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The Global Lighting Team

By: Rob Halliday

How to proceed when the show and members of the lighting team are spread across three continents

Almost exactly two years ago, lighting designer Ken Billington, his associate Aaron Porter, and I as lighting programmer convened, in person, at London's Adelphi Theatre, for the London transfer of the musical *Waitress*.

Two years later, we did another production of the show, this time in Tokyo's Nissay Theatre. Since it was also one global pandemic later, none of us were actually there: Japan's borders were closed to travelers. Instead, we convened on the Internet and lit the show remotely, Ken and Aaron at Ken's office in New York, me and a console at home in London.

Since it feels like we're not quite through this pandemic

yet, this is what we learned along the way—in case any of you find yourselves having to attempt the same thing.

The show

Planning for the show predated the pandemic, a shop order sent out on March 4, 2020 for a production scheduled to open on March 9, 2021. The rig plan for Tokyo was based on the most recent US tour of the show. Where there were equipment substitutions, mainly in the LED battens used to light the show's skycloth, they were fixtures for which we had the color data from other versions of the show. All of this turned out to be fortunate.

Around Christmas, the producers heard rumors that the Japanese borders were to be closed. The show's associate choreographer and music director were bundled onto almost the last flight to Tokyo, to sit through their 14-day quarantine then wait for rehearsals to start. The rest of us—director, lighting, sound—couldn't get there. We needed to come up with a new plan.



The rig plan for Tokyo was based on the most recent US tour of the show.

Photos: Courtesy of Japan Waitress Company



Remote working

Lighting shows remotely isn't new anymore. I worked with Rick Fisher on *Billy Elliot* in Tokyo last summer, watching remotely via YouTube to give feedback to the on-site team, all of whom had done the show with us before. We knew that Woodroffe Bassett Design (WBD) had been lighting projects in Las Vegas and Macau from the UK, and that Mike Odam had relit *Phantom of the Opera* in Tokyo from his UK home. Their setups were slightly different (console, programmer, and others who knew the show on-site as trusted eyes), but we asked what they'd learned, thankful as ever, that lighting is such a tightly knit, friendly community.

Aaron drew up a "comms and video diagram"—who'd need to talk to whom, who'd need to see what. For lighting, we knew we'd want a fixed wide shot from upstairs, to let us see the floor for focusing, and a downstairs camera to let us see up to the top of the show's cyc. From *Phantom*'s director, Ken heard that it was useful to have an operator on the downstairs camera, able to go in for close-ups to check on details.

Immediately, we knew we'd need a good Internet con-

nection at the theatre; the Japanese reported that what was there was poor, and it was unclear if anything better could be installed in time. In one scenario, we would try to do all of this through 5G cellphones. Ultimately, and clearly demonstrating the strong will from everyone to make this work, production manager Takaaki Tanaka (T2 to all) managed to get a fast fiber connection lined up, though, slightly nerve-wrackingly, it wouldn't be installed until the first day of load-in.

We also knew that we wanted a comms and video platform that everyone was familiar with. That led the Japanese producers to set everything up on Zoom, with separate sessions for the director, lighting, and sound, the director's session carrying the images from both cameras.

For lighting, we had to crack being able to turn an encoder on a console in London and have a light move in Tokyo, while also having a display of what was going on available in New York. *Waitress* runs on ETC Eos consoles, which have always been designed to operate over local area networks. A virtual private network (VPN)—in effect, a direct pipe through the Internet to join the three locations into one



The Japanese crew in the theatre in Tokyo.



Halliday's setup in his London apartment.

local network—was what we needed. That's a pretty standard tool now, but one for which you really want specialist hardware and someone who understands it to get going. If there were issues, that world wouldn't understand terms like "Eos" or "sACN."

Terry Cook, at WBD, had mentioned hearing of a new product called theBRIDGE, designed to give the entertainment world a zero-configuration, plug-and-play VPN solution. In the UK, Lights Control Rigging had it and had seen it do what we needed with grandMA2 consoles but not with Eos. LCR connected us with the people behind the product, Just Networking, three concert touring guys who were working on it before coronavirus came but who might well have ended up with the perfect product for this moment in time; they were super-supportive throughout this process. Two boxes showed up for us to test. I roped in an "Eos buddy," the National Theatre's Dan Murfin, and we tested them across London. They worked straightaway, the consoles connecting just as they would sitting next to each other in a theatre. For fun, we even tried one end of the link over a 4G cellphone connection and that worked, too. The initial show file sync was the slowest part; turning off the "fast file transfer" function sped that up and turning off network lighting protocols sped it up more. In the theatre, we'd use dual-port Eos consoles, one connected to theBRIDGE, the other sending data to the rig. That problem was solved. Boxes were dispatched to Tokyo and New York.

