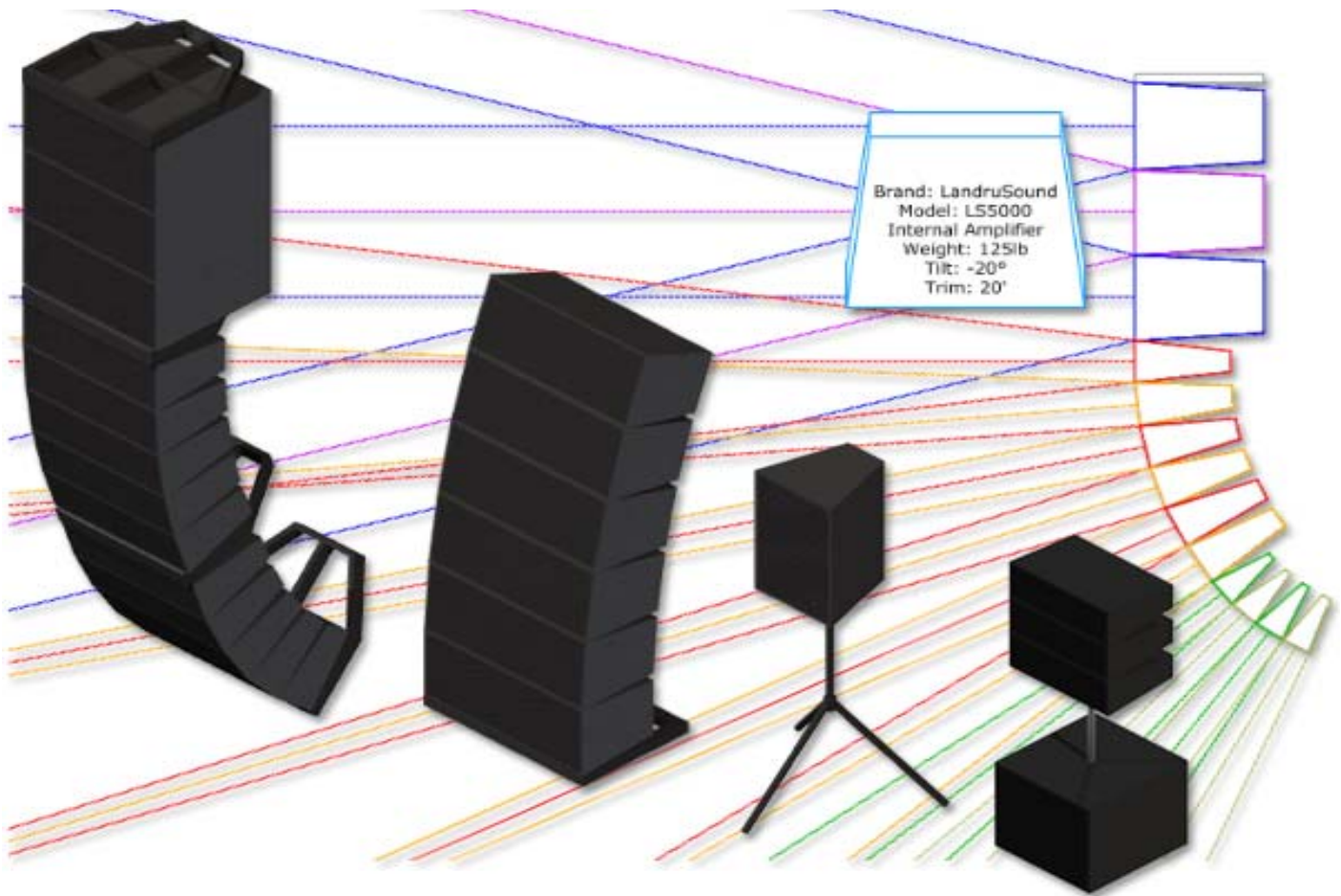


The Audio ToolSet 2 Suite

build 3.43



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...

- Vectorworks Spotlight® and Designer® are not required. All will work in any 2020 or newer Vectorworks® product.
- Loudspeaker and bumper geometry can easily be changed on-the-fly based on specifications users enter or the tools can insert existing Symbols.
- Regularly-used user-defined configurations can be saved in a Library for later retrieval.
- 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.
- Loudspeakers can be easily turned “side-ways” using the “Flip Orientation” toggle.
- The different parts of each audio object can be assigned to different Classes.
- **NEW in version 3.301**, text blocks can include bubbles and leader lines.
- **NEW in version 3.4124**, the Object Information Palette can, in select sections, be collapsed, hiding less-used areas.
- **NEW in version 3.4124**, Resources created by the tools on-the-fly or imported by the tools are automatically placed in distinct Resource Manager folders.

