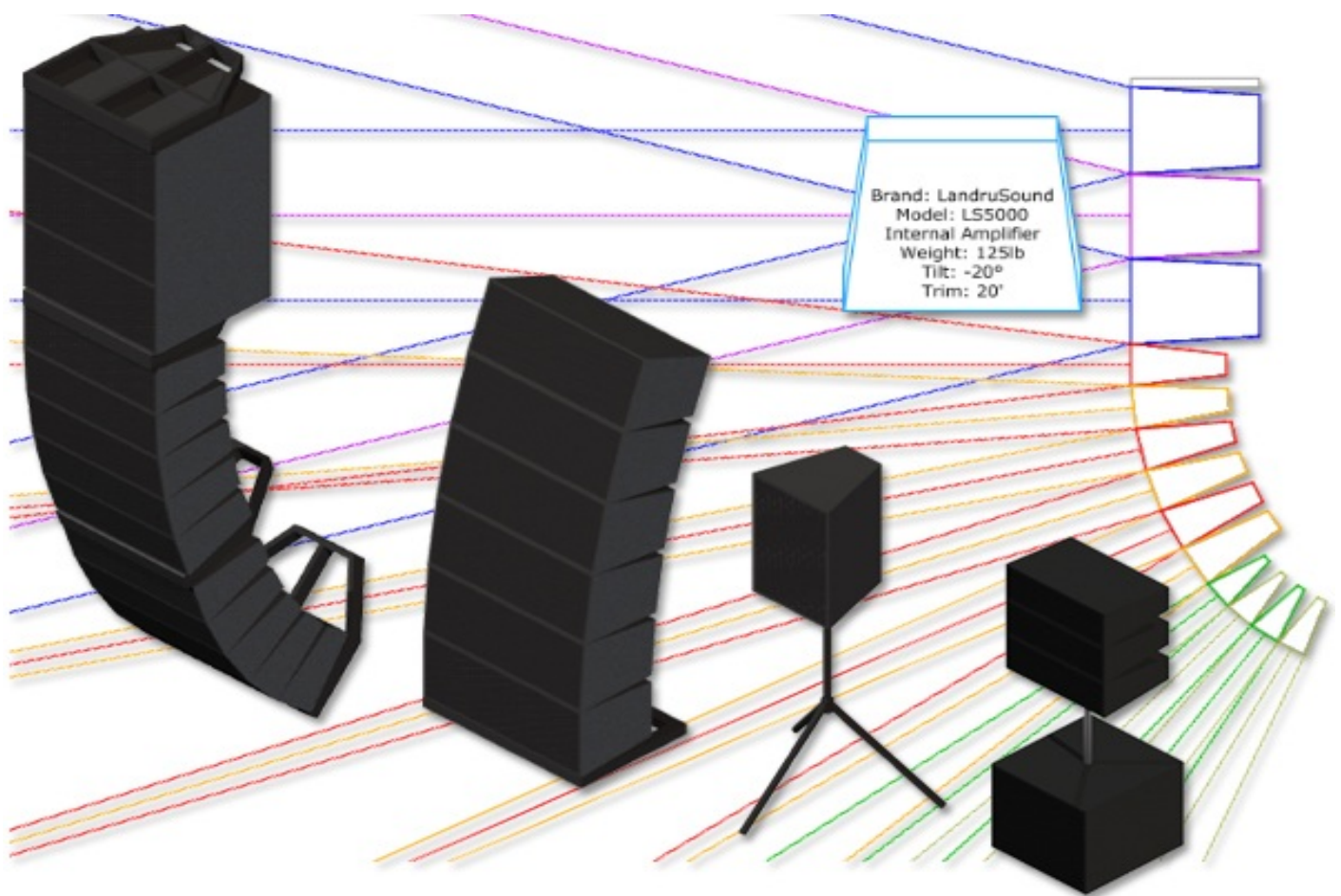


The Audio ToolSet 2 Suite

build 3.3



manual



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Audio ToolSet 2 is a trio of Vectorworks® Plug-In Objects that enable you to insert simple Hybrid (2D and 3D) models of loudspeakers and line-arrays. While they are not meant to replace (or even approach the complexity of) manufacturers' or 3rd-party high-end sonic analysis software, these flexible tools give Vectorworks® users considerable power...: to perform basic audio coverage analysis, to create audio system layout drawings, to check general space requirements, and to visualize audio components for projects.

Notable features of *Audio ToolSet 2*:

For all three of the tools...

- Loudspeaker and bumper geometry can easily be changed on-the-fly based on specifications users enter or, ***NEW in Audio ToolSet 3.3***, the tools can insert existing Symbols.
- Regularly-used user-defined configurations can be saved in a Library for later retrieval. For those, ***NEW in Audio ToolSet 2.5***, these can have user-assignable names. (*For example, a loudspeaker's Brand and Model might be "Landru Design" and "LD6000" but a user can store the Type as "Mid/High."*) Bumper and loudspeaker specifications are stored independently of each-other and can now be deleted without users' having to edit the external Library file manually.
- The tools help to track relevant information, like brands and models, weights, locations, purposes, drive lines, trim heights, and tilt angles. Most of this information can be displayed directly on drawings as text blocks.
- ***NEW in Audio ToolSet 2.5***, stock loudspeaker and bumper data can be imported from appropriately-configured Vectorworks® files. These files can also be easily shared with other users.
- ***NEW in Audio ToolSet 2.56***, loudspeakers can be easily turned “side-ways” using the “Flip Orientation” toggle.
- ***NEW in Audio ToolSet 2.61***, the “Weight” fields now recognize kilograms and U.S. pounds. The given units are stored in the Library alongside the previous “unitless” weights.
- The different parts of each audio object can be assigned to different Classes and, ***NEW in version 3***, users can choose which parts are assigned to Classes and can define custom Class names.

AudioBox 2...

- Allows the display of variable horizontal and vertical dispersion areas (in both 2D and 3D). The dispersion lines compensate for the project “floor” (the drawing Ground Plane) and a user-defined listening height. **NEW in AudioBox 2**, three independently-definable Dispersion Ranges can be defined so users can visualize loudspeaker performance for different frequency ranges, key frequencies, or crossover points. Each range can be independently Classed and is color-coded. **NEW in version 3**, horizontal dispersions can be asymmetrical.
- Will track different support options (flown, stacked, tripod, etc.). **NEW in AudioBox 2**: While the other "Support" options remain reference-only, if "Tripod" is chosen, a floor stand will be created with adjustable height. **NEW in AudioBox 3** is the “Yoked” “Support option, which creates a yoke and clamp for the loudspeaker.
- **NEW in version 3**, ceiling speakers can be created, in addition to the standard “cabinet” loudspeakers possible in previous versions.
- **NEW in version 3**, speaker wattages (Minimum, RMS, and Peak) can be tracked.
- **NEW in version 3.021**, tripod orientation can be rotated.
- **NEW in version 3.021**, “Mic Stand” supports can be created.
- **NEW in version 3.021**, yoke supports can be either “down” or “up.”
- **NEW in version 3.1** are several additional data fields.

AudioArray 2...

- Will insert up to 42 loudspeakers and/or additional bumpers in a given array and, **NEW in AudioArray 2**, of up to three different *AudioBox 2* types in each - for things like subs, underhangs, etc. Geometry and data for each loudspeaker type is totally independent of the others.
- **NEW in AudioArray 2**, element-to-element angles are independent for each loudspeaker in the array.
- Uses a **NEW AudioArray 2** user-friendly “Array Detail and Configuration” dialog. This dialog includes automatically-updated preview windows so users can instantly see what they’re creating - bumpers, loudspeakers - and/or changes to the over-all array.
- **NEW in version 2.5**, loudspeakers can be inserted for multiple arrays at the same time.
- **NEW in version 2.55**, arrays can be ground-stacked in addition to being flown.
- **NEW in version 2.55**, trapezoidal or chamfered bumpers can be created.
- **NEW in version 2.55**, bumperless arrays can be created.
- **NEW in version 2.56**, tripod-mounted arrays can be created.
- **NEW in version 2.55**, speakers can be shifted backward and forward relative to their bumpers.

