If you're looking to carry out acoustic assessments, you’re likely to have some data and you're probably going to want to do something with it. Therefore, the general idea in Sound Design is this: you enter all your project data in the data area of the program, and if you want to do anything with it, you access the data on the canvas where you can play around with it to your hearts content.

Once you've finished playing around with it and you've come up with all the answers, that's where the automated schedule and calcs printing comes in.

As that's generally how things go, this guide will first talk you through the various options you have for getting your data into your Sound Design project file. Then we'll move on to how you carry out your assessments, looking at the different options suitable for the type of assessment you’re doing. Finally we’ll look at how the printing side of things works.

This guide aims to get you started with using Sound Design as quickly as possible. It should give you a good idea of how to do most of the things you’ll want to do when using the program.

If you can, we'd recommend watching the promo video first. It'll give you a nice overview of the software, and will also give you the opportunity to hear some lovely ukulele music!

As always, if you need any help, have any questions, or just want a general chat about the program, just get in touch!

### Getting Started

### The General Idea

If you're looking to carry out acoustic assessments, you’re likely to have some data and you're probably going to want to do something with it. Therefore, the general idea in Sound Design is this: you enter all your project data in the data area of the program, and if you want to do anything with it, you access the data on the canvas where you can play around with it to your hearts content.

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### Making a New Project

All your data and calcs are stored within a Sound Design Project File. You can create a new project, save your current project and open a different project using the File Operations buttons on the Home Tab at the top of the main window.

Clicking New Project will open up the dialog box to the right. Here you can enter the name of your project, the project reference, client and load a project image. This information will come in handy when printing your project schedules and calculation sheets.

You can also set the range of octave and third-octave bands used in the project.

**Tip**

When you first open Sound Design, a new project with standard octave and third-octave bands is automatically created. You just need to name it, give it a reference etc. using the Project Settings button.
Data

So the other members of the design team have promptly sent you a collection of comprehensive data to use in your project, and you need somewhere to organize it. That's where the data area of the program comes in.

The image to the right shows the Data tab. It’s found on the ribbon bar at the top of the main screen, and it gives you access to all your project data.

Clicking on any of the icons will open up a window showing the items of the selected data type. The window shown to the right is opened when you click the Noise Sources icon for example, but they all work pretty much the same way.

From this window you can add new items into your project by clicking on the ‘Add’ button on the right. You can also edit, copy and delete the selected item using the other buttons on the right. Double clicking on an item in the list will open it for editing.

**Tip**

If you’ve got lots of data already in a spreadsheet, such as a load of noise sources, or a load of internal receivers with dimensions etc., you can import these in one go. Open the help file (press F1) and navigate to Data > Common Data Dialog Parts > Data Type Dialogs and scroll down to ‘Importing Spreadsheet Data’ for instructions.

Data Entry

Clicking ‘Add’ will bring up a window like this one.

The reference for each data item is how you will refer to it on the canvas. It can also be printed out along with the item to help identify it.

The input method will be set to ‘Manual’ by default, meaning you type in all the information yourself. See below for using databases.

Type your values into here. You can use the TAB key to move to the next cell, or SHIFT + TAB to move back.

**Tip**

If you’ve already got your values in excel, you can copy and paste the values straight into Sound Design. To do this, select the values in excel and copy them to your clipboard (press CTRL + C), then put the cursor in the first cell in Sound Design and press CTRL + V.

If you select Database as the Input Method the Database tab will appear.

From here you can select the data you’re looking for from any database loaded into the program. You select the item by first selecting the host database (1), then the category (2), Type (3) and finally specific item (4).

You can click the Search button to search all databases.

**Tip**

Clicking the ‘Search’ button will open the database search window. Just type in the name of the data item you’re looking for and it will filter the results as you type. Once you find the one you want, double click it and it will be loaded into your project. This is by far the quickest way of getting data from the database into your project.
Assessment

Now you’ve got your data into your project file, it’s time to do something with it.

The majority of the assessments you’re likely to carry out will take place on the canvas. Room acoustics assessments can be carried out within the internal receiver window, so we’ll look at that first.