AudioBox 2...

- Variable horizontal and vertical dispersion areas (in both 2D and 3D) can be displayed. The dispersion lines compensate for the project “floor” (the drawing Ground Plane) and a user-defined listening height. 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.
- Different “Support” options (flown, stacked, tripod, etc.) can be specified. **NEW in AudioBox 3** is the “Yoked” “Support option, which creates a yoke and clamp for the loudspeaker.
- Ceiling speakers can be created, in addition to the standard “cabinet” loudspeakers possible in previous versions.
- 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 3.1** are several additional data fields.
- **NEW in version 3.3**, text blocks can include bubbles and leader lines.
- **NEW in version 3.41**, constant voltage settings can be tracked.
- **NEW in version 3.41**, the tools use the Vectorworks® Resource Selector system for choosing speaker and bumper symbols.
- **NEW in version 3.41**, Vectorworks® structural units replace dedicated lb and kg fields.
- **NEW in version 3.4124**, dispersion cone line origins have all been moved to the front center face of the speaker cabinet/grill.
- **NEW in version 3.42**, Yokes attach to truss and adjustments to loudspeaker rotation and tilt are all relative to that attachment point.
- **NEW in version 3.42**, Yokes are no longer limited to “Down” and “Up” and have variable tilt angles.
- **NEW in version 3.42**, is the ability to use yoke elements contained within Symbols, to define custom yoke pivot points, and to designate custom dispersion origins.
- **NEW in version 3.42**, is an optional arrow indicating the direction the loudspeaker is aimed.

AudioArray 2...

- Up to 42 loudspeakers and/or additional bumpers can be inserted in a given array - including 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.
- Element-to-element angles are independent for each loudspeaker in the array.
- A user-friendly “Array Detail and Configuration” dialog is used. 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.
- Loudspeakers can be inserted for multiple arrays at the same time.
- Arrays can be ground-stacked in addition to being flown.
- Trapezoidal or chamfered bumpers can be created.
- Bumperless arrays can be created.
- Tripod-mounted arrays can be created.
- Speakers can be shifted backward and forward relative to their bumpers.
- Multiple bumpers (pull-back and transitional) per array can be inserted.
- Extension bars can now be created and stored with defined bumpers in the Library.
- Rigging guides can be shown, marking potential insertion points for hoist Symbols and Plug-In Objects.
- ***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.
- ***NEW in version 3.43***, arrays can include two different bumper types.

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**Starting with version 3.42, *Audio ToolSet 2* requires
Vectorworks® and Renderworks® 2020 or newer.**

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Installation

If the tools were installed through the Vectorworks 2021® (or newer) Partner Products system, this section does not apply.

Using the Vectorworks® Plug-in Manager Installer:

1. Back up any pre-existing content, like speaker and bumper Symbols, you might wish to save.
2. With Vectorworks® running, open the Plug-in Manager through your Vectorworks® menu ([Tools][Plug-ins][Plug-in Manager...]).
3. Select the “Third-party Plug-ins” tab.
4. Click the “Install...” button.
5. In the dialog that opens, find the Zip file that you downloaded from our server. Select that file and click the “Open” button. Contents of the Zip file will be copied into the appropriate folders in your User Folder structure:
 - Manual → “...Plug-ins\Landru Manuals”
 - *LandruStrings.vwr* → “...Plug-ins”
 - Tools (*.vso files) and Commands (*.vsm files) → “...Plug-ins\Landru Tools”
 - Default Symbol files → “...Libraries\Entertainment\Audio Bumpers” and “..Libraries\Entertainment\Audio Speakers” (or, in Vectorworks® versions older than 2023 “...Libraries\Objects - Ent Audio\Bumpers” and “...Libraries\Objects - Ent Audio\Speakers”)
 - *Texture_Destroyer_20**.vwx* → “...Plug-ins\Landru Utilities” (*This file contains a script for users who are needing to open files created in Vectorworks® versions older than 2014 and are having issues with Textures created by our tools not being generated correctly. If this applies to you, open the file and follow the instructions. If not, simply ignore this folder and file.*)

The installer will also move pre-existing copies of any Landru Design Tools and Commands to the “...Plug-ins\Landru Tools” folder.

6. In the dialog that opens, click the “Restart” button.
7. After re-opening Vectorworks®, add the newly-installed tools and Commands to your Workspace. See below if you’re not sure how to do that.

Manually installing the Tools and Commands:

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

“Landru Manuals”	“Landru Utilities”
This folder contains the PDF manual for <i>Audio ToolSet 2</i> . Copy this folder to wherever you’d like on your hard-drive.	This folder contains a file called “Texture_Destroyer_20**.vwx.” This file contains a script for users who are needing to open files created in Vectorworks® versions older than 2014 (including Template files) and are having issues with Textures created by our tools not being generated correctly. If this applies to you, copy this folder to wherever you’d like on your hard-drive, open the file, and follow the instructions. If not, simply ignore or delete this folder and file.

