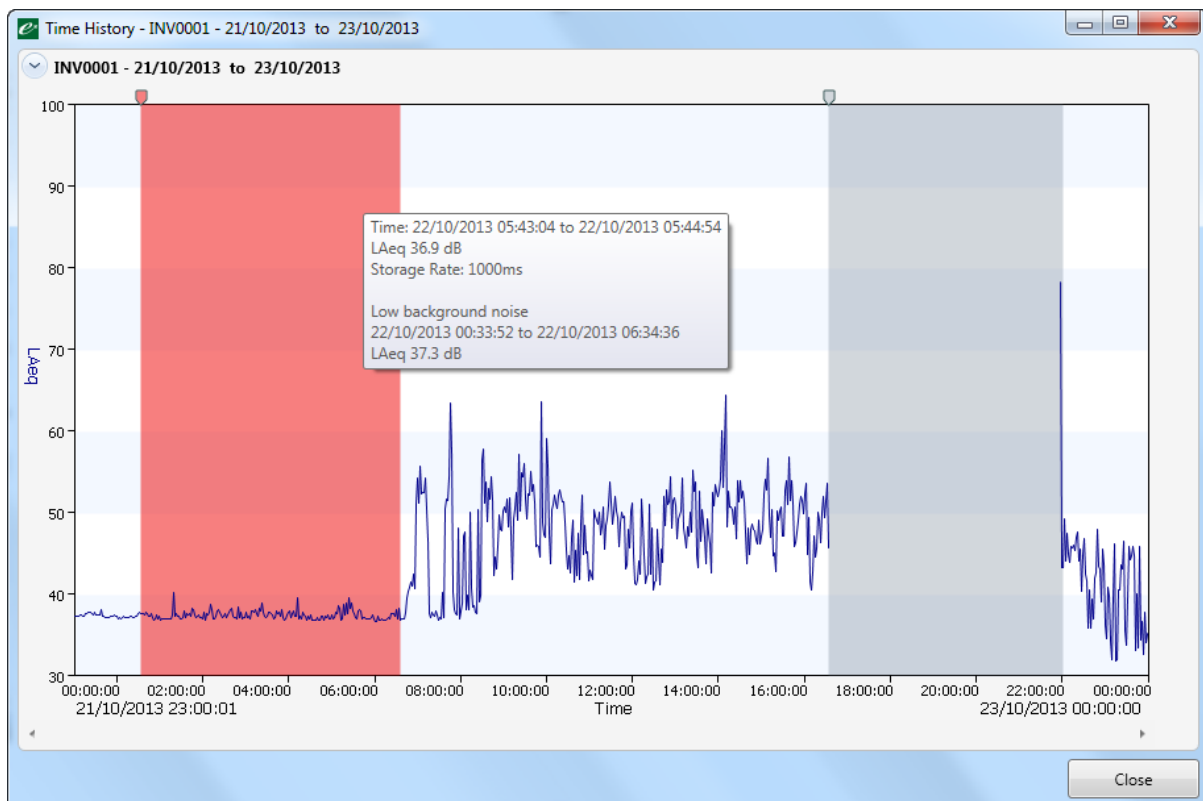


The exact times of the marker can be adjusted and notes included.

Press OK to add the marker to the data.



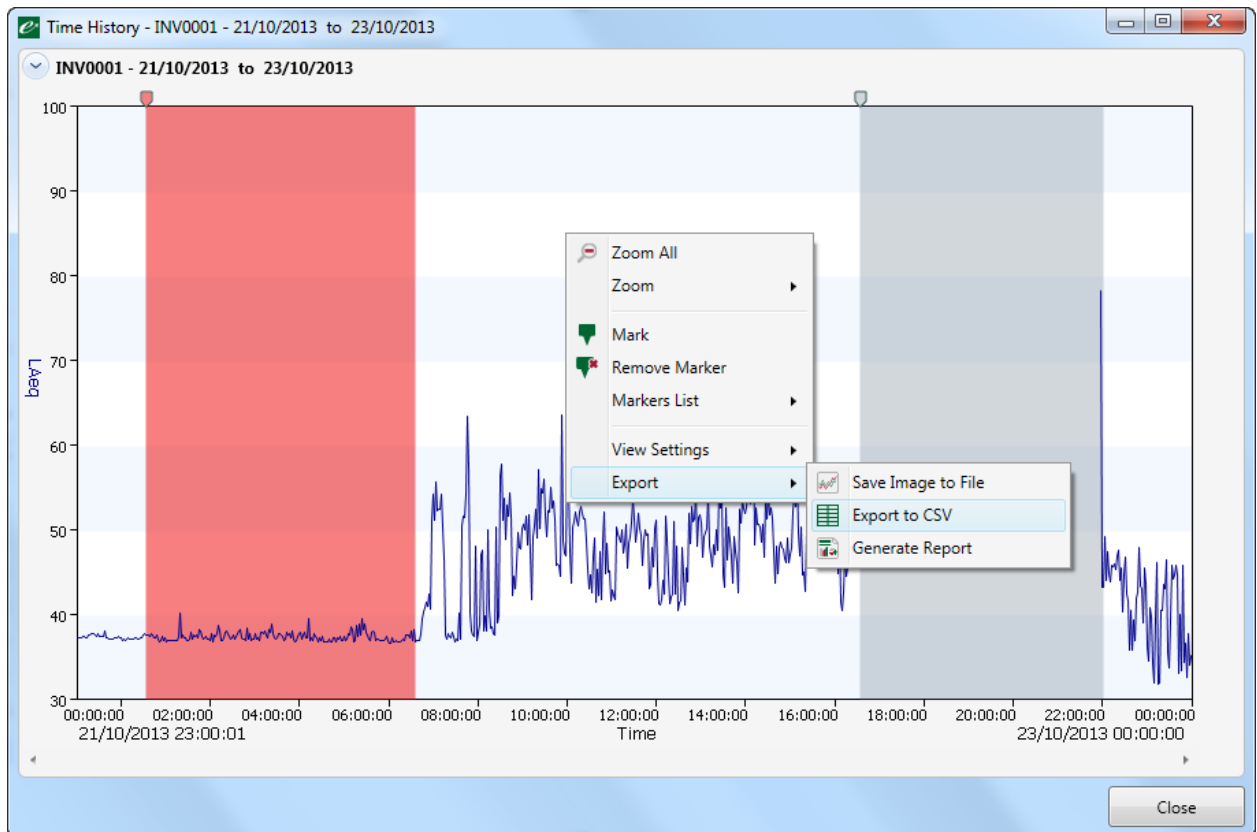
Move the mouse over a marked section to view the details of that section.



Exporting time history data

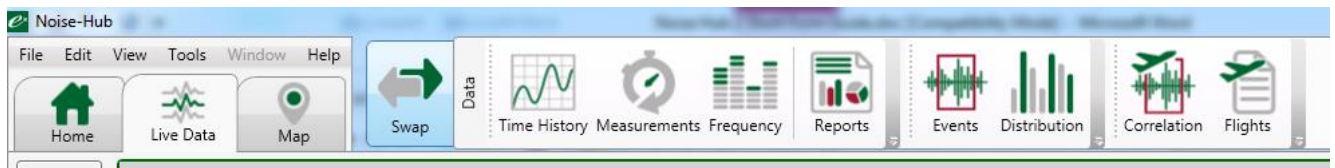
To export the time history data, right click on the graph and select Export to CSV.

The image can also be exported from the same menu.

