Dr. Glen Boyle (Lennie James) suits up to save a patient in the medical drama *Critical*.

Complex Procedures

By Phil Rhodes

"*Critical* was always conceived of as a show that would not hold back on anything at all," says cinematographer Tim Palmer, BSC. He speaks of a series that is widely described as a medical drama, although the production exhibits an almost documentarian interest in its depiction of medical procedures. Furthermore, the production schedule for the 13-episode first season was far from conventional. When the cameras began to roll in February 2014, Palmer says, "nobody quite knew how long it was going to take. The producers knew they had to finish filming 13 episodes by the middle of October, and that we'd fill in the time accordingly."

Palmer's background includes work on a wide variety of popular British series, including episodes of *Doctor Who*, *Silent Witness*, *Life on Mars*, *Hustle* and *Wire in the Blood*. Prior to his motion-picture work, he recalls, "I started out as a stills photographer in the late Eighties." His move toward cinematography took him through the National Film and Television School at Beaconsfield Studios and a series of jobs as a camera trainee, including *Institute Benjamenta, or This Dream That One Calls Human Life*, which was photographed by Nic Knowland, BSC.

"I owe so much to Nic," says Palmer. "He gave me my first break as a clapper loader. He was shooting a big-budget TV drama in Africa called *The Dying of the Light* and had to use a lot of local crew. It was not working out, and one evening I received a call asking if I could get on a plane to Ghana, and that was that."

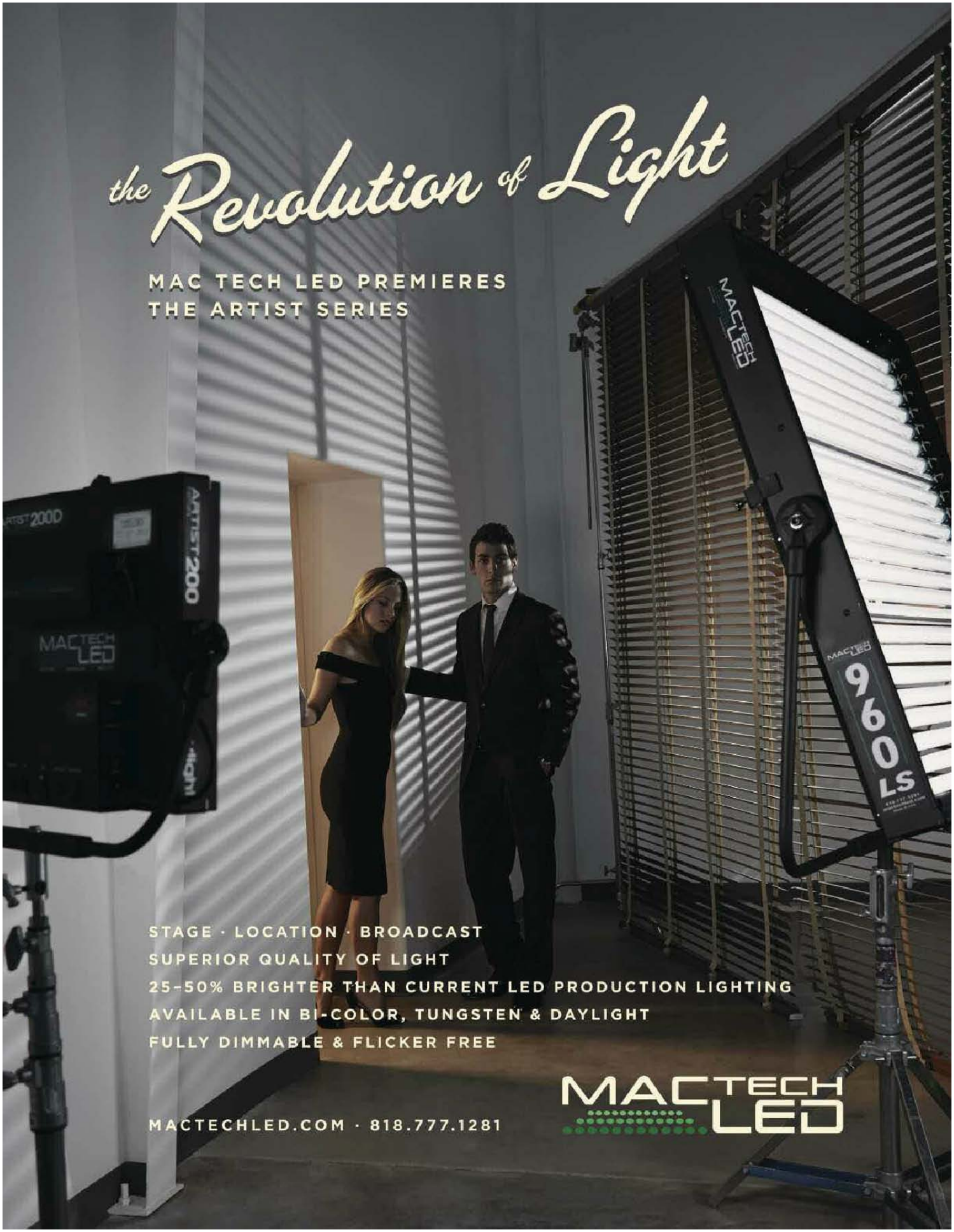
Palmer's involvement with *Critical* began early. "Graciously, the producers brought me on board at a very early date — I was involved from mid-November [2013]. Long before the sets went up, we were having discussions with the production and set designers about the extensive use of built-in LED lighting and how it would be incorporated into the set. It was a groundbreaking show in terms of its reliance on LEDs to light such a large portion of the set."

