



# A QuickTime VR Survival Guide

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## Introduction

Welcome to *A QuickTime VR Survival Guide*. This guide offers some tips and techniques from my company, 21st Century Media®, developed during the production of our enhanced CD title, *Prestige Studios of the World™*. The CD is co-sponsored by Apple Computer and features over 150 nodes of QuickTime VR photography shot in the US, the UK and Europe. As a team, we have quickly become aware that there are many hidden skills to producing good VR, and I hope to share some of those with you, the developer, in this guide.

In the spirit of multimedia publishing, I have produced this guide in Adobe Acrobat 2.1, which while being Postscript® and printable, allows embedded URLs; clicking on any web address should launch your browser and take you there. I hope to update this guide to include techniques such as object movies, and as QuickTime VR has more features added in the future versions. Please do not hesitate to email me with your suggestions and comments on things I may have left out!

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## Choosing Your Camera Format

Choosing which format of photography with which to shoot your VR scenes depends entirely on how you intend to deliver your content. For example, for Apple New Year's Eve event in San Francisco, I shot VR with a QuickTake 150 and a panoramic tripod assembly since the scenes had to be immediately stitched, diced and uploaded to the QuickTime Live web site during the course of the evening. The quality of the VR was not as important as the speed with which it had to be delivered. Conversely, the VR content for the Prestige Studios CD needed to be of the highest quality, resulting in the use of a 35mm SLR camera, and PhotoCD transfer. The QuickTake however is an excellent tool for pre-production 'scouting' of VR scenes, and in an ideal situation, a VR photographer might use both a QuickTake and a 35mm camera for a project. As digital cameras become increasingly less expensive, higher quality, and are able to accept Canon or Nikon wide angle lenses, they will no doubt see wider use in the future.

### A QuickTake Rig

For low-resolution VR proofing, and shooting scenes suitable for fast turnaround, the QuickTake 150 paired with the Kaidan QuicktakeVR panoramic head and Bogen tripod is an ideal rig (**fig 1**). The lens that comes as standard with the QuickTake is not suitable for good VR photography, and we used a Tokina 0.5x wide angle conversion lens usually used on consumer video cameras. Kaidan supplies a small adaptor ring that allows the lens to be mounted on a QuickTake. The Kaidan panoramic head is adjustable for a wide range of lenses; you might need to shoot anywhere from twelve to sixteen shots per 360 degree panorama depending on how wide your lens is. The Tokina lens produces 14 pictures per panorama, and these should be shot on the QuickTake's high resolution setting. You will need a PowerBook to download each node as you shoot it, or something a little more powerful if you intend to stitch and dice on location.



Figure 1 – The Kaidan QuickPan head

### A 35mm SLR Rig

While some magazine articles have recommended the Nikon as the perfect choice for camera body when shooting VR, we use the Canon EOS Elan body which provides excellent metering for both automatic and manual photography, and supports the full range of Canon Autofocus FD lenses. The lens is the critical component of the rig, and we chose the 14mm Canon AF FD 2.8f lens with which we have had superb results. It is important to remember that you need a rectilinear lens, not a fisheye, or else your shots will be curved at the edges and not stitch correctly. As for your tripod and camera head, I cannot recommend enough the 3Sixty panoramic head from Peace River Studios. It has produced flawless panoramas for us, is easy to use, and has convenient stepped rotation for error free sequential shots. We mounted this head on a Bogen pan/tilt head allowing for horizontal and vertical adjustment, and this lot on top of a Bogen tripod (**fig 2**). Other essential items include a good light meter and a glare shield for avoiding lens flare (see Appendix A for a detailed photography packages).



Figure 2 – The 3Sixty Panoramic Camera Mount



## Creating a Node Map

When on a shoot, scout your location well. Plan ahead and sketch out a map of the area, marking in the nodes you intend to shoot. Take a long tape measure, and mark the centre point of each node with a little spot of sticky tape on the floor. Ensure that each node has a clear view of the previous one if you want the resulting multi-node movie to feel contiguous. When planning node locations, try to envision what the user will want to explore in the scene. Making an accurate node map on site will enable you to create a miniature version in your application later on, allowing the user to navigate the nodes quickly, as well as aid in linking the nodes during the production process.

