NYSA Presents! Editing Techniques using AR Glasses

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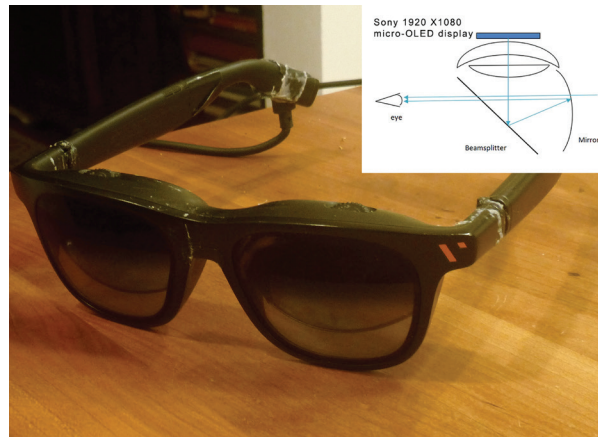

Figure 1: In the past two years companies such as XREAL and Viture have brought to market so-called "AR Glasses" - really dual miniature HD monitors mounted to glasses with birdbath optical systems which superimpose the displayed images on the real world. Pictured here are a pair of Viture Pro XR glasses, you can see the optical system behind the outer lenses.

Figure 2: While most of these display glasses don't offer a true "Augmented Reality" experience - allowing interaction with digital objects integrated into the real world - they do offer some intriguing possibilities for those of us who like to edit, create and restore stereoscopic images.

When connected to a laptop that offers Micro-Display Video Out over USBC the glasses can serve as a second monitor, and all of these glasses offer a stereoscopic viewing option. Being able to refer to a full stereoscopic image on a second screen while doing detailed close up editing can be invaluable. Please note that the glasses should not be "Mirroring" your main display but should be configured as an external monitor - in Macs this is configured in "System Settings - Displays".
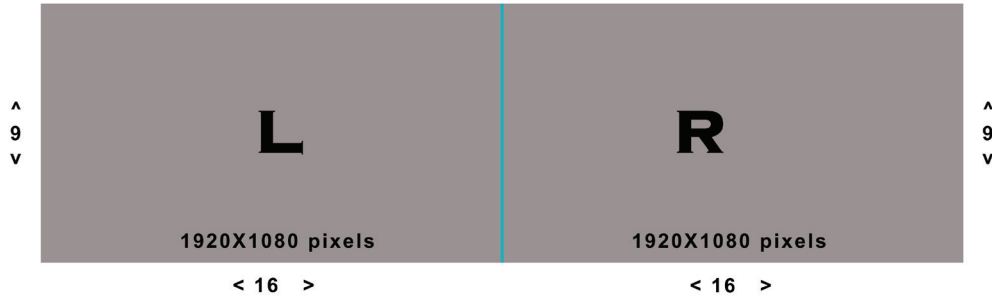
Figure 3: It's important to understand how these display glasses handle stereoscopic images. In 3D mode a 3840 X 1080 pixel wide pair is split between the left and right micro LED monitors in the glasses. No allowance is made for stereo convergence or windowing, you have to do all that yourself, unless your images are already in a 16 X 9 ratio.

Figure 4: Here is an example of how not to set up a stereo pair for viewing in AR display glasses.

Figure 5: This anaglyph shows what the problem with that approach is. The left image is positioned all the way on the right of its frame, and the right image is positioned all the way on the left of its frame. I don't recommend trying to fuse it.

CORRECT PLACEMENT OF LEFT AND RIGHT IMAGES FOR COMFORTABLE VIEWING IN AR DISPLAY GLASSES
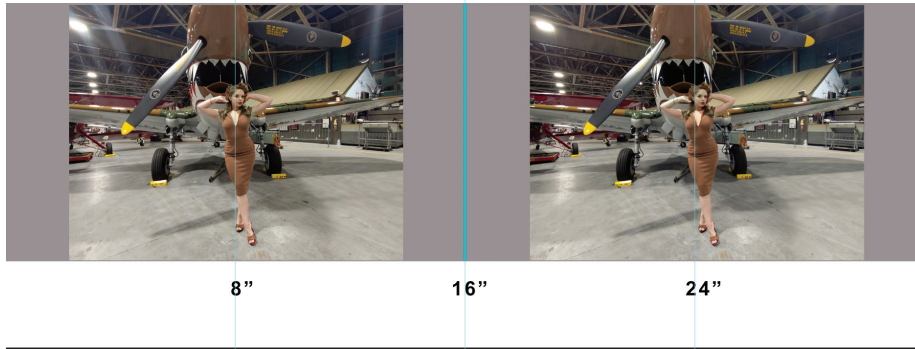
8"   16"   24"

Figure 6: Here we see the solution. Each side of the stereo pair has to be centered in its individual 1920 pixel wide frame. This is how the left and right images need to be configured when working in Photoshop to be able to use the display glasses as a stereoscopic monitor. Note that this doesn't mean your image has to be at that resolution, you just need to center it within its 16 X 9 ratio frame. In Photoshop I suggest setting your image size to be 9 inches high, with the Canvas set to 32 inches wide. This will give you the twin 16 X 9 frames to position the images in. Setting vertical guides at 8", 16" and 24" can help with positioning.

Figure 7: As you can see here this yields an easily fused anaglyph - the 3D view in the glasses will be equally easy to view.

Figure 8: Many of these display glasses come with dark lenses in front of them or auto-chomatic dimming lenses which unfortunately are not able to give a fully transparent view. Since the techniques I'm suggesting depend on being able to clearly see the real world as well as the virtual display you might consider removing the front lenses. Note that this will void any warranty and any such modification is done at your own risk. I've removed front lenses from all three of XREAL's current glasses without any issues, this just requires pushing on them until they pop out. Autochromatic dimming lens have a small ribbon cable going to the top frame. that will easily pull out.

