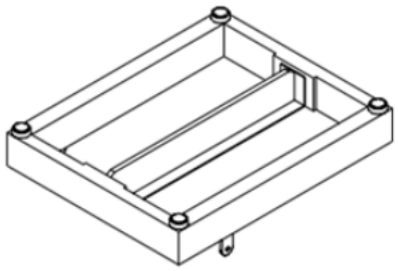
Audio Bumpers Guide

Version 1.0

About the Guide

This guide provides the instruction on the Audio Bumpers (a.k.a. rigging accessories, rigging frames) that are needed in speaker line arrays when using the Speaker Array Tool in Vectorworks. The bumpers are placed on the top portion of the overall speaker line array system.



The line array speakers are explained separately in the “Line Arrays - Speakers & Subwoofers” section of the Audio Speakers guide. This should be also looked at since there is overlapping and related data between the two guides.

★ Please read the Vectorworks Basic Style Guide first. It will cover more common aspects that you need to consider in creating your resources, and it is a companion to this guide. The information found there should be understood before using the more specific topic guides like this.

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Getting Started

Before proceeding you should have basic Vectorworks knowledge on modeling and creating symbols. This includes understanding the Vectorworks Basic Style Guide.

Also consult the Vectorworks Help section on inserting speakers, here.

Collect source info

Start by collecting the necessary source materials for the bumper and related array speakers. Speaker manufacturers will have this information on their website in the form of CAD files, PDF drawings, and spec sheets/brochures.

Manufacturer drawings – with properly scaled dimensions that show the top, both side views, and the front are the easiest to draw from. Avoid any views that are isometric as they are no help because you cannot accurately dimension. If the manufacturer has 3D model files (e.g. DWG, STEP, etc.) files they can be used but are often very heavy and model every screw and curve.

> See also “Importing models from other CAD/BIM formats” in the Basic Guide.

Dimensions – Our standard bumper record format, __ATS-BumpModData will require accurate dimensions of the outer cabinet to be entered. Make sure the source material has accurate dimensions for height, width, and depth. Incorrect dimensions in these record fields can cause compounding errors. This record will be found in the included Vectorworks template with this guide.

Weight – The total weight of the bumper. Weight can be provided in either pounds or kilograms.

Start a file

The library should be made using the Spotlight templates and samples supplied with this guide, which contains all the correct record formats, classes, colors, accessories, and textures currently in use.

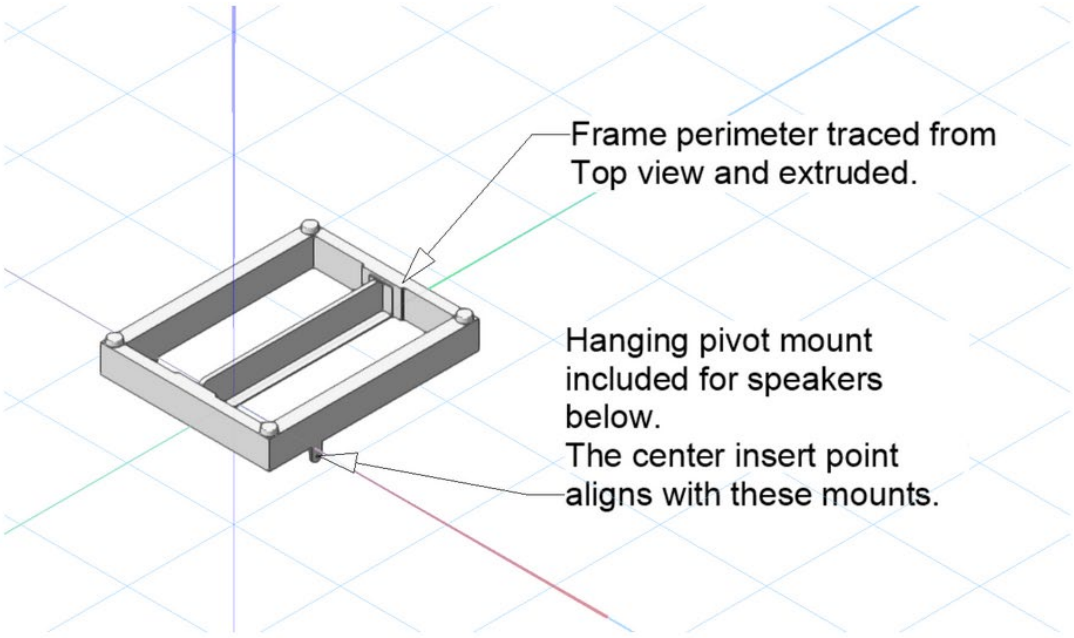
3D Component

The 3D component of the bumper, which is in essence a frame, will provide an accurately sized model representation of the real world object. Although it should be simplified if the device is highly detailed. Avoid drawing minute details like hardware and rigging holes that are not necessary in the 3D symbol.