- **NEW in version 2.61**, the “Update” button now fixes misarranged arrays.
- **NEW in version 2.61**, *AudioBumper 2* has been added, allowing multiple bumpers (pull-back and transitional) to be inserted.
- **NEW in version 2.61**, extension bars can now be created and stored with defined bumpers in the Library.
- **NEW in version 2.61**, rigging guides can now be shown, marking potential insertion points for hoist Symbols and Plug-In Objects.
- **NEW in version 3**, speaker Rack and Drive Line data can be entered in the “Array Detail and Configuration” dialog.
- **NEW in version 3.02**, “T”-style bumpers can be defined.
- **NEW in version 3.021**, tripod orientation can be rotated.
- **NEW in version 3.1**, “Sub Pole” arrays can be created.
- **NEW in version 3.1**, additional data can be entered in the “Array Detail and Configuration” dialog and automatically sent to placed *AudioBox 2* instances.
- **NEW in version 3.3**, users can choose different rendering modes for the preview boxes in the “Array Detail and Configuration” dialog.

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**Starting with version 3, *Audio ToolSet 2* requires
Vectorworks® and Renderworks® 2014 or newer.**

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Installation

UnZip the *Audio ToolSet 2* Zip file you downloaded, **with the folder structure it contains intact**. You will end up with two folders, the contents of which will need to be copied as-directed, **without Vectorworks® running**:

“Copy to Plug-Ins folder”	“Copy to Libraries/Defaults folder”
<p>This folder contains five files. These files are the actual Plug-In files, a command file, and a resource file:</p> <ul style="list-style-type: none"> • <i>AudioBox 2.vso</i> • <i>AudioArray 2.vso</i> • <i>AudioBumper 2.vso</i> • <i>Connect Audio Records.vsm</i> • <i>LandruStrings.vwr (or, for Vectorworks 2014®, LandruStrings.xml)</i> <p>As the folder name hints, copy all of the files in this folder into your Vectorworks® 2019** Plug-Ins folder. The Plug-ins folder is found either in your main application folder or in your User folder.</p>	<p>This folder contains a folder, “Audio Tools,” which contains two folders - “Bumpers” and “Speakers.” Each of these contains a file with a default Symbol used by <i>Audio ToolSet 2</i>.</p> <p>As the folder name hints, copy this folder - with its folder structure intact - in this folder into your Vectorworks® 2019** “...Libraries/Defaults” folder. The “...Libraries/Defaults” folder is found either in your main application folder or in your User folder.</p> <p>It is VERY important that you copy the “Audio Tools” folder structure intact into the Libraries/Defaults folder.</p> <p>If these folders already exist on your system, simply copy the <i>Audio ToolSet 2</i> files you downloaded into them. Be sure to back-up and/or rename any existing files that you don’t want overwritten.</p>

** “2019” can be “2018,” “2017,” “2016,” “2015,” or “2014.”

Next, start Vectorworks® and add the tools to your favorite Workspace. If you've never done that before and are not near your Vectorworks® manual:

- 1) Click...[Tools]...[Workspaces]...[Workspace Editor]. Make sure "Edit current workspace" is selected and click "OK."
- 2) In the resulting dialog, click the "Tools" tab.
- 3) Scroll down the Tool section (the left side) until you see the "Landru" section. Click the "+."
- 4) Drag the *AudioBox 2* and *AudioArray 2* icons to an existing palette or create a new palette (or Tool Set) and drag the icons there. (Do NOT add *AudioBumper 2* to your Workspace.)
- 5) Click the "Menus" tab.
- 6) Scroll down the Commands section (the left side) until you see the "Landru" section. Click the "+."
- 7) Drag the *Connect Audio Records* command to an existing menu or create a new menu and drag the command there.
- 8) Click "OK."

Using *Audio ToolSet 2*

Choose the *Audio ToolSet 2* icon for the particular tool you wish to use (*AudioBox 2* or *AudioArray 2*) from the Tool Set to which you added it earlier. A ghost image of the object's default geometry will appear in your drawing window. Click in your drawing to place the *AudioBox 2* or *AudioArray 2* object. Rotate the object to the desired angle and click again (*similar to placing Vectorworks® symbols*).

With the newly-placed object selected, use the Object Info Palette to make adjustments. If the Shape tab is not in the forefront of the Object Info Palette, click it to make it so.

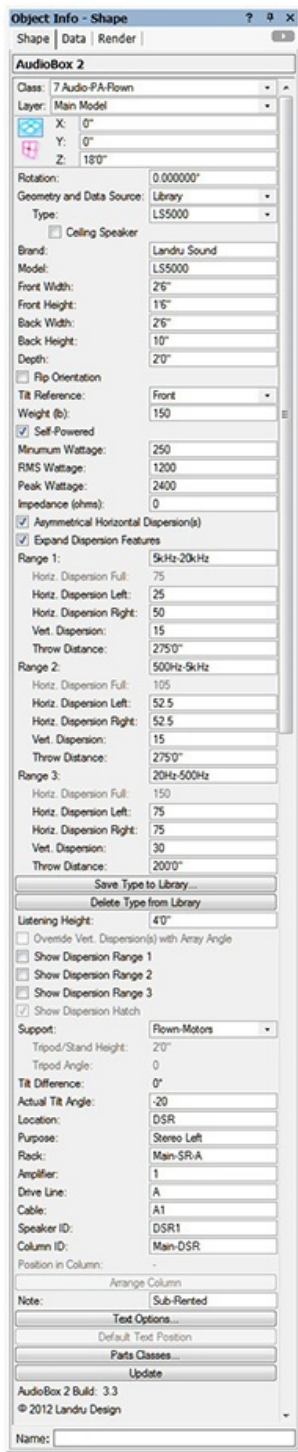
AudioBox 2's tools' different settings are detailed in the next 3 pages. *AudioArray 2* has additional steps in its use. [See pages 12-18 for more information.](#)

If you are transitioning to this version - either from a build older than 2.61 or from the audio tools included with Vectorworks Spotlight® - expect the tools to ask you from time-to-time which weight units (lb or kg) were intended when working with Plug-In Object instances or Library items created with those versions. See pages 24-25 for more information.

If you are wishing to take advantage of the build 3.3 and newer "Symbol" feature, you may find issues using many of the stock speaker and bumper Symbols. See pages 21-23 for more information on configuring Symbols to work with the *Audio ToolSet 2* tools.

Please forgive any discrepancies between this manual, its illustrations, and reality. It is often easier to make software fixes and/or additions than it is to keep a manual current.

AudioBox 2 parameters



Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects. (“Z” is the distance from the drawing’s ground plane to the bottom front center of the loudspeaker or to the bottom of the floor stand if “Tripod” is chosen under “Support”).

Geometry and Data Source: The source of the geometry and data *AudioBox 2* uses to create loudspeakers: “Library” or “Symbol.”

If “Library” is selected, geometry will be created on-the-fly, using either user-input data or information from a Library file. Select this option if you’re wanting *AudioBox 2* to build speakers from-scratch based on dimensions you enter. (See “Save to Library” and “Delete from Library,” below, and pages 24-25 for more information on the *Audio ToolSet 2 Library system*.)

If “Symbol” is selected, *AudioBox 2* will insert appropriately-configured existing speaker Symbols. When “Symbol” is selected, many of the following parameters are disabled but are populated by data stored with the Symbol definitions.

Depending on their configuration, the stock Spotlight and/or VSS Symbols may or may not work with the Audio ToolSet Symbol feature. See pages 21-23 for more information on configuring Symbols to work with AudioToolSet 2.

Type: A list of predefined loudspeakers.

If the “Library” **Geometry and Data Source** is selected (see above), this will be a list of the speakers stored in the Library. The only option is “<Generic>” unless you have saved custom loudspeaker types to the Library using the **Save to Library** button (see below). If so, your additions will be listed here, as-well. Selecting a stored type will populate many of the parameters below. Choosing the “Import...” option will cause the “Import Speaker Type” dialog to open, which will allow loudspeaker data to be imported from appropriately-configured Symbols in Vectorworks® files found in the “...Libraries/Defaults/Audio Tools/Speakers” folder. *Again, the “Import...” option will only use Symbol data and not actual geometry.*

If the “Symbol” **Geometry and Data Source** is selected (see above), this will be a list of the speaker Symbols available to *AudioBox 2*. This list will include appropriately-configured speaker Symbols contained in the current working file or in Vectorworks® files stored in the “...Libraries/Defaults/Audio Tools/Speakers” folder. Selecting a given Symbol will populate many of the parameters below.

Ceiling Speaker: Causes ceiling speakers to be created, as opposed to the “cabinet” type.

Brand and Model: Places for entering the loudspeaker brand and model.

