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# NBA Bubble 2020: Sports Lighting for the Camera

By: Richard Cadena with Rob Baxter

## Creating lighting, under lockdown, for a TV-only sports series

At first glance, it may seem a bit odd for an entertainment lighting crew to handle the lighting of a sporting event like the NBA restart, but it is a unique situation that required an unconventional approach, at least from the standpoint of conventional basketball court lighting. Because the basketball games were to be held in three different venues on the campus of ESPN Wide World of Sports (EWWS) Complex in Disney World, none of which were designed for televising professional basketball, they had to be adapted for the purpose. It turns out that entertainment lighting equipment, crews, and practices were all pretty well-suited for it.

### Color, ballyhoos, and more

Basically, we installed what looks like a concert lighting rig—LED fixtures and automated lights rigged on modular truss—in each of the venues, although they are being used in three completely different ways. The primary purpose was to uniformly light the basketball courts for the game and to throw in some color and movement for the national anthem and ballyhoos during the player introductions, timeouts, and during halftime. Rob Baxter, a long-time veteran of the entertainment lighting industry, designed the lighting systems for all three venues, drawing on his nearly 30 years of experience with the NBA, as well as designing the custom court truss lighting systems for the LA Lakers at STAPLES Center and the Brooklyn Nets at Barclays Center.

The three EWWS venues include

what is referred to as “the Arena,” the Field House, and the VISA Athletic Center. The trim heights in all three

were limited by the existing rigging and/or ceiling height, which is less than optimum, and the weight-bearing



Rob Baxter (left) and Kevin Dobstaff getting on their game faces for tech rehearsals.



NBA supervising producer Carlton Myers (right) connects with Chris Peterson of Fuse.

Bottom photo: David Dow



capacity in VISA was insufficient for the 160 fixtures in the original plan, which meant that the lighting rig had to be reduced to 140 fixtures.

In the Field House, Baxter chose to use his standard NBA All-Star Game rig, which has 408 ETC Source 4Wrd PAR LED light engines on folding truss, because the trim height and weight-bearing capacity could accommodate them. But in the Arena and VISA facilities he designed Tyler GT truss systems using Martin by Harman Quantum Wash LED fixtures, as he had used previously lighting games for the NBA in India and for the NBA D-League Showcase (See *Protocol*, Summer 2014, page 27). He knew the fixtures were small, lightweight, and bright enough for the purpose and, given the previous successes with the NILA and ETC LED rigs, the NBA had confidence in the choice of LED fixtures. And since the Quantum Wash fixtures are automated, they could be focused remotely, plus they have variable color temperature.

Controllers include an ETC Gio for court lighting and an MA Lighting grandMA2 for moving lights in the Field House; a High End Systems Hog4 Full Boar for court lighting and moving lights in VISA; and a Hog4 Full Boar for court lighting and a grandMA2 for moving lights in the Arena.

### Lighting for TV

The NBA has a specification for lighting the court and it spells out the requirements for illuminance (145fc), uniformity (1.35:1), and metering height (3'). It says, "Illumination in the arena bowl must be designed primarily for television broadcasting, while minimizing glare for the players and spectators. The light on the court must be bright and uniform with minimal player shadows."

Illuminance specs include horizontal, main, and reverse camera angles and baseline camera. Baxter's is always a four-point lighting approach, which, studies say, make it easier for



Inside the outside broadcast truck where the video crew switched cameras. Notice that some of the camera angles show more reflections on the floor than others.



Entrance to the ESPN Wide World of Sports Complex with the Arena in the background. Not shown are the myriad security gates, checkpoints, and broadcast compound.





Rob Baxter metering the court.



Creating a ballyhoo during a programming session inside of the Field House arena. The in-house entertainment lighting package supplemented the court lighting systems.

athletes to see the ball. Surprisingly, basketball courts are not often lit this way. Football fields and soccer fields are commonly lit with four groups of lighting and each group covers the entire field of play, but in the case of the Quantum-based systems, we had up to 47 individual areas to light and blend to create uniform coverage using four lights per area.