“Plug-Ins”

This folder and its sub-folder contain eight files: the actual Plug-In files, four Command files, and a resource file.

As the folder name hints, copy the contents of the downloaded “Plug-ins” folder into your Vectorworks® 2024 (or, 2023, 2022, 2021, or 2020) “Plug-ins” folder. The “Plug-ins” folder is found either in your main application folder or in your User folder.

If you have older versions of the supplied files installed, you'll need to delete the old files or move them to another folder before adding the new files.

If you wish, the *.vso and *.vsm files can be placed in a sub-folder of the Plug-ins folder other than “Landru Tools” but ***LandruStrings.vwr* MUST be placed in the “Plug-Ins” folder.**

“Libraries”

This folder contains a folder containing two folders and Vectorworks® files containing default Symbols used by *Audio ToolSet 2*.

As the folder name hints, copy the subfolders of the downloaded “Libraries” folder - structure intact - into your Vectorworks® 2024 (or, 2023, 2022, 2021, or 2020) “Libraries” folder, being sure to back up any pre-existing content files you might wish to save. The “Libraries” folder is found either in your main application folder or in your User folder. **It is VERY important that you copy this folder structure intact into the “Libraries” folder. For users of builds prior to 3.41: note that this folder location and structure have changed. Also note that the structure is different for Vectorworks® versions prior to 2023.**

If these folders already exist on your system, simply copy the files you downloaded into them. **Again, be sure to back-up and/or rename any existing files that you don't want over-written.**

After copying the folders and files and re-opening Vectorworks®, add the newly-installed tool and Commands to your Workspace. See below if you're not sure how to do that.

Adding the Tools and Commands to your Workspace:

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 Tool Set in the “Palette” section (*the right side*). If desired, drag “New Tool Set” into the “Palette” section to create a new Tool Set. **Do NOT add *AudioBumper 2* to your Workspace.**

Optional...

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 desired Command items into the desired positions in the "Menus" section (the right side).
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 into 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*).

The Check and Add License Keys dialog may appear the first time you use one of these tools. If so, paste/enter the key provided by Landru Design, click the "Add" button, and then the "OK" button. If the key entered is correct, you should not see this dialog again. If you don't have a key, visit [the Landru Design Web site](#) for information about purchasing a license.

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 14-20 for more information.](#)

If you are wishing to take advantage of the "Symbol" feature, you might be wanting to modify or create your own Symbols. Or, you may find issues using many of the stock speaker and bumper Symbols. [See pages 24-26 for more information on configuring Symbols to work with the *Audio ToolSet 2* tools.](#)

If you are transitioning to this version from early builds, 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 27-28 for more information on the Library system.](#)

If you chose to install any of the four optional Commands:

- 1) "Check or Add Landru Keys" will allow you to check which Landru Design license keys are installed and to add additional keys as-needed. "Remove Landru Keys" will allow you remove Landru Design license keys.
- 2) "Resource Folder Names..." will allow you to specify Resource Manager folder names used to store Resources created on-the-fly or imported by tool version 3.43 or newer.
- 3) "Connect Audio Records" attaches appropriate Records to Symbol definitions when creating custom speaker and bumper Symbols. [See pages 24-26 for more information on creating 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”).

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 27-28 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 24-26 for more information on configuring Symbols to work with AudioToolSet 2.](#)

Type: The current loudspeaker type.

If the “Library” **Source** is selected (see above), this will be a Pop-Up menu listing the loudspeakers stored in the Library. The only option is “<Generic>” unless you have saved custom loudspeaker types to the Library using the **Save Type to Library** feature (see below). If so, your additions will be listed here. 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\Entertainment\Audio Speakers” folder. *Again, the “Import...” option will only use Symbol data and not actual geometry.*

If the “Symbol” **Source** is selected (see above), this will display the currently-chosen Symbol being placed by AudioBox 2.

Select Symbol: Opens the Vectorworks® Resource Selector, allowing the selection of the loudspeaker Symbol to use. This list will include loudspeaker Symbols contained in the current working file, in Vectorworks® files stored in the “...Libraries\Entertainment\Audio Speakers” folder, and in the on-line Service Select library. Selecting a given Symbol will populate many of the parameters below. *(Only enabled if “Symbol” Source is selected.)*

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 AND a yoke-designated Symbol is NOT specified. For yoke-designated Symbols, separate Symbols must be created for each orientation.)*

See [page 26 for information on configuring Symbols to include yoke elements.](#)

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: The loudspeaker’s weight.

