Hearing the Message

By: David Barbour

Designing a simple, yet elegant, sound system for a vintage Catholic church

The Iconyx IC24 mounts on the church's pillars, blending into the environment.

The 125-year-old Sacred Heart Church, in Springfield, Massachusetts, is a visually stunning, yet highly acoustically reverberant, space. When Richard G. O'Connell, of the firm AV DesignBuild, appraised the site, the problems were quite clear: parishioners were unable to hear eulogies and sermons. Even worse, on occasion a local radio station could be heard through the church's sound system.

"The distance from the edge of the altar to the last pew is approximately 102'," O'Connell says. "The seating area is arranged in a 'T' configuration, with the wider section measuring approximately 108' across, and the narrower section measuring approximately 92' across. Rows of columns split the space into thirds, and run the length of the church. The ceiling height is approximately 70'. The choir has an elevated area to the right of the altar, which includes an Allen electric organ and a grand piano. The church has a basement and a recently installed electrical service entrance."

The sound system consisted of ten loudspeakers. Two were suspended overhead about 35-40' above the congregation; eight more boxes were placed in wall-mount positions. Additional gear included six loudspeakers in an underbalcony area and one speaker in a cry room. Also, O'Connell notes, "The equipment rack was located in a room behind and to the left of the altar, where the celebrants prepare for mass. Mounted on the rack was a loudspeaker for foldback purposes. I also noted three permanently connected microphones—at the pulpit, at the altar, at a second altar position—with a patch point at the foot of the altar. I also noted a 'mix-in' patch point for the choir's audio mixer. The rack contained two amplifiers, a mixer, two mono feedback suppressors, a hearing-assistance transmitter, a wireless microphone receiver, and a combination CD/cassette player. Thermal noise, hum, and buzz, along with the occasional RFI blast, were audible throughout the church when the system was powered on."

O'Connell recommended replacing the ten speakers with two line arrays; replacing the rack mixer and feedback suppressors with a single DSP unit; installing two 20A circuits at the service entrance; installing conduit for new audio cable, replacing the mics with RF-immune units; and redeploying the OFE equipment rack, cry room, and underbalcony speakers and two Crown amplifiers.

To demonstrate the new speaker concept to the parish's leaders, Scott Pizzo, of Renkus-Heinz, Inc., and Bob Strauss, of Cardone Solomon Associates, the AV manufacturers' rep firm, installed a Renkus-Heinz Iconyx IC24 loudspeaker. The Iconyx, a tall, slender enclosure than can be flush-mounted to walls and pillars, is a vertically steerable system that allows for equivalent apparent volume levels from 12-100'. Scott Pizzo programmed the loudspeaker system to deliver four separate beams of sound to achieve the effect. "The decision-makers concurred that a single speaker could replace five loudspeakers, delivering greater clarity and much better sound coverage," says O'Connell.

Next, says O'Connell, came the task of selecting the right audio capture solution. Dave Fuchs, of the firm Chris Ross Associates, brought in eight Audix microphones for testing. AV DesignBuild supplied an Aphex 1788 eight-channel microphone preamplifier with headphone output. "We monitored the microphones with Direct Sound EX-20 extreme isolation headphones to be certain we were listening to the audio capture exclusively," says O'Connell. "We then tested microphones at every position, to ensure that the width and reach of the mic was optimal. We also checked the microphone's off-axis rejection, as this is critical for loudspeaker placement. The winner was the [Audix] M1255 capsule. Audix offers a variety of architectural attachment solutions, so we deployed it as a microboom for the chorus, a gooseneck for the pulpit, conference-style for the altar, and a cus-

Photo: Mike Lethby

tom configuration for the kneeler.

"The pulpit mic was secured at a distance of approximately 24" from one of the Iconyx IC24 speakers," adds O'Connell. "Yet a speaker can be up to 3' from the microphone and still be heard throughout the church. This is a testament to the pattern control of both the loudspeaker and the microphone."

O'Connell met with Jim Berini, of Berini Electric, to review speaker installation, cable pathways for conduit and power, and removal of the existing speaker system. "As we intended to hardwire the loudspeakers for power, we worked with Berini Electric's lead electrician, Tom Lajoie, and specified the correct Surgex NEMA enclosure to provide not only surge suppression and power conditioning, but also remote power up from the equipment rack."

After the choir's audio mixer was stolen, O'Connell supplied an APB DynaSonics H10290 mixer, housed in a secure Raxxess Converta Rack which is bolted to the floor. The console has 20 mic inputs. All existing audio cable was replaced with double-shielded Gepco cable within conduit, which reduced noise and EMI/RFI interference. The existing CD/cassette player was replaced with a Tascam CD700. A Raxxess iPod docking station was added to the rack, with a Biamp 412e stereo preamp/mixer used as a stereo program source selector and level control.

Also, O'Connell learned that the monsignor didn't care for his wireless lapel mic, which had two soft-touch switches—for power and mute—when he preferred one mechanical switch. Fuchs recommended an Audix system. Also, the existing audio mixer and feedback suppressor were swapped out for a Biamp Audio Solo, a programmable automixer with sophisticated EQ filters and a matrix router, to deliver all sound sources to seven destinations.

AV DesignBuild received the job order on November 1; the goal was to be done by Christmas. "This allowed us just enough time for Renkus-Heinz to manufacture the loudspeakers and apply custom color paint," he says. "While waiting, we installed power, conduit, and cabling. The loudspeakers arrived on December 10; we arrived on the site on December 12, and installed, tested, and commissioned the loudspeakers. After I programmed and commissioned the Biamp Audia, terminated the cable, and installed new microphones, we disabled the existing audio system and deployed the new system on December 18. This allowed a week for final adjustments prior to Christmas. I attended several services, and only minor adjustments were required to achieve the project goal."

O'Connell adds, "Simplicity, or design elegance, is the new model. My approach is to use the fewest number of parts to accomplish the goal. Our clients want to hear audio content—and see video content—and not press buttons. They don't want to see machines, which only detract from content and the beauty of timeless architectural spaces. At Sacred Heart Church, the system delivers clear, intelligible sound to 1,200 parishioners, and the technology is nearly invisible. The message is now pre-eminent."