NEMETSCHEK Vectorworks

ENTERTAINMENT DESIGN:

SCENERY, LIGHTING, AND SOUND

WITH VECTORWORKS SPOTLIGHT

KEVIN LEE ALLEN | THIRD EDITION

written with version 2014

SAMPLE

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For more Vectorworks training information or to purchase more copies of this book, please visit www.vectorworks.net/training, or call us at (410) 290-5114.

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Introduction: How to Use This Book

As a professional scenic and lighting designer in the entertainment industries, I am a long-time Vectorworks® user. Vectorworks has streamlined my process and accuracy. I have been pleased to teach these skills, and I am similarly happy to present as much as possible here in this book.

This book will explore Vectorworks Spotlight and Renderworks® for use in the entertainment industries. Although applicable to film, television, concerts, exhibits, and themed architecture or interiors, we will explore a project that creates and lights a set for the stage, the root of entertainment design.

You will need Vectorworks Spotlight and Renderworks 2014 software to follow the exercises in this book. If you do not have the Renderworks module, some rendering can be completed with only the Spotlight Package using OpenGL. I use and recommend the complete Vectorworks Designer suite and will demonstrate some tools and techniques unique to the Architect and Landmark Packages as well as some third-party add-ons.

In my own practice, I started with Vectorworks when it was known as MiniCAD, and as the program evolved, I added additional modules as I needed them for specific projects. There is no requirement that you invest in the complete Designer package at one time. It will be possible to work through this book with older software, but some of the techniques will be different. Your copy of the software could be a demonstration copy, an educational license, or a full license.

We will begin immediately after the designers's pencil thumbnails and explore a process of design development. Design ideas and construction theory are outside the parameters of this volume.

This text is tutorial-based. In the first exercise, initially we will use a basic 3D form to learn specific, basic techniques. From there we will design and detail a complete production through a step-by-step process. As techniques and concepts are covered, the reader is encouraged to work with and master each. This book assumes a basic working knowledge of computers and Vectorworks.

Our main focus will be the creation of the scenic, lighting, and sound designs for a theoretical production of *Romeo and Juliet,* designed on a Broadway scale, in a Broadway House; the Booth Theatre is used here courtesy of The Shubert Organization. This project will begin with the earliest of design development in Vectorworks and proceed through creating presentation renderings. It will end with the designer's elevations for the scene shop, a sound plot, and a lighting design and plot.

The book is not intended to make you an expert in Vectorworks. The intent is to give you a foundation of knowledge and techniques that will help you to understand the way the application is intended to work. This book complements and adds to the information provided in the free guides that accompany the software and the extensive Help system installed on your computer with the application. In addition to this book, Nemetschek Vectorworks also publishes other volumes. All of Nemetschek's books complement one another and offer specific detailed information. There are also many training options available to users from experts in the field and directly from Nemetschek Vectorworks.

The material presented here is offered in a way that users with minimal previous experience would encounter if they had accepted a design project and set out to create the design using Vectorworks.

Before You Begin

This book builds on the basic skills covered in the free *Getting Started Guides* that cover the basics of drawing in both 2D and 3D. These guides come with the Vectorworks Help application. You may also download the guides from www.nemetschek.net. Feel free to work through the guides first, or just start with this book.

This book comes as a hard copy with one CD-ROM. The CD contains a folder called "Spotlight for Entertainment." Copy the folder to your hard drive. Create a folder(s) for your work in a nearby location.

To begin, you should work through the book, using the examples on the accompanying CD as references. Your work should look very much the same as you follow the specific directions. Even if you think you are familiar with a subject, work it through, as there is always something new to learn. Vectorworks is a complex program, and any two users may have different means to the same end.

Once you have completed this book, it should prove to be a handy desktop reference.

The Vectorworks Environment

I'm a Macintosh user based in the United States. All of the screen shots will show the Mac OS interface, but the PC interface should look very much the same. When keyboard shortcuts are given, they will generally be given as, for example, "Command + S" for saving a file. On a Windows machine the keystroke would be "Control + S," a substitution that is generally always true. Likewise, the Option key on a Macintosh has the same functionality as the Alt key on a PC.

