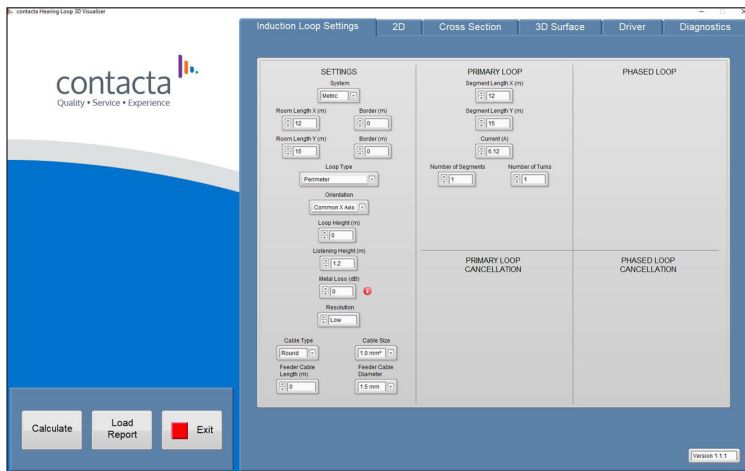


Visualising a Hearing Loop Layout



Software Walkthrough

March 2020

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Overview

The Contacta 3D Visualiser software can be used to accurately represent the magnetic field of a hearing loop layout by entering the dimensions of the potential design.

The software can also predict the overspill level from a hearing loop layout and subsequently manipulate the layout parameters to reduce the overspill levels.

Note: As most enquiries are provided with a plan of the area to be looped, it is recommended that a basic 2D drawing software, e.g. Autodesk AutoCAD LT 2020, should be used in conjunction with the Contacta 3D visualiser.

This document details the setup of an example hearing loop with the following parameters:

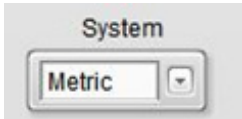
1. Metric measurements will be used.
2. The area to be looped is 20m x 10m.
3. There is a metal loss value of 3dB.
4. The layout will be of the Phased Gapped Array style.
5. Overspill will not be a factor so cancellation loops will not be used.

Note: For large area hearing loop installation instructions, consult Contacta's Large Area Hearing Loop Installation Guide.

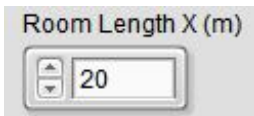
Software Walkthrough

Induction Loop Settings

1. Click on the Induction loop settings tab.
2. Select 'Metric' or 'Imperial' measurements.



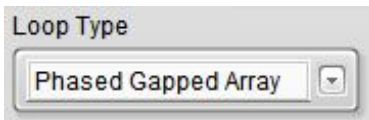
3. Enter the 'Room length X' – in this example we'll use 20m as our base X axis.



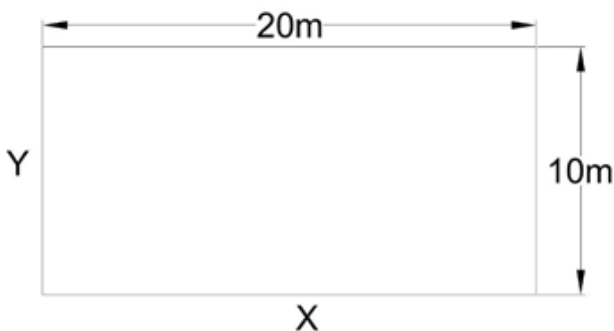
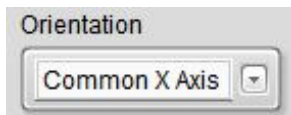
4. Enter the 'Room length Y' – in this example we'll use 10m as our base Y axis.



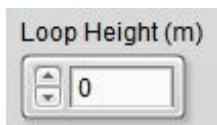
5. Select the loop type – in this example we'll use 'Phased Gapped Array / 222'.



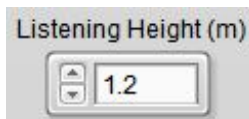
6. Select the orientation – in this example we'll use 'Common X Axis' (landscape).



