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By Glenn Derry

All photos from "Real Steel" are courtesy of Dreamworks SKG. We thank them for their permission to offer this behind-the-scenes peek at their production of "Real Steel," which opens October 7, 2011.



"Real Steel" director Shawn Levy, beside the Simulcam developed by Glenn Derry, outfitted with the Sony F35

Blackmagic Technology Succeeds With Tighter Budgets on "Real Steel"

GLENN DERRY TAKES YOU INSIDE THE PRODUCTION OF DREAMWORKS' "REAL STEEL"

My team created something we call Simulcam, which provides a sort of augmented reality. We've pre-recorded CG characters and backgrounds, and feed them into a camera playback system on set. The director can then see CG elements, motion-captured characters and live actors composited together in the viewfinder or the monitor, using a real time chroma key. He can direct the movie as it will be seen in theaters, rather than guessing on set how live action will work with CG, and hoping to make it work in post.

This is the next generation of the system that we developed for James Cameron to use on "Avatar." We gave him a tool that he could use in real time to combine pre-viz environments, motion-capture, and the typical pieces of a live action movie. It was played back for Jim, but also sent straight into the Avid for on-set editorial. Editing and metadata cataloguing was beginning even as the shots were being recorded, connected together into what we call a virtual production system.

It was a little different on "Real Steel," where, with "Avatar," we spent years experimenting with this technology, and here, it was ready to go. More important, these tools were used less for visual effects than to support traditional narrative storytelling. Yeah, there are boxing robots in "Real Steel," and I understand why when you look at the trailer you might think that it's only



GLENN DERRY

boxing robots, but the main part of the story is between a father and a son, played by Hugh Jackman and Dakota Goya, who's just amazing. They bond over these boxing robots, but the robots themselves are a backdrop to the father-son story. It's a really heartfelt movie, and the approach that the director, Shawn Levy, took very much reflected that.

So we were able to use the tools we developed for Jim Cameron on "Avatar" to support more traditional storytelling by someone who isn't a visual effects-oriented director. It actually made things much easier for Shawn. He was able to lean on his animators

and effects team to come up with solutions to problems, and focus his attention on the performances.

VIRTUAL LOCATION SCOUTING

In this case, most of what we're concerned about for "Real Steel" was the fights themselves that took place in four or five arenas, although not really arenas in the traditional sense. One was a field, another was a factory, and is set in an abandoned zoo in Detroit.

You might say that we scouted the locations virtually. We would review a location, do HDRs, and build a mock-up of the area. The art department could use that to build a physical set that we put into our motion control capture environment.

This allowed us to choreograph a fight months ahead of time the actual layout of the physical set is built into the CG model much earlier in the process.

Those decisions help inform the art direction because while you're choreographing, you see a shot. "That would be cool. You know what would be even cooler? If we add a doorway here...or we're going to need more people here." We take care of all of this months ahead of time, and shoot it with our virtual camera. We already know where the CG elements are, and we already know where our live actors need to fit into it – and we know that the entire shot works.

We can go even further. "Okay, it's going to be 35mm lens, facing northwest," and a lot of other things that we would have had to work out on set anyway. We can get away with building only half an arena, and know that we only needed 600 extras to sit in sections A1 to A6. We could then know that we'd always have a full set of extras in the background of every shot. We used them to populate the stadium, and used 180-degree flips depending on what side we were shooting from.

Then once we start shooting, everything makes sense geographically, within the context of the fight itself. So, you have this fight with really cool choreography. You've predetermined what the angles are going to be that will work really well for the actual fight between a CG characters that aren't even there. And you have your live actors positioned exactly where they need to be. That's how the director has the extra time to spend with his actors, focusing on their performance. Every aspect of the logistics has been mapped out long ahead of time. It's not, "Let's just shoot now, and figure out later where it fits." There's no sense of place that way.

This way, you know exactly where you are in the fight the whole time. The camera operator, the Steadicam or crane operator – whatever they aim it, however they frame the shot, it all makes sense, because they can see the previz CG and the live actors together in their viewfinder or on their monitor, in real time. Camera operators can see exactly what they're going to get from a set-up, all the way through post. This is imperative for giving them the freedom to do their work on set, and be confident that it's exactly what the production needs. It's exciting to watch them when see that they can work in that kind of context. With that information in the hands of the director, the DP and all the camera operators, you're basically walking onto the set with an uncut sequence in hand. "Okay this is my shot, this is my shot, this is my shot." Breaking it down this way, sort of like by the numbers, we were able to jam through these huge fight sequences very quickly. Think about the biggest, nastiest CG effects shots, how long does it take to set these up? Forever, right?

Not for us. We were picking up on days on what would normally be the slowest part of a production.

