CLAYTON ACOUSTICS GROUP is an acoustics consulting firm specializing in projects for houses of worship, serving congregations across the spectrum of Christian and Jewish denominations. Our projects include new construction, renovations and historic restorations, and we are equally at home in a small parish church, neighborhood synagogue or large city cathedral.

Successful worship spaces share highly-valued qualities such as clarity for intelligible speech, reverberance for liturgical music, responsiveness for congregational participation, and low background noise for enhancement of all sounds. We offer a full scope of architectural acoustics consulting services, including room interior acoustic design, sound isolation, mechanical equipment noise and vibration control, speech- and music-reinforcement sound system design and pipe organ acoustics.

Bringing both music and speech to life in a worship space is an exciting challenge, and our passion.

DESIGN PHILOSOPHY FOR HOUSES OF WORSHIP

Clayton Acoustics Group’s design philosophy and consulting practice are acoustics-centered and engineering-based—the natural room acoustics and sound system must fully be part of the architectural design, and selection of materials and equipment must serve this goal exclusively. We support the theory that *acoustics is architecture*, as well as the equally important corollary *audio is acoustics*, and always look for simple, flexible and elegant solutions which meet our clients’ needs.

Many of our projects are houses of worship, with a clear emphasis on churches and synagogues having traditional liturgies and strong music programs. We most often serve those congregations which wish to retain or even enhance the natural worship-space acoustics and may also require a high quality speech-reinforcement sound system to provide excellent speech intelligibility. We also help our clients with a variety of organ-related acoustics issues.

A reverberant synagogue or church is often a very complex acoustical space which must reconcile a distinct conflict of uses, needing to simultaneously be a music room and a lecture hall. Choral and organ music, as well as congregational singing and responses, are typically well supported by the natural acoustics of a responsive and reverberant worship space. Sermons, prayers and scripture readings are best served by a space with little reverberance which favors clarity of the spoken word. Our preferred design approach is to preserve those qualities of natural acoustics which are already good and enhance those which need improvement, and then specify a high quality speech-reinforcement sound system capable of providing excellent speech intelligibility.

Noise in a worship space—even the background hum of traffic or whir of machinery—can be a potent enemy of speech and music. Any amount of background noise reduces speech intelligibility and music clarity, masking nuance of the spoken word and subtlety of a musical phrase. We advocate strongly for elimination of noise in the worship space, whether from environmental sources outside