

The United Way

A Chicago sports arena gets a new scoreboard plus lighting and sound systems

By: Sharon Stancavage

he United Center [in Chicago] was ready for a new scoreboard," says Eric Wade, of Crossfade Design, the firm charged with the task. The existing model was fairly old, he notes, adding, "they did a lot of updates over the years, but it was pretty small. In this day and age, everybody has big, nice scoreboards, and, being the Blackhawks and the Bulls, they needed to step it up."

Crossfade Design was brought into the project by the global design firm HOK. "We did Little Caesars Arena [in Detroit] with them," Wade notes. "They've given us a call

on a few projects, and they're a wonderful company to work with."

The Crossfade team, which includes Michael Nevitt and a staff of designers, got to work. "We put together several different ideas because they didn't know exactly what they wanted," Wade says. "We were trying to make something that would fit the building and the space."

The United Center did have one requirement, Wade notes. "Our directive was, 'We don't want the largest board in the business; that's not our idea here'." Nevitt adds, "Everyone wants their scoreboard to be bigger than the last guy. They have reached the point that they can't get larger." In some venues, he notes, "You can't put a concert in there anymore. It takes up the whole room." Instead of going for size, the client "wanted a creative idea and a different approach."

"The concept from Day One was to make it a transforming scoreboard," Wade says. "We didn't want the box that sits in the middle and only goes up or down. The idea was to have it form different shapes." The resulting unit moves in six different pieces. "The upper ring is about 192' in diameter," he adds. "It is 9' high and moves on highspeed winches down to about 6' off the floor; it can go as high as 135'. The next section down is the main screen. It moves up and down on its own. The rest consists of what we call aux screens." There are four of the latter, each of which moves independently. "They are there for eye candy, advertising, or whatever you want."

Screens are also found on the underbelly of the main scoreboard. "The players always want to see replays," Wade says; "you can see these poor guys craning their heads, looking up at the ceiling to see the main board. I wanted a design that was customized for the players; when they are sitting on benches, they can look up and see a screen angled primarily for them. It's an angled curvature screen; it's very unique."

The video product was supplied directly by Mitsubishi. "The center-hung screen is composed of Mitsubishi XL-Series of ultra-lightweight, high-brightness SMD LEDs with true 4mm pitch," notes video designer Barry Otto. At 8,661 sq. ft, "it's nearly five times the previous center-hung display," he adds.

"A lot of [the rigging] was done by ETC Hoists sales and service," Wade says. "They did most of the winches and upper rigging. Crossfade designed and manufactured parts of the board and designed the truss structure that goes up the middle. We designed the truss and Reliable Truss Design did the fabrication of the custom trussing. The automation is [ETC's Prodigy] proprietary system; we worked with them and came up with 28 or 29 presets; there are that many different configurations of the board right now. They can simply hit a preset and the board will go to that position." Video content control is handled by a "routable Ross [Video] content system with backup servers," explains Otto. It comprises three [XPression] Tessera control systems, 34 Tessera nodes, five Mosaic video processors, two DashBoard servers, two Ultrix routers, and three XPression INcoders. "There are also seven cameras on the scoreboard, a combination of in-house and broadcast," Wade says.

Lighting

The center's lighting system also needed to be updated and reimagined. "They didn't have lights to color the interior," Wade says. Enter the Robe ColorStrobe, a color-mixing LED unit. "It's a really nice fixture that's super-bright and super-reliable. They have 24/7 operation. in the arena If can do red during the game; it can also turn white after the game and light the building for cleanup. There's no longer any need for mercury vapor or metal halide lamps; the new fixtures don't have to warm up and you save money." Nineteen ColorStrobes light the floor and the lower bowl. "From Elation [Professional], we have the ZCL 360i," Wade says. "It's a small moving-beam fixture. We installed 96 in the scoreboard. We have them at the bottom of the auxiliary screens and also a bunch in the upper truss structure. In the middle of a game, you can have beams all over the floor. They also have a zoom. They're very functional little fixtures."

In the scoreboard's upper corners, Wade says, "We wanted a hybrid fixture, so we went with the MegaPointe from Robe, the premier hybrid light in the market." Twelve MegaPointes are placed in the scoreboard, with room for more in the future.

Also part of the installation are seven Elation Professional Artiste Monets. "For another concert venue in Louisville, we specified a number of the smaller version of that product line, called the Artiste DaVinci," Nevitt says. "We're very happy with them." The Monet is "a 50,000lumen LED fixture that has a hard edge, so we can have custom gobos," Wade adds. "We have Bulls and Blackhawks gobos to run around the floor."

