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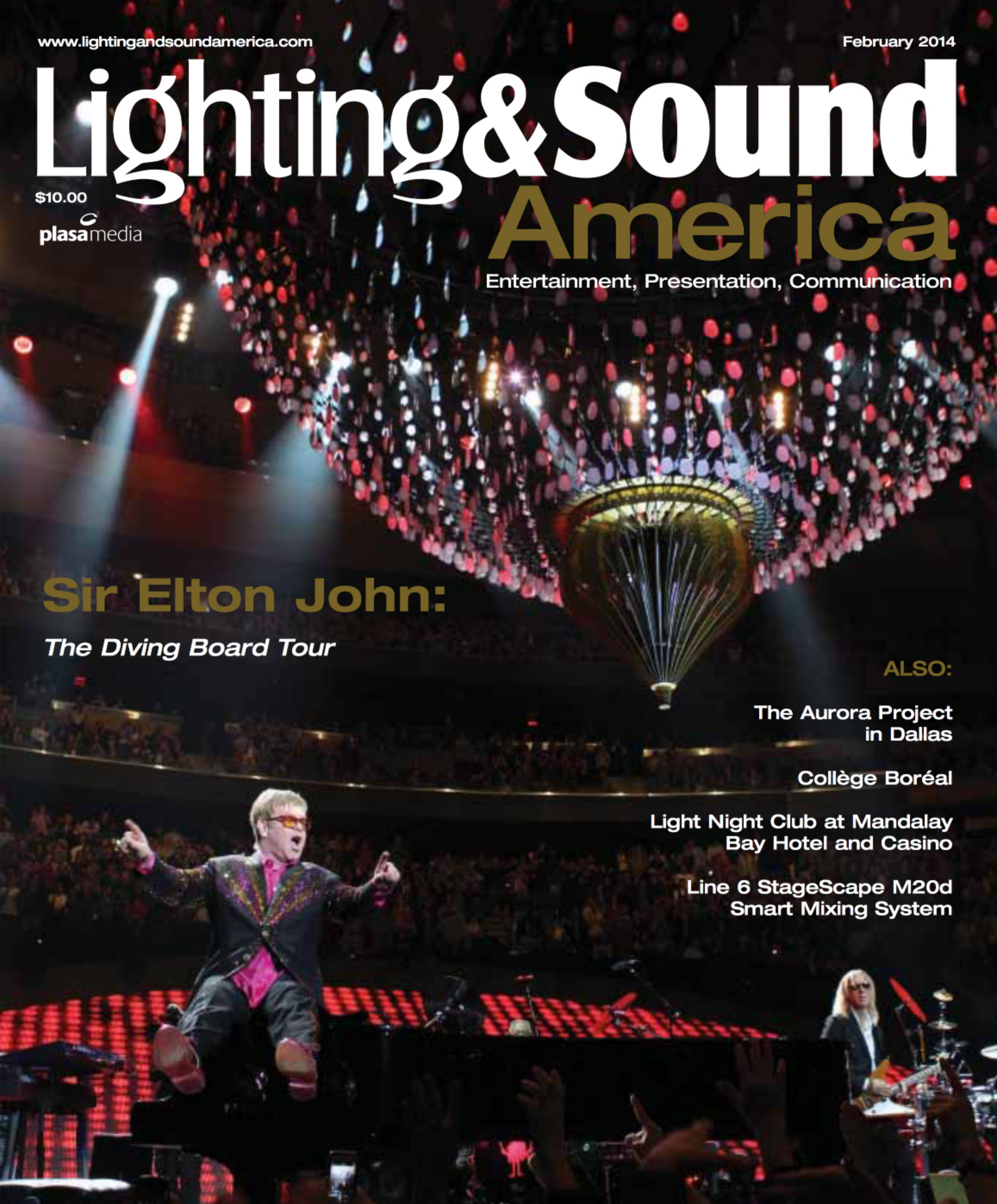
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# The Speed of Light

A new Vegas club mixes lighting, sound, projections, and performance into a nonstop parade of effects

By: Louis M. Brill

Light, the new night club at Mandalay Bay Hotel and Casino in Las Vegas, Nevada, is certainly an eye-ful. It's a performing arena and a 360° multimedia experience with lighting, lasers, and booming audio, and the dancing, of course, never stops. But wait ... there's more! A series of acrobats and otherworldly costumed performers weave through the club, parading in the aisles and swinging from the rafters.