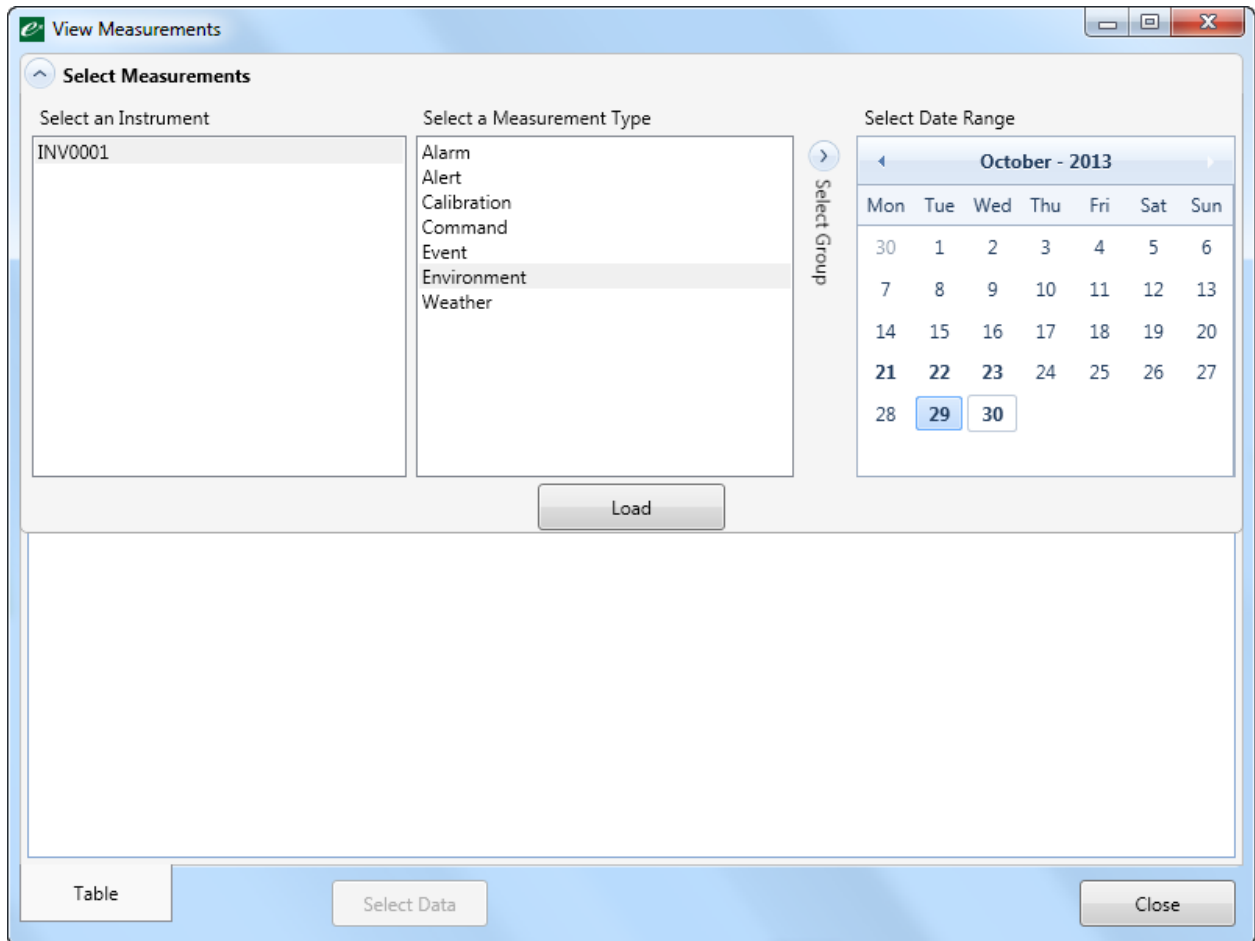


Viewing & exporting overall measurement data

The overall measurement data can be exported for use in other programs. Click the Measurement button on the main menu bar.



The following selection window will open.



Select the instrument and the measurement data type. For an Invictus noise monitor, select All from the Group selection and choose the date range required.

Where measurement data is available, the dates will be highlighted.

When the selection is complete, click the Load button. The measurement data will be shown in a tabular format.

View Measurements

INV0001 - Environment - 29/10/2013 to 29/10/2013

Drag a column header and drop it here to group by that column

| Start Time | End Time | Instrument | Class | LAeq | LAF5 | LAF10 | LAF50 | LAF90 | LAF95 | |
|---------------------|---------------------|------------|-------|-------|------|-------|-------|-------|-------|--|
| 29/10/2013 16:30:02 | 29/10/2013 17:00:02 | INV0001 | | 45.02 | 50.9 | 47.3 | 32.3 | 31.0 | 30.9 | |
| 29/10/2013 17:00:01 | 29/10/2013 17:30:01 | INV0001 | | 31.28 | 31.3 | 31.3 | 31.1 | 30.9 | 30.9 | |
| 29/10/2013 17:30:01 | 29/10/2013 18:00:01 | INV0001 | | 31.32 | 31.7 | 31.3 | 31.1 | 30.9 | 30.9 | |
| 29/10/2013 18:00:01 | 29/10/2013 18:30:01 | INV0001 | | 31.12 | 31.3 | 31.2 | 31.1 | 30.9 | 30.9 | |
| 29/10/2013 18:30:02 | 29/10/2013 19:00:02 | INV0001 | | 31.12 | 31.3 | 31.2 | 31.1 | 30.9 | 30.9 | |
| 29/10/2013 19:00:02 | 29/10/2013 20:00:02 | INV0001 | | 31.14 | 31.3 | 31.2 | 31.1 | 30.9 | 30.9 | |
| 29/10/2013 20:00:01 | 29/10/2013 21:00:01 | INV0001 | | 31.11 | 31.3 | 31.2 | 31.0 | 30.9 | 30.9 | |
| 29/10/2013 21:00:02 | 29/10/2013 22:00:02 | INV0001 | | 31.12 | 31.2 | 31.2 | 31.0 | 30.9 | 30.8 | |
| 29/10/2013 22:00:01 | 29/10/2013 23:00:01 | INV0001 | | 31.06 | 31.2 | 31.2 | 31.0 | 30.8 | 30.8 | |
| 29/10/2013 23:00:01 | 30/10/2013 00:00:01 | INV0001 | | 31.03 | 31.2 | 31.1 | 31.0 | 30.8 | 30.8 | |

Table

Select Data

Displaying 10 Measurements

Close

The columns can be ordered by left clicking in the title of the column of interest. By right clicking with your mouse over the table you get the option to Copy, Export to Excel, or to Customise Columns. This allows the data columns to be chosen.

View Measurements

INV0001 - Environment - 29/10/2013 to 29/10/2013

Drag a column header and drop it here to group by that column

| Start Time | End Time | Instrument | Class | LAeq | LAF5 | LAF10 | LAF50 | LAF90 | LAF95 |
|---------------------|---------------------|------------|-------|-------|------|-------|-------|-------|-------|
| 29/10/2013 16:30:02 | 29/10/2013 17:00:02 | INV0001 | | 45.02 | 50.9 | 47.3 | 32.3 | 31.0 | 30.9 |
| 29/10/2013 17:00:01 | 29/10/2013 17:30:01 | INV0001 | | 31.28 | 31.3 | 31.3 | 31.1 | 30.9 | 30.9 |
| 29/10/2013 17:30:01 | 29/10/2013 18:00:01 | INV0001 | | 31.32 | 31.7 | 31.3 | 31.1 | 30.9 | 30.9 |
| 29/10/2013 18:00:01 | 29/10/2013 18:30:01 | INV0001 | | 31.12 | 31.3 | 31.2 | 31.1 | 30.9 | 30.9 |
| 29/10/2013 18:30:02 | 29/10/2013 19:00:02 | INV0001 | | 31.12 | 31.3 | 31.2 | 31.1 | 30.9 | 30.9 |
| 29/10/2013 19:00:01 | 29/10/2013 19:30:01 | INV0001 | | 31.14 | 31.3 | 31.2 | 31.1 | 30.9 | 30.9 |
| 29/10/2013 19:30:01 | 29/10/2013 20:00:01 | INV0001 | | 31.11 | 31.3 | 31.2 | 31.0 | 30.9 | 30.9 |
| 29/10/2013 20:00:01 | 29/10/2013 20:30:01 | INV0001 | | 31.12 | 31.2 | 31.2 | 31.0 | 30.9 | 30.8 |
| 29/10/2013 20:30:01 | 29/10/2013 21:00:01 | INV0001 | | 31.06 | 31.2 | 31.2 | 31.0 | 30.8 | 30.8 |
| 29/10/2013 21:00:01 | 29/10/2013 21:30:01 | INV0001 | | 31.03 | 31.2 | 31.1 | 31.0 | 30.8 | 30.8 |

Table Select Data Displaying 10 Measurements Close

If more than one row of data is selected, the Copy option allows data to be pasted quickly into programs such as Excel.

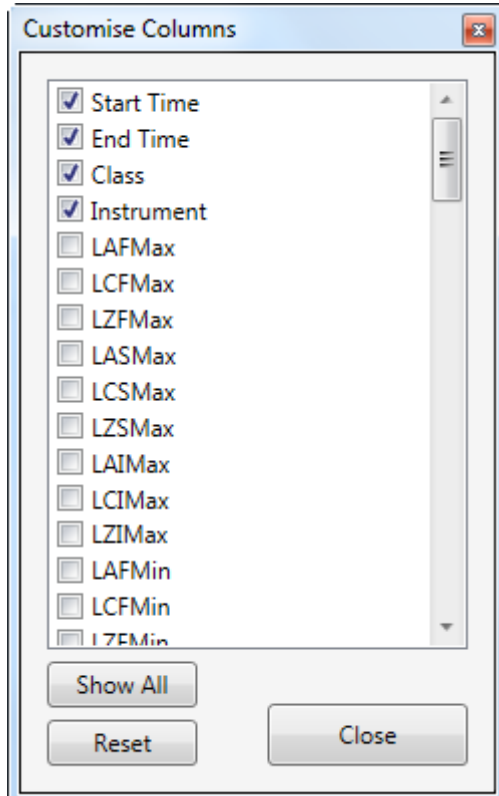
Right clicking on the chart gives a further set of options:

Export Table

This option allows the measurement data in the table to be exported as a XML file for use in Excel or as a CSV file.

Customise Columns

This allows any or all of the available measurement data to be displayed in the table.



Click the required data sets and press the Close button.

Periodic Calculation

The Periodic Calculation option allows data to be recalculated over different measurement periods.

For example, measurements may have been made every hour over a week. The periodic calculator allows this data to be combined and recalculated over different time periods.

From the View Measurements window, select the measurements to be used, right click and select Periodic Calculation. In this example, a set of 10 1 hour measurements have been selected.

The Periodic Calculator window will open as shown below.

Periodic Calculation Wizard

Period Options

Periods

☒ Use Periods

Period Duration

15 Minutes

☒ Synchronise Times

☐ Use Single Period

Fixed Times

☐ Use Fixed Times

Day 07:00:00

Evening 19:00:00

Night 23:00:00

Extra

Extra

Extra

Period Options

☒ Override Start/End Times

29/10/2013 17:00 30/10/2013 00:00

Load Settings Create Measurements < Previous Next > Close

Choose the duration of the calculation. In this example, 15 minutes has been selected.

Use the Synchronise times option to lock the calculation to 15 minute periods ie. 12:45, 13:00, 13:15 etc.