Custom Color: Information regarding any custom colors. *(This has no effect on loud speaker geometry color(s).)*

AudioBox 2 parameters, continued...



Constant Voltage: Selects whether the loudspeaker is part of a constant-voltage system.

Tap Settings: The transformer tap settings for constant-voltage loudspeakers. (*Only enabled if “Constant Voltage” is selected.*)

Self-Powered: Selects whether the loudspeaker uses an internal or remote amplifier. (*Disabled if “Constant Voltage” is selected.*)

Minimum Wattage, RMS Wattage, and Peak Wattage: Wattage data.

Impedance (ohms): Impedance data.

Asymmetrical Horizontal Dispersion(s): Enables asymmetrical horizontal dispersions.

Expand Dispersion Features: Enables Range notes and Dispersion area information beyond a simple “Overall.”

Range 1, Range 2, and Range 3: 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 Type to Library: 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” Source is selected [see above].* [See pages 27-28 for more information on the Audio ToolSet 2 Library system.](#))

Delete Type From Library: Deletes a selected loudspeaker Type from the external data file. (*Only enabled if the “Library” 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 1, and Show Dispersion Range 1: 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.*)

[See page 26 for information on configuring Symbols to designate dispersion origins other than the 3D center of the front face of the loudspeaker.](#)

Draw Focus Arrow: Draws an arrow indicating the direction the loudspeaker is aimed.

Line Length and Head Size: Settings for the Focus Arrow line and arrowhead. (*Only available if “Draw Focus Arrow” is toggled on.*)

AudioBox 2 parameters, continued...



Support: Support options. While the other options are reference-only, if “Tripod,” “Mic Stand,” or “Yoke” is selected, *AudioBox 2* will create a tripod, mic stand, or yoke geometry. (Only available if “Ceiling Speaker” is NOT selected. “Yoke” will be automatically chosen if a Symbol configured to include yoke elements is specified.)

[See page 26 for information on configuring Symbols to include yoke elements.](#)

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 Rotation: The 2D rotation angle of the tripod. (Only enabled if “Ceiling Speaker” is NOT selected and only if the “Tripod” “Support” is selected.)

Yoke Tilt Angle: The tilt angle of the yoke, from “0” to “180.” (“0” is bottom-hung; “90” is side-hung; “180” is top-hung. Only enabled if “Ceiling Speaker” is NOT selected AND “Yoke” “Support” is selected.)

Yoke Weight: The weight of the yoke. (Only enabled if “Ceiling Speaker” is NOT selected AND “Yoke” “Support” is selected - AND a yoke-denoted Symbol is NOT chosen.)

Rotate Clamp 90°: Rotates the yoke clamp 90°, relative to the yoke. (Only enabled if “Ceiling Speaker” is NOT selected AND “Yoke” “Support” is selected AND “Yoke Tilt Angle” is “0,” “90,” or “180.”)

[See page 26 for information on configuring Symbols to designate yoke pivot points other than the 3D center of the loudspeaker - or - to use yoke elements included in Symbols.](#)

Mounting Details: Information regarding loudspeaker mounting.

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.)

Speaker 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°.)

Self-Powered Wattage, Self-Powered Circuit Number, and Self-Powered Circuit Name: Self-powered power data.

Rack: Information about the rack driving the loudspeaker.

Amplifier: Information about the amplifier driving the loudspeaker.

Drive Line: Information about the drive line feeding signal to the loudspeaker.

Cable: Information about the cable(s) connecting the amplifier to the loudspeaker.

Location: The loudspeaker’s location (such as *Main Ballroom*).

Position: The loudspeaker’s position (such as *Downstage Right*).

Unit: The loudspeaker’s unit number or designator.

Purpose: The loudspeaker’s purpose (such as *Center Fill*).

Zone: The loudspeaker’s zone designation.

Speaker ID: The 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” 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.)

Arrange Column: 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.)

Place 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.)

Vendor: The loudspeaker’s vendor.

Cost: The loudspeaker’s cost.

Note: Miscellaneous notes, such as rental source or stock number.

AudioBox 2 parameters, continued...



Text Options...: Opens the “Text Options” dialog, in which text elements are shown, hidden, and/or modified. ([See page 22 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 23 for more information.](#))

Update: 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.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, “Total Weight” is disabled.

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 an early 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 Information 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 Information Palette. *AudioArray 2* will place independent "child" [AudioBox 2](#) loudspeakers and/or [AudioBumper 2](#) bumpers that are "connected" to the "parent" 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 Information Palette. All of the additional bumpers' settings and the majority of the loudspeakers' settings are "fed" by the *AudioArray 2* "parent" 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 following 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 “parent” bumper and the “child” loudspeakers and/or additional bumpers. This is how the Plug-In Object knows which *AudioBox 2* and *AudioBumper 2* models to control, **each Column ID MUST be unique.**

Location: The array’s location (such as *Main Ballroom*).

