# SoundSens

## Leak Localisation & Correlation System

# User Guide

# Record of Amendments

Keep this record in the front of the User Manual. When the document has been amended write the amendment number, the date, the paragraph numbers affected by the amendment and your initials in the table below.

| Amendment Number | Amendment Date | Reason for Re-Issue (Paragraph Number (s) Amended) | Amended by |
|---|---|---|---|
| 1.0 | 9 July 2007 | First draft | AMB |
| 1.1 | 18 July 2007 | Issued | AMB |
| 1.2 | 16 Jan 2008 | Added information about charging | AMB |
| 1.3 | 28 May 2008 | Added more information about changing default sensor type | AMB |
| 1.4 | 2 July 2008 | Added information about daisy chaining cases together | AMB |
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# Contents

# Introduction

## *Components*



SoundSens correlation pods
SoundSens carry case
Software CD
Mains charger
Download leads
(1 x Serial, 1 x USB)

## *Concept*

The SoundSens system comprises a powerful software package and the new SoundSens i pods which can be setup in the field with or without a PC.  Recordings can be stored in the memory of the pod, or the unit can be used with a PC to correlate in the field as a multipoint unit carrying out the test straight away or as a delayed test ie: over night.

SoundSens i can store four sets of recording sessions.  This is equivalent to 4 nights of data storage.  The SoundSens PC software contains help files for using the PC to setup, download and analyse recordings.

This manual was written using SoundSens software version 3.2.1 and Radcom SoundSens i sensors.

## *Charging the Carry Case*

The carry case contains rechargeable batteries. It must be charged for 24 hours before first use. Re-charge the carry case when the battery status LED starts to flash RED. The data will be lost if the unit goes completely flat. However the battery low LED will give plenty of notice of a low battery (i.e. days) and should be seen as an indication to download data and re-charge.

The charge in the carry case battery pack should last approximately two months depending on how frequently it is used.

To charge the batteries plug the supplied mains charger into the charging socket next to the battery status LED. While charging the LED will flash ORANGE.

When the batteries are charged the battery status LED will flash GREEN (even if the charger is still connected).

# Setting Up SoundSens

## *Setup With PC*

### Start the software
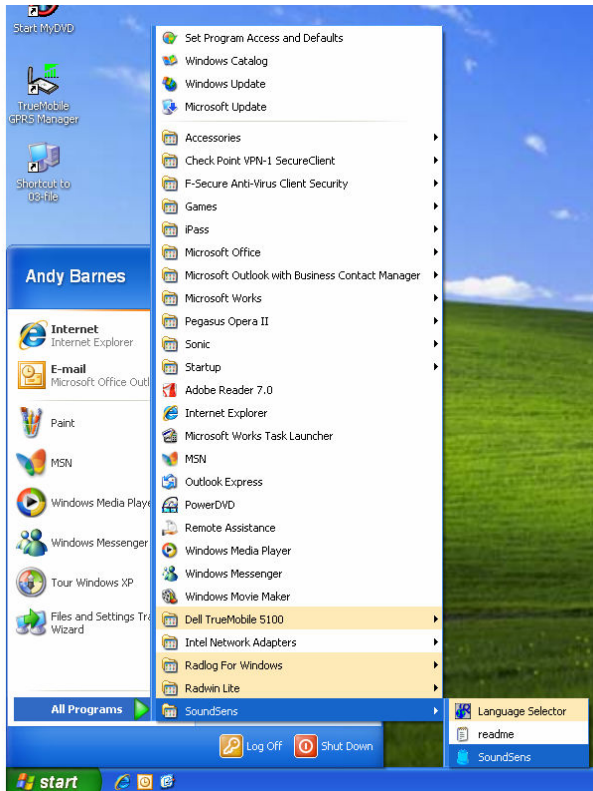
Run the SoundSens software from the Start menu as illustrated here.
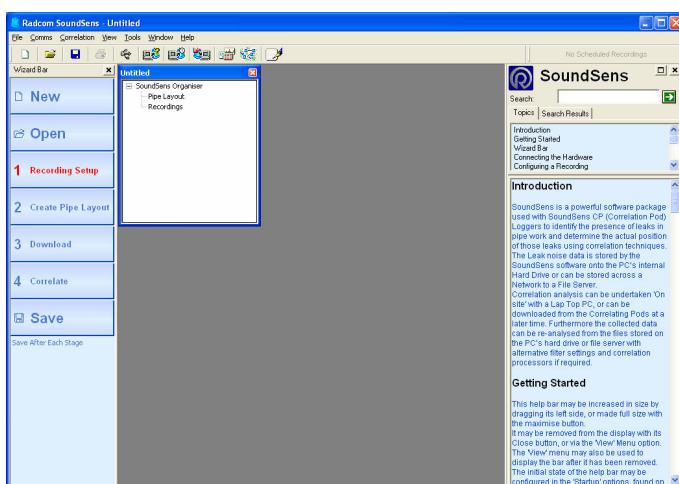
The opening screen for the SoundSens software.

## Connect the carry case to the PC

**Serial (RS232) Communication Cable**

The male end of the cable plugs into the Master Serial connector on the carry case, and the female end plugs into your laptop or PC.

**See next page for further information**
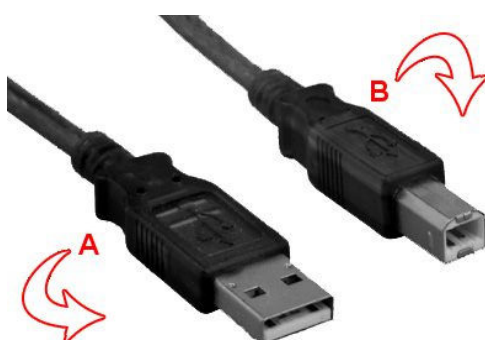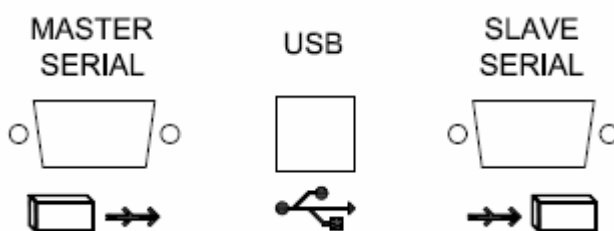
**USB Communication Cable**

The A end (rectangle shape) plugs into your PC or laptop, and the B end (square shape) plugs into the USB connector on the carry case.
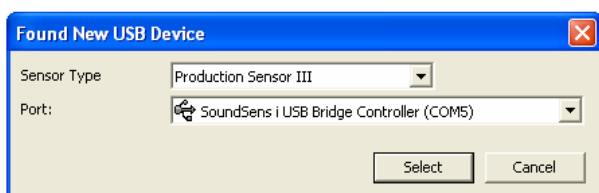
This message will appear indicating the software has detected the case

**See next page for further information**

## Information regarding connection via Serial RS232

When you connect the carry case to your laptop or PC via the Serial (RS232) cable the PC will not do anything. You must select the correct communications port manually.
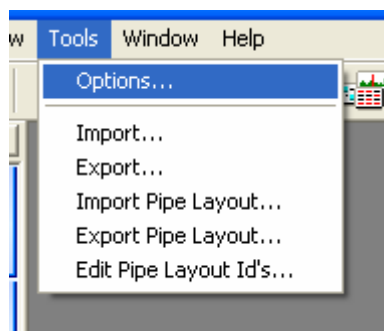
From the Tools menu click Options

Then select the Communications tab (see below)
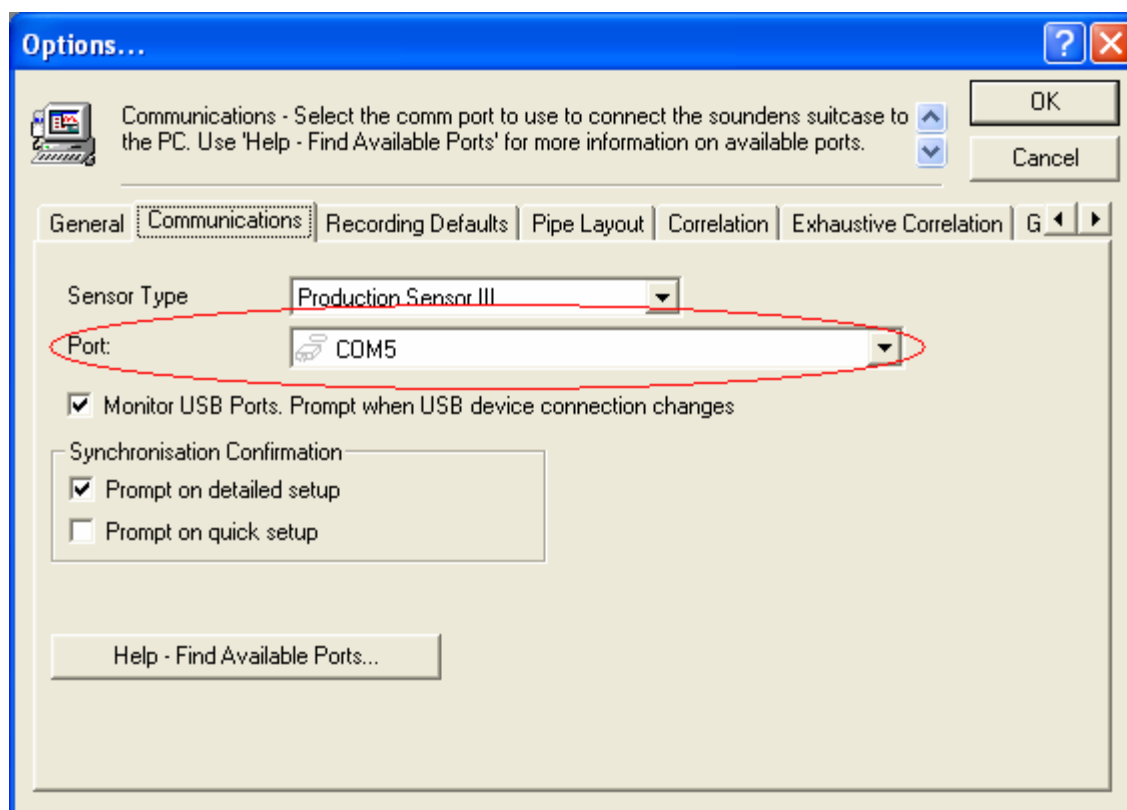
Select the correct port from the drop down list.

For extra help please see page 54 or contact the Radcom technical support team.

## Information regarding connection via USB

With the software started connect the SoundSens carry case to the PC using the USB communication cable.

This message will appear indicating the software has detected the case.
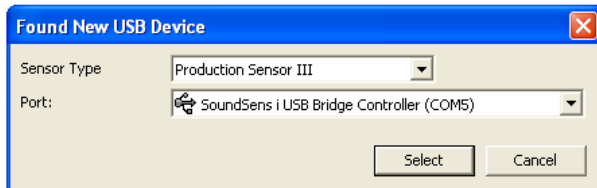
On the Sensor Type drop down menu you can select the following
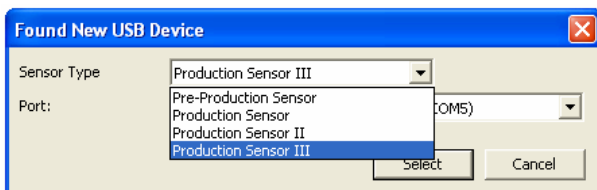
- Pre Production Sensor
- Production Sensor (The original SoundSens logger)
- Production Sensor II (Dark blue plastic logger)
- Production Sensor III (Otherwise known as SoundSens i)

The port drop down menu is usually picked automatically.
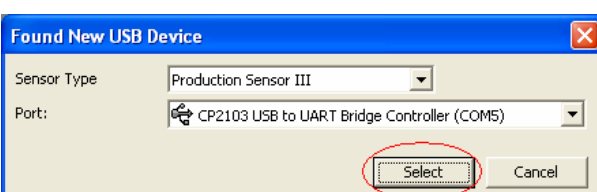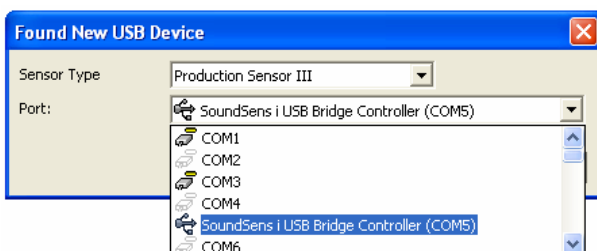
Click Select to continue.

## Information regarding daisy chaining multiple cases together

To communicate with multiple cases you need to connect them together using SoundSens serial communication cables, and then via USB to the PC.

The suitcase lid will have an arrangement of D shape communication ports and a USB port.

*There are variations on the lid as shown below.*
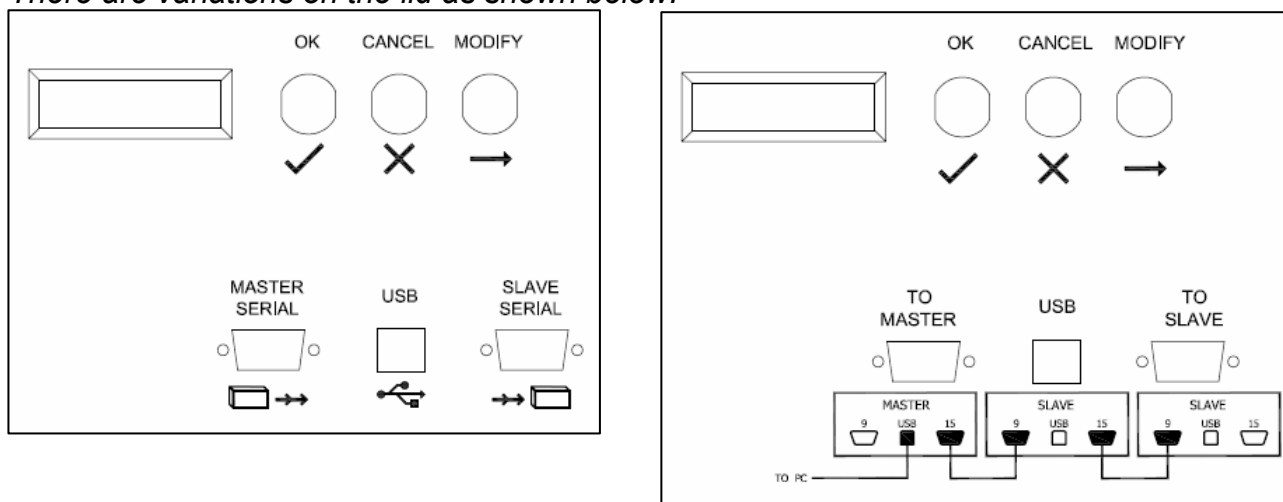


**In all situations you need to daisy chain the cases as shown below.**
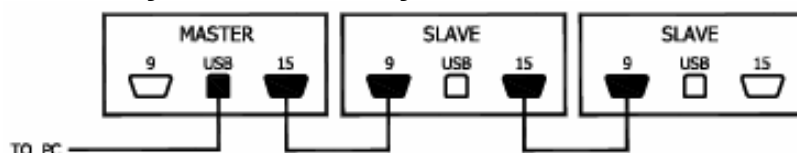


Note: You can not chain together 4 pod kits, but one 4 pod kit can be connected to the end of a chain of 8 or 6 pod kits.

## Communication Test
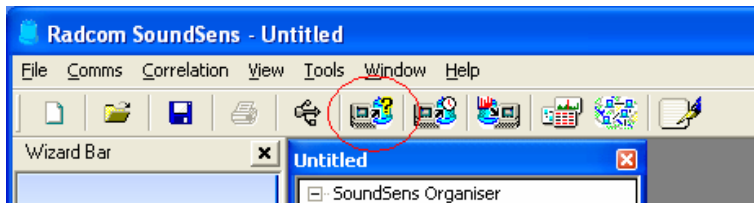
With the carry case (or cases) connected to your PC or Laptop click the sixth icon on the menu bar.
The software will now communicate with the case (or cases) and loggers.
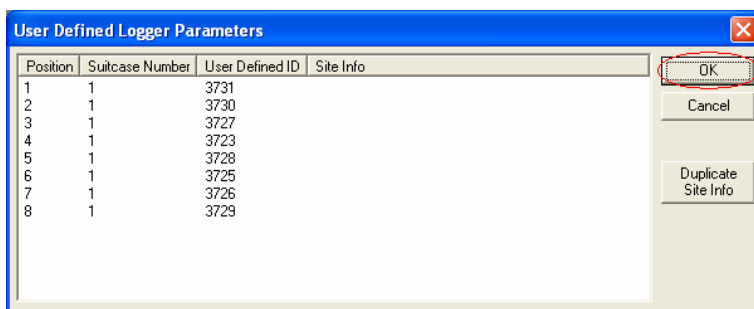
The list which pops up shows the logger positions in the case. If any loggers have failed to communicate they will be missing from this list.

Click Ok.

## REMEMBER TO SAVE REGULARLY

Click Save

Type a name for your file.

Make sure the file name has not been used before.
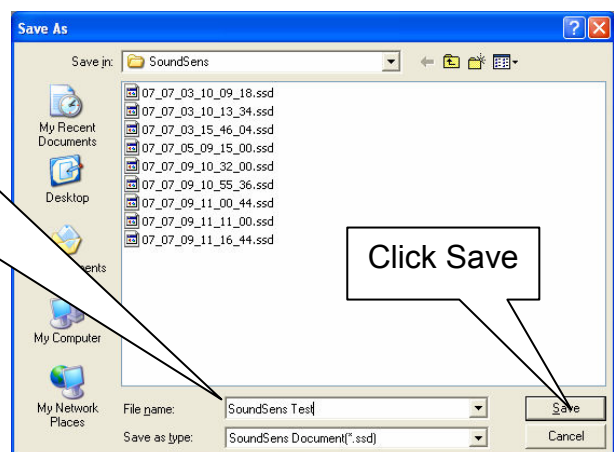
Click Save

You will only be prompted to type a file name if you have not clicked save before.

Every other time you click save the updates will be saved but no other action will be required.

## Quick recording setup
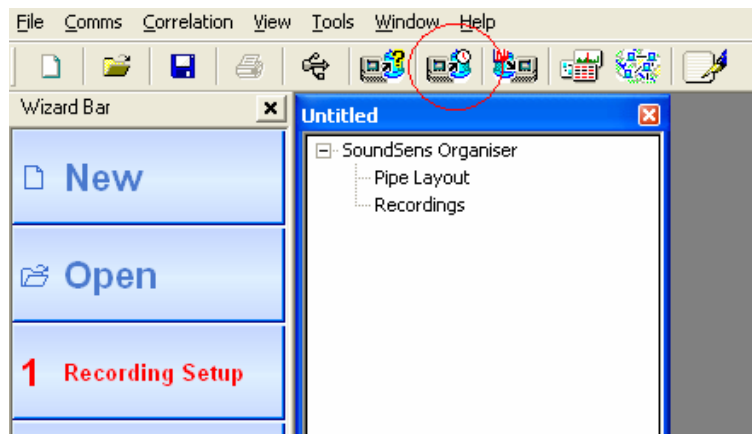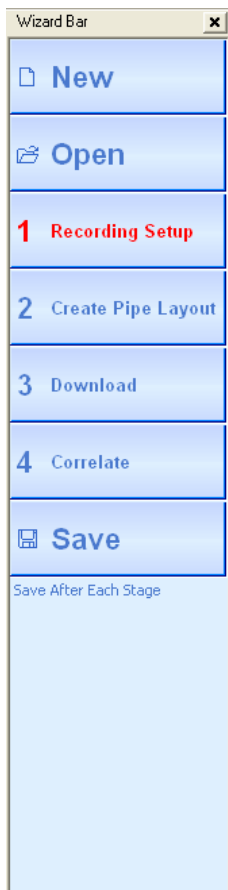


Connect the carry case to your PC or Laptop.