LOCATION TECH

We did some stage work, but the bulk of the work was in several live-action locations in Detroit. The easiest thing for us to was to set up a 22 foot production trailer that had in it engineering, some of the video assist equipment, an Avid Unity with two Avid editing seats, and a Truelight color station, all built into this trailer. We were also to roll our video assist carts and other gear in and out as we moved from location to location.

Otto Nemens provided our Sony F35s, lenses and camera platforms, and they helped us set up a quad-link network



Inside the engineering section of the location truck for Real Steel, on location at the Detroit Silverdome



Hugh Jackman, right, with director Shawn Levy



Robots battle in "Real Steel"

connected over fiber. The cameras had one little box on the back of them. And everything came out of the camera over a single CAT4 fiber that ran back to the truck. From the truck, we would send back out to the set everything they needed for monitoring at the video assist carts, video village and all that good stuff. We were in certain locations where we couldn't get in, we had to set up way, way down the street. We brought six miles of fiber in all.

The cool thing about fiber is that it's fiber, man. It's really durable, and the signal integrity is very high if it's set up right.

In addition to the picture mastering, we did a lot of what we call Image-Based Capture. We had a series of cameras — in this case, six EX3s — placed around the location, pointing to an area,



Front of one of the video assist carts for "Real Steel." Each day typically had nine cameras rolling — three Sony F35s and six Sony EX-3s — and video assist carts for all of them including Blackmagic Design mini-connectors and routers, including Blackmagic Smart Videohubs.

and we basically did live optical flow motion capture, to capture things that weren't mo-capped during pre-production.

On a normal shooting day, then, we would have three F35s and six EX-3s connected to the truck, and a cart for the guy operating the EX-3s, and feeds for the video assist guy, the video engineer, the colorist and the editorial, plus the other video assist carts around the set, for the director and others. All of it was run through Blackmagic Videohubs.

Because every single node in the chain was also a networked Videohub — we had GigE running over the fiber everywhere — we could switch any monitor from anywhere else on the network. We built a cool little custom front end application so that somebody could pre-set a bunch of buttons to do whatever he wanted them to do, and then just press one button to switch all the Videohubs into a particular shooting mode.

None of this had to be in any one place. This is very different from other routers, in that we didn't need to be homerunned. Everything could be dispersed in the way that made most sense physically.

COLOR-TIMED DAILIES

We used Blackmagic mini-converters for all of the hard copper SDI connections in each of the carts, and then we used HDLink Pro 3D

Displayport on some of our color correct monitors. The cool thing about those is you can play out proper output transforms to the monitor you're working on. You've got an HP Dreamcolor monitor attached for instance. You can build the proper 709 output, probed so that it's correct, and then build an output transform just for that monitor so that it matches back to the color profiles already set up during pre-production to match up in the DI later on.

We treat that live/CG material from the Simulcam just like you would footage coming off the video tap of a camera. For that and the live-action footage, we're cataloguing metadata as it's rolling right into the Avid while we're shooting. The footage is color-timed properly, with all the appropriate hooks that will allow you to get back to the source media, like an online-offline workflow.

As soon as we hit the stop button, we're done. We have all the footage captured, color-timed and sitting in the Avid, ready for anything. We have an assistant editor on the set to make sure that everything is coming in organized the way the editor wants it. He can start cutting on the spot, or walk away with a hard drive that has everything on it — color-timed footage, real-time previz comps, all kinds of metadata — and be ready to go. The material is already prepped, so basically, we're doing finished dailies as we shoot, immediately.

COUNTING UP THE SAVINGS

Working this way, we cut conservatively \$2.5 million dollars out of our budget. The money came out of film processing, and it went into hardware on the front-end to a certain degree, but it was so much more cost efficient and so much more elegant.

I'm a proponent of doing things right. Doing so much work in setup means that the production is efficient as it can be, both with the live action shooting and budgetarily. As a result, I'm becoming more of a producer now. I understand the technology, and how it can be used with the right people to operate the equipment so that things are as efficient as they can be. Otherwise, all this tech is a waste of breath. You have to understand where the budgetary efficiencies are.

We've been learning a lot about this over the years. People think that we had an unlimited budget on "Avatar." Let me tell you, everything was budgeted. It was tight. Every single penny spent on making "Avatar" is in the final print.

I look at a film like "Real Steel," and we came in under \$80 million. I don't kid myself. This is still a big-budget picture, but it has all the same large-scale visual effects that you would see in a \$200 million movie. The reason we were able to do it is because we planned it. We knew what we were going to shoot and shot it. Not one day went over — not one — so by the end, we actually wound up ahead of the production schedule.