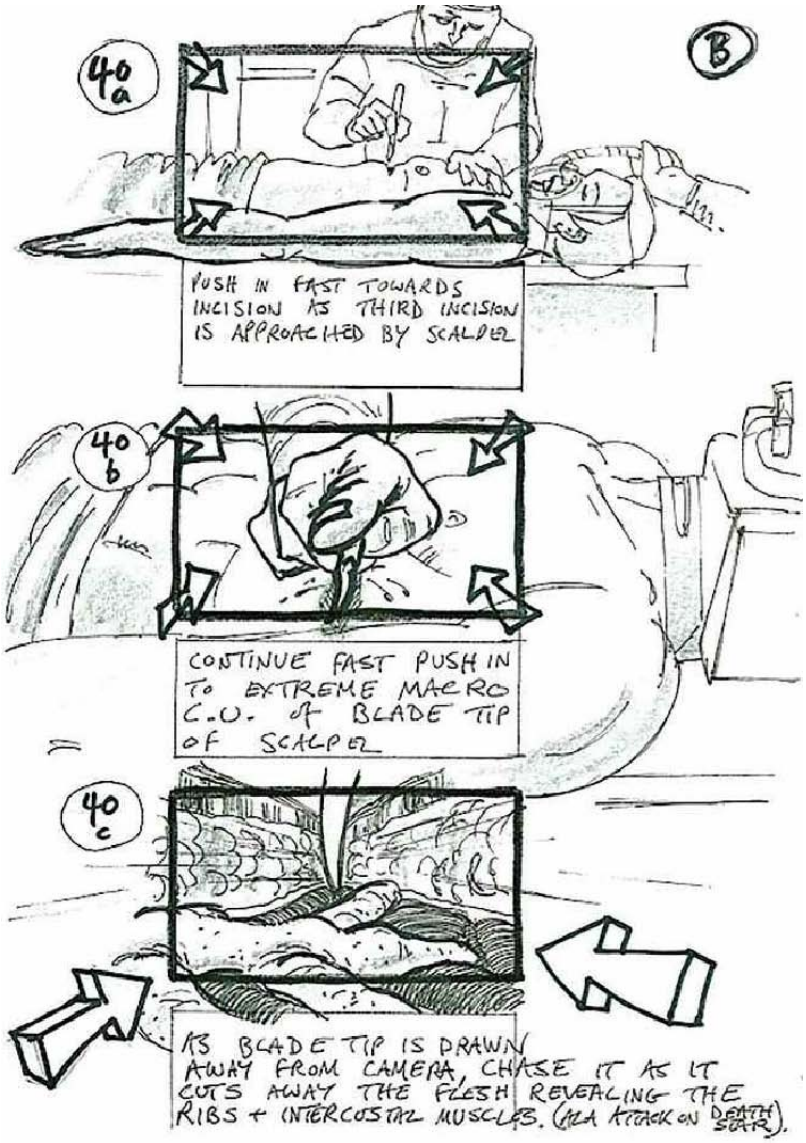
U.K. vendor LED Flex supplied RGB color-mixing light strips, which worked in conjunction with color-mixing Fresnels. "The set was color-coded," explains Palmer, who worked with gaffer Chris Bird. "The resuscitation department was blue, the O.R. was green and the CT room was red." While Palmer used Arri's VersaTile LED panels — in their cooler 5,000K incarnation — much of the practical lighting built into the set was more prosaic. "All the ceiling panels were dimmable LEDs," the cinematographer notes. "They were not LED panels designed for film, specifically; they were just commercial industrial units from a supplier that kits out office buildings, but that particular supplier happened to have the best CRI in the industry.