It can be challenging to take hundreds of fixtures and blend them to create a uniform wash across the entire 94' x 50' court. Each fixture has a different throw distance and, therefore, a different zoom setting and a different intensity. Judging by the naked eye, it may look perfectly uniformly lit, but the light meter ultimately tells the tale, and the presence of television cameras and monitors means there's little room for imperfection.

## Cameras everywhere

Since the court is lit primarily for television broadcast and to minimize the

glare for the players, we're lighting for the camera. So, the main question is, where are the cameras?

The short answer is that wherever you look, there's a camera. In front of the court facing the players' benches is the main camera platform and there are more than three dozen cameras from two different broadcast networks: ESPN and Turner Network Television (TNT Sports). There's also a reverse angle camera on the opposite side of the court, plus two "slash" cameras on the front corners, a rail cam that is remotely guided up and down the court from goal to goal, and four robotic cameras on each of the two basketball goals. There are also a couple of handheld cameras, not to mention the stationary interview cameras peppered around the facilities, foul line PTZ robotic cameras, and several Fletcher robotic cameras in various locations. While we were focusing the system, many of these camera angles had to be taken into account but the

main cameras and the slash cameras were the main concerns.

When Carlton Myers, vice president of live production and entertainment for the NBA, walked the court during focus, in addition to illuminance and uniformity, his main concern was minimizing the glare in the players' eyes. Any lights behind the basket and in the direct line of sight of key shooting points on the court sometimes created a blinding glare that handicapped the shooter. So, we had to identify the most common shooting areas, like the low post, the three-point wing, and corner shots, and either dim them or refocus those lights in such a way that they were less blinding. It was a bit like solving a Rubik's Cube because, when you change the focus of one light, you often have to compensate with another.

Baxter (lighting designer), Rick Pettit (assistant lighting designers), and Dave Feldman and I (lighting directors) spent a day or two roughing

in the focus and then came back to balance the intensities. It's a time-consuming process and, to make matters worse, when we came back to balance the lighting in the Arena, the intensities were all over the place.

It didn't take long to figure out that there was an issue with a setting in the Quantum fixtures; you can choose between constant fan speed and variable intensity, or constant intensity and variable fan speed. They were set to constant fan speed with variable intensity. That was so the LED emitters didn't overheat because they have pretty strict operating parameters. When they get too hot, it shortens their lives considerably, so the manufacturer has to build in safeguards. Ultimately, it was an easy fix to change the setting.

Once that was taken care of and the intensities were balanced again, it became apparent that any change in the intensity or zoom would also change the color temperature. So, in a sense we were chasing our tails. We quickly learned that adjusting the color temperature is the last tweak you want to make. And it's not as simple as matching the CTO value from one fixture in all of them because, as the LEDs age, they behave differently. So, you might have the same CTO settings in any two fixtures, but the light meter reads very different color temperatures. That meant that every single fixture had to be measured and adjusted individually, which takes a tremendous amount of time.

### Mirror, mirror on the floor...

All of this was taking place during a pandemic inside of a bubble of isolation from the rest of the world, so there was that layer to deal with as well. It didn't really have much of an effect on the whole affair up to the point that many of us were scheduled to go into quarantine off-site for seven days prior to the arrival of the players and the final push to iron out any technical details before going into game mode. It just so happened that the

