

Tuning the Bass

By: Mel Lambert

A new sound system is the key to refining the acoustics at a University of Texas concert hall



When administrators at the University of Texas at Austin realized that the safety standards within its Nancy Lee and Perry R. Bass Concert Hall needed to be upgraded, the end result was a major acoustic renovation and the installation of a new L-ACOUSTICS line array and distributed sound system. Originally completed in 1981, and featuring seating for 2,800, Bass Concert Hall offers a large stage, an orchestra pit for 100 musicians, and dressing rooms for more than 100 performers, with a large backstage area and several workshops.

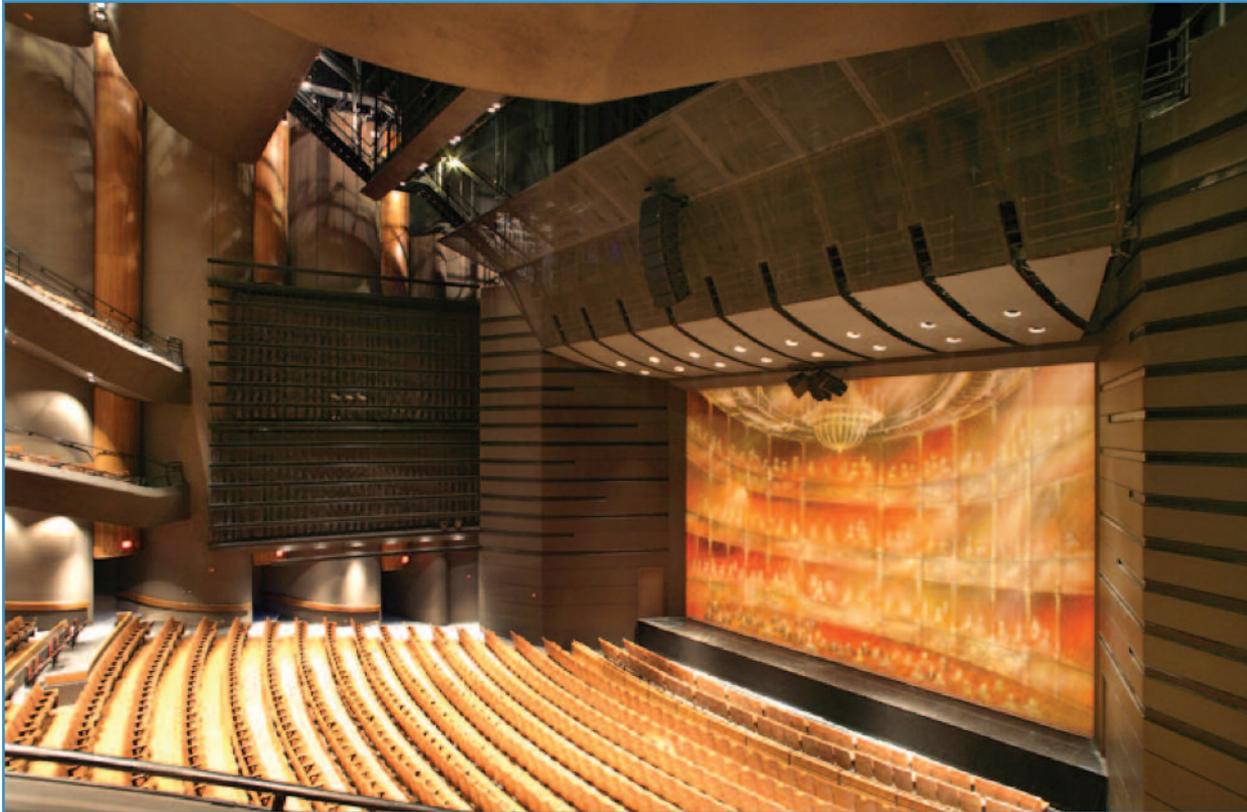
The recent renovation added more than 7,000 sq. ft. of new lobby space, in addition to fire-safety upgrades that include new enclosed stairways for safe egress from the front of the building. "We teamed up with Portland-based BOORA Architects, who won

the contract," recalls Mark Holden, owner/design principal with JaffeHolden, the firm responsible for the sound elements within the Bass Concert Hall project. "The university had secured a \$14.7-million budget for the lobby renovation, but we soon realized that the auditorium was also in need of an acoustic renovation. Originally, the hall had been built for operatic and symphonic performances. With some of these productions moving to the nearby Long Center, the university was aware that the venue had to be improved so that it could host a more varied program that would accommodate in-house and visiting orchestras, as well as amplified concerts. In essence, the venue lacked speech intelligibility, and was far too live-sounding, with long RT60s at the critical mid-frequencies."

