


Motor City Modern

Photo: Olympia Development of Michigan



Little Caesars Arena is uniquely suited for both sports and entertainment

By: Sharon Stancavage

“Working under Christopher Ilitch’s leadership, our team set out to build the greatest arena in the world,” notes Peter Skorich, VP of entertainment services at Olympia Entertainment, the group that manages the sports and entertainment aspect of Detroit-based Little Caesars Arena. The venue will serve as the home of the Detroit Red Wings hockey team and Detroit Pistons basketball team; it will also provide the city with a major new venue for concert touring and other entertainment events. Olympia Entertainment is an Ilitch company, one of a multitude of businesses founded or purchased by [the late] Mike and/or Marian Ilitch. The Ilitch family has been involved with the revitalization of Detroit for decades. “You have to give the credit to Chris Ilitch. The vision these guys have for the city is absolutely amazing, and they are really making a difference,” notes Eric Wade, of Crossfade Design, LLC, based in New Albany, Indiana; the firm handled the entertainment lighting/projection design at Little Caesars Arena.

ARENA



Projection content was supplied by a variety of sources, including Crossfade Design and Dangers, Inc.

A host of firms were involved in the creation of Little Caesars Arena, including the Kansas City office of HOK, the global design, architecture, engineering, and planning firm; architectural lighting designers Illuminating Concepts, located in Farmington Hills, Michigan; Minneapolis-based Parsons Technologies; Motor City Electric, based in Detroit; and many more. Crossfade Design was tapped for the entertainment elements inside the arena. Wade was the principal designer, with Jason Robinson and Michael Nevitt also serving as designers. “When Crossfade Design works on a project, we tend to all contribute to it in some way,” Nevitt says.

Over the course of the project, Wade—and Crossfade’s role—changed. “I was brought into this about three years ago by Illuminating Concepts,” he says. “Basically, they wanted me to take care of performance lighting and video projection. They brought us in, initially, as consultants/designers, and they hired me to design the overall lighting.”

Arena lighting

Entertainment lighting for hockey and basketball games has been a trend for a while, and when Wade entered discussions with the LCA team, everything was on the table: “We spent a lot of time and effort creating renderings and motion ideas, so they could see things actually working.”

Determining the location of the instruments, which were going to be installed on permanent trusses, also took some time. “HOK spent a lot of time on sightline studies,” Wade reveals. “At the lighting booth, you’re almost even with the lights; it’s right up at the low steel, and there are seats that go up higher than us. You really have to be careful what you’re putting in and where you’re putting it, because you can’t block any seats.

“We have two 140’ side trusses, two 40’ end trusses, and [four] corner trusses; that makes eight. We also have extreme corner trusses [40’], which makes 12. In total, there are 13, because we boxed in the scoreboard, which we count as one truss. That’s all permanent and it never leaves.” The product chosen is 20.5” by 20.5” box truss by

Midland, Texas-based Tomcat.

The venue's trim height of 103' helped determine some of Wade's fixture decisions: "In some shots, if you're going from one end of the ice to the other, there could be a 300' - to-400' shot, so the instruments had to be extremely bright," he says.

For a long-throw fixture, Wade says, "We went with the [Robe] BMFL Blade; it was the only fixture at the time that would even come close to having the horsepower we needed. We started with 70-something units, but the design changed over time, so we now have 34." The BMFL Blades are located on the side and end trusses over the ice.

Working with the BMFL Blades are additional instruments from Robe. "We have trusses in the high corner balcony, way up in the corner of the building," Wade says. "I loaded them with Robe BMFL WashBeams. It's pretty much as bright as the BMFL—if not brighter—because it has fewer things happening in it. The punch of those lights is amazing. We get that 400' or 500' throw from the corners with the beam." There are 20 WashBeams in the far corner trusses.

Wade also wanted a hybrid fixture, and originally specified the Claypaky Mythos 2. At one point, when he was less involved in day-to-day decisions, the Mythos 2 was changed to the Martin by Harman MAC Axiom Hybrid. He

notes, "The Axiom is a good hybrid light, and it works just fine for the situation. So now we have a bunch of Axioms [69] in there as well. After that, we added [60] Martin MAC Quantum washes." The lighting fixtures were specified by Crossfade Design and purchased from multiple lighting vendors through Caniff Electric Supply in conjunction with Illuminating Concepts.