The Monets have another benefit. "We were looking for



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Above: Eight double-nozzle cryojet heads are located around the scoreboard, creating a circular ring of effects. Below: Screens are also found on the underbelly of the main scoreboard, allowing the players to easily see replays.

a high-output fixture for sports specifically, that we could put in these boards, and offer to the teams so they're not replacing lamps," Wade says. "At the end of the day, no one likes spending money on bulbs."

These are some of the first Monets in use. "The units come from the product's first run," Wade says. "It's the primary workhorse under the board and everyone is happy with it."

The console is an M6, originally manufactured by Martin but now marketed under Elation's Obsidian label. Nevitt says, "I was involved in the initial R&D on the console with Martin, quite a while ago. It was already installed and there was no reason to make a change. The M6 is a very userfriendly console that is easy to operate. The in-house staff is very good; they worked with interfacing the new stuff into it and that was very seamless. I was scheduled to go up there, since I had the expertise with that console, and in terms of programming, they were totally on top of it."

Also, Wade notes, "We built and installed a computer for Vision by Vectorworks, so they have a 3D visualizer with really detailed 3D of the building and lights. That way, they can program without having the rig on. We're very big on making sure these 3D files are accurate and as detailed as possible."

Special effects

"The special effects cryo system is a one of a kind," states Wade. It's provided by Michael Willet, of Atlanta Special FX. "The United Center wanted





Above and opposite: Sycamore, Illinois-based Upstaging did a full mockup, using drapes, of the scoreboard for the Crossfade team.

cryo in the board," Wade says. "They wanted something unique, and we wanted to make sure the system functioned.

"The biggest issue with cryo is working with engineering to get a humidity level that works," he continues. "This is a challenge because most hockey arenas try to remove as much humidity as possible to keep glass from sweating, etc. There is a happy medium, however, so all items can function as needed."

Eight double-nozzle cryojet heads are located around the scoreboard, creating a circular ring of effects. "Basically," Wade says, "a system of hoses runs up into the ceiling and across; there are eight home runs to 16 heads. The hose reels were custom-made, so we could have 125' of vertical hose and the board could move up and down with the hoses. Two rooms on the upper floor behind the suites were usable; we ended up putting cryo tanks for one side of the board in one room and those for the other side of the board in the other room. The entire home run of hose ended up at about 550' per head, with check valves along the way." Customization was key to the success of the cryojet installation. "We had custom carts built with custom manifolds," Wade says, "so that each head can have six or eight tanks running at one time. The manifold is critical because it takes nearly two full tanks to energize the line. There are four double head jets on the lower ring, and four on the upper ring, in the corners."

Sound

"The United Center wanted a sound system like no other building," Wade says. To realize it, he and Nevitt called on sound designer Horace Ward. "I went to the United Center with them and thought, 'God, this is a project'," Ward admits.

"The original setup was four speaker clusters hung north, south, east, and west around the old screen," Ward says. "They also had speakers scattered around to provide sound to the corners of the arena; 20 years ago, it was a pretty good system."

Ward adds, "When I heard it, the room overpowered the system. It was probably meant just for speech vocals,





Concept drawing showing the scoreboard at work.

period; it wasn't meant for music and it wasn't meant to reproduce sub low end of any sort. If you played music through it, you would think it was a large radio speaker with no depth. It sounded off in the distance, and it sounded reverby, without adding reverb."

Also, he says, "The boxes, which were meant to throw 100', were trying to throw 250', so they could never win. The longer you throw your sound in certain frequency ranges, the more reverb you get. The highs, the high-mids, and mids are basically the vocal range [for announce-ments]. If you have all that midrange reverb going on in the body of the vocal and all that clatter going on in the high end because of reflection, that's because you're try-ing to throw sound too far and it's bouncing everywhere."

Therefore, he says, "I wanted a nicely distributed system with a central configuration around the scoreboard, and a delay outer ring, so you don't have to pump the sound so far." The main system is located level with the top edge of the screen. "We have an eight-hang main system: four hangs of six [Clair Brothers] C12-i-90s and four hangs of five C12-i-90s with eight hangs of three CS218





The above drawings break down the scoreboard to its various components, suggesting how it can be used in different configurations for different events.

subs flown behind each of the main hangs. The subs are in a cardioid setup, so we push that bass sound out from the middle. You hang the top and bottom speakers facing forward, and the middle units facing back, which helps to direct the sound outwards and give it directivity. Otherwise, it would be an omni-like low-end presence with a lot of sub frequencies in the middle of the arena."