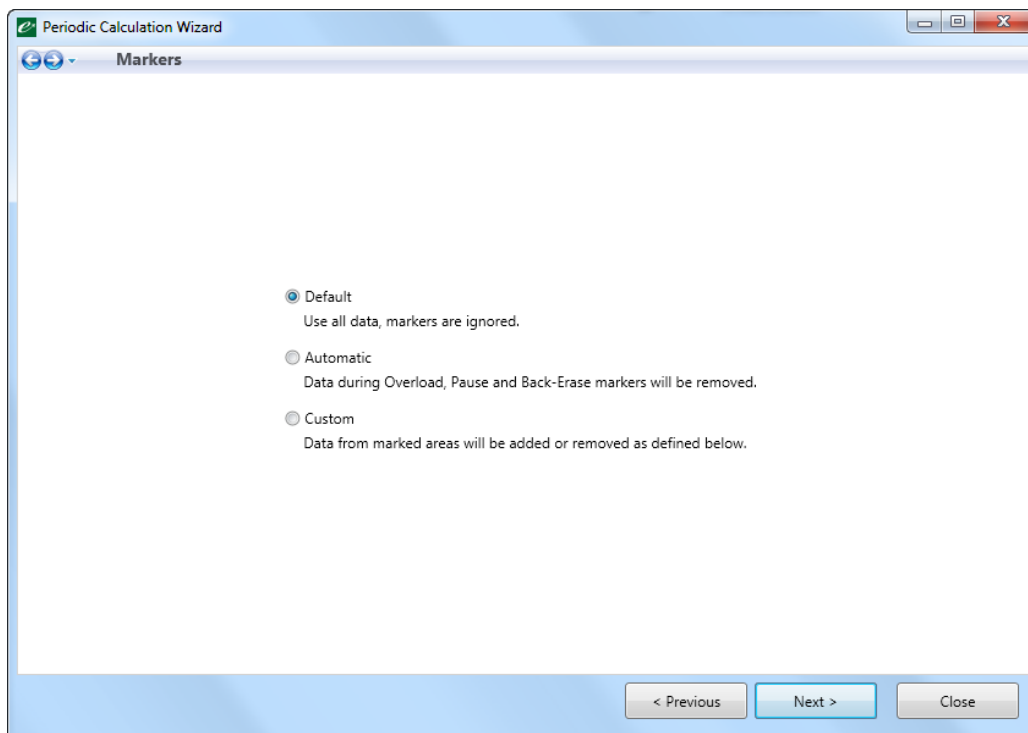
The Single Period option can be used to combine multiple measurements into one long, single period.

The Fixed Times option can be used to calculate data over day, evening, night periods allowing LDEN values to be produced.

The Override Start Times option allows a specific start time and date to be entered.

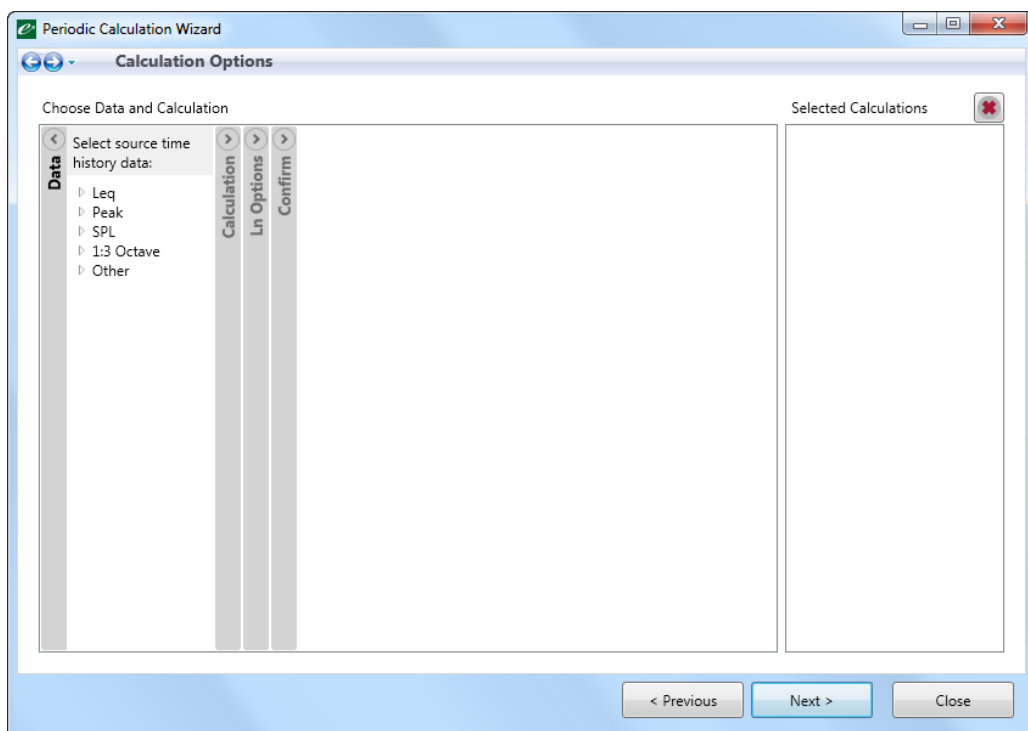
The Load Settings allows a previously saved configuration to be loaded and applied to a new set of data.

Click Next to move to the next step.

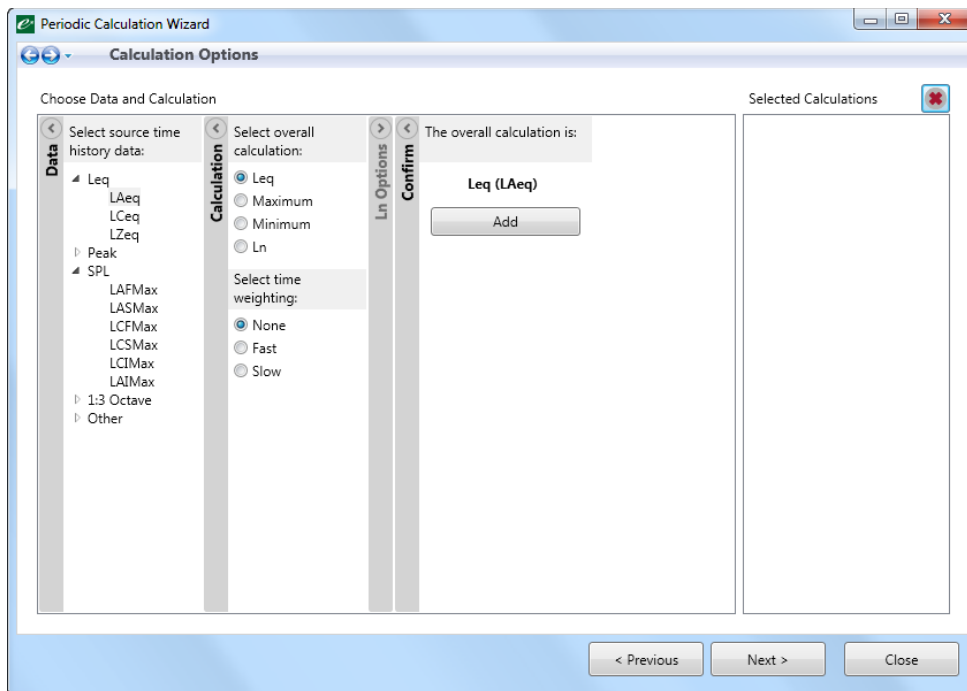


The Periodic Calculator can take account of markers that have been included in the measurement data.

Choose the option required and press Next to move to the next step:

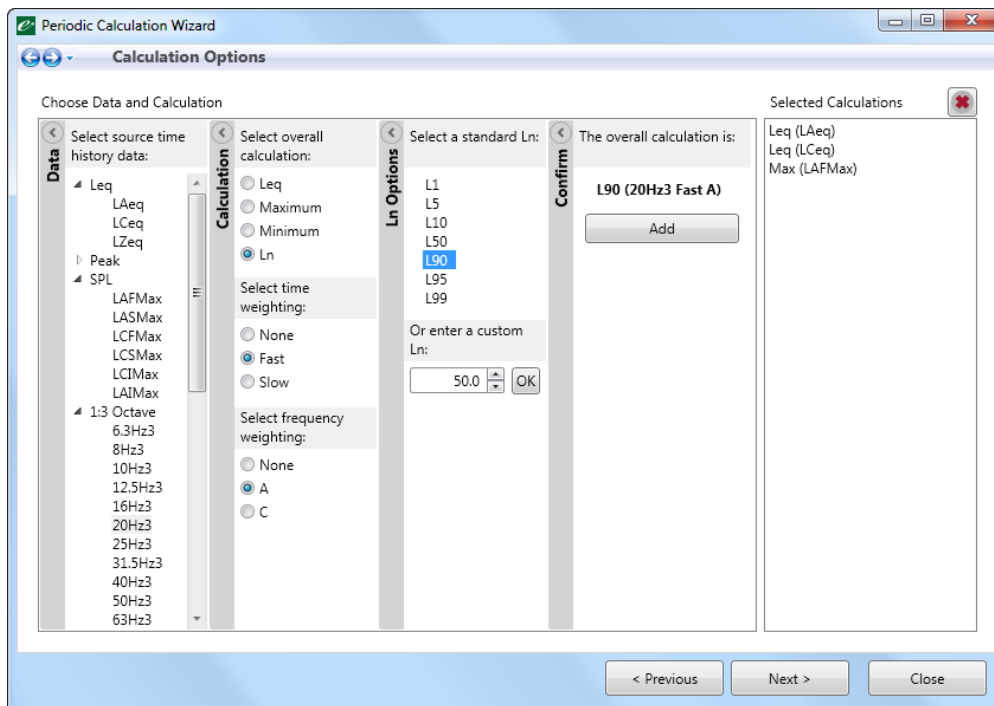


This window allows the data source for the recalculation to be chosen, along with the functions required

