High School Musical

Specifying a sound system for the Tony Bennett Concert Hall

In 1999, singer Tony Bennett and his wife Susan Benedetto, then a public school teacher, were inspired to start a public high school for young artists. They envisioned an institution that would integrate the arts with rigorous academics, require a commitment to community service, and help students cultivate a lifelong love of, and dedication to, their artistic passions.

Over the next several years, the Bennetts received assistance from the New York City Department of Education, local leaders, and the not-for-profit organization Exploring the Arts (founded by the two), which assisted in raising the necessary funds required. In 2001, The Frank Sinatra School of the Arts, named after Bennett's longtime friend, opened in temporary quarters with 250 students. With the help of many friends and supporters, in 2009, the school opened its new home, located at the Kaufman Astoria Studios complex in Astoria, Queens, Bennett's hometown. Ennead Architects LLP (of New York City, formerly Polshek Architects) designed the school under the supervision of lead architect Susan Rodriguez.

The Tony Bennett Concert Hall, named for its founder, is built specifically for the use of the students. The 800-seat venue hosts the school's annual musical as well as instrumental, vocal, and dance performances and screenings of work by film and media students. The theatre's features include a 40'-wide proscenium stage constructed with a permanent sprung floor, a 35-lineset fly system, digital audio system, 244-circuit theatrical lighting system, and digital projection. Bennett says his desire is for high school student artists to experience performing in a venue that is comparable to that of a professional venue.

Enhancing the acoustics

The Tony Bennett Concert Hall opened in 2009 but wasn't completed until 2012. During the early design phase in 2005, Tom Young, a sound engineer and designer who has

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The front-of-house position with the installed Yamaha M7CL-48 console.

worked with Bennett for close to 20 years, was brought in to oversee the acoustical design of the concert hall and two black-box theatres. He had an idea about how to make the theatre acoustically appealing for the many genres of music performed there. He took the Bennetts to preview the Yamaha Active Field Control System (AFC) installed in the Fifth Avenue location of Yamaha Artist Services. "We were all impressed with the sound of the system and how it created a natural, reverberant field in a room with a drop ceiling and rectangular shape," Young says. "After hearing the system, it was definitely something we wanted for the Tony Bennett Concert Hall."

Active Field Control is a reverberation enhancement system that adjusts and enhances the acoustics of a facility while preserving its natural characteristics. This is achieved by creating feedback loops of microphones and speakers located in the reverberant field of the room to "recycle" the reverberant energy, thus extending the RT time. This is used to create varying RT settings to suit different performance applications within the same facility. The system can also add spaciousness to underbalcony or stage areas so all audience members and performers can enjoy the same sense of connection to the music for a greater shared experience. AFC systems can also be used to add early reflections or as crowd enhancement systems.

ETA director Cheri Walsh, Larry Italia (vice president of Yamaha Commercial Audio Systems), Tony Bennett, Susan Benedetto, and sound designer Tom Young.

"The Frank Sinatra School of the Arts, and more specifically, the concert hall, was a project that encompassed a dream come true for me personally," says Young. "Over a span of 30 years working as front-of-house engineer for Frank Sinatra and Tony Bennett, my personal goal was to create one of the best-sounding theatres in New York City. The original audio design by David Harvey, of Harvey, Marshall, Berling Associates, and me initially was a typical value-engineered system required by any New York City school but with the added mission of creating a good-sounding space." In addition to the AFC system, Young and Harvey envisioned a traditional line array sound system that would accommodate any level of performers, including national and headline acts brought to the school for master classes.

Measuring the room

The project, which began prior to 2008, had some uphill battles to solve—in particular, the school education authority process for approvals. During that period, the late Lon Brannies, of Yamaha Commercial Audio Systems in California, and Takayuki Watanabe, from Yamaha Japan, began the process of initial room measurements followed by the design of the AFC system. By February 2010, a site survey was conducted by Yamaha Systems design engineer Joe Rimstidt. He provided the team with options for the main sound system while working on both an EASE model and NEXO GeoSoft model. During the original construction phase, the house PA system was

The theatre's AFC retrofit was completed with the assistance of ACIR Professional.

changed back to a center cluster of NEXO Alpha EF and EM cabinets, and the AFC system was tabled for later installation/retrofit.

