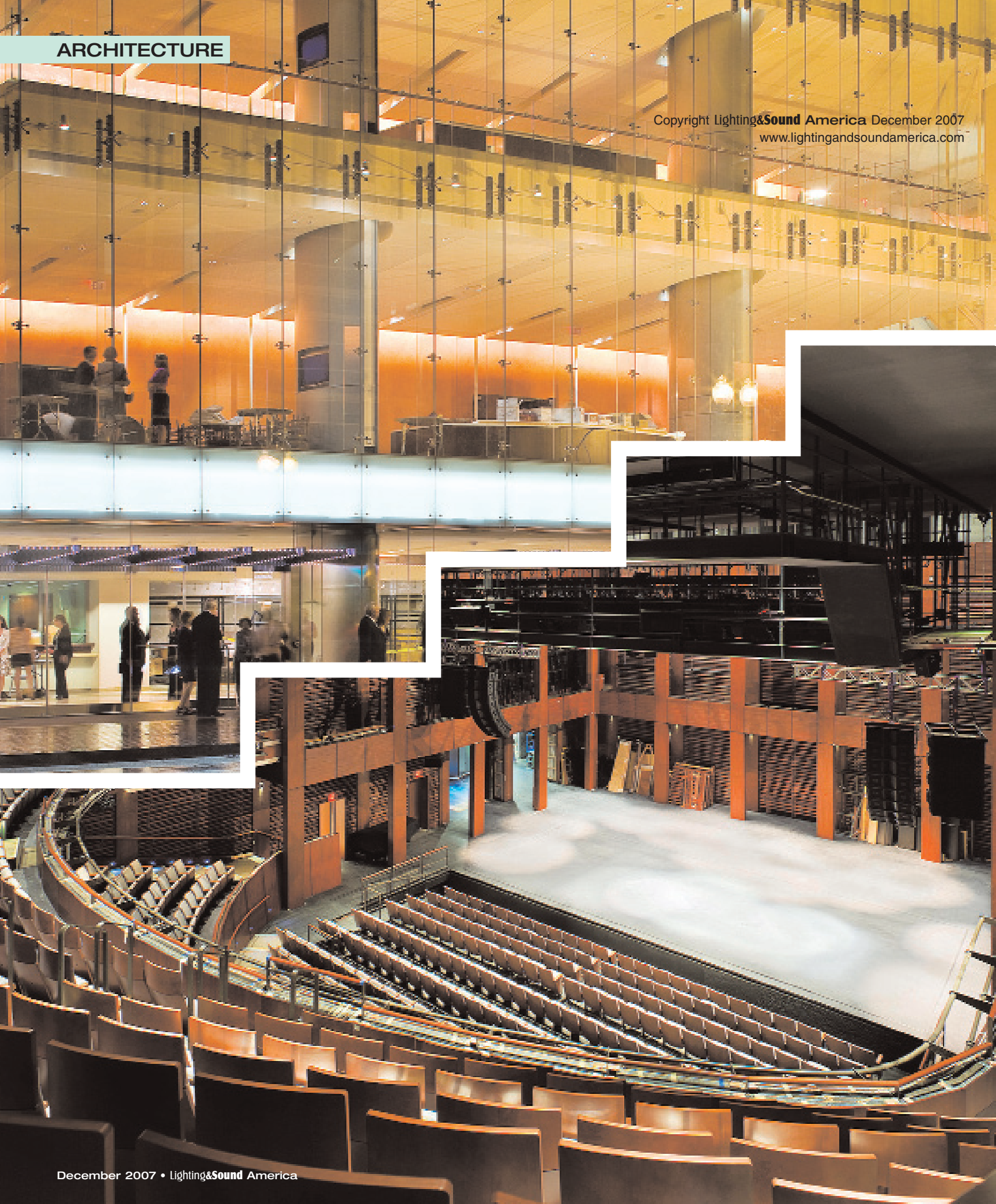




SIDNEY harman's GIFT

Two weeks after the September 15 ribbon cutting, sponsored by Target, and a scant three years after groundbreaking, the October 1 opening gala of Sidney Harman Hall, the sparkling new venue born of the Shakespeare Theatre Company in downtown Washington D.C., was a tony international gathering featuring the likes of Chelsea Clinton, Michael Chertoff, Wynton Marsalis, Patti LuPone, and the Duchess of Gloucester.