A right-click in Windows is the same as Control + click or a two-finger tap on the trackpad in the Macintosh operating system to open contextual menus—fly off access to commands available in the working window.

Although this book covers industry standard workflows, it will not replace the extensive Help system that installs with the software. Vectorworks Help provides in-depth supplementary information on the tools you will use in this book. The Help application is searchable, and you can create and save your own comments. The Help system is covered at the very end of this manual.

Measurements given are imperial US-based measurements, with converted metric equivalents in millimeters. If your document is set up for metric but you enter imperial data, appropriately notated, Vectorworks will translate the numbers.

There are some topics, such as the design concept for *Romeo and Juliet*, that are really outside of the parameters of this book. I'll blog about those things at http://klad.com/blog, and you can find posts that specifically deal with this book in the category *VWX Spotlight and Design*.

Some General Rules and Thoughts

This manual covers a lot of ground. Yet it just skims the surface of a powerful application. Everything is here so that you can get up to speed with Vectorworks Spotlight quickly. The following are points to keep in mind as you work through the guide:

- Alternate methods are shown for activating/using many tools, commands, and modes. Use what works best for you. Experiment with different tools and techniques.
- Watch for *SmartCursor* cues, which appear as you hover your cursor over significant drawing or object geometry.
- The text assumes you are familiar with basic computer terms and basic theatrical concepts.
- Save early, and save often. Save after every operation.
- Establish a back-up ritual. Macintosh users should take advantage of the Time Machine feature within the OS.
- Use the Vectorworks auto back-up in addition to your own back-up plan.
- Use *Save As* frequently, so you can always access earlier ideas and solutions.
- Use symbols, and get to know and understand them early on.
- Most tools have options that are available for selection in the Tool bar. See the illustration on page 1.

Don’t be concerned if you do not understand this entire introduction. Everything will be explained as you work your way through this guide.

Now, let’s draw something!

Application Overview

Before we can model, we'll take a quick look at the application environment, just so we can find the drawing tools and put them to work.