The venue also features 12 Lycian 1295 ELT followspots, sourced through Upstaging, located in DeKalb, Illinois. "There are four spotlights at the front of house, three along each side, and two in the rear," explains Upstaging's Mike Hosp. The firm also provided "two Limpet E5 [multifunction height safety systems], so the venue would be able to repair and replace any broken lighting and video gear. We mounted them on to a single [Gallagher Staging] Mini G Block for ease of setup."

The arena's entertainment lighting can be used as an audience lighting package for visiting concert tours, Wade says: "It's valuable for a show coming in, because they're not running into that expense of renting extra gear for an audience package."

Control of the lighting rig is via three MA Lighting grandMA2 consoles. "It was a long project, and took a long time to put it together, so we had a lot of different programmers involved," Wade says. "Eric Marchwinski was in the building, as were Tyler Roach, Brent Sandrock,



Barco HDF-W30LP Flex projectors are used in the mezzanine display as well as in the arena proper.

Jason Winfree, and others. You call them programmers, but, to me, these guys can do it all; they're designers in their own right." Other programmers who worked on content for the preshow, period breaks, and more include Sam Brown, Chris Lose, Joe Bay, Kevin Lawson, Brandon Wade, Aaron Wade, and Drew Hornback. Once Crossfade Design's initial design, setup, and programming was complete, the system was handed off to Robert Wertheimer, of Spectacle Lighting Design, who handles the day-to-day operation for Olympia Entertainment and Little Caesars Arena.

Arena rigging

ARS Entertainment Rigging, based in Atlanta, handled the installation of the in-house automated sports and event lighting package. "It was a pretty complicated job," says Dave Gittens, president of ARS. "That being said, ARS is uniquely qualified for a job like this in that we are equally capable of working in construction or production; not many companies can straddle that line. This job is a prime example of how those two completely different worlds can sometimes meet in the middle. We know what the designer wants when the dust clears and it's show-time—but navigating through a construction site with a general contractor and working alongside other construction trades has no resemblance at all to a standard live event load-in."

The rigging system, says Neil Montour, director of automation at ARS, "consists of 28 variable-speed hoists; eight can reach speeds up to 64fpm and 20 can reach 32fpm. The hoists are located over the hockey ice floor, with an additional eight fixed-speed hoists; with a speed of 16fpm, these hoists support trusses over the seating area. The variable-speed hoists have VFD [variable frequency drive] cabinets at each location, built by ZFX in Louisville; they control the hoist movement and receive load cell data, which is read by the control console. All hoists are Columbus McKinnon Next Generation Lodestars, with ARS spec modifications; RAYNOK software [manufactured by Niscon, Inc.] runs the front-end control. We also had truss and beam clamps custom-fabricated by Athletic Performance Rigging, in Tiffin, Ohio. Since it was new construction, the installation of the various components had to be broken up at different times, adding to the challenge of getting the right people in place to finish on time."

Arena projection

For projecting onto the ice, Wade says, "We went with a Barco [HDF-W30LP Flex, a three-chip DLP laser phosphor projector]. It wasn't even out yet when we put that in the spec. It was one of their first 30K laser projectors; it doesn't require a lamp and has an external cooling system. You're using a white light laser to provide your light



source; I think it's 30,000 hours of laser life, and it's going to be good for the next ten to 15 years before anyone touches it again. It's going to save money in the long term, keep the quality of the projector high for the long term,



Wade's lighting rig includes Robe BMFL Blades and WashBeams.

and you can run it 24/7 and not ever have to turn it off.”

Projector positioning was critical, notes projection system consultant Barry Otto: “We had to accommodate the oversized scoreboard, and also the fact that the score-

board was going to be moving up and down. Basketball is a lower trim than hockey, so the design had to incorporate that. The projectors had to be physically positioned off of center ice, so you had enough overlap across center to do

the blend.”

Four sets of double-stacked Barco laser projectors are located over the ice in four zones: end right, center right, center left, and end left. “One set of projectors is 58' from the center ice while the other set is at 68',” Otto says. Mounting the units required some custom fabrication. Nevitt adds, “They mount to a custom truss piece we designed and had Eurotruss build; it allows units to side-mount, and the truss beam clamps to the top of the main grid I-beam, allowing the projection to shoot through a gap in the SkyDeck grid [about which more in a minute]. The trim height of the projectors is 102' to the physical lens of the projector.

