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Here We Go Again

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Mamma Mia! is a capsule history of modern theatrical lighting design

Cats may be now and forever, and the *Phantom of the Opera* may have his sequel, but is there a musical more indestructible than *Mamma Mia!*? The fifth-longest-running show in West End

history, the ABBA jukebox musical logged 14 years on Broadway, while repeatedly spanning the globe in innumerable touring editions, not to mention sit-downs in cities like Hamburg,

Las Vegas, and Toronto. Twenty-five years after its West End opening, audience enthusiasm for it remains undimmed. When a six-month return engagement of the current US national tour was announced for the Winter Garden Theatre, home of the original Broadway production for most of its run, many snickered. They're not laughing now: It opened in August to *Hamilton*-level business, selling out nightly and, once again, inducing audiences to stand, clap along to the music, and dance in the aisles. Interestingly, the audiences at the

All photos: Joan Marcus



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Winter Garden span several generations: The appeal of ABBA is eternal, it appears.

It's a luxury problem to be sure, but the designers of any blockbuster hit face the challenge of replicating the original in successive productions. Forty years ago, when gear lists were relatively limited, this was less of an issue. These days, however, technology changes fast, and gear can become obsolete even as a show runs and runs. Each time a new edition is mounted, product choices must be evaluated in terms of performance and reliability. Even the most efficient unit is problematic if replacement parts are impossible to find.

In the case of *Mamma Mia!*, the history of its lighting design is the history of modern theatrical lighting in miniature, not least because the show's quarter-century (and counting) lifespan takes in the transition from incandescent to LED units. And institutional memory, in the form of associate designers and technicians with deep knowledge of a show, is crucial to maintaining high standards. *Mamma Mia!*'s lighting designer, Howard Harrison, who has done it all—opera, dance, and theatre (including the smash hit *Mary Poppins*), says, "Who in 1999 would ever have guessed that in 2025 we'd still be doing it? I'm absolutely blessed by having a fantastic team of people. I'm so lucky that [associate designer] Andy Voller has been with it since the beginning. He's a great designer on his own and a brilliant associate."

Commenting on maintaining the show's lighting design during arguably the biggest era of change in the history of theatrical lighting, Harrison says, "Unfortunately for us, the fundamental things we needed for the show were not that easy to achieve in 1999. Things have gotten much, much easier as time has gone on. The newer equipment has been much more favorable to the show. It's been a fascinating journey, and a lot of it goes to Andy. We started with [Vari-Lite] VL6s,



The US tour features a simplified version of Mark Thompson's set design.

VL7s, and [DHA Lighting] Digital Light Curtains! All this stuff doesn't exist anymore."

Indeed, a look at the automated gear list for the original West End production, which opened at the Prince Edward Theatre in 1999, included, from Vari-Lite, 20 VL5s, 18 VL4s, ten VL6s, eight VL7s, and three VL7Bs, plus ten DHA Lighting eight-lamp digital light curtains. The show was controlled by a Strand 500 Series console linked to a Vari-Lite Artisan. This was the era when a musical needed two boards, one for conventional gear and one for movers. (According to Ed McCarthy, *Mamma Mia!*'s US associate, on Broadway, the typical console matchup at the time featured an ETC Obsession and a High End Systems Wholehog 2. Whatever the combination, two boards were needed if moving lights were involved.)

Such a gear list was typical for the 1990s, when Vari-Lite dominated on Broadway and in the West End. And, as Harrison notes, if one used VL units, "You had to have an Artisan. There was no way of running the VL gear without it. Therefore, it wasn't a choice. Very soon after this production, I started trying to do everything on one desk. I always found it bizarre that you needed two.

There were some weird conventions during those times."

Also, the original *Mamma Mia!* rig was hung long before the advent of LED performance lighting. The Broadway production opened in October 2001. A Toronto company was so successful that a US tour was mandated, beginning in San Francisco and arriving on Broadway in 2001. This was months before designers Donald Holder and Kenneth Posner incorporated LED units into, respectively, *Thoroughly Modern Millie* and *Hairspray*. Even so, LEDs functioned in these shows only as set electrics; LED-based spot and wash units for the stage were years away from being realized.

