

Version: 1.0

Title – SoundSens i FAQ's

Made By: AB 18/10/14

(Issue 1)

# Soundsens i – explanation of advanced configuration options

## **Options> Recording Defaults > Low Pass Filter setting**

This is a way of focusing attention on the most prevalent frequencies for the given pipe properties. Plastic pipes would use a low / very low setting and steel pipes a medium or higher setting.

Options	? X						
Recording Defaults - Select the Notch filter setting (mains power frequency) and the default recording configurations for use with quick recording setup							
General Communications Recording Defaults Pipe Layout Correlation Exhaustive Correlation G							
Notch Filter 50Hz Low Pass Filter High							
1. Small Diameter Metal 10 Seconds   2. Large Diameter Metal 20 Seconds							

The default setting is 'High' so you should leave it at this in general use. The software works on the pipe layout and pipe properties that you configure in. You would really only change these low pass filter settings if you knew the pipe properties were giving you particular problems. In 99% of applications the default settings work fine – particularly if you are using the kit at night when ambient noise and flow noise are at their lowest in the pipes. SoundSens is best used by installing it one day configured to test at 2.00am the following night with a return in the morning to recover the pods, download and analyse. However it is not always practical to carry out testing at night and during the day you may need to be doing some 'fancy footwork' with filters to maximise the leak noise (peaks) and minimise other noises – it is really a case of 'trial and error' based on experience gained over many tests.

The critical thing for leak detection using acoustic devices is to understand how the leak noise is heard and what it sounds like – during training we encourage customers to set up known 'leaks,' carry out testing and then listen to the noise so they thoroughly understand the difference between the leak noise and the other noises that can be around. Also the acoustic files are stored so when they have success in the field again they can build experience by noting the conditions, settings and acoustic results.



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## **Options>Pipe Layout >Star or Line**

Options	? ×
Pipe Layout - Enter grid values to set the precision of items placed on the layout, and the survey sweep configuration. Survey sweep can be used to automaticaly	OK Cancel
General Communications Recording Defaults Pipe Layout Correlation Exhaustive Corre	lation G
Pipe Layout Grid Survey SweepLayout	
X Units 10 🗖 Automatically Build 💽 Line	
Y Units 10 Pipe Defaults Star	

If the correlation is using two loggers with a straight piece of pipe between them then you would use the 'Line' setting -

<b>X</b>	Pipe Layout	
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Pipe Join Text Comment		-
J		lh

- if the pipe layout involves several pipes meeting at the same joint then you would use the 'Star' setting -



#### **Options >Correlation> Peak Detection**

Options.				? ×				
	Correlation - Configures how pea of peaks to highlight, or a percer	aks should be detected ntage confidence may t	and displayed. The number be set (all peaks above this	Cancel				
Gener	al Communications Recording	) Defaults   Pipe Layout	Correlation Exhaustive Co	orrelation GI				
- Pea	k Detection		Peak Suppression					
•	Number of Peaks 1 ✓ Mid-peak Suppression 0.01							
0	Percentage Threshold	60 %	Peak Width	(secs): 0.01				

Correlation - Configures how peaks should be detected and displayed. The number of peaks to highlight (1 is set above), or a percentage confidence may be set (60% is set above) all peaks above this level will get highlighted on graphs. Select colours and values for leak markers. The percentage value range is the range of confidence levels where a peak is marked as a leak. The out of bounds value defines the pipe length close to loggers where a highlighted leak may be suspect (leak is too close to the logger to be certain a leak really exists as it may be caused by a noise source outside the pipe being correlated). Background colours may also be selected for leak markers. This is used to indicate the confidence of a leak on the pipe layout. The more foreground and less background colour, the higher the confidence. Leak optimisation may be enabled. This treats leaks that occur within the specified distance as the same leak, and the prominent leak is marked on the pipe layout and the others are greyed. This also checks leaks exist in multiple recordings. If the leak is Not found in a majority of recordings, the leak marker is displayed shaded, background colour and white (instead of marker colour and background colour). The default graph type may be selected. This is the default type that will be displayed in correlation windows.

#### Measuring the speed of sound in an unknown pipe



You would use this when you are not confident that you know enough about the pipes underground, so you would physically measure the speed of sound in the pipes and then apply this figure to the correlation – it is then independent of the pipe properties.