To setup a quick recording either click the Recording Setup button on the Wizard Bar (left image), or click the 7th button on the menu bar (circled above).
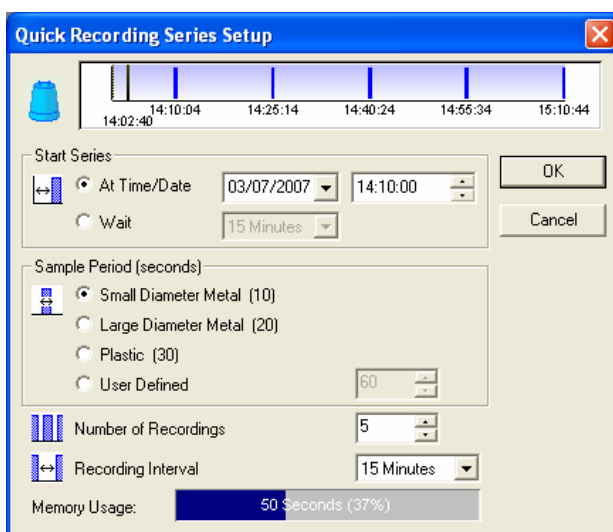


This is the Quick Recording Series Setup window which will pop up after clicking the Recording Setup button.

Quick recording setup is explained in detail next.
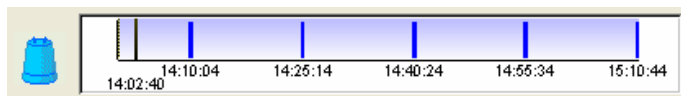
The time line shows a series of logging sessions as dark blue lines. (SEE DIAGRAM BELOW)
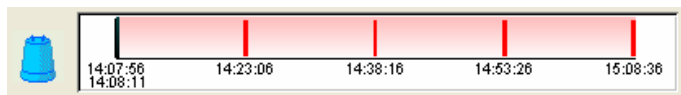


If the time line is red then check the "Start Series At Time/Date" values are not in the past (SEE NEXT DIAGRAM).



It is possible to set a date and time for the recording series to start
NOTE : Do not set a start time more than 36 hours in the future.



Alternativly you can set the loggers to wait for a period of time before starting.
You can set the waiting time between 1 minute and 3 hours.

Make sure you have sufficient time to deploy the pods before the run starts!
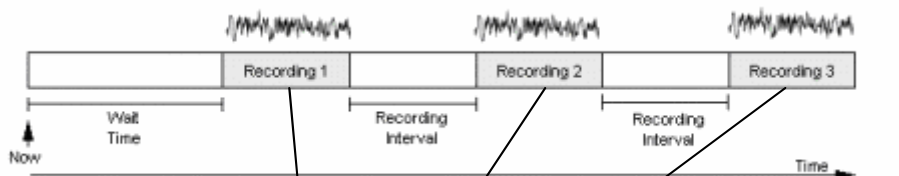


Black line indicates the time now

First light blue space is Wait time

Dark blue lines are recording times

Select the sample period.
This is determined by the pipe material and diameter.

Suggested sample periods for pipe materials and lengths are shown below.

| Pipe | Short distances | Metre | Long distances | Metre | Very long distances | |
|---|---|---|---|---|---|---|
| Up to 6" Metal | 10 Seconds | 500 | 10-20 Seconds | 1000 | | |
| 8" +Metal | 20 Seconds | 400 | 20-30 Seconds | 800 | | |
| Up to 6" AC | 10 Seconds | 100 | 20 Seconds | 500 | | |
| 8"+ AC | 20 Seconds | 80 | 30 Seconds | 500 | | |
| Up to 4"MDPE?PVC | 30 Seconds | 50 | 60 Seconds | 100 | | |
| 4" + MDPE/PVC | 60 Seconds | 50 | 120+Seconds | 100 | | |
| 300+Steel | | | 20 Seconds | 500 | 60 Seconds | 1000+ |

NOTE : On sites with mixed pipe material always select the longest sample period.  So if you have some 6" and some 8" Metal (less than 500 metre lengths) select 20 seconds.

Set the number of recordings (max 9), and set the recording interval (between 1 minute and 3 hours)

The recording interval is the gap between the START times of each recording.
e.g. if three recordings of 1 minute each are set to start at 1AM with a recording interval of 1 hour then the start times will be 1am, 2am, 3am.  If the recording interval is 15 minutes then the start times will be 1am, 1:15am and 1:30 am.

Radcom recommends 3 recordings – see explanation below.

The recording interval needs to be set with local knowledge in mind.  Think of how long it takes for a toilet to fill in your local area, and set the recording interval to that time.  This will help reduce the detection of noise which is due to legitimate consumption.

This is also partly the reason why we suggest 3 recordings.  If a logger detects a noise which can be put down to legitimate usage then hopefully on the second or third recording the usage will have stopped.

Some combinations of sample periods and number of recordings will cause excess memory usage.  This is due to memory size restrictions in the logger.
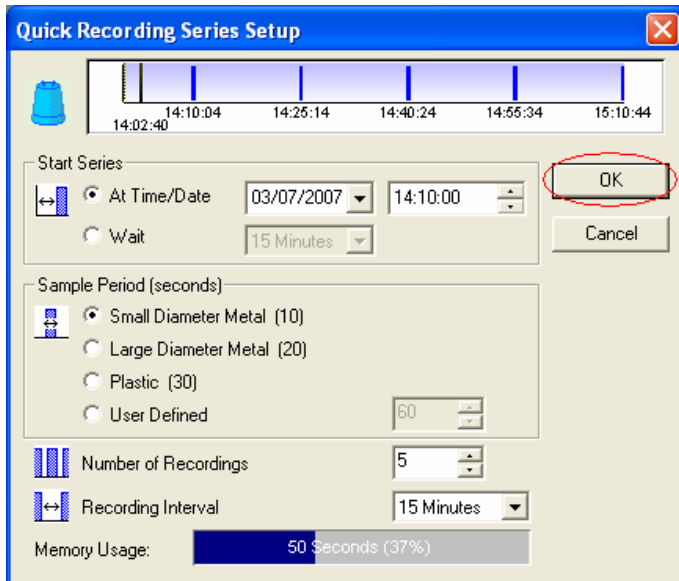
After you are happy with the settings in the setup window, click OK.
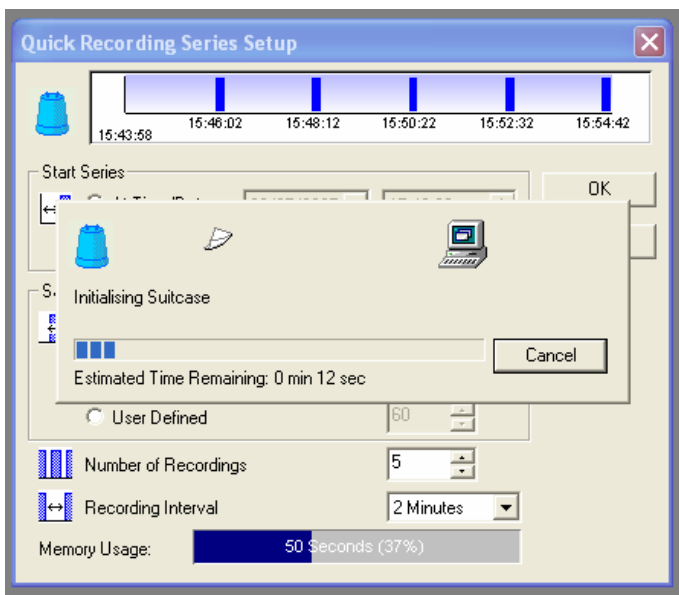


The SoundSens software should communicate with the suitcase.
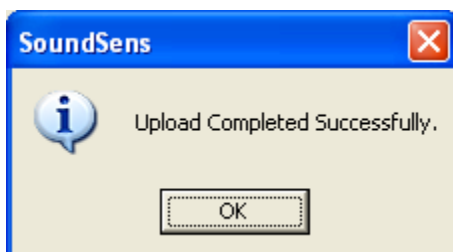


The SoundSens software will display this message if the setup worked.  Click OK to continue.

Deploy SoundSens correlation pods ( i.e. loggers) on site.
You should have sufficient time to deploy the pods before the run starts.
As you deploy make a note of the SERIAL NUMBER of the Pod and it's location on site.
**CONTINUED…**

## Quick recording setup with Multiple Cases

Connect the suitcases together as shown in the section "Information regarding daisy chaining multiple cases together"

Follow the instructions from the section "Quick recording setup".

At the stage of upload you will notice the software communicates with each suitcase and each logger within in turn.

After uploading the settings to the loggers the SoundSens software will look something like this…
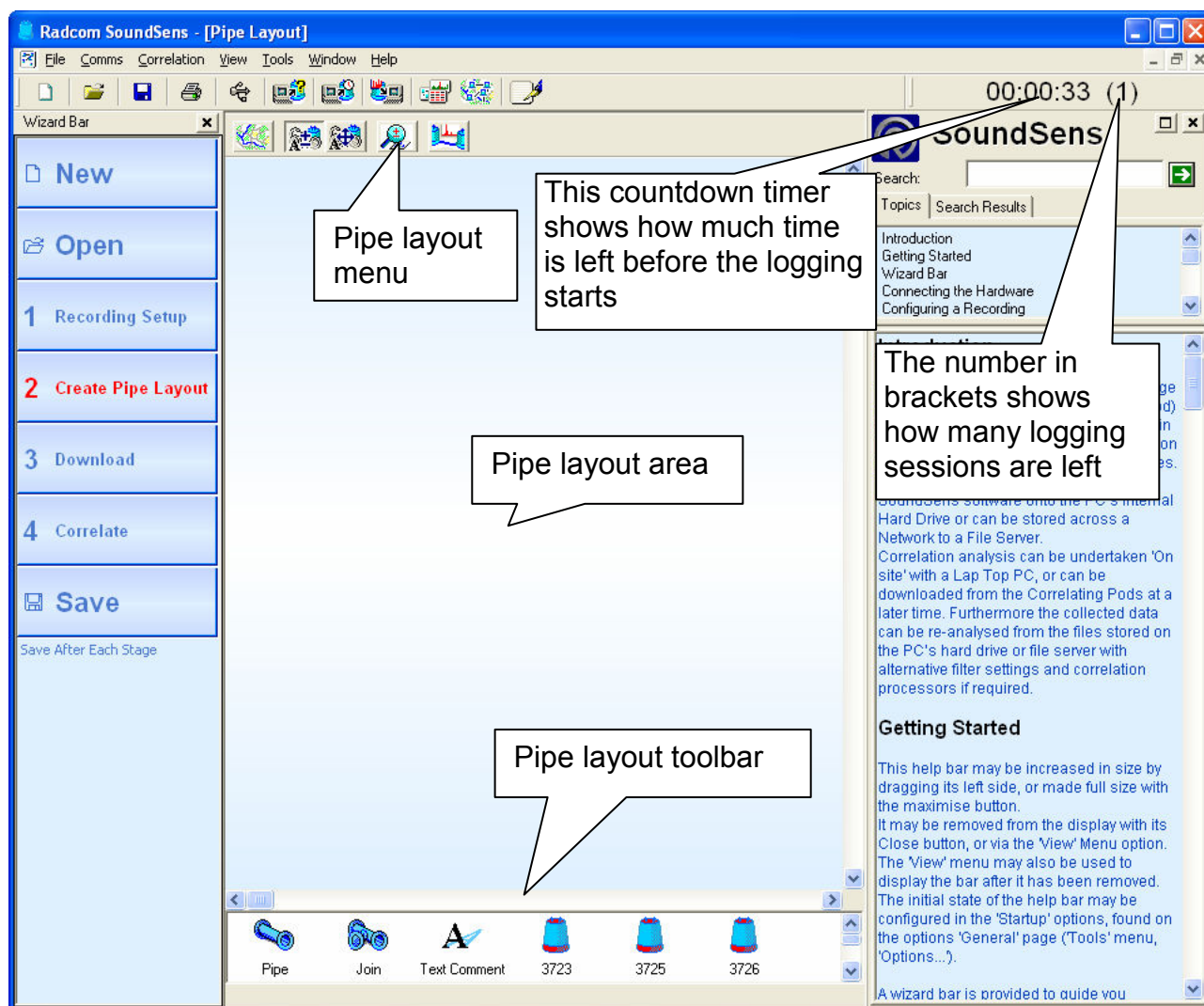


The next step is to create a pipe layout.

Creating a pipe layout is explained in the Pipe Layout section within the Dealing With Data chapter of this manual.

**REMEMBER TO SAVE REGULARLY (PAGE 8)**

## Setup Without PC

### Basic Carry Case Operation

*Please note*
When the carry case is not being used it will switch to a low power standby mode for battery conservation, so the carry case display will turn off after 20 seconds if no buttons are pressed.  If you are in the middle of making any changes or setting up a recording session you will have to start again.

The carry case display can be reactivated by pressing OK, CANCEL, or MODIFY.  The first thing you see on the display will always be the time and date – **You must check that this is correct before setting up a recording**.  However the chances of the time being wrong are very small because every time the SoundSens software communicates with the carry case it will synchronise the time.

In addition to the time/date this screen can also show

- BATTERY LOW (if the battery needs charging)
- BATTERY CHARGING (when the charger is plugged in)
- Recording countdown (time until next recordings starts) if neither of the above apply and a recording has been set up.

The format for the recording countdown is:  HH:MM:SS (N)

      HH    – Hours
      MM    – Minutes
      SS    – Seconds
      N     – Number of recordings remaining

Pressing the MODIFY key cycles through the main options.
To select an option press OK.
Pressing CANCEL returns to the time/date screen.

Main options (Press Modify to cycle through):
- Time/Date
- Set recording 1? (30min delay) – daytime quick recording setup
- Set recording 2? (2am start) – overnight quick recording setup
- Recording setup? – Custom recording setup
- Download data?
- Stored data
- Set time/date

## Set Time / Date

Setting the time is rarely necessary as the unit contains an accurate clock, and when connected to a PC the time and date are updated.

1. Press MODIFY to cycle through the menu options until you see "**Set Time / Date**"
2. Press OK to enter edit mode
3. Use the MODIFY key to change the value
4. Press OK to move to the next value

## Recording options

There are three options for setting up a new recording.
1. Daytime Quick Recording
2. Overnight Quick Recording
3. Custom Recording

This table should assist you in deciding weather one of the pre-programmed sessions will be suitable, or if you need to set up a custom recording.

| Pipe | Short distances | Metre | Long distances | Metre | Very long distances | |
|------|-----------------|-------|----------------|-------|---------------------|---|
| Up to 6" Metal | 10 Seconds | 500 | 10-20 Seconds | 1000 | | |
| 8" +Metal | 20 Seconds | 400 | 20-30 Seconds | 800 | | |
| Up to 6" AC | 10 Seconds | 100 | 20 Seconds | 500 | | |
| 8"+ AC | 20 Seconds | 80 | 30 Seconds | 500 | | |
| Up to 4"MDPE?PVC | 30 Seconds | 50 | 60 Seconds | 100 | | |
| 4" + MDPE/PVC | 60 Seconds | 50 | 120+Seconds | 100 | | |
| 300+Steel | | | 20 Seconds | 500 | 60 Seconds | 1000+ |

## Daytime Quick Recording Setup

This sets up a recording session which will start after a 30 minute delay. Three recordings will be made each 20 seconds long, five minutes apart.

| | |
|---|---|
| Delay to start of recording: | 30 min |
| Interval between recordings: | 5 min |
| Length or each recording: | 20 sec |
| Number of recordings: | 3 |

Check the table at the bottom of this page to see if it is suitable for your test.

1. Press MODIFY to cycle through the menu options until you see "**Set recording 1**"
2. Press OK to setup the quick recording

If the loggers contain any data then it will be downloaded before the new recording is set up. This ensures that the data in the loggers cannot be lost accidentally by setting up a new recording. All recordings will be available for download in the SoundSens software.

When the recording setup is complete the screen will show a confirmation message, e.g.

```
4 LOGGERS     -O—-
PROGRAMMED    -OOO
```

The number of loggers programmed is displayed, and the right side of the screen shows a map of the positions of the programmed pods ('O' represents a logger present and a '-' shows a vacant position). If this differs from the actual positions of the loggers below the most likely explanation is that the windows on top of the pods are dirty or that an object is on top of the loggers.

| Pipe | Short distances | Metre | Long distances | Metre | Very long distances | |
|---|---|---|---|---|---|---|
| Up to 6" Metal | 10 Seconds | 500 | 10-20 Seconds | 1000 | | |
| 8" +Metal | 20 Seconds | 400 | 20-30 Seconds | 800 | | |
| Up to 6" AC | 10 Seconds | 100 | 20 Seconds | 500 | | |
| 8"+ AC | 20 Seconds | 80 | 30 Seconds | 500 | | |
| Up to 4"MDPE?PVC | 30 Seconds | 50 | 60 Seconds | 100 | | |
| 4" + MDPE/PVC | 60 Seconds | 50 | 120+Seconds | 100 | | |
| 300+Steel | | | 20 Seconds | 500 | 60 Seconds | 1000+ |

## Overnight Quick Recording Setup

This sets up a recording session which will start at 2am. Three recordings will be made each 20 seconds long, one hour apart.

| | |
|---|---|
| Recording start time: | 2 am |
| Interval between recordings: | 1 hour |
| Length or each recording: | 20 sec |
| Number of recordings: | 3 |

Check the table at the bottom of this page to see if it is suitable for your test.

1. Press MODIFY to cycle through the menu options until you see "**Set recording 2**"
2. Press OK to start the recording setup

If the loggers contain any data then it will be downloaded before the new recording is set up. This ensures that the data in the loggers cannot be lost accidentally by setting up a new recording. All recordings will be available for download in the SoundSens software.

When the recording setup is complete the screen will show a confirmation message, e.g.

```
4 LOGGERS    -O--
PROGRAMMED   -OOO
```

The number of loggers programmed is displayed, and the right side of the screen shows a map of the positions of the programmed pods ('O' represents a logger present and a '-' shows a vacant position). If this differs from the actual positions of the loggers below the most likely explanation is that the windows on top of the pods are dirty or that an object is on top of the loggers.

| Pipe | Short distances | Metre | Long distances | Metre | Very long distances | |
|---|---|---|---|---|---|---|
| Up to 6" Metal | 10 Seconds | 500 | 10-20 Seconds | 1000 | | |
| 8" +Metal | 20 Seconds | 400 | 20-30 Seconds | 800 | | |
| Up to 6" AC | 10 Seconds | 100 | 20 Seconds | 500 | | |
| 8"+ AC | 20 Seconds | 80 | 30 Seconds | 500 | | |
| Up to 4"MDPE?PVC | 30 Seconds | 50 | 60 Seconds | 100 | | |
| 4" + MDPE/PVC | 60 Seconds | 50 | 120+Seconds | 100 | | |
| 300+Steel | | | 20 Seconds | 500 | 60 Seconds | 1000+ |

## Custom Recording Setup

This option sets up a recording with user-defined settings.

