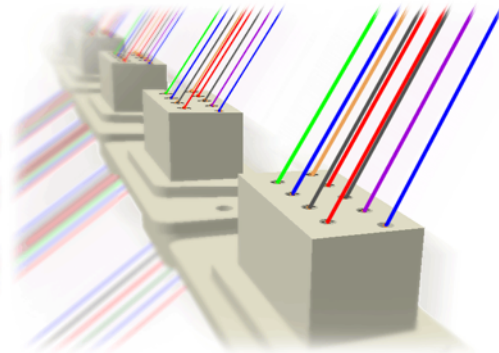


Cable and Harness - RefDes

In this exercise

This Skill Builder describes how to understand the relationship between the RefDes property and part occurrences in an Autodesk Inventor assembly file.



What is a RefDes?

RefDes is short for Reference Designator. A RefDes is a unique identifier, or value, that you assign to an occurrence of an electrical part (typically a connector) in the context of a harness assembly. In general terms, the RefDes maps that part occurrence to a schematic, wiring diagram, or electrical connectivity data.

That's interesting, but why should I care?

In harness-type electrical systems, it is very common that a given harness will include, or connect to, two or more occurrences of a particular connector. This means that if you attempt to import a wire list (csv file) into your harness assembly, and there are multiple occurrences of a given connector, and those occurrences do not each possess a unique RefDes, then Autodesk Inventor will not know which wire connection goes with which connector occurrence and the import will fail.

Occurrence, defined

The key word in this discussion is *occurrence*. Let's take a moment to review the general meaning of this term as used within Autodesk Inventor assembly files.

An occurrence of a part or subassembly in an assembly is an identical duplication, or instance, of that component. An assembly can, theoretically, contain a limitless number of occurrences of a given component. Each occurrence is a reflection, if you will, of a single document. When you modify the document, all occurrences reflect the change. This is a powerful, efficient characteristic of parametric modelling. If you have much experience with creating and manipulating parametric assembly files, this scheme is probably quite intuitive to you.

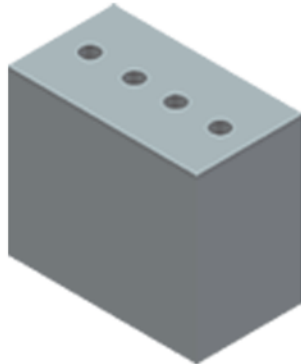
In the context of a cable and harness assembly, where *unique* and *discrete* are oftentimes the operative words, the concept of identical occurrences requires special treatment - and that special treatment is the RefDes.

Let's see how this works in the real world.

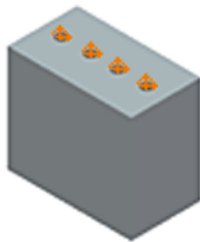
Create and use reference designators

In this exercise you create a harness assembly to see how reference designators function within the context of a wire list import operation. The following steps presume that you have a working knowledge of Autodesk Inventor modeling and the cable and harness environment.

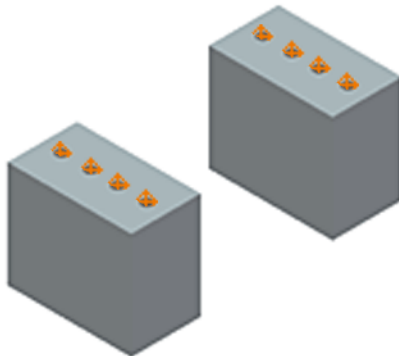
1. Create a simplified connector part, approximating the following image. The units of measurement and sizes are not important (the holes are for illustration purposes and are not necessary).



2. Switch to the Harness Part Features panel bar, and then add four pins to the connector. Name the first pin '1,' the second pin '2,' and so on. Save the part into the **Cable & Harness > Samples** directory within your installation of Autodesk Inventor Professional.



3. Create a new assembly, and then place two occurrences of the connector part.



4. Click the Create Harness tool to create a harness. For the sake of expediency, we won't create segments. At this point, the harness will be graphically empty.
5. Using an Explorer window, navigate to **Wire List Import** under the **Samples** directory. Open one of the csv files, for example, **Rack Harness Import.csv**.

6. Save a copy of this file to the **Cable & Harness > Samples** directory.
7. Clear the contents of the cells as shown in the image, leaving the data in only the first five rows.

	A	B	C	D	E	F	G	H	I
1	//Wire ID	Cable ID	Library Name	Conductor ID	REFDES 1	Pin 1	REFDES 2	Pin 2	
2	1001		20AWG-VIO		J3	4	P1	1	10
3	1002		20AWG-RED		P1	2	J3	3	10
4	1003		20AWG-BLU		J3	2	P1	3	10
5	1004		20AWG-BLU		J12	1	SW2	1	10

8. Modify the cells in the RefDes and Pin columns as shown in the image. Save the file.

	A	B	C	D	E	F	G	H	I
1	//Wire ID	Cable ID	Library Name	Conductor ID	REFDES 1	Pin 1	REFDES 2	Pin 2	
2	1001		20AWG-VIO		A1	1	A2	1	10
3	1002		20AWG-RED		A1	2	A2	2	10
4	1003		20AWG-BLU		A1	3	A2	3	10
5	1004		20AWG-BLU		A1	4	A2	4	10

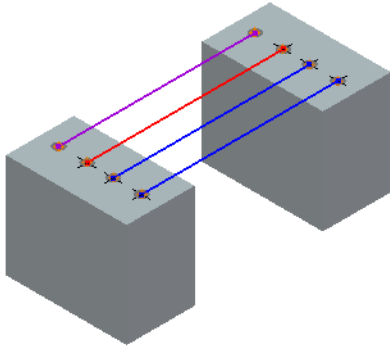
9. Return to Autodesk Inventor and click the **Import Wire List** tool.
10. For the cfg file, browse to and select **WireListConfiguration.cfg**.
11. For the csv file, select the csv file you just created. Click OK in the Import Wire List dialog box.

Notice that since we did not assign a RefDes to each connector part occurrence, Autodesk Inventor doesn't know which wire/pin connection goes with which connector occurrence and the operation fails. This is also be the case if each connector possesses the same RefDes.

Now let's add the needed reference designators.

12. In the browser, right-click the first connector occurrence, and then select Harness Properties.
13. In the RefDes field enter **A1**. Click OK.
14. Repeat steps 12 and 13 for the second connector occurrence, this time using **A2** as the RefDes.
15. Repeat step 9, and then click OK in the Import Wire List dialog box. (The cfg and csv files are pre-selected from the previous operation.)

Because we specified a unique RefDes for each connector, the wire import succeeds.



Finally, there are two more things to remember as you work with RefDes values and wire list import:

- You must specify the RefDes value for each occurrence in **every** assembly where you perform a wire list import, even if the RefDes value is the same for a connector occurrence from one assembly to another.
- You can place a RefDes value directly in the part document, however, that value is only a placeholder and is not recognized by the wire list import operation. For a wire list import operation, you must place the RefDes value in the context of the assembly.