By Ramy Katrib

Producing Features? A Hawaiian Vacation Compared to Episodic Television's Velocity.

DIGITAL FILMTREE SHARES HOW DAVINCI RESOLVE SPEEDS THEIR EPISODIC TV WORKFLOW

As Digital FilmTree has evolved, we have focused on building exceptionally stable workflows. This includes including "Cold Mountain," where we built the first major film infrastructure to be based around Final Cut Pro. We have also built systems for global-scale, effects intensive features including "Sky Captain and the World of Tomorrow," "The Forgotten Kingdom," and "Where the Wild Things Are," among others.

We not only designed the first Final Cut Pro-based workflow for prime time television on "Scrubs," but we created internal workflows that enabled us to simultaneously post three different TV series on three different networks.

We have come away from this with two major lessons. First, we have learned that, in comparison to weekly TV, features are a Hawaiian vacation. The velocity of weekly episodic TV has forced us to be far more creative. Second, in all of our attention to speed, we cannot afford to compromise stability.

So why on earth would we blow up a proven workflow in the middle of the season while working on two prime-time series? This would appear to threaten both speed AND stability. But with the reward potentially so high, we were willing to take the risk.

NCIS: LA

This year, we are handling both "Cougar Town" and "NCIS: LA," which is the one I'll focus on this time. It came to us through Erik Whitmyre, whom we worked with on "Everybody Hates Chris." He approached us to discuss the possibility of working on a new hour long TV show. Even before knowing the show name, we started mapping out possible workflows. We were pleased to discover that we landed the job, and that it was a spin-off of one of TV's most popular dramas.

Principle photography for "NCIS: LA" (or NLA) is with two ARRI Alexa cameras, recorded to Sony SR tapes, at 10-bit

uncompressed in Log C. When they shoot untethered, they record directly to SxS cards at ProRes HQ in Log C. LUTs are created by the DP Victor Hammer and DIT on set, using the Truelight LUT box.

In addition to the ARRI Alexa, NLA shoots on a stunning variety of cameras and formats on any given episode. These include Canon 5D, 1D Mark IV, 7D, 60D, Rebel T2i, JVC GY-HM100, Nikon 7000, GoPro, Sony F900 and DVCAM.

Every night, DFT receives 5-10 SR masters, and a drive containing master files from all the file-based cameras. We process it all to ProRes LT, while baking in the SR-recorded LUT using a Blackmagic HDLink box. All file-based codecs are converted to ProRes LT as well. For both SR footage and file based footage, we sync DEVA sound to video.

All dailies are delivered to NLA Editorial at 6:30 AM. Each episode is assigned to one of NLA's three editors and three assistant editors. When an episode is locked, an FCP project file is emailed to us, at which time we begin to online digitize at 10bit uncompressed from master tapes. All file-based codecs are converted to 10bit uncompressed as part of the online as well. Once online assembly is completed, our online editor, Jacob Tillman, begins conforming the project, exporting VFX, prepping for color grading and performing quality control.

Dylan Chudzynski, Senior VFX Artist, creates all VFX elements for each episode, which contains between 100-300 VFX elements. This is where DFT's Senior Colorist Patrick Woodward comes into the picture, and where the twist in this story begins.

WINNING WITH DAVINCI

I came into the industry 12 years ago as a DaVinci colorist, but we found alternatives that we wanted to share. One of Digital FilmTree's first steps as a company was to self-publish Color



Article title photo: Ramy Katrib in Digital FilmTree's machine room. Upper right: (L-R) Ramy Katrib, Patrick Woodward, Henry Santos. Middle right: Henry Santos and Patrick Woodward (at console). Bottom right: Patrick Woodward grading a scene from The CBS drama "NCIS: LA" stars LL Cool J, (shown here) Chris O'Donnell, Daniela Ruah and Linda Hunt.

Correction for Final Cut Pro Users. Shortly after, we produced the Color Correction for Final Cut Pro DVD, and another book, Advanced Color Correction and Effects in Final Cut Pro 5.

Blackmagic Design purchasing DaVinci in 2009 piqued our curiosity. Henry Santos had been my assistant telecine operator before joining me at DFT, and when DaVinci Resolve software for Mac was released, we bought several copies and a couple of consoles, and he and DFT's Senior Colorist Patrick Woodward started testing it. "I'd already played with the Linux version of Resolve and really fell in love with it," Patrick confessed. "Once I got to work with the Mac version, I found myself working so much more quickly that I started campaigning to shift over to Resolve right away."

Right away, as in mid-season!

This was crazy! We had a perfectly good workflow, which, besides color, included hundreds of VFX shots, titling, online conform and re-conforms.