In addition to a number of acoustic and lighting improvements, while the original sound-reinforcement system was being removed the designers soon realized that the audio rig was beyond recovery. "We recommended that the university's remodeling budget be extended so that the sound system could be replaced, in addition to improving the acoustics to make the hall more suitable for both symphonic and amplified performances."

"At one time," recalls Mark Turpin, JaffeHolden's senior consultant, audio and video, "Bass Concert Hall was the only venue in the city available for symphonic concerts, and served as home for the Austin Symphony, the Austin Ballet, and Austin Lyric Opera. Two years ago, a new symphony hall was built in the city, which attracted a number of events normally held at Bass Hall. During that time, the University of Texas started to use Bass Hall for campus events. The original sound system comprised a 30-year-old [JBL Professional] central cluster mounted over the center of the proscenium. The array included a fiberglass horn with a 2" driver and a number of bass bins. Its physical dimensions and location meant that sound propagation was problematic to the rear of the hall and the back of the first balcony."

After consulting with Adam Dudley, audio supervisor of the UT Performing Arts Center, which consists of six theatres, including Bass Concert Hall, it was decided that a new sound system would be needed to handle amplified events in the venue. "The funding process took a while," Dudley says, "but we had already decided upon a collection of line-array clusters and floor-mounted cabinets. We developed a proposal and solicited suitable bids." The sound system update and installa-



tion budget was close to \$300,000.

“Eventually, we settled on an L-Acoustics system supplied and installed by Hariel Enterprises,” Dudley continues. “I had seen [L-Acoustics] V-DOSC cabinets being used on local tours, and liked what I had heard about the company and its after-sales support. We were looking for a system that would be recognized by visiting acts at Bass Concert Hall, and help us avoid rentals. In essence, we wanted this to be a viable house system that could be augmented by an artist’s touring-system cabinets, if necessary. Flexibility was our key criterion.” Since opening on January 23, the hall has hosted concerts by John Legend; Broken Social Scene; Ghostland Observatory; and the University of Texas’s symphony orchestra, wind ensemble, choruses, and jazz trio, in addition to *Legally Blonde: The Musical*.

“Because Bass Concert Hall is such a tall environment,” Dudley continues, “we needed to ensure that

sound from a center cluster could cover the entire seating area and reach the rear of the balconies. We selected L-Acoustics KUDO, KIVA, and ARCS Series cabinets for the upper and lower central arrays, augmented by a pair of lower flown cabinets and a pair of ground stacks to cover sections of the auditorium not reached by the center arrays.”

The primary upper-central array comprises eight L-Acoustics Kudo line-source cabinets, arranged one above the other some 40’ above the stage, close to the top of the proscenium arch, and thrust 20’ out into the auditorium. The lower-center array comprises six L-Acoustics Kiva ultra-compact line-source cabinets and a pair of L-Acoustics Arcs constant-curvature line-source cabinets splayed and angled downwards to cover the front seating areas and located in the corner of the proscenium some 10’ below the main center cluster. A pair of upper-side arrays, located at the same height as the center array, con-

sists of a pair of Arcs cabinets per side, with horns uppermost along the same center line. These cabinets are situated 26’ off the center line. The stage-located lower-side arrays comprises three Arcs cabinets and two (originally three) L-Acoustics SB28 subwoofers per side, tightly packed to the stage throat wall located downstage of the curtain line and arranged to fire into the center of the hall; these stacks can also be flown 16’ above the stage, if necessary. Finally, to cover the front seating areas, a total of six L-Acoustics 8XT compact two-way coaxial cabinets are bracket-mounted along the stage apron, with five more 8XTs for over-balcony coverage.

