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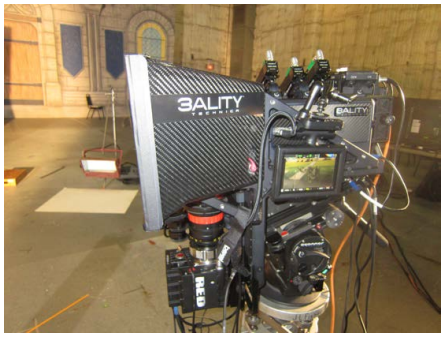
How It Works: The 3ality of 3D Movies

Written by Cole the Kid Critic Tuesday, 14 August 2012 07:01

3D films have grossed billions of dollars and that trend seems to be continuing. So how does it work? Recently I was invited to Red Digital Cinema studios to ask questions about the 3ality camera rig that is often used to film 3D movies such as *The Amazing Spider-Man* and *Step Up Revolution*. So when I went down to the studio I was prepared for anything. When I walked up into the giant mostly barren soundstage, I immediately took notice of the giant backdrop of a cartoonish medieval castle with tons of little kids running around playing Don't Let The Balloon Touch The Ground. The children were there for Red Digital's weeklong film camp which allows them to have hands-on experience making a 3D film.



However, I was there for a demo of the 3ality Technica rigs which are equipped with RED Epic cameras. The rig is an expensive piece of machinery that has two cameras: one camera facing in the normal straight-ahead position and one camera 90 degrees below it that reflects up through the lens with a $6000 mirror. When the camera duo is in the default position, that inside mirror shows one perfectly aligned lens which gives a regular 2D effect. When the cameras move away from each other horizontally, it achieves a 3D effect. The 3ality 3D rig is the most reliable way to film the exact same image at the same time. Without this, the best that can be done is to have two regular cameras side by side (like your eye position). It works but this 3ality Technica rig allows for a better sculpting of the image which the regular camera effect doesn't allow.

The best grasp of what 3D does is to hold a finger up and close one eye then the other; it seems like the finger's position is moving which is the gist of 3D. To get that deep pop-out effect, the screen plane has to be set like an invisible backdrop, defining which images get the most depth. This effect is called Convergence. Images can pop out even more by having the cameras paced farther out from each other which allows certain objects to pop out more than others.

After the demo was over, I spoke with Jill Smolin who educates people about how to use 3ality Technica systems. One of my first questions was why 3D often makes certain films darker when the glasses are on, but once the glasses are taken off the screen appears brighter. She says 3D movies appearing dark is a common problem with an easy solution. Projectionists simply need to turn up the brightness on the projector. Unfortunately, it's an issue because most projectionists don't care enough to do so, which is a big reason why filmmakers like Christopher Nolan refuse to use 3D. Smolin says it's a situation that's aggravating to the 3D

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community; in fact, she found a screening of *The Amazing Spider-Man* nearly unwatchable due to this fixable mistake on the theater's part.

The future of 3D may be glasses-free 3D, a technology popularized by the Nintendo 3DS. Smolin believes that glasses-free 3D is the future, but it's unfortunately not happening soon. She says most glasses-free TV setups require you to sit in one certain position to the screen. Right now, the maximum amount of positions any glasses-free monitor has achieved is 27.

Eyestrain is a common complaint about 3D, or as it's called in the 3D world, "Throw Up 3D." Smolin says Throw Up 3D occurs when the screen plane is so far back that it causes too much depth so that looking at the screen for more than a few minutes causes eyestrain. The audience can tell when this is occurring because when the glasses are removed, it looks like two separate pictures. The viewer's eyes are literally adjusting to looking at two different images at the same time. In fact, the width of a piece of tape on the TV monitor was used to show the line between Throw Up and comfortable 3D.

Coming back to the darkness issue, modern 3D glasses have a dark tint to them which I believe contributes to a darker effect to bright/colorful movies like *The Lion King 3D*. I wondered if it was possible to have clear lenses like those of reading glasses. Smolin says the black tint comes from a polarizer filter, which literally makes the 3D seeable, and that this can't be changed.

However, all 3D glasses are not the same. Smolin says two types of 3D glasses exist: passive and active. Passives are the common disposable RealD glasses, these just take two images and combine them into one. Active is more complex, the glasses are like a computer whose LCD screens continuously calculate how best the picture should be seen by the user. Active glasses are usually seen in the Imax theater and are collected and recycled. Theaters need to collect active glasses because it costs about $100 per pair minimum while the less complicated, disposable passive glasses cost a mere 50 cents each. The disposable are given out for with the purchase of a 3D ticket in America because they're made here and are therefore cheaper. Other countries aren't as lucky - the cost to the theater is higher. In some countries, like the UK, the moviegoer is charged extra for the glasses even after paying the already inflated price for the 3D ticket!

After my Q&A was over, I was able to observe the 12 year olds campers make a minute-long short film about wizards with props like Chinese yo-yos, bubbles, and confetti. It wasn't complicated, but the kids had fun controlling the camera, the convergence, and just being in front of the camera acting. Whether or not 3D is truly the future of cinema remains to be seen, but knowing how the technology works makes the 3D experience that much richer.