Getting connected

Next: puzzling out our work environments and our working day. The show in Tokyo was supplied by PRG, its global reach proving its worth when it also supplied the setups in New York (a 75" monitor for the stage view, ETCnomad Pucks to provide monitors for the LD) and in London (another big monitor plus an Eos Ti console and monitors to go into my office, or what my kids renamed my "evil villain lair"). Old devices were given new life in making all this work—in London, a Mac mini giving the upstairs camera view on the big screen, my main iMac the downstairs camera, an iPad by lighting-ring comms, and my laptop the show information, including the MLA focus data plus a comms back channel to Aaron through Apple Messages. My phone gave a second, WhatsApp, back channel to Sonoko Ishii, our interpreter in Tokyo. The KBA office setup for Ken, Aaron, and the show's production supervisor Mahlon Kruse, was very similar but, because there were three of them in the room, they added a COVID testing regime.

With all that set up, Aaron and I sat and waited from the start of load-in (10am Tokyo, 1am London, 8pm New York), fingers crossed. About halfway through the day, my Eos found another Eos and synced, and the Zoom chat sprung to life. There was the stage! There were the crew! There was the set!! Turn down the lights in the room and squint a bit at

the big monitor, and you could have almost been sitting upstairs in the theatre's circle.

And then I turned on a light in London, and it came on in Japan. I moved it, and it moved in Japan. That felt pretty amazing—for about the first five minutes. Then it just became the new normal.

Focus and tech

What we immediately started learning about was video quality versus latency. When I turned that first light on, it appeared near-enough instantaneously on the console screen. I knew that the light was on in Tokyo. But it didn't appear on Zoom until a beat or two later. As a result, focusing, particularly moving light framing, was always a bit of an exercise in overshooting, then backtracking. And while the Zoom view was good enough for focusing, it was not a good representation of what the show looked like, or even what was coming out of the semi-pro Sony cameras in Tokyo. Zoom is a pretty amazing thing, but this was clearly not the world it was optimized for.

Nonetheless, we could get going with both the moving light focus and the conventional focus, this called by Ken and Aaron in New York very much as they would have done had they been standing in the theatre, aided by very detailed focus notes they'd already been sent to the ART Stage Lighting Group crew led by head electrician Wataru Okazaki. Here we added another camera, an iPad giving a mobile onstage view of what was happening. It was interesting how different the image coming from that iPad was.

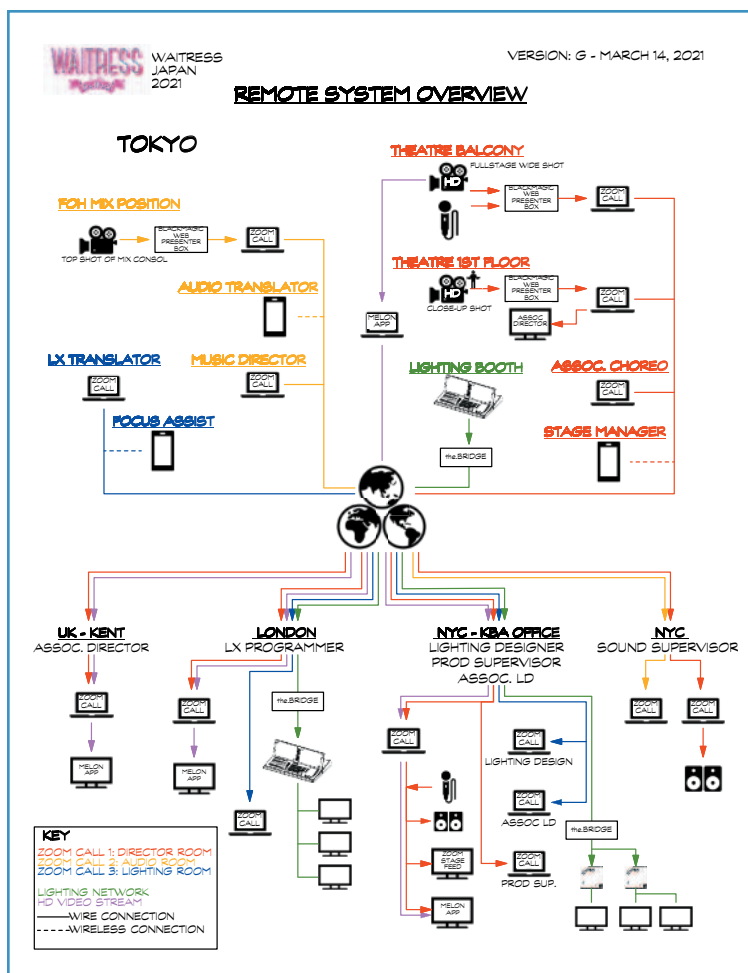
None of this will, of course, be a surprise to anyone who works in broadcast; to those of us who dabble in it when our shows are filmed, it was a reminder of why all those expensive cameras and calibrated monitors appear on-site on those filming days. The real issue is the lack of control that systems like Zoom give you over their video encoding. Microsoft Teams possibly has better image quality, but we found it a pain to use. We found an online service called MelonApp, which is like Zoom but runs in a browser and gives an image quality that was better for our purposes while still being close to real time. YouTube and Vimeo gave better quality but with much longer (5 – 15 seconds) delays, no good for focusing or lighting. We tried using the OBS software to stream a UDP feed—good quality, but too long a delay. The best combination of quality and speed we found was using the VNC/Screen Share function built into our Macs over theBRIDGE and I think that's where I'd start next time; VNC doesn't carry sound, though screen sharing via Apple Messages does, so there's some experimenting to be done there. I'd also try to make sure that anyone who might have an opinion about lighting, including the director, had their displays set to the same color profile so we were all at least close to seeing the same thing.