Eighteen months later, during the fall of 2011, the planning of the AFC retrofit got back underway and was finally completed a year later with assistance from ACIR Professional of Egg Harbor Township, New Jersey; ACIR Professional project manager Bobby Harper; the Long Island City-based electrical firm Striano; Yamaha's Rimstidt; and the school technical director, Andre Vasquez. The concert hall had already installed a Yamaha M7CL-48 as its front-of-house console. The M7CL-48 uses Yamaha AD8HR remote preamps located in the racks over the stage and controlled via EtherSound.

"The newly installed AFC system, virtual band shell, and line array system have dramatically changed not only the quality of the way our productions sound but how the students perform," Vasquez says. "Patrons who attend our productions have come up to me countless times to express how much they enjoyed not only the show but the sound of the show. The performers can hear one another so well that now the level of readiness has increased in all students, resulting in one great performance after another. Mr. Bennett and Susan, Tom Young, and Yamaha have given us a system that has changed not just the audience experience but the performers' experiences on the stage as they produce their art."

Choosing the gear

The final main system is a Nexo GEO S12 system consisting of two main clusters, each containing six Geo S1210 cabinets and one Geo S1230; the bottom two cabinets on each side are equipped with FLG kits for 120º of horizontal coverage. Also featured are two Nexo RS18 subwoofers per side; three NXAMP4X4 amplifiers equipped with EtherSound cards connected to the existing EtherSound network; and four Yamaha DSR115 self-powered Yamaha speakers for stage fills/monitors. The Nexo line arrays were flown to an existing catwalk just outside of the proscenium, motors were brought in to raise the array to right the location, and then the speakers were dead-hung from the catwalk.

The AFC system is a hybrid AFC3/LAP3 system with both the standard AFC3 system utilizing a new AFC-FIR card for processing and the enhanced option of using a dedicated FIR processing computer with the LAP3 external computer. Four microphones above the proscenium feed two different AFC systems. "System One is for reverberation enhancement in the house and underbalcony areas," notes Rimstidt. "This system includes four Yamaha S8AFC speakers mounted above the proscenium reflector and 15 S8AFC-D speakers placed in the ceiling above the audience area. There are also 14 S8AFC-D ceiling speakers in the ceiling to cover the underbalcony seating area. Nine Yamaha XM4080 four-channel amplifiers power these speakers. This AFC setup enables variable room RT characteristics to be changed to be more suitable for the performance material and enables audience members sitting under the balcony to share the same sense of spaciousness as those seated out in the open room area."

AFC System Two was designed for reverberation enhancement/energy exchange on the stage. It consists of 18 Yamaha IF2205 speakers mounted above the stage with five XM4180 four-channel amplifiers powering the speakers. "System Two adds a sense of spaciousness to the normally dead-sounding stage area and helps performers hear others on the stage," says Rimstidt. "The microphones are split to feed both systems, and while the systems change scenes together, each is tuned individually (with the other system 'on' as the two interact and will affect each other's final RT characteristics)."

Each sub-system has its own master AFC processor, separate output processing, and amplification for each speaker. The Yamaha AFC team created four initial scenes with varying RT times and equipped them with a control to adjust the enhancement for each of these scenes using a Crestron control system. One set of scenes has a very similar average RT time using the AFC-FIR card for processing, while the other scene uses the AFC-LAP3 computer that will allow for dual system comparisons when required.

In a joint statement, the Bennetts said: "Putting the finest sound system in the Tony Bennett Concert Hall at Frank Sinatra School of the Arts has turned it into one of the best-sounding halls in the United States. How fortunate we are that both Tom's team and Yamaha were able to create this for the public school children of New York City."

In addition to the ongoing performances by the school's choir and ensembles, its theatre group recently performed the musical *Footloose* in the Tony Bennett Concert Hall.