“The projectors are controlled on the network. On/off/logs and everything like that is handled through the Barco Projector Toolset software,” Otto says. However, the projectors also interface with three disguise [formerly d3 Technologies] 4x4pro media servers. “As far as the ice is concerned, in my design I treated it as one big projection surface,” he adds. “Zak Haywood did the disguise media server programming; Crossfade tapped Brent Sandrock and Ross McNamara for a bunch of content. Zak is the primary guy who did the programming, warping, and the layouts.” Crossfade Design provided the initial content and layout templates; most of the on-ice projection was created by Dangers, Inc., based on Longueuil, Quebec, in conjunction with the Detroit Red Wings production team.

Arena ceiling

Above the arena floor is the SkyDeck wire tension grid, manufactured by Sanford, Florida-based InterAmerica Stage, Inc. It's touted as the largest installation of the product in the world. Nevitt notes: “This is just like a tension grid you might have in a theatre. When you walk on it, it has some give to it; there's about an inch and a half gap between the wires.” Three hundred seventy-two modular SkyDeck panels cover 43,000 sq. ft. The steel mesh is rigging-friendly. “You can spread the steel apart slightly, to pull the rigging up through to rig directly to the steel, while being able to work safely,” Otto says. “There is enough play, so that if you need to, you can pull the steel cables open large enough to get rigging through it.”

Wade realized that the SkyDeck needed to be illuminated and so more studies were undertaken. “I got Illuminating Concepts involved,” he says. “I told them I was working on this and we should do another demo at their office. We got a piece of the SkyDeck mesh, put it in their office, and tried different fixtures, but I couldn't find anything that worked ideally for it. I found an Elation fixture, and talked to Eric Loader [Elation's director of sales and marketing] and said, ‘Hey, can we custom-build a fixture?’ When he found out it was 1,700 units, he said, ‘Of course we can.’”

The Elation Professional fixture that Wade proposed to

alter was the SixBar 500 (.5m-long) and SixBar 1000 (1m-long) linear LED strip lights. “We needed different LED chips, glare shields, relocation of connections, and, finally, linear lensing,” Wade says. “We needed a glare shield, because I had audience members sitting high at the end and we didn't want lights shining in their faces. We needed a more linear output, so we could graze the ceiling and not light up everything else.” He adds: “We moved all the plugs on [the unit] to the ends, we changed out the LEDs, I put a glare shield on it, and Eric Loader got us a couple of prototypes.

“Each deck has four quadrants that you can light with these units,” Wade says. The custom fixtures, christened the ELAR Quad Bar 500 and ELAR Quad Bar 1000, are mounted directly to the frame of the SkyDeck. “It all operates on the same grandMA system; we just added more NPU's and parameters to make this happen,” he adds.

“When people watch a game, they notice the ceiling,” Wade says. “You'll see people sitting there, just looking up at it. It's an amazing feature of the room.” The ceiling can easily be used to make patterns that copy the looks of various national flags, in addition to a limitless number of color patterns. Skorich adds: “The combination of the tension grid and the lighting allows us to provide an artist a unique canvas that does not exist in most places.”

Transformation is the end goal of the lighting, projection, and ceiling, Skorich says: “We developed a look for Red Wings and Pistons games, so when you come to Little Caesars Arena, the building has a distinct look, and when you come to a concert or other form of entertainment, the building looks like what you're coming to see, whether that be Janet Jackson, Guns N' Roses, or Paul McCartney. We can essentially transform this building and have it look completely different, depending on what event is being housed in it.”

Mezzanine

The entertainment lighting reaches also outside of the arena proper. Wade explains: “There is a standard concourse with normal ceilings and concessions on one side of the building. On the other side of the building is a big open-air area; the ceilings are probably 90'-to-100' high, with walkways, bridges, and restaurants.” The space also includes an architectural feature named the “jewel skin.” “It's 640' wide of geodesic material with 3D bump-outs; it's a curved wall that runs around three-quarters of the building, inside the mezzanine level.”

Initially, there was talk of using LEDs for the jewel skin. Wade notes: “When you look at the cost of making that entire wall, which is 80' high and 640' long, the video would have been a fifth of the cost of the building, so that wasn't an option. At that point, they came to us and asked: ‘If the ice is going to look this good, can you do that on the jewel skin?’”



The SkyDeck ceiling can be used to create various patterns, such as the flag image seen above.

Settling on projection, the team began testing the material of the jewel skin. Wade notes: "Illuminating Concepts helped tremendously with this, because they acquired a big chunk of the wall and put it in their warehouse. We got a Barco projector, left all the warehouse lights on, we left the doors open, and we did some shots on this surface. We quickly found out it would work, but it needed a different coating. The material itself is almost like brushed aluminum. They ended up putting a paint surface on it to help the projection."