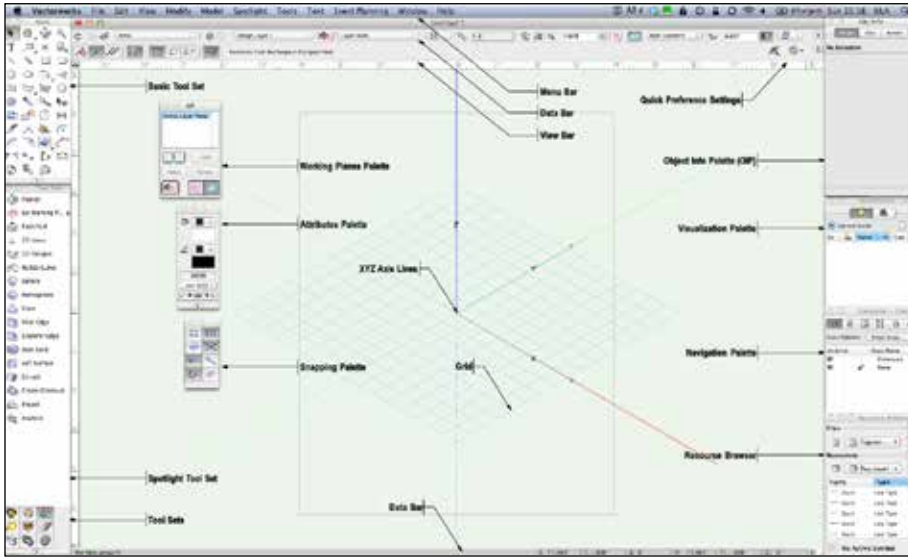
The Vectorworks Working Environment

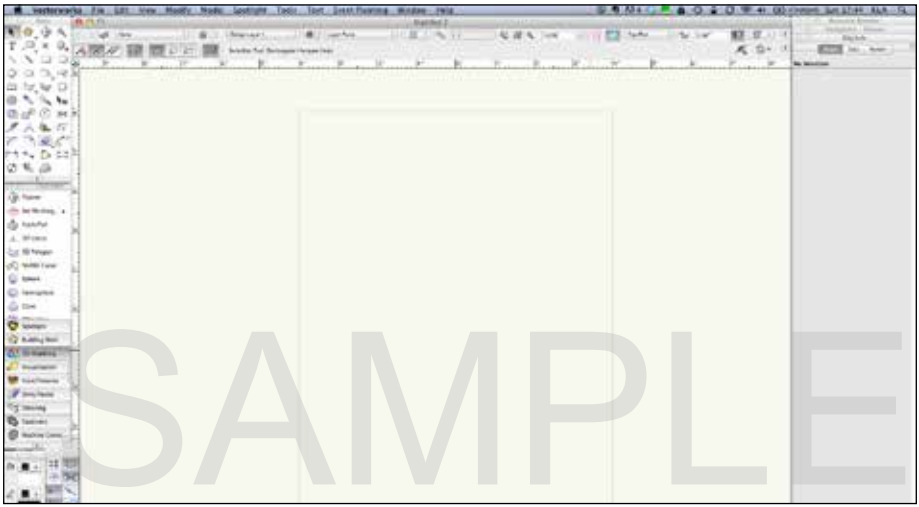
Go to **Tools>Workspaces>Spotlight** to select the Spotlight workspace. Although we'll discuss workspaces in depth later, you should know that a workspace is a collection of tools and commands assembled to create a working environment in order to accomplish a focused set of tasks. In our case, the tasks will be designing scenery, lighting, and sound for the entertainment industries.

Your screen should now look something like the illustration below. For clarity of illustration, some things (called palettes) have been moved around. If you do not have a blank document window open, go to **File>New** and select "Create blank document."

On a PC, the palettes should line up on either side of the screen. On a Macintosh, palettes have to be aligned manually. The right-hand side of the Object Information palette (OIP), the Resource Browser, the Navigation palette, and the Visualization palette will dock to the right side of the screen when you click the right side of the title bar and drag the palette. These palettes can be resized by selecting the lower right-hand corner and clicking and dragging. When resizing, you will be constrained to the screen.

Of course, some of these restrictions will not apply if you have multiple monitors, but for this text we will assume you are using a single screen.





On a Macintosh, the windows can be collapsed by double-clicking the title bar. While the arrangement in the illustration is clean, most users will find the need to reshape and reorganize the palettes as part of their workflow. When the palettes are docked to the right side of the screen, a click on the green button in the top left of the document window should resize that window to fit between the palettes. Resizing is an option in the Vectorworks Preferences Session tab. Preferences will be fully discussed later in the text.

The illustration above shows How I choose to lay out palettes for my workflow. You may find a different arrangement more effective. The Resource Browser, Navigation Palette, OIP, and Visualization Palette are stacked in that order, as full-height as possible, and aligned to the right, wide enough for three objects to show as thumbnails in the Resource Browser.

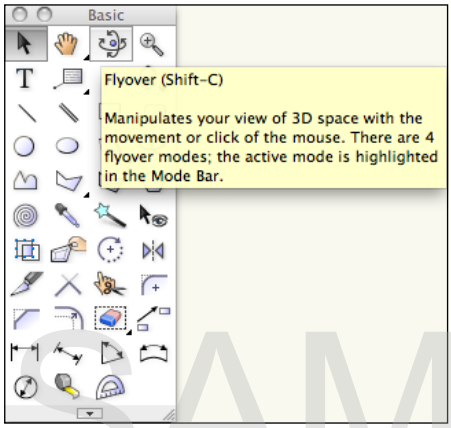
As always, descriptions like "wide enough for three objects to show as thumbnails in the Resource Browser" will be explained as we go along.

I use the window-shade function of the MacOS to show and reveal the palettes I need, as I need them.

The Screen

On the left side of your screen you should see the Basic tool palette and the Tool sets palette, which allow you to access additional tools for particular jobs. The Attributes palette and the Snapping palette are also to the left. On the right you should see the OIP, Navigation palette, Visualization palette, and Resource Browser.

At the top of the active window, you will see the View bar and the Tool bar. The Message/Data bar is located at the bottom of the window.