"Up in the grid there were about 50 Arri L7-C [Fresnels]," Palmer continues. "For complex tracking shots when the camera had to revolve around the characters, the L7s could be programmed so that a block or run of lamps could fade off and their opposites could come up on multiple cues, so that the actors remained backlit at all times. It was very liberating to have such quick control over lamp color and exposure. This, in turn, enabled us to be even more creative with lighting."

Weather and the time of day were written into the script, allowing each of the one-hour episodes variability in the depiction of exterior light. "We shot episode two first," Palmer recalls. "It looks good, but from my point of view it's the flattest. The learning curve was steep, and I realized that letting the practical lighting drive the look, though making the sets very easy to shoot, resulted in not

Critical photos by John Rogers, courtesy of Hat Trick Productions. Additional images courtesy of Tim Palmer, BSC.


the Revolution of Light
MAC TECH LED PREMIERES
THE ARTIST SERIES
STAGE · LOCATION · BROADCAST
SUPERIOR QUALITY OF LIGHT
25-50% BRIGHTER THAN CURRENT LED PRODUCTION LIGHTING
AVAILABLE IN BI-COLOR, TUNGSTEN & DAYLIGHT
FULLY DIMMABLE & FLICKER FREE
MACTECHLED.COM · 818.777.1281
MACTECH LED



Storyboards for a surgical scene whose shooting technique was based upon the "attack on the Death Star" sequence in *Star Wars*.

enough overall contrast. What started to work better was to introduce stronger sources through the windows and correspondingly reduce the ambient levels inside. If memory serves me correctly, we began the shoot with the interior LED levels set at 80 to 100 percent, but by episode three they were down to 25 to 35 percent."

The first episode — and the second to be shot — was scripted to occur at sunrise, and represents the results of Palmer's realization. "The idea was low sunlight, and if you look at the quality of that type of light, you will see peachy, warm highlights and very indigo fill." Implementing this look required "conventional sources," he adds. "We used 2.5K [HMI] through the windows, warmed up with a Full CTS gel." Palmer also used in-camera settings in pursuit of his photographic goals: "Because all the LED practicals were 5,600K daylight-balanced, it became a simple matter of setting the color temperature on the camera to 4,300K. This kept the light coming through the windows warm, but really cooled down the fill light."

The production's sets were constructed at Longcross Studios in Surrey, just a few miles southwest of London. "The production designer, Malcolm [Thornton], was fantastic," Palmer enthuses. "Over the Christmas holidays the art department poured this hardened resin floor across the whole set. It was half an acre at least — it was enormous. When we came back for the last month of prep in January, this immaculate floor was in place and it remained pristine for the 10 months [of production]. The beauty of it was that it was designed to function as a studio floor. We only laid one track over the course of the shoot and that was because the camera had to move in a dead-straight line. You could dolly anywhere on dolly wheels, even at 290mm — the [long] end of the Angenieux Optimo 24-290mm [T2.8] zoom." Other lenses included what Palmer calls a "standard set" of Cooke S4s.

Creative filtration included the occasional use of a Vantage Blue-Vision filter, which adds an anamorphic-style horizontal streaking flare. "We did look into shooting anamorphic, but the costs were too high," Palmer accepts. "I only used [the filter] when there was a definite point source in frame."