Front Width and Front Height: The width and height of the front face of the loudspeaker. (*Only available if “Ceiling Speaker” is NOT selected.*)

Back Width and Back Height: The width and height of the back face of the loudspeaker. (*Only available if “Ceiling Speaker” is NOT selected. Back Width and Back Height cannot be larger dimensions than the Front Width and Front Height.*)

Depth: The depth of the loudspeaker. (*Only available if “Ceiling Speaker” is NOT selected.*)

Grill Diameter: The diameter of a ceiling speaker’s front grill. (*Only available if “Ceiling Speaker” is selected.*)

Cutout Diameter: A ceiling speakers cutout or “can” diameter. (*Only available if “Ceiling Speaker” is selected.*)

Height: A ceiling speaker’s height (or, depth). (*Only available if “Ceiling Speaker” is selected.*)

Flip Orientation: Flips the loudspeaker to a “side-ways” orientation. (*Only available if “Ceiling Speaker” is NOT selected.*)

Tilt Reference: The mounting or pivot-point reference that *AudioArray 2* uses when setting the tilts of each box in an array - either the front or back face of the loudspeaker. (*Only available if “Ceiling Speaker” is NOT selected.*)

Weight (lb) or Weight (kg): The loudspeaker’s weight. If the drawing units are Imperial, this should be entered in U.S. pounds. If the drawing units are Metric, this should be entered in kilograms. When the weight is entered in a given unit, the other is automatically calculated and stored.

Self-Powered: A toggle for noting whether the loudspeaker uses an internal or remote amplifier.

Minimum Wattage, RMS Wattage, and Peak Wattage: Places for entering wattage data.

Impedance (ohms): A place for entering impedance data.

AudioBox 2 parameters, continued...

Asymmetrical Horizontal Dispersion(s): A toggle to enable asymmetrical horizontal dispersions.

Expand Dispersion Features: A toggle for enabling Range notes and Dispersion area information beyond a simple “Overall.”

Range 1, Range 2, and Range 3: Places for entering notes for the three Dispersion Ranges (for example, a frequency range, key frequency, or crossover point). *(These parameters are only enabled if **Expand Dispersion Features** is toggled on.)*

Horiz. Dispersion Full, Horiz. Dispersion Left, Horiz. Dispersion Right: Horizontal dispersion angles. “Full” is the sum of “Left” and “Right.” “Left” and “Right” are relative to a loudspeaker facing “down-screen.” *(The “full” angles can be between 0° and 180°. The Dispersion parameters for **Range 2** and **Range 3** are only enabled if **Expand Dispersion Features** is toggled on.)*

Vert. Dispersion: Horizontal and vertical dispersion angles. *(These angles can be between 0° and 180°. The Dispersion parameters for **Range 2** and **Range 3** are only enabled if **Expand Dispersion Features** is toggled on.)*

Throw Distance: The throw distance reference for the dispersion lines. *(The Throw Distances for **Range 2** and **Range 3** are only enabled if **Expand Dispersion Features** is toggled on.)*

Save to Library (button): Saves key loudspeaker information to an external data file for later use. *(See **Type**, above.)*

When this button is clicked, a dialog opens, allowing the assignment of a custom Type name. Though the default name is [Brand]-[Model], a new name can be entered. *(For example, the Brand and Model in this OIP are “Landru Sound” and “LS5000” but the Type could be “Fill,” “Full-Range,” “Sub,” etc. - “LS5000” used in the example OIP.)* This Type name is what appears in the Type pop-up. *(Only enabled if the “Library” Geometry and Data Source is selected [see above]. See pages 24-25 for more information on the Audio ToolSet 2 Library system.)*

Delete From Library (button): Deletes a selected loudspeaker **Type** from the external data file. *(Only enabled if the “Library” Geometry and Data Source is selected [see above] and if a non-Generic **Type** from the Library is selected. See **Type**, above.)*

Listening Height: The listening height reference for the dispersion lines. *(Listening Height cannot be higher than a given AudioBox 2 model’s “Z” value.)*

Override Vert. Dispersion(s) with Array Angles: Will use **Angle Relative...** angle instead of stated **Vertical Dispersion** angles when drawing Dispersion lines. *(See **Tilt Difference** below and **Angle Relative...** on page 18 for more information. Only enabled if the AudioBox 2 instance has been placed by AudioArray 2.)*

Show Dispersion Range 1, Show Dispersion Range 2, and Show Dispersion Range 3: Draws top, bottom, left, and right dispersion lines, and a center reference for each of the three Dispersion ranges. Also, an outline and hatch representing the listening area coverage “shadow” will be drawn if the **Vertical Dispersion** angle, **Throw Distance**, and **Tilt Angle** allow the loudspeaker to cover the **Listening Height** or below. *(The toggles for **Range 2** and **Range 3** are only enabled if **Expand Dispersion Features** is toggled on.)*

Show Dispersion Hatch: Adds a hatch pattern to represent the listening area coverage “shadow” if the **Vertical Dispersion** angle, **Throw Distance**, and **Tilt Angle** of any of the enabled ranges allow the loudspeaker to cover the **Listening Height** or below, in addition to the “shadow’s” outline. *(Only enabled if one of the Dispersion Ranges is shown. See **Show Dispersion Range 1**, **Show Dispersion Range 2**, and **Show Dispersion Range 3**, above.)*

Support: A pop-up menu of support options. While the other options are reference-only, if “Tripod” or “Mic Stand” is selected, *AudioBox 2* will create a tripod or mic stand and either of the “Yoke” options will create yoke geometry. *(Only available if “Ceiling Speaker” is NOT selected.)*

Tripod/Stand Height: The height of the tripod or mic stand. *(Only enabled if “Ceiling Speaker” is NOT selected and only if the “Tripod” or “Mic Stand” “Support” is selected.)*

Tripod Angle: The orientation angle of the tripod. *(Only enabled if “Ceiling Speaker” is NOT selected and only if the “Tripod” “Support” is selected.)*

Tilt Difference: The tilt difference between the selected loudspeaker and the bumper or loudspeaker above it, once the **Arrange Column** button has been clicked - or as determined by the *AudioBox 2* object’s being placed by *AudioArray 2*. *(Only available if “Ceiling Speaker” is NOT selected.)*

Actual Tilt Angle: The actual tilt of the loudspeaker. *(Only available if “Ceiling Speaker” is NOT selected. Negative numbers tilt the cabinet down; positive, up. AudioBox 2 will not allow the loudspeaker to tilt more than 90° or less than -90°.)*

AudioBox 2 parameters, continued...

Location: A place for entering the loudspeaker location (such as Downstage Right).

Purpose: A place for entering the loudspeaker purpose (such as Center Fill).

Rack: A place for entering information about the rack driving the loudspeaker.

Amplifier: A place for entering information about the amplifier driving the loudspeaker.

Drive Line: A place for entering information about the drive line feeding signal to the loudspeaker.

Cable: A place for entering information about the cable(s) connecting the amplifier to the loudspeaker.

Speaker ID: A place for entering an ID marker for the loudspeaker.

Column ID: The name for the column (if any) in which the *AudioBox 2* object is placed. This is also the name for the *AudioArray 2* “parent”/“master” bumper and the “child”/“slave” loudspeaker. This is how the Plug-In Object knows which loudspeaker or additional models to control - either via the **Arrange Column** button (*see below*) or the *AudioArray 2* PIO. (*Only available if “Ceiling Speaker” is NOT selected.*)

Position in Column: The loudspeaker’s position in its column, once the **Arrange Column** button has been clicked or the *AudioBox 2* object has been placed or updated by an *AudioArray 2* object.. (*Only available if “Ceiling Speaker” is NOT selected. “1” is the top loudspeaker or the loudspeaker closest to the AudioArray 2 bumper.*)

Arrange Column (button): If multiple *AudioBox 2* objects are selected, each with different “Z” values - but with matching **Column IDs**, clicking this button will adjust the stacking order so that 2D “overlaps” are correct, calculate **Tilt Differences**, and assign **Position in Column** numbers. (*Only available if “Ceiling Speaker” is NOT selected.*)

Note: A place for entering miscellaneous notes, such as rental source or stock number.

Text Options...: A button to open the “Text Options” dialog, in which text elements are shown, hidden, and/or modified. (*See page 20 for more information.*)

Default Text Position: Returns text to its default location. (*Only enabled if text has been inserted.*)

Parts Classes...: Opens the “Parts Classes” dialog, used to assign the different elements comprising the *AudioBox 2* model to different Classes. (*See page 20 for more information.*)

Update (button): Regenerates the *AudioBox 2* object. You might need to click this if you’re making changes regarding using Class Attribute settings.