Palettes

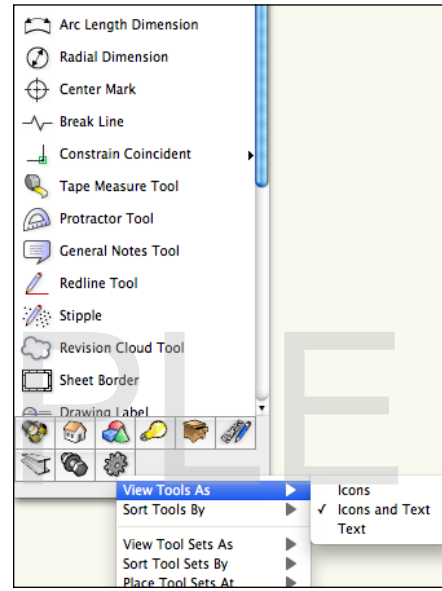
Basic Tool Set

The Basic Tool set provides ready access to a collection of 2D drawing tools, 2D and 3D drawing modifiers, and basic dimensioning tools.

On the top left of the Basic tool set you will find the Selection tool. Place or hover your cursor over the arrow-shaped icon, and see the hint indicating the functionality of the tool and the keyboard shortcut for accessing the tool. You can choose the Selection tool by clicking on the icon or by pressing the x key (unless you are editing text).

The Selection tool will be used frequently to choose objects for modification, move, or duplicate by pressing the Alt (Windows) or the Option (Macintosh) key and dragging any object.

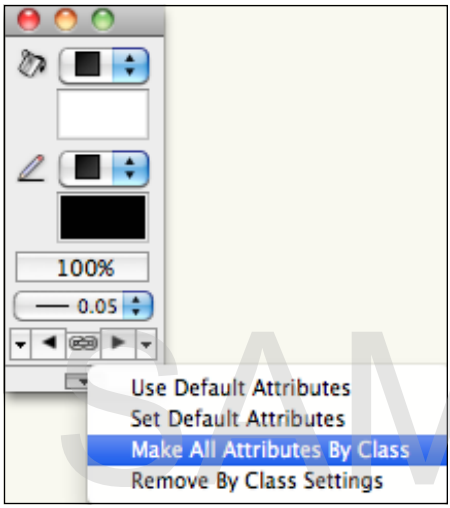
Next to the Selection tool is the Pan tool, very useful for navigating around a drawing when you have zoomed in on a detail area. The Pan tool can be activated in Boomerang mode at any time (unless you are editing text) by pressing and holding the spacebar.



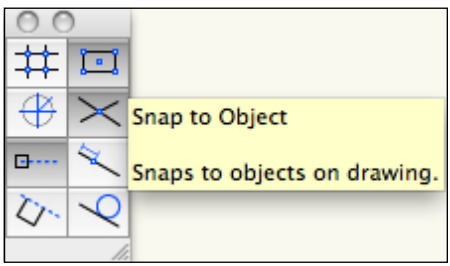
Tool Sets

Tool sets are collections of tools grouped for specific tasks. Note, for example, that there is a Dims/Notes tool set in addition to the Dimensioning tools provided in the Basic tool set. In the Dims/Notes tool set, the Basic tools are joined by additional tools for dimensioning and annotating drawings.

The Tool sets can be viewed in a number of different ways. Note that, as seen in the next illustration, you can click on the access arrow at the bottom of the Tool sets palette to choose different ways of viewing the tools and the tool sets. In the case of the illustration, the tools are icons, and the tool sets are icons and text. I personally choose to view both as icons and text.



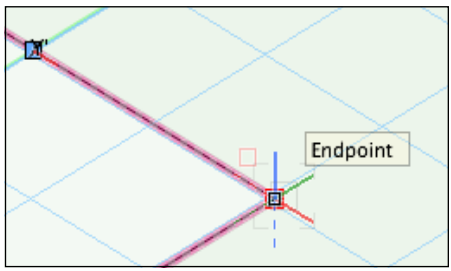
Attributes
The Attributes palette sets various graphic attributes of 2D and 3D objects. When an object is selected, the line, fill, line style, and opacity of an object may be changed. Notice the access arrow at the bottom of the palette and the choices available. As you will come to find, Make All Attributes By Class can often save many clicks.