One of the project's most attention-getting aspects is the key philanthropic role played by Sidney Harman, who sits on the Shakespeare Theatre Company's board of trustees. Now in his late 80s, the founder of Harman International Industries and spouse of Rep. Jane Harman (D-California) contributed \$19.5 million of the building's \$80-million budget, including some \$1 million in audio equipment. (The city of Washington also provided \$20 million in funding.) When they see Harman's name on the glass theatre

façade and marquee fronting the assertive, new building on F Street, audio professionals will always be able to feel a rush of insider's pride.

Spreading over 67,000 sq. ft., Sidney Harman Hall is a remarkable space that represents the genesis of a new, world-class performing arts center. Harman was a major advocate for building the company's new venture to support a variety of performing arts.

And so it came to be. Shakespeare Theatre Company (founded in 1985, with Michael Kahn as artistic director since 1986), its 451-seat Lansburgh Theatre and the new, versatile, 775-seat venue now function under the umbrella of the new Harman Center for the Arts. This allows the company to run more productions—a total of eight this season, up from five previously—and for the umbrella PAC to book a

An audio industry legend makes possible a superb new venue for the Shakespeare Theatre Company

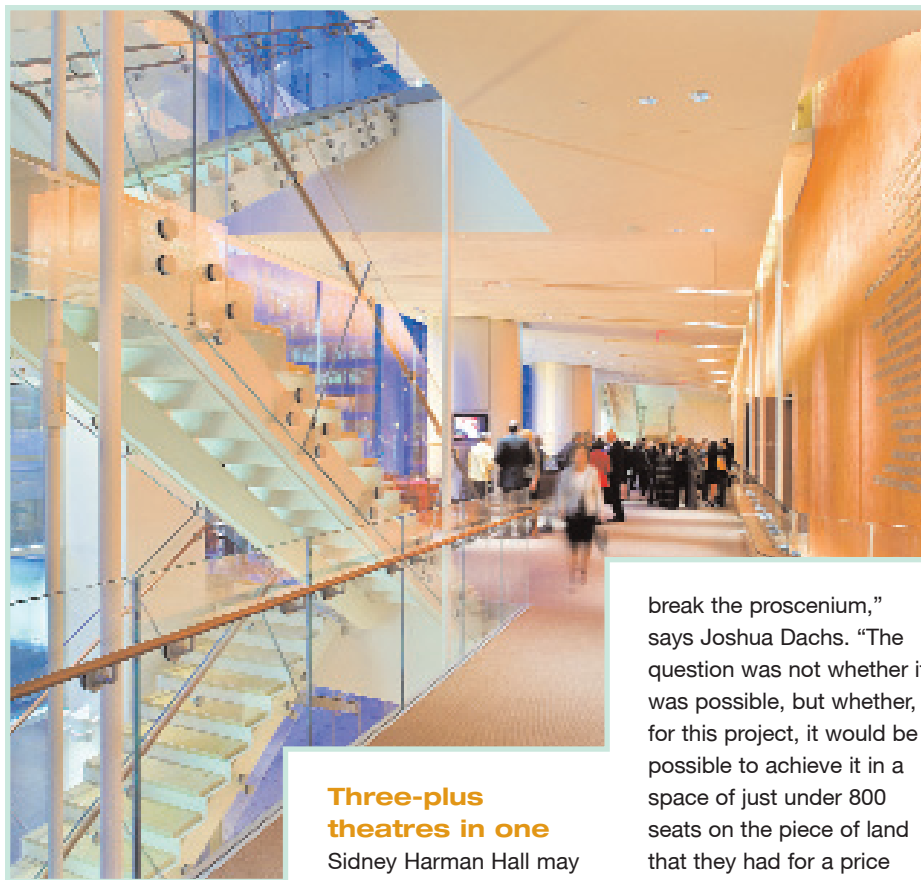
By: Judith Rubin Photography: Tom Arban

wide variety of non-Shakespeare events, from ballet to wedding receptions, some 200 of them in the first season.

