Best of Both Worlds: Designing a Copy Unit for Viewmaster (VM) Reels

I have many 5p Realist slides that I wanted to share with friends and family, but I did not want to send them my originals. Even if I did, there is no easy way to help them view my 3d photos without an appropriate, and expensive, viewer.

Most people view my stereo slides through one of my Realist Red button viewers, but almost everyone who looked through the viewer wanted to know where the ***rest*** of the pictures were. They seemed to instinctively recall a time when, as a child, they looked into a VM, and could just pull a lever to change the picture!

I was concerned that the VM format was far too small and might not capture the detail I wished for. I have 7p and two MF 3d Cameras of my own design, so I do appreciate the amazing effect of a large original! I tried using a VM Personal camera and found that the level of detail in *original* VM chips were generally adequate for photos of friends, family, and for travel. I decided that I would try and make a copy unit that would allow me to copy my 4p, 5p, and 7p original stereo slides onto a VM format, to mount, and then share with others.

My first concern in designing my unit was that the separation of the VM Personal camera's optical system would be different from the mounted stereo slides, requiring elaborate prisms or mirrors. I was either lucky, or someone from Stereocraft (who designed the VM Personal) figured that it might be used for just this purpose some day. The VM Personal lenses have a 62.60mm separation; so do my stereo slides! No realignment or prism was needed.

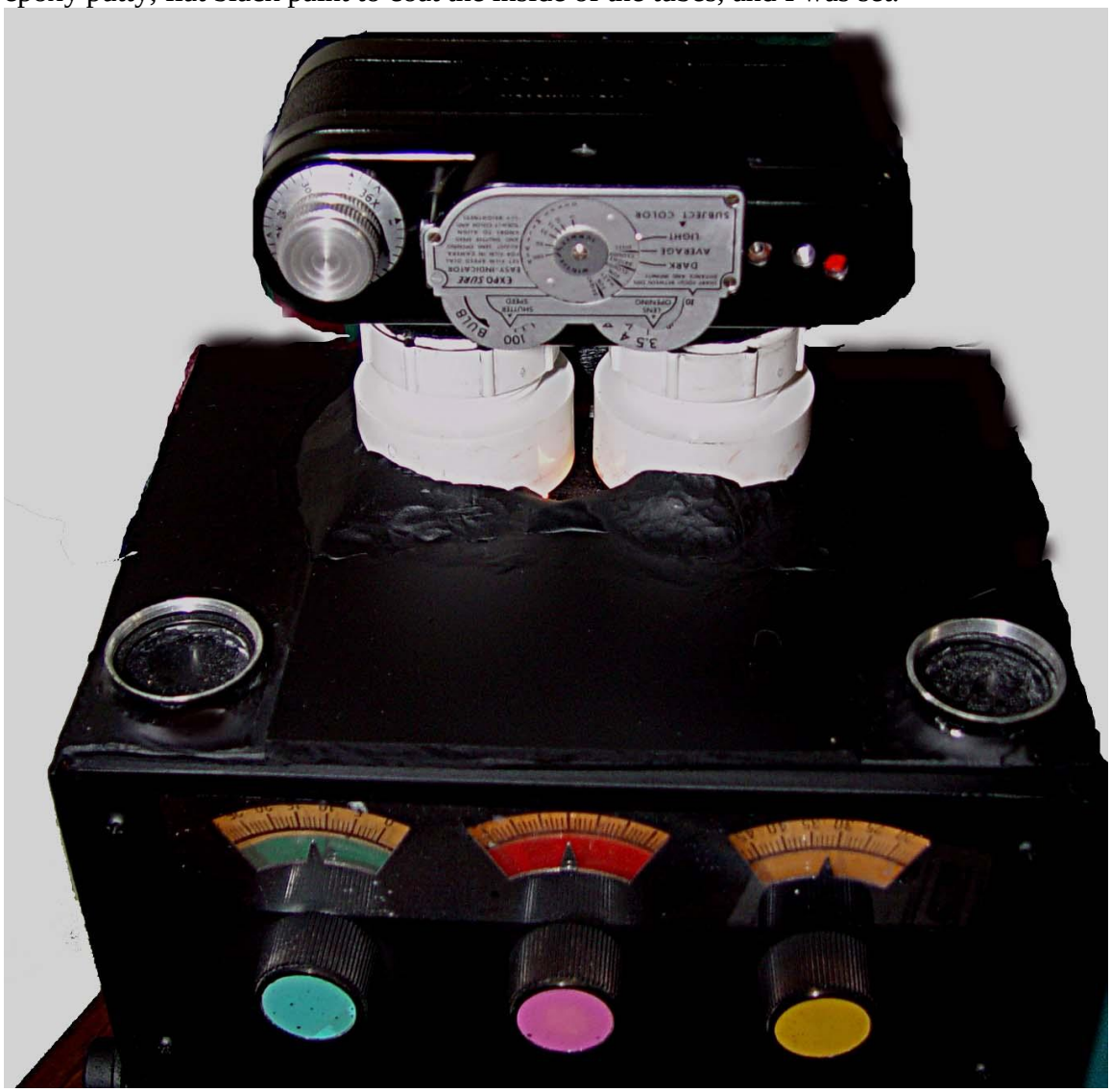
The VM Personal has lenses that shift vertically, about 12mm, when the user changes from the "A" setting to the "B" setting. If the VM Personal is not centered right above the original image when copying, the lenses will shift above or below the original image. I planned for this when crafting my copy unit. When using the "A" setting, the lenses are centered right above the original stereo slide so that the cameras exposure dials face me. When I shift the lenses to the "B" setting, I flip the camera 180 degrees so that the lenses remain in line with the original, but the camera exposure dials now face away, and the camera base faces me. (See the instructions below for an illustration.)