1. Press MODIFY to cycle through the menu options until you see "**Recording Setup**"
2. Press OK to start
3. For each setting number use the MODIFY key to change the value
4. Press OK to move to the next setting

The options available are:

1. Recording Start Delay
   - 1,5,10,15,30 or 60 minutes
   - At the beginning of an hour (press modify to cycle through)

2. Length Of Each Recording
   - 10, 20, 30 or 60 seconds

3. Recording Interval (time between recordings)
   - 1, 2, 5, 10, 15, 20, 30, 45 or 60 minutes

4. Number Of Recordings
   - 10, 20, 30 or 60 seconds

This table should assist in selecting the recording options you need.

| Pipe | Short distances | Metre | Long distances | Metre | Very long distances | |
|------|-----------------|-------|----------------|-------|---------------------|---|
| Up to 6" Metal | 10 Seconds | 500 | 10-20 Seconds | 1000 | | |
| 8" +Metal | 20 Seconds | 400 | 20-30 Seconds | 800 | | |
| Up to 6" AC | 10 Seconds | 100 | 20 Seconds | 500 | | |
| 8"+ AC | 20 Seconds | 80 | 30 Seconds | 500 | | |
| Up to 4"MDPE?PVC | 30 Seconds | 50 | 60 Seconds | 100 | | |
| 4" + MDPE/PVC | 60 Seconds | 50 | 120+Seconds | 100 | | |
| 300+Steel | | | 20 Seconds | 500 | 60 Seconds | 1000+ |

NOTE : On sites with mixed pipe material always select the longest sample period.  So if you have some 6" and some 8" Metal (less than 500 metre lengths) select 20 seconds.

The recording interval needs to be set with local knowledge in mind.  Think of how long it takes for a toilet to fill in your local area, and set the recording interval to that time.  This will help reduce the detection of noise which is due to legitimate consumption.

This is also partly the reason why we suggest 3 recordings.  If a logger detects a noise which can be put down to legitimate usage then hopefully on the second or third recording the usage will have stopped.

**Continued…**

For the last setting, 'number of recordings', if a value is selected that uses more than the available memory in the logger then exclamation marks will be shown as a warning.  For example if the recoding length is set to 60 seconds and the number of recordings is set to 4 then the display will show:

```
NUMBER OF
RECORDINGS:4 !!
```

The exclamation marks show that the logger memory will overflow if this combination of settings is used.  In this situation, use a lower number of recordings or a shorted recording time.

If the loggers contain any data then it will be downloaded before the new recording is set up.  This ensures that the data in the loggers cannot be lost accidentally by setting up a new recording. All recordings will be available for download in the SoundSens software.

## Downloading Data To The Carry Case

Data can be held in the carry case and downloaded to a PC or Laptop at a later stage.  To download data after a recording:

1. Place the pods back into the case (in any order or position) and lower the front panel.
2. Press MODIFY to cycle through the menu options until you see "**Download Data**"
3. Press OK to start the download

A message will be displayed during data transfer.  After downloading data from the pods a confirmation message is shown.  This is the same format used after setting up a recording and shows which loggers have transferred data.

```
DOWNLOAD     ----
COMPLETE     -OO-
```

## Viewing Stored Data Details

This option shows a summary of data sets stored in the SoundSens i.  A 'set' is the collection of data transferred during a download.  The summary shows the set number, number of pods used and the start time of the first recording, e.g.

```
SET: 02 PODS: 06
 09:50 20/02/07
```

1. Select the **Stored Data?** option with MODIFY
2. Press OK to view the summary for the first set
3. Press OK to view the next set

When all sets have been displayed there is an option to delete the last set.  Note the delete operation **cannot be undone**.

1. Select the **Stored Data?** option with MODIFY
2. Press OK until all the sets have been seen and the message "Remove last set" is shown

To delete the data use the MODIFY key to select YES then press OK

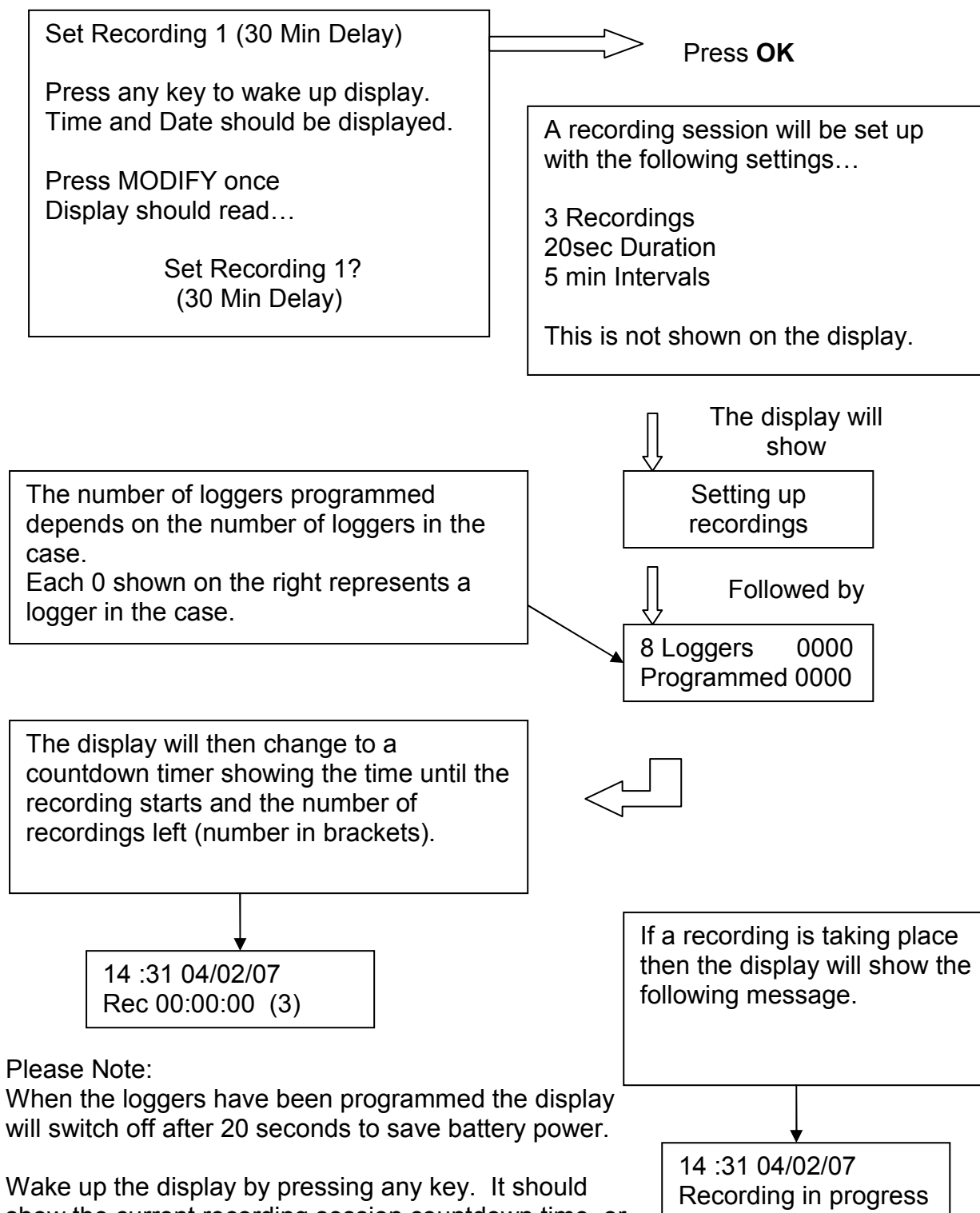## Memory Capacity

There is enough memory in the case to hold 4 downloads from 8 SoundSens i correlator pods which are full of data.  When the case and all the pods are full of data you will not be able to record any more and you will see "Memory Full" on the display.  Either download the data to a PC or erase some data from the View Data menu.

One pod will hold approximately 120 seconds of data.

## SoundSens Case User Interface

### Summary

| Press any key to wake up display.<br><br>First screen is always Time and Date |
| --- |

```
          ┌─────────────────────┐
          │    Time and Date     │
          └─────────────────────┘
                     │
                     ▼   Press Modify
          ┌─────────────────────┐
          │   Set Recording 1?   │
          │    (30 Min Delay)    │
          └─────────────────────┘
                     │
                     ▼   Press Modify
          ┌─────────────────────┐
          │   Set recording 2?   │
          │     (2 am Start)     │
          └─────────────────────┘
                     │
                     ▼   Press Modify
          ┌─────────────────────┐
          │   Recording Setup?   │
          │    (OK) To Start     │
          └─────────────────────┘
                     │
                     ▼   Press Modify
          ┌─────────────────────┐
          │   Download Data      │
          │    (OK)  To Start    │
          └─────────────────────┘
                     │
                     ▼   Press Modify
          ┌─────────────────────┐
          │   Stored  Data       │
          │    (OK)  To View     │
          └─────────────────────┘
                     │
                     ▼   Press Modify
          ┌─────────────────────┐
          │   Set Time/Date      │
          │    (OK)  To Start    │
          └─────────────────────┘
                     │
                     └──────────▶  Pressing Modify
                                   returns to
                                   Time and Date
```

| Press OK to select an item.<br>Further explanation below. |
| --- |

## Set Recording 1 (30 Minute Delay)

Set Recording 1 (30 Min Delay)

Press any key to wake up display.
Time and Date should be displayed.

Press MODIFY once
Display should read…

Set Recording 1?
(30 Min Delay)

Press **OK**

A recording session will be set up with the following settings…

3 Recordings
20sec Duration
5 min Intervals

This is not shown on the display.

The display will show

Setting up recordings

Followed by

The number of loggers programmed depends on the number of loggers in the case.
Each 0 shown on the right represents a logger in the case.

8 Loggers      0000
Programmed 0000

The display will then change to a countdown timer showing the time until the recording starts and the number of recordings left (number in brackets).

14 :31 04/02/07
Rec 00:00:00  (3)

If a recording is taking place then the display will show the following message.

14 :31 04/02/07
Recording in progress

Please Note:
When the loggers have been programmed the display will switch off after 20 seconds to save battery power.

Wake up the display by pressing any key.  It should show the current recording session countdown time, or the time and date if recordings have finished.

## Set Recording 2 (2am Start)

Set Recording 2 (2 am Start)

Press any key to wake up display.
Time and Date should be displayed.

Press MODIFY twice
Display should read…

Set recording 2?
(2 am Start)

Press **OK**

A recording session will be set up with the following settings…

3 Recordings
20sec Duration
1 hour Intervals

This is not shown on the display.

The display will show

Setting up recordings

Followed by

8 Loggers       0000
Programmed 0000

The number of loggers programmed depends on the number of loggers in the case.
Each 0 shown on the right represents a logger in the case.

The display will then change to a countdown timer showing the time until the recording starts and the number of recordings left (number in brackets).

14 :31 04/02/07
Rec 00:00:00  (3)

If a recording is taking place then the display will show the following message.

14 :31 04/02/07
Recording in progress

Please Note:
When the loggers have been programmed the display will switch off after 20 seconds to save battery power.

Wake up the display by pressing any key.  It should show the current recording session countdown time, or the time and date if recordings have finished.

## Set User Defined Recording

Set User Defined Recording

Press any key to wake up display.
Time and Date should be displayed.

Press MODIFY three times
Display should read…

Recording Setup?
(OK) To Start

After the loggers have been programmed the display will change to a countdown timer showing the time until the recording starts and the number of recordings left (number in brackets).

Press **OK**
Display will show

14 :31 04/02/07
Rec 00:00:00  (3)

Recording Start
Delay  01Min

Press **OK** to accept
Display will show

If a recording is taking place then the display will show the following message.

Length of each
Recording

Press **OK** to accept
Display will show

Recording Interval
Delay 01Min

14 :31 04/02/07
Recording in progress

Press **OK** to accept
Display will show

Please Note:
When the loggers have been programmed the display will switch off after 20 seconds to save battery power.

Number of
Recording :3

Press **OK** to accept
Display will show

Wake up the display by pressing any key.  It should show the current recording session countdown time, or the time and date if recordings have finished.

Setting up
Recording

Followed by

The number of loggers programmed depends on the number of loggers in the case.
Each 0 shown on the right represents a logger in the case.

8 Loggers      0000
Programmed 0000

## Download Data From Loggers to Carry Case

Download Data

Press any key to wake up display.
Time and Date should be displayed.

Press MODIFY four times
Display should read…

Download Data
(OK)  To Start

Press **OK**
Display will show

Downloading From
Loggers…

Followed by

Downloading 0000
Complete      0000

The number of loggers downloaded in the case is represented by a 0 shown on the right hand side of the display.

When the download data option is used, the data is read from the loggers and held in the memory of the case.  It can then be downloaded to the SoundSens software at a later stage.

## View Stored Data

View Stored Data

Press any key to wake up display.
Time and Date should be displayed.

Press MODIFY five times
Display should read…

Stored  Data
(OK)  To View

---

Press **OK**
Display will show

Set : 01  PODS : 08
17:09 30/01/07

This indicates that the first recording in the memory of the case had 8 loggers and was recorded on 30/1/07 at 17:09

Press **OK**
Display will show

Set : 02  PODS : 08
17:49 30/01/07

Here you have the option of deleting the last recording held in the case.  By default NO is selected.  If you want to delete the last recording press Modify

Press **OK**
Display will show

Remove Last Set
Yes  (--No--)

Press **MODIFY**
Display will show

Remove Last Set
(--Yes- -)  No

Press **OK**
Display will return to

Press **OK**
Display will show

Stored  Data
(OK)  To View

Set
Removed

And then the display will return to

Stored  Data
(OK)  To View

## Set Time and Data

```
Set Time and Date

Press any key to wake up display.
Time and Date should be displayed.

Press MODIFY six times
Display should read…

          Set Time/Date
(OK)  To Start
```

```
Time and Date
Displayed
```

Press **OK**

```
Set Hour
```

Press **Modify** to change value
Then press **OK**

```
Set Minutes
```

Press **Modify** to change value
Then press **OK**

```
Set Day
```

Press **Modify** to change value
Then press **OK**

```
Set Month
```

Press **Modify** to change value
Then press **OK**

```
Set Year
```

Then press **OK** to set the time.

# Dealing With Data

## *Creating A Pipe Layout*

It is possible to either create a basic schematic layout of the underground pipe work, or add a background image for illustration purposes.

## Pipe Layout Menu

Add map / background image

Move pipe layout items

Logger correlation selection

Show / Hide pipe layout toolbar

Adjust zoom level
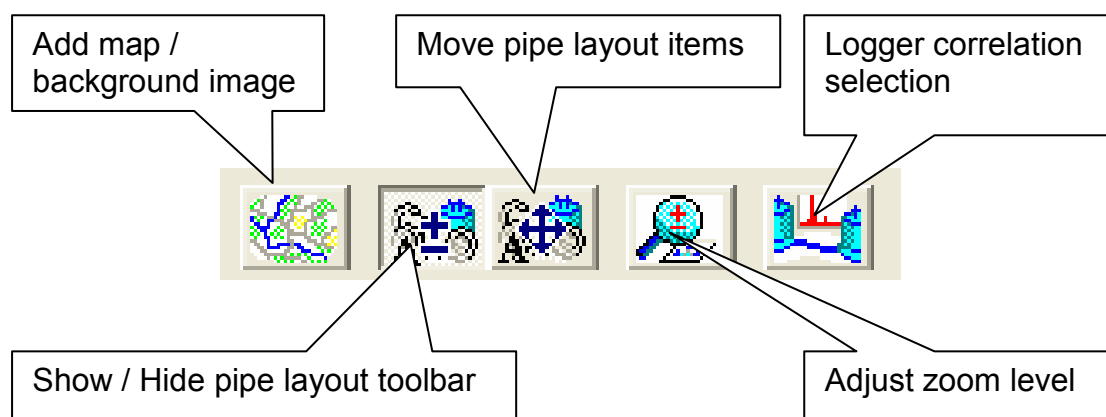
## Add a background image (optional)

Click the Add Map / Background Image button.
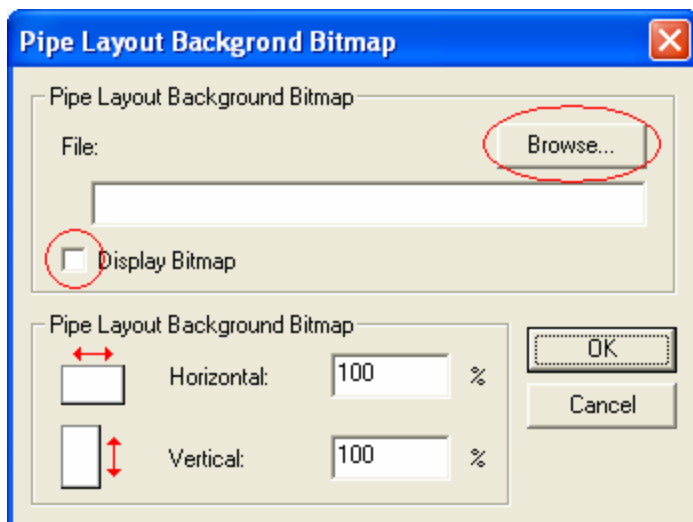
Click Browse and use the standard windows explorer interface to locate a bitmap (bmp) file to use as a background.

You must click the "Display Bitmap" tick box for it to appear on the layout. By default it is **not** ticked.

At a later stage you can go back to this menu and un-tick this option to remove the map.

SoundSens software shown below with map background image.
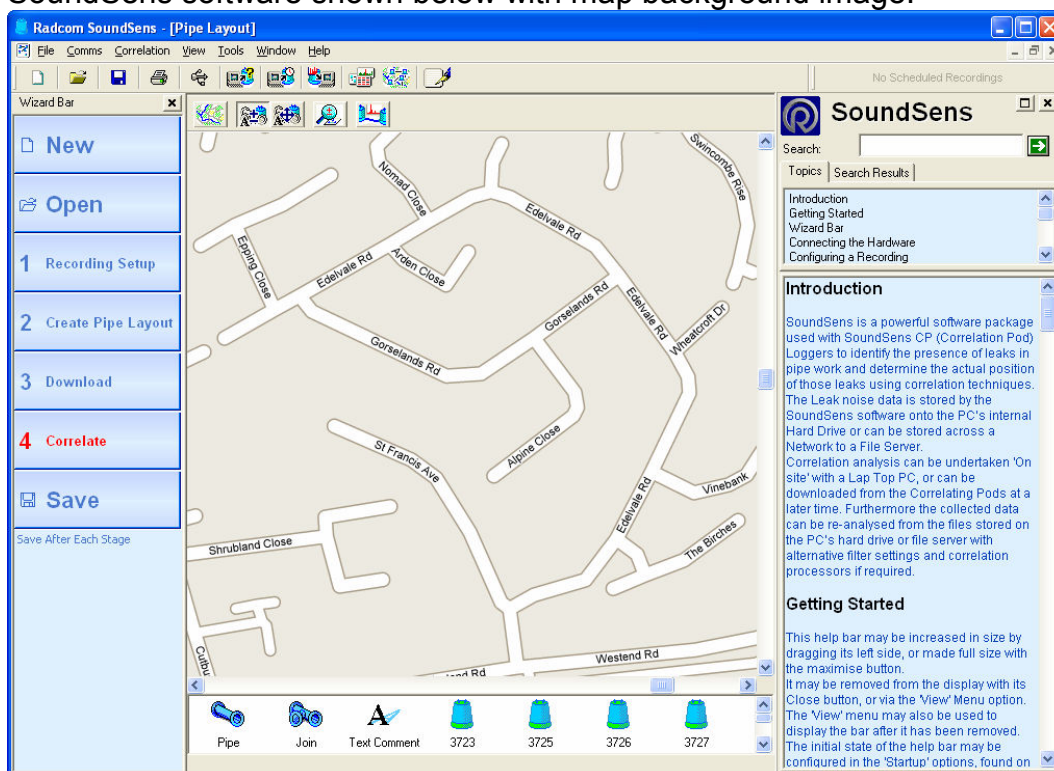
## Pipe Layout Toolbar



The pipe layout toolbar at the bottom of the pipe layout area shows Pipe, Join, Text Comment and the serial of each logger used.