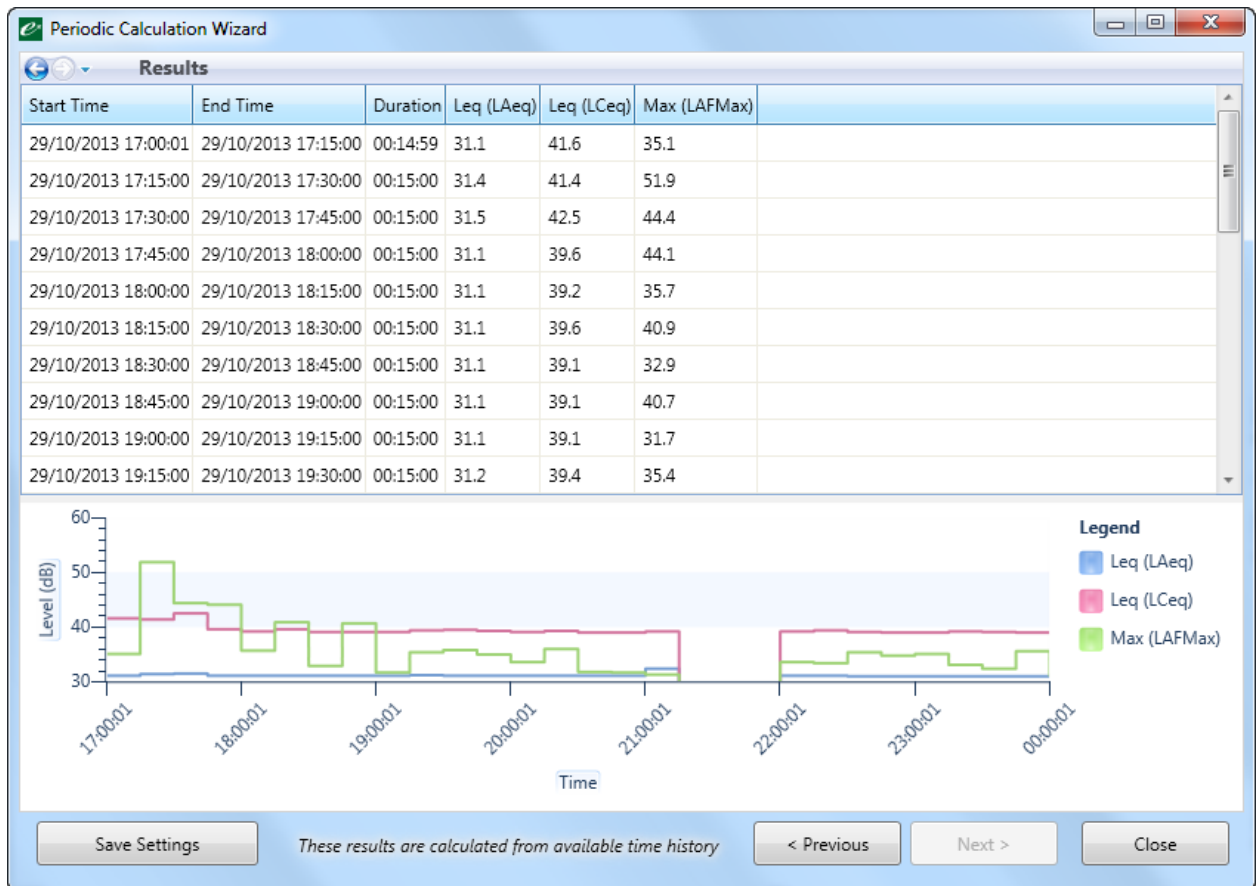


Choose the calculated parameter required and press Add to include this into the final calculation.

Add any additional parameters required to the list. If an Ln value is chosen, the Ln Options will appear and the value for the Ln calculation can be chosen.



In this example, the LAeq, LCeq and LAFmax will be calculated for each 15 minute period. Click next to run the calculation.



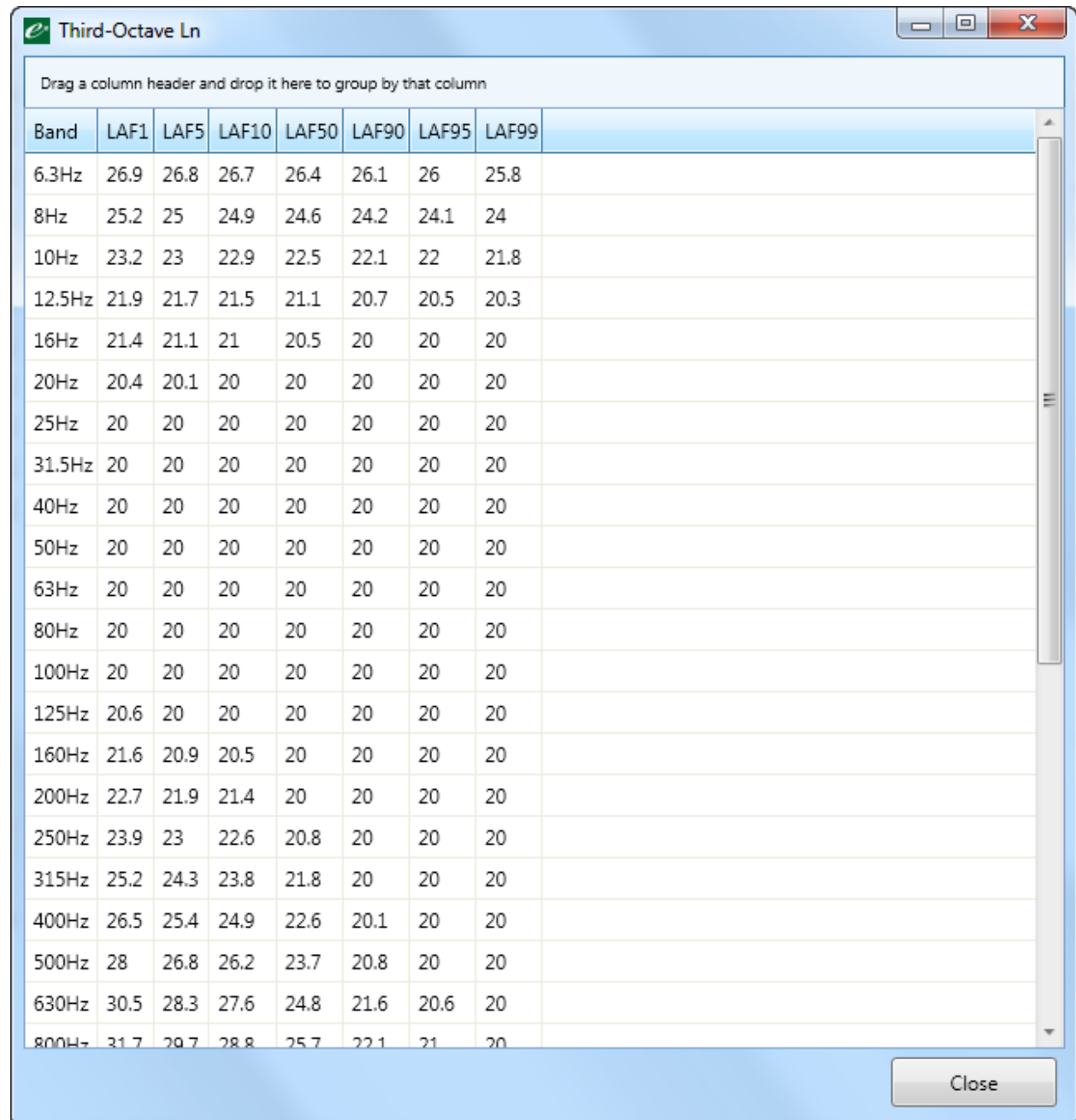
The data in the table can be exported by right clicking on the chart. The graph can also be exported by right clicking and selecting Export Graph.

The Save Settings button allows this configuration to be stored and reused.

Third Octave Ln

The Invictus instruments measure and store Ln values in the 1:3 octave bands and this data can be accessed through the View Measurements section.

Right clicking on an individual measurement and selecting Third-Octave Ln displays the preset Ln values in each of the bands for that measurement.