Since joining the Shakespeare Theatre Company as managing director in 2002, Nicholas Goldsborough has worked with the board of trustees to fulfill the vision of a national destination theatre and oversee the plan to create the Harman Center for the Arts. He helped broker the real estate deal that should help keep things on a good financial footing: Sidney Harman Hall is nested into an 11-story office building, co-owned by Shakespeare Theatre Company and the International Union of Bricklayers and Allied

Craftworkers (BAC), each with its own entrance. The Shakespeare Theatre Company owns the lower five stories. The upper six are owned by BAC and, in addition to comprising some 120,000 sq. ft. of office space, the floors provide excellent overhead sound insulation for the theatre.

The design team for the building architect, SmithGroup Inc., was headed by Colden (Coke) Florence. The architect for the Sidney Harman Hall design team was Toronto-based Diamond and Schmitt Architects Inc., including principals A.J.



The theatre's lobby.

(Jack) Diamond and Gary McCluskie, and project architect Jennifer Mallard. Fisher Dachs Associates, New York, headed by Joshua Dachs, was theatre consultant. Acoustical and audio system design was provided by the Chicago-based Talaske Group Inc., headed by Rick Talaske. CarrAmerica Urban Development was the project developer and Clark Construction was general contractor. JM Zell Partners, Ltd. served as project manager, coordinating the design work and business transaction, and representing both the Shakespeare Theatre Company and BAC during construction.

Three-plus theatres in one

Sidney Harman Hall may have 775 seats, but there was no stinting on acoustics, design, or equipment; it is outfitted like a major performing arts center. Outside, the building's three-story glass curtain wall and bay window/balcony, projecting 8' over the sidewalk below (an almost unheard-of variance in D.C. was granted for this), have transformed the streetscape. Inside, the theatre features double-walled concrete construction, adjustable acoustic panels, and a wood-lined space with movable components that can be rearranged into multiple configurations, with each changeover taking a matter of hours.

"Sooner or later, some director is going to want to

break the proscenium," says Joshua Dachs. "The question was not whether it was possible, but whether, for this project, it would be possible to achieve it in a space of just under 800 seats on the piece of land that they had for a price that they could afford."

Clearly the answer was yes. There are three basic configurations: Proscenium, thrust, and end-stage. A 625-seat "music ensemble" setup can be achieved by putting the front seating wagons into storage and setting a freestanding bandshell in front of the proscenium—allowing the room to be used for concerts without disturbing the stage set. (The wagons move on an Aeris air-caster system.) The room can also be cleared out for an arena configuration. Team members anticipate that, as directors and stage crew get to know the new space and its theatrical building blocks, the time needed to change from one configu-

ration to another will shrink from about four to two hours, and additional setups will be discovered. Indeed, the nature of the design is conducive to the discovery process.

The space and its components and systems, made functional through custom rigging and controls supplied and installed by JR Clancy, are faithful to the tools and culture of theatre crafts and theatre technology. The result is what FDA project manager Robert Campbell terms "a sophisticated kit of parts" that nevertheless remains an environment familiar to any stagehand. "From a stage-rigging point of view," he says, "the hardware is standard theatrical equipment. When you want to fly the truss, you use a system of chain motors. Pieces were constructed similar to stage scenery, with lightweight materials and a minimum of connections. With few exceptions, the rigging is from the grid over the stage, and is accessible to the crew. Acoustic panels can be flipped by just one person. You aren't tied down with large, cumbersome pieces that you can't get out the door. The sophistication is in the planning and design, not the technology." All the same, there will be a learning curve. "This building is so incredibly integrated, it could take a full year before they know all its capabilities," says Campbell.