“The lower-center array,” explains Dudley, “is made up of three pairs of Kudo cabinets, augmented by outer Arcs cabinets splayed at 90°, and oriented approximately 45° down from horizontal to cover the front seating areas—aiming approximately at Rows Seven and Eight. The upper-side arrays”—two Arcs per side mounted

in-line with the upper cluster—“are designed to cover the curved outer edges of first-balcony seating; basically, they augment the side coverage offered by the central Kudo cabinets, which are 4dB down on the side.”

Five weeks for installation

Hairel Enterprises served as the project’s system contractor. Once the contracts had been awarded and the systems designed by JaffeHolden, it was a race to complete the sound-system installation project against a very tight deadline. “We had our walk-through on November 17, 2008, and a contract by December 5,” recalls Robert Slaughter, Hairel’s senior project manager. Work started on December 15, with a planned opening concert by John Legend on January

“To ensure that each step of the install process was coordinated to meet that completion date, we broke our crews into separate disciplines,” continues Slaughter. “By using three crews, we were able to maximize labor efforts, plus put in long days. Each crew was to work independently of the others, until larger efforts required the teams to support one another. Since part of this project fell during the holidays, our approach allowed us to give each crew member some time off with their family. We have used this divide-and-conquer method before on installations for Kingsland Baptist Church, in Katy, Texas; Lutch Theatre in Orange, Texas; and Bowie High School Theater in Austin.

“Our Red Team, headed by Bruce Simmons, who has become our man

Turpin [from JaffeHolden] arrived, we would be ready to commission the system and not just have the normal punch-list items to overcome.”

“The upper-side arrays were the first speakers to be hung,” the project manager continues, “with two L-Acoustics Arcs on each side ready and waiting for the conduit and cabling. Next were the upper-center array—eight Kudos—followed by the lower-center array—six Kivas and Arcs; the over-balcony cabinets—five 8XTs—were also being installed at this time. We then turned our attention to the side clusters, bottom tier, and subwoofers—four SB28s and six Arcs—that were to be configured for both floor-supported and flown applications. The mock-ups we fabricated in our shop allowed us to have the custom steel supports manufactured and in place when we were ready. We then moved to the front fills—five 8XTs—as the last speakers to be installed.

“We had Whirlwind manufacture all speaker drop cables and ship them to the site; they were terminated within 24 hours of receipt. The customer had requested that cabling for one more subwoofer per side be installed, so that they could be added in the future, if funding became available. L-Acoustics was great to work with—they are very professional. We needed a custom setting for an LA8 amplifier controller, and we had what we needed in a few hours—not days/weeks.”

During the installation, Slaughter says, a fiber-optic backbone was used—instead of the suggested conventional Cat5—to carry digitized audio signals from the front-of-house position, which houses a 40-channel Yamaha PM-4000 console, to the equipment racks. “We were to provide a single Cat5 from FOH, as per the design. With approval, we chose to use a single-mode optical fiber to accommodate future needs. We also used an armored, BX-style cable that can withstand tremendous stress. Any time we can use fiber for applications

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23—five short weeks later, with Christmas and New Year in between.

“Had this been a normal schedule-type installation,” Slaughter explains, “we would have sent one crew that would do everything. But that would have taken about nine weeks, which we did not have. During the pre-bid walk-through, several contractors were visibly concerned about the tight installation schedule. While [the company’s owner] David Hairel and I were there, I was taking in more than just what the tour was offering: How would we do what we do and why would we do it that way? It was an open mindset of what the consultant had specified, the needs of the customer, and what we could do in the limited amount of time available. This was one of the rare times that consultant, owner, and contractor were able to complete a task in weeks that normally would take months, if not longer—a team effort from all involved.”

to go to for hardware procurement and supply runs, handled infrastructure: conduit, pull boxes, termination boxes, cabling, and transition boxes. Work started on December 15 with a base crew of four people, supplemented with eight more as required. The Blue Team, headed by Bruce Grant, our key rigger/detailer, handled rigging and installation of all loudspeakers. Work started December 19 with a base crew of two persons, plus three more as necessary. Bruce built rigging mock-ups in the shop area to get visualization of what needed to happen in the short time we had available. The Green Team, headed by Kevin Bell, one of our lead installers/programmers, handled termination, testing, and commissioning at the main equipment-rack location. Dave Cheramie came in from our crew, set the gain structure, phase-checked all the speakers and balanced the system so that, when consultant Mark

such as this, we will make the request to do so. For an inside-plant application of 300', we prefer to use armored optical fiber for its robust durability. The cost impact of such a short run meant it cost us more to use fiber, but the operators now have a future-proof path from FOH to racks. There is a fine line between what is bid and making approved improvements, even if it costs the contractor." Tie lines are also provided between the front-of-house equipment racks to a recording studio within the University of Texas' Butler School of Music.