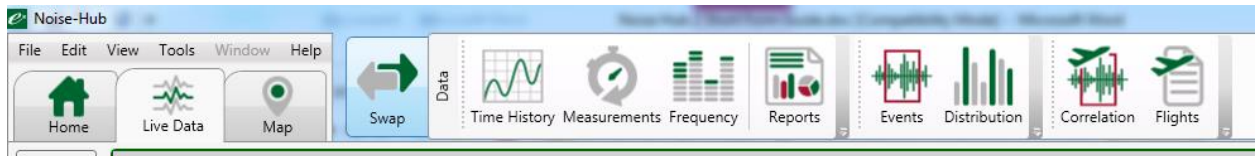


| Band | LAF1 | LAF5 | LAF10 | LAF50 | LAF90 | LAF95 | LAF99 | |
|--------|------|------|-------|-------|-------|-------|-------|--|
| 6.3Hz | 26.9 | 26.8 | 26.7 | 26.4 | 26.1 | 26 | 25.8 | |
| 8Hz | 25.2 | 25 | 24.9 | 24.6 | 24.2 | 24.1 | 24 | |
| 10Hz | 23.2 | 23 | 22.9 | 22.5 | 22.1 | 22 | 21.8 | |
| 12.5Hz | 21.9 | 21.7 | 21.5 | 21.1 | 20.7 | 20.5 | 20.3 | |
| 16Hz | 21.4 | 21.1 | 21 | 20.5 | 20 | 20 | 20 | |
| 20Hz | 20.4 | 20.1 | 20 | 20 | 20 | 20 | 20 | |
| 25Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 31.5Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 40Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 50Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 63Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 80Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 100Hz | 20 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 125Hz | 20.6 | 20 | 20 | 20 | 20 | 20 | 20 | |
| 160Hz | 21.6 | 20.9 | 20.5 | 20 | 20 | 20 | 20 | |
| 200Hz | 22.7 | 21.9 | 21.4 | 20 | 20 | 20 | 20 | |
| 250Hz | 23.9 | 23 | 22.6 | 20.8 | 20 | 20 | 20 | |
| 315Hz | 25.2 | 24.3 | 23.8 | 21.8 | 20 | 20 | 20 | |
| 400Hz | 26.5 | 25.4 | 24.9 | 22.6 | 20.1 | 20 | 20 | |
| 500Hz | 28 | 26.8 | 26.2 | 23.7 | 20.8 | 20 | 20 | |
| 630Hz | 30.5 | 28.3 | 27.6 | 24.8 | 21.6 | 20.6 | 20 | |
| 800Hz | 31.7 | 29.7 | 28.8 | 25.7 | 22.1 | 21 | 20 | |

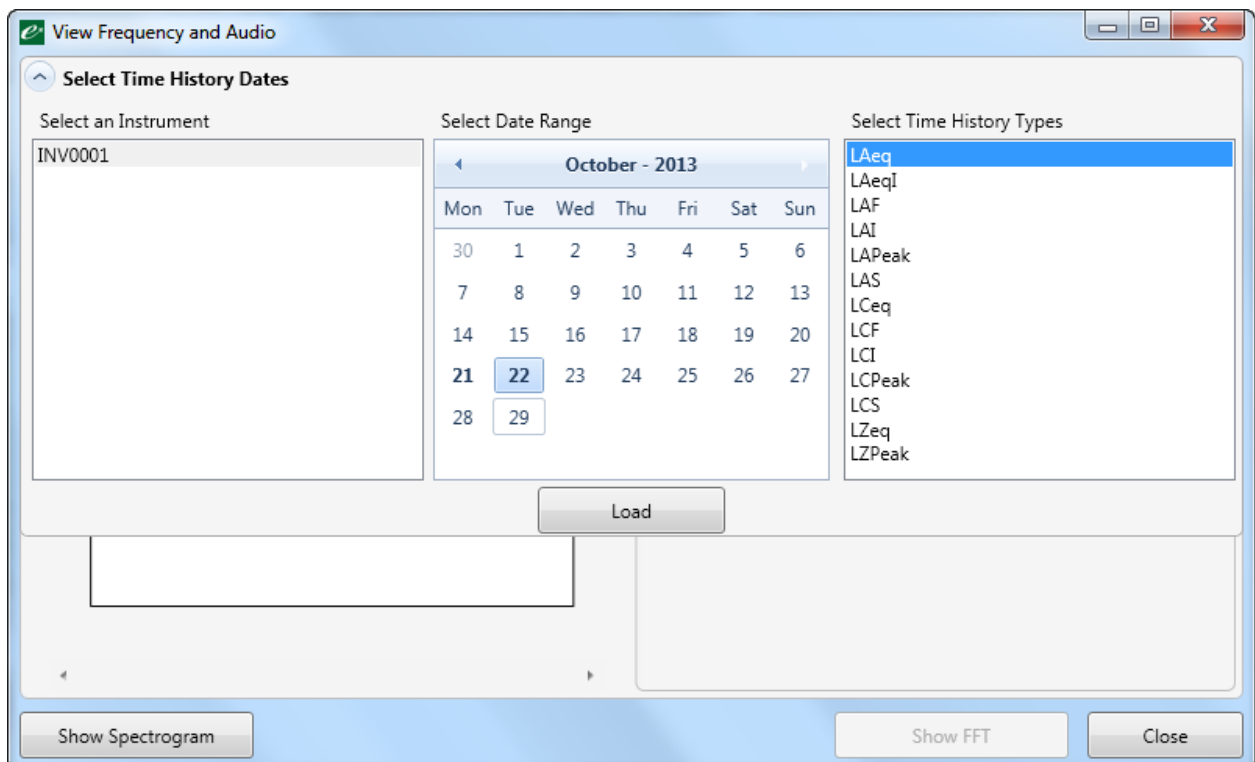
Right click to export the data into Excel or as a CSV file.

Viewing frequency data

Where available, the 1:3 octave band data can be viewed by clicking on the Frequency button.

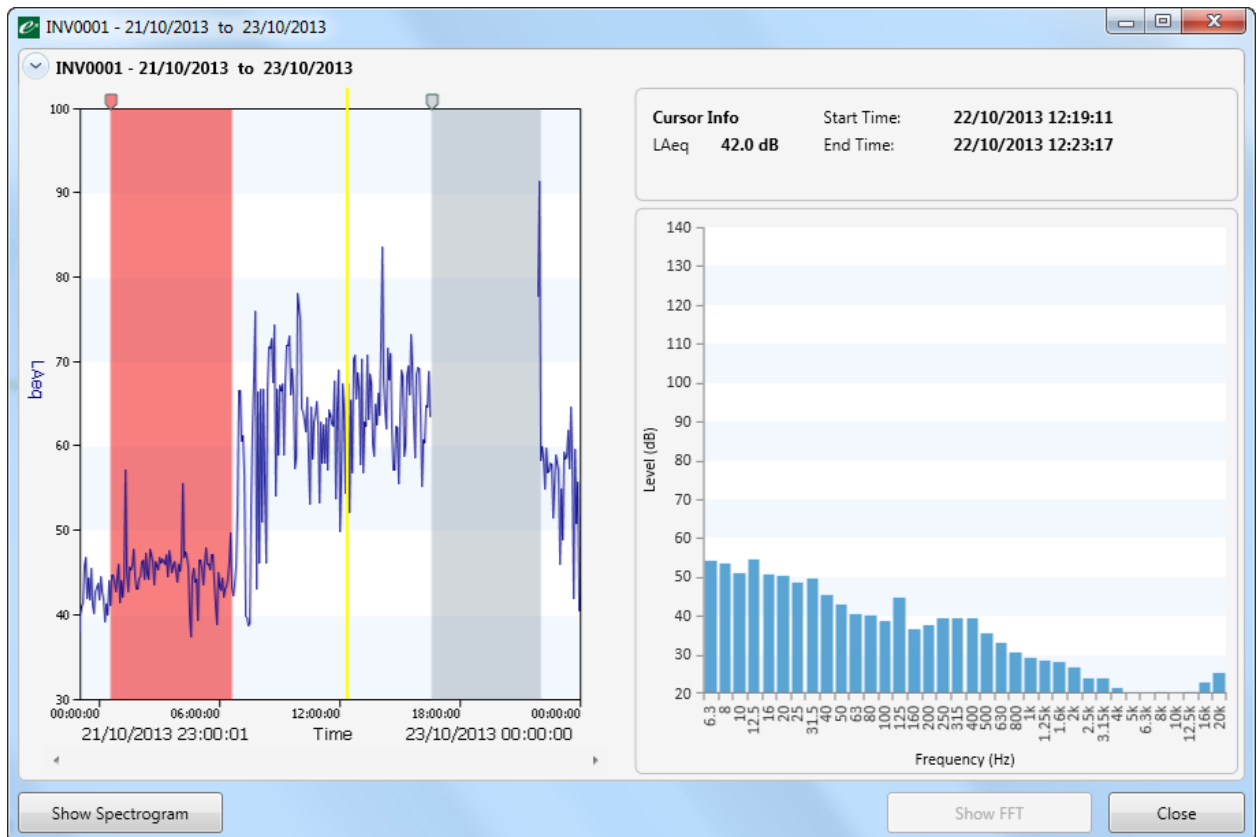


Select the instrument, the date range and the data type required. Click the load button to open the measurement data window.



Choose the date or date range for the analysis and choose the data type to be shown on the time history display.