"There may be configurations that won't be arrived at for 10 years,"

says Dachs. "Time will tell. It's a tool that can accommodate a wide range of approaches that directors and set designers will bring to bear. Michael Kahn's direction was to create a 'muscular space for robust plays of epic scope.'"

"The real challenge of doing theatres like this is to make each configuration look purpose-built," says Campbell. "Jack Diamond and Josh Dachs collaborated to create a certain sense of formality in each of the configurations and a specific character, even without a lot of scenery—something that takes us back to the days of Shakespeare and the Globe Theatre, where the space supported the text and the spoken word."

"The company is known for very beautiful and relatively elaborate productions," adds Dachs. "If you strip everything out and choose not to have

variety of positions and locations to make the proscenium opening larger or smaller. It can also move the panels upstage to downstage, or gather them together and raise them up out of view. If desired, the proscenium, and the mechanism that moves it, can both be dismantled and removed. The custom mechanism, which also controls the house curtain, was engineered and installed by JR Clancy and Tomcat USA and is the key component of the transformable theatre. JR Clancy's project manager was Robert Degenkolb.

The first four rows of seats are wagons that can be moved around to the sides for the thrust configuration, rotated upstage for an arena configuration, or lowered into the floor via a custom Gala Spiralift for the end-stage setup. They can also be removed and



A view of the theatre's glass-covered facade.

Campbell: **"You aren't tied down with large, cumbersome pieces that you can't get out the door. The sophistication is in the planning and design, not the technology."**

scenery, the room is still very beautiful. It has resonance. The timber columns evoke timber columns at the Globe—not a literal recreation, but some memory of the wooden 'O' that Shakespeare describes."

The proscenium arch does literally break; it is formed by a series of panels flown by a motorized gantry truss that spans the width of the stage. It can move the panels into a

stored to extend the downstage area. There is no orchestra pit, due to lack of access; the lift is raised to extend the stage into the audience area by about 10'. A Niscon, Inc. Raynok control system, using Niscon proprietary software in a Windows PC platform, activates the proscenium and all motorized axes, including the Stagemaker chain motors, reflectors, acoustical banners, and

lifts; the system comes with a portable touch screen, allowing the operator to move through the space while making adjustments. The client requested the Niscon product because of its capacity for future add-ons, according to Mike Murphy, executive VP of JR Clancy: "It controls what is on the gantry, it controls the lift and the acoustic banners, and it raises and lowers the

sound reflector in the ceiling via two high-capacity winch hoists. It also has the potential to tie into future show control and chain hoist systems."

The rigging system consists of 50 double-purchase counterweight sets. The extensive trap system is made up of 36 individual chambers, each covering a 7' by 4' area of the stage and with a lightweight aluminum framework devised

and installed by JR Clancy. The entire stage can be dismantled if a crater effect is desired.

The arcade game

The average theatregoer will find the handsome, three-sided arcade of makore (African cherry wood) lining the stage to be an attractive architectural element that gives the room visual warmth and depth. However, there's more to it than that. Parts of it are removable—the entire rear section hangs on a winch system and can be dismantled entirely to provide another 5' of stage depth. Doors on the lower half of each side of

as a way to hide a lot of the wiring and conduit," says Campbell. "Behind the upper arcade beams and columns is a plethora of power conduit, as well as audio circuiting and speaker lines." The space was limited and the routes complex. "We had to find paths within the architecture," adds Campbell. "A lot of it goes in the ceiling areas between the office building and the theatre box. The feeder wires had to go from F Street to the dimmer room, and the lighting load circuits from the dimmer room to the theatre space. There are nearly 800 stage lighting circuits, and the dimmer

much as possible. "We provided two additional dimmer racks, reducing the need to rehang or refocus lights and allow minimal time for changeovers between shows," says Campbell. Richard Hoyes, of FDA, designed and specified the lighting systems; ETC was the stage lighting systems manufacturer.

