

Small Camera, Big Picture

With the season finale of FOX TV's *House* shot entirely with Canon EOS 5D Mark IIs, will more professional productions follow suit?

By Skip Ferderber

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What more is there to say about the season finale of FOX TV's *House M.D.*, which is the episode shot entirely on the Canon EOS 5D Mark II HD DSLR? A lot, actually.

Oh, not so much on the facts of the production itself. Unless you've been shooting in Mammoth Cave for the last four months, you probably know a fair amount about how the episode entitled "Help Me" came to be, and since the show aired on May 17, the commercial and critical reaction to it. We'll talk more about the show and the shoot in a moment.

The bigger story is what it all means. For an industry used to stunt programming, the idea of a major network series using a still camera with video "smarts" to shoot a network TV episode has brought out equal levels of awe and cynicism—as well as downright hostility as evidenced by some industry blogs. Slamming HD DSLR rolling-shutter artifacts that distort horizontal pans, inadequate on-board audio support and low recording bit rates that complicate visual effects in post are popular topics.

But like *Avatar*, which raised the bar on 3D production to a new level, the *House* episode has opened the door to HD DSLR cameras being used as principal cameras in broadcast/cable television, feature films and commercials. The possibilities include brilliant video with amazing shallow depth of field from a very small camera, a fearsome reduction in crews, staff, equipment and rolling stock, and the ability to shoot in very tight spaces in extreme low-lighting conditions.

According to the hands-on production team on *House*, the key factors for using the 5D on the "Help Me" season finale were twofold: its small size and its astonishingly large sensor, which is a full-frame (24x36mm), 12.8-megapixel sensor, delivering essentially an 8-perf

35mm image matched by few other cameras—film or video.

“[The size is] VistaVision format, which used to be used for big spectacles back in the ‘50s,” notes House DP Gale Tattersall (*Ghost Ship*, *Pushing Tin*). “It’s enormous—four times the real estate of a 16:9, 3-perf frame. It’s like moving up to a 4x5 or an 8x10. The thing about the 5D that’s totally unachievable on any movie camera—and I don’t care what it is—is that you can achieve a shallow depth of field that’s unmatched.”

Tattersall also found he could control the lighting by adjusting the ISO on the fly. “You can’t change the exposure by changing the shutter speed; that’s fixed at 24p at a 50th [shutter speed] if you want it to look cinematic. But you can control your light by dialing the ISO up and down. It’s like having 50 different film stocks in your back pocket. We went regularly from 100 ISO to 1600, depending on the circumstances.”

But it wasn’t all smooth sailing. According to Tattersall, there were some problem areas shooting with the 5D, including rolling-shutter issues during fast panning movements and racking focus backward and forward.



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Another issue, he notes, relates to the 5D design. “As soon as you take a feed out of the camera, you can’t look through the eyepiece,” he says. “The little LCD monitor on the back goes black. So you have to go out to a small five- to seven-inch monitor that’s mounted on top of the camera for the operator to use. That extra monitor enables you to loop out and send the feed to video village and also a feed to your focus puller.”

Then there were some dynamic range concerns that go with any digital recording. “You lose a little bit of dynamic range, maybe as much as three stops,” explains Tattersall. “Our entire episode took place at night so it was all lighting, and that’s when one has control of the exposure. It wasn’t such a big issue.”

Tattersall received some help by using a Marshall LCD monitor, which employs a color system that shows productions where the levels on exposure gradients are. Calling it a quick and safe way of evaluating exposure and monitoring for peaking, he adds,

“[That’s] the big danger that a lot of traditional DPs such as myself have faced. You tend to think, ‘Oh, I’ll just give it a little more exposure and have a nice rich neg,’ which is absolutely fatal in digital because if you overexpose a tiny bit, then you clip everything at the top end and it looks awful.”

Continues Tattersall, “Since we had the 5D assignment thrust on us at the last moment, our first assistant had virtually no time to adapt to a totally new and unfamiliar digital system in two days. Redrock Micro came to Fox Studios with a truck full of accessories, so we constructed workable systems based on the Redrock Field Cinema Bundle. This provided handheld and studio tripod-mounted setups that accommodated the follow focus and the 7-inch Marshall monitor to be incorporated in no time flat. We came out of the gate first thing, first day of shooting, looking professional, and thanks to the help from Redrock, we pulled it off.”

The ability to shoot in very low-lighting conditions and the camera’s small proportions made it the perfect choice for the “Help Me” episode, which was shot in a collapsed building. House director and coproducer Greg Yaitanes wanted the audience to be right there with actor Hugh Laurie during his long night. “Looking at the episode, my goal as a filmmaker was to create a very realistic environment for [Hugh] to deal with spaces that were truly tight and claustrophobic,” he says.



For the season finale of *House*, the production employed Canon EOS 5D Mark II HD DSLRs to shoot the entire episode. For the shoot, they used Canon still lenses and a Marshall LCD monitor to help in evaluating exposure and focus. Although the camera crew enjoyed working with the small HD DSLRs, the cameras aren’t ideal in all situations. ABOVE: DP Gale Tattersall’s Redrock Micro/5D rig based on the Field Cinema Bundle.

Shooting the collapsed building sequence in 35mm film, the standard for all *House* episodes, went out the window because the film cameras were too big for parts of the sets that were only two feet, six inches high. “We spent days on our bellies and days on our hands and knees,” reveals Tattersall. “The idea of shifting around our regular ARRI cameras on gear heads that were taller than the ceilings of the set would have been a living nightmare.”