The HDF-W30LP Flex projectors that were used in the arena were also tapped for use on the jewel skin. Otto says, "The biggest challenge was dealing with the complex curve, which the disguise 4x4pro made really simple at the end of the day. As for the surface of the wall itself, the hurdle was determining throw distances, based on where we could put things in the building, and dealing with the complex curves, as well as all the math to work out what the circumference is. Because it's a complex curve, the top and bottom of the wall are a much longer projection throw than the center of the wall. The jewel skin is

convex into the concourse from top to bottom, so it falls away slightly at the top, and then more at the bottom, and makes that convex curve.

"The math involved in making sure the projectors were positioned properly around the arena had to be laid out carefully in 3D AutoCAD so that we could make sure we had the coverage," Otto continues. "Then, the disguise units, because of their ability to handle warping in a 3D world, made getting all the images correct much less complex, than it would have been if we had to do the warping at each individual projector."

Finding the optimal location of the projectors was a challenge, Otto says: "Every projector's physical position had to be different, based on the building. We took the overall length of the center of the jewel wall all the way around and determined how many projectors it would take to cover it if it were flat. Then we laid it out on the curve, to those dimensions from center point to center point, and we had to come, perpendicularly, off the wall to find out where they landed in the center of the building. We also had to accommodate windows and other physical features



Twelve Lycian 1295 ELT spotlights are used for a variety of purposes, including player introductions.

of the building, shifting things one way or another a percentage or two to physically have a location for the projectors. Some projectors aren't as high as the others, and we did end up moving some even after multiple site surveys, and the throw distances varied greatly, based on the dims of the building." Twelve Barco HDF-W30LP Flex projectors are used in this area, outfitted with a variety of lenses, depending on projector location. "At one point, Zak had to get into a lift and get himself 40' in the air to get all the mapping correct on each separate projector," Otto notes.

Working with the projectors and the three disguise units is a Lightware USA MX-FR 33R Digital Crosspoint router frame with redundant power supplies. Otto explains: "The disguise units spit out a boatload of outputs that go to a Lightware high-resolution router, and then the destinations of the routers feed all the various projectors in the building. All 20 projectors come off the Lightware router, via fiber, and then there are Lightware media converters at each projector, converting from fiber back to DVI for the projectors themselves." The latter are Lightware USA HDMI-3D-OPT-RX150RA receivers, which are HDMI, and audio signal extenders over fiber. "Now, if there's any kind of a failure of any type, the disguise units communicate to the

Lightware router, saying, 'We need to go to a backup' and it does it. I always spec Lightware in all of our high-res distribution work; it works 100% of the time."

Exterior

The lighting system also includes the roof of Little Caesars Arena. Per protocol, tests were done and the winner for the SkyTracker replacement was the Claypaky Supersharpy. Wade says: "The Supersharpy is the brightest thing out there; there are 20 on the roof in Tempest Lighting enclosures that had to go up via helicopter."

Yes, via helicopter. Nevitt explains: "They bought the Tempest [Tornado G4] enclosure; Motor City Electric built a weighted stanchion for it that they engineered themselves and they were assembled on the ground." Unfortunately, the enclosure itself wouldn't fit through the doors going through the roof, since the frames and enclosure are approximately 6' x 6'. Wade adds, "There were no cranes left on-site that were tall enough, so the helicopter idea was the easiest idea, because it could drop them in the location where which one had to go. A crane would have put it on the roof, and you would have had to worry about how to get it to each location. They shut down roads and

the whole thing.” Skorich notes, “When you see that happening, you know that this is a major project.”

Control

The lighting network “is mainly a MA-Net system, but we’re also running devices on SACN and Art-Net, and then we’re running MA-net to the nodes for the lighting system, some via fiber, others via copper,” says Nevitt. Typically, the entertainment lighting exists independently of the house network. “However,” he adds, “the ownership required us to integrate fully with building network. We had to create VPNs within their network. There are advantages to that, of course; we can go to any port in the entire building, call IT, and say, ‘We want port number XYZ mapped to the VPN for the MA-Net,’ and we can plug a console to it.” Crossfade tapped resident networking and lighting control network expert Tyler Roach to handle the integration. “Tyler’s a jack-of-all-trades guy, so I’d lay out the basic concepts of how the control system functioned and he’d work to fill in the technical details, making sure choices I made integrated into the overall network,” Nevitt says. Sam Brown, an associate designer at Crossfade, worked with Roach on-site as well. “Paul Gillespie and his team at Motor City Electric were terrific to work with,” Nevitt says. “They were so accommodating when something had to change. They understood the complexity of

the system and trusted us when we needed to adjust something to meet the technical challenges we would run into on site.”