Use a compass, and for good reason; when shooting each node, start with the first shot facing due north and work clockwise until the panorama is complete. Having this base directional reference will help in the stitching process later on. Try not to shoot up against walls or in corners unless you absolutely have to, otherwise you will end up with 180 degrees of wall in your shot. Take LOTS of film; you will probably shoot a roll per node. Most importantly, label every roll of film you shoot in a numbered sequence. This is critical if you are shooting multiple locations during a day; there is nothing worse than confusion with numerous unnumbered rolls of film.

## About Lighting & Exposure

Actually, there is something worse; finding out too late that all your film is under or over exposed. Regrettable if you've just come back from a distant location. Solution: shoot the same node with various bracketed exposures. For indoor locations, by using your light meter around the room you will come up with an average exposure for the entire room. Set the cameras exposure manually; if there is a change in exposure between shots, it will look terrible in the stitched panorama. With a QuickTake, you are unable to adjust exposure, so just shoot the scene quickly! Adjusting the ambient lighting will help this process. Take gels and sticky tape with you so that you can mask the more aggressive light sources in a room. Move problem lights, or direct them away from the camera. You want to minimize the likelihood of lens flare, otherwise you'll be spending a long time airbrushing it out in PhotoShop later on. Use a flare guard (also known as a flag or shield), such as the Bogen Avenger, and hold it above the camera during a problematic exposure. If you have a lighting package, subtle use of floods and spots can help, but you don't want them in the shot so be creative with your concealment. We have found that using existing light sources will generally suffice, as long as you compensate by shooting the scene at different exposures. For example, your light meter suggests an average exposure of f4 at 1/90th. Shoot one panorama at this exposure, then two more; one at f3.5 and one at f5.6. If you are using a 15mm lens, you will be shooting 12 shots per panorama, and will thus get three exposures of the same node on one 36 shot roll of film. Later on, after the film has been developed, you can choose the perfect exposure from the uncut roll of negatives. For most of the VR work we have done, we have used Kodak Kodacolor Gold 100 ASA daylight print film, and been pleased with the results.

## Setting Up Your Camera Rig

No amount of precision in this step would be wasted. Five or ten minutes per node during setup will save hours of work later, stitching interactively, airbrushing and cloning in PhotoShop to correct errors in camera position and alignment. Make sure the camera body is precisely mounted on the camera mount, be it a 3Sixty or otherwise. Level the tripod, and then the camera meticulously, using a pocket level. We use a cube level that mounts in the flash shoe on the camera that assists in this process. The 3Sixty camera mount features built-in levels as well.

## Preparing for PhotoCD

### Choosing Your Shots

You're back from the shoot, you've got all your labelled rolls of film ready to go. The next step is to find a local, reputable developer to process your film. Make sure you ask for uncut negatives, which you will need for the PhotoCD process. I have known of people scanning each shot one by one into their Mac using a Nikon 35mm slide scanner from cut negatives, but I can assure you do **not** want to do this. Instead, examine each series of exposures from a single node, and choose the best looking exposure. Write down the range of frame numbers for each node until you have a complete list for all your nodes. It is from this list that your PhotoCD will be created, saving you the considerable expense of having all of the exposures transferred to CD when you really only need a third of them.

## Choosing a PhotoCD bureau

Find a reputable PhotoCD bureau, with staff who know what they're doing, and to whom you can talk about your requirements. As QuickTime VR becomes more popular, so bureaux are becoming attuned to VR requirements. We use Palmer Photographic in Sacramento, who are both knowledgeable and reliable. They understand deadlines and provide fast turnaround. If you are not in California however, your local Yellow Pages will help you find an authorized PhotoCD bureau near you. Most bureaux provide differently levels of PhotoCD quality depending on resolution. We have used the Palmer's standard quality process for all of the VR work we have produced to date, and been very happy with the results. Technically, it is possible to have your VR scenes processed at higher quality, although you will need what could be a prohibitive amount of RAM to stitch the resulting pictures together. Also, Apple's VR stitcher is not specifically designed for higher resolutions and the stability of the stitching process cannot be guaranteed.