Room Acoustics

Assessments relating to Room Acoustics can be carried out within the Internal Receiver, such as calculating the reverberation time, the total amount of absorption in the room, or the amount of absorption required to achieve a certain reverberation time.

The internal receiver window is shown below with a description of how to use it.

1. Enter your room details.
2. If you’ve set up internal criteria, select the room type.
3. Select the bits of the room you want to see.
4. Enter your room geometry either using the simple calc, or manually.
   - It can be useful to add an image for your room. You can either load an image by clicking ‘Select Image’, or you can capture one straight from the screen by clicking ‘Clip Image’.
5. If you want to calculate the reverberation time, you can use the built-in calculator. Add, Edit and Remove materials from the room using the buttons on the right. Clicking ‘Add’ will open the window shown below.
   - If you’ve calculated it elsewhere, turn off the calculator to enter the absorption manually.
6. Select the calculation method used to calculate the reverberation time, and whether air absorption is taken into account.
   - Alternatively, if you want to calculate the amount of absorption needed to achieve a certain reverberation time, check the Rev Time radio button and enter the rev time manually.

Add/ Edit Material

You can enter your absorption coefficients manually, or link to a material in your projects Surface Finishes.

Tip
Linking the absorption coefficients to one of your projects Surface Finishes means that if the material changes at some point during your project, the room acoustics of any room using it will be immediately updated.

You can enter the area of your material manually, or link to surface in your room, if you’ve used the simple room geometry calculator.

Tip
Linking the material to a surface in the room means that if the room dimensions change, the room acoustics will be automatically updated.
The Canvas

The majority of the assessments you carry out will be done on the canvas, so we’ll look at that next. Firstly we’ll give you an overview of what the canvas is and how it works, then we’ll look at how you use it to carry out specific assessments.

The basic idea behind the canvas is a fairly simple one - you put modules on the canvas to either bring data onto it, or do something to the data, then you connect the modules together to tell Sound Design in what order you want things done. For example, if you want to calculate the noise levels from a noise source to an external receiver, you drag a noise source module from the toolbox onto the canvas, then modules for each of the propagation losses you want in your calc, and finally an external receiver module. You then connect these together in the order you want the calc carried out.

The Canvas - This is where you put your assessments together. Your assessments are carried out by interacting with or modifying existing modules, or creating new ones as necessary.

Tip
By default, your calculation sheets will be organised based on the category you assign them. You can use the buttons at the top to sort your sheets by either the noise sources or receivers used in them.

Putting assessments together graphically is particularly helpful when you’re doing multiple calculations where some parts are the same and some parts are different, as you can just take branches off where you need to. For example, calculating the noise levels from one source to multiple receivers, or calculating the noise levels through different branches of ductwork.

Module Types

The real power of the canvas comes from the two different types of modules it uses - components and containers. Components are the basic building blocks of a calculation. They bring data to the canvas from your different data items (noise sources, material finishes etc.) and do basic things with the data like log sum and arithmetic average. They also allow you to interact with a calculation you’ve made, like switching between different values using a drop down box, or entering a number using a text box.

The containers allow you to take a collection of modules on your canvas and store them inside one module. You can use the interactive components to interact with the key parts of your container from the outside. You can go back inside your container any time you want, and the canvas explorer above the canvas shows you where you are as you navigate in and out of the different containers.

Any container can be saved to a database so you and anyone else using the database can access it from the toolbox. As containers can host other containers, you can build up not only individual corrections, but entire calculations to be instantly added to your project when you add it to your canvas. Also, because containers are so easy to copy and paste on the canvas, it’s very efficient for making variations of your calculations to suit different situations.
The Calculations Database

The canvas is a great platform, but it’s nothing without containers for the different corrections and calculations you want to use as an acoustics consultant. That’s where the Calculations Database comes in.

The Calculations Database is a database of corrections and calculations created by Acoustics Central that is available to anyone using Sound Design. The latest version is always available from acousticscentral.com. It contains a variety of environmental, architectural, building services and industrial noise calculations for you to use immediately. The great thing about the database is that as more calculations get added in, you can just download the latest version and you will immediately have access to all the new calcs. Also, if you’d prefer the calc worked differently, you can easily make modified versions.