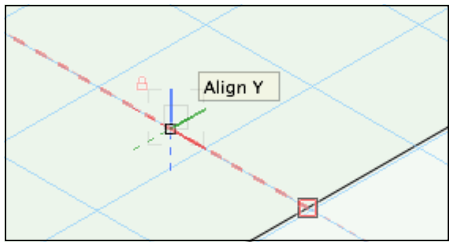
Snapping/Constraints
The Snapping palette sets options for drawing with precise alignment. Constraints can be temporarily turned off by pressing and holding the single quote (‘) key.

Users may set Preferences for the constraints and the displayed grid by double-clicking on any of the constraint icons. Constraints help with precise drawing and provide cues to the SmartCursor. If you do not see the grid and the XYZ guidelines as illustrated, double-click on a tool in the Snapping palette to access the palette preferences, select **Grid**, and check the boxes to show the grid and the XYZ axis.

SmartCursor
The SmartCursor provides a series of visual cues displayed as text at the cursor’s current location. It can create snaps to specific points relative to other objects.



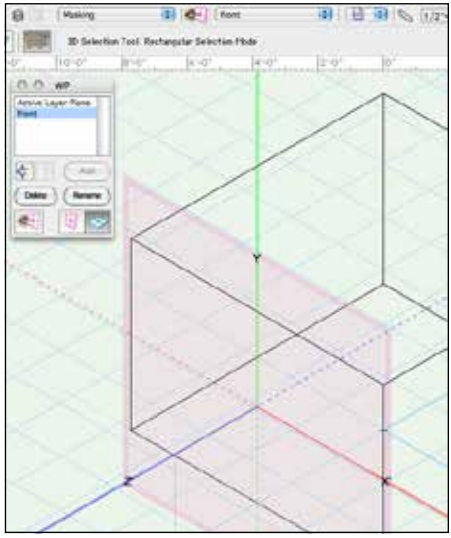
Smart Points
Smart Points allow the use of existing geometry as drawing guides. When Smart Points snapping is on, a Smart Point can be defined by pausing the cursor over an object point and pressing the “T” key. Drawing can then be aligned with that point. The alignment is visually shown with a dotted red line.



Working Planes

The Working Planes palette is not opened by default. For the purpose of familiarity, go to **Window>Palettes>Working Plane** to open the palette. Locate the palette so it is accessible but not in the way of drawing.

Simply put, working planes allow you to change the base plane on which you are drawing. Typically, the base plane is a flat horizontal plane. This palette will allow you to access multiple saved base planes. Vectorworks automatically finds the Working Plane when you hover over objects. Frequently used planes can be saved and accessed through the Working Plane palette.

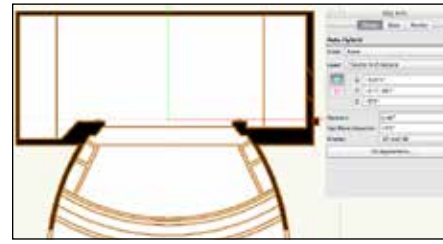


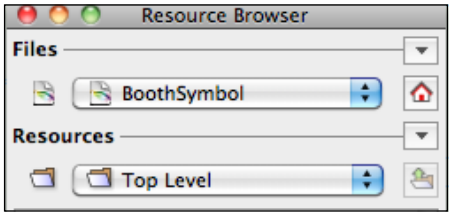
Those same saved planes are also accessible via the Planes drop-down menu in the View bar. The Saved Planes function is particularly useful if you are creating an object with a plane that you frequently return to, like a raked stage surface or a set with multiple rakes and levels.

You can now close this palette.