## Stitching & Dicing

### Your VR Production System

It helps to have a dedicated machine for VR work during a project, and someone who knows exactly what they're doing. It cannot be said that Apple's QuickTime VR Authoring Tools Suite possesses one of the world's most appealing user interfaces. It has been designed by developers for developers with no frills. It is a speed devil and a memory hog, so the minimum system configuration you should offer it would be a PowerPC with 72Mb of RAM and a quad speed CD-ROM drive; the more RAM the better as you will preferably want to be able to run PhotoShop, DeBabelizer and other programs simultaneously. Creating dozens and dozens of nodes takes a lot of time and a lot of hard disk space. Our VR workstation comprises a Power Macintosh 6100 with a Newer 120MHz clock accelerator, 80Mb of RAM and a 2Gb hard disk. We use an FWB CD recorder with Toast CD-ROM Pro to archive the completed scene editors and stitched PICTs to multisession write once CD; an optical drive would also be fine.

### The Stitching Template

The QuickTime VR Authoring Tools Suite provides templates for stitching with 15mm, 18mm and 28mm lenses, but for any other setups (QuickTake, etc.) you'll need to modify the templates provided. The documentation does tell you how to do this, but it is fairly complex so beware if you are using a non-standard camera rig. You can download a script we have written for the QuickTake 150 and Tokina 0.5x wide angle attachment from our web site, but you may have to massage it to work with your camera if you are using a different lens. If you have a lot of nodes to stitch, you can automate the process with custom scripting. You will probably have to stitch some nodes 'by hand' using the interactive stitcher as well. If you run into badly stitched panoramas, look back on some of the solutions provided in the documentation. It goes without saying that when you embark on a large project, getting to know the stitcher inside out will really pay off.

### Creating Hot Spots

Creating hot spots or links within your VR scene is a key part of the node creation process. Without links, you cannot create multi-node movies, and without hot spots you cannot identify objects or people in your scene. Creating a hot spot log will simplify the process; open up a stitched PICT in PhotoShop and write down each object you wish to create a hot spot for. I use Excel to create a hot spot log that identifies each object and its attributes, such as name and number color. In this way I can create a log on any Mac, without having to use the VR Tools Suite – just PhotoShop and Excel. This is also useful Hot spots work by assigning a sequential system palette color (i.e. from color 1 to 255) to each area required, and painting over the desired object on a floating layer in PhotoShop. If you have a lot of hot spots to paint, it can become difficult to keep track of which numbers are what color; I have found occasions where I've accidentally painted different objects with the same color. To avoid this, we exported a *System Palette Referencer* from a DeBabelizer dialog box, which when opened in PhotoShop provides a handy numbered palette from which to select the color you require (fig 3).

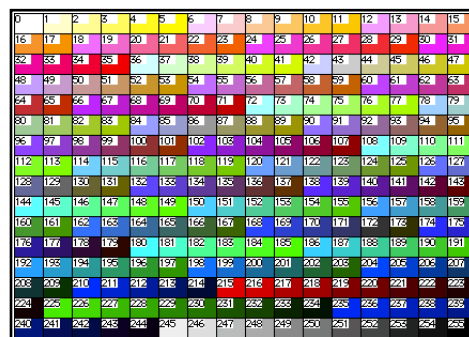


Figure 3 – The System Palette Referencer



## Dicing & Linking

There is no easy way to discuss the technical process of dicing and linking – you must know your way around MPW and that's it. However, the scene editor is the nearest you'll come to functional interface design in the Authoring Tools Suite. It is authored in Hypercard, and as a result is easily modifiable. Although the linking process requires diced single-node movies, you can set up the scene editor with just stitched PICTs, and run the "Make Resources..." command to have it create an MPW worksheet with all of the calls for that scene. Use DeBabelizer to create your quarter-res source PICTs and link backdrop PICTs. When you're finished in the scene editor, composite the link hot spot PICTs with the object hot spot PICTs: use "Batch Replace..." and be sure to set *selection transparency* to white. Also, set DeBabelizer's file creator type for PICTs to the same as PhotoShop's (8BIM) in DeBabelizer's preferences; this will avoid confusion throughout the project, as double-clicking a PICT will then launch PhotoShop instead of DeBabelizer.