Position: The array’s position (such as *DSL*).

Unit: The array’s unit number or designator.

Purpose: The array’s purpose (such as *Stereo Right*).

Note: Miscellaneous notes, such as rental source or stock number.

Configure Array...: 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 16-20 for more information.](#))

Current Types:

Bumper A or B: The type(s) and quantities of the bumpers defined in the [“Array Detail and Configuration” dialog](#).

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

Speaker A, B, or C: The types and quantities of the loudspeakers defined in the [“Array Detail and Configuration” dialog](#).

Total Weight: After the **Populate Array** button has been clicked, the estimated total loudspeaker and bumper weight of the array. (**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 12 and Angle Relative to Preceding on page 20 for more information.](#))

Show Dispersion Range 1, Show Dispersion Range 1, and Show Dispersion Range 1 : Causes the *AudioBox 2* models to 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 16-20 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: Marks potential insertion points for hoist Symbols and Plug-In Objects.

Hanging Support: Hanging designation options: “One Hoist,” “Two Hoists,” or “Multiple Hoists.”

Populate Array: 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 16-20 for more information.](#))

Text Options...: Opens the “Text Options” dialog, in which text elements are shown, hidden, and/or modified. ([See page 22 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 *AudioArray 2* model to different Classes.. ([See page 23 for more information.](#))

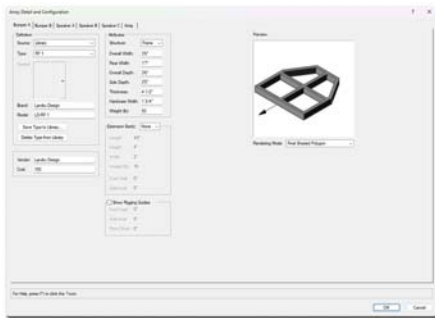
Update: Regenerates the *AudioArray 2* object. You might need to click this if you’re making changes regarding using Class Attribute settings. This button will also cause the array to be rebuilt or “repaired” using current settings.

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

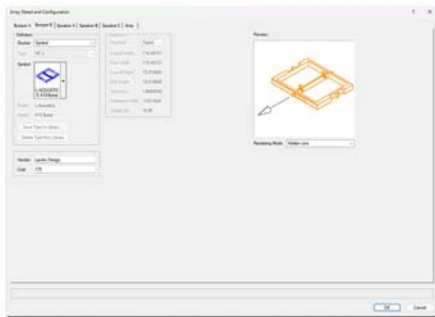
Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters in the “Array Detail and Configuration” dialog and should not be edited, here. For Vectorworks 2021® and newer, “Total Weight” is disabled.

Array Detail and Configuration dialog

Each of the first four tabs (Bumper A, Bumper B, 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.



Library Mode



Symbol Mode

Bumper A and Bumper B:

Source: The source of the geometry and data *AudioArray 2* uses to create bumpers: “Library,” “Symbol,” and “None.”

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 Type to Library](#)” and “[Delete from Library](#),” below, and [pages 27-28 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 24-26 for more information on configuring Symbols to work with AudioToolSet 2](#).

If “None” is selected, *AudioArray 2* will replace bumper geometry with Locus points.

Type: A list of predefined bumpers as stored in the Library. The only option is “<Generic>” unless you have saved custom bumper types to the Library using the **Save Type 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\Entertainment\Audio Bumpers” folder. *Again, the “Import...” option will only use Symbol data and not actual geometry. (Only enabled if the “Library” Source is selected.)*

Select Symbol: Opens the Vectorworks® Resource Selector, allowing the selection of the bumper Symbol to use. This list will include bumper Symbols contained in the current working file, in Vectorworks® files stored in the “...Libraries\Entertainment\Audio Bumpers” folder, and in the on-line Service Select library. Selecting a given Symbol will populate many of the parameters below. *(Only enabled if “Symbol” Source is selected.)*

Selecting a given Symbol will populate many of the parameters to the right.

Brand and Model: The bumper’s brand and model.

Vendor and Cost: The bumper’s vendor and cost.

Save Type to Library: 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” Source is selected [see above]. See [pages 27-28 for more information on the Audio ToolSet 2 Library system](#).)*

Delete Type From Library: Deletes a selected bumper Type from the external data file. *(Only enabled if the “Library” 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...

Bumper A and Bumper B 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 file structural units are Imperial, this should be entered in U.S. pounds. If the file structural 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.

The next 11 parameters are only available for Bumper A.

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 file structural units are Imperial, this should be entered in U.S. pounds. If the file structural 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.