But do include necessary linkage that the array speakers need to hang from below the bumper.

The 3D component of the bumper symbol must be made with Vectorworks native geometry. The bumpers can vary in shape depending on the manufacturer design. Using your source drawings/CAD files, you should trace the side and/or top views of the bumper to construct the bumper's shape, with the Polyline Tool. When using source drawings, be sure they are properly scaled.

Avoid tracing rounded corners and instead make them square corners using the center of the radius. This further helps reduce file size and improves speed when rendering. Once the polygon(s) needed are made, use the measurements listed from the manufacturer, to extrude it to the correct depth.



3D model shown in relation to insertion point

Any necessary interior frame parts or smaller details parts that are needed can have their profile traced and extruded, as well. Do this until the all needed part shapes are all created to complete the bumper.

Once the bumper is complete, it should have the following “attributes”:

- There should be single piece of geometry for the bumper.
- Line weight of 0.05 mm applied to all the 3D geometry.
- Fill color should be set to: Cool Gray 80%
- The model should not have chamfers or fillets which will slow performance.
- No texture is used on the bumper.

Insertion/orientation

The front of the bumper, like its array speaker counterparts, should always be oriented so that the front is positioned facing down when in Top/Plan view.

The bumper should also be orientated so it aligns vertically with the specific array speakers that it is designed to connect with. This alignment is based on aligning the side mounting points that are typically on the array system speaker and bumpers.

Please refer to the Audio Speaker Guide’s section that also explains this topic, “VI. Line Arrays - Speakers & Subwoofers.” As it is explained there, the Line Array Speaker's rigging points may require that some of the geometry be placed forward of the 0,0,0 insertion point, when orienting the 3D component.

Classing

The bumper geometry should be placed on the **Audio-Rigging** class. This will also apply to the 2D planar geometry later explained in Creating the Bumper Symbol section.

Create the Bumper Symbol

Once all of the 3D components have been completely modeled, they can be made into a symbol.

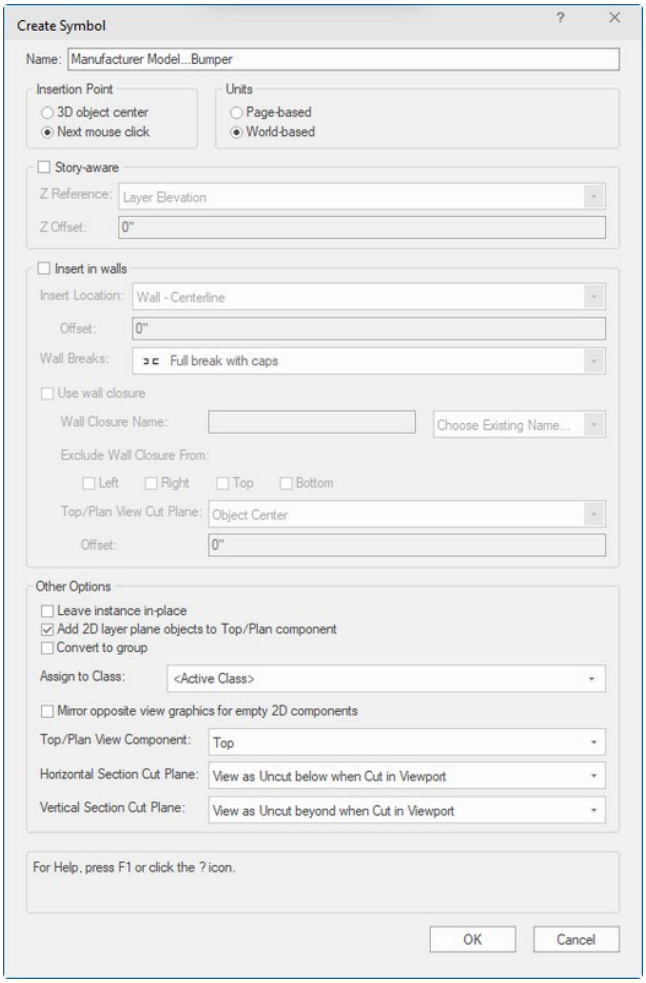
- Select the modeled 3D components.
- Use the ‘Modify > Create Symbol’ menu command in Vectorworks.
- Name the symbol appropriately.