The presence of Light at Mandalay Bay is the convergence of several premier entertainment organizations, including The Light Group, a leading hospitality, development, and management company; Moment Factory, of Montreal, Canada, which provides the extravagant background visual effects throughout the club; Cirque du Soleil, also of Montreal, which presents the nightly aerial acrobatics over the dance floor; and John Lyons Systems, of Hollywood, California, which provides the audio-visual entertainment that beams out every night during show time.

Light is operated by Light Group and is described by Guy Laliberté, Cirque du Soleil's founder, "as the ultimate theatrical night club experience that will serve as a laboratory of artistic possibilities."

While all of the entertainment aspects of Light are important, its audio-visual infrastructure is the spine on which everything else hangs. John Lyons Systems installed the infrastructure. Its founder, John Lyons, currently owns and operates five night clubs around the US, including the renowned Avalon Hollywood. John Lyons Systems designs and installs audio-visual entertainment systems for all his night clubs and other night clubs.

Lyons says he feels that within the market, most night clubs have matured, but there are other entertainment levels waiting to be explored. To keep ahead of the curve, venues such as Mandalay Bay have to take things a step further, and Light is now at the edge of that curve.

Light is 38,000 sq. ft. of drinking, dance, and DJ entertainment. Its front-of-house space is composed of huge (almost floor-to-ceiling) LED screens located left and right of the DJ booth. A smaller LED screen is found in front of the DJ booth. Below the latter, a speaker chamber is filled with compact front-of-house speakers. Facing the speakers is a large dance floor surrounded by table booths; overhead is a mezzanine with more table booths.

Photos: Courtesy of Moment Factory

## CLUBS

"The challenge with Light was to not only to create a perfect audio space on the dance floor," Lyons says, "but also to have the same experience move from the dance floor to the surrounding table booth spaces.

"The dance floor is the main thrust of where the music is directed, and that's the space where you want the most audio impact for your audience," he continues. "For Light, we selected the Avalon series by EAW CLUB.two [loudspeakers]. These provide extremely high output from a very compact enclosure. It was essential that we delivered no-questions-asked superb audio for both the dance floor and booth monitoring systems given the roster of world-class DJs planned for the venue. The booth system uses the Avalon series CLUB.three combined with the SUB.two from the same line. The SUB.two is an extraordinary piece of engineering, as it incorporates two independent and discrete sub bass chambers. One has double 12" horn-loaded drivers and the other a single 21" direct radiating