AudioBox 2 Build: The build number of the *AudioBox 2* Plug-In Object code.

When *AudioBox 2* objects are placed by *AudioArray 2*, several parameters will be automatically populated and disabled.

AudioArray 2 (introduction)

AudioArray 2 works a little differently than *AudioBox 2*. Whereas *AudioBox 2* inserts a single loudspeaker cabinet in a single step, *AudioArray 2* is actually used to insert a bumper and then a vertical array of loudspeakers and/or additional bumpers in separate steps. (This is similar to the way *VideoScreen 4*'s **VS4-Blended Screen** works.)

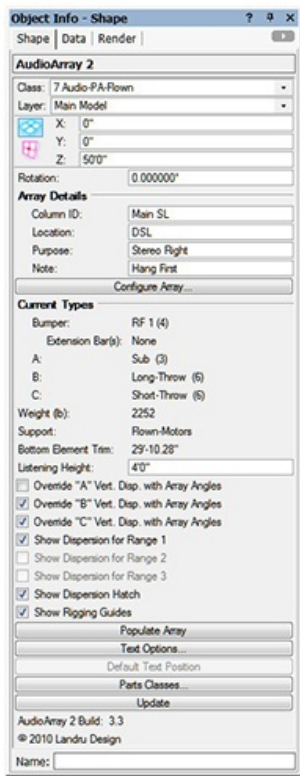
If you're transitioning from a previous version of Audio ToolSet, note that, as described below, the approach for using this new version is a little different...

To use *AudioArray 2*:

- 1) Click the *AudioArray 2* icon in the tool palette to which you added it earlier. A ghost image of the tool's default bumper will appear in your drawing. Click in your drawing to place the bumper. Rotate the bumper to the desired angle and click again to set the angle (*like placing Vectorworks® symbols*). If an initial settings dialog box appears, make adjustments and click "OK" in that box.
- 2) With the *AudioArray 2* object selected, use the Object Info Palette to make basic adjustments (*such as bumper trim height*) and to enter general array data. On *Audio Array 2*'s Object Info Palette, click the "Configure Array..." button to bring up the "Array Detail and Configuration" dialog, allowing you to specify array details and loudspeaker counts, to enter data, or to make adjustments (*such as bumper and loudspeaker dimensions, loudspeaker counts, and hanging angles*). Double-clicking the *Audio Array 2* object will also bring up the dialog.
- 3) Click the "Populate Array" button toward the bottom of the *AudioArray 2* Object Info Palette. *AudioArray 2* will place independent "child"/"slave" *AudioBox 2* loudspeakers and/or *AudioBumper 2* bumpers that are "connected" to the "parent"/"master" bumper. The *AudioBox 2* and *AudioBumper 2* instances are built using settings designated in the *AudioArray 2* "Array Detail and Configuration" dialog - and display their own info in the Object Info Palette. All of the additional bumpers' settings and the majority of the loudspeakers' settings are "fed" by the *AudioArray 2* "parent"/"master" object. Once loudspeakers and/or additional bumpers have been inserted by a given *AudioArray 2* object, changes made in its "Array Detail and Configuration" dialog will automatically rebuild the array.

AudioArray 2's parameters are detailed on the next pages...

AudioArray 2 parameters



Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects. (“Z” is the distance from the drawing’s ground plane to the bottom front center of the bumper.)

Array Details:

Column ID: The name for the inserted “parent”/“master” bumper and the “child”/“slave” loudspeakers and/or additional bumpers. Because this is how the Plug-In Object knows which *AudioBox 2* and *AudioBumper 2* models to control, **each Column ID MUST be unique.**

Location: A place for entering the array location (such as DSL).

Purpose: A place for entering the array purpose (such as Stereo Right).

Note: A place for entering miscellaneous notes, such as rental source or stock number.

Configure Array... (button): Opens the “Array Detail and Configuration” dialog. This dialog is where you specify bumper/support and loudspeaker details and configure the array (tilt angles, loudspeaker and/or bumper counts, and loudspeaker and/or bumper positions in the array). (See pages 14-18 for more information.)

Current Types:

Bumper: The bumper type defined in the “Array Detail and Configuration” dialog, along with the quantity.

Extension Bar(s): The layout (center or sides) of Extension Bars (if defined).

A, B, or C: The types and quantities of the loudspeakers defined in the “Array Detail and Configuration” dialog.

Weight (lb) or Weight (kg): After the **Populate Array** button has been clicked, the estimated total loudspeaker and bumper weight of the array. If the drawing units are Imperial, this will be shown in U.S. pounds. If the drawing units are Metric, this will be shown in kilograms. (Remember, **THIS IS AN ESTIMATE ONLY. YOU ARE STRONGLY ADVISED TO CONFIRM ALL CALCULATIONS.**)

Support: How the array is supported, as defined in the “Array Detail and Configuration” dialog.

Bottom Element Trim: After the **Populate Array** button has been clicked, the trim of the bottom loudspeaker or bumper.

Listening Height: The listening height reference for the loudspeakers’ dispersion lines.

Override “A” Vert. Disp. with Array Angles, Override “B” Vert. Disp. with Array Angles, and Override “C” Vert. Disp. with Array Angles: Will force inserted *AudioBox 2* objects to use **Angle Relative...** angles for each of the three loudspeaker types instead of stated **Vertical Dispersion** angles when drawing Dispersion lines. (Only potential dispersions for loudspeaker definitions actually in the array will be enabled. See [Tilt Difference on page 10](#) and [Angle Relative to Preceding on page 18](#) for more information.)

Show Dispersion Range 1, Show Dispersion Range 2, and Show Dispersion Range 3: Causes the *AudioBox 2* models do draw top, bottom, left, and right dispersion lines, and a center reference for each of the three Dispersion ranges for each of the *AudioBox 2* models in the array. (Only ranges allowed by loudspeaker definitions actually in the array will be enabled. See the *AudioBox 2* section in preceding pages and the “Array Detail and Configuration” dialog section on pages 14-18 for more information.)

Show Dispersion Hatch: Adds a hatch pattern to represent the listening area coverage “shadows” for each of the *AudioBox 2* models in the array. (See the *AudioBox 2* section in preceding pages for more information.)

Show Rigging Guides: Toggle to mark potential insertion points for hoist Symbols and Plug-In Objects.

Populate Array (button): Inserts *AudioBox 2* and/or *AudioBumper 2* models or replaces array models if you’ve made adjustments in the “Array Detail and Configuration” dialog. (Only enabled if at least one loudspeaker or additional bumper has been added in the “Array Detail and Configuration” dialog. See the “Array Detail and Configuration” dialog section on pages 14-18 for more information.)

Text Options...: A button to open the “Text Options” dialog, in which text elements are shown, hidden, and/or modified. (See page 20 for more information.)

Default Text Position (button): Returns text to its default location. (Only enabled if text has been inserted.)

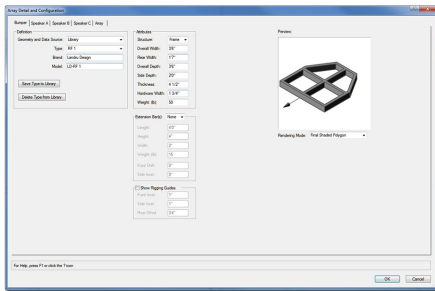
Parts Classes...: Opens the “Parts Classes” dialog, used to assign the different elements comprising the *AudioArray 2* model to different Classes. (See page 20 for more information.)

Update (button): Regenerates the *AudioArray 2* object. You might need to click this if you’re making changes regarding using Class Attribute settings. This button will also cause the array to be rebuilt or “repaired” using current settings.

AudioArray 2 Build: The build number of the *AudioArray 2* Plug-In Object code.

Array Detail and Configuration dialog

Each of the first four tabs (Bumper, Speaker A, Speaker B, and Speaker C) in this dialog is used to define elements that are used in the fifth tab (Array) to create the array.



Bumper:

Geometry and Data Source: The source of the geometry and data *AudioArray 2* uses to create bumpers: “Library” or “Symbol.”

If “Library” is selected, geometry will be created on-the-fly, using either user-input data or information from a Library file. Select this option if you’re wanting *AudioArray 2* to build bumpers from-scratch based on dimensions you enter. (See “Save to Library” and “Delete from Library,” below, and pages 24-25 for more information on the *Audio ToolSet 2 Library system*.)

