The Oculus3D™ Projection System

Exhibitor Guide

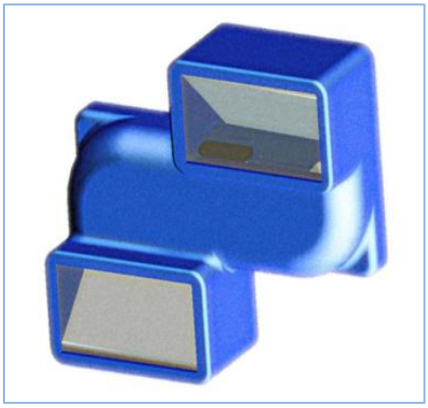
1. System Background

The Oculus3D system is designed for projecting 35mm 3-D movies. It uses a proprietary film format, compatible with 3-D filmmaking and film distribution practices in all respects, and provides an efficient utilization of 35mm film for superbly bright 3-D images. The system is capable of projecting 10-foot-lambert (fL) per eye images with a projector meeting SMPTE spec, on silver screens of just about any size in both 1.85:1 and Scope aspect ratios. For this first release of the product the exhibitor needs to be aware of a few things.

2. Theatre Installations

It's possible to classify two populations of theatres in the United States. The first are older theatres that are longer than they are wide and use longer focal length lenses (50mm and above for 1.85). They typically use side masking to achieve the transition from 1.85:1 to Scope. The second population is one of newer theatres that have a more nearly square footprint and often use shorter focal length lenses. These theatres are setup with 1.85:1 screens and use top-masking to achieve Scope.

Because there are two populations, the Oculus3D system must take into account both. The initial offering of the Oculus3D system, specifically the OculR™ lens, will be useful in theatres with longer focal length lenses. The second offering (summer of 2010) will address the needs of the newer auditoriums.



3. The OculR Lens

The Oculus3D system uses a unique optic, the OculR, consisting of three components shipped together and assembled as a unit:

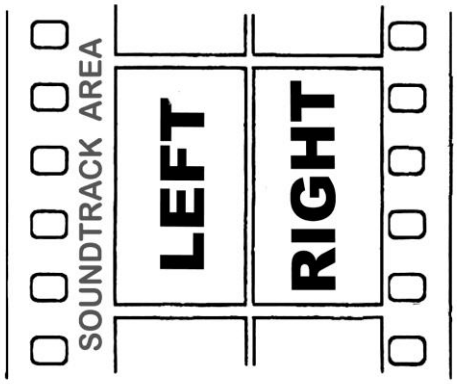
two refractive components, a prime projection lens and an afocal extender/converter, and closest to the screen, one reflective component.

The first refractive component, the image-forming or prime lens, is a high-quality optic designed to produce a much flatter field of even illumination and greater sharpness than ordinary projection lenses. The second component, the afocal extender serves two purposes: (1) to adjust the focal length of the lens for precise screen size and (2) to move the reflective component to the front of the projector.

The third component, the reflection unit, serves three purposes: Its initial job is to rotate the sideframe images through 90 degrees, next to superimpose the images on the screen, and then to polarize the images. The images are intrinsically 1.85:1 and, as mentioned earlier, occupy the entire available Scope aperture.

4. Flat and Scope

Oculus3D prints fill the entire Scope area, with two sideframes, side-by- side, rotated through ninety degrees. In their native state for maximum size the sideframes have the 1.85:1 aspect ratio. Scope prints are achieved by cropping the sideframe keeping a common center. Oculus3D Scope prints are not anamorphically squeezed.



Top Masking. For 1.85 the image fills the screen when it is fully open. To project Scope no change in focal length is required. If the exhibitor wishes to project common bottom then the image location is adjusted.

Side Masking. For 1.85 the image fills the screen when it is side masked. To project scope there are two choices: (1) Use the same approach as top masking and project the image either common center or common bottom, or (2) open the masking to Scope and substitute a short focal length Ocul*R* prime lens to fill the wider screen.

Fixed Masking. Fixed masking is an approach that projects both flat and Scope images at about 2:1. The Ocul*R*, in this case, uses one prime lens with a focal length suitable for both flat and Scope images.

Bottom Masking. For 1.85 the image fills the screen when it is fully open. To project Scope no change in focal length is required. If the exhibitor wishes to project common bottom then the image location is adjusted if required.