There’s a lot in the calculations database, so it’s worth having a look at some specific parts that will be useful for the different types of assessments.

Environmental

ISO 9613 Calculator
If you’re doing environmental calcs, the ISO 9613 calculator is a useful one to know about. Starting with your source octave band sound power levels, this calculates the noise at a receiver position by taking off geometrical divergence, atmospheric attenuation, ground attenuation and barrier attenuation.

CRTN Calc
If you’re doing transportation noise calculations, you may want to use the Full CRTN calculator. This implements a Calculation of Road Traffic Noise (CRTN) calculation using the procedure described in The Department of Transport Calculation of Road Traffic Noise.

There are also some individual CRTN corrections, to calculate from a measurement position back to the CRTN source position, or from the source position to a receiver position for example.

CRN Calc
Part of the Environmental Toolbox, this implements a Calculation of Railway Noise (CRN) calculation using the procedure described in The Department of Transport Calculation of Railway Noise 1995. This includes the corrections given in CRN, and the additional values produced by DEFRA in 2007.

Individual Corrections
There are a whole load of individual corrections like point, line and plane source distance calculators, path difference calculators, Maekawa screening loss calculator.
Architectural

BS 8233 Break-In Calc
If you're calculating the level of noise breaking-in through the building envelope, the BS 8233 Break-In calc could be useful. It contains a calculation of noise break-in from free-field noise levels at the location of the facade based on the input dimensions and selected materials. It is based on equation 1 from section 6.7.2.1 of BS 8233 1999.

EN 12354-4 Simple Break-Out
If you're calculating the level of noise breaking-out through the building envelope, the EN-12354-4 Simple Break-Out calc could be helpful. Part of the Sound Insulation Toolbox, this calculates sound pressure at receiver location based on the simplified model given in Annex E of EN 12354-4 to a receiver in line with the centre of the radiating surface.

Noise Transfer Calcs
If you’re calculating the level of noise transferring from one part of a building to another, the noise transfer calcs will be useful. Part of the Sound Insulation Toolbox, the Rev to Rev and Rev to Direct calculations calculate the amount of noise transferred from one space to an adjacent space. The Rev to Rev calc calculates the transfer of reverberant sound pressure levels from one reverberant space to another. The Rev to Direct calc calculates the transfer of reverberant sound pressure in the source room to the direct field of the receive room.

Building Services

Fan Noise - Atmospheric Side
Part of the Building Services Toolbox, this contains a basic calculation of noise from a fan to an external receiver location. Includes duct loss, bend loss, end reflection, directivity, correction for off-axis, radiation, distance, screening and facade incidence.

All the individual corrections that make up the calc and more are also in the database, i.e. duct loss, bend loss, split loss, plenum loss, end reflection, directivity etc.

Fan Noise - Room Side
Part of the Building Services Toolbox, the room-side fan noise calcs contains basic calculations of noise from a fan to internal receivers. Three calcs are included, one direct to the room being served which includes general system losses along with the corrections required to calculate the direct and reverberant components in the receive rooms, one to calculate break-out from duct work travelling through a room, and one to calculate to multiple receivers and break-out locations.

Basic Crosstalk Calc
Part of the Building Services Toolbox, this contains a basic calculation of the resulting level difference across a separating element as a result of noise travelling through the partition separating and the ductwork serving the adjacent rooms.
**Spreadsheet Viewing**

You can create spreadsheet views of your calculations using the Spreadsheet Viewer, and interact with them exactly the same way you do on the canvas.

Spreadsheet views can be customized to show the information you want to see, like a running total, or the difference a certain correction has made. You can also specify the number of decimal places, and choose which single figure values to show on octave or third-octave bands.

Once you've created a spreadsheet view, these can be saved with your containers, meaning that when someone adds it to a canvas in their project, the spreadsheet version is instantly available.

There are two parts to viewing your calculations as spreadsheets, the Spreadsheet Calculation Selector where you select the bits of your canvas you want to see as spreadsheet calculations, and the Spreadsheet Viewer, where you view your selected calculations as spreadsheets.