If “Symbol” is selected, *AudioArray 2* will insert appropriately-configured existing bumper Symbols. When “Symbol” is selected, many of the parameters to the right are disabled and are populated by data stored with the Symbol definitions.

Depending on their configuration, the stock Spotlight and/or VSS Symbols may or may not work with the Audio ToolSet Symbol feature. See pages 21-23 for more information on configuring Symbols to work with AudioToolSet 2.

Type: A list of predefined bumpers.

If the “Library” **Geometry and Data Source** is selected (see above), this will be a list of the bumpers stored in the Library. The only option is “<Generic>” unless you have saved custom bumper types to the Library using the **Save to Library** button (see below). If so, your additions will be listed here, as-well. Selecting a stored type will populate many of the parameters to the right. Choosing the “Import...” option will cause the “Import Bumper Type” dialog to open, which will allow bumper data to be imported from appropriately-configured Symbols in Vectorworks® files found in the “...Libraries/Defaults/Audio Tools/Bumpers” folder. *Again, the “Import...” option will only use Symbol data and not actual geometry.*

If the “Symbol” **Geometry and Data Source** is selected (see above), this will be a list of the bumper Symbols available to *AudioArray 2*. This list will include appropriately-configured bumper Symbols contained in the current working file or in Vectorworks® files stored in the “...Libraries/Defaults/Audio Tools/Bumpers” folder. Selecting a given Symbol will populate many of the parameters to the right. Choosing the “None” option will replace bumper geometry with Locus points.

Brand and Model: Places for entering the bumper brand and model.

Save to Library (button): Saves key bumper information to an external data file for later use. (See *Type*, above.) When this button is clicked, a dialog opens, allowing the assignment of a custom Type name. Though the default name is [Brand]-[Model], a new name can be entered. (For example, the Brand and Model in this dialog tab are “Landru Design” and “LD-RF 1” but the Type is “RF-1.”) This Type name is what appears in the Type pop-up. (Only enabled if the “Library” Geometry and Data Source is selected [see above]. See pages 24-25 for information on the *Audio ToolSet 2 Library system*.)

Delete From Library (button): Deletes a selected bumper **Type** from the external data file. (Only enabled if the “Library” Geometry and Data Source is selected [see above] and if a non-Generic **Type** from the Library is selected. See *Type*, above.)

Structure: A choice of 2 basic bumper structures: “Frame” or “T.”

Overall Width, Overall Depth, and Thickness: The overall width, depth, and thickness of the bumper.

Rear Width: The width of the rear face the bumper.

Array Detail and Configuration dialog, continued...**Bumpers** parameters, continued...

Side Depth: The measurement of the side face of the bumper, as measured from the front face.

If “Rear Width” and “Side Depth” are less than “Total Width” and “Total Depth” but “Side Depth” is greater than 0, a “chamfered” bumper will be created. If “Rear Width” is less than “Total Width” and “Side Depth” is 0, a trapezoidal bumper will be created. Otherwise, a rectangular bumper will be created.

Hardware Width: The width of the hardware members comprising the bumper.

Weight (lb) or Weight (kg): The bumper’s weight. If the drawing units are Imperial, this should be entered in U.S. pounds. If the drawing units are Metric, this should be entered in kilograms. When the weight is entered in a given unit, the other is automatically calculated and stored.

Extension Bar(s): A list of options for creating Extension Bars (“None,” “Sides,” and “Center”).

The next 5 parameters are only enabled if an Extension Bar(s) option other than “None” is chosen.

Length, Height, and Width: The dimensions of the Extension Bars.

Weight (lb) or Weight (kg): An individual Extension Bar’s weight. If the drawing units are Imperial, this should be entered in U.S. pounds. If the drawing units are Metric, this should be entered in kilograms. When the weight is entered in a given unit, the other is automatically calculated and stored.

Front Shift: The distance the Extension Bar(s) will shift forward or backward on the bumper.

Side Inset: The distance the Extension Bar(s) will shift in from the bumper sides. *(Only enabled if the Extension Bar(s) option “Sides” is chosen.)*

Show Rigging Guides: A toggle for marking potential insertion points for hoist Symbols and Plug-In Objects.

The next 3 parameters are only enabled if “Show Rigging Guides” is toggled on.

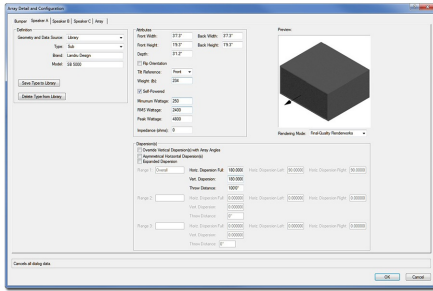
Front Inset: The distance “in” from the front of the bumper for the front guide(s).

Side Inset: The distance “in” from bumper sides. *(Disabled if an Extension Bar(s) option other than “None” is chosen. In those “non-None” cases, the guides “track” with the Extension Bar layout.)*

Rear Offset: The distance “back” from the front guide(s) for the rear guide(s).

Rendering Mode: The rendering mode for the Preview box (“Wireframe,” “Final Shaded Polygon,” “Hidden-Line,” “OpenGL,” and “Final-Quality Renderworks”). *(This setting determines the Rendering Mode for all five tabs.)*

Array Detail and Configuration dialog, continued...



Speaker A, Speaker B, and Speaker C:

Geometry and Data Source: The source of the geometry and data *AudioArray 2* uses to create loudspeakers: “Library” or “Symbol.”

If “Library” is selected, geometry will be created on-the-fly, using either user-input data or information from a Library file. Select this option if you’re wanting *AudioArray 2* to build speakers from-scratch based on dimensions you enter. (See “Save to Library” and “Delete from Library,” below, and pages 24-25 for more information on the *Audio ToolSet 2* Library system.)

If “Symbol” is selected, *AudioArray 2* will insert appropriately-configured existing speaker Symbols. When “Symbol” is selected, many of the parameters to the right are disabled and are populated by data stored with the Symbol definitions.

Depending on their configuration, the stock Spotlight and/or VSS Symbols may or may not work with the Audio ToolSet Symbol feature. See pages 21-23 for more information on configuring Symbols to work with AudioToolSet 2.

Type: A list of predefined loudspeakers.

If the “Library” **Geometry and Data Source** is selected (see above), this will be a list of the speakers stored in the Library. The only option is “<Generic>” unless you have saved custom loudspeaker types to the Library using the **Save to Library** button (see below). If so, your additions will be listed here, as-well. Selecting a stored type will populate many of the parameters to the right. Choosing the “Import...” option will cause the “Import Speaker Type” dialog to open, which will allow loudspeaker data to be imported from appropriately-configured Symbols in Vectorworks® files found in the “...Libraries/Defaults/Audio Tools/Speakers” folder. **Again, the “Import...” option will only use Symbol data and not actual geometry.**

If the “Symbol” **Geometry and Data Source** is selected (see above), this will be a list of the speaker Symbols available to *AudioBox 2*. This list will include appropriately-configured speaker Symbols contained in the current working file or in Vectorworks® files stored in the “...Libraries\Defaults\Audio Tools\Speakers” folder. Selecting a given Symbol will populate many of the parameters to the right.

(For Speakers B and C, the rest of the tab is only enabled if you choose a Type other than “None.”)

Brand and Model: Places for entering the loudspeaker brand and model.

Save to Library (button): Saves key loudspeaker information to an external data file for later use. (See *Type*, above.) When this button is clicked, a dialog opens, allowing the assignment of a custom Type name. Though the default name is [Brand]-[Model], a new name can be entered. (For example, the Brand and Model in this dialog tab are “Landru Design” and “SB 5000” but the Type is “Sub”) This Type name is what appears in the Type pop-up. (Only enabled if the “Library” Geometry and Data Source is selected [see above]. See pages 24-25 for more information on the *Audio ToolSet 2* Library system.)

Delete From Library (button): Deletes a selected loudspeaker **Type** from the external data file. (Only enabled if the “Library” Geometry and Data Source is selected [see above] and if a non-Generic Type from the Library is selected. See *Type*, above.)

Front Width, Front Height, Back Width, Back Height, and Depth: Basic dimensions of the loudspeaker. (All of these dimensions are subject to the same limitations as *AudioBox 2*. See page 9-11 for more information. Any changes made to these dimensions will automatically update the “Array Configuration” tab - and then the model itself once you click “OK.”)

Flip Orientation: Flips the loudspeaker to a “side-ways” orientation.

Tilt Reference: The mounting or pivot-point reference used when setting the tilts of each box in an array - either the front or back face of the loudspeaker.