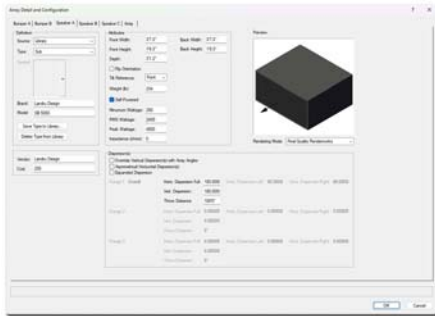
Front Inset: The distance “in” from the front of the bumper for the front guide(s).

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:

Source: The source of the geometry and data *AudioArray 2* uses to create loudspeakers: “Library” and “Symbol” (and “None” for Speakers B and C).

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 Type to Library” and “Delete Type from Library,” below, and [pages 27-28 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 24-26 for more information on configuring Symbols to work with AudioToolSet 2.](#)

Select Symbol: Opens the Vectorworks® Resource Selector, allowing the selection of the loudspeaker Symbol to use. This list will include loudspeaker Symbols contained in the current working file, in Vectorworks® files stored in the “...Libraries\Entertainment\Audio Speakers” folder, and in the on-line Service Select library. Selecting a given Symbol will populate many of the parameters below. (*Only enabled if “Symbol” Source is selected.*)

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 Source other than “None.”.)

Brand and Model: The loudspeaker’s brand and model.

Vendor and Cost: The loudspeaker’s vendor and cost.

Save Type to Library: 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” Source is selected [see above]. [See pages 27-28 for more information on the Audio ToolSet 2 Library system.](#)*)

Delete Type From Library: Deletes a selected loudspeaker Type from the external data file. (*Only enabled if the “Library” 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. [\(See page 10 for more information.\)](#) 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.

Array Detail and Configuration dialog, continued...

Speaker A, Speaker B, and Speaker C parameters, continued...

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 file structural 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: Selects whether the loudspeaker uses an internal or remote amplifier.

Minimum Wattage, RMS Wattage, Peak Wattage, and Impedance (ohms): 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 12](#) and [Angle Relative... on page 20](#) for more information.)

Asymmetrical Horizontal Dispersion(s): Enables asymmetrical horizontal dispersions.

Expand Dispersion Features: Enables Range notes and Dispersion area information beyond a simple "Overall".

Range 1, Range 2, and Range 3: 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.)

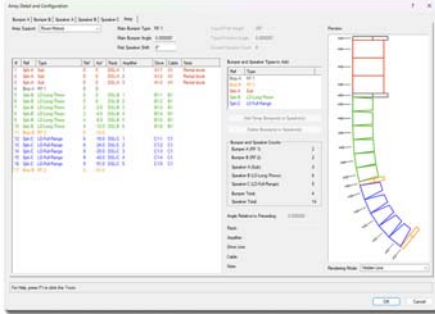
Horiz. Dispersion Full, Horiz. Dispersion Left, Horiz. Dispersion Right: Horizontal dispersion angles. "Full" is the sum of "Left" and "Right." "Left" and "Right" are relative to a loudspeaker facing "down-screen." (The "Full" angles can be between 0° and 180°. The Dispersion parameters for Range 2 and 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.

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

Main Bumper Angle: The tilt of the main 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 A](#), Bumper B, [Speaker A](#), Speaker B, and Speaker C tabs. Only Bumper and Speaker **Types** other than “None” are listed. As with the **Bumper** and **Speaker 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 Bumper(s) or Speaker(s) 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: Information about the rack driving the loudspeaker.

Amplifier: Information about the amplifier driving the loudspeaker.

Drive Line: Information about the drive line feeding signal to the loudspeaker.

Cable: Information about the cable(s) connecting the amplifier to the loudspeaker.

Note: 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: The bumper’s weight.

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: 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.

Bumper ID: A place for entering an ID marker for the 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” bumper.

Place 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’s location (such as *Main Ballroom*).

Position: The bumper’s position (such as *Downstage Left*).

Unit: The bumper’s unit number or designator.

Purpose: The bumper’s purpose (such as *Pull-Back*).

Vendor: The bumper’s vendor.

Cost: The bumper’s cost.

Note: Miscellaneous notes, such as rental source or stock number.