Voller, who came onboard the West End production in 1999 as a programmer, moving up to associate, has a hand in several iterations of the show. "I mainly do Korea, Japan, and the international tour," he says. "David Holmes and I look after London. And I've got back involved in the US. I did the early US productions, and, after that, Ed was on his own for quite a while. Then, because I had the experience of doing the LED show, they brought me back to the US show."

Voller notes that the current US tour, which started in October 2023,



In 2018, the design underwent a sea change, largely replacing incandescent and discharge units with LED products. “We needed to move to more reliable fixtures,” Voller says.

features a simplified version of Mark Thompson’s set design. Automation has been dispensed with, leaving scenery to be moved by the crew. Certain aspects of the set, including a light-up cobblestone deck (featuring red, green, and blue dimmable neon controlled via DMX) and a rising jetty, have been eliminated. This design is based on the smaller format now used in the London production, which ultimately moved from the Prince Edward to the Prince of Wales Theatre and, later, the Novello Theatre.

“In more recent years,” Voller says, “I have helped the other associates,” who are in charge of other iterations of the show. Voller’s touch is evident in several aspects of the lighting design. “I’ve redesigned the gobos, which we had to do when we moved away from

Vari-Lites. Because of intellectual property issues, Rosco wouldn’t make Vari-Lite gobos for a non-VL fixture. I also researched all the dichroic colors [used in Vari-Lite units] and passed that information on to the other associates.” Such crucial information allows the design’s integrity to be maintained across all productions.

Voller notes that the rig changed incrementally over time: “The first tour was a full-scale production with elements like the original dedicated finale truss and the old rig.” (During the finale, the theatre virtually becomes a disco, with these trusses contributing mightily to the look. Originally, these trusses were used only in this sequence.) “In 2002, we started the second US tour, which Ed [McCarthy] was very much involved

in, and was a bit of a redesign; we switched out a lot of fixtures for different Vari-Lites, which were more DMX-friendly; that’s when we changed the finale to have two of the over-stage trusses fly in. The international tour, which started in 2004 and recently celebrated its 20th anniversary, is based on this.” McCarthy adds, “The US tour was designed to fit into the shallowest theater on the route, which, at the time, was the Saenger in New Orleans, so the dedicated finale truss would not fit.”

However, 2018 was the year when the design underwent a sea change, largely replacing incandescent and discharge units with LED products. “We needed to move to more reliable fixtures,” Voller says. “Obviously, we wanted something that wasn’t expen-

sive in terms of lamp replacement, so we moved the international tour over to LED. I basically designed that version for Howard, researching everything we needed. Most of the LED versions of the show are based on that core design. We changed over the London show in 2019 at the Novello over a couple of weekends without losing any performances.”

The time was ripe for the switchover, Voller notes: “The Vari-Lites started to become scarce. We’ve had that problem in London; we got rid of all the VL500s in the rig because maintenance and getting parts were problems. The main failure point always seemed to be the lamp power supply; the unit uses an 80V lamp, and there isn’t anybody now to fix them or get the parts.” The new workhorse became the GLP impression X4L.

McCarthy says the switch to LED represented a significant rethinking of the rig. “It wasn’t just upgrading from a VL6 to VL2000, and you knew the technology was the same. When Andy first programmed it with Howard, they often didn’t pick a light because they wanted a specific effect; they did the effect because they knew that’s what the light could do. Once you codify that, when you swap out fixtures, even simple things, like the timing of a gobo, change.”