The lighting package for the theatre includes approximately 430 ETC Source Fours in various degree sizes, 18 Lighting & Electronics MR16 mini-strips, 15 L&E Broad Cyc units, 38 Altman PAR 64s, 24 Selecon Acclaim Fresnels, 24 Selecon Arena Theatre Fresnels, 20

the ability to easily control moving lights, should they be required. There is also an ETC Unison architectural lighting control system.

Other details planned by the theatre consultants include a followspot booth at the upper rear of the theatre, additional steel beams in the auditorium ceiling for future rigging needs, and a number of 100A and 400A disconnects in the stage and loading areas to provide additional power. The theatre's multipurpose room, the Forum, is outfitted with 52 ETC Sensor dimmers, and an ETC Express 48/96 console. Other spaces below grade include dressing

Dachs: "If you strip everything out and choose not to have scenery, the room is still very beautiful. It has resonance. The timber columns evoke timber columns at the Globe—not a literal recreation, but some memory of the wooden 'O' that Shakespeare describes."

the arcade can be shifted to provide additional wing space, and the stage right, stage left, and upstage lower columns are removable to increase the stage area. Lighting pipes behind the arcade columns supply lighting positions. Additional lighting positions run the perimeter of the arcade.

The fixed side portions of the arcade encapsulate the final product of a long bout of collective, creative problem-solving among the design team. Behind its slatted framework reside multiple theatrical workings. "We used the arcade

room and all the major electrical rooms are outside the acoustic isolation joint, on the west side of the building. The amplifier rack room and IT room are both on the east side. We had given Clark Construction the challenge, 'Run 1,400 stage lighting wires, plus hundreds of microphone, speaker lines, and data paths, and they can't be within three feet of each other, and it has to be within the confines of the acoustic isolation joint.'"

The 800 dimmers were born of the client's need to minimize changeover time between configurations as

Selecon Aurora three-way cyc lights, 12 Selecon Aurora three-way groundrows, two Lycian M2 medium-throw followspots, and 62 Wybron Coloram scrollers. Among the gear list's really new items is a Wybron InfoTrace IT interface box; the Colorams are outfitted for Wybron's InfoTrace system, which means that any performance issues can be very easily tracked. Also new is the Eos lighting control console from ETC, which has won a number of awards over the past year; with the Eos, the theatre's lighting staff will have

rooms, a green room, rehearsal hall, trap room, kitchen, and 1,350 sq. ft. of storage space, as well as theatre production offices and workshops.