Text Options...: Opens the “Text Options” dialog, in which text elements are shown, hidden, and/or modified.. ([See page 22 for more information.](#))

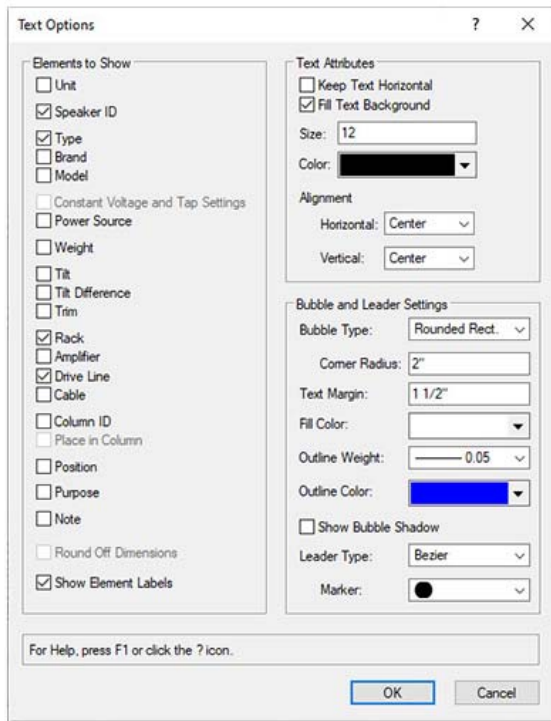
Default Text Position: Returns text to its default location. (Only enabled if text has been inserted)

Update: 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.

Load Information: Braceworks®-related parameters and controls. The Weight values in this section are determined by parameters elsewhere in the Object Information Palette and should not be edited, here. For Vectorworks 2021® and newer, “Total Weight” is disabled.

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.

Round Off Dimensions: Round off displayed trims to the nearest inch or millimeter.

Show Element Labels: Include label 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: Keep text horizontal, regardless of the *Audio ToolSet 2* object's rotation angle.

Fill Text Background: Make 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.

Bubble and Leader Settings (only enabled if at least one text element is selected to be shown):

Bubble Style: The style of the bubble around the text: "None," "Box," or "Rounded Rect."

Corner Radius: The radius size of the rounded rectangle corners. (*Only enabled if the "Rounded Rect." Bubble Style is chosen.*)

Text Margin: The size of the margin around the text.

Fill Color: The fill color of the bubble.

Outline Weight: The line weight of the bubble outline.

Outline Color: The line color of the bubble outline.

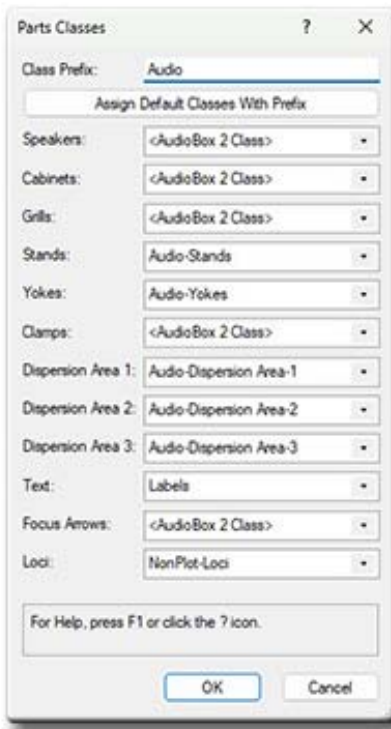
Show Bubble Shadow: Give the bubble a drop-shadow.

Leader Type: The style of the bubble leader line: "None," "Line," or "Bezier."

Marker: Options for setting text alignment and justification. (*Only enabled if a Leader Type other than "None" is chosen.*)

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 “Assign Default Classes With Prefix” button is clicked.

Assign Default Classes With Prefix: Populates each of the Class Pop-Ups with suggested Class names, each (*except for “Loci”*) with the prefix as entered in the “Class Prefix” box.

Speakers, Cabinets, Grills, etc.: 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 that the individual part is simply using the given object’s overall Class. By-default, “Loci” are assigned to the “NonPlot-Loci” Class and all other parts are assigned to the object’s overall Class.

In the example to the left...

Speakers, Cabinets, Grills, Clamps, and Focus Arrows are using the *AudioBox 2* object’s overall Class.

Stands, Yokes, Dispersion Area 1, Dispersion Area 2, Dispersion Area 3, and Loci are all assigning the given parts to Classes generated by clicking the “Assign Default Classes With Prefix” 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 in the current file, in same-version Vectorworks® files stored in "...Libraries\Entertainment\Audio Bumpers" and "...Libraries\Entertainment\Audio Speakers" (or, in Vectorworks® versions older than 2023 "...Libraries\Objects - Ent Audio\Bumpers" and "...Libraries\Objects - Ent Audio\Speakers") - including files you add - and, in the appropriate Service Select libraries. If they exist, the local 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..." 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. (On a Mac, "Libraries" folder is generally hidden unless you press the Option key when choosing the "Go" menu in the Finder application.)

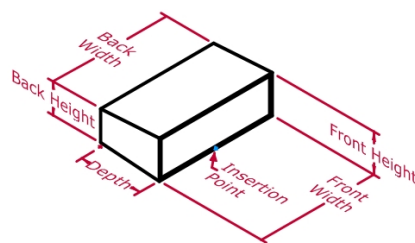
Below is information regarding properly configuring speaker and bumper Symbols. There are three things to note before looking at the specifics for both:

- 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.