## Putting loggers on the map

Start by selecting a logger and with the mouse button held down drag and drop it from the toolbar onto the pipe layout area.   It is not important to place the loggers precisely as the software pays no attention to position on the screen.  The most important data is pipe length and material type which is entered later.
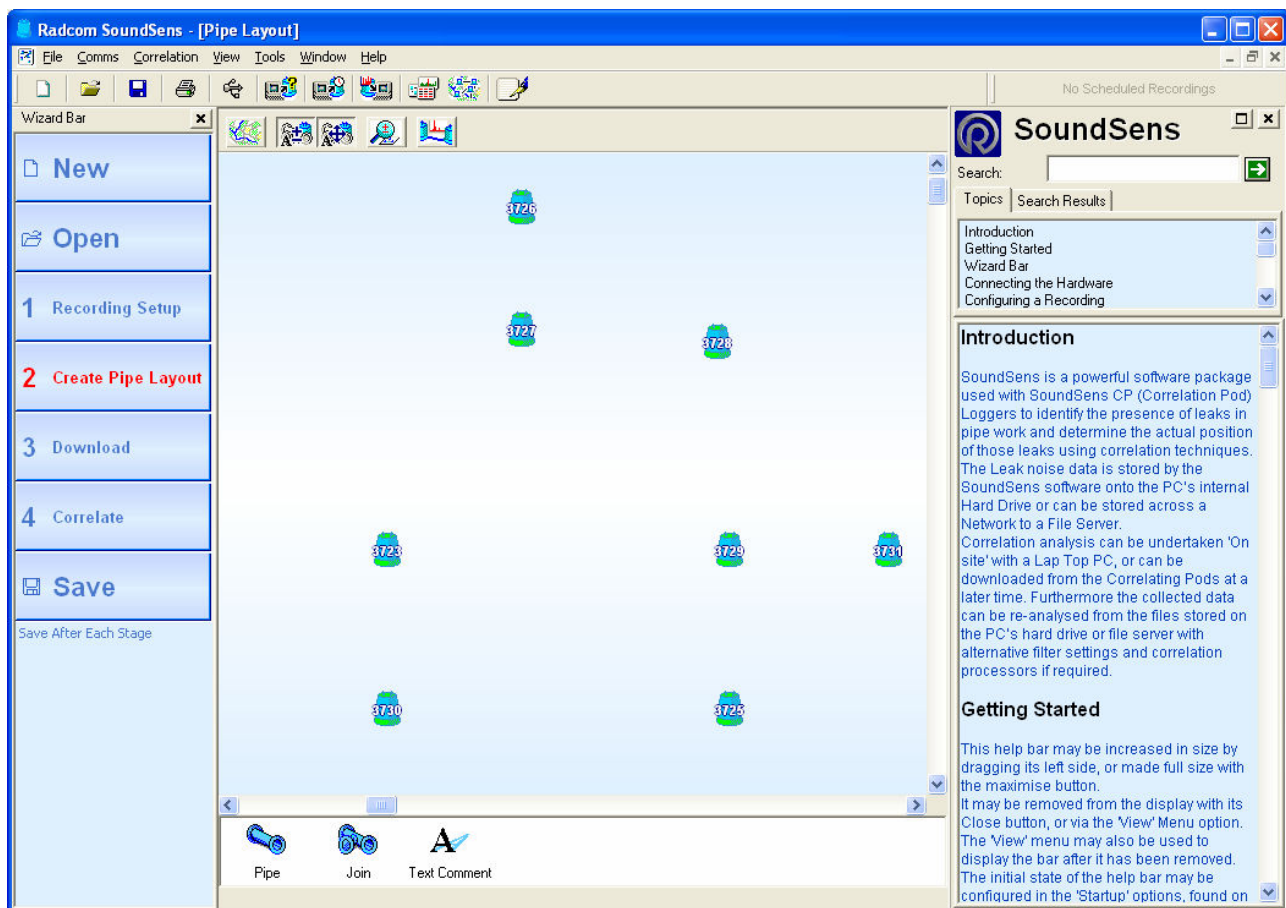


## Putting joins on the map

To add a join on the map click once on Join and then click once on each place that you need a join.  Only use a join



for a change in pipe direction, or pipe material.

**REMEMBER TO SAVE REGULARLY (PAGE 8)**

## Putting text comments on the map

To add a text comment click Text Comment and then click on the map where you wish to see a text comment.
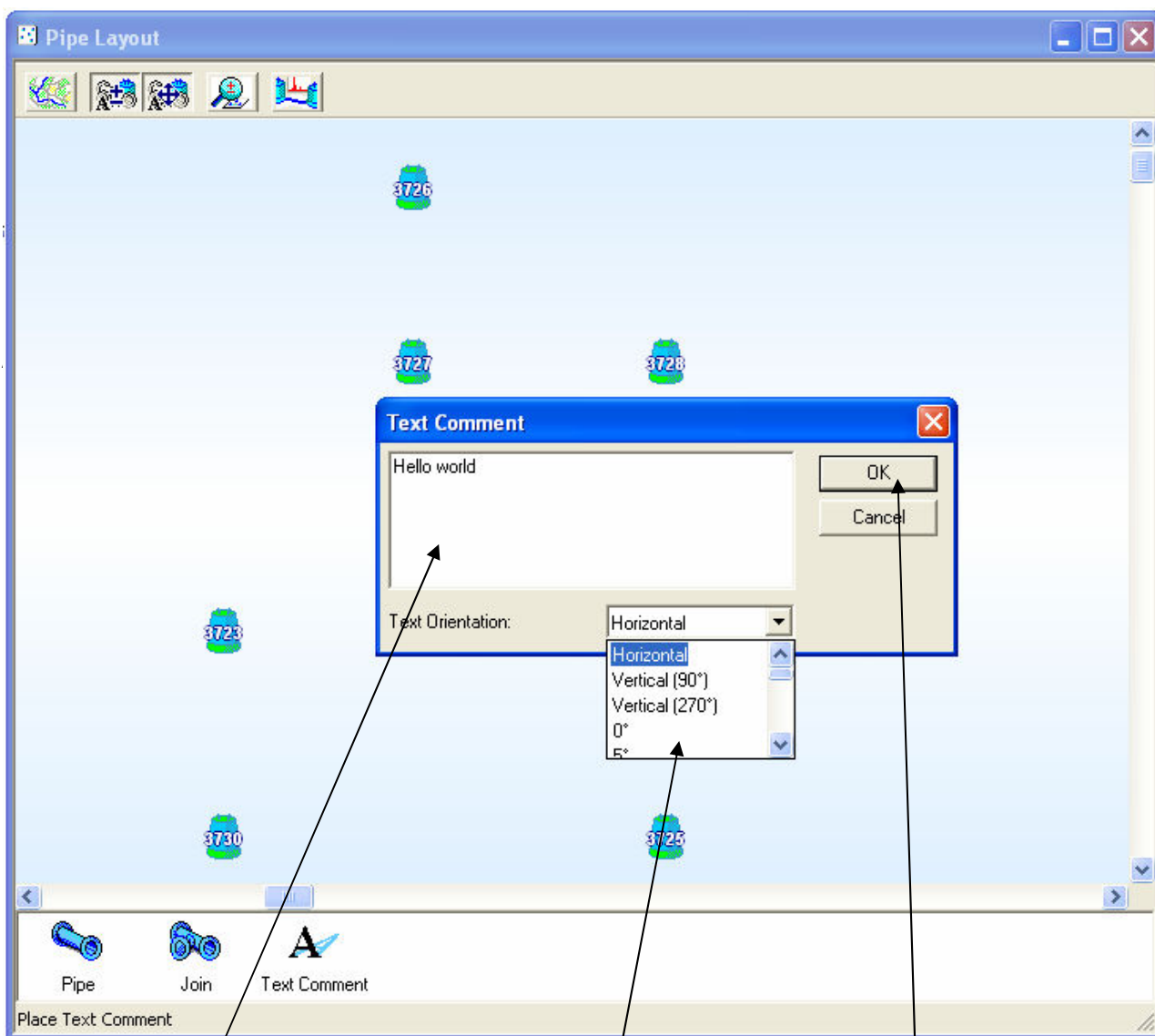


Type your text comment here, and pick a text direction, then click OK

## Adding connecting pipe work to the map

After dragging and dropping the loggers onto the pipe layout area and adding the join points you can start adding the connecting pipes.



Click the pipe icon once and then move the mouse pointer over one of the loggers. Click and hold the mouse button down over the first logger and then move the mouse to the logger you wish to connect it to.
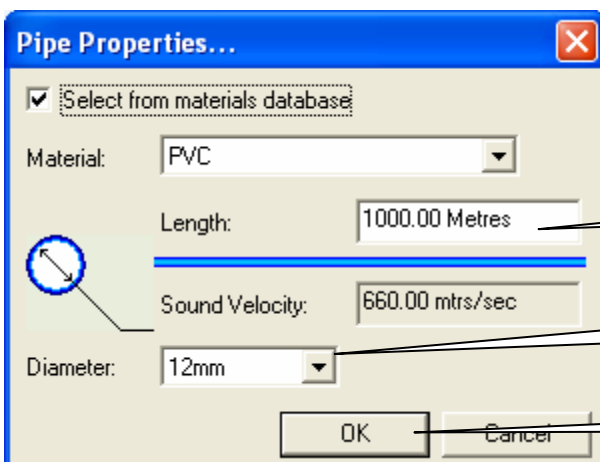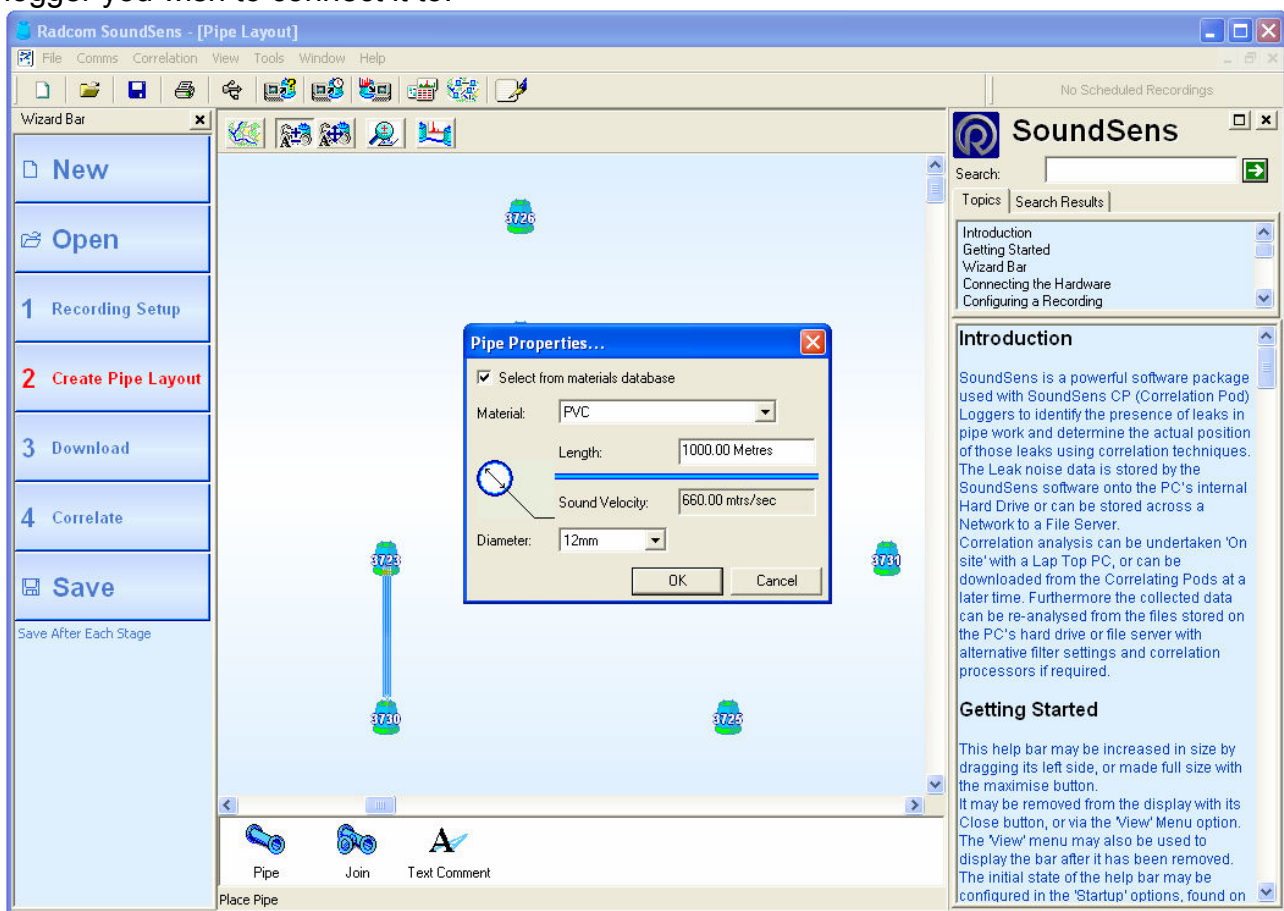




Selecting a material from the drop down list will set a sound velocity. Un-tick "Select from materials database" to enter your own sound velocity.

Enter the pipe length

Select the pipe diameter from the drop down menu

Click OK

## Changing Properties on Pipe Layout



Right click on the pipe you want to change and select Pipe Properties from the menu.
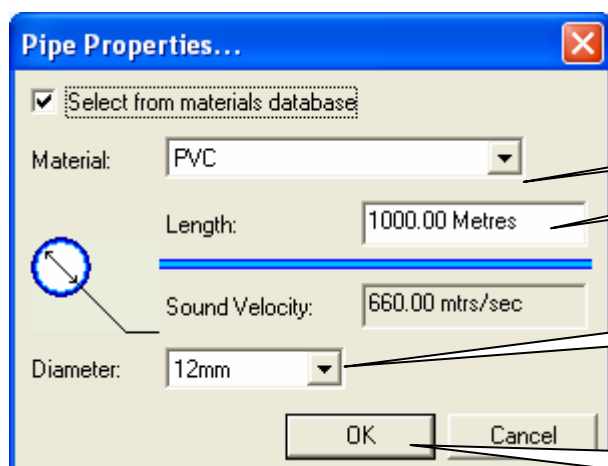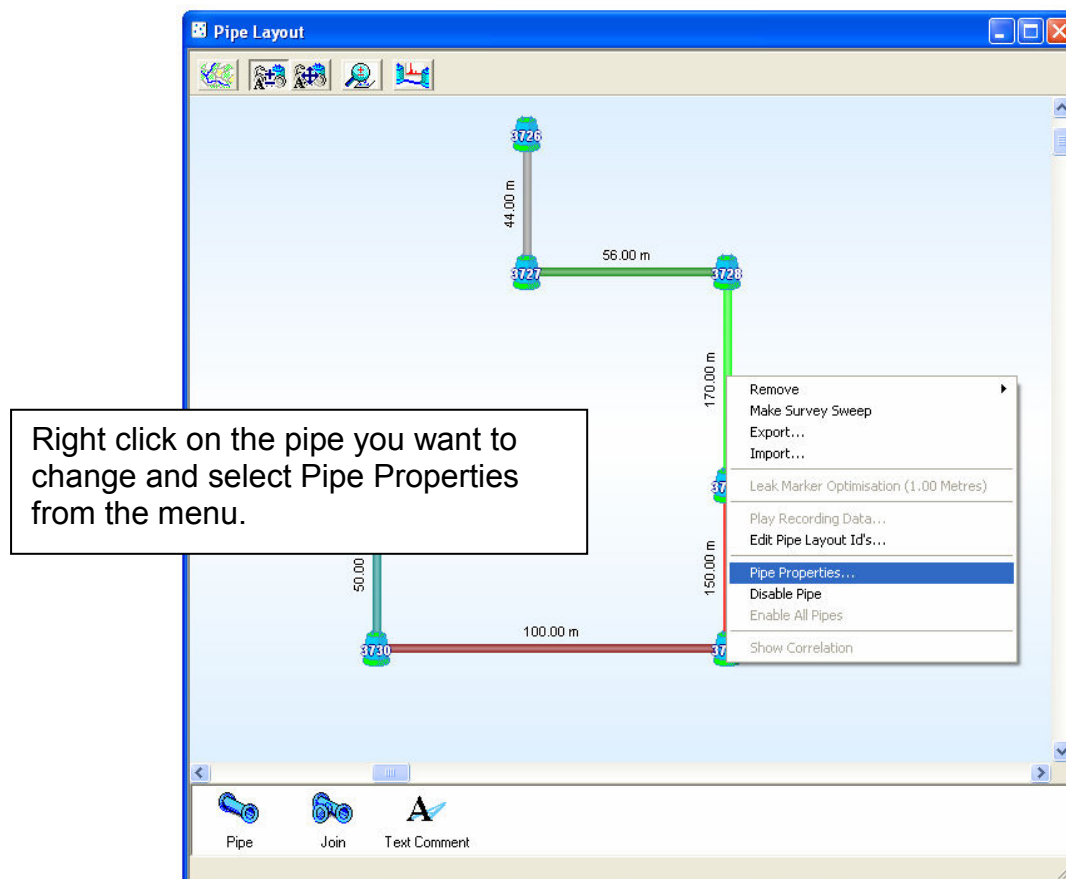


Change the pipe material here

Change the pipe length here

Change the pipe diameter from the drop down menu here

Click OK to keep the changes or Cancel to leave unchanged.

**REMEMBER TO SAVE REGULARLY (PAGE 8)**

## *Download loggers*

The loggers can be collected when the recordings have finished.

If you leave the SoundSens software running then you will see the following information to help you tell when the recordings are being done, and when they are finished.

00:00:36 (5)
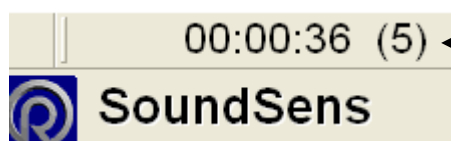
**SoundSens**

Time shows how long until the recording starts. The number in brackets shows how many recordings are left to do.