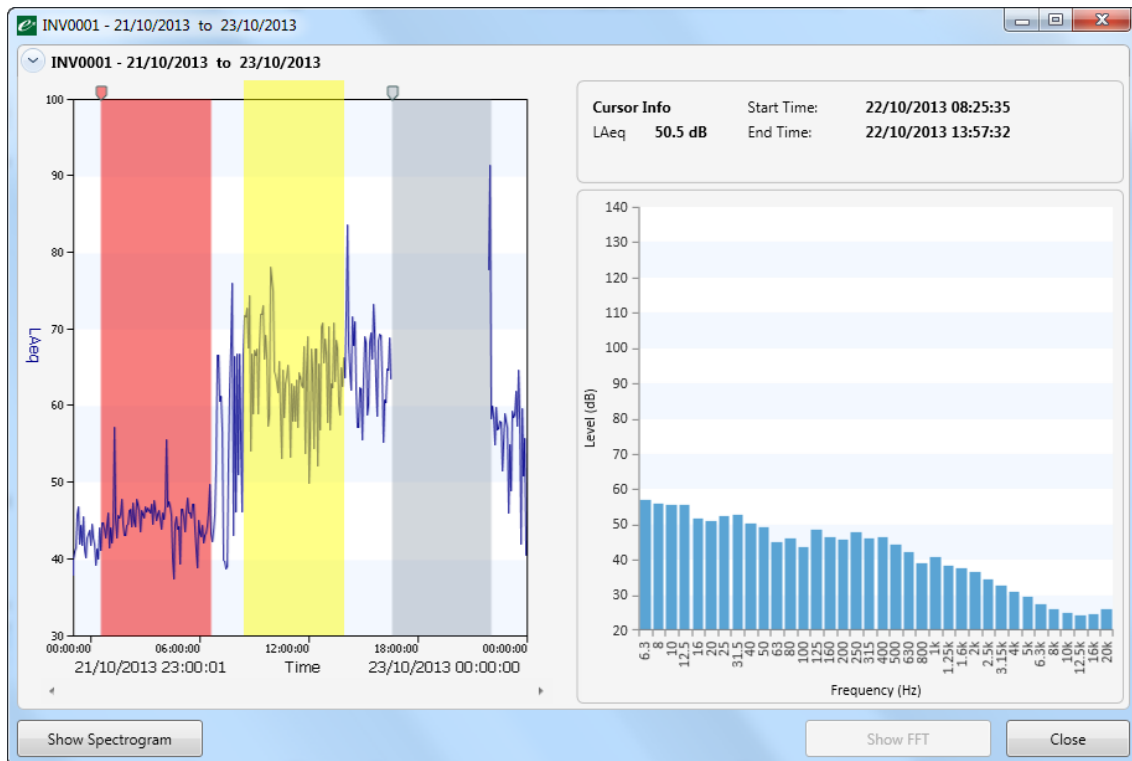
Click Load to retrieve the data.



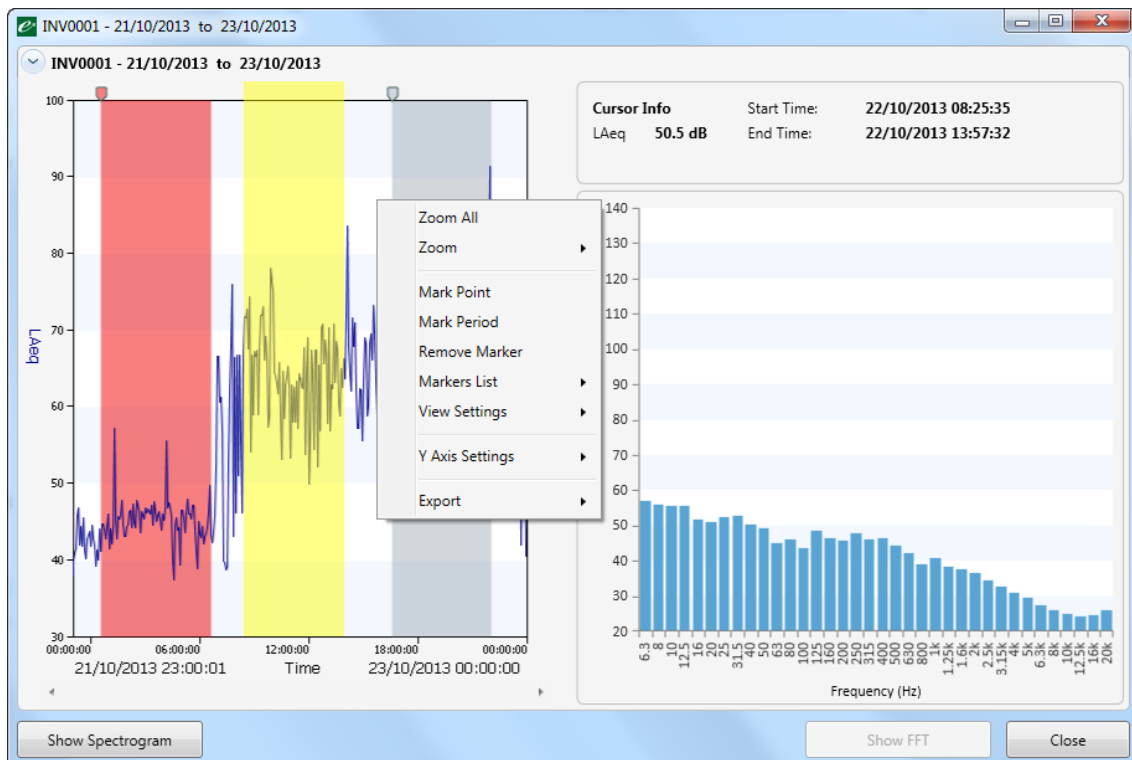
If any user markers have been added to the time history data, these will be shown on the left hand panel.

Clicking on the time history data will show the 1/3 octave band spectrum at that point in time.

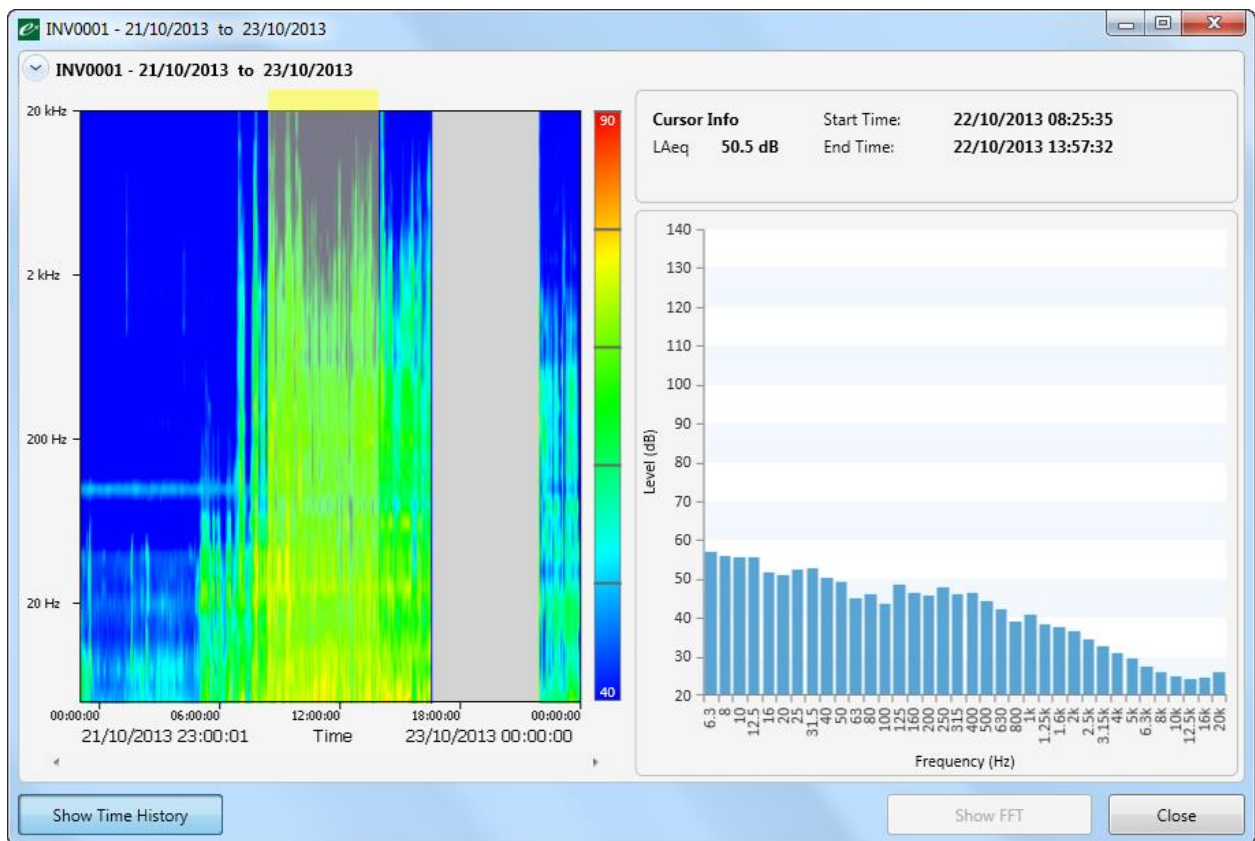
Dragging a region on the time history display will show the Leq for the frequency bands across the chosen period as shown below:



Markers can be added to the time history graph in this window and the information exported or saved as an image using the right click function:

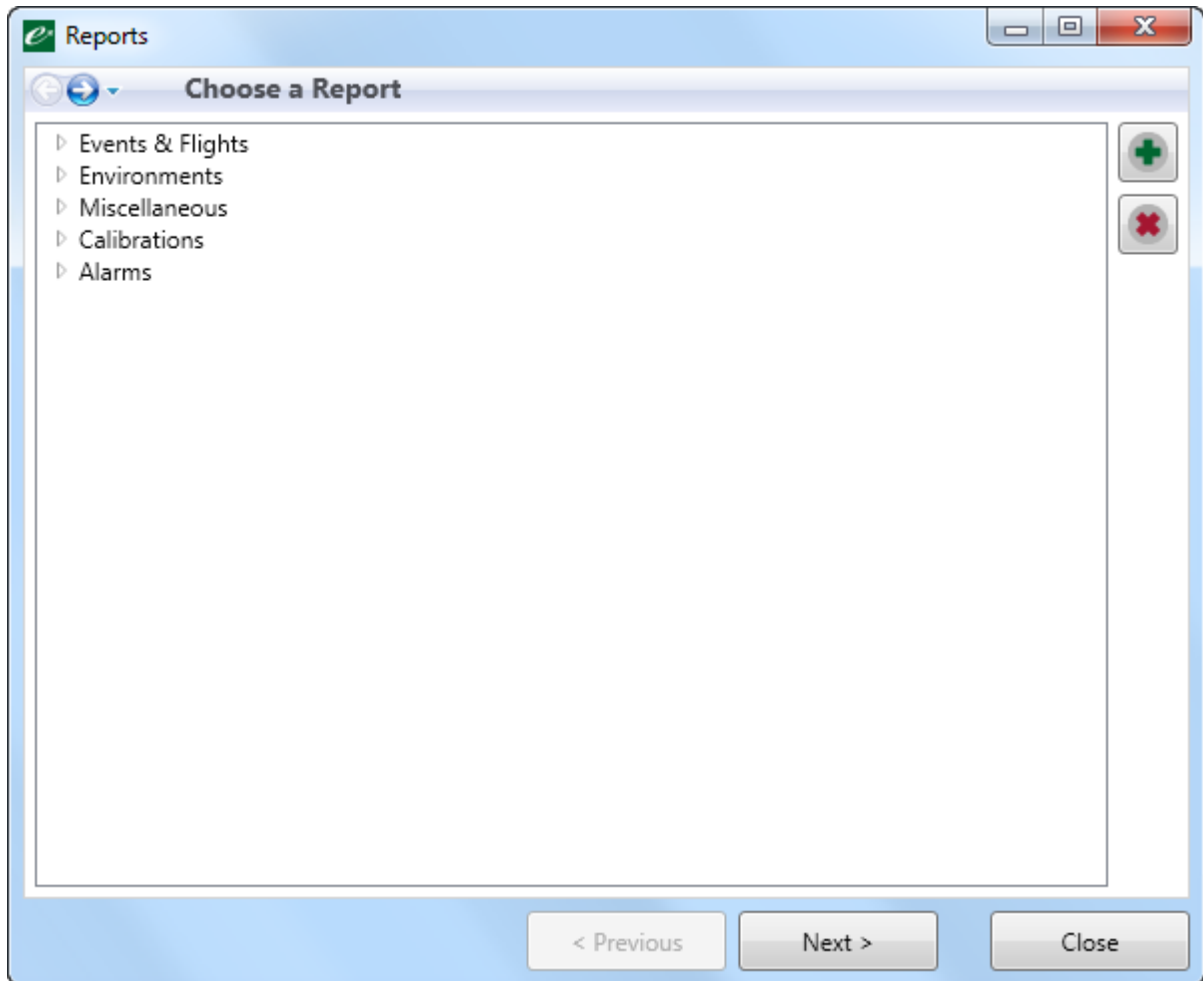


The Show Spectrogram button switches the display between the Time History view and a Spectrogram View:



Measurement Reports

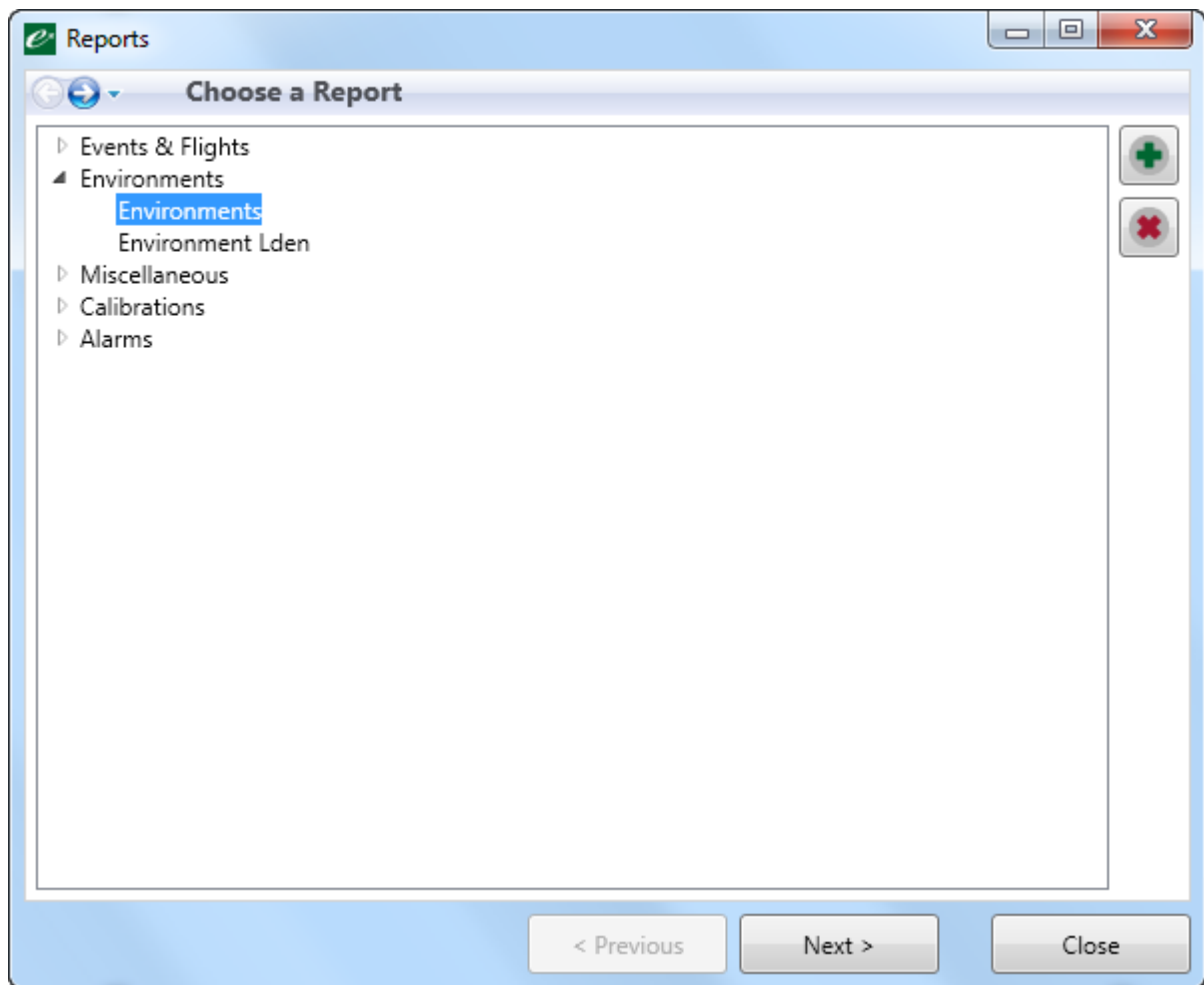
Press the Reports button will open the measurement report list.



All reports are fairly self-explanatory and in most installations, only a few reports are regularly used. Any bespoke measurement reports that have been installed will also appear in this list.

The most commonly used report is the Environments Report. This is used in the following examples.

Make sure the Environments menu is expanded by clicking on the triangle to the left of it, click on Environments in that drop down list and then click Next.



Choose the instrument to be used for the source data. Where measurement data is available for that instrument, the date will be highlighted.

Select dates by clicking on the first date and dragging to the last day needed in the report.

The Environment Options allows different measurement groups to be selected. This options is included to support older instrument such as the CR:240 Series.

For the Invictus, this should be left as All.

Reports

Filter Results

Select an Instrument

INV0001

Select the Date Range

October - 2013

| Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|-----|-----|-----|-----|-----|-----|-----|
| 30 | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