5. The Aperture Plate

A Scope aperture undercut plate plank can be used as a starting point but it needs to be filed out to .838 by .715 inches. This is the size of the box that surrounds the RP-40 test chart. The left and right images are hard matted, so the plate is only used to block the sound track and other stray light.

6. SuperLinear™ Polarization

The Ocul*R* lens outputs polarized light that is used to separate the left image from the right image when the patron wears 3-D eyewear. The polarizers in the Ocul*R* have a large area to dissipate heat to ensure long life.

We use linear polarized light in the standard configuration in use for more than half a century – axes in an inverted "V". Our

polarizers have high extinction (100 times better than circular) and cost about 25% less than the circular type used for digital projection. We call our process *SuperLinear* because of its high brightness and because it allows for good head tipping.

Oculus*3D* does not make 3-D eyewear but we refer exhibitors to vendors who follow our SuperLinear formula.

7. The Silver Screen

Oculus*3D* does not sell or supply silver screens (screens painted or coated with aluminum pigment). There are several vendors who do that and we can refer them to you. The silver screen is required for preserving the polarized light created by the Ocul*R* lens.

Silver screens are highly reflective and usually have a gain of 2.2 to 2.4 compared with a matte screen. They sometimes perform better if they are tipped in the vertical to maximize their illumination effectiveness, and also curved to reduce excessive center brightness. The screen supplier or installer can adjust the screen to maximize its performance.

8. The Projector and Lamphouse

If your projector runs at SMPTE specification for brightness the Ocul*R* lens and eyewear will light up you screen with 10 fL. open-gate per eye – through the eyewear polarizers – making this the brightest 3-D projection. It's like having two projectors in your booth – one for the left and the other for the right eye. By comparison the great majority of digital3-D projection is running at something like 3 to 5 fL. So it's worth having the projector run at spec and it's worth using a lamp only for its rated life.

3-D projection requires steady images. The OculR produces rock steady images if you have a rock steady projector. There is no relative movement between left and right images. If required it's best to have your projector, gate, intermittent and shutter assemblies serviced and adjusted to specification to produce the best 3-D images. It's one way to add justification to the special event nature of 3-D and any ticket upcharge.

8. Installation

If your company employs service technicians Oculus3D will train them to do a great job of installation and maintenance. If you use outside contractors we offer a nationwide network of installers. The OculR can be rapidly swapped with flat or Scope lenses after it is installed. The length of time for proper installation can take from several hours in a theatre that is up to specification to several mornings if work needs to be done to adjusted or repair the projector/lamphouse, or increase the size of the port.

10. Projection

The OculR takes the place of the usual projection lens. We anticipate that because of the great number of 3-D shows the lens will remain in place. Although it is straightforward to change the OculR it is bigger and heavier than usual lenses so care must be taken with its installation and removal.

11. 2-D Trailers

2-D runs with the OculR in place: No change or adjustment needs to be made. The audience simply does not wear the 3-D eyewear when watching 2-D trailers.

12. The Port

Typical port glass, by our measure, loses 8% of the light passing through it. Despite this loss you may wish to retain your glass (please clean it!). For the maximum light on the screen using anti-reflection (AR) glass is the way to go – especially for large screens and many side masked Scope installations. We can refer you to a source of AR port glass.

There may be instances in which the port needs to be enlarged. The Ocul*R*, in effect, turns your projector into two projectors, with lenses spaced a few inches apart. Thus the ports in some theaters may clip the image if not opened up. We have tested the Ocul*R* in many theaters and screening rooms in the Los Angeles area and haven't had to do that but we suspect it's a possibility. Instead of increasing the size of the port, in some cases, all that may be required is to move the projector closer to it.

13. Your Theatre – What We Need to Know

The exhibitor needs to provide certain information to Oculus*3D* in order to make sure that we can supply the right unit to do the job. Soon just about all theatres will be able to project Oculus*3D* images, but for now there are some restriction while we roll out the optics suitable for all theatres.

Exhibitors need to tell us: the focal length of the flat lens, the size of the screen for Scope and flat, whether it's top or side masking, also the size of the port, and the distance from the gate to the port. Based on this information, Oculus*3D* will be able to determine whether our first-generation can meet the exhibitor's requirements.

April, 2010