No Scheduled Recordings
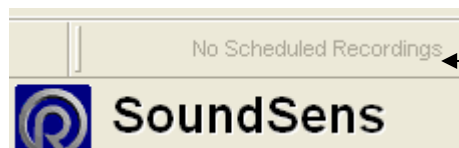
**SoundSens**

When is says No Scheduled Recordings it means all the recordings have been finished. The SoundSens software must be left running for this to work. If the software is stopped then the counter will reset back to showing No Scheduled Recordings.

Note : When the loggers are put back in the case for downloading they can go back in any order.

Wizard Bar

New

Open

1 Recording Setup

2 Create Pipe Layout

3 Download

4

Save
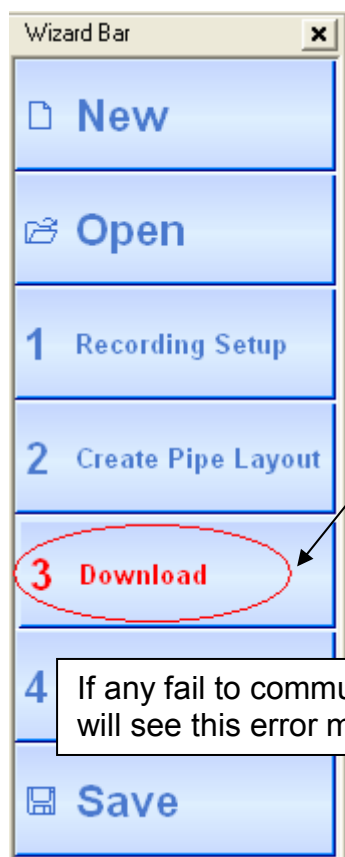
With the SoundSens software running and the USB cable connected between the laptop and the suitcase click the Download button.

Downloading All Recordings
(Recording Set 1, Suitcase 1, Position 1, 3731)

Estimated Time Remaining: 1 min 32 sec

Cancel

**SoundSens**

Download Completed Successfully.

OK

**Loggers Will Be Excluded**

The following loggers will be excluded beacuse they have no recorded data:
3731

OK
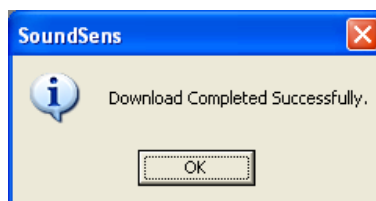
If any fail to communicate you will see this error message.
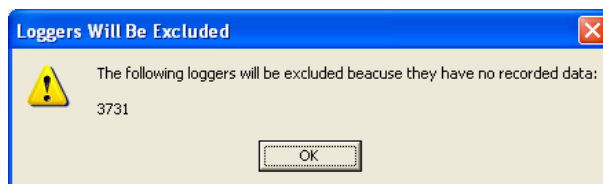
## Downloading Loggers (Multiple Suitcases)

Connect the suitcases together as shown in the section "Information regarding daisy chaining multiple cases together"

Connect the USB cable to the first suitcase.

Click the Download button.

The software will ask for conformation about the number of cases.  If this number is incorrect ensure the USB cable is connected to the first suitcase, and that all the cases are connected together correctly.

If the number of cases is correct then the download can begin.  After each box of loggers has been downloaded the software will ask for the USB cable to be moved to the next box in the line.  This process will be repeated until all the connected boxes have been downloaded.

## Correlation

After the data has been downloaded correlation begins automatically.
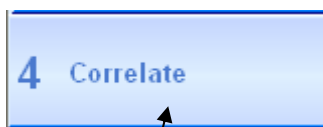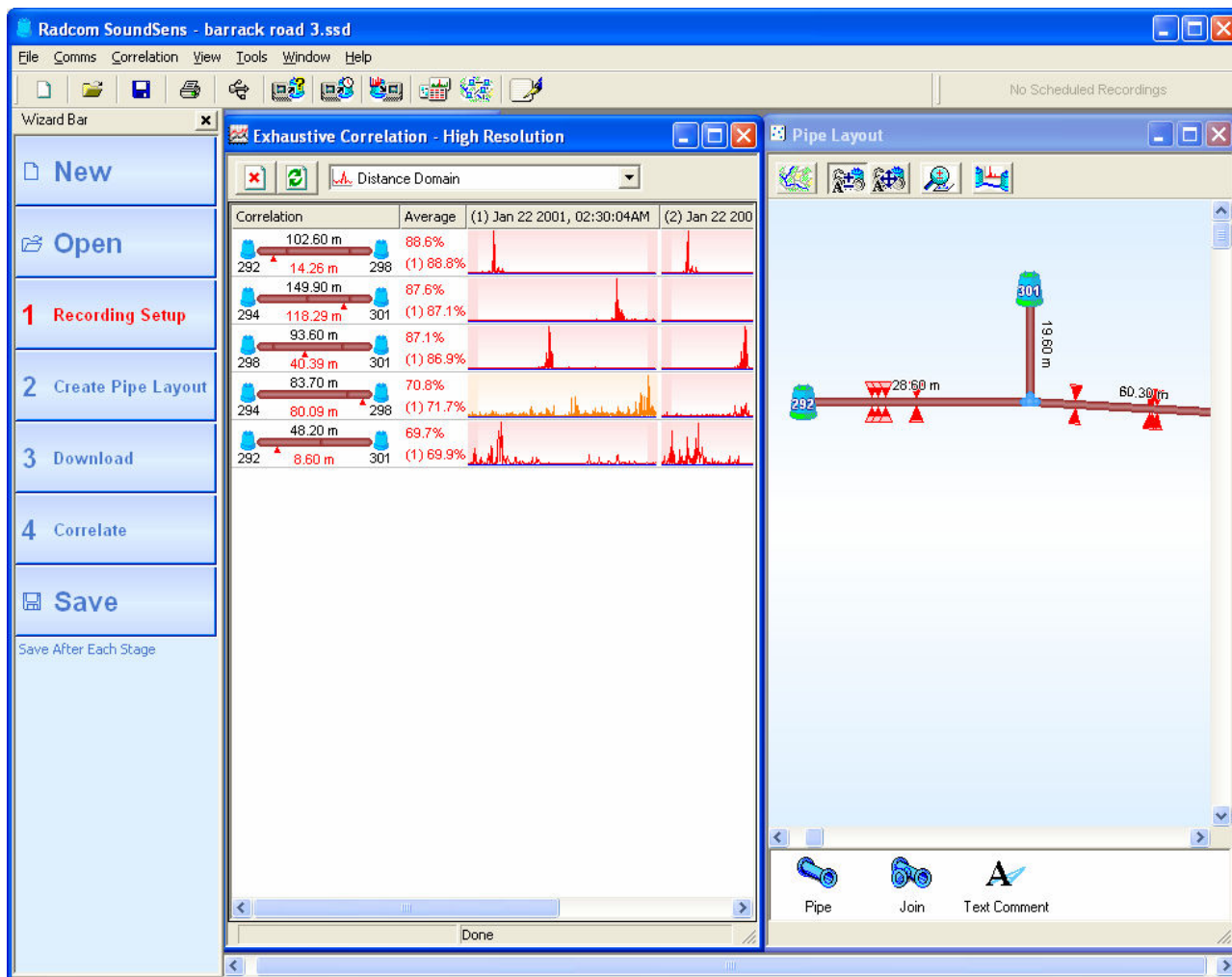




To begin the correlation process manually after opening a data file click the Perform Correlation button, or click Correlate on the left menu bar.
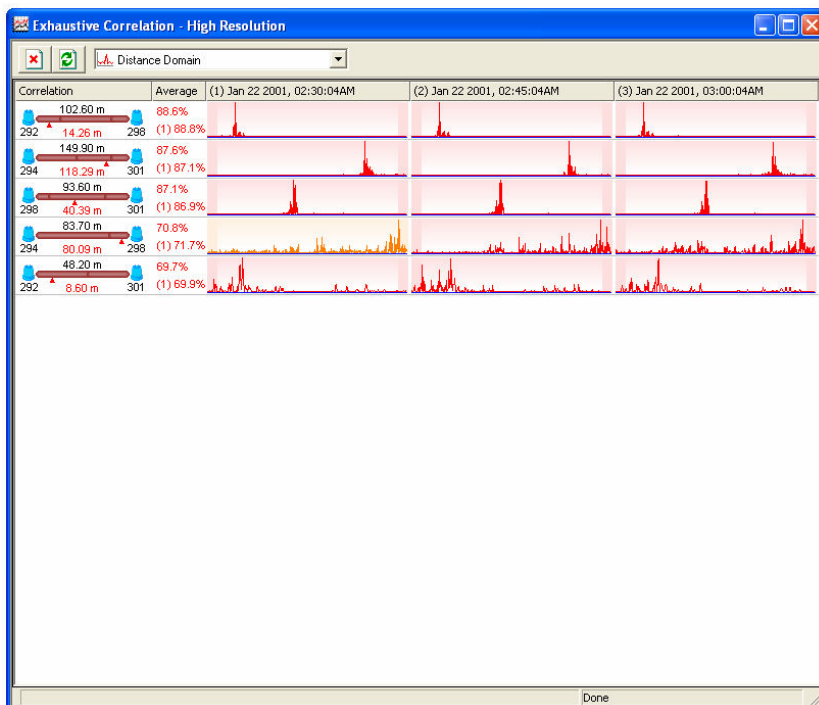
After correlation has finished the software sorts the data. The most likely leak correlations will be at the top.
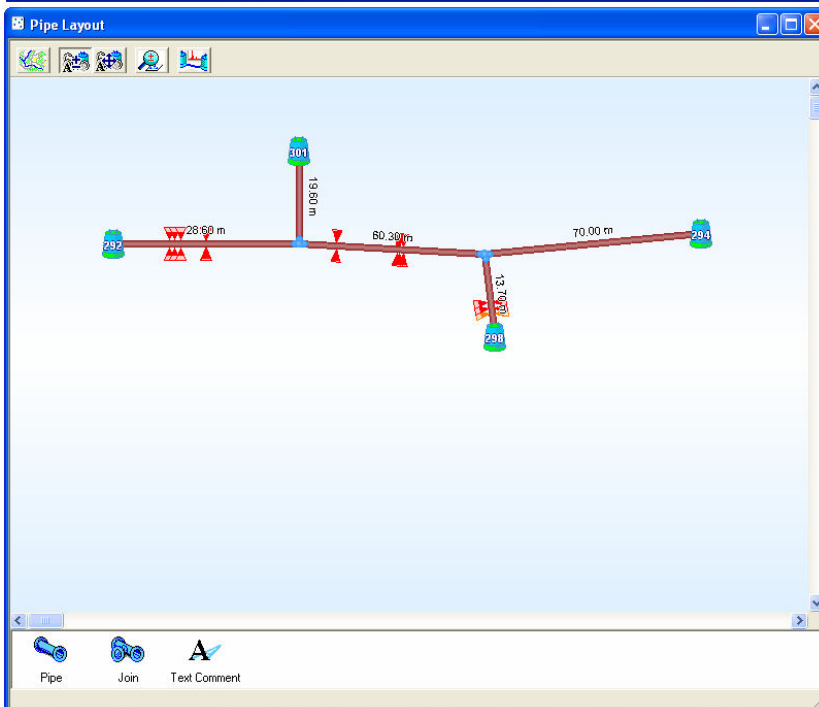


The location of each possible leak is marked on the map by red markers.

Click once on the recording graph and the blue circles will indicate which two loggers have been correlated between.
A third smaller blue circle will show the possible leak location
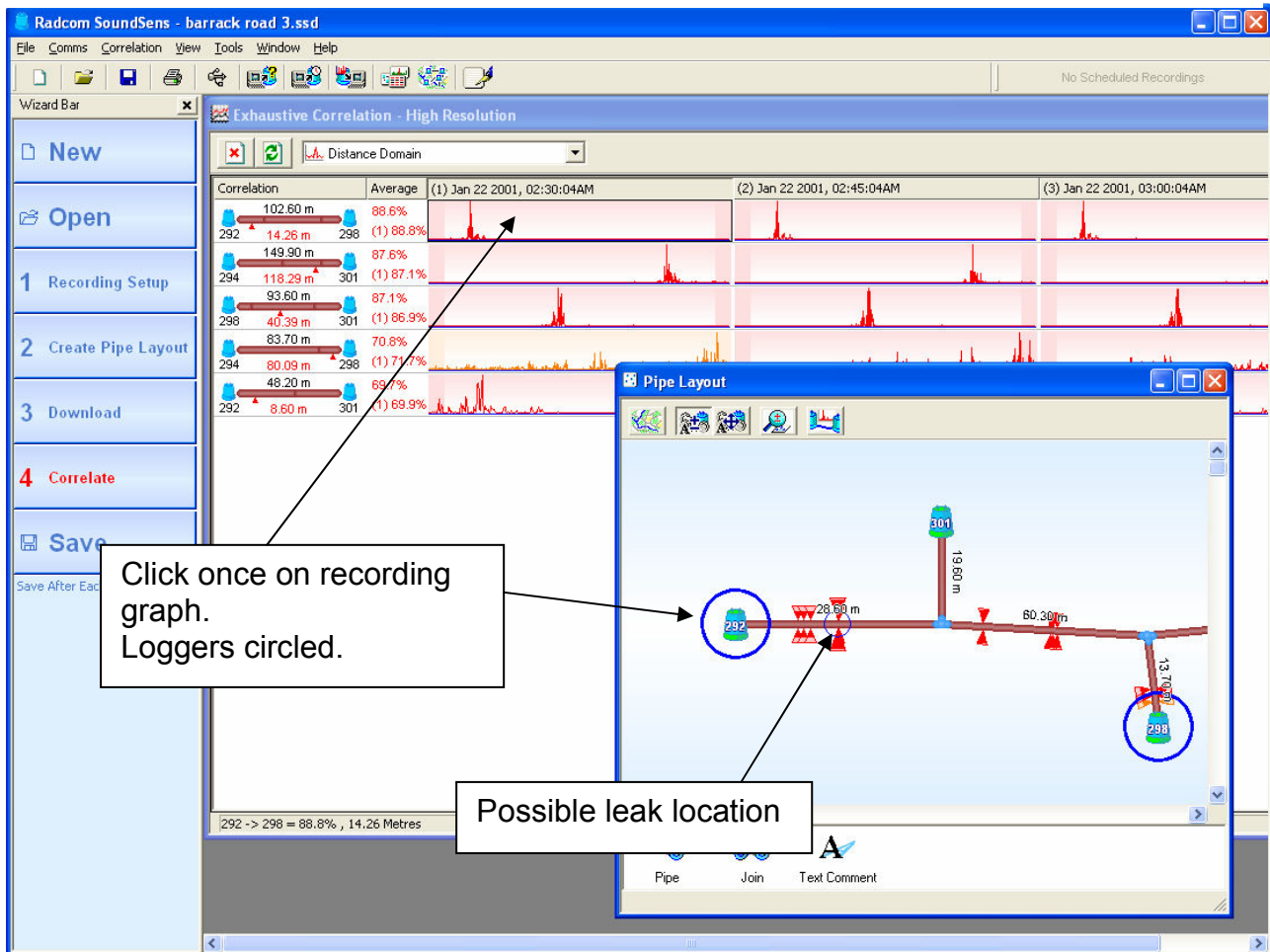


Double click on the recording graph to see a close up view.
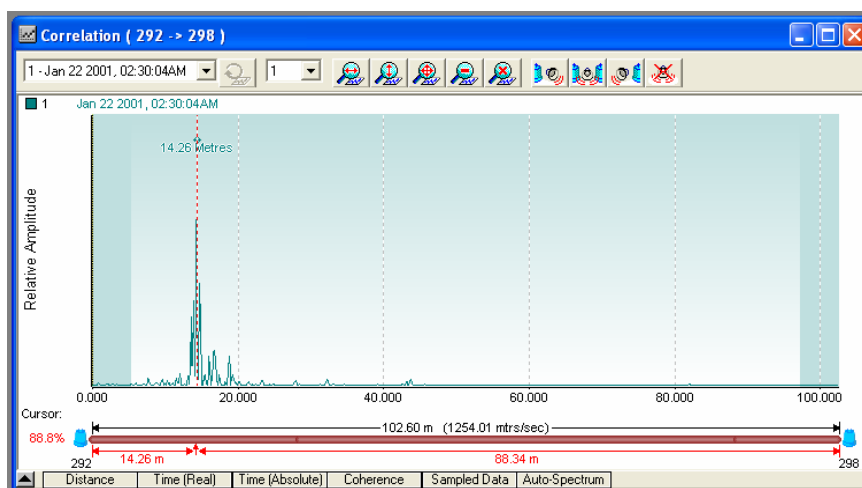
## The Basic Recording Graph

Two logger serial numbers between which correlation has taken place
(Logger 1 > Logger 2)

Leak location shown as distance from logger 1.

**Correlation ( 292 -> 298 )**

1 - Jan 22 2001, 02:30:04AM

☐ 1    Jan 22 2001, 02:30:04AM

14.26 Metres

Relative Amplitude

Distance between loggers
Sound velocity shown in brackets

0.000    20.000    40.000    60.000    80.000    100.000

Cursor:

102.60 m   (1254.01 mtrs/sec)

88.8%

292    14.26 m    88.34 m    298

Distance | Time (Real) | Time (Absolute) | Coherence | Sampled Data | Auto-Spectrum

Logger 1

Logger 2

Leak distance from logger 1 and logger 2

## Recording Graph Advance Features

Zoom functions



Zoom X – Zoom Y – Zoom XY – Zoom Out One Step – Zoom Out Fully
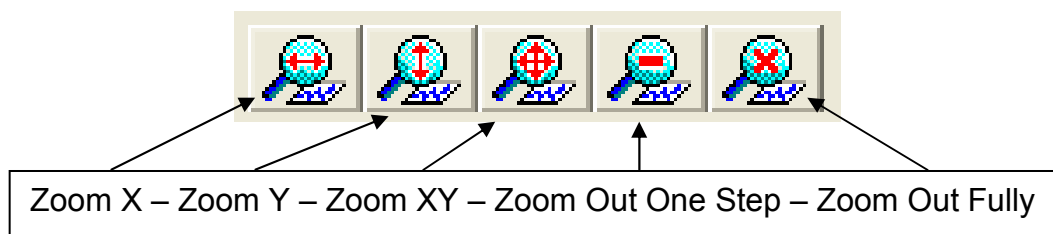
Listen to recordings from loggers
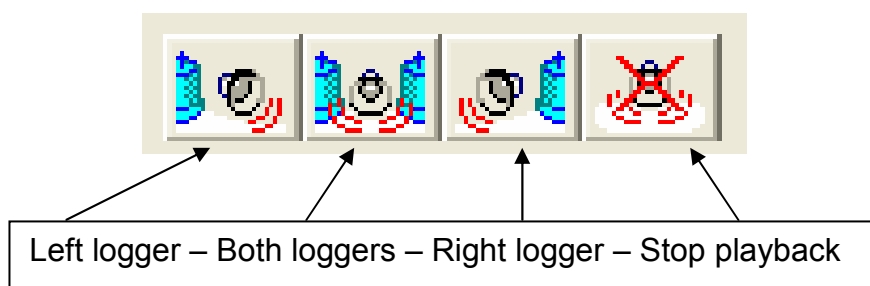


Left logger – Both loggers – Right logger – Stop playback

Graph viewing options



If two or more graphs are being viewed this drop down menu selects which one is on top.