Environment Options

Group: All

< Previous Next > Close

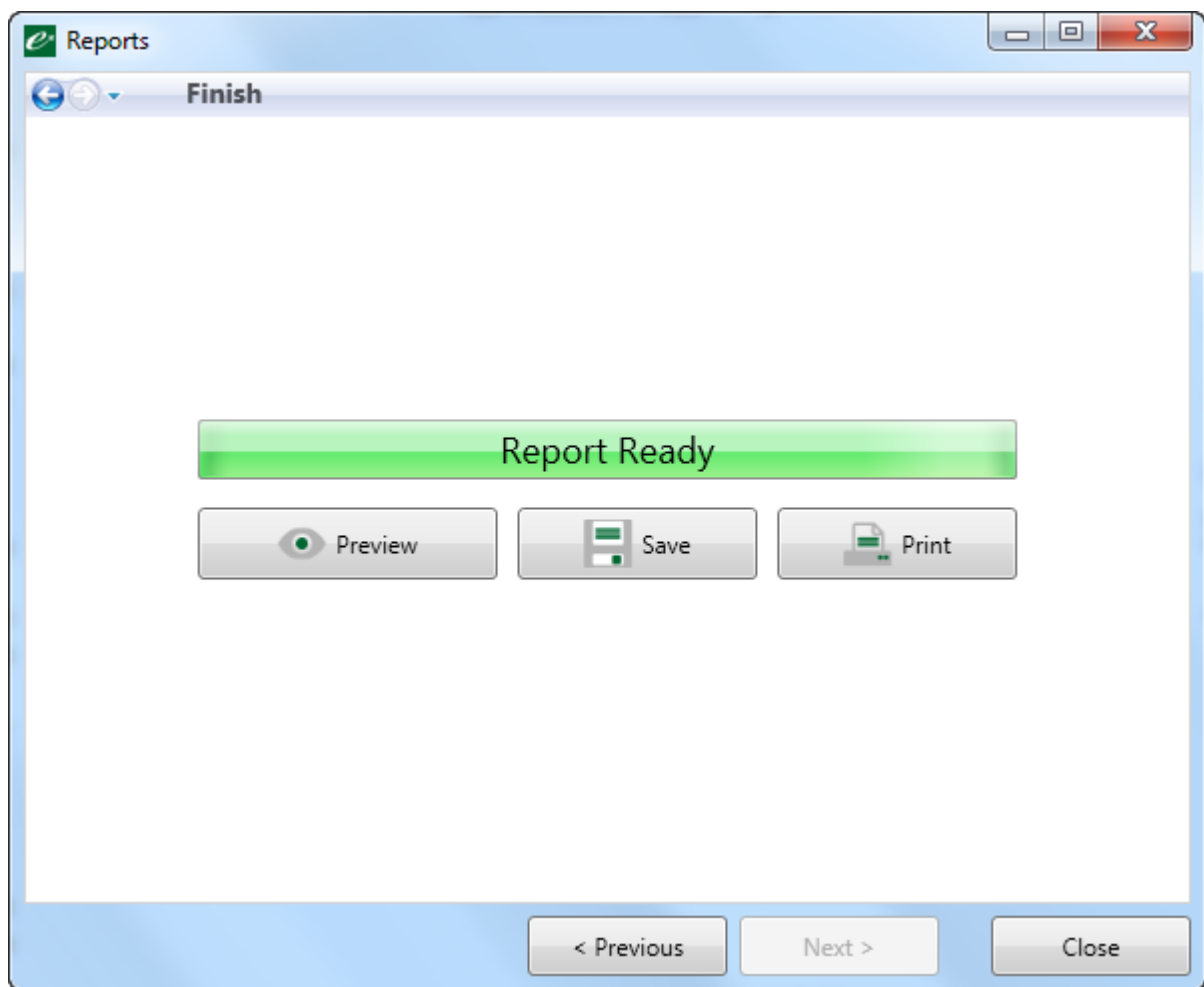
Click next and add any additional information to the report. Click next to create the report.

Reports

Customise Report

Notes

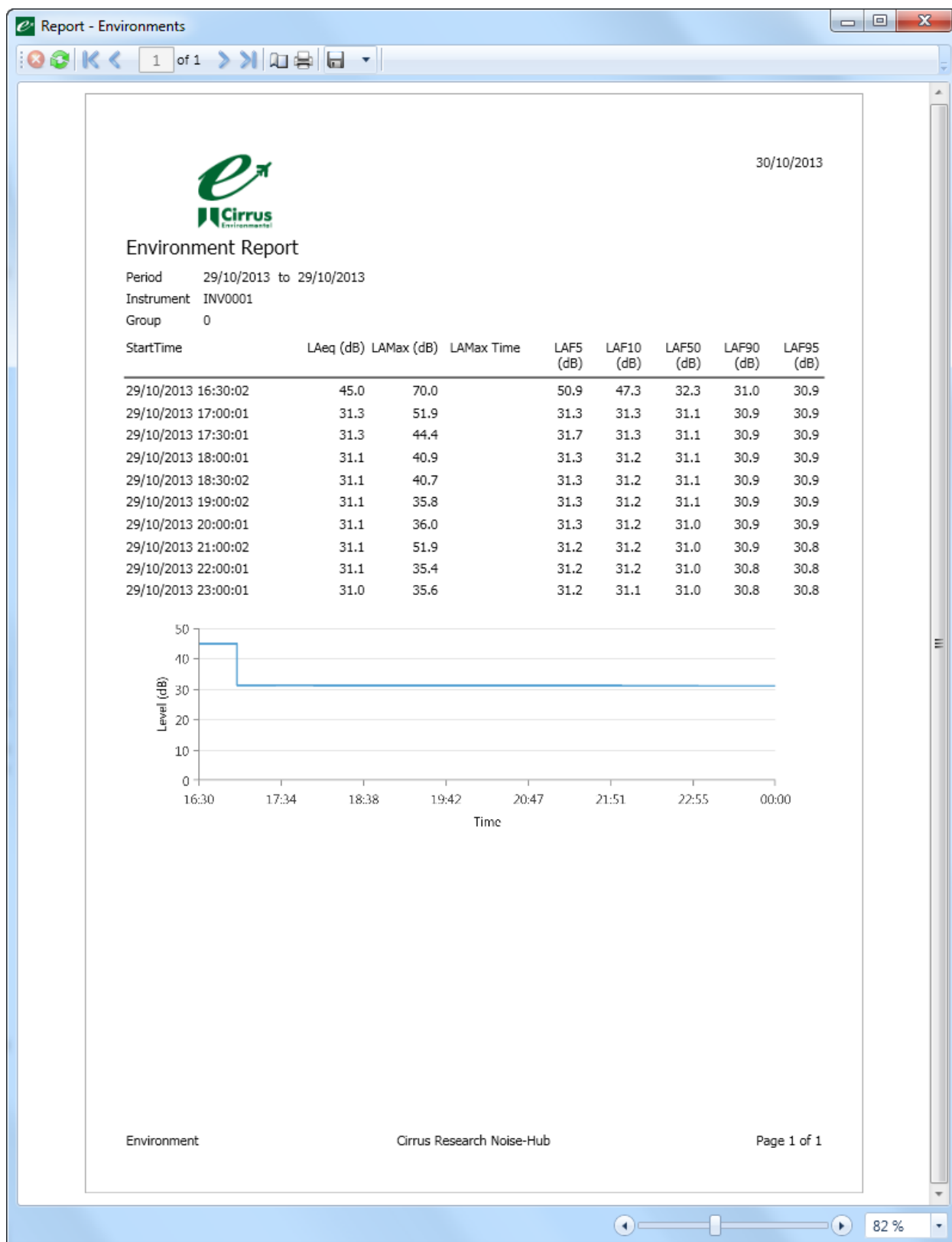
< Previous Next > Close



When the report has been created, it can be viewed, saved or printed. Selecting Preview will display the measurement report.

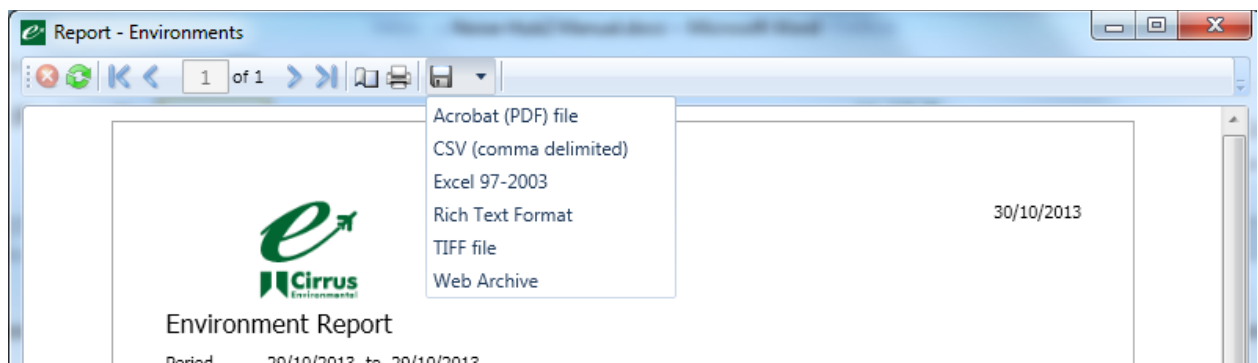
The report can be saved as a PDF or as a Microsoft Word .docx file.

Print will use any printer connected to that PC or available on the network.



The end of the report includes a graph displaying LAeq values over the selected dates followed by any additional text inserted by the person running the report. The parameters displayed on these reports and graphs can be altered to suit specific end user needs.

The menu at the top of the screen allows the data to be saved into additional formats:



Appendix 1 Noise-Hub2 system requirements

NoiseHub2 PC Specification

- Windows 7 SP1 (x64) or Windows Server 2008 R2 (x64)
- CPU: 3GHz Quad Core
- Memory: 4GB
- Storage: 50GB free space
- Display: 1280x1024 (dedicated NVIDIA/AMD graphics card)
- Sound card and external speakers

Storage:

- Approximately 1GB for installing Noise-Hub and dependencies
- Typically 500MB per NMT per Year (varies depending on what is downloaded {especially time history}, and how many events occur)
- Audio requires significantly more space

Warranty information

1. Every new product is provided with a 12-month no-quibble warranty. This covers everything we provide against failure, poor workmanship and accidental damage.

NB - European Union law states a product has to be fit for purpose for 24 months after purchase. This two-year period covers failure and poor workmanship only.

2. If the product is calibrated by Cirrus Research or an authorised calibration and service centre, then the initial 12-month warranty is extended by a further 12 months, with the same conditions, for up to 15 years in total.
3. If a product has not been calibrated annually by Cirrus Research or an authorised calibration and service centre, then you may buy back into the warranty scheme for a small fee, plus the cost of calibration. This can only be done once during the life of the product.
4. If a microphone capsule fails under warranty and is physically damaged, we will replace it with a refurbished capsule.
5. If you don't wish to have a refurbished capsule, then you can trade in your damaged capsule for a new one, which will incur a fee.

Contact information

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| | |
|--------|--|
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| Web: | www.cirrusresearch.com |