I needed a light source, preferably one that would allow adjusting color balance of originals, or allow me to adjust for different film types. I procured an old Beseler 2 x 3 inch color head from Chuck Rubin Photographics in Louisville, added aluminized reflective paint inside to improve evenness of illumination, and fit it with an appropriately sized piece of opal plexiglass. I then routed out a 42mm x 105mm aperture from piece of opaque Black plexiglass and epoxied it on to the White plexiglass to stabilize it.

I still needed a set of close-up lenses that would give me high quality, or al least the highest quality, copies I could get. Using some optical formulas, trial and error, I finally found that a 48-50mm focal length lens would work. I decided on a 2-element achromat because I wanted the best color rendition. I obtained mine from Anchor Optics, a subsidiary of Edmund Scientific in NJ.

Next, I needed a way to mount the lenses in a way that would consistently and accurately provide the proper camera to original distance. I tried using a camera stand, but it was hard to accurately place the camera time after time. Then I designed a pseudo lens hood arrangement using inexpensive PVC plumbing fittings, so the camera and close-up lenses would rest right against the original slides. I chose two 1 3/4 inch plumbing adapters, which were threaded so I could make fine adjustments to the apparatus. Once I affixed a Series V adapter to one end and attached the tubes to the camera, the correct distance (height of the tubes) was done using a ground glass screen, magnifier, and screwing &

unscrewing the plumbing fittings until the sharpest image was obtained. Finally, a little epoxy putty, flat black paint to coat the inside of the tubes, and I was set.



Final alignment of the camera to the cutout (so that the lens was directly above the originals where the slides would be held) was accomplished in two stages using slow curing epoxy putty. First, I wrapped the close up lens tubes with painter's release tape to keep them from adhering to the epoxy. I then set the camera in vertical alignment (top to bottom) so that the lens in the "A" position would line up with the center of the slides.

Second, I horizontally aligned the slide optically using the ground glass and magnifier. I was able to set the camera on Bulb, viewed the images on the ground glass and made sure that the copied image was centered over each chip on my original. Once I had obtained the best alignment, I carefully pressed the epoxy putty around my lens tubes, rechecked the alignment visually once more, and waited for the epoxy to harden. Once cured, the lenses slid out of the epoxy easily. I added some satin black paint to complete the unit's cosmetic appearance, and I was ready to go.

A few final touches were needed. I added a pair of Series V threaded adapters on top of the unit to hold the special close up lenses so I wouldn't lose them when the unit was in storage. I also got an old meter and affixed it to a PVC tube so that I could measure the light levels transmitted by my originals. There is a surprising amount of fluctuation in density, even if the original slide "looks" normal. Measuring this allowed me to establish the exposure for each slide.

I used Kodak E-60 transmissive targets as a basis for my exposures, and they worked beautifully. I initially tried a wide range of exposures and color balances, just in case. I found that most reproduced well with a narrow range of exposures, and these are listed below.

I tried several different films and found that I got excellent copies using Ektachrome 64T or Kodak EDUPE. Kodachrome also works well, but it has a slightly shorter exposure range (more contrasty) than the EDUPE or 64T. Fujichrome 64T is very similar to

Ektachrome 64T. I have some of the Fuji CDU film, but it is much slower and harder to find than the EDUPE.

Once I had my unit working, and selected some stereo pairs, I photographed a batch of originals, some monochrome some color. I then cut them with a VM Cutter and mounted them in personal reels. In most cases, the 5P and 4P originals only fill a part of the VM frame, owing to the difference in formats. However, the border around the image is black, so you can still experience stereo. There is some unavoidable image degradation simply because of the copying process, but IMHO, still within acceptable limits.

I have sent on some samples for the OSPS to view and enjoy. Feedback and emails are welcome at stereo_shrink@yahoo.com

Shoot more stereo!

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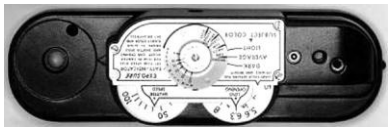
PS: I made a set of instructions to use with the unit, just in case my memory failed me. This follows below:

INSTRUCTIONS ON USING THE VIEWMASTER DUPLICATING MACHINE

1. LOAD VIEWMASTER PERSONAL CAMERA, ADD SPECIAL CLOSE UP LENSES AND MAKE SURE DIAL IS SET TO “A”.



2. PLACE CAMERA WITH EXPO***SURE*** DIAL FACING YOU INTO COLLARS ON TOP OF LIGHT BOX.

3. MEASURE DENSITY OF STEREO SLIDES USING METER AND CALCULATE EXPOSURES USING THE FOLLOWING TABLE:

Meter Reads:	f/16 (EI=64 *)	f/16 (EI=12 **)
64	1 / 20 sec.	1 sec.
32	1 / 10 sec.	2 sec.
16	1 / 5 sec.	4 sec.
8	1 / 2 sec.	8 sec.
4	1 sec.	16 sec.

Film & Color Corrections, if Needed:

Kodak EPY 64T: 10M + 10Y
Kodak K64: 60C + 40M
Kodak EDUPE: 30C + 35Y (see package)

4. WHEN CAMERA HAS USED ALL OF SIDE “A”, FLIP TO SIDE “B”.

5. PLACE CAMERAL WITH CAMERA BOTTOM FACING YOU INTO COLLARS ON TOP OF LIGHT BOX.