In the Create Symbol dialog box, set parameters as follows:

- Name: Choose an appropriate name (naming conventions covered at the end of this guide).
- There is no container class for audio symbols. Set this to 'Active Class'
- Horizontal Section Cut Plane: Set to ‘Uncut Below’
- Vertical Section Cut Plane: Set to 'Uncut Beyond'

- Story Aware: Uncheck this option
- Insert in Walls: Uncheck this option

After applying these settings, locate the newly created symbol and select 'Edit 2D Components' to create the 2D/Planar geometry.



Modify > Create Symbol dialog box

Create the 2D Geometry

The 2D component of the bumper symbol should be a very simple outline with as few internal lines as possible. There should also be no text as the symbols should be unique enough to differentiate from each other without requiring text.

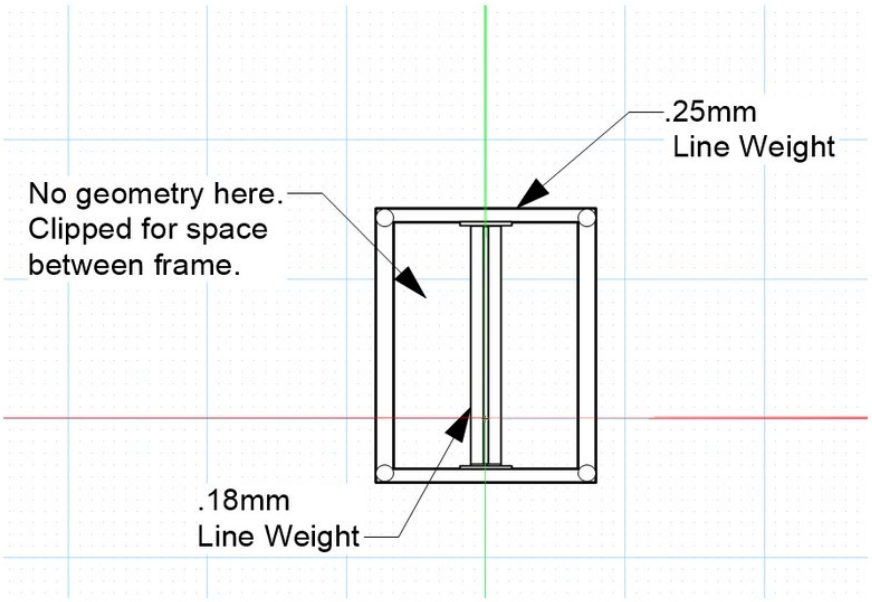
Like the 3D component, the bumper geometry should be placed on the **Audio-Rigging** class.

- External line weight should be .25mm
- Internal lines should be a line weight of .18mm.

Be sure that the bumper's 3D component is properly placed in relation to the insertion point.

Then edit the 2D component of the symbol, make sure that the 3D component is visible using the Edit Component Palette. This will allow easier tracing of 3D geometry.

Using the Polyline tool, trace the outer shape of the bumper frame and make sure the resulting shape is a closed polygon with a solid fill and classed appropriately. Geometry that is between the framing of the bumper should be clipped, so only the actual frame has a fill.



2D object and linework, also showing alignment to the insertion point

Test the symbol in an array

After the bumper symbol is complete it should be tested to check if the speakers used in conjunction with it align correctly together with the bumper in an array. This is described the Audio Speakers guide section on line array speakers.