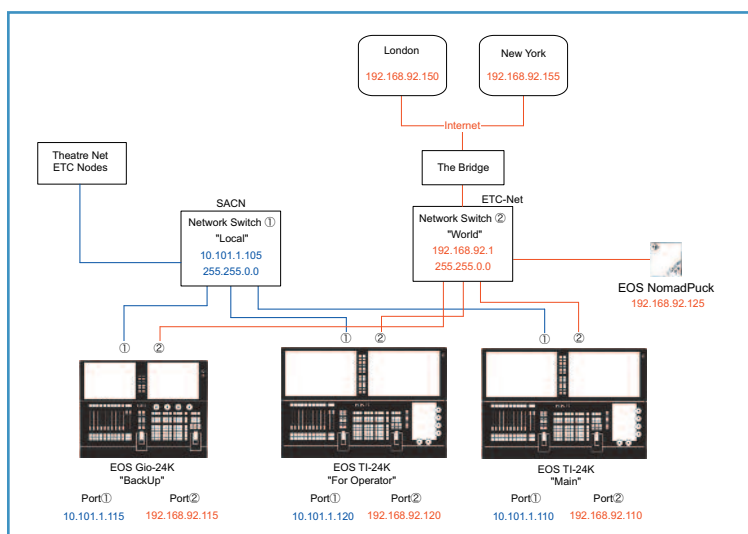
Halliday (on-screen) meets with the New York team: Kruse, Porter, and Billington. Top: The New York team at work. Note the multiple-screen setup.

Lighting

What none of this really solved was actually being able to see the lighting properly. We know, of course, that no camera can match the human eye, but if you're lighting for broadcast that doesn't matter—you just make it look good on screen. The difference here is that we were using cam-



The drawing above shows the extent and complexity of the remote system needed to connect the team members in London, New York, and Tokyo.



This drawing shows how theBRIDGE, a VPN solution, was used to link the team to the multiple lighting consoles involved.

eras to light for a live audience.

It was possible in this case because the starting point—the rig and show file—was from a previous version of the show, and where it was different (those LED battens), we had color data to get those to be the right color. We had to trust that what was coming out at the other end looked about right, then make a mental compensation for how it looked on screen.

For products that were different and unknown to us—new Japanese-sourced LED tape in the set—you needed a source you trusted, a Lustr or a Viper, to match to as closely as the camera would let you before asking the Japanese team for an opinion.

And...open

Four days of rapid tech meant more learning, particularly about when exactly “now” was (since you’d hear a question directly in Zoom, then the same question a fraction later as it arrived in New York, then went from there to London). In New York, Aaron found headsets with super-directional microphones to help manage this stray noise. Operator Naoko Ito took the cues in Japan to be sure they were in sync with the show; we set up a “Rob working” motorized fader that I’d push up if I wanted her to hold on a cue.

The oddest moments were usually life moments rather than technical moments—almost convincing yourself you were there in Japan, then stepping through the door to find yourself in your house, your family running around. Or celebrating two sunrises each day, in London and New York. Having jet lag without even leaving your house is a slightly strange feeling.

Ultimately, the show opened. We watched it “live” (give or take ten seconds) via YouTube, including the delight of seeing a real, non-distanced audience rise to its feet and applaud at the end.

Would we do it like this again? We know we can if we need to. We suspect producers will be tempted, since the savings on hotels and airfares probably outweighed the costs of the extra gear required. But we also know that it worked here because the rig was completely known; change any of it and it would become harder (probably involving having samples of those lights with the designer and programmer) and lighting a show from scratch wouldn’t work well at all. As Ken Billington says, “This is no way to light a show. It was fun and exciting to figure out how to do this. Focusing was very easy. But lighting the show was frustrating and not fun; this solved a specific problem of not being able to travel to the venue, but it’s not a reality for lighting a show.”