7. Enter the 'loop height' – in this example we'll assume the cable is installed on the floor, therefore the value will be zero.



8. Enter the 'listening height' – in this example we'll assume the listener is seated, therefore the value will be 1.2m.



Note: At this stage the software has already divided the area up into a layout and calculated the approximate current requirement to meet standard.

The Contacta 3D Visualiser software has extra features allowing the user to override many of the values that are automatically calculated. e.g. 'Number of Segments', 'Number of Turns', 'Phased array offset', 'Current (A)' etc.

These values could be changed to visualise an existing loop design

with specific number of segments and dimensions.

PRIMARY LOOP		PHASED LOOP	
Segment Length X (m)		Segment Length X (m)	
<input type="text" value="3.03"/>		<input type="text" value="3.03"/>	
Segment Length Y (m)		Segment Length Y (m)	
<input type="text" value="10"/>		<input type="text" value="10"/>	
Current (A)		Current (A)	
<input type="text" value="3.11"/>		<input type="text" value="3.11"/>	
Number of Segments	Number of Turns	Number of Segments	Number of Turns
<input type="text" value="4"/>	<input type="text" value="1"/>	<input type="text" value="4"/>	<input type="text" value="1"/>
Segment Pitch (m)		Segment Pitch (m)	
<input type="text" value="4.84"/>		<input type="text" value="4.84"/>	
		Phased Array Offset (m)	
		<input type="text" value="2.424"/>	

9. Enter the 'Metal loss' value if known – in this example we'll apply a level of 3dB.

Note: You will observe that the values in the 'Current (A)' boxes in the Primary and Phased Loop sections have now increased.

Metal Loss (dB)

3

Metal Loss



Construction metal within a building structure can interfere with an Induction Loop and cause a loss of signal. The loss is dependent on the amount of metal and its proximity to the induction loop, and the size of the room. Reinforced concrete floors, metal tiles or cladding are a few examples of metal structures that can be found within a building.

Determining the amount of metal loss within a site accurately is only achievable through a site survey, and this allows for adjustments to be made to the design of the induction loop to mitigate signal loss.

Below is a guide to expected metal loss levels based on style of building;

0dB-3dB – Very little metal reinforcement within the building (eg. church, village hall)

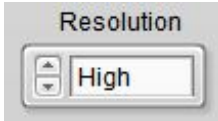
3dB-6dB – Small amount of metal reinforcement within the building (eg. Single story classroom)

6dB-9dB – Moderate amount of metal reinforcement within the building (eg. Single story school building)

9dB+ – Large amount of metal reinforcement within the building (eg. Modern multi story office building)

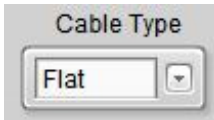
Please note, these figures will allow for the calculator to show the effect different metal loss figures will have on the loop calculations. A site survey is required for accurate measurements of metal loss.

10. Select the resolution level required. In this example we'll use the 'High' setting.

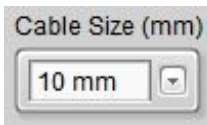


Note: Choosing a lower resolution will produce a faster calculation but the diagram in the 2D Tab's appearance will have a lower resolution. Choosing a higher resolution results in a smoother final image.

11. Select the 'Cable Type' – in this example we'll select 'Flat Tape'.



12. Select the 'Cable Size' – in this example we'll use the default value of '10 mm'.

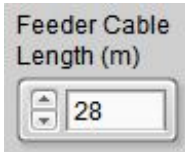


Note: The cable type and size are subjective in the first instance. These choices may be changed as required due to external factors and performance results.

13. Feeder cable length: If the distance between the layout and the loop driver is known, double the distance and enter the value in the 'Feeder cable length (m)' box.

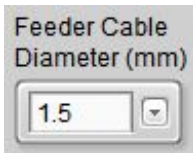
In this example the loop driver is in a nearby room, and the cable run from the loop layout to the location of the loop driver is 14m. We therefore enter a value of 28m in the 'Feeder Cable Length (m)' box.