Add the Symbol Record Formats

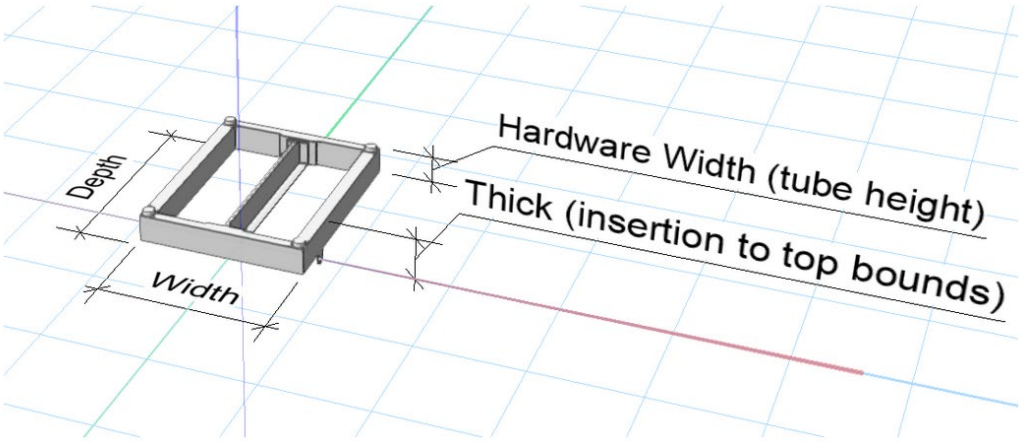
There are two record formats that need to be attached to the bumper symbol in order to complete it. These are both provided in the template.

Bumper record format: __ATS-BumpModData

This table shows the bumper record's fields that need to be considered. This will be covered in more detail later in the guide.

Field and values for the Bumper record format:

Field	Value Criteria
Type	Add: Bumper
Brand	Manufacturer name
Model	Bumper model from manufacturer specs
Width	Width of the front of the bumper. This value must be entered in mm units.
Depth[1]	Distance from the front to the back of the bumper when viewed from the Top/Plan view or a side view. This is a flat plane measurement and not an angled distance if the bumper is shorter in the back than front. This value must be entered in mm units.
Thick[1]	Height from insertion point to the top bounds of the geometry in mm.
Hardware Width1	Thickness of the bumper frame's tube wall height in mm.
Weight	The weight of the bumper without any rigging elements. This can be in pounds or kilograms, just add appropriate units (lb or kg)
User Field 1	Leave blank – User field
User Field 2	Leave blank – User field
User Field 3	Leave blank – User field
User Field 4	Leave blank – User field
User Field 5	Leave blank – User field
User Field 6	Initials of developer (used for troubleshooting)



Bumper record format – dimension fields visualized

[1] The Speaker tool has two speaker source options when inserting speakers. These dimension are used for the catalog mode.
"Symbol mode" uses the actual symbol's geometry when placing the symbol in the drawing, and has the most accurate appearance. That is what this guide covers: making

the symbols which will typically represent manufacturer products.
There is also “Catalog mode” that uses the measurements in the speaker’s record format to draw a simpler 3D box representation of the speaker. Although more simplified, this object type improves the file’s performance. Accurate measurements are required to be entered in the record’s dimension fields, that are shown above, in order for this to correctly work.

Equipment record format: EntEquipUniversal

This is used for inventory and equipment tracking purposes. It allows users to keep track of what equipment has been used vs. what is in their inventory. The record is applied to every Spotlight symbol and the fields are populated. As the record is used by all Spotlight symbols the device type varies. Enter Bumper in the Device Type field.

Field and values for the Equipment record format:

Field	Value Criteria
Short Name	Model Name
Symbol Name	Manufacturer-Model Name
Location	Leave Blank (User will edit)
Position	Leave Blank (User will edit)
Unit Number	Leave Blank (User will edit)
Notes	Leave Blank (User will edit)
Device Type	Bumper
MVR-ID	Leave Blank (User will edit)

Completing the Library

The Finishing the Library section of the Basic Style Guide should be referred to in conjunction with the following:

Resource names

The symbol names should use the following structure for its nomenclature. In the example below the company L-Acoustics is being shown but each company will be unique.

Manufacturer	Name or Model Number	Type
L-Acoustics	KARA M-Bump	Bumper

Resource arrangement in the Resource Manager (RM)

If the bumpers are a part of product lines containing different models in a series it is important to organize the symbols in a folder for ease of locating. The folder should be named after the series and contain all of the models from the series. Use the product manufacturer web pages and documentation to help lay out the series names and accompanying models.

Setting the views of the resources

Set up the proper views in the Resource Manager.

The symbol thumbnails should be:

- Set Thumbnail View to: Top/Plan
- Set Thumbnail Render Mode to: Wireframe

The High Res Preview (aka “Large Preview”) should be:

- Set High Res Preview View to: Right Isometric
- Set High Res Preview Render Mode to: Hidden Line.