## **Operating Peak Suppression and calculating actual sound velocity**

How to use Peak Suppression and Velocity in the SoundSens software?

Below is a simple correlation between two loggers with the leak was located correct.



This is not going to work very well with this example because it so obviously identifies the leak position with a single high and narrow peak - there is little possibility of it not being a leak and there are no other significant peaks in the vicinity (the next significant peak is near to 1466)

Wigard Bar X	El Pipe Layout	
44, 14,02,17,08,51,28 44, 14,02,17,09,32,20 44, 14,02,17,09,51,28 44, 14,02,17,09,51,28 44, 14,02,17,9,44 44, april 1,2014 test		ì
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Download	*	, `

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Note - the leak position in the below view is identified at 216.09 metres from the logger 1466. (103.9m from logger 1468)



If you now use the Peak Suppression icon and select 'Suppress next' you will see this below (as the name suggests pressing this button suppresses the main peak)



Note the biggest peak has now been eliminated from the correlation and the second most prominent peak has been identified – this is at 12.73metres from logger 1466.

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If I now again select 'Suppress next' you will see this -



The second highest peak has been eliminated from the correlation and the third one now identified at 20.05 metres from logger 1466. If you continue to select 'Suppress Next' the software will continue to remove the next most prominent peak. If you have a number of significant peaks then a combination of peak suppression and audio will help you to identify how many of them truly are leaks.

From the correlation screen below –

<u>.</u>	Radcom SoundSens - Øvre Sundvolden 100mm.ssd	
File Comms Correlation	View Tools Window Help	
Wizard Bar X	Exhaustive Correlation - High Resolution	
-41 14_02_17_08_51_28	X Children Domin	
41 14_02_17_9_44	Correlation Average (1) Jan 16 2007, 03:00:28AM (2) Jan 16 2007, 03:02:28AM (3) Jan 16 2007, 03:04:28AM (4) Jan 16 2007, 03:	.06:28AM
-44 april 1 2014 test -44 may 13	1466 216.09 m 1468 (1) 97.8% )	
Andu Test Feb13		
andy rest roots		
< >		
New		
1.1		
Recording Setup		
후 Create Pipe Layout		
11.0		
Download		
- Correlate		
Save		
Save After Each Stage	1400-> 1408 = 92.8%, 210.09 Metres	



If you now select the Velocity wizard button you will see this -

orrelation	Average	(1) Jan 16 2007, 03:	00:28AM	(2) Jan 16 2007, 1	03:02:28AM	(3) Jan 16 200	7, 03:04:28AM	(4) Jan 16 200	7, 03:06:28AN
320.00 m	92.8%	1			1	1	- P		
466 216.09 m 1468	(1) 92.8%								
		G							
				Velocity V	/izard				
		Select t	ne loggers in th	neir correct position	s, and enter th	e pipe lengths. The	e leak should be sit	tuated A	
		betwee	n logger pair Al	B, or logger pair BC	. If the pipe ma	aterial is known, sel	ect it from the list	to 🗸	
		Moder	les la tata	Web-shire and the second					
		House Desitioned	[Calculate	velocity between A	and b		<u> </u>		
		Logger Positions:	T				-		
		1466 -		1468	-			<u>~</u>	
		A		в			C	å l	
				L	->	12-		*	
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		Pipe Lengths:	320.00 M	letres		100.00 Metres			
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		Recording.	[Jan 10 20	107, 03.00.28AM	<u> </u>				
							and a state of the state	o	

### Select Next -



The error message advises it cannot calculate the pipe velocity – ideally you need at least 3 loggers or a significant leak outside of the two loggers (out of bracket) – sometimes you can cause this using a local tap to simulate the leak.

If you select 'Yes' anyway -



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Calculated Velocity Is Out Of Range				
<u> </u>	Material: Ductile Iron Known Material Velocity Range: 1040.00 mtrs/sec - 1320.00 mtrs/sec Calculated Velocity: 3701.20 mtrs/sec Do you wish to continue?			
	Yes No			

It calculates the velocity based on the 'assumptions' the software has had to make – if you then select 'Yes' it will apply the new velocity to the correlation as below – and as you can see in this case it does not adjust it by much (because the leak is so prevalent).



#### **Document History:**

Edition	Date of Issue	Modification	Notes
1st	18/10/14	Release	