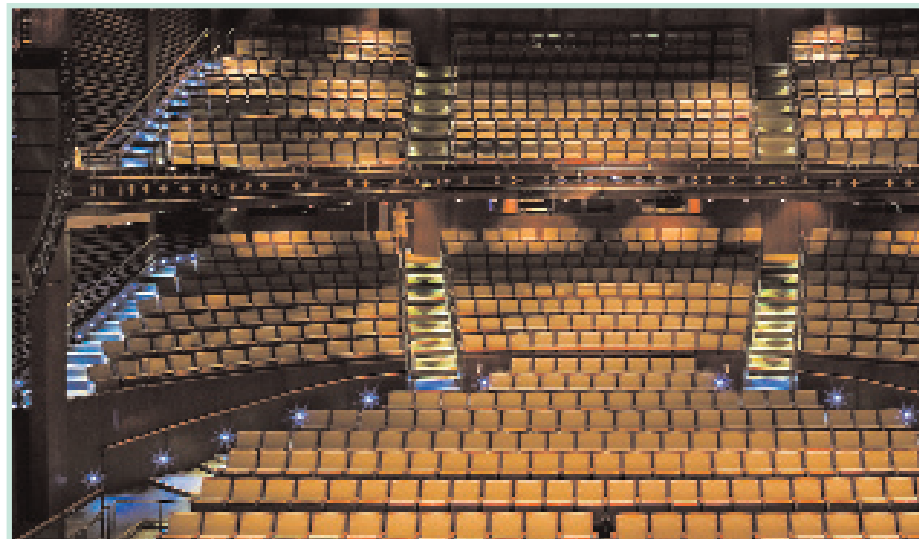
Wood, fabric, air, and rubber

The slatted panels of the arcade also conceal the acoustic curtains and their adjustment devices. "To help reduce reverberation time in the theatre, two curtain layers, 4" apart, can be deployed behind each slatted panel," says Campbell. JR Clancy engineered the system of scrollers that deploy the

fabric panels from the top down, like motorized window shades. Motors, rollers, conduit, and panels all live together in an area only 1' deep.

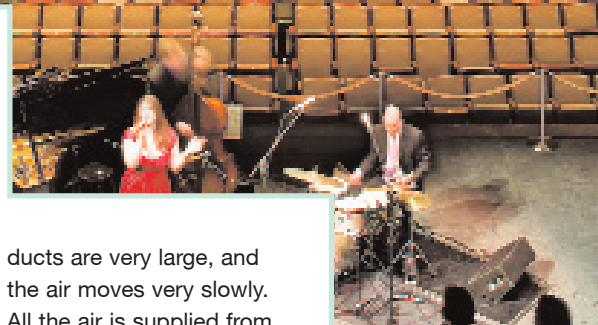
"We spent a lot of time going back and forth with the architect and FDA to fit everything needed into that 12" space," says Greg Miller, who was project manager for the Talaske Group. "The architect did a beautiful job on something that grew out of technical needs. There are 4,500 sq. ft. of velour curtains hidden behind those wood screens—in fact, they're located behind all four walls—but the interior of the room always looks the same, regardless of the acoustic setting. We had to take into account that the slats make the curtains a bit less sound-absorbent than if they were hanging out in the room, so we tested samples in a lab to see exactly how they would perform." Depending on the curtain position, the reverb (in the empty theatre) has been measured ranging from 1-1.7 seconds.

The Talaske Group specified an adjustable acoustic reflector to live in the rectangular space between the catwalks. "It has a very slight curve from front to back—and, from side to side, it steps up and down," says Miller. The reflector can be raised and lowered, and tilted back and forth, depending what is needed. It is painted black and blends unobtrusively into the black ceiling. Additional sound reflectivity



is provided by a dozen portable acoustic panels, 4' wide by 12' tall and made of plywood veneer, of the same Makore wood that lines the walls. "They are essentially pieces of furniture and coordinate with the architecture," says Miller. "They can move around from place to place and will be used for pretty much everything that goes on in the room. So far, we have made recommendations for six configurations, and eventually the company will have a catalog of options to choose from." (Also, for the thrust configuration, the balcony's guard panels are adjustable, so they can tip forward to provide cross-stage speech reflectivity.)

To prevent HVAC noise, the Talaske Group worked closely with the mechanical engineer, Crossey Engineering Limited International Inc., on duct size and air movement. "It was nothing out of the ordinary for a building like this," notes Miller. "The



ducts are very large, and the air moves very slowly. All the air is supplied from beneath the seats, with a very large plenum. We conducted a detailed review to make sure of slow, smooth movement, and that the air would have a long way to go from the fan to the room. There is one spot where, in order to travel from one end of the building to the other, a duct has to pop down into the parking garage."

All entranceways into the theatre have double doors and a vestibule to shut out noise from lobbies, bathrooms, and corridors. The elimination of noise from outside the building was the biggest task, one that the Talaske Group consulted on from the very early stages, when the land purchase was being considered. "It was a

Inside the auditorium.

difficult spot for a theatre," says Miller. "There's a fire-house across the street and a subway runs alongside the site. We measured the noise levels of the fire engines and the vibrations of the subway and did a study recommending that the entire structure of the auditorium be supported on rubber pads." And so it was built—an 80-million-lb. concrete box positioned on 124 specially formulated rubber pads specified by Wilson, Ihrig & Associates. The 7" thick pads are of a material similar to that used to enable bridges to expand and contract, and for earthquake-proofing in building construction.