The reason for doubling the length is that the feeder cable is twin-core, meaning there are two cables of 14m length in the feeder cable. The DC resistance of both cables must be factored into the calculations.

A screenshot of a software interface showing a label 'Feeder Cable Length (m)' above a numeric input field. The input field contains the number '28' and has small up and down arrow buttons on its left side.

Note: If the feeder cable length is substantial, then the extra resistance created by the cable could have a detrimental effect on the voltage requirement of a loop layout. It is therefore important to enter an approximate value.

14. Select the 'Feeder Cable Diameter' – in this example we'll select the default value of 1.5mm.

A screenshot of a software interface showing a label 'Feeder Cable Diameter (mm)' above a numeric input field. The input field contains the number '1.5' and has a small dropdown arrow button on its right side.

15. Click on the 'Calculate' button to apply all inputs.

A screenshot of a software interface showing three buttons in a row: 'Calculate', 'Load Report', and 'Exit'. The 'Exit' button has a red square icon to its left.

Note: The 'Calculate' button will change to 'Please Wait' during the calculation process. When the process has finished the button will revert to 'Calculate'.

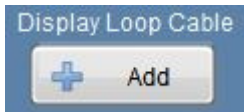
The cancellation loop sections are not used in this example as overspill control is not required.

16. Move to the 2D Tab.

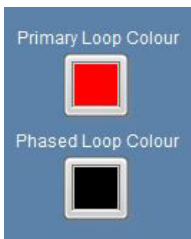
2D

In this section you will see a visual representation of the loop layout with some crosshairs.

1. To display the layout cables on the diagram, press the 'Add' button under 'Display Array'.

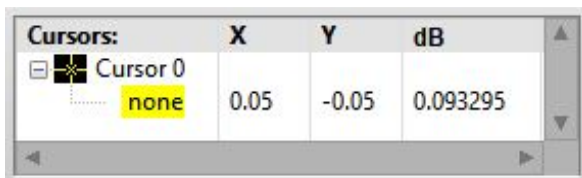


2. To change the colours of the overlays, click on the relative coloured square and select the colour of your choice.



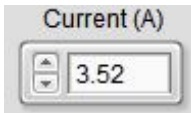
Note: you will need to toggle the 'Remove/Add' button to apply the changes

3. The dB value at the point where the crosshairs intersect is displayed in the 'Cursors' box at the bottom of the screen



4. If this value is lower than 0dB in the centre of the layout, then the

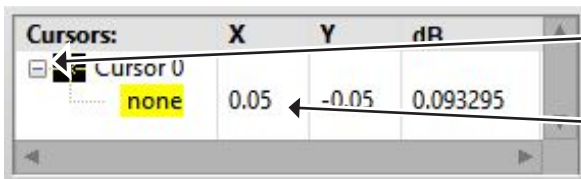
current may need to be increased. This can be achieved by overriding the 'Current (A)' values in the 'Induction Loop Settings' Tab and then pressing the 'Calculate' button to apply the changes.



Note: Selecting 'Low Resolution' in the 'Induction Loop Settings' Tab will speed up the calculation process, this is useful when frequently changing parameters for fine tuning a layout.

5. The crosshairs can now be moved to different locations for examining the dB levels throughout the layout.

To move the crosshairs, they can be clicked and dragged or enter the X/Y position in the 'Cursors' box. Alternatively, the 'Cursor Control' buttons at the bottom of the screen can be used.

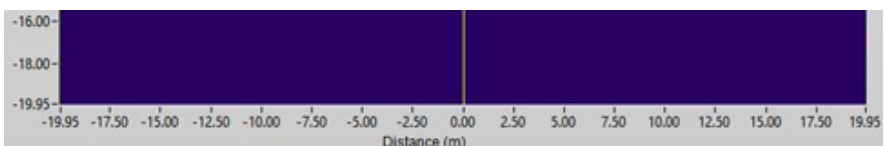


Click here to display coordinates.

Double-click here to enter new value.

Note: This feature is especially useful when measuring overspill levels in surrounding areas as the crosshairs have an X/Y plotting value which can be quantified on a building plan/drawing etc.