**The Spreadsheet Calculation Selector**

Pressing F3 (or clicking the Select Spreadsheet Calcs button on the Home tab at the top of the main window) will open the spreadsheet calculation selector window shown on the right.

From this window you can create calculation groups (e.g. Plant Noise Calcs, Break-In Calcs etc.), and add calcs to the groups.

Clicking New Calc will open up the window shown below. From here you can define the chain you want to see as a spreadsheet. When selecting calcs, the canvas background will go grey and the selected chain will glow to help you see what you've selected.

Use the Smart Select to select the start and end of calcs you want to see as spreadsheets.

**Tip**

Add All Calcs on Canvas creates an individual spreadsheet for each calculation chain on the canvas, and Select Specific Calcs creates a sheet for each chain you select. These are the quickest methods of getting spreadsheet views of multiple calculations in one go.

**Spreadsheets**

Pressing F2 (or clicking the Select Spreadsheet Calcs button on the Home tab) will open the Spreadsheet Viewer shown on the right. There will be a separate tab for each spreadsheet defined using the Spreadsheet Calculation Selector.

If you click on the first line of a module (e.g. Distance Loss) you can select whether to show the interactive elements, values at the input, sub-total, and difference made by the module. Clicking an individual line showing octave bands will allow you to select which single figures to show, along with the number of decimal places.

You can also copy the selected spreadsheet to the computer's clipboard for pasting into another program, or export all spreadsheets to a single Excel file.

The spreadsheet calcs you create will also form the calculation sheets you print when you've completed your assessment.
Printing

Once you've finished your assessment, you may want to print out schedules of the data used in your assessment, along with any calculation spreadsheets you created. This is where the automated printing comes in.

Before you can print anything, you'll need some schedule templates with which to fill the data from your project. The templates define what type of data will go in the schedule (Noise Levels, SRIs etc.) and include your company's logo and any other information you want to show.

The graphics items used to create the templates are stored in a Sound Design Database File along with everything else, so you use the Database Manager (Data Tab from the top of the main window) to create new databases to host the schedule templates, or load in existing ones. Our Template Print Objects Database (this is downloadable from acousticscentral.com) has most of the standard schedules you'll want and, to be honest, you can pretty much just change the logo to your own and you're ready to go.

If you want to create your own schedules from scratch, go to the Database Manager, create a new database, and click the Graphics Items button to explore the printing related objects in the database. From here, start at the top of the tree on the left and work your way down creating the styles you want to use in your templates (right-click on each item type and select New).

When creating the new Schedule Template, you'll be asked to select Item or Group. Item will print one schedule for each item, e.g. one page for each noise source, internal receiver etc., and Group will print one schedule for the whole group, e.g. a schedule containing all noise sources, internal receivers etc.

The quickest way to get usable template schedules is to load in the Template Print Object database from acousticscentral.com and modify the schedules to use your logo, font, colour scheme etc. Speak to us if you need any help with this.

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Print Manager

Any schedule templates contained within any of the database files loaded into the program will be shown when you open the Print Manager. The Print Manager is opened by clicking the Print Manager button on the Home tab of the ribbon bar at the top of the main screen.

When you select a template, filtering options will be shown on the right-hand side relevant to the template you've selected. For example, if you select a template that gets its data from noise sources, you will be able to select only the Building Services sources, along with which individual sources you want to print.

If your schedule template includes a Schedule Reference, you can use the boxes at the bottom of the window to customize the schedule reference, including whether you want to include sequential numbering for your item templates.

Your calc sheets will print out in the same format as your spreadsheets, including any single figures added to bands, and the number of decimal places specified.

Also, if you specified a print prefix for your spreadsheet calculation group, you can use this as part of your schedule reference.

Ready for more?

There's a lot in this guide, but there's a whole lot more in the in-program help file (press F1 while using the program) and on the website including tutorials and frequently asked questions.

If there's anything you don't understand, want help with, or just want to find out general information about the program, don't hesitate to get in touch. Call us, Skype us, email us, whatever you prefer.

We're also very happy to help get your own data, calcs, and print schedules into Sound Design, so if you need any help with that, just let us know.