"They work through energy dissipation," explains Miller. "The vibration dissipates across the pads and doesn't get into the structure. Technically, the vibration is converted into heat."

The loading dock street door opens onto the fire-house and leads to the side stage of the theatre. Here, a series of four doors spaced along the 22' corridor dissipates the noise; two high-end roll-up doors at the end nearest the street, one folding door of the type used to divide conference rooms, and at the stage end, a sliding door. "If you listen very closely and you're right next to the last door, you

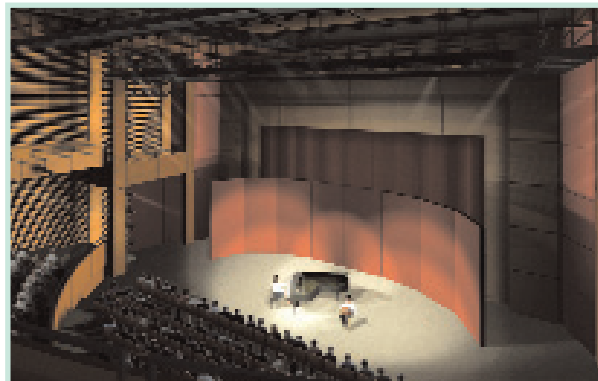
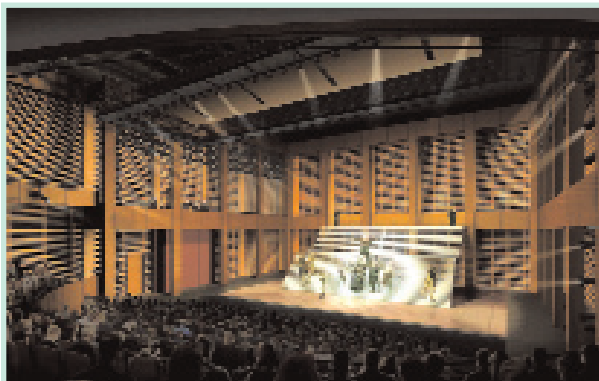
timing and strength of individual sound reflections. It used a signal convolved within a computer using music and speech that had been recorded within a reflection-free environment. A unique use of this effort was a recording that was released to assist with fundraising efforts."

The Harman audio package

Sidney Harman's \$1 million in-kind donation sent the Talaske Group's audio specialist, Aaron Downey, back to the product catalogs to make the best possible use of the gift. "We went to replace as many of the items already specified as

ogy in the market as well." Downey adds that the Harman Center represents one of the first U.S. installations of the new Soundcraft Studer Vista 5 digital console: "The Studer does all the artistic audio processing onboard, and allows you to transport

be flown in as needed for music performance events. Powered loudspeakers can be hung in various locations throughout the theatre and configured on a show-by-show basis, supported by the large grid and three catwalks. An extensive network of patch bays runs all



This page and next: Drawings show the theatre's possible configurations.

can just barely hear the siren—it almost makes it through, but it's inaudible within the theatre itself," says Miller. "We did a lot of calculations and knew it would be on the edge."

Rick Talaske recounts an interesting aspect of the design process that was put to multiple good uses: "We developed a computer model to create an 'auralization' of the space—a model that predicts the

we could, selecting comparable mics, loudspeakers, processors, audio mixing consoles, and so forth," Downey says. "The selection is pretty diverse, as Harman Professional is an umbrella company for JBL, Soundcraft, AKG, BSS, dbx, Crown, and Lexicon. We were able to substitute the vast majority of the list with Harman products, and, in doing so, to take advantage of new technol-

audio digitally, over fiber optics from the stage to the mix position. This console has a powerful user interface and the client has really grown to like it." Copper cabling infrastructure was also installed in the theatre for situations that require analog.