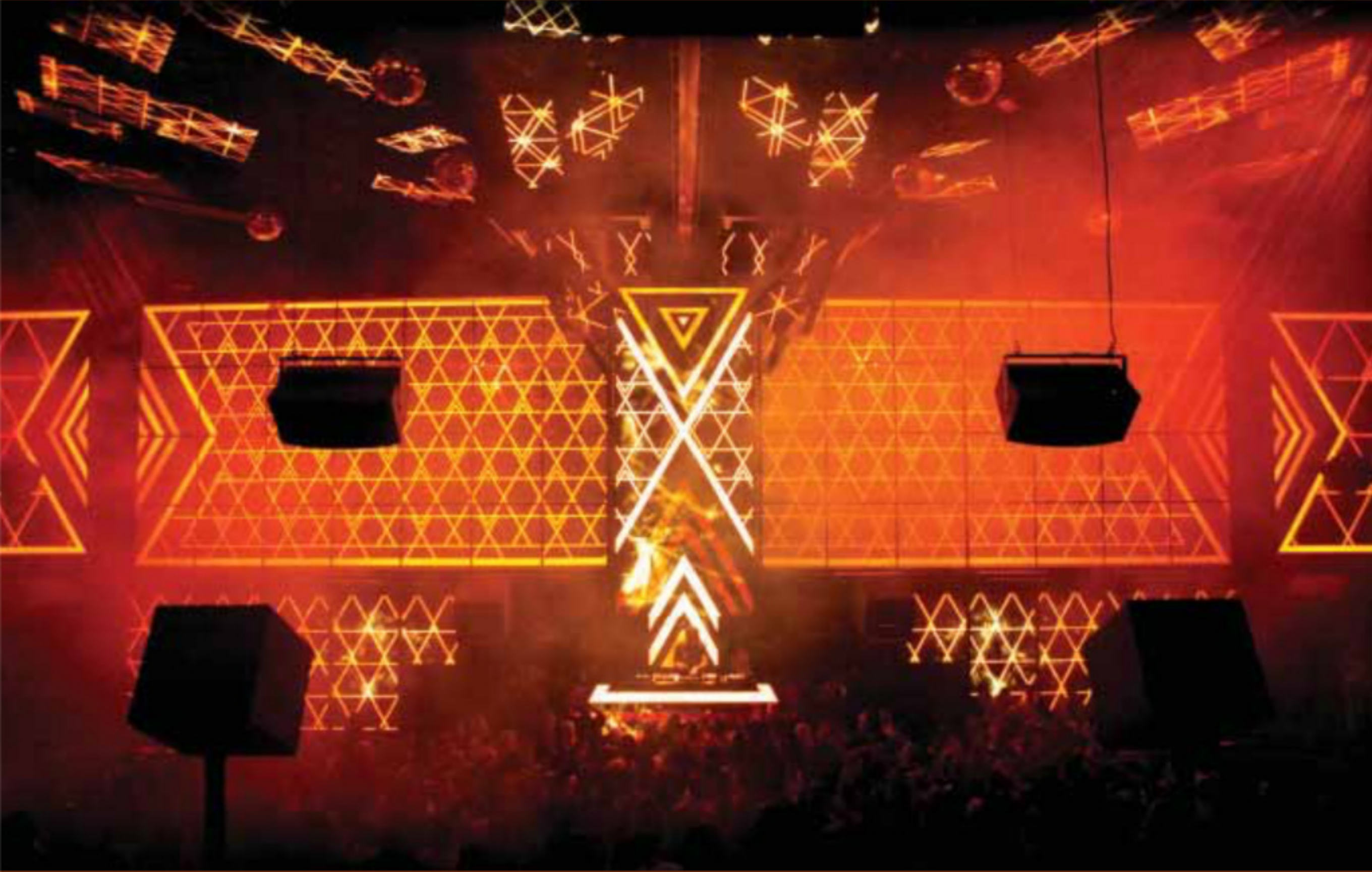
device. This allows you to customize the sound for each DJ. The end result is mind-blowing

"Relatively speaking, sound doesn't travel very fast," Lyons says, "and if the room is big enough and you have a powerful-enough speaker, the sound will travel through the entire space and particularly well in the lower frequencies. When this happens and your patrons are 25' – 30' away, there is enough of a time lag that it becomes a very unpleasant audio experience. Here, patrons are trying to assemble all the audio information from the speaker right next to them with what's arriving at their ears from the dance floor and other surrounding areas arriving at different moments in time, which all becomes very disconcerting. It's a common audio problem at many large venues, but it's also fixable by selecting the right processing equipment and programming it to obtain an optimal music experience.

"To implement the audio environment at Light, I installed five separate, but connected, audio systems, one for the



The front-of-house projection display includes a 120' x 30' hybrid screen made up of both LED panels and translucent polycarbonate.



The DJ booth's central screen continues upward, breaking up and cascading into multiple LED fragment displays embedded into the ceiling. The fragments then become three circular displays that curve to face the DJ space.

dance floor and one for each of the table booth zones in the lower and mezzanine levels of the space—a total of more than 176 various speakers that completely envelop the club and present a perfect music experience regardless of where you are positioned in the room.