Cabinet Speaker



Ceiling Speaker

Assuming the "__ATS-SpkrModData" record is properly attached to the given speaker Symbol, below is information about the fields

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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.

Minimum 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.”

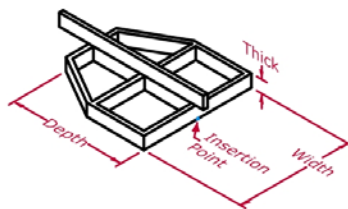
Vert Disp 1-3: “Full” vertical dispersion angles. "Full" is the sum of "Left" and "Right." Must be a number between 0 and 180. 2 and 3 are only used if **Is Expanded Disp** is “TRUE.”

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.

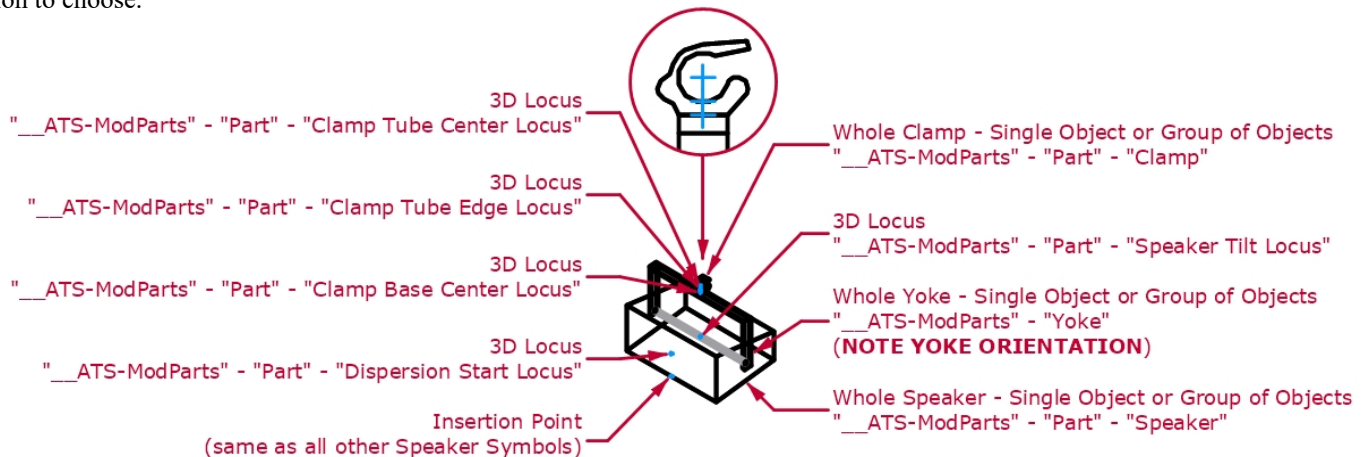
Hardware Width: The width of the hardware members comprising the bumper.

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.

Speaker Parts

Optionally, Symbols may be configured to designate a dispersion origin other than the default (the center of the front face of the loudspeaker), to define a yoke pivot point other than the default (the 3D center of the loudspeaker), or to provide custom yoke elements. This is done by attaching the “__ATS-ModParts” Record to specific 3D parts of the Symbol and by choosing the appropriate option in the Record’s “Part” Pop-Up menu. The image below shows the different parts and the appropriate “Part” menu option to choose.



For dispersion origin and yoke pivot customization, all that has to be done is to insert the given 3D Locus, attach “__ATS-SpkrParts,” and select either “Dispersion Start Locus” or “Speaker Tilt Locus” in the “Part” Pop-Up menu.

For *AudioBox 2* to use the yoke geometry correctly, there are 3 important details:

- 1) The Symbol’s name MUST include the text “(Yoke).”
- 2) All eight of the above elements MUST be present and the different “Part” names MUST be properly assigned.
- 3) Each of the different parts MUST be a single object or a Group of objects.

Sample Symbols demonstrating these options can be found in the “Default Speakers” file, included in the installation package.

Library System

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 "Workgroup" folder
- Second: "User" Library in the "User" folder
- Third: "Sample" Library in the Application folder
- Fourth: "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.

An important note for Workgroup folder users using build 3.41106 or newer:

"AudioToolSetData.xml" should ONLY exist in the given Workgroup folder. Because of the hierarchy and file writing process described above, any time changes are made to the Library the resulting "AudioToolSetData.xml" must be moved from the "User" folder to the Workgroup folder in order for the tools to see the changes..

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 much of the current data and if you "round-trip" the file, that information will be lost.