"All areas were completed by third week of January in time for the John Legend concert," Slaughter confirms. Our installers were so dedicated they worked on Christmas Eve without being asked. This was a perfect example of how consultant, owner, and contractor can work together for a common goal on a hyper-tracked project. We provided all conduit, cable, speakers, and amplifiers. Most of the rigging hardware came from L-Acoustics, which we added to as needed from vendors in Los Angeles and Houston."

All speaker systems are powered by a rack of L-Acoustics LA4 and LA8 eight-channel amplifier controllers located in the rear of the auditorium several levels above the front-of-house mix position, with loudspeaker cable running up into the ceiling and down to the cabinet arrays. The LA Series controllers feature power amplifiers, DSP, Ethernet network control, and system protection in a compact, two-unit chassis; the LA4, used for the Kiva and small cabinets, delivers up to 4 x 1,000W at 4 ohms, while the LA8 offers twice the LA4's powerful performance and was used on the larger Kudo and Arcs systems.

"Even though the speaker lines run some 500'," Dudley confirms, "there is no performance trade-off. We used system EQ to dial out the effects of long cable runs. During final tuning, we hooked up a laptop PC to control the

LA4/8 units via a [hard-wire] Ethernet link, so that we could adjust all playback system parameters from within the hall itself, which was a great advantage. In fact, the entire L-Acoustics rig sounds excellent. Considering our budget, we have that wow factor that we couldn't have achieved with a [JBL] VerTec or Meyer rig."

Adjustable acoustic modifications

The acoustic upgrades were relatively modest, but had a major impact, according to JaffeHolden's Turpin. "When the hall was built," he says, "the dropped ceiling and side walls had been treated with a series of what we referred to as 'Tootsie Rolls'—chocolate-colored decorations that were highly reflective. We determined that if we removed the front third of the ceiling treatment to allow sound to access a dead space above the ceiling, and changed the front wall in the first third of the room, we could create an acoustic throat zone—or ATZ—that would offer three major benefits.

"First, the restyled side walls would provide better lighting positions, enabling side lighting for the university's productions. Secondly, we could incorporate adjustable acoustic drapes along the ATZ that would absorb sound from the loudspeaker line arrays along the sides. And thirdly, we reshaped the walls behind the drapes to make them flatter and more reflective by adding a multilayered drywall on a heavy-duty frame constructed in front of the Tootsie Rolls. Then, by gathering the side drapes for non-amplified opera and orchestral performances, the acoustics could be made livelier by exposing the reflective wall surfaces. Now, using the electrically operated drapes system, the hall can vary the acoustics to match that evening's performance requirements. The movable drapes above the ceiling are arranged as four panels per side that drop 25-35' from the roof at the front and 10' in the rear; width is some 75' for a total of

10,000 sq. ft." Auerbach Pollock Friedlander served as theatre consultants on the project and designed the motorized drape systems.

"The adjustable side-drape system worked out very well," Turpin says. "RT60 with the drapes closed is 2.0S and around 1.4S with them open, thereby enhancing the hall's flexibility."

Initial reactions from Bass Concert Hall staff were overwhelmingly positive. "They were blown away," says Slaughter. "The compliments still continue to come in, even today. The room has made the local news, and many other theatres are asking what we installed. Adam Dudley and house staff were great to work with. JaffeHolden is very good at what it does; no question about that. We worked with them on projects at The Hobby Performing Arts Building, Houston, The Houston Baptist University, and The Long Center, Austin Texas; our current project includes Mimms Baptist Church."

"The key to this project," says Dudley, "is that a quality installation and a quality design result in a quality experience for our audiences. The difference between the older sound system and this new one, plus the acoustic enhancements made to Bass Concert Hall, is like night and day. We have the peace of mind that comes from a system capable of delivering whatever the audience needs, and the flexibility to address the ever-changing needs of our performance programs. Finally, we have a major increase in sound quality for the product we produce. L-Acoustics was pivotal to that success." 

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