The Canon EOS 5D Mark II, however, allowed them to roll A and B cameras, plus a self-directed floater in the highly confined space, and fulfilled the production’s aesthetic goal of allowing the audience to enter the head space of lead character Dr. Gregory House and how he’s separated from reality. Taking the background out of focus was the method they chose to show his state of mind; the camera’s physical size and its ability to handle depth of field perfectly matched the story line.



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5D Workflow

Coproducer Allen Palmer became convinced the 5D would work after shooting tests prior to production and comparing its output with the film cameras. “At one point, we cut together a scene intercutting film footage with the 5D footage,” explains Palmer. “We color-corrected the scene, evened it out, put grain reduction on the film footage and then we output it to a high-def QuickTime file that I brought back here to our offices. I brought people into my office and said, ‘Okay, can you tell me which is film and which is video here?’ A lot of people had trouble telling the difference. That was the point at which I knew it would work.”

A further requirement was that the quality of the digital footage matched the film look of the previous episodes. “We had to develop a workflow that was going to fit within our existing film-based editorial scheme,” says Palmer. “In addition to that, the studio wanted to have all the material laid off to tape so it could almost become like a virtual negative and be an archival copy. So that pretty much dictated that we use what I call the ‘brute force’ approach to converting the material.”

Every clip shot was loaded into the Avid DS finishing system and laid to HDCAM SR tape. The video layoff reel and production sound then were used to create comp reels of the circled takes, which were recorded simultaneously un-color-corrected to HDCAM SR for assembly and color-corrected to .dbc and .mst files for dubs and offline editorial.

“From [the editors’] viewpoint, it wasn’t any different than a film episode,” says Palmer. “And that was part of the goal. It needed to fit within our regular Avid editing system.”

“The biggest problem with using the 5D camera in production was the skewing, or Jell-O effect,” he adds. Palmer saw issues with moving the camera around quickly, both in lateral movement and movement in general, even on a tilt-up if someone was standing up out of a chair or similar movement. Quick movements needed to be carefully monitored while shooting. “If you’re doing fine tracking for a visual-effects shot, you’ll probably be surprised how much distortion there is within the image. You see straight lines start to bend when they shouldn’t be bending. I think that’s one of the things you just have to be aware of as a limitation with systems that scan that way as opposed to a film camera. In really dark scenes, you can see a little bluish grid pattern that starts to appear mostly in dark material, but there was nothing artifact-wise that was going to take away from the storytelling.”

While some may wonder what technology “shortcuts” Canon is using to overcome its sensor deficiencies (e.g., line skipping or pixel

binning), Neil Smith, CEO of Hdi RAWworks, a company that develops workflow systems to integrate HD DSLR cameras and digital motion-picture cameras, has a different question. According to Smith, in still mode, the 5D shoots 12-bit RAW footage, but as a video camera, it outputs 8-bit H.264, which is a definite downconvert from the camera's full capacity. The mystery, to him, is how that 8-bit footage looks as good as it does—not only on 8-bit HDTV receivers, but also on large-screen, 10-bit, 4:4:4 RGB projectors. “Have they built on their knowledge in still 8-bit photography and made it applicable to 8-bit video?” he asks.

Smith also believes that moiré is a problem. (Moiré is a ripple or wave pattern that sometimes can appear on screen.) During a recent shoot, a short film shot at the Hollywood Park racetrack in Los Angeles by DP/blogger Philip Bloom using a modified 7D, one shot showed the limitations.



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Shooting the last leg of a horse race, the camera panned the horses all the way to the finish line. In playback, the moiré patterns between the horses and the horizontal rail, in Smith's understated description, “didn't work at all.” Shooting against a herringbone pattern also produces moiré.

When it comes to color correction, 5D footage creates a “thin neg,” says Smith. A skilled DP can create a beautiful image with the 5D, but, in his words, “you can't push it around as much as you can a 10-bit log or 12-bit linear image. You can adjust black levels, white levels and gamma, but there's definitely not as much room to push the neg around as you would from a much more expensive digital cinema camera. But then, at the price point [of the camera], that's to be expected.”



Adds Smith, “These cameras aren't as forgiving as more expensive cameras, but if you have a DP who knows their limitations and works with them, then you can get a very nice image. You have to be a bit more precise in your exposure than you may on a more expensive camera.”

What Lies Ahead

What may be most instructive today, and a stronger clue to tomorrow, is to understand how the three *House* episode principals view the future use of the camera in their own production plans. Would they shoot an entire series with it?

Palmer is cautiously optimistic. “I think there are limitations,” he says, “and moving the camera around is a big one, both in lateral movement and movement in general, even on a tilt-up. You just have to be aware you can't have those quick movements. [But] I think it's absolutely possible. Obviously, if this was the regular shooting format of a series, I would want to design a workflow that takes much better advantage of the file-based system and is able to pull stuff right out of the camera and bring it into editorial.”

Tattersall sees it happening with the right director. “If Greg was my director, then absolutely [yes],” he says. “Although I think it could be rather dangerous [working with] other directors who have less flexibility to work around the frailty of the system.”

And Yaitanes is unequivocal about his enthusiasm to work with the small camera again. “When I get back into the pilot game, that's a ‘definite’ to explore.”

Concludes Yaitanes, “We did this [episode] because it was called for; we would never be opposed to doing something like this again when it's called for. But until there's a digital format that gives us all the security of the focus and all the ease in which we worked with

film on a normal day-to-day episode of House, then it's just going to stay on film.”

Visit www.fox.com/house for more information on the series. To learn more about the Canon EOS 5D Mark II HD DSLR, visit www.usa.canon.com.

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