But according to Patrick, it wasn't as big an adjustment as we thought it was going to be. It took a couple of weeks to work out the kinks, but after everyone settled into the new workflow with Resolve, we were able to turn around NLA episodes even faster.

Patrick and Henry let us know about several specific features that have become extremely helpful. One is that everything is in real time. This allows us to color time material without having to leave the application in order to preview. We can complete a first pass grade, making changes with the client as we go. In past preview sessions with clients, the notes could not be addressed until later. Another round of approvals would have to take place, which took extra time.

He and Henry can also preview color correction previews with audio. The Node Based Image Processing function provides unlimited options of stacking grades allowing for more precision. The Secondary Key has the HSL and Matte Keyers which allow for further precision when isolating areas of a shot, and 3D Tracking adds literally another dimension to our control.

"Sometimes we're not getting elements right until the end, but I feel like I'm spending less time handling the logistics of a shot, and more time coloring," Patrick told me. "So in that sense, it's not time SAVINGS as much as it is time SHIFTING. I'm now able to spend more time working on the shot."

Especially because we are performing similar tasks for "Cougar Town" at the same time, we are reminded every day that the velocity of weekly episodic TV is far beyond any feature film. Our ability to actually pick up speed, without compromising stability even while completely changing over mid-season, has made Resolve the clear winner for us.



By Tim Lewis

Blackmagic Design Delivers Sports for Proshow Broadcast Trucks

SPORTS NETWORK RELIES ON BLACKMAGIC DESIGN VIDEOHUB FOR MONITORING HD BROADCASTS

Proshow Broadcast is a bit of an unusual hybrid of a company. We started as an audio company, doing a lot of support for large scale entertainment and broadcast events, and grew from there to an AV company directly servicing the broadcast industry. Proshow Audio/Visual still handles rentals for concerts, conferences, awards shows and the like, but our sports clients were outgrowing what we could do in a flypack-based package. This led us to small trucks.

The mobile sports business is dominated by big providers with fleets of 53 foot HD trucks that are doing the top level stuff. And there's a whole second tier of the business that is doing secondary-level events, for instance in the college ball realm, running on networks like Comcast Sports Network VS, and FOX Sports Net that have a little lighter equipment requirement.

The business sprung open for us because we had been using these smaller trucks that are perfect for regional sports. Although we're based in Vancouver, British Columbia, most of what we do is in the Pacific Northwest of the US — for example, we broadcast all the games for Oregon Ducks football, basketball and baseball. But we've hit

the right size, price point, and availability to go even as far afield as Chicago and Winnipeg, especially in the fall when hockey, basketball and football all start overlapping each other.

READY FOR HD

The transition to HD has been slower for regional networks, but everybody is now demanding HD, and it has put inordinate strain on the inventory of HD Mobile that's out there.

Once again, we found ourselves very well positioned. When we built our first truck, we knew that the demand from our customers for HD just wasn't there. We saw we might have two more years that we could see revenue out of an SD package, so we designed and wired the truck for HD, but first configured with SD equipment that we knew would subsidize our transition to HD.

To begin, we raided the gear from a couple of fly packs that we owned. We got ourselves on the road with that for a couple of years, which worked out very well. By 2009, we made the major investment to go full-on HD on our first truck, with the second one getting upgraded close on its heels



Two of the eight Sony HXC-100 HD Triax Cameras in Proshow Broadcast's Prodigy production package.



In the "DivaHD" production room, a small section of control area monitors with patch bays, all run through the 72x144 Broadcast Videohub.

It was a significant investment to fully commit to sports and HD at the same time. For the two trucks, we bought a total of 14 Sony HXC-100 digital triax cameras, 18 Canon HD zoom lenses up to 68x, EVS XT(2) HD 6 Ch LSM servers (they can be HD or SD, but ours are all HD), Grass Valley T2 iDDR Intelligent Digital Disk Recorders, the new Chyron HyperX to handle the HD graphics, and the Abekas HD Clipstore MXc.

Monitoring in our ProdigyHD truck includes Miranda Alto 10-input and quad view HD multiviewers, two 37" Marshall quadviewers, and 10 20" Marshall HD monitors. The DivaHD truck includes a couple of 45" Sharp HD quad multiview displays, three 22", nine 19", and other multiviewers integral to the switcher.

The switcher for ProdigyHD is the Sony MVS-8000GSF Multiformat Digital Switcher with 2.5 M/E, 24 crosspoints, 34 inputs and 24 outputs. Diva uses the Panasonic AVHS-450 switcher with 18 inputs and 6 outputs, and 32 crosspoints. Both switchers also have frame stores, effects, keyers, resizers and all the rest, of course.

I'm leaving out quite a bit, but both were significant packages. About the only area we didn't really have to upgrade in the truck was audio.