"Starting with the dance floor and the DJ booth," he says, "I installed a series of ten Fulcrum Acoustic VLF Install US-221 speakers as direct radiating subwoofer units (at 4,000W per speaker unit) placed in a speaker chamber under the DJ booth as a sound wall facing out to the dance floor. The idea is that, from the dance floor, we could present a powerful enough audio ambiance that would radiate outward to fill the rest of the night club.

"Overhead, in the ceiling area surrounding the dance floor, I used horizontal Fulcrum Acoustic Prophile coaxial mid-high loudspeakers, which were carefully placed around each of the table booth areas. The Fulcrum units installed are the Prophile M series, mounted in eight pairs, a dual, 12" coaxial speaker offering a high-output, three-way coaxial system with wide dispersion, suitable for use as mains and other near-field applications. The coaxials offer HF/LF transducers with a nominal impedance from LF 700W at 8Ω, to a HF/LF 400W at 8Ω. Further along in the rear of the table booth area, we used several Prophile S speakers, which are much smaller in size, to accommodate their locations at the back end of the night club."

Accompanying the overhead speakers are eight Avalon EAW CLUB.two speakers (four in front of the dance floor and left and right pairs at the back of the dance areas) used as the dance main speakers. CLUB.two is a very high output, full range system using four 12" LF cones arranged in a symmetrical pattern behind the mid/high section.

These drivers sum to produce the output of larger drivers without suffering from the slow response usually associated with big cones. The system design is interesting because it turns the loudspeaker inside-out by mounting the MF/HF horn outside the grille. The speakers offer a coaxial mid/high compression with such high sensitivity that it produces peak output of around 136dB using only 150W of amplifier power.

Every table has its own pair of Fulcrum Acoustic VLF Install US-221 speakers placed under the seating. Their output is rated at 1,400W and offers everyone sitting at a table booth their own original immersive sound experience identical to the music on the dance floor.

"The challenge is combining both the dance floor and the table booth audio systems into a singular coherent presence, and that involves beam steering, audio placement, and digital delay," Lyons says. "Once I have my corrected sound, I place it where I want in the night club and then I time-align it to the primary audio source so everything is timed to arrive everywhere in the night club at the same time."

Lyons describes the DJ station as the usual configuration of an audio mixer and playback setup, including a Rane SL4 USB interface that connects up to four vinyl or CD turntables, a Pioneer DJ mixer (DJM-900), and a Pioneer digital playback unit (CDJ-2000) for CD and USB memory sticks. "It was meant to be a good home hi-fi system in a night club, which was achieved with the best audio equipment available for the most perfect audience listening experience we could get," he says. Also featured in the sound system are QSC AD-S82H and AD-C152ST units; Crown MA 5000i, MA 9000i, CDI 4002,



The acro wall is really a set of walls that act as a hollow chamber; the enclosed performance space within features winches in the ceiling for lifting backdrops and props.

and XTi 4002 amplifiers, and BSS BLU-160 8 x 8 network processors.

#### Video

With the audio set in place, Lyons turned his attention to Light's visual environment, which includes theatrical lighting, video projection, laser, and a series of LED displays deployed through the club space, which is distinguished by visual effects in the front of house, ceiling displays, and separate club lighting to light up the dance floor and acro performers.

"When we put the visual environment together, it's really from the eyes and perspective of the person running the show," Lyons says. "The night club lighting design is usually a collaboration between myself and Richard Worboys. When not working on new designs, he is a full-time working light jockey. Each lighting fixture and its placement is carefully selected with the specific intention of how the club is set up and anticipated to be used. The light placement is designed with a serious programming intent; after it has been programmed, when the house lighting operator steps through those cues, the final output will produce some amazing visual presentations."