Object Information

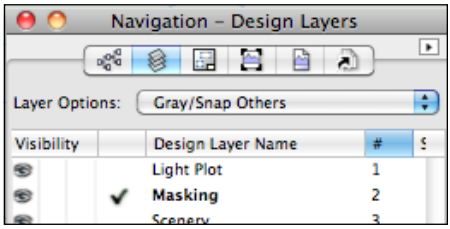
The Object Information palette (OIP) is a critical design control point; every object selected in Vectorworks can be manipulated via the OIP. When you can't figure out how to modify something, look here first. The OIP has three tabs: Shape, Data, and Render. Shape affects size, location, and specific parameters associated with different types of objects. Data references information associated with the object for use in worksheets, and Render affects the look of 3D objects in presentations.





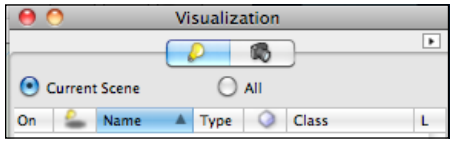
Resource Browser

The Resource Browser allows access to symbols, textures, and other data within your file and other files that may or may not be open. Select the disclosure arrow at the top right of the Resource Browser and note the Add New Favorite Files option. Although we'll come back to it at length later, you should know that this allows you to navigate to other files and always have access to resources you frequently use. There is Default Content available from within the Vectorworks application. For example, the Default Textures can be accessed from the OIP and when editing class definitions.



Navigation

The Navigation palette will be covered thoroughly, but for now, notice that this palette allows you to quickly access Classes, Design Layers, Sheet Layers, Viewports, Saved Views, and References. Each of these items will be covered and defined. From the Navigation palette you can activate, navigate, and control visibilities.



Visualization

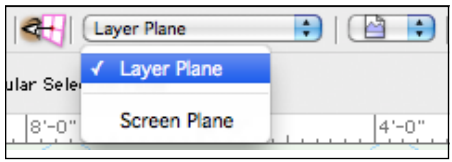
The Visualization palette will be covered in depth later. Note that this palette allows control of Light Objects and Camera Objects.

Document Window

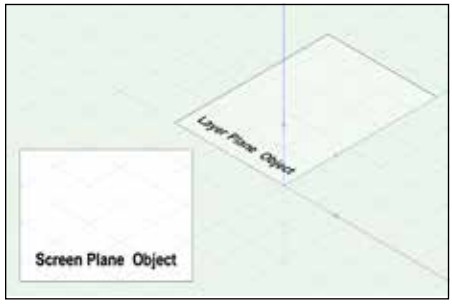
View Bar

The View bar allows immediate and constant access to a number of important functions. View bar functions can be hidden and displayed from the drop-down list accessed via the Disclosure Arrow on the right of the View bar. From the left you will see forward and backward arrows; clicking on these will take you back and forth between recent document views. Skip to the center right, and you will see two magnifying glass icons that take you to a view of either a selected item or to a view of all items in the visible drawing (if nothing is selected). Command + 6 on a Macintosh and Control + 6 on a PC have the same functionality.

In the View bar, a drop-down menu allows you to select the working plane of your drawing. There are up to three basic options available here (excluding any saved planes): Layer, Screen, and Automatic.



Drawing in the screen plane with a 2D drawing tool from the Basic tool set gives you a 2D object that is locked to the screen or the front of the drawing space. As you change views, the object remains as a flat 2D elevation. In the Layer Plane mode, drawing 2D or 3D objects places the objects on the working plane. This is most readily evident drawing a rectangle in an isometric view, as you can then draw the rectangle in 3D space. In fact, you can draw a 2D rectangle, walls, or any primitive and then extrude into 3D space without switching tools when you select the Push/Pull option in the Tool bar. This mode is not available in the Top/Plan view.

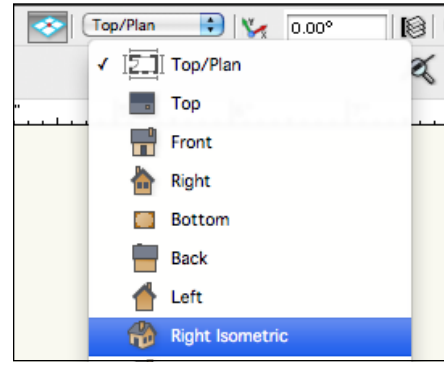


The Automatic Layer Plane option is active, and you can select it when you have a 3D object and are drawing other 2D or 3D objects adjacent to the original. Hovering the 2D or 3D Primitive tool over the surface of the original 3D object causes the face plane of the original object to be highlighted. With the Push/Pull tool option selected, you can extrude objects in the active working plane.