SIZE MATTERS

We're not a 53-foot truck with an 80,000-pound GPW. We have small trucks, under 40 feet long, with a 27 foot box, but we still carry a full 8-camera package, audio, tripods, cabling, and everything else. Even with two engineers riding in the cabin, we still don't tip the scales overweight.

It's not an expanding truck, so it can sit anywhere –

loading docks, curbs — and it deploys very quickly. One of our clients refers to it as the 10-hour truck because it's one of the few trucks they work with that can actually be in and out within a 10-hour call. The big 53-footers were doing parking and power two hours before crew call. We can park and power 30 minutes before crew call, and have the thing on its checks and air-conditioned and stairs in and equipment unloaded and ready in half an hour. We can be out in an hour flat.

Doing the best job is still important, but we're doing it with ten crew in the truck, not 15 and 20 people. It's a practical scale for many situations, including college ball, and a practical price tag for people who want HD at for what they were previously paying for HD.

CENTER OF THE UNIVERSE

All of our monitoring is done with the Blackmagic Broadcast Videohub. We first bought that router to do the unaccredited media center for the 2010 Olympic Games here in Vancouver. As you know, there are two media centers in every Olympics. In fact, the one for the non-rights holders is bigger, with companies like ESPN, ABC and CBS to name just a few. We served as the center of the universe



Patch bays and servers inside Proshow's "ProdigyHD" truck.



A Proshow engineer uses Blackmagic Design's iPad app to manage routing through the Broadcast Videohubs, which are permanently installed behind the wall.

for that media center, handling every feed for the entire facility, and it worked out well.

In the meantime, we had a 64x64 router in our ProdigyHD truck. But as we added more VTRs, and we added another EVS, and we upgraded our monitor walls, the sheer number of in and outs involved has far exceeded what 64x64 router could

hold. The Broadcast Videohub with 72x144 was a natural step up. Everything that we need to look at goes into it.

It's also an easy thing to program and switch. In the case of our larger truck, we don't even have any hardware remote panels. We're not really changing things on the fly. We program it at set-up, and maybe make a couple of changes during the show. With the iPad interface that's available for it, our engineer can walk through the truck and find out what people want on the wall, then just take his iPad and program it up. It's working brilliantly.

We also have dozens of Blackmagic Mini Converters. Everywhere. Many of them are wired directly into the truck's patch bays, so that they're permanently in line. We have dozens more that we use as throwdowns. For \$1,500 in converters, you're good to go for anything that comes up. You never know what's going to land where.

For example, we're all digital HD, but we sometimes need to get down to analog SD run through the existing stadium wiring. Or one

client might need to have a Beta deck in the mix – well now you need video in, out, and the super outputs – so a minimum of three converters just for the video on an analog deck.

Some of our clients bring their own decks, including 720p decks, where our trucks are 1080i. Then we get guys who show up with these little handycams and say, "Hey, I just shot this great thing while I was walking around, and I want to get it onto the EVS." Well, we just take the HDMI out of the camera, run it through one of the Mini Converters, and come out with HD-SDI with embedded audio, and we're off to the races.

THE FUTURE

There are big players in Canada and the northwest US, and they're GREAT players. We were unprepared to go up against them. But we've seen this whole second tier market that still wants to put a quality HD product on the air, but needs a bit different equipment model to do it.

We're not sure where we'll go with the next truck. We're kind of watching things play out over the next year and then decide, do we build another one of a similar size, or do we go for a little more room while still keeping well under 53 feet? We're not sure, so we're talking to our clients to get their input on what works and what doesn't. Smaller companies are seeing the opportunity to dramatically improve what they offer on these regional sports channels with affordable HD. We don't want to outgrow the best part of our market.

But we're watching, and we're paying attention.



Control Freaks

Phoenix's Copper Post has found "the touch," thanks to DaVinci Resolve's hardware control interface

For the better part of four years, I've been working as a Colorist/Motion Graphics Artist with Copper Post, a full service post facility headquartered in Phoenix that opened in 2002. As the company has grown, we have required bigger and better tools to get the job done, improve workflow and increase efficiency.

Copper Post recently added DaVinci Resolve for Mac by Blackmagic Design, including the nice, hefty control panel — finally some tangibility! Since I'm a musician, you can imagine my excitement at being able to do my job much more intuitively than squinting at a monitor and trying to fine-tune with a pen.

It's almost like being in a spotlight with all the monitors around me, and the control panel softly lit up. With clients behind me, I can almost hear the cheering. I can't help but feel like I'm back up on stage playing music again.