## Creating Dual Res Movies

One of the great features of QuickTime VR is the ability to create dual resolution VR movies; if the users system does not have the memory to display the high res file, it will switch to the low res version, ensuring that VR will play on the large majority of CPUs with QuickTime installed. The final VR movie file will be slightly larger (about 30%) than a single res file, but ensures the best compatibility for your end product. This is especially important when authoring VR for cross platform use, although changes to the QuickTime .ini file must be made to instruct the PC to use the low-res versions.

## Integration

### Working with Director

The majority of developers require seamless integration of their completed VR movies with an authoring tool such as Director, Apple Media Tool, Hypercard or Supercard. For the Prestige Studios project, we authored in Macromedia Director 4.0.4 using QuickTime 2.1 for Macintosh and 2.0.3 for Windows. Integrating the VR with Director was an interesting experience, although we had done it before when developing the SyQuest Product Gallery CD. We rewrote our code repeatedly to get proper operation on both Mac and Windows platforms, and satisfactory operation with other scripts that were running concurrently. We developed a cross-platform code solution allowing us to use one Director movie for both Mac and Windows. Not only did this save disc space, but it saved on version conflict during development. With QuickTime VR, memory management is vital. The VR component eats into a projector's RAM as well as the system's. Even on an 8Mb machine this can prevent your project from running. Pay close attention to unloading castmembers and count the kilobytes used by the frame where you're displaying your panoramas (don't forget your audio overhead either!). Director is flexible to the extent that it offers maximum interactivity and control over the QuickTime VR component. Remember that in order to ensure the best compatibility with the end-users CPU, the general rule of thumb for memory usage is about 5Mb of free application RAM for the Director movie.

The Apple Company Store CD that ships with the VR Authoring Tools Suite is a very valuable source of reference material. When developing our first VR project, we referenced it a great deal; thoroughly understanding it will ensure quick development of your VR project as well.

### VR and the End User

QuickTime VR is still a new technology – future upgrades promise exciting features, such as dynamic sound and QuickTime video support, but its current use in commercial titles is limited. The Prestige Studios project contains over 150 nodes of real-life VR scenes, accessed via a 3D modelled VR interface. We knew that the end user would not necessarily immediately recognize the use of QuickTime VR, or know what to do with it. Remember then to include help for the user, either interactively or otherwise, that lets them know how to click and pan within VR window, and use the option and control keys to zoom in and out. Using VR in your multimedia production will hugely increase the appeal of your project; we get excitement from even our most blue chip clients. While you may not have the budget for high-end object rigs and digital cameras, the integration of VR in consumer 3D modelling and rendering packages such as Strata Studio Pro and Infini-D can only help increase QuickTime VR popularity.



### Useful Numbers

If you do not want to get completely involved with the development of VR movies, then there are companies who can help you; from shooting the VR photography, to stitching, and authoring tool integration. Here are two that you may wish to contact:

e-vox	www.evox.com	
21st Century Media	www.c21media.com	415.453.9407
More bureaux and useful information can be found on Apple's QuickTime VR web site.		
Equilibrium (makers of DeBabelizer)		415.332.4343
Peace River Studios (makers of the 3Sixty)		617.491.6262
Kaidan (makers of the QuickPan)		215.364.1778

### QuickTime VR Photography Packages

We used two different rigs for the VR photography in the Prestige Studios project; one digital camera package for proofing and Web site material, and one 35mm SLR package for the main high resolution work.

#### *QuickTake 150 Package*

Apple QuickTake 150 digital camera  
Tokina 0.5x wide angle lens adaptor  
Kaidan QuickPan panoramic head  
Bogen 3221 tripod  
Bogen 3039 pan/tilt head

#### *Canon 35mm SLR Package*

Canon EOS Elan camera body  
Canon 15mm AF lens  
Peace River Studios 3Sixty panoramic head  
Bogen Avenger flag/glare shield  
Bogen 3221 tripod  
Bogen 3039 pan/tilt head

### How to get the Prestige Studios CD

The Prestige Studios of the World CD is free of charge (excluding shipping & handling). To order your copy, visit the Prestige web site at [www.studiosource.com/prestige](http://www.studiosource.com/prestige) or alternatively contact:

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