Arena audio

Parsons, a firm that has installed AV systems in over 45 sports venues to date, handled the installation and commissioning of the entire main audio system. “This is the largest arena I have ever installed in terms of the BOH [back of house] sound systems,” says Dave Potts, field systems engineer at Parsons. “While the front of house is great, almost all of the challenges were the sheer numbers of speakers, amplification, control systems, and digital signal processing from the back-of-house sub systems. With the systems combined, it’s the largest I have ever installed, and I have done about 25 stadiums and arenas.

“A complete Harman solution was provided to Little Caesars Arena; this consists of distribution via Dante, AES, analog, and proprietary signals via network cabling,” Potts continues. The PA in the lower bowl of the arena consists of six arrays; each consist of ten JBL VLA901 three-way full-range loudspeakers and sub arrays of four JBL ASB7128s. All are fed using Crown I-Tech 3500 and I-Tech 5000 amplifiers. “The bowl PA, for upper arena coverage, consists of various models of JBL Precision directivity cabinets [specifically, JBL PD6212/95s and PD6212/64s];



Rigging of the trusses, handled by ARS, includes variable-speed hoists.

there are 20 per side [east and west], with an additional six on the north and south. These are powered by Crown DCi 4 four-channel amplifiers.” Each lower bowl array also has a JBL PD764 for floor coverage during basketball games. “It sounds a incredible during games,” Skorich notes. “The biggest challenge was getting the 103” fully loaded [amp] racks up on the catwalk,” Potts says. “They are huge, awkward, delicate, and very heavy.”

The sound-reinforcement package in the venue expands beyond the arena. Potts adds: “We also have 1,200-plus speakers in the building subsystems, clubs, and entrances. The Chevy Plaza area [outside of the venue, featuring food and seating] has its own pair of JBL VerTec arrays, which sound amazing.”

Control is provided by a Yamaha CL5 console with a RIO 3224 I/O box; also on hand are four QL1 [mixers] with two Rio 1608-D Dante-equipped I/O racks. Two are located in the production control room/video replay, one is portable, and another is kept in a remote mix location. Potts notes: “Dante is the primary means of audio transport between broadcast and in-house video production. We have the ability to route audio to/from any locations, with the ability to plug into almost any other system via portable equipment, such as the Yamaha QL1 and Rio 1608. This includes locations outside of the building. Using the network connectivity in every broadcast junction box.” Outboard gear includes two Yamaha Rupert Neve Designs 5045 Primary Source Enhancers. The mic package includes Shure UHF-Ds, Shure Beta 58s, Electro-Voice RE16s, Electro-Voice RE20s broadcast announcer mics, and Sennheiser K2 shotgun condenser mics.

Like the lighting package, the audio system is also optimized for incoming tours. “When tours show up, they almost all use some of the permanently installed systems,” Potts says. “Depending on how their rig is deployed ultimately determines exactly what they need. On the control computer, Parsons has tried to make this task relatively easy by setting up a ‘tour’ preset, which shuts down the main arrays and adjusts the delay parameters for the speakers for time alignment with the temporary system. When it’s time to get back to hockey or basketball, the operators simply recall a preset that reconfigures the system to whatever sporting event they are supporting.”

Also featured in the arena are 76 banners that management wanted to disappear, as needed. Wade designed a prototype and turned to Lititz, Pennsylvania-based TAIT to make it happen; the resulting product is the BannerBox. “The banners live in the Tait Navigator-controlled BannerBox, which lowers the banner,” Wade says. “The also have internal LED lights that light the banners when they come down. We can roll up, lower, and raise the banners from the console when we want to.” The product’s internal lighting is also controlled from the console. Additional features include variable speed deployment, standard single or optional double roller, and flexible rigging and mounting options.



TAIT, of Lititz, Pennsylvania, manufactured the custom BannerBoxes from Wade's design.

The venue also has a few surprises. “We did install a beautiful organ here that is obviously tied into the sound system; it’s a work of art and a throwback to all the old pipe organs,” Skorich notes. The SkyDeck is also slated to get an upgrade as well, in the form of a star field that will be made up of 412 Robe Anolis ArcDot multichip-based, multicolor LED fixtures.

As for the future of Little Caesars Arena, Skorich notes: “We are always trying to recalibrate and improve upon our Red Wings and Pistons presentation. We’re also eager to collaborate with the entertainment and other sporting shows that come through our building, to see what we can provide them and what they can learn from each other.”



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