Weight (lb) or Weight (kg): The loudspeaker’s weight. If the drawing units are Imperial, this should be entered in U.S. pounds. If the drawing units are Metric, this should be entered in kilograms. When the weight is entered in a given unit, the other is automatically calculated and stored.

Array Detail and Configuration dialog, continued...**Speaker A, Speaker B, and Speaker C** parameters, continued...

Self-Powered: A toggle for noting whether the loudspeaker uses an internal or remote amplifier.

Minimum Wattage, RMS Wattage, Peak Wattage, and Impedance (ohms): Places for entering wattage and impedance data.

Override Vertical Dispersion(s) with Array Angles: Will force inserted *AudioBox 2* objects to use **Angle Relative...** angles for each of the three loudspeaker types instead of stated **Vertical Dispersion** angles when drawing Dispersion lines. *(See **Tilt Difference** on page 10 and **Angle Relative...** on page 18 for more information.)*

Asymmetrical Horizontal Dispersion(s): A toggle to enable asymmetrical horizontal dispersions.

Expand Dispersion Features: A toggle for enabling Range notes and Dispersion area information beyond a simple “Overall”.

Range 1, Range 2, and Range 3: A place for entering notes for each of the 3 Dispersion Ranges (for example, a frequency range or cross-over point). *(These parameters are only enabled if **Expand Dispersion Features** is toggled on.)*

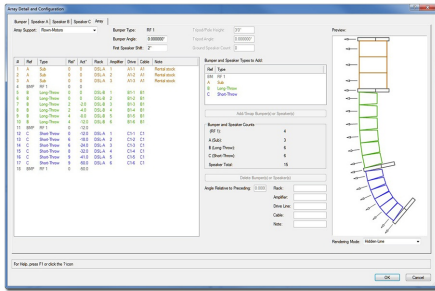
Horiz. Dispersion Full, Horiz. Dispersion Left, Horiz. Dispersion Right: Horizontal dispersion angles. “Full” is the sum of “Left” and “Right.” “Left” and “Right” are relative to a loudspeaker facing “down-screen.” *(The “Full” angles can be between 0° and 180°. The Dispersion parameters for Range 2 and Range 3 are only enabled if **Expand Dispersion Features** is toggled on.)*

Vert. Dispersion: Vertical dispersion angles. *(These angles can be between 0° and 180°. The Dispersion parameters for Range 2 and Range 3 are only enabled if **Expand Dispersion Features** is toggled on.)*

Throw Distance: The throw distance reference for the dispersion lines. *(The Throw Distances for Range 2 and Range 3 are only enabled if **Expand Dispersion Features** is toggled on.)*

Rendering Mode: The rendering mode for the Preview box (“Wireframe,” “Final Shaded Polygon,” “Hidden-Line,” “OpenGL,” and “Final-Quality Renderworks”). *(This setting determines the Rendering Mode for all five tabs.)*

Array Detail and Configuration dialog, continued...



Array Configuration:

Array Support: How the array is to be supported. If “Ground-Stacked,” “Tripod,” or “Sub Pole” is chosen, a bumper, tripod, pole will become the base for the array and the speakers will “stack” on it. Otherwise, the speakers “hang” from a bumper.

Bumper Type: The Bumper defined in the “Bumper” tab. If no **Type**, **Brand**, or **Model** information has been entered, the **Bumper Type** will be “Generic.”

Bumper Angle: The tilt of the bumper. *(Negative values will tilt the bumper and loudspeaker array down. Positive values will tilt the bumper and loudspeaker array up. Only enabled if an Array Support option other than “Tripod” is chosen.)*

First Speaker Shift: The distance the first speaker (and, as a result, all of the elements) will shift forward or backward relative to the “parent”/“master” bumper.

Tripod/Pole Height: The height from the tripod’s or pole’s insertion point to the bottom speaker. *(Only enabled if the “Tripod” or “Sub Pole” Array Support is chosen.)*

Tripod Angle: The orientation angle of the tripod. *(Only enabled if the “Tripod” Array Support is chosen.)*

Ground Speaker Count: The number of speakers on the ground at the base of the pole. *(Only enabled if the “Sub Pole” Array Support is chosen.)*

Bumper and Speaker Types to Add: The bumper and speaker(s) defined on the Bumper, Speaker A, Speaker B, and Speaker C tabs. Only Speaker **Types** other than “None” are listed. As with the **Bumper Type**, if no **Type**, **Brand**, or **Model** information has been entered, the definition’s **Type** will be “Generic.”

Add/Swap Bumper(s) or Speaker(s) button: A button to add or swap bumpers or loudspeakers to or into the array. Bumpers and loudspeakers will be added to (or, swapped into) the **Definition** list to the left. *(Only enabled if one of the element definitions in the **Bumper and Speaker Types to Add** list is selected. Up to 42 elements may be added to a single array.)*

Bumper and Speaker Counts: Current totals for each of the bumper and loudspeaker definitions.

Delete Speakers button: A button to delete bumpers and loudspeakers from the array. *(Only enabled if one or more of the bumpers and/or loudspeakers in the **Definition** list is selected.)*

Angle Relative to Preceding: The angle for a selected bumper or loudspeaker relative to the element (loudspeaker or bumper) immediately above it. For each of the bumpers and/or loudspeakers in the list, the **Definition** list will note this relative angle and the actual tilt angle. *(Only enabled if the bumper or one of the loudspeakers in the **Definition** list is selected. Note: Audio Array 2 will only allow bumpers and/or loudspeakers to be tilted less than 90° or more than -90°.)*

Rack: A place for entering information about the rack driving the loudspeaker.

Amplifier: A place for entering information about the amplifier driving the loudspeaker.

Drive Line: A place for entering information about the drive line feeding signal to the loudspeaker.

Cable: A place for entering information about the cable(s) connecting the amplifier to the loudspeaker.

Note: A place for entering miscellaneous notes, such as rental source or stock number.

Rendering Mode: The rendering mode for the Preview box (“Wireframe,” “Final Shaded Polygon,” “Hidden-Line,” “OpenGL,” and “Final-Quality Renderworks”). *(This setting determines the Rendering Mode for all five tabs.)*

Clicking the **Add/Swap Bumper(s) or Speaker(s)** button when no bumpers or loudspeakers are selected in the **Definition** list to the left will **ADD** the currently-selected bumper or loudspeaker **Type** to the array. Clicking this button when one or more bumpers or loudspeakers are selected in the **Definition** list to the left will **REPLACE** the currently-selected element in the array with the **Type** selected in the **Bumper and Speaker Types to Add** list.

For any of the elements contained in the **Definition** list, the bumper or loudspeaker in position #1 is closest to the “parent”/“master” bumper (or tripod or pole) and ascending numbered elements count up or down away from that bumper.

For any of the bumpers or loudspeakers contained in the **Definition** list, their positions can be changed by dragging their numbers to other locations in the list.

Any changes made in the **Definition** list or to the **Angle Relative to Preceding** value will automatically update the Preview window.

If *AudioArray 2* has already inserted *AudioBox 2* or *AudioBumper 2* models, clicking “OK” on any of the “Array Detail and Configuration” dialog tabs will cause the array to be rebuilt automatically.

AudioBumper 2 parameters



Class, Layer, X, Y, Z, and Rotation: Settings similar to other Vectorworks® symbols and objects. (“Z” is the distance from the drawing’s ground plane to the bottom front center of the bumper).

Type: The type of the bumper inserted.

Brand and Model: The bumper brand and model.

Overall Width, Overall Depth, and Thickness: The overall width, depth, and thickness of the bumper.

Rear Width: The width of the rear face the bumper.

Side Depth: The measurement of the side face of the bumper, as measured from the front face.

Hardware Width: The width of the hardware members comprising the bumper.

Weight (lb) or Weight (kg): The bumper weight. If the drawing units are Imperial, this will be shown in U.S. pounds. If the drawing units are Metric, this will be shown in kilograms.

Tilt Difference: The tilt difference between the selected bumper and the bumper or loudspeaker above it, as determined by the “parent”/“master” *AudioArray 2* object.

Actual Tilt Angle: The actual tilt of the selected bumper.

Trim: The “Z” height of the selected bumper, as measured from the Ground Plane to the bottom front center (the Insertion Point) of the selected bumper.

Column ID: The name for the column (if any) in which the *AudioBumper 2* object is placed. This is also the name for the *AudioArray 2* “parent”/“master” bumper and the “child”/“slave” bumper.