The audio can be reconfigured to handle the various seating arrangements and types of events. A separate JBL VERTEC line array can

through the theatre, to patch audio as well as video.

There is a Clear-Com eight-channel intercom system in place and a paging system accessible by custom as well as AMX touch panels. (Also available is an HME Pro wireless intercom system.) Dressing rooms can be paged from various locations and receive show program and video.

Lobbies and rest rooms also can be paged, chimed, and sent various types of background music on CD or from the show program. Each of the four lobby levels (three public and one private, at the cellar level) can be isolated from an audio and video

descriptions to the sight-impaired, and provide language translation.

The in-theatre audio includes a 16-channel SFX effects playback system from Stage Research and two DSP-controlled and networked speaker clusters. One cluster serves the

the over-balcony positions are three more of the JBLs, with three Crown CTS2000 amps; in the under-balcony can be found six JBL MS26 units, with three Crown CTS 2000 amps and three Crown IQ-P.I.P.LIT amp modules. An additional pair of VP7212/95DPANs constitute a side stack. For subs, there are four JBL VPSB7118DPANs, and, for front fill, six MS26s with a CTS2000 amp. In the thrust configuration, six more VP7212/95DPANs are available. For sound effects, there are four JBL AM62212/00s, 20 MS28s, four Control 25AVs, and 16 CTS 2000s.

In the sound booth, aside from the Studer console and SFX system, there are two LSR6328P active monitors and one LSR6312P active sub. System processing is

Two line arrays of JBL VerTecs—a total of 16 VT4888s, plus eight VT4882 subs—can be flown in for music events, or employed outdoors for summer events. The audio contractor and installer was Professional Audio Design, of Wauwatosa, Wisconsin.

“It’s a terrific project and it went beautifully,” says Dachs. “We had a terrific team, and Michael Kahn provided extremely clear artistic leadership and strong feedback.”

“There were some issues, but very few things were not completed in time for the opening gala,” says Campbell. “It was a great collaborative effort between theatre planning, the architect and acoustician, and client—right up to the nail-biting conclusion. The fact that our client was so clear about the theatre’s mission helped enormously



standpoint to support simultaneous events. For the lobby and front of house, the list includes JBL loudspeakers and Crown amps, and an AMX control

drama system and is comprised of powered loudspeakers and powered subwoofers distributed throughout the space. It has two primary configura-

Miller: “It was a difficult spot for a theatre. There’s a firehouse across the street and a subway runs alongside the site. We measured the noise levels of the fire engines and the vibrations of the subway and did a study recommending that the entire structure of the auditorium be supported on rubber pads.”

system. Backstage are JBL Control 26CT loudspeakers and Crown amps. The multi-purpose room includes JBL Control loudspeakers, subwoofers, and Crown amps.

In the theatre, a two-channel wireless assistive listening system from Listen Technologies is available for the hearing-impaired, to furnish

tions, one for thrust, one for proscenium. The thrust mode adds speakers to cover the side seating. For ultimate versatility, none are fixed in place—they either hang or are removed and put into storage. All are accessible via the three catwalks or the grid.

The main loudspeaker system features four JBL VP7212/95DPAN units. In

handled by a BSS Audio B LU80. There’s also a Tascam CD player, two BSS DPR-404 limiters, two DPR 504 gates, one Lexicon PCM81 and one PCM91 digital effects unit. Mics include eight AKG WMS4000 wireless systems, plus AKG, Royer, Earthworks, DPA, Neumann, Shure, and Sennheiser gear.

in making the room successful. You don’t walk into that room and say, ‘Gee, the architect won that battle,’ or ‘The acoustician won that battle.’ What I love about the Harman Center is that when you walk in, you know the owner won. The Shakespeare Theatre Company has an identity in that room.”