This drop down menu reduces the number of graphs on the screen.
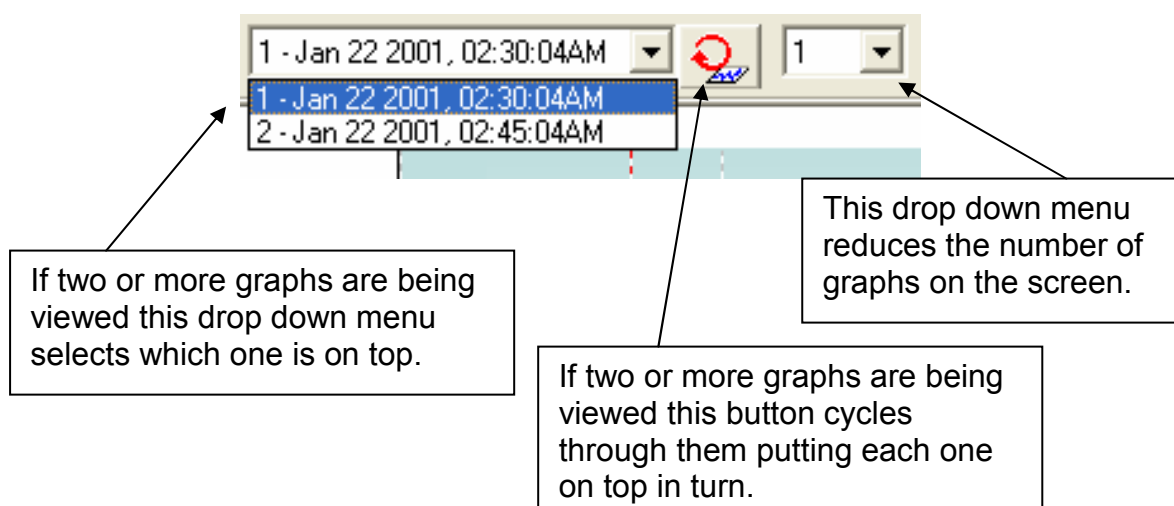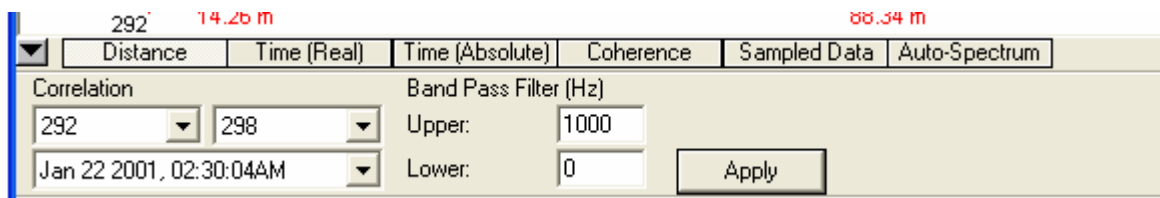
If two or more graphs are being viewed this button cycles through them putting each one on top in turn.

Reveal Advanced Graph Options
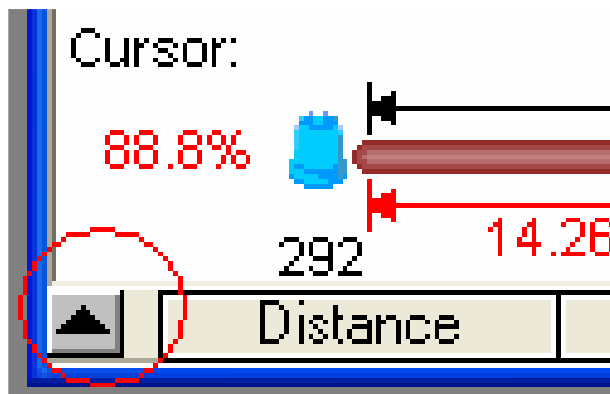


Click the small up arrow on the bottom left of the graph to reveal the advance graph options (see below)
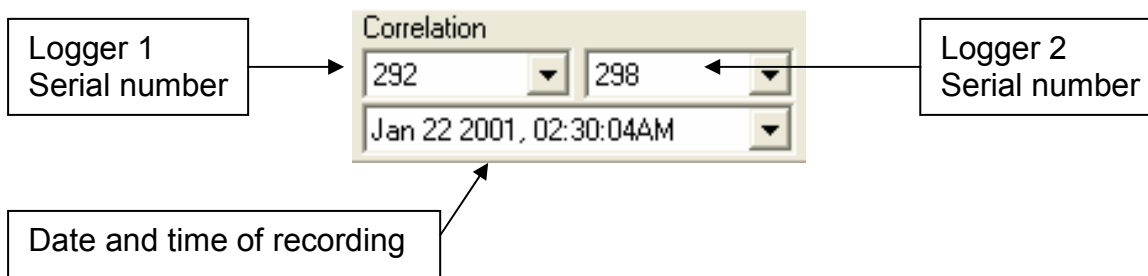




To see the correlation graph between two different loggers just change the serial numbers shown in the drop down menus for logger 1 and logger 2, and then click Apply.

To superimpose another recording taken between the same two loggers over the existing graph, select it from the time and date drop down menu and then click Apply.

To change the Band Pass Filter, adjust the figures and then click Apply.

# SoundSens Software Advanced Configuration
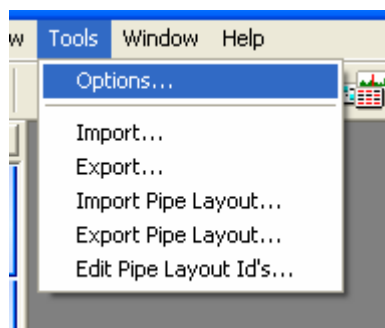
From the Tools menu click Options.

This is intended as a general guide to the SoundSens software options. For further assistance and explanation please contact the Radcom technical support team.

## *The General tab*

Software start up options.
These changes will take effect next time the software is started.

**Wizard bar**
The blue bar found on the left hand side of the screen

**Help bar**
Found on the right hand side of the screen

Ticking this box makes the software auto save your work

Ticking this box makes the software fill the screen when it is started
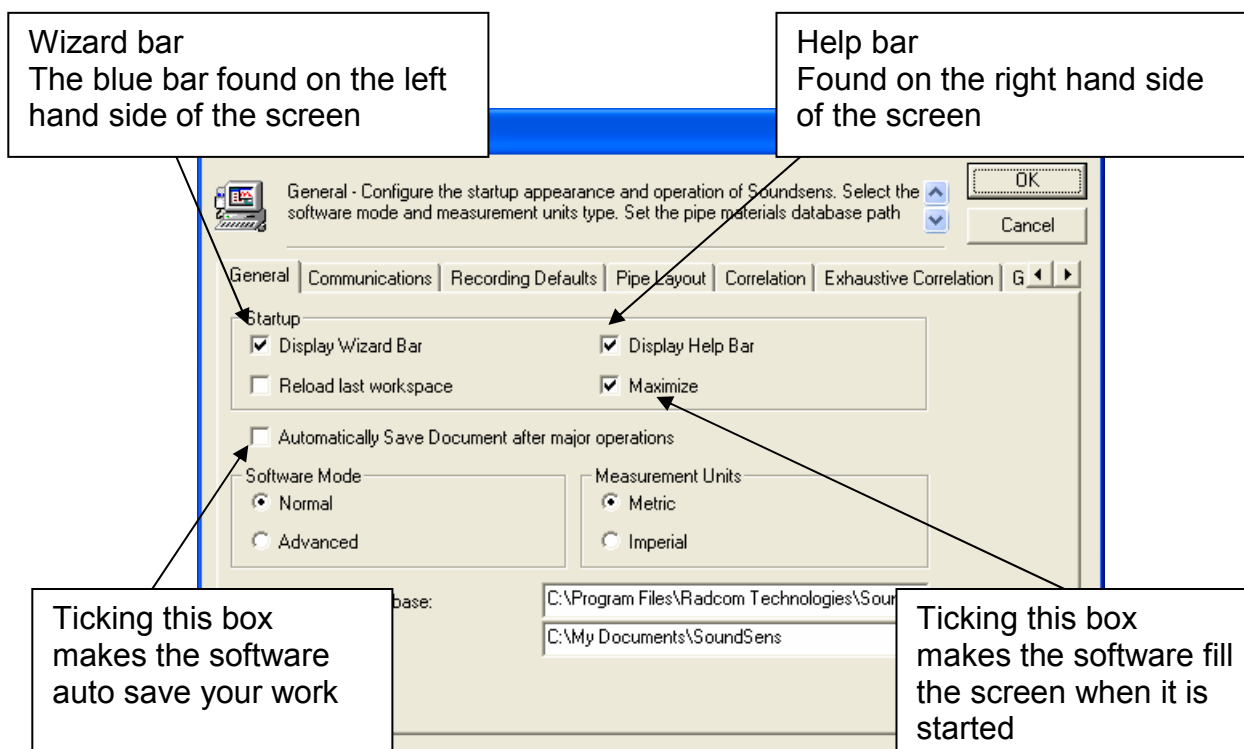
## *The General tab (continued)*
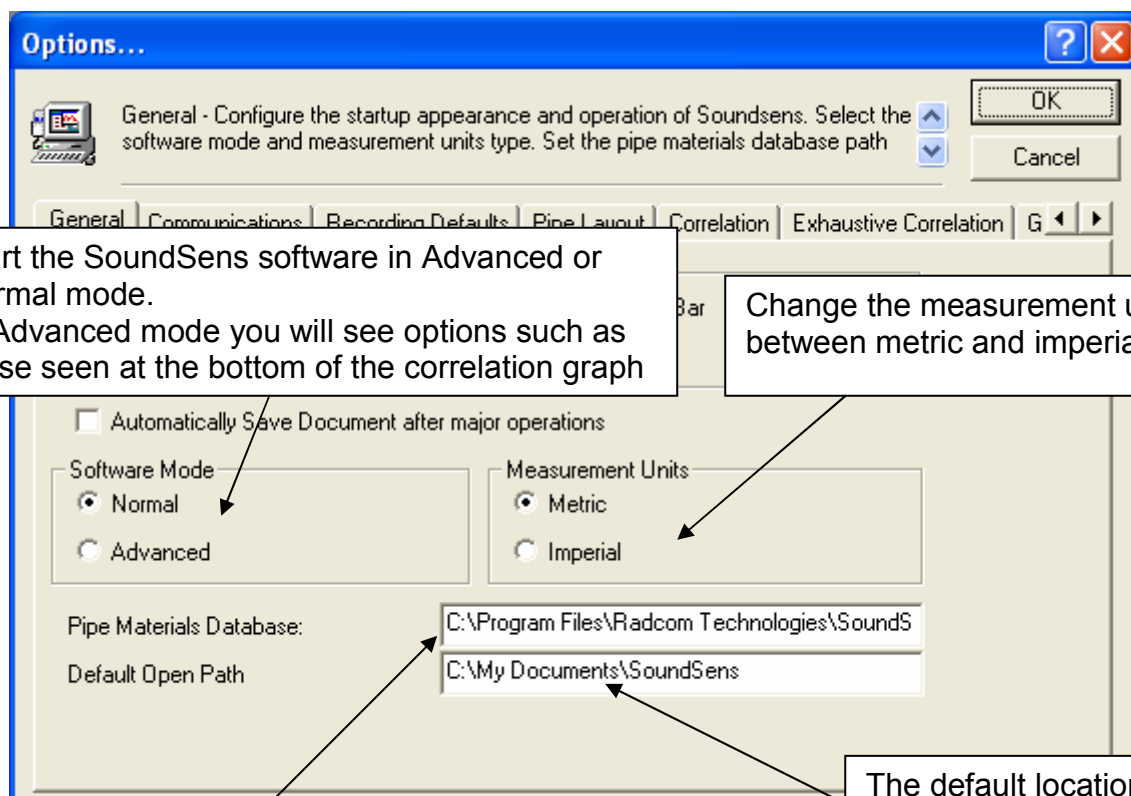


Start the SoundSens software in Advanced or Normal mode.
In Advanced mode you will see options such as those seen at the bottom of the correlation graph

Change the measurement units between metric and imperial

The location of the pipe materials database

The default location for the SoundSens data files

## The Communications tab
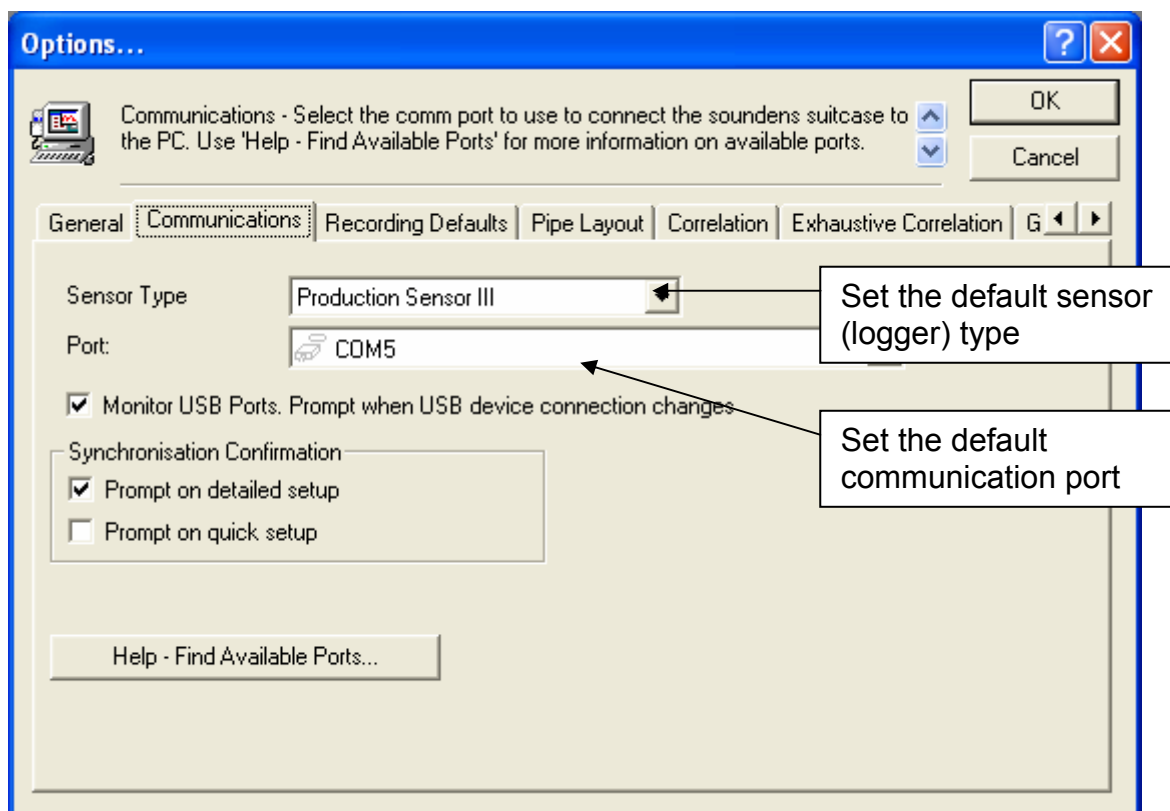
## *The Recording Defaults tab*

The default recording options.

Change the Notch filter value for filtering out mains frequency interference. This is set when the software is installed, but can be changed here (for UK it should be set to 50Hz)
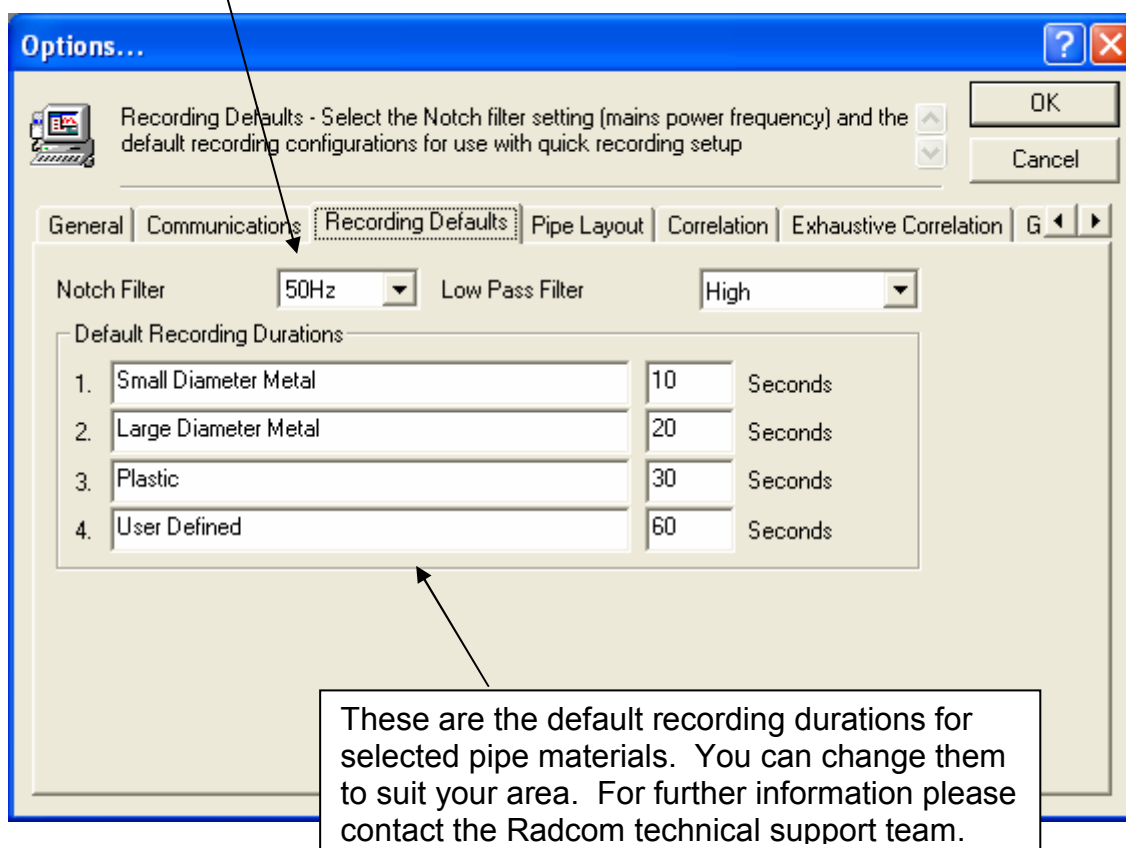


These are the default recording durations for selected pipe materials. You can change them to suit your area. For further information please contact the Radcom technical support team.