Position in Column: The bumper’s position in its column, once the *AudioBumper 2* object has been inserted or updated by an *AudioArray 2* object.. (“1” is the loudspeaker or additional bumper closest to the main bumper.)

Support: The support option for the array to which the bumper belongs.

Location: The bumper location (such as Downstage Left).

Purpose: A place for entering the bumper’s purpose (such as Pull-Back).

Note: A place for entering miscellaneous notes, such as rental source or stock number.

Text Options...: A button to open the “Text Options” dialog, in which text elements are shown, hidden, and/or modified..

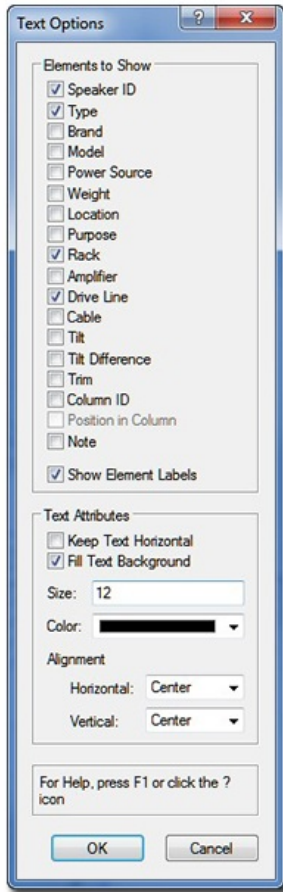
(See page 20 for more information.)

Default Text Position: Returns text to its default location. *(Only enabled if text has been inserted)*

Update (button): Regenerates the *AudioBumper 2* object. You might need to click this if you’re making changes regarding using Class Attribute settings.

AudioBumper 2 Build: The build number of the *AudioBumper 2* Plug-In Object code.

Text Options dialog (AudioBox 2 shown)



Elements to Show:

A list of potential text elements that can be shown as part of each *AudioBox 2*, *AudioArray 2*, or *AudioBumper 2* instance - "Type," "Brand," "Model," "Power Source," etc. Check the boxes of the elements to be included in the text block placed on the drawing. Only items appropriate for a given object and/or elements actually containing information will be enabled.

Show Element Labels: Check the box to include labels for each of the text elements. (*“Brand,” “Model,” “Weight,” etc. Only enabled if any of the “Elements to Show” are checked.*)

Text Attributes (only enabled if at least one text element is selected to be shown):

Keep Text Horizontal: Keeps text horizontal, regardless of the *Audio ToolSet 2* object’s rotation angle.

Fill Text Background: Makes text background opaque.

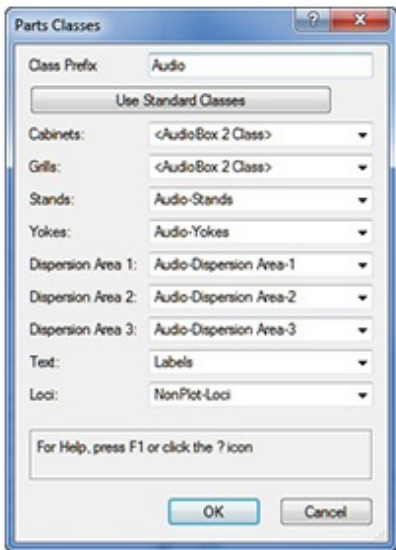
Size: The size of the text element, in points.

Color: The color of the text element using the Vectorworks® Color Picker.

Horizontal and Vertical Alignment: Options for setting text alignment and justification.

The *AudioArray 2* and *Audio Bumper 2* Text Options dialogs contain different elements to show, but are identical in functionality.

Parts Classes dialog (AudioBox 2 shown)



Class Prefix: The prefix that will be applied to each suggested Class generated if the “Use Standard Classes” button is clicked.

Use Standard Classes: A button to populate each of the Class Pop-Ups with suggested Class names, each (except for “Loc”) with the prefix as entered in the “Class Prefix” box.

Cabinets, Grills, Stands, etc.: Class Pop-Ups specifying the Class to which the given part is assigned. Existing Classes can be chosen or new Classes can be created on-the-fly. “<AudioBox 2 Class>” signifies the individual part simply using the given object’s overall Class. By-default, “Loc” are assigned to the “NonPlot-Loc” Class and all other parts are assigned to the object’s overall Class (*the rough equivalent of leaving the previous Audio ToolSet 2 versions’ “Class Parts...” box un-ticked*).

In the example to the left...

Cabinets and **Grills** are using the *AudioBox 2* object’s overall Class.

Stands, Yokes, Dispersion Area 1, Dispersion Area 2, Dispersion Area 3, and **Loc** are all assigning the given parts to Classes generated by clicking the “Use Standard Classes” button.

Text is assigning object text to a custom Class.

The *AudioArray 2* Parts Class dialog is identical in functionality.

Symbol Details

Folders

The *AudioToolSet* tools look for appropriately-configured Symbols both in the current file and in same-version Vectorworks® files stored in the “...\Libraries\Defaults\Audio Tools\Speakers” and “...\Libraries\Defaults\Audio Tools\Bumper” folders - including files you add. If they exist, those folders will be found in either your Vectorworks® application folder or in your User folder structure. If you've not set up a custom User Folder structure, you can find out which “...\Libraries\Defaults...” folders Vectorworks® is combing for Symbols by going to the "User Folders" tab in the [Tools][Options][Vectorworks Preferences...] dialog. The folder shown, there, will be where the "Libraries" folder structure is stored - which, in-turn, holds the "Audio Tools" folder. (On a Mac, "Libraries" folder is generally hidden unless you press the Option key when choosing the "Go" menu in the Finder application.)

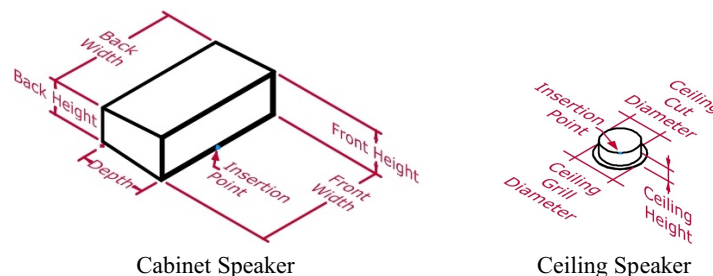
Below is information regarding properly configuring speaker and bumper Symbols. There are three things to note before looking at the specifics for both:

- 1) Depending on their configuration, the stock Spotlight and/or VSS Symbols may or may not work with the *Audio ToolSet* Symbol feature, as out-lined below.
- 2) Symbols must be Hybrid. 2D-Only and 3D-Only Symbols will not work with any of the *Audio ToolSet 2* tools.
- 3) Symbols must each have one of two records attached, either “__ATS-SpkrModData” or “__ATS-BumpModData,” whichever is appropriate for a given Symbol. This is done by editing the Symbol and running the *Connect Audio Records* command - or- with **NO GEOMETRY SELECTED**, clicking on the Object Info Palette “Data” tab, clicking “Attach Record,” selecting the desired record, and filling in the different parameters. **If not already present in the current file, these records can be found in the “Default Speaker” and “Default Bumper” files in the above folders.**
- 4) Symbols can be quite simple or fairly detailed - or, anywhere in-between. A word of warning, though: the more intricate the Symbol(s), the longer things like inserting or moving objects or navigating dialogs will take. This could be the difference between your seeing near instantaneous response and your waiting several minutes.

Speakers

For most “Cabinet” speakers, Symbol geometry must be created so that the Insertion Point is at the bottom front of the cabinet. For “Cabinet” speakers with protruding elements like curved grills, “front” means in-line with the mounting pivot-point.

For “Ceiling” speakers, Symbol geometry must be created so that the Insertion Point is at the bottom center of the grill.

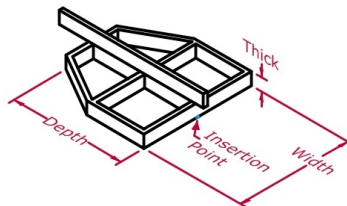


Assuming the “__ATS-SprkrModData” record is properly attached to the given speaker Symbol, below is information about the fields found in that record. Fields marked with **BLACK** text must contain valid information in order for the given Symbol to work properly with the *Audio Toolset* tools. Information in fields with **BLUE** text will be used to populate fields in the Object Info Palette but are optional.