When the switch to LED units happened, preserving the show’s distinctive pink-blue-and-white palette was a challenge. “We’d started with VL6s, which were the workhorse profiles,” Voller says, “and then went to VL2000 Spots; they all had the same dichroics. We never used CMY color mixing; we always used custom colors or Vari-Lite catalog colors, so we had that consistency until we went to LED. We didn’t want to use the fixtures’ color mixing because it wasn’t fast enough. We do lots of bumps; in ‘Money, Money, Money,’ going between an open white and a slate blue. In ‘Gimme! Gimme! Gimme!’ we’re going between cyan and lavender. So, Martin Chisnall and I looked at Rosco Permacolor and

found two colors that worked. We also sent a couple of colors to [the UK-based gobo manufacturer] Projected Image to get a close match, but their pieces of glass were too fragile, so we moved to Gobo Image, based in the Netherlands, and got two fairly close matches. With the wash lights, of course, we can just do color mixing.”

Also in 2018, Voller revised the conventional portion of the rig. “We ditched all the scrollers and went to [ETC] Source Four Lustr 2s. That was a big change. Now there are only six tungsten Source Fours in open white; everything else is LED. For the US tour, Ed said, ‘Keep some tungsten in, because it helps to blend the LED units.’ This was good advice, Voller notes: “On the international tour, all the big courtyard scenes, which are very tungsten white daylight, would go slightly pink or green. Having tungsten blends that out so you’re not aware of any slight color shift.”

The rig continues to evolve. “The 2023 US tour uses the GLP X5, which is RGBL and does tungsten tones better than the X4L,” Voller says. “When the US tour was on track to open,” McCarthy says, “I called Andy, because he had just opened the international tour. He used PRG Icon Stages as their spot fixtures, which is what we have now, and GLP impression X4Ls as the wash units. Which was fine, except that, by the time the tour was going out, the X4L had been discontinued. I wasn’t going to send a discontinued unit on a four-year tour; also, it didn’t fit in our truss structure. But the X5 did’.”

McCarthy adds, “We have Icon Stages at the front of house, overhead, and one on each side tower. All the washes are X5s; it was just easier to use one fixture in all these positions.” Providing house lighting effects during certain numbers are Robe Spiiders. “They were added for New York,” he says. “We wanted to add to the entr’acte and finale some front-of-house stuff that had been previously cut.” Originally on Broadway, “We had

26° and 36° Lekos with gobo rotators and Rosco 76 [Light Green Blue] in the front, doing that big rotation look. The Spiider is a great light with a beautiful dimming curve at the bottom. It can do effects with the center LED versus those on the outside; it gives this spinning effect.”

The conventional portion of the rig includes eight ETC Source Fours, seven Source Four PAR MFLs, 35 Lustr 2s in various sizes, and 20 Elation KL PAR FCs. About the latter, McCarthy says, “I was looking for a replacement for a Source Four PAR 750W narrow fixture with a scroller, which is hard, because there’s a lot of hot white light on the set. Most LED PARs, if you go to CTO, they’re not that bright. But I found the KL PAR FC. It’s great. It comes with a lensing system as opposed to zooming, so, mechanically, it doesn’t take a lot of work. You just pick a lens and lock it in really tight, so it never gets out of focus.” Filling out the conventional rig are 15 Chroma-Q Color Force 72s, four Rosco Miro Cube UVs, and two Wildfire VioStorms UV units, the latter used in the number “Under Attack.”

The automated rig features 44 GLP X5s, 28 PRG Icon Stages, 13 Robe Spiiders, and three Robe BMFL-LT followspots. The giant moon that flies in is illuminated by Environment Lighting TruColor 2835 LED tape (about 450’ worth). Festoon lighting is by Lumisphere. For effects, there are two Look Solutions Cryo-Foggers, two Look Solutions Unique 2.1 hazers, and two Martin AF-1 fans. Gear was supplied by PRG Broadway.