6. The Distance values of the X and Y Axis's are shown for measurement purposes and are automatically scaled to suit the layout.



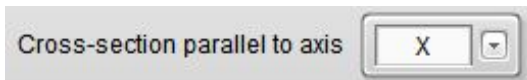
7. These values can be overridden if required by double clicking on first and last dimensions and entering new values.

Note: All the values must be equal in order to maintain the aspect ratio.

Cross Section

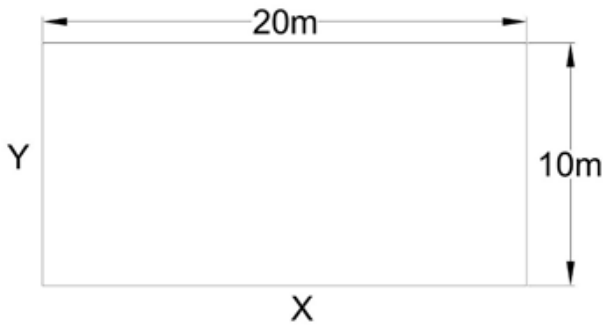
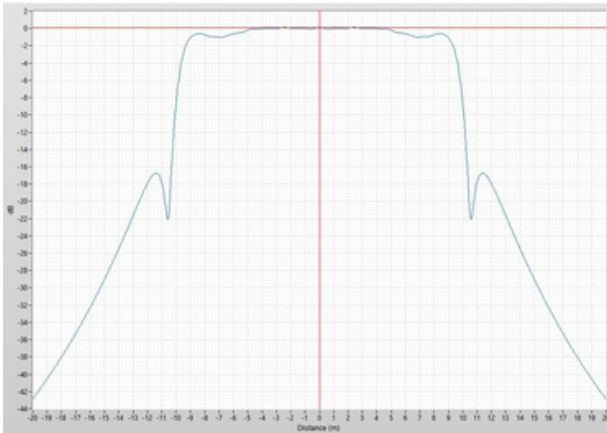
In this section you will be able to see representational slices through the loop layout parallel to both the X and Y axis.

1. Select the axis to be viewed using the 'Cross-section parallel to



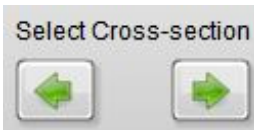
- axis' selection drop down arrow at the bottom of the screen.
2. The axis you have chosen will be displayed as a plotted graph which is automatically scaled to the loop design you have chosen.
3. If 'X' is selected, then the scale along the bottom represents the X axis in Meters (metric) or Feet (Imperial), zero is the centre point of the loop along the X axis.
4. If 'Y' is selected, then the scale along the bottom represents the Y axis in Meters (metric) or Feet (Imperial), zero is the centre point of the loop along the Y axis.
5. By moving the vertical crosshair to a position along the bottom scale, you can measure the expected dB level by referencing the horizontal lines' position on the left-hand scale.
6. The crosshairs can be moved using the same methods as in the 2D section.

Note: The scale on the left represents the dB level at the height of the listener along an imaginary centre line through the 'Y' Axis. See



the following diagrams:

7. The position of the slice can be moved by using the 'select cross section' arrows.

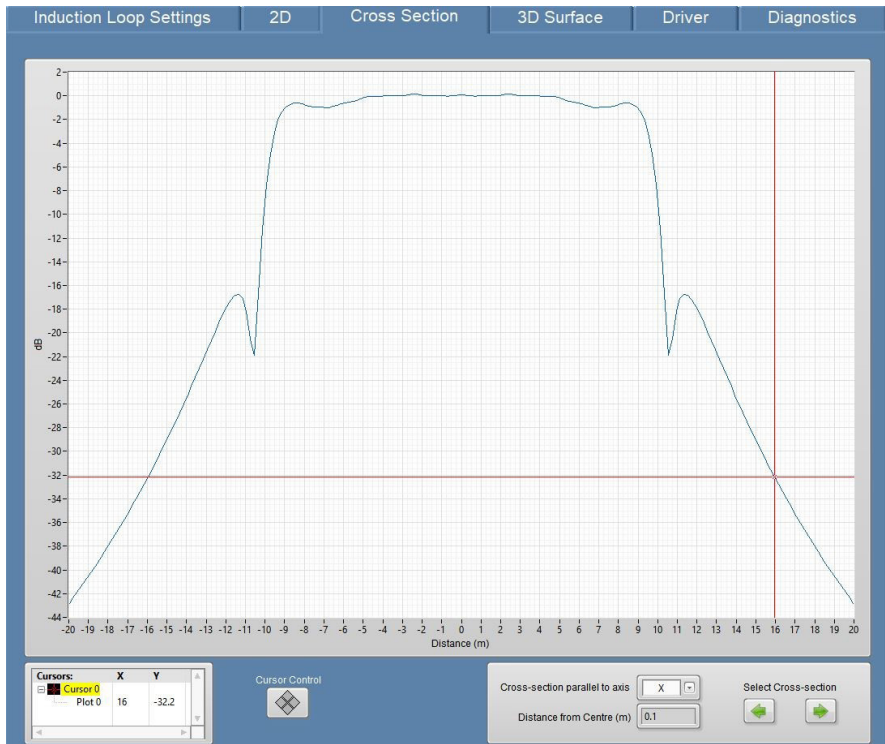


Positive values move the slice away from the viewer and negative

Distance from Centre (m)

values move the slice toward the viewer.

8. To measure the dB level at 6m outside the loop layout along the X Axis, move the vertical crosshair to '16' along the bottom scale and refer to the horizontal crosshair position on the left-hand scale value. (-32dB) as seen in the example below:



Note: As the scale is measured from the centre of the layout, move the vertical crosshair 10m or half the length of the X dimension of the layout, then add the distance outside the layout, 6m in this example.

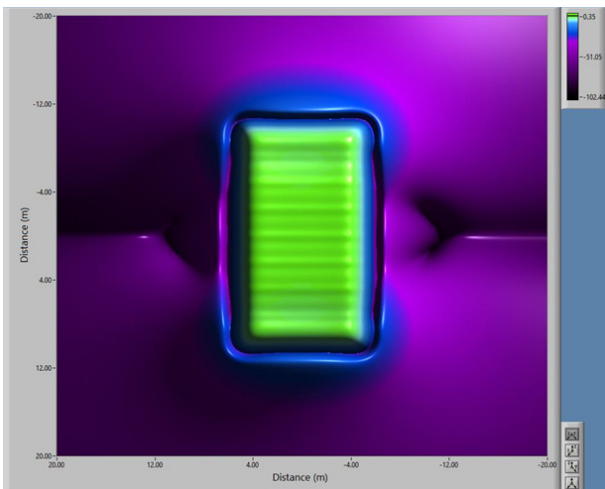
3D Surface

This section is for visual representation purposes only. There are four views which the user can select.

To select a view, click on any of the four grey buttons at the bottom right corner to display the relevant image.