My enthusiastic experience working with Resolve seems to connect the concept of spinning records with two things: 1) The speed and intuitive nature of the software/hardware and 2) the intuitiveness I'm able to translate from my hands to the screen. I can just **feel** where the color needs to go.

This is how I felt color grading "Queens of Country," the first independent feature film colored using Resolve for Mac. The film tells the story of Jolene, the prettiest girl in a small Arizona town, who is living in a fantasy era long gone. After an evening of country line dancing, she finds a lost iPod filled with songs that speak to her sensitive heart, convincing her that the owner must be her soul mate, and thrusting her into a heartwarming and hilarious adventure.

The film was shot using 2 RED MX cameras and a combination of RED Primes and some long Nikon lenses. Principal photography took place in May/June, 2010; offline editing was completed that December; and the film is scheduled to be complete by Summer, 2011. In addition to color grading, Copper Post was responsible for the film's post-production, including dailies through visual effects. Rob Beadle, owner and senior editor of Copper Post, served as post production supervisor and offline editor of the project.

Directors Ryan Page and Christopher Pomerence, the Arizona-based filmmakers behind the hit documentary "Blood into Wine," worked with Director of Photography Dan Stoloff to establish a timeless and classic "look" for the film that was created through a blend of wardrobe, set design and color optimization.

Using the RED camera, Dan was able to dial in the look they were hoping to achieve during principal photography. Our main goal with color grading was to optimize the look established for the film. We pushed colors to increase their richness, and looked for ways to create a "hyper-real" reality to visually express main character Jolene's view of the world.

SOFTWARE PERFORMANCE

Compared to previous software solutions we had used, the increased speed and shorter render times in Resolve translate into a more client-friendly experience. It's been pretty incredible seeing how our clients interact with the system, knowing that they will be able to try multiple things to establish a particular

look or color effect without falling behind in the timeline. It certainly makes for a more enjoyable experience, and allows me to provide better service.

Several scenes with lots of energy took place in a country bar, and they all had wide variations in color and lighting. The Resolve's tracking capabilities, combined with Power Windows, was really impressive, especially when working to bring up detail and highlights in faces. I was able to isolate difficult areas, such as dark-set eyes, bringing up the brightness with a track that was flawless. (The VFX guys were actually jealous!)

Jolene wore western-themed dance costumes, that were embellished with fringe, sequins, beading and rhinestones, reminiscent of the glamorous country stars of the 1960s. We used the shape recognition tool to call out these special features in several of the scenes. As an example, the precision and accuracy of the tool enabled us to bring out the details in intricately detailed fringe on her blue vest by opening up the mid-range hues, directing the audience's eye, capturing the movement of the fringe as she moved through the bar.

HARDWARE INTERFACE

Working with a mouse and/or pen and tablet to color grade hasn't always been ideal, especially since I'm left-handed. Selecting curves and trying to work specifics with a pen and tablet seemed to limit my ability to control and fine-tune the software, especially in a high-pressure, quick deadline setting. I can honestly say that my efficiency has grown since transitioning to the control panel. Now, I'm able to use both hands to control the grading process,

making fine tuning and navigation incredibly fluid.

Our DaVinci Resolve is based on a 12-core Mac Pro with 48 GB of RAM, and connected to our 24 TB XSAN. Internally it hosts an ATI Radeon HD 5770 to run the GUI, a Blackmagic Design Decklink Extreme to output to both our 42" Cine-tal Cinéma and a 50" Panasonic VT20 for clients.

We are able to add extra PCIe slots to our computer thanks to the Cubix GPU-Xpander, which holds a RED Rocket card and 3 NVIDIA Quadro 4000 cards. With this amount of horsepower in one computer, we are able to color correct raw .r3d RED footage with several Power Windows in realtime at 2K.

OUTPUT TO FILM

When it came time to prepare digital files for output to film, we partnered with FotoKem's Los Angeles facility. Given the number of night/bar scenes, we selected Kodak stock to provide a more dramatic feel. We used FotoKem's in-house LUTs to convert the digital footage, allowing our graphics and color team to work with linear files simultaneously. This streamlined our internal process and eliminated the need for us to work with a conversion algorithm.

With coloring for "Queens of Country" now complete, and a satisfying flow of commercial and corporate projects underway at Copper, it's exciting to think what I'll be working on next. It's a great time to be in post! I'm looking forward to what's next and, until then, I'll have my hands full delivering the projects that are my next big "performance."

By Clive Hunte

Band on the Wall

One of England's most venerable live music venues keeps its eyes on the future with Blackmagic Designs' Broadcast Converter and DeckLink HD Extreme 3D



Band on the Wall is not only an iconic live music venue in Manchester England, but also a charity that includes music education and a recording studio. It goes back to the 1800s as the George and Dragon Hotel and pub. Musicians have been playing here since the 1930s – jazz, punk, electronic, world music – you name it. Everyone from Dizzy Gillespie and Lonnie Liston Smith to Mike + The Mechanics and Julian Marley, to Manchester punk legends Buzzcocks, Joy Division and The Fall.