You can see the reflective birdbath optical setup through the frames. The frames provided darkening needed to give adequate contrast and visibility. My solution is to put black electrical tape in front of the birdbath assemblies.

Figure 9: For my XREAL One glasses after removing the lenses I found the unused outer frames to be distracting, so I used a hacksaw to cut them off. Once again warranty voided, at your own risk etc., but this has worked well for me.

Figure 10: It goes without saying that this approach to image editing only makes sense if both the virtual screen and real screen are clearly visible and in focus. I wear non-prescription bifocals which smoothly transition from 1.5 in the upper zone to 2.5 in the lower. After experimenting with various reading glasses I found that I got the best results by taking a pair of these bifocals, removing the arms and using velcro ties to attach them to the XREALs. This allows me to see both virtual and real screens clearly. You'll have to experiment to see what works for your eyes. There are prescription inserts that cover only the birdbath optics, these could be combined with other lenses for the real world.

Note: If you wear prescription glasses, you can order prescription inserts for the XReal glasses from HONSVR (https://honsvr.com/product/custom-xreal-air-2-air-2-pro-prescription-lenses-by-honsvr) for about $50.00. (If you wear bifocals, you will need to specify your distance prescription.) The presciption inserts are perfectly sized to so that everything displayed on the dual HD miniature monitors should be in perfect focus. These inserts do not affect your vision of the computer monitor or anything else in the real world. You many need to add lenses in front of the XReal glasses if you can not clearly see your computer monitor or the real world.

Figure 11: Another way to take advantage of the combination of a virtual and real screen is to use Red/Cyan filters to view the real screen in anaglyph while working with a full-color virtual screen. I've been surprised at how useful this is for optimizing convergence, color and levels on newly created anaglyphs as well as restoring old stereo cards. As you can see from the image this entails attaching the Red/Cyan filters in front of the AR glasses so that the view underneath them is filtered. When a second viewing window is creating in Photoshop you have the option of viewing different sets of channels for each window. This means you can do detailed cloning or healing brush work zoomed in on one side in the virtual glasses while constantly checking how your edits affect the stereoscopic view in the real monitor.
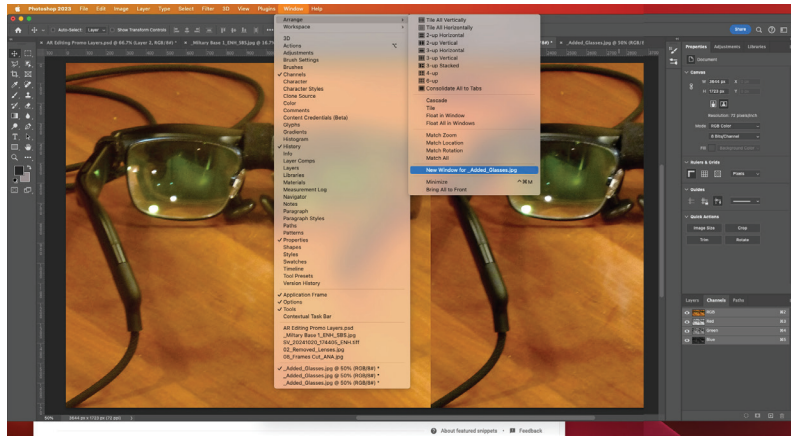
Figure 12: To create a second viewing window in Photoshop - go to the "Window" menu at the top of the screen (towards the right). Select the "Arrange" option, scroll to the bottom of the choices and select "New window for ____"

This will create a new tab with the image next to the tab you are currently working. Drag one of those tabs into the second monitor space created for the virtual glasses. If you've set the Photoshop project up in a 32 X 9 ratio you should be able to go to the "View" window and select "Fit layer on screen" to get a comfortable stereoscopic view on the virtual screen.

Figure 13: This is a stereo view showing the Comte de Paris and his Brother, the Duc de Chartres playing Dominoes as Guests of the Army of the Potomac during the American Civil War, May 3, 1862. There are numerous cracks, splotches and spots throughout the pair.

Figure 14: This is the same stereo view in side-by-side parallel showing the Comte de Paris and his Brother, the Duc de Chartres playing Dominoes as Guests of the Army of the Potomac during the American Civil War, May 3, 1862. There are numerous cracks, splotches and spots throughout the pair.

Figure 15: Here is the same view after about 30 minutes of Photoshop restoring using Red/Cyan glasses to view the pair in stereo on my laptop while zooming in on each side with the XREAL glasses and using Photoshop's Healing Brush, Clone Tool and some good old fashioned painting. The one disadvantage of this approach is that it isn't possible to copy material from one side and paste it over damaged sections in the other.

Figure 16: This is another Civil War stereo view showing Union Artillery Officer Horatio Gibson (2nd from the left) with his officers in Fair Oaks VA. While this pair is in better shape than the last one there are some portions of the right side of the view that have faded.

Figure 17: This is the same Civil War stereo view in side-by-side parallel showing Union Artillery Officer Horatio Gibson (2nd from the left) with his officers in Fair Oaks VA. While this pair is in better shape than the last one there are some portions of the right side of the view that have faded.

Figure 18: Here it is after some quick restoration. This time I had the XREAL glasses in "3D mode" providing a reference stereoscopic view while I edited on the laptop. This made it possible to paint in a partial Levels adjustment to the left side. I was also able to fix some retinal rivalry by copying elements from one side and pasting them to the other. Being able to monitor the results of these change as I made them in stereo was enormously helpful.