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## *The Pipe Layout tab*

The pipe layout area options
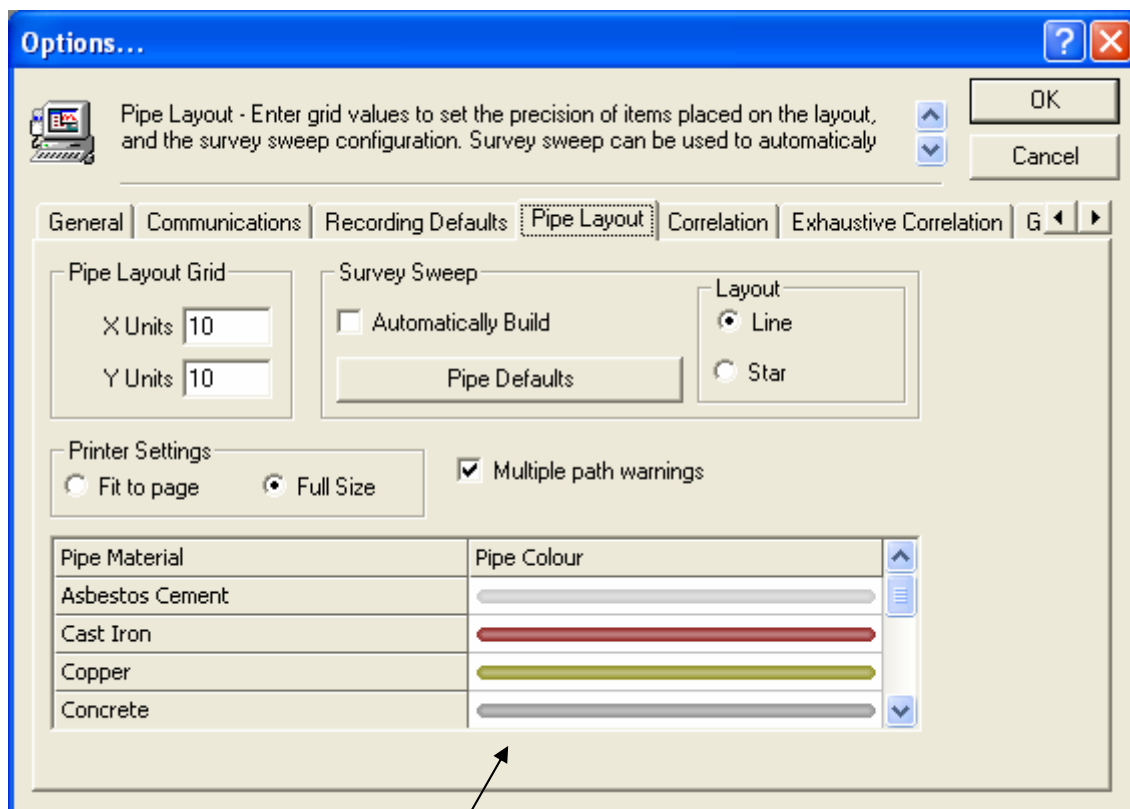


To change the colour of the pipes on the pipe layout double click on the coloured area.

Select a new colour from the menu which pops up on the screen, and then click OK
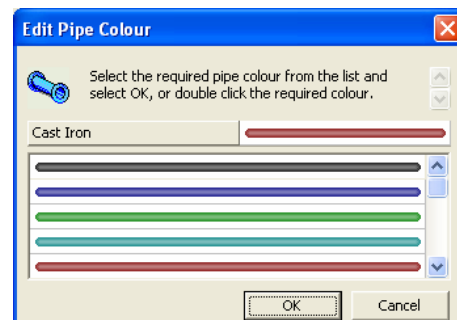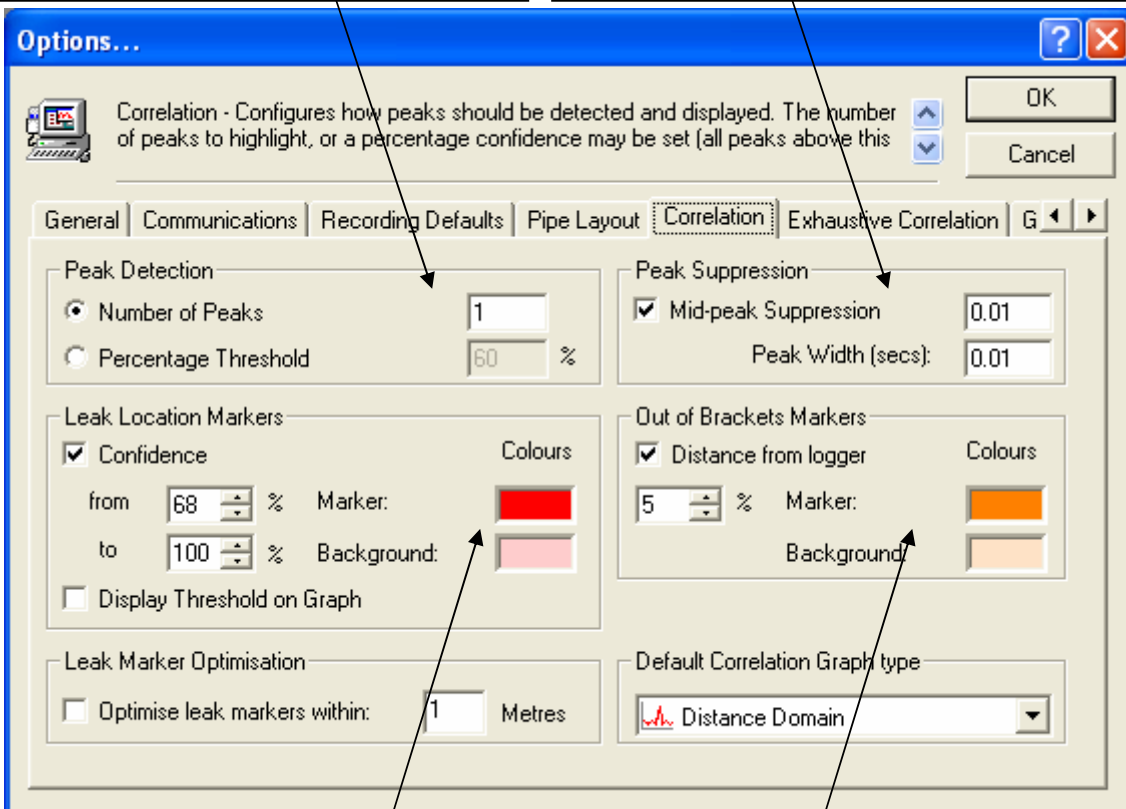
## *The Correlation tab*

By default only one peak will be highlighted with it's value displayed on the graph. You can change this to a higher number if preferred.

Mid peak suppression
If the logger hears nothing then it may put a large peak in the centre of the correlation graph. This option will prevent it from happening



Change the default colours of your leak location and out of bracket markers here.

### *The Exhaustive Correlation tab*

The default option here is All Recordings.  This will perform correlation using all the recordings in the loggers.

Use Pop-up Significant Correlations to automatically display the graph or graphs for locations most likely to have leaks.
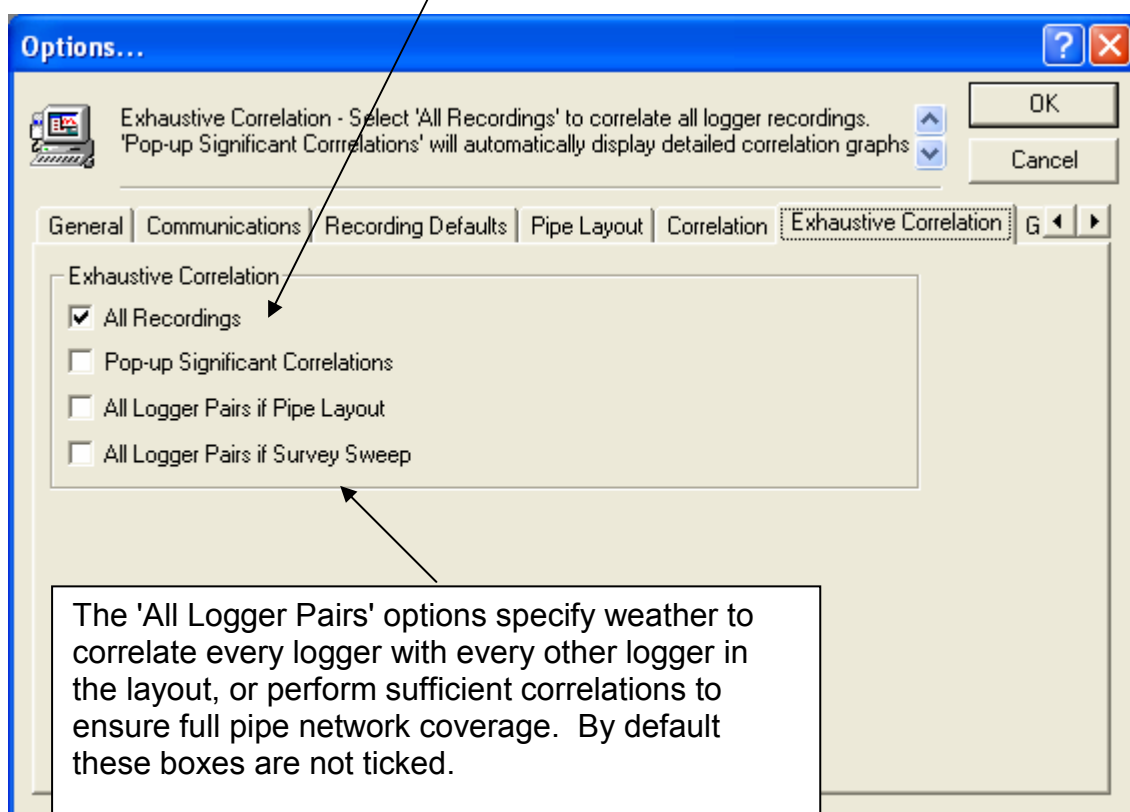


The 'All Logger Pairs' options specify weather to correlate every logger with every other logger in the layout, or perform sufficient correlations to ensure full pipe network coverage.  By default these boxes are not ticked.

Exhaustive correlation using 'All Logger Pairs' may take significantly longer on a large pipe network.

## *The Graph Colours tab*

To access the tabs past Exhaustive Correlation you need to click the right hand arrow as indicated on this diagram
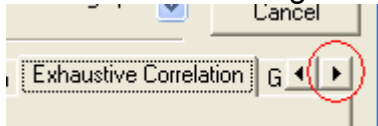
Configures the styles and colours used to display data graphs as well as fonts for axis and graph text. Select Defaults to return to the default settings.
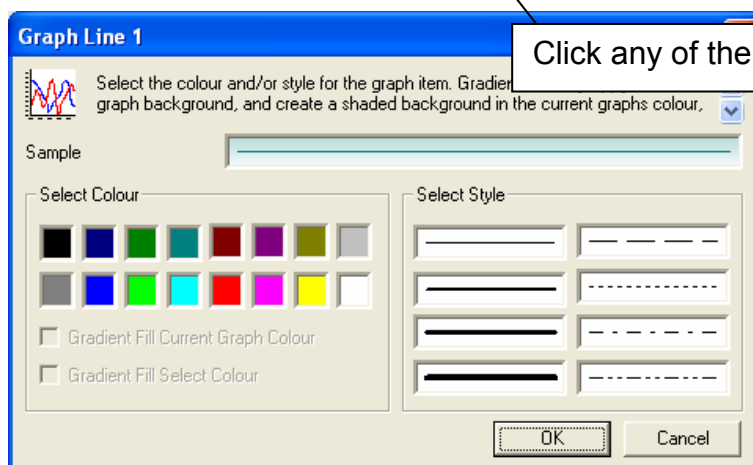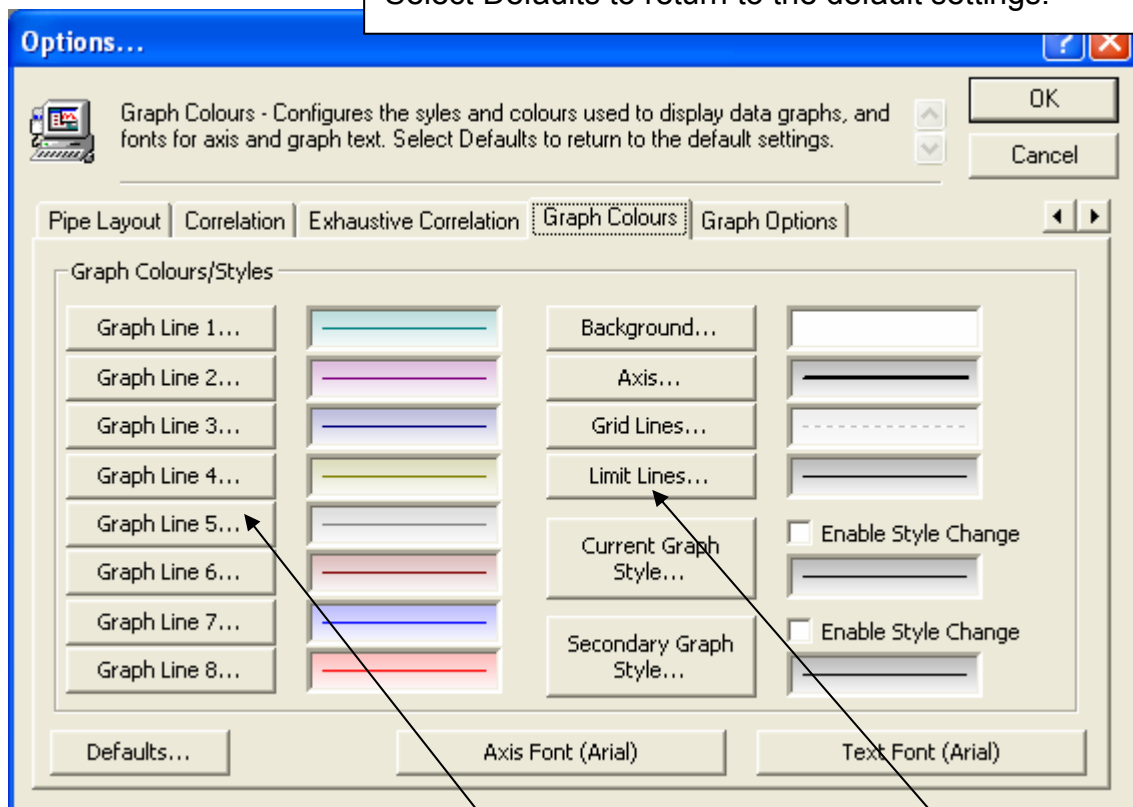
Click any of the buttons to change a colour

Select a new line colour and style, and then click OK

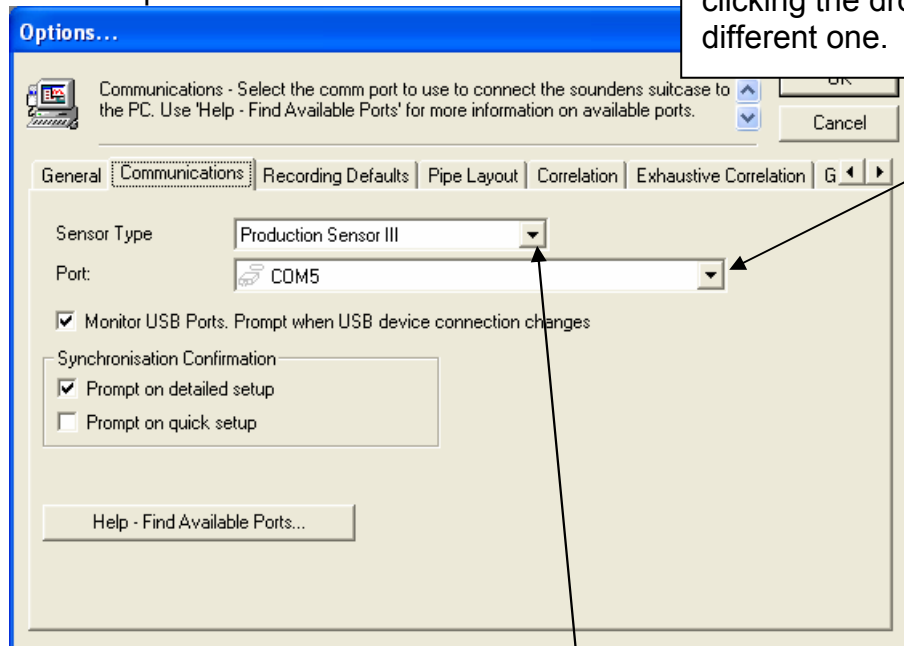## The Graph Options tab

Configures the functionality of the graph.
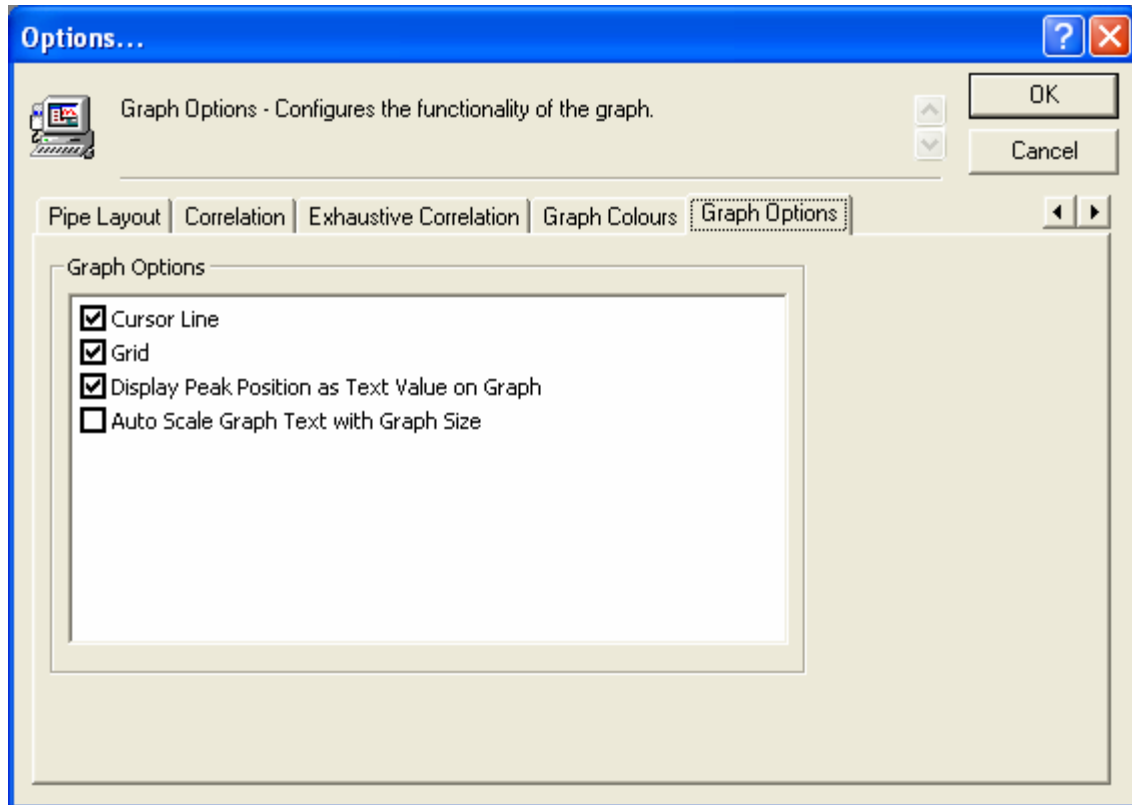
# Troubleshooting

## *Carry Case Not Communicating with PC or Laptop*

### Using Serial (RS232) Cable
Check the communications port.
Tool -> Options -> Communications tab

Change the communications port number by clicking the drop down menu and selecting a different one.