I used to take photographs back in the day, and in 1988, I wanted to take pictures of a sax player called Andy Sheppard who was playing at Band on the Wall. They said it would be no problem, so in return, I gave them some prints. The relationship took off from there. Today, my role is Archive Technician, and the position is paid for by the Heritage Lottery Fund. It's a five year grant for archiving photographs from the venue's history, but also filming and archiving recent performances here.

Filming takes place in the main hall using three Panasonic AW-HE100 HD pan and tilt cameras. These things are amazing – really beautiful pictures, even in low light. They're connected to a Panasonic AW-HS400 Vision Switcher, and controlled remotely via the Panasonic Hybrid Controller AW-RP55.

Above left, Band on the Wall in 1979, courtesy Kevin Cummins.

Clive Hunte with bass, on right, playing with trumpeter Matthew Halsall, left.



Right: In the 1930s, the George and Dragon Hotel became known as "Band on the Wall," because of its very narrow stage, high up at the far end of the pub. The photo here is from 1937.



We broadcast a live HD feed of the concerts throughout Band on the Wall. And then there is the Picturehouse, a building next door that used to be a cinema going back to the early 1900s. It's now part of Band on the Wall: a quieter place for people who would like to chill out and have a drink, rather than come up where it's louder and more crowded. They have three LCD screens, as well as two electrical drop-down screens.

There is also an Aura high contrast LCD rear-projection screen pointing toward the street, so sometimes we project concerts from inside to attract people in.

We decided to use Blackmagic Designs Broadcast Converter to send video feeds everywhere we need to, and it has been a lifesaver for us. We feed SDI out of the Vision switcher, to SDI in on the Converter, then HDMI out of the Converter to an HDMI/CAT 6 box.

At the same time the Broadcast Converter is feeding all of the screens in Band on the Wall, Picturehouse, and facing the street, it is routed to our Sony HVR-M25AE HDV deck to back up the concerts to tape.

When I record the concerts for archiving, I take uncompressed HD over SDI into a Blackmagic Design DeckLink HD Extreme 3D card in my Mac. Once that footage has been captured using Final Cut Pro, I edit clips for uploading to YouTube, Vimeo and other sites.

I then use Compressor to archive the full concert using the ProRes codec, which is then backed up to our Drobo system, and written to Blu-ray as data.

BANDING TOGETHER

Part of my job is to encourage people interested in music and video to come to Band on the Wall for free basic training in using the A/V equipment. Most are students studying media that come in to gain experience. Once they're competent, I'll let them film a whole show unsupervised. That is only a small part of what we teach. Upcoming classes include tap dancing, folk fiddling, and advanced jazz improvisation.

My favorite thing about working at Band On The Wall is the music. It's the best job in the world, an extension of what you love. Being able to film musicians, it's brilliant!

I think everybody apart from the marketing department is a musician, all the way up to the boss. Myself, I play bass, all kinds of music. I even played on Lilly Allen's hit, "Smile." (I never met her, but there I am.)

I'm playing now in a band with a jazz trumpet player called Matthew Halsall, a DJ and a beatbox, doing live remixing of his music: The Matthew Halsall Remix Project. We have gigs all over Europe this summer, including the Glastonbury Festival.

Band on the Wall have also sent me to London to learn more about what's coming in the industry, especially around streaming. That's their next goal, but there are still things to be worked out with record companies.

I don't think there's any place in the world like Band on the Wall – concerts, music education, as well as the history. It's an amazing place.



Above, "A Certain Ratio," photo by Alex Staszko.

Below, recent archive photos from Band on the Wall.





At left: Tim Dashwood monitoring 3D signals on set using the Blackmagic DeckLink HD Extreme 3D and HDLink Pro 3D DisplayPort.

TOOLS AND TECHNOLOGIES FOR WORKING WITH 3D ON THE SET

by TIM DASHWOOD

The nature of how we shoot 3D and monitor it on set has changed as we have learned from our mistakes.

Today, I would say 75% of stereographers out there prefer DPs to shoot in parallel. Not necessarily parallel rigs, with cameras side-by-side, since beam-splitter rigs are more flexible and therefore much more common — but instead, pointing both cameras straight ahead, literally shooting parallel to each other.

Of course, there are two schools of thoughts about this. There's one that says, "Let's get it in the camera and be finished." I can see certain advantages to just shooting, then handing it off to post. But then I see a lot of stereographers who abuse convergence. They have toed in to set the convergence at the center of their scene, giving no consideration to the three-dimensional depth, or the distribution of objects, in the scene.