“It’s a really well-designed tour,” McCarthy says. “There are no fixtures overhead that have to be focused by hand, so you don’t have to get a Genie out once you’ve gotten the trusses flown. They can work on getting the set in quickly. We have 24 Lekos at the front of house; they have to be refocused in each city, but it’s only 24 lights. They’re open white Source Fours to get that tungsten feel that you don’t get out of a Lustr. And

we have an additional 12 Lustrs in cove/box-boom positions. It loads in less than seven hours.”

Control issues

The original Broadway production was controlled using a Virtuoso, the state-of-the-art Vari-Lite console circa 2001. After that, Voller says, “We moved to a grandMA1 [from MA Lighting], then a grandMA2. For the new US tour, Ed wanted an [ETC] Eos, the primary reason being it’s easier to get electricians. I encountered this with *Riverdance* [which he designs]. The previous tour was on the MA2, and we struggled to find good electricians who knew the desk.”

“The first time on Broadway, we had a Strand console that ran everything, and it triggered the Virtuoso,” McCarthy says. “But the second tour, which is what the current Broadway

version is based on, was ten or 11 trucks instead of the first tour, which was 18 or 19. We didn’t have the neon deck, which was a huge part of what the Strand board dealt with. So, we put everything on the Virtuoso, which was easy, right? Except it was hard to find electricians in America who knew how to run it.”

The reason for this, McCarthy notes, was simple. “If you’re coming out of college, the console you know is ETC. You might know a little about the grandMA, too; we ended up switching to it at one point because we couldn’t find anybody to run the Virtuoso. They sent us a South Korean show file, on the grandMA, which worked for the entire show except the finale, which was completely different on our tour from that production, with those VL5 trusses and white portals. So we had to hand-copy DMX values

from our tour Virtuoso into the MA and brought both along for tech with a DMX switcher to compare each effect and make sure we had done it accurately.”

Changing consoles meant considerable software-intensive work, however. “When we went to the Virtuoso, I wrote a program that converted the show file from Artisan to Virtuoso,” Voller says. “When we went to MA1, I basically reprogrammed the show, sitting at home. It’s not that complicated; the number of cues is something like 255.” The MA1 version, he adds, “was used by other productions I was not involved in, including Hamburg. For each production, the associate will make changes—they all do things slightly differently—and they’ll continue to build on their own version of the show going forward. I also did the conversion to MA2, which became the



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basis of the international tour; in 2023, that version was converted to Eos. They all have the same essence.”

(Just to give you a sense of the design’s seemingly infinite flexibility, McCarthy says, “I had to do the show on two Royal Caribbean ships. The first, on the Quantum of the Seas, used the ship’s rig and was run on a Hog 4. My programmer, Mark Pranzini, and I cued and time-coded the entire show in his studio in LA, as we knew we wouldn’t have time onboard. When they moved us to the Allure of the Seas, I had a Hog 3, and the consoles aren’t backwards-compatible. Plus, the entire rig changed again, so we had to go through the whole process again.”)

For the new US tour in 2023, McCarthy says, “Andy sent me a grandMA2 file from the international tour, with all the new gear. ETC translated it for us into an Eos file. Jackson Miller, my programmer, and I spent a week at ETC’s offices in New York, cleaning up the file. I used what I call my ‘Flintstones’ version of the set, a rudimentary 3D model, then we put it into Augment3d and got rough focus points. We programmed it on an Eos Ti; it runs off a Gio on tour.” He adds that the Broadway rig is larger, with additional front-of-house units for extra sparkle and punch.

The Broadway engagement of *Mamma Mia!* is scheduled to run through February 1, when it returns to touring. The job of keeping it fresh is never-ending. Harrison stays in touch with all productions via associates and checks in on the shows from time to time. Voller, as previously noted, supervises several companies, and McCarthy notes that the US tour will run at least two more years. (Voller and McCarthy also have busy design careers, too.) McCarthy says it may be time to train new associates. “You know, in seven or eight years, we’re going to have to rethink the show all over again,” he says. “Because it’s all going to change.” Maybe so, but one feels certain that, whatever is hanging in the rig, *Mamma Mia!* will keep rolling along. 📶