- Type:** The unique identifier for the speaker. This information is only used when importing using the “Library” **Geometry and Data Source**.
- Brand:** The brand of the speaker.
- Model:** The model name or number of the speaker.
- Is Ceiling Speaker:** Denotes whether the speaker is a “ceiling” speaker or a “cabinet” speaker. Enter “TRUE” for a ceiling speaker and “FALSE” for a cabinet speaker.
- Front Width, Front Height, Back Width, and Back Height:** Front and Back width and height dimensions for cabinet speakers (*see graphic above*). These fields must include the dimension unit marker. These dimensions are unused for a “ceiling” speaker.
- Depth:** The overall depth of a cabinet speaker - or, if the Insertion Point is not the actual cabinet front, the distance from the Insertion Point to the rear of the cabinet. This field must include the dimension unit marker. This dimension is unused for a “ceiling” speaker.
- Ceiling Grill Diameter and Ceiling Cut Diameter:** The diameter of a ceiling speaker's front grill and cutout or “can.” These fields must include the dimension unit marker. These dimensions are unused for a “cabinet” speaker.
- Ceiling Height:** A ceiling speaker's height (or, depth). This field must include the dimension unit marker. This dimension is unused for a “cabinet” speaker.
- Is Tilt Ref Front:** The mounting-point reference that *AudioArray 2* uses when setting the tilts of each box in an array. This must be either “Front” or “Back,” denoting the desired face of the speaker. This field is unused for a “ceiling” speaker.
- Weight:** The speaker's weight. This data must be in either kilograms (kg) or U.S. pounds (lb) and must include the appropriate unit marker.
- Is Self-Powered:** Denotes whether the loudspeaker uses an internal or remote amplifier. Enter “TRUE” for an internal amplifier and “FALSE” for a remote amplifier.
- Mininum Wattage, RMS Wattage, and Peak Wattage:** Wattage data.
- Impedance:** Impedance data
- Dispersions are Asymmetrical:** For enabling and denoting asymmetrical horizontal coverage dispersions. “TRUE” or “FALSE”
- Is Expanded Disp:** For enabling and denoting Range notes and Dispersion area information beyond a simple “Overall.” “TRUE” or “FALSE”
- Disp Range Label 1-3:** For entering notes for the three Dispersion Ranges (for example, a frequency range, key frequency, or crossover point). 2 and 3 are only used if **Is Expanded Disp** is “TRUE.”
- Horiz Disp 1-3:** “Full” horizontal dispersion angles. Must be a number between 0 and 180. 2 and 3 are only used if **Is Expanded Disp** is “TRUE.” None of these parameters are unused if **Dispersions are Asymmetrical** is “TRUE.”
- Horiz Disp 1 (-3) Left and Horiz Disp 1 (-3) Right:** Left and right horizontal dispersion angles. “Left” and “Right” are relative to the speaker facing “down-screen.” Must be a number between 0 and 180. 2 and 3 are only used if **Is Expanded Disp** is “TRUE.” None of these parameters are unused if **Dispersions are Asymmetrical** is “FALSE.”
- Vert Disp 1-3:** “Full” vertical dispersion angles. “Full” is the sum of “Left” and “Right.” Must be a number between 0 and 180. 2 and 3 are only used if **Is Expanded Disp** is “TRUE.”
- Throw 1-3:** The throw distance reference for the dispersion lines. 2 and 3 are only used if **Is Expanded Disp** is “TRUE.”
- User Fields 1-6:** For miscellaneous user data.

Bumpers

For most bumpers, Symbol geometry must be created so that the Insertion Point is at the bottom front of the bumper. For bumpers with protruding elements like rigging hardware or extension bars, “front” means the mounting point used by speakers with a “front” tilt reference. For bumpers with mounting hardware that hangs below the actual frame, “bottom” means the lowest extent of that hardware.



Assuming the “__ATS-BumpModData” record is properly attached to the given bumper Symbol, below is information about the fields found in that record. Fields marked with **BLACK** text must contain valid information in order for the given Symbol to work properly with the *Audio Toolset* tools. Information in fields with **BLUE** text will be used to populate fields in the *AudioArray 2* “Array Detail and Configuration” dialog but are optional.

Type: The unique identifier for the bumper. This information only is used during when importing using the “Library” **Geometry and Data Source**.

Brand: The brand of the bumper.

Model: The model name or number of the speaker.

Width: The overall width of the bumper. These fields must include the dimension unit marker.

Depth: The overall depth of the bumper. This field must include the dimension unit marker. If the Insertion Point is not the actual bumper front or if geometry protrudes beyond the back speaker mounting point, this is the distance from the Insertion Point to the back mounting point used by speakers with a “back” tilt reference.

Thick: The overall thickness of the bumper - from the Insertion Point to the top of the bumper frame. These fields must include the dimension unit marker.

Hardware Width: The width of the hardware members comprising the bumper.

Weight: The bumper’s weight. This data must be in either kilograms (kg) or U.S. pounds (lb) and must include the appropriate unit marker.

User Fields 1-6: For miscellaneous user data.

Library Notes

Because questions about the *Audio ToolSet 2* Library system are the most-asked of all of the inquiries we receive regarding any of our tools, here are a few “under-the-hood” notes:

The File and Location

The Library system simply stores information (dimensions, weight, dispersions, etc.) about your speakers and bumpers - not the model geometry. All of this information is stored in a file called "AudioToolSetData.xml." That file is found in the "...\Libraries\Defaults\Audio Tools" folder - either in your Vectorworks® application folder or in your User folder structure.

If your installation of Vectorworks® includes the "Speaker" and "Speaker Array" tools, a sample version of that file might be found in the "...\Libraries\Defaults\Audio Tools" folder, found in your main Application folder. If your installation does not include those tools, that file in that location will not exist until you save your first speaker or bumper in the Library.

The User Folder

If you've not set up a custom User Folder structure, you can find out which folder Vectorworks® is using to store your *Audio ToolSet 2* Library by going to the "User Folders" tab in the [Tools][Options][Vectorworks Preferences...] dialog. The folder shown, there, will be where the "Libraries" folder structure is stored - which, in-turn holds the “Audio Tools” folder. (On a Mac, “Libraries” folder is generally hidden unless you press the Option key when choosing the “Go” menu in the Finder application.)

Functionality Prior To Version 3.0

Prior to version 3.0 of these tools, if the sample file existed, the tools automatically created a “User” copy in the “Audio Tools” folder in your User folder structure the first time one of the tools was used. Then on-out, this is the location where the tools accessed and stored your Library of speakers and bumpers. The sample file was never checked again. If the sample file did not exist, the tools didn't do anything until you stored your first speaker or bumper - which created the XML file from-scratch in the User folder. Every time either an *AudioBox 2* instance was touched or inserted or *Audio Array 2*'s “Configure Array...” dialog was opened, the "User" Library file was read and re-written - in addition to being re-written when you added or deleted a speaker or bumper to or from your library.

Functionality in Version 3.0 and Beyond

Starting with version 3.0, every time either an *AudioBox 2* instance is touched or inserted or *Audio Array 2*'s "Configuration Array..." dialog is opened, the Library file is read and checked using the following hierarchy:

- First: "User" Library in the "User" folder
- Second: "Sample" Library in the Application folder
- Third: "Old" (version 1) Library

The tools will stop looking with the "highest-priority" Library. In addition to adding or deleting speakers or bumpers, the Library file is only re-written (or, copied) if certain errors are found and need to be fixed. Any Library "writing" is done to the "User" folder. Assuming no elements are being added or deleted and the "sample" Library doesn't contain the checked-for errors and it is the highest-priority Library found, the "User" file is never written.

The one exception to this error checking and fixing has to do with weight. When the Library is simply read (to populate the various Pop-Up menus), weight units are not considered. When different speakers or bumpers are selected, though, these units ARE checked. If weight unit information is missing, you are asked what unit was intended when the selected element was initially added to the Library and the Library file is written (or, created for the first time) to your "User" folder. If the correct lb/kg weight system is found for the selected element, no Library writing is done.

Sharing Library Files

To copy your *Audio ToolSet 2* Library from one computer to another, simply find "AudioToolSetData.xml" on the "source" computer and copy the file to the same place on the "destination" computer (more-than-likely, the "User" folder).

Two warnings to heed:

- 1) If there is **ANY** question about truly wanting to over-write any Library information on the "destination computer, make sure you save a copy of that file in a safe place.
- 2) While all versions of the *Audio ToolSet 2* tools will be able to read any version of "AudioToolSetData.xml," older versions don't recognize the much of the current data and if you "round-trip" the file, that information will be lost.