What happens in post production at that point? Well now, I want to shift the convergence. But in the simple act of toeing the cameras in towards the center, you create a keystone effect. Now each camera has an opposing keystone that we have to

correct. Any time that we saved on set by shooting converged might be gone, because now we're doing more correction in post production.

The software tools that we have developed can handle that, though. Many other tools in the market can also handle keystone correction, but it's one of the tougher disparities to actually fix up by eye. You're basically introducing a third dimension of geometric correction at that point, which takes a lot more time to fix.

This is one of the major advantages to shooting parallel: convergence can be added in post with more control, with fewer errors to fix. There is still the challenge of finding out what potential errors might be developing in a shoot, and this is what we are beginning to address.

CONNECTING PRODUCTION AND POST

We are typically using beam-splitter rigs. One camera will have a flip or flop in it, because it is shooting through the mirror. That is going to have to be rectified at some point. Even before



Working with Stereo3D CAT camera alignment and analysis software.

that, we have to deal with the fact that these are two, separate, parallel streams. We haven't done a horizontal shift to choose a convergence point, so when the two streams are muxed, everything in the scene is going to be in negative parallax, coming out of the screen.

Of course, we don't want to show the client that. We want to show the client or the director exactly what the final product is going to look like. So in our software, we can do a convergence shift. We can also line up any disparities between the cameras that for whatever reasons we haven't either had time to tune out, or maybe we're using a particular rig that day has an inability to tune out a certain disparity. So we can actually show the clients a sense of the finish product, while having some sense of what we need to do to complete it.

Until now, we have been using Blackmagic's own capture software. But we have developed our own software to support ingest of 3D material, and output to monitors or for recording, called Stereo3D CAT. It takes the two inputs, and analyzes the images coming in. We can check color calibration and geometric calibration. We can calculate the depth of the scene, and actually see representation of the depth in the scene. We can see where the convergence point is, and make adjustments.

This works in conjunction with a chart we have developed with DSC Labs, called the Dashwood 3D Chart. It has visual code trackers that automatically track to 1/1000th of a pixel for ideal stereo alignment. The chart also offers an interface for

live feedback to assist in automating camera alignment, sync testing and slating, and color and gamma calibration.

All of these tools link back to the Stereo3D Toolbox software suite that we have already been shipping for Final Cut Pro, Motion and After Effects. Any information that the on-set stereographer has gathered using Stereo3D CAT can be passed through to editorial, where they will use Stereo3D Toolbox to address it. This direct communication from the on-set stereographer to the editor in post is one of the ways that we hope to bridge the gap between production and post production.

ON-SET REVIEW

All of this begins with on-set monitoring of the 3D signals. The big tool that we use for this is the Blackmagic HD Link DisplayPort 3D box to mux our 3D streams. Anyone doing 3D needs to plan to have a few of them in their inventory — for instant dailies, for preview, and so many purposes, it's just a wonderful little box. No matter what we're shooting, we have some of those around.

The left and right signals we send through it are of course already genlocked together. We can capture that output if we want, put it on tape, we can down convert it — there are a lot of things we can do with that signal, but in our case, mostly we just view it on a monitor.



For ingest on set, we use the Decklink HD Extreme 3D card inside a Mac Pro, recording a separate left file and a separate right file, full raster 1920 by 1080. That's going to an internal RAID in ProRes HQ.

The great thing about the HD Extreme 3D is that it has HD-SDI inputs and outputs with loop through. We can go into the Mac Pro first, so it's recording the separate left and right eyes, and then we can loop into the DisplayPort 3D muxed. We can then also record that output on a different computer, so that we can get our side by side dailies immediately.

We've actually been using Blackmagic cards for 3D for years. Before the DeckLink card even existed, we were using two Intensity cards with HDMI, and Blackmagic HD-SDI to HDMI converters to get our HD-SDI signal in. We even put two Intensity cards into a Mac Pro and they showed up as two separate inputs. Then Blackmagic came out with the Duo card, which is basically the same thing, but on a single slot.

But today, having the DisplayPort 3D box, and the Extreme 3D card in our Mac Pros, has made a big difference. I'm really glad they came out with these.



Photo at left: Tim Dashwood's production company Stereo3D Unlimited, in partnership with ARRI, Stereo3D Tango, JVC and Zeiss shot Ariana Gillis' "Shake the Apple" music video with two ARRI Alexa cameras.

To learn more about Blackmagic Design and our philosophy of delivering "what ever it takes to give creative editors and designers the very best quality tools," please visit our story at:

blackmagic-design.com/company/overview

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