In addition, Palmer made extensive use of an Optex Excellence periscope-borescope system from Take 2 Films in London. "When I went to interview for the job, I had a gut feeling that a device of this type would prove invaluable. I had been doing some research on the making of the 'attack on the Death Star' sequence in *Star Wars* and knew that the filmmakers had shot the scene with a camera and periscope lens suspended from an overhead track. The producers agreed that this would make a good starting point as an approach to filming the surgical scenes."

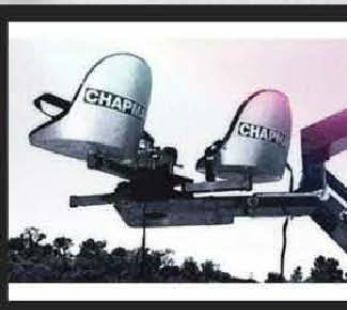
Such decisions, however, are not made lightly, given the budgetary implications of such a specialized piece of equipment. "It's a really expensive lens," Palmer concedes. "We shot tests in all its configurations and showed these tests to the Sky [network] execs. The presentation must have gone down well, because we were allowed to have the lens as part of

CHAPMAN/LEONARD
STUDIO EQUIPMENT, INC.

Hydrascope
Telescopic Cranes
15′ 20′ 32′ 43′ 60′ 73′
Fully equipped for any environment.

Hybrid IV
camera dolly
Featuring an increased payload up to 700 lbs.

Cobra VT 22-61
camera dolly
Chapman/Leonard's smallest camera dolly.



www.chapman-leonard.com
Ask about our ORLANDO SOUND STAGE

LOCATIONS:

California	(888) 883-6559
NM, FL, TX, OH, LA, NY, GA & Canada	(888) 758-4826
UK & Europe	+44 172 783 8424
UK site:	www.chapmanleonard.com

Cranes | **Dollies** | **Camera Cars** | **Pedestals** | **Remote Heads**

Top: The "attack on the Death Star" visual. Bottom: Cinematographer Tim Palmer, BSC mans the camera, while director Jon East (wearing glasses) looks on.

the camera package for the whole job. It proved to be the right decision because we used the Excellence two or three times every single day. The lens took us to places we would never dream of going: highly unusual close-ups of actors, under arms, through fingers, into fridges — all sorts of things that really gave the show its signature style."

That style, says Palmer, also has its roots in Stanley Kubrick's films. "The director, Jon East [who helmed the first three and last four episodes of the season], and I wanted [*Critical*] to have a Kubrick look," the cinematographer acknowledges. "We are both big fans of Kubrick. Jon told me his father took him to see *2001: A Space Odyssey* when it first opened, and that childhood experience cemented his desire to become a filmmaker. I went through *A Clockwork Orange* and *2001* literally frame by frame in order to analyze the compositions."

Kubrick's rather geometric approach to framing is something Palmer "really tried to adhere to — I made an effort to keep the camera absolutely level, especially with such a rectilinear set, which from any view contained multiple vanishing points and myriad horizontals and verticals. Particularly on a wider lens, I'd get quite obsessive about ensuring that the camera was absolutely level, to the point where I would check to make sure the tilt was 'on the bubble' before locking off the tilt, and then only jibbing to alter the frame height and not tilting the camera."

Additionally, the filmmakers made a point of avoiding mid-range focal lengths. "In a lot of preproduction conversations with [East], he didn't want anything in the middle; he either wanted it to be really wide or really long. We were between the 14mm and the 21mm on wide and mid shots, then the 27mm and 32mm for close-ups. After that it would be the 100mm and 180mm. There was very little use of anything between a 40mm and a 75mm." On the periscope, Palmer generally mounted the 14mm, with occasional use of the extremely wide (and non-rectilinear) 10mm lens.

Writer-producer Jed Mercurio is an ex-cardiologist known, as Palmer puts it, for "bold medical dramas." With *Critical*, Palmer adds, Mercurio was "determined to show everything exactly as it was, in as minute detail and with as much veracity as possible. Within each episode there were three, perhaps four major events, whether it was a resuscitation or an invasive surgery or a CT scan. Once we knew what procedure we were going to be filming, there would be a medical advisor — sometimes two or three from St. George's [Hospital] in Tooting — who'd come on set and start talking through with the actors what would be happening at that point."