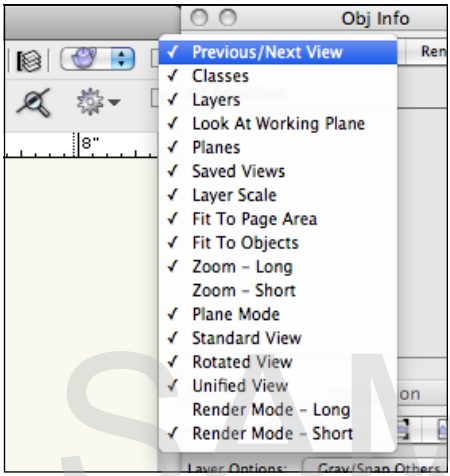
When working on different planes, the red, blue, and green axes will shift to the active working plane.

There is a drop-down menu for your view of the drawing. The view defaults to Top/Plan (Command + 5), which is the 2D view from overhead. In the illustration of the working area, the view is set to Right Isometric.

Top is a 3D overhead view, and the others should all make logical sense. You may also access each of these views from your numeric keypad with 5 being Plan, 2 being Front, 4 being the left view, 6 being the right view, and 8 being the back. The isometric views are the four corner numbers.



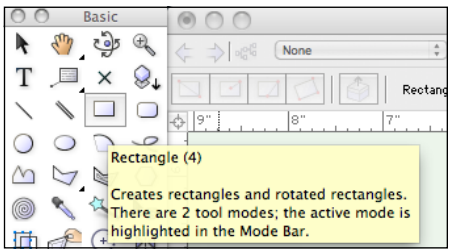
On the right of the View bar you can select the disclosure arrow and choose the options available in the bar. These are choices made based on individual workflow. For our purposes, please select the options illustrated.



Tool Bar

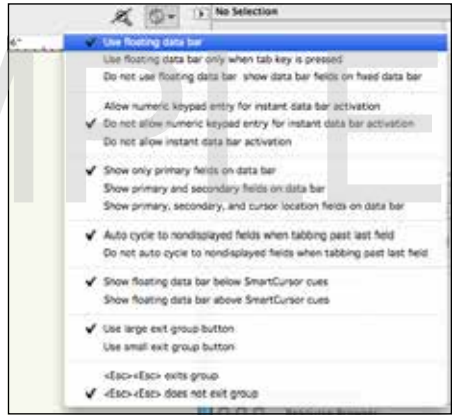
The Tool bar is just below the View bar and displays different options available for each tool selected from the Basic tool set or one of the task-specific tool sets.

From within the Tool bar, each tool has a variety of settings available on the left of the Tool bar. For example, rectangles can be drawn diagonally, from the center out, from two sides, and rotated. The option to activate the Push/Pull capability allows you to immediately draw an extrude into 3D. You can shift between drawing modes by pressing the "u" key. This is particularly useful with the Polyline tool, which creates shapes with straight lines and/or a variety of different types of curves.



Quick Preferences

On the right of the Tool bar you have Quick Preferences, which are frequently used settings available from the Vectorworks Preferences that allow the user to make rapid interface changes, as desired. Select available options via the Disclosure Arrow on the right of the Tool bar.



Message Bar

The Message bar displays precise information about the location of the cursor in the drawing space. Preferences accessed via the Disclosure Arrow in the far right-hand corner of the screen can affect this display. Additionally, the Message bar displays important alerts, back-up information, and rendering progress.

Moving the View

To pan across the drawing at any time (even if a tool or command is active), hold down the Space bar and drag the cursor. The Boomerang mode will return you to the active tool as soon as the space bar is released. Boomerang mode does not work when you are editing text.

You may also directly select the Pan tool from the Basic tool set. Scroll bars can be activated or deactivated from the Vectorworks Preferences.

Zooming
By default, the application's preferences set the scroll wheel of the mouse to zoom in and out. Similarly, two fingers on a multi-touch track pad will zoom in and out of a drawing.