Another challenge involved delivering sound to the floor level. "During a basketball game, I walked the floor when [the operator] was trying to pump up the music with the older system during the break," Ward says. "He had it up so loud that there was feedback down the floor, because to shoot it back to the audience, you had to have it up really loud. We need to control what comes onto the floor and what goes out to the different seating sections." To address this, he positioned hangs under the scoreboard. "There are 12 speakers [eight Clair Kit15-60vs and four Kit15-90vs]. All are positioned inside of the scoreboard; its underside area is pretty great, so we're providing coverage with these speakers in four controlled zones on the game floors [the ice rink floor and all the basketball court]."

In most arenas, he notes, coverage of the upper areas consists of "line arrays coming from the middle to reach that seat up in the third balcony; up at the top that's a 250'-plus shot. A lot of people do it, but you are overworking the system, shooting loud sound over a great distance to achieve the coverage. I was going to do something like that, but I always wanted to use a delay ring on the system."

As it turns out, delays were a requirement, rather than an option in the United Center. "There are so many banners in the [ceiling]," he says, "we had to design the system that way anyway, because you can't shoot through them. The grid is so low there that you can't do a line array arc of more than eight boxes high."

The delay rings are "located right above the top of the Section One seating. If you walk halfway up the staired seating and look up, you can see the line of the speakers. They cover the top two seating sections and the VIP seats." The delay rig consists of 12 clusters: six clusters of eight Clair Brothers C12-i-90s and an additional six clusters of four C12-i-90s plus four C12s with custom horn flares.

To complete his design, Ward added in downfills for hockey games: six JBL PD544 15" horn-loaded full-range units are three spaced, equidistantly behind the goal scoring areas on each end of the floor.

Amplification is achieved using a variety of Lab.gruppen products; the main rig features D120:4Ls, and D200:4Ls; the delay ring contains D120:4Ls, with Dunits for underscoreboard and goal fills. All of the audio equipment is provided through Clair Solutions.

Audio is controlled using a Avid S6L-32D, "a console I

use live," Ward says. "I went through custom layouts with them; we have a hockey layout, and basketball layout; it's just a flick of the button and you're in a different setup. We have also split the arena into eight audio zones; we can receive eight individual sounds from video and pump it through the system: You can have eight different things playing in eight zones. You can rotate music around the room; it adds audio effects to the modernization of the system."

Ward adds that he has little use for outboard gear "unless you want a nice tube compressor to give it warmth, or unless you want to come out from a group to a summing amp," says Ward. "If you want a warm sound, get a warm-sounding console. We gave them the S6L, which is naturally warm, and Waves plug-ins were added. You can enhance the vocal, so you can articulate it more with plug-in vocal chains, and everything is, like, 'Wow'."

The audio system goes far beyond simply basketball and hockey. "With it, the United Center will be able to do productions and save so much money," Ward says. Such events can be done at either the end of the arena, in a concert format, with a small line array enhanced by the new in-house system, or in-the-round. For the latter, he adds, "You don't need to bring anything else in; it's already there. It's probably going to be one of the favorite places to do shows. The system was designed for visiting engineers to do what needs to be done while bringing in bringing in a minimal amount of gear. It doesn't fight the space; it is now a well-defined, well-distributed, powerful audio system."

The new-and-improved United Center system opened in September 2019; the entire project spanned approximately 13 months. Nevitt notes, "We had the limitation of getting this installed in the off-season, and it had to be ready for this season. The entire ceiling had to be reengineered to handle the new scoreboard." Wade adds, "The old scoreboard was 90,000lb and this one is around 125,000lb, so it's a big difference in the ceiling. They ended up moving catwalks and putting in new catwalks, a new fly bridge, and more steel in the ceiling to support the weight; it was a lot of work for weeks on end for all of us and especially the staff at the United Center."

Nevitt notes that Crossfade worked to give the client more than was expected. "In the entertainment side of the industry, the artist wants to see multiple concepts, but in the sports arena world, that almost amounts to special treatment. We're used to talking to the artist, getting their opinions, implementing them, and being collaborative." Wade adds, "We treated the United Center like we would treat a rock star. At the end of the day, that's what we wanted; we want them to have something they are proud of for years and years to come."