In the club, Lyons says, "The entire inventory of lighting fixtures and then some needed to fit in a very small night club ceiling space. To do so, the lighting design took all the remaining available ceiling real estate and maximized its lighting presence based on what could be done with that room. Anne Tovatt, the lead designer from my company, was involved with all these disciplines, and having designed everything in the ceiling made it easier for us to slip and slide all these parts between each other and get the lighting system in the ceiling as it needed to be."

As for visual effects, the most predominant feature is the front of house with its projection display consisting of

a 120' x 30' hybrid screen, partly made up of LED panels and partly of a translucent polycarbonate material. There is a judicious use of LED video displays throughout the front and ceiling of the night club. All the LED modules are custom manufactured with a 6mm pitch.

In an interesting extension, the central DJ screen continues upward, breaking up and cascading into multiple LED fragment displays embedded within the ceiling. This becomes three semi-circular displays that curve around the ceiling facing toward the DJ space. The visual imagery was conceived by Moment Factory. The final content was synchronized between the main

screen and ceiling screens, creating a unified effect.

#### Lighting

Lighting for the dance floor and surrounding club space comes from a collection of ceiling-hung lighting trusses, each with a series of lighting fixtures and fog and haze machines. On the lighting trusses is an illuminated syncopation of lighting instruments, including Elation Platinum Series units, Martin Professional Atomic strobes, UV PAR lights, mirror balls, and fogging and haze mists, all going off simultaneously throughout the night. The lighting trusses are also formed into semi-circular arcs and are alternately placed between the ceiling LED displays.

"Normally, we'd use a lot of traveling lights that would move up and down through the night club, but with so much of that space already taken up with other equipment, we elected to use a lot of beam fixtures that could shoot from one end of the club and fill the entire room," says Lyons. "With this technique, we could choreograph its illuminations, and you end up with a lot of dynamic visual energy without needing lots of traveling lights to accomplish the same thing. The club light show is also unique because, instead of a typical presentation that has video showing off imagery, we combine both the show lighting and LED displays (both front of house and ceiling), which are as bright as the additional show lights and together are all combined into a singular night club visual treatment."

The full lineup of lighting gear includes 28 Elation Professional Platinum Spot 35Rs, 44 Elation Platinum Spot 5R Pros, 12 Elation Platinum Spot 15R Pros, 12 Elation Platinum Beam 15Rs, 48 Elation Platinum 5Rs, eight Elation Rayzor Q7s, 16 Martin Professional Atomic strobes, 12 Diversitronics 16DMX 16-channel DMX controllers, 192 Diversitronics strobe fingers, 26 Elation Event Bars, 28



The projections for the front-of-house display are provided by four Barco HDXW-18 WUXGA DLP video projectors.

Chauvet Professional COLORado Batten 72s, 18 ETC Source Four LEDs, 60 OXO Funstrip warm white LED strips, and 12 Elation Opti 12 UV PARs. Elation also provided 84 custom in-ground RGB LED units and 18 custom warm white LED units. Lighting is controlled by a ShowCad PC-based system, with the network including 50 Pathport nodes distributed around the room.

Effects gear includes two Artistry in Motion Mini Blaster confetti cannons, eight Antari SD200 snow machines, six Antari Z1000ii and four Z-1020 fog machines, 18 Martin Professional Jem Hydra fog systems, two Look Solutions Unique2 hazers, and 24 Elation AF-5 fans.

#### Behind the acro wall

One especially unique visual/theatrical effect is its front-of-house LED/rear projection screen, which hides a small stage behind the rear projection screen. Set next to the LED displays is a second special set of screens made of a translucent polycarbonate material that serves as a front and rear projection screen, a vertical stage, and a theatrical space all in the same location. With Cirque performers climbing on and bouncing off the polycar-

bonate wall, it's known as the acro wall. Because of its translucency, it also acts as a theatrical scrim.

The acro wall is placed on either side of the DJ station. Each wall is 20' tall by 30' wide and fitted with tiled Lexan polycarbonate panels covered with a white translucent 3M Scotchcal perforated window graphic film (IJ65) with a 50% transparency projection surface.