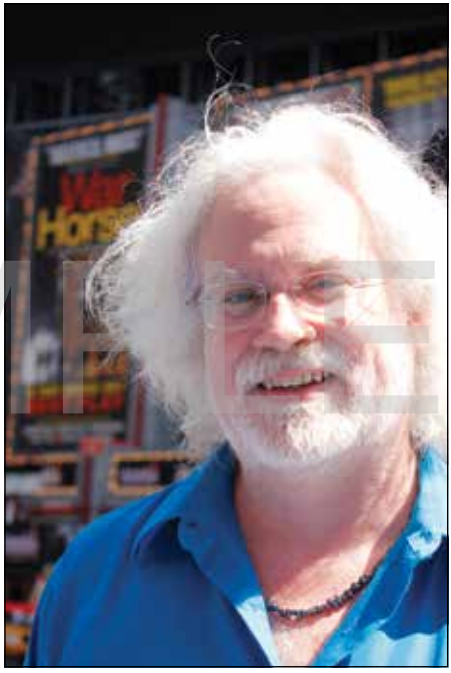
From the View bar, click **Fit to Objects** (Command/Control + 6), which adjusts the view to fit the selected object to the screen. When nothing is selected, the same action will fit all objects to the screen.

Command/Control +1 will zoom in, Command/Control + 2 will zoom out, Command/Control + 3 returns to the last view, and Command/Control + 4 shows the full-page view.

OK, now let's *really* draw something.

This is a quick study of how simply and flexibly you can design and create working drawings or elevations in 2D from a 3D source. We will create a simple 3D model and then look at and annotate that model in 2D. We'll then modify that model and see how the elevations are automatically updated.

About the Author



Kevin Lee Allen has received multiple awards for his work in scenic and lighting design. He works in theatre, film, television, museums, and corporate environments, including architainment, exhibits, fashion, and special events. His notable projects include work for MSNBC News, the United States government, CNN and CNN International, a virtual interview with Benjamin Franklin, productions of *Romeo and Juliet* and *The Tempest*, and the Chase Bank Flagship Signage in Times Square. His design sketches are held in private collections and in the permanent collection of the Library of Congress.

Kevin is a longtime Vectorworks user and has always used the program as a 3D modeler. He has taught, lectured, and demonstrated the application on the university level and, most recently, at the Broadway Lighting Master Classes.

Kevin's work can be seen at http://klad.com. Kevin and his wife, Kathleen McDonough, blog at http://klad.com/blog. Sometimes he blogs about Vectorworks. Blog posts that specifically deal with this book can be found in the category VWX Spotlight and Design.

If you have comments or questions, feel free to e-mail Kevin at klad@klad.com.

Kevin Lee Allen | third edition

ENTERTAINMENT DESIGN: SCENERY, LIGHTING, AND SOUND with Vectorworks Spotlight

written with version 2014

ABOUT THE AUTHOR

Kevin Lee Allen has received multiple awards for his work in scenic and lighting design in theatre, film, television, museums, exhibits, and corporate environments. Notable projects include work for MSNBC News, the United States government, CNN and CNN International, a virtual interview with Benjamin Franklin, productions of *Romeo and Juliet* and *The Tempest,* and the Chase Bank Flagship Signage in Times Square. He is especially fond of designing new musicals. His design sketches are held in private collections and in the permanent collection of the Library of Congress. Kevin is a longtime Vectorworks user and has taught, lectured, and demonstrated the software on the university level and at the Broadway Lighting Master Classes.

THIS BOOK WILL EXPLORE the use of Vectorworks Spotlight and Renderworks for use in the entertainment industries. Although applicable to film, television, concerts, exhibits, and themed architecture or interiors, we will explore a project that creates sets, lights, and sound for the stage — the root of entertainment design.

From one step beyond traditional pencil thumbnails, we will explore a process of design development and collaboration with other designers and technical staff.

This text is tutorial-based and will direct the user to learn the software and prepare the design of scenery lighting and audio for a Broadway scale production.

Completion of each step will put the user well on the way to mastering the software.

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