The talk-through of the proposed procedure, Palmer remembers, could easily take two or three hours, followed by another two hours of rehearsals. "One character goes to fill a syringe here, another character is putting on a mask here — all action that would need to be procedurally correct. As the drama was being filmed in real time, every single piece of action would have to be covered on camera. When you get to an operation, it would become even more detailed. We could easily spend half a day rehearsing. It's unheard of in TV. But when we started filming, it was non-stop for five or six hours, save for reloading cameras and changing lenses." The result was a greatly variable production schedule. "Some episodes were finished in 12 days, some in 17 or 18 days. It depended on the complexity of the surgical procedures. It was a whole new paradigm in a sense, certainly for me."

Your 4K Toolbox

FiDO-4T FiDO-4R **Extend Your 4K Reach**

AJA's FiDO line of SDI to fiber optic transmitters and receivers are the ideal way to move signals over long distances without the need for repeaters or distribution amplifiers. The latest addition to the FiDO lineup takes this concept to the next logical step with the ability to handle up to four individual SDI signals in one lightweight, compact device. This is especially useful in 4K applications where four 3G-SDI connections are needed to carry 4K images. FiDO-4 can extend these signals up to 10km utilizing locking ST fiber connectors to prevent accidental disconnects.

4K2HD **4K to HD Down-conversion**

Keep your 4K images looking great, even in HD.

Easily integrate 4K/UHD signals into HD workflows using AJA's high-quality down-conversion technology. The 4K2HD Mini-Converter provides both SDI and HDMI outputs for local monitoring and facility-wide routing.

Hi5-4K HA5-4K **Convert 4K between SDI and HDMI**

Integrate 4K HDMI and SDI workflows.

Integrate 4K HDMI and 4K SDI workflows easily with Hi5-4K and HA5-4K. With support for High Frame Rates up to 60fps, you can seamlessly combine professional SDI 4K signals with more affordable 4K HDMI equipment for whatever your workflow requires.

AJA® VIDEO SYSTEMS

Because it matters.®

Find out more at | www.aja.com

Palmer used the Optex Excellence periscope-borescope system on *Critical* to capture hard-to-reach perspectives.

A particularly complex sequence could take two or three days to shoot, with two or three Arri Alexa Plus cameras in use. "I'm very comfortable with the camera," says Palmer. "I knew it would deliver exactly what we had in mind. I was keen to convey the idea of a very white, very futuristic, sparkly and clean environment. This approach will often benefit from searing highlights to make the whites feel 'alive,' and I have complete confidence in the Alexa to deal with massively overexposed highlights in a naturalistic and sympathetic way."

Palmer's approach to monitoring is similarly straightforward: "I grew up with film and watched one-light rushes the following day. I would never ask the labs to do graded rushes; I just wanted to see things as they came out of the camera, as that was the only way to tell if the lighting and exposure were correct." For a similar workflow in the digital realm, he says he used a "simple Rec 709 LUT and that was it. If the pictures look good on Rec 709, you know that you are in the right place." Dailies were processed at London's Molinare. Colorist Gareth Spensley performed the final grade, also at Molinare, with FilmLight's Baselight.

Palmer currently enjoys a full schedule, with work underway on the *Masterpiece* period drama *Indian Summers*. At the time of writing, *Indian Summers* was on location in Penang, Malaysia, an environment that could hardly mark a greater contrast to the sterile corridors of *Critical*. The hospital set, remembers Palmer, had the capacity to surprise even real medical professionals: "There was a crewmember one morning who was feeling distinctly unwell, at the point of fainting. Thankfully she was fine in the end, but production called [the paramedics]. They arrived, walked onto set, and there was this patient on oxygen, sitting in a medical chair in a high-tech operating theater. They thought it was an April Fools' joke!"

TECHNICAL SPECS

1.78:1
Digital Capture
Arri Alexa Plus
Cooke S4, Optex Excellence, Angenieux Optimo, Fujinon ●