### NBA Restart Lighting Team

Carlton Myers—Supervising Producer	Programmer
Kevin Dobstaff—Project Manager	Karl Bontrager, ACT—Arena Asst. Elec.
Rob Baxter, Local One, Local 52, Local 205—Lighting Designer/Supervising Electrician	Weston Baxter, Local 205—Arena Asst. Elec.
Otis Howard—Entertainment/Automated Lighting Designer	“Tinez” Michael Martinez, Local 205—Visa Hog Programmer
Dave Feldman, Local 829—LED PAR Court Lighting Director	Gerry Walls, Local 631—Visa Asst. Elec.
Richard Cadena, Local 205—Quantum Court Lighting Director	Tori Byrd, ACT—Field House Asst. Elec.
Rick Pettit—Assistant Lighting Designer	James “Ralphie” Weisbecker, Local 631—Disney Lighting Director
Pete Campbell, Local 631—Production Electrician, Quantum Plots and Visa	Ed Pottorff, Local 631—Disney Arena MA Programmer
Rolf Lee, Local 16—Production Electrician, LED PAR System and Field House	Kenny Haines, Local 631—Disney Fieldhouse MA Programmer
Dean Brown, Local 591—Production Electrician, Arena	Ashley Jenner, Local 631—Disney MA Programmer
Henry Parks, Local 591—Production Electrician, Control Systems, and Field House	Bryan Chess, Local 631—Disney MA Programmer
Gio	Paul Cox, Local 631—Disney Crew Chief, Arena
Chris Szabo, Local One—Production Electrician, Power Distribution	Vinnie Cross, Local 631—Disney Crew Chief, Field House
Tom Buddingh, Local 720—Power Distribution Asst. Elec.	Kevin Parsley—4Wall Shop Lead
Neil McShane, Local One—Power Distribution Asst. Elec.	John Campbell—4Wall Shop LX, Arena
Heath Goodwin, Local 631—Power Distribution Asst. Elec.	Jessica LaPoint—4Wall Shop LX, Visa
Seth Weldon, Local 635—Arena Hog and MA	Ami-Jo Mazur—4Wall Operations Manager
	Todd Mertz—4Wall Account Rep/Project Manager

quarantine period coincided with the broadcast team's plans to set up and turn on their cameras to get a preliminary look through the lens. Someone from the lighting team needed to be there, and I was elected. That meant that I would be moved from the “green” team to the “yellow” team since I would not be quarantined.

On the appointed day, I went to the outside broadcast trucks, notebook in hand, to look and listen. As soon as I saw the monitor, it was apparent that the biggest issue was the glaring reflections in the polished hardwood floor. It's a physics problem: When you have cameras on one side and lights on the other, the angle of reflection is critical and, in this case, there were many instances where the angle of

reflection matched the camera angle, resulting in a big hot spot on the floor. That's something that we ordinarily don't encounter because a stage floor is usually black or carpeted, not shiny wood that reflects like a mirror. The lower the ceiling and trim height, the worse the problem. It was obvious we would have to fix it. Of the three venues, the VISA had the most glare.

For the next few days, I worked the overnight shift with the yellow team so that once the green lighting team was out of quarantine, we could take turns working on the courts—green by day, yellow by night. The first task I took on was to “fix” the reflections in VISA. The best way, I thought, to fix the issue was also the most radical. I refocused the lights in such a way that

they crisscrossed the floor, maintaining a four-point approach, but with much longer and flatter throw angles to avoid focusing into the main and slash cameras as much as possible.

When I finished, I went back to the hotel, but I couldn't sleep. I was preoccupied with how radically the focus changed, and I was anticipating an excoriating phone call the next day. Instead, when I checked in the next day, I heard from Baxter that the change was very well-received. While there was still some glare from certain side angles, it was much better for the main and slash cameras. I felt like I dodged a bullet!

In the end, all the time we spent with NBA programmers Henry Parks, Tinez Martinez, and Seth Weldon, as well as Disney programmers Kenny Haines, Ashley Jenner, Bryan Chess, and Ed Pottorff; reading a light meter; walking the court; and adjusting the intensity, the color temperature, and the green/magenta balance paid off. It was a lot of work but when you go to the outside broadcast truck to talk to the video crew, you kind of hold your breath waiting for their feedback. These people are real pros, with a lot of experience, and they have critical eyes. When they're satisfied with your work, it's a great feeling of satisfaction. And when you see it on TV, it's even better. 📶