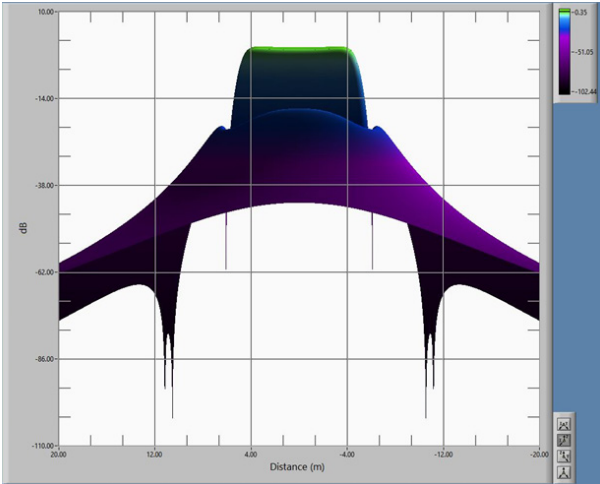


Top View

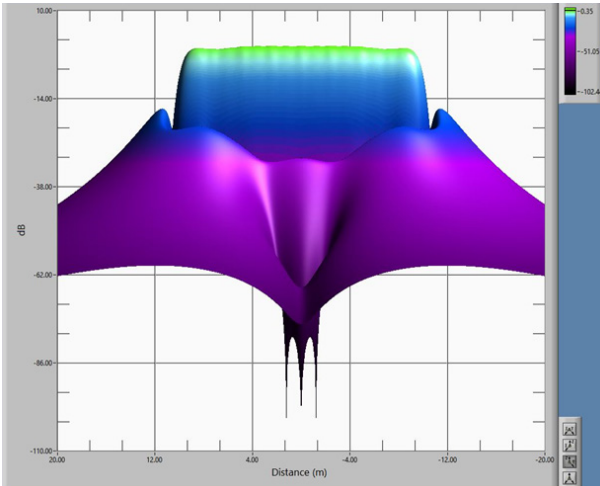




Cross Section Parallel to the Y Axis

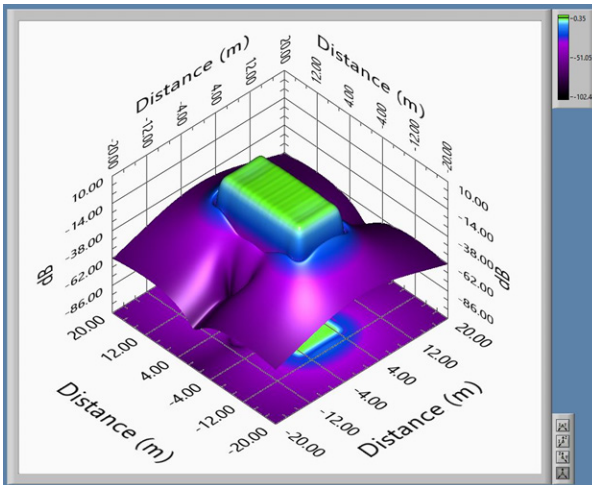


Cross Section Parallel to the X Axis





3D View



Driver

This section is used for selecting the loop driver that is best suited to the loop layout.

1. Use the green up/down arrows to scroll through the available loop drivers.



There may be an option to select from more than one loop driver.

Note: If none are available, it may be necessary to change the cable type or loop design in the Induction loop settings page and recalculate the design.

This can happen for one of two reasons.

- a. The current requirement is higher than the maximum current available from the loop drivers.
 - b. The voltage requirement is higher than the maximum voltage available from the loop drivers.
2. Once you have selected the driver for the loop layout an image will appear in the window on the right-hand side.

The current and voltage values for the driver and loop requirements are displayed in the six boxes alongside the image.



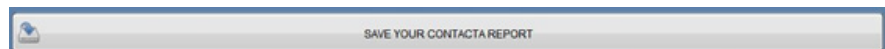
The screenshot shows a software window titled 'Available Drivers'. It features a list of drivers with 'HLD9' selected. Below the list, there are six input/output boxes arranged in a 2x3 grid:

Required Voltage (V)	Driver Voltage	Voltage Headroom (dB)
1.86	36	25.756
Required Current (A)	Driver Current	Current Headroom (dB)
2.15	10	13.362

To the right of these boxes is a 3D image of the 'contactaHLD9' driver unit. Below the image, a status message reads: 'This driver will be added to the report.'

Note: The two sections labelled 'Voltage Headroom' and 'Current Headroom' display the amount of Current and Voltage the selected loop driver has in reserve.

3. To save a report in PDF format, click on the 'Save your Contacta report' which will offer the option to rename and save the report in a location of your choice.



The screenshot shows a single button with a document icon and the text 'SAVE YOUR CONTACTA REPORT'.

Note: To load a report, click the 'Load Report' button in the 'Induction Loop Settings' tab.



The screenshot shows a horizontal bar with three buttons: 'Calculate', 'Load Report', and 'Exit' (which has a red square icon next to it).

Diagnostics

This section displays information about the loop cable i.e. DC resistance, impedance, and cable lengths.

Primary Loop Cable Length (m)

115.1

Phased Loop Cable Length (m)

119.948

There is also an option to save input settings in the 'Induction loop Settings' Tab.



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