## *Incorrect Sensor Type*

If the wrong sensor type is selected you may see an error during communication.
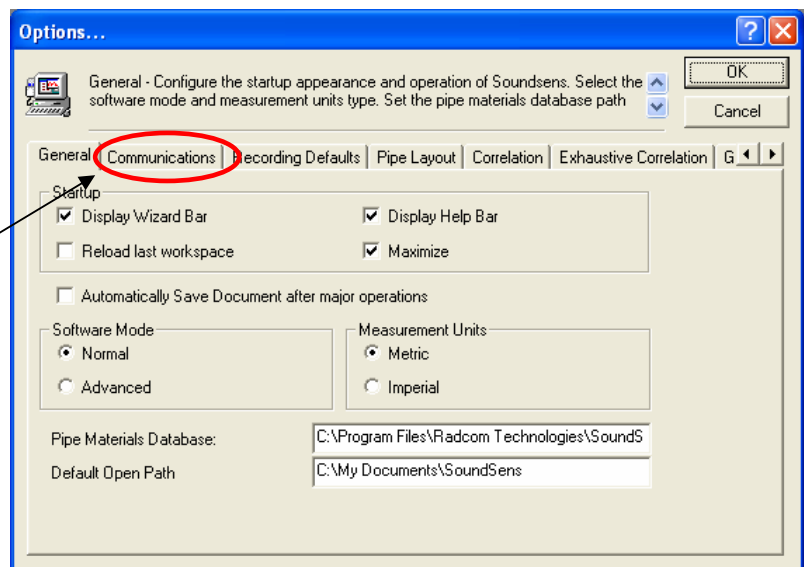
Change the sensor type from the drop down menu

The options are

- Pre Production Sensor
- Production Sensor (The original SoundSens logger)
- Production Sensor II (Dark blue plastic logger)
- Production Sensor III (Otherwise known as SoundSens i)

*Change Sensor Type*

From the Tools menu click Options
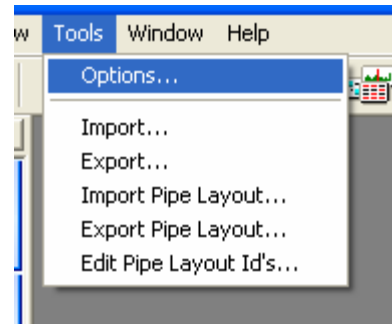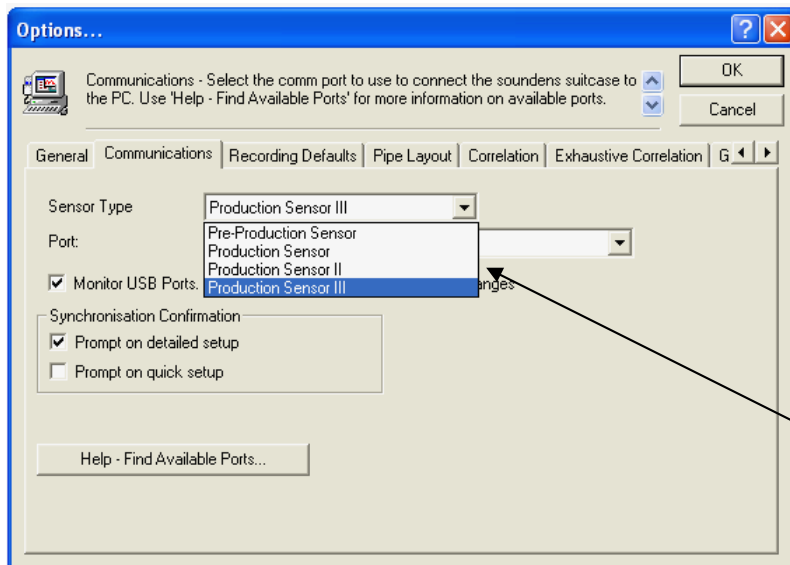
Click the Communications tab

The currently selected sensor
Is shown here
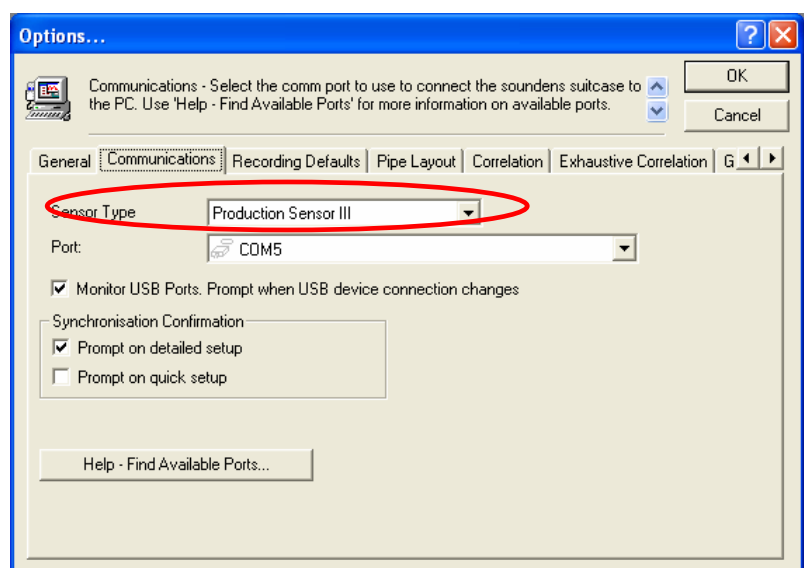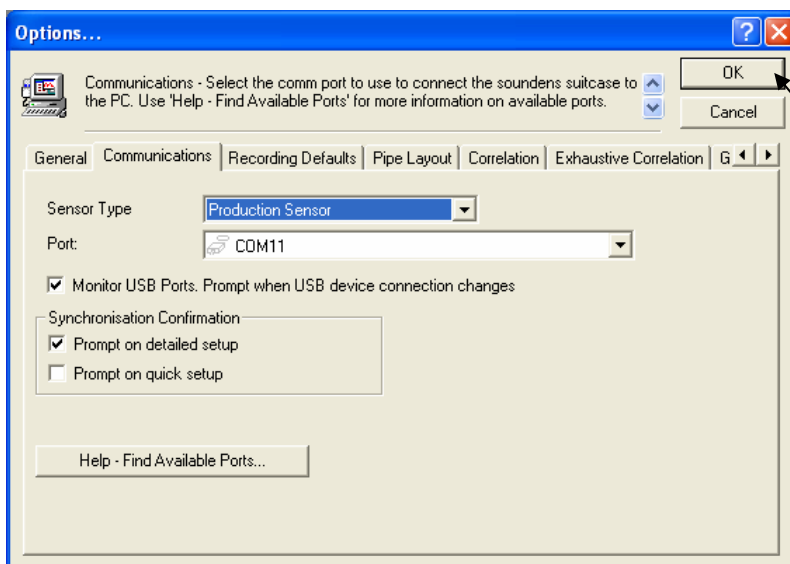
To change the sensor type
follow the next instruction

Click the drop down menu and click on the type of sensor you have.

The options are

- Pre Production Sensor
- Production Sensor (The original SoundSens logger)
- Production Sensor II (Dark blue plastic logger)
- Production Sensor III (Otherwise known as SoundSens i)



After making your selection click OK to save the change.

# SoundSens Software

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Acknowledgement: You acknowledge that you have read this agreement, understand it, and agree to be bound by its terms and conditions. You also agree that this agreement is the complete and exclusive statement between the parties and supersedes all proposals or prior agreements, verbal or written, and any other communications between the parties relating to the subject matter of this agreement.

Should you have any questions concerning this agreement, please contact Radcom in writing at the relevant address:

RADCOM (Technologies) Ltd.
Sentry House, 10 Romsey Industrial Park,
Greatbridge Road, Romsey
Hampshire SO51 0HR
Tel: +44 (0)1794 528 700  ●  Fax: +44 (0)1794 528 760
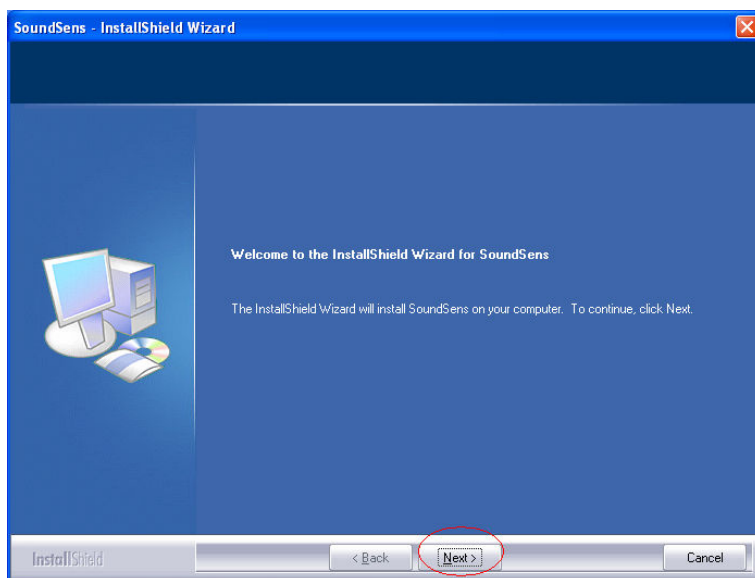
## *Installation Instructions*

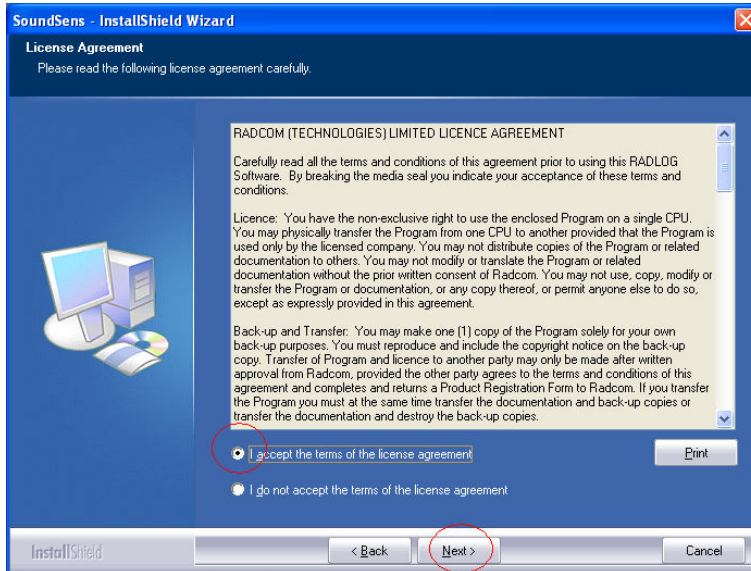Put the CD in your PC drive, and double click the "installer" icon

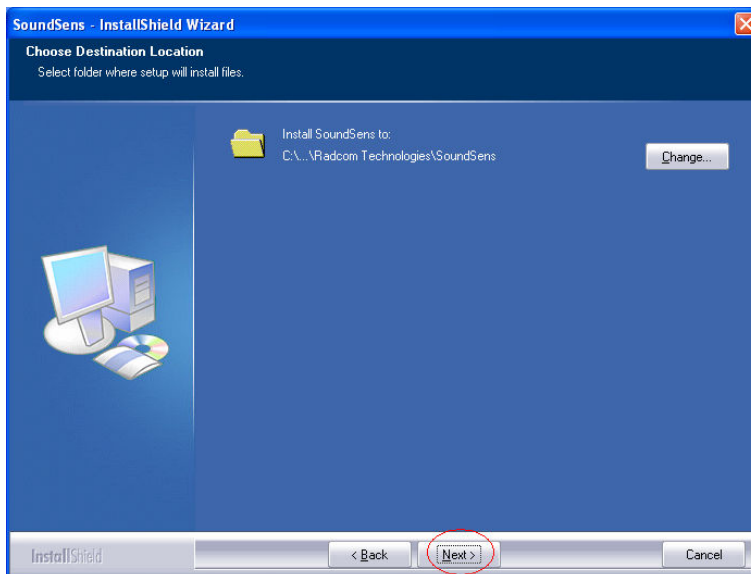The Radcom Software Installer window will pop up. Click the SoundSens button.

When the Installation Wizard begins click Next to continue.

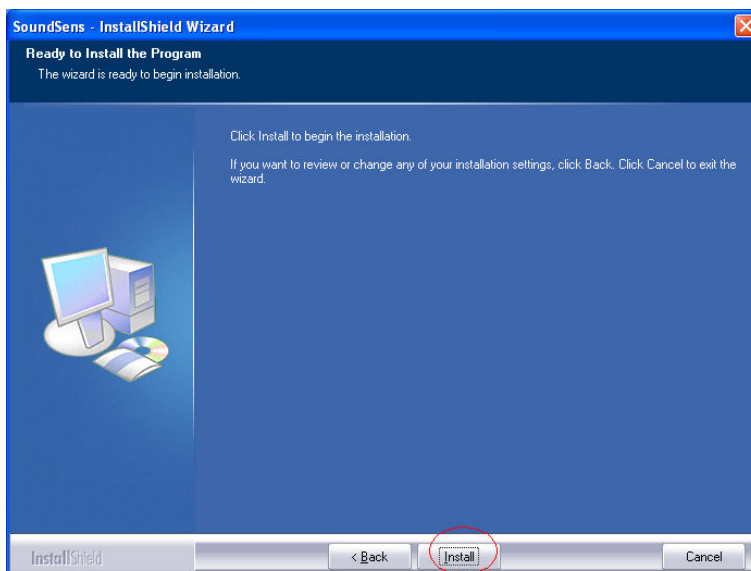# SoundSens User Guide
## *Leak Localisation and correlation*

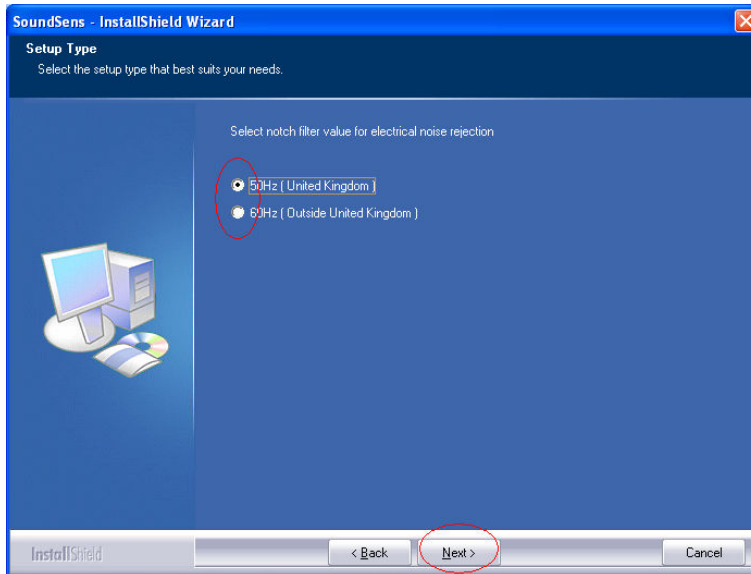

Agree to the license, and then click next.



If you wish to change the location of the installed files you may do so here.  Click next to continue.
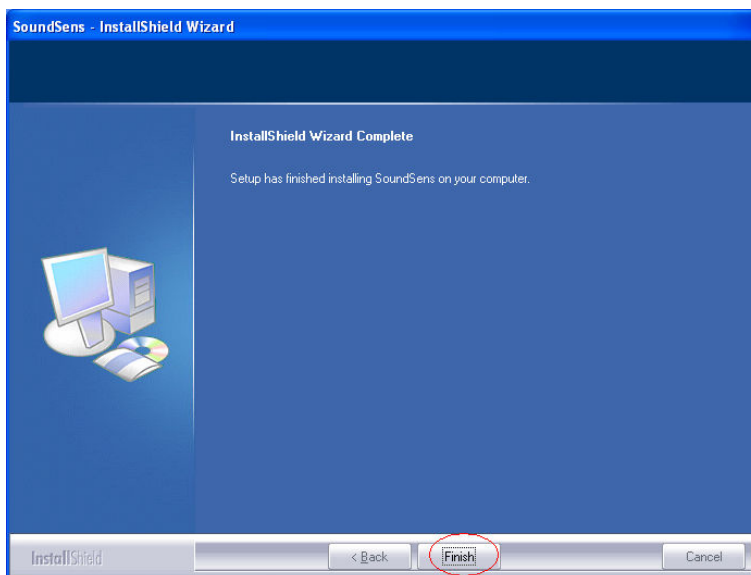


Click install to continue.

Select notch filter value for electrical noise rejection. By default 50Hz is selected for the United Kingdom. Then click next.

(this option can be changed from within the software after installation.
Tools -> Options -> Pipe Layout)
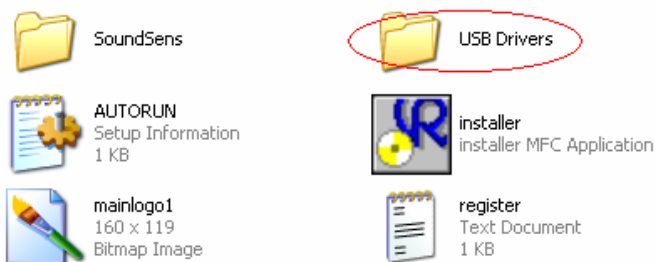


Click Finish to complete the installation.



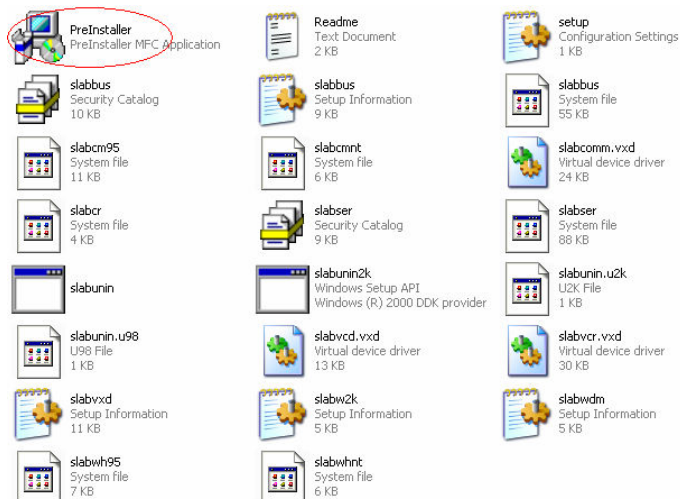Finally close the Radcom Software Installer.

**Please now follow the USB driver instructions.**

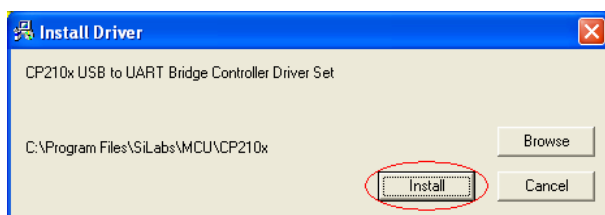## USB Driver Installation Instructions

If you are installing the SoundSens software on a PC which has never had a USB SoundSens case connected to it, you should install the USB driver.
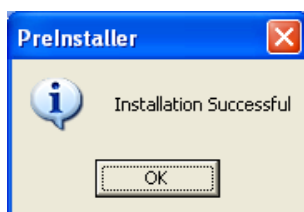
From the installation CD double click the "USB Drivers" folder.

Double click the "PreInstaller" icon.

Click Install to "install" the driver.

The PreInstaller program will display this message if the driver installs correctly. Click OK to continue.