More than just a projection screen, the acro wall also serves as a staging area for immersive visual effects with Cirque performers. The acro wall is actually a set of walls that act as a hollow chamber; behind them is an enclosed performance space. The space also features winches in the ceiling to lower and lift backdrops and props. On the back wall, Lyons says, "We have two large roller scrims that are rear-lit by 2,000 RGB nodes. When in the down position, this creates a rear backdrop that presents a glowing depth behind the performance space. When rolled up, it reveals a high-output dot matrix of pattern and color, creating a fourth dimension with the acro wall." Lit from the back, the acro wall becomes a theatrical scrim and a window into the magical manipulations of vignettes by Cirque du Soleil performers.



The acro walls on each side of the DJ booth are 20' tall by 30' wide and fitted with tiled Lexan polycarbonate panels covered with a white translucent 3M Scotchlcal perforated window graphic film.

A small back-room collection of lights create that visually transparent look, Lyons says, including basic wash fixtures, LED units, and some intelligent spot and beam instruments located on the floor, all dedicated to backlighting the wall. The acro wall's hollow chamber also acts as a curtain, which can be immediately filled with fog, obscuring any sudden change out of scenery or props. The wall also has a collection of RGB LED color baton strips lighting the floor and the sides of the hollow chamber and colorizing the fog as needed.

Illuminated from the front, the acro wall is a screen for video projections. Light has four Barco HDXW-18 WUXGA DLP video projectors, each outputting 18,000 lumens. A Dataton Watchout media server delivers content.

Sakchin Bessette, partner and creative director at Moment Factory, says one challenge is matching video and LED brightness levels across two disparate display formats. "When our content is going through video projectors, sometimes we have to boost up the contrast and the brightness to get brighter images. In this case, our video presentation, with its translucent screens, competes with the LED screens, so we have to adjust each display

platform accordingly. We also have to be aware of the performers and their lighting needs, the overall ambient house lighting, and other lighting situations as they come up. So we work with the house lighting designers in setting up the overall visual presence for each evening."

Bessette adds, "Night clubs are dynamic environments, as every night is different, as are the DJs, the projected images, the performers, and the audience. However, despite these differences, we still need to have a visual presentation that somehow synchs up with the DJ and the surrounding club environment. To make our visual presentations really work, we integrate the architecture, the lighting, the amazing Cirque du Soleil performers, and their acro entrances as they appear. Ultimately, it's about pacing, which starts slow with a house warm-up, and, as the DJs begin their shows, builds up the club's energy as the visuals follow along with a more upbeat and dynamic presence. The VJs work very closely with the artistic directors from Cirque in preparing the program for each night and adopting it to the flow of the night club."

He adds, "To build this visual library, so far we've done almost 20 video shoots, which has given us more than

Photo: Courtesy of Light Group

1,000 video clips that have been edited into a large array of concepts and story lines, and each night's visual presentation is drawn from all that material."

What separates Light from other night clubs is the injection of live theatre into a preexisting night club environment as a new kind of clubbing ambiance. Given the various performance vignettes, the venue becomes a 360° stage.

Leu Strobe, managing director of Light, says that Cirque du Soleil is very cognizant of the fourth wall, "And we always strive to bust it as much as we can. At Light, we perform in and around the club all the time. When you enter, you're greeted by some of our character performers. When you're on the dance floor, there are aerial performances going on over your head and across and behind the acro wall. We have parades in the club aisles, and our various Cirque characters are wandering around the club. With the visual effects, the acro wall, and the proximity to the audience, it's as much of a sensory and visual experience as we can sustain to bring our Cirque presence as close to the audience as possible."

Lyons adds, "With everything at Light put in motion, it is presenting a seismic shift in defining what a night club should be." Bessette says, "Does this all work? We know it does because of how the audience reacts. What we see every night we're open is a big party with people getting sweaty, dancing, hands in the air, and they're all smiling and jumping around and letting go. When we see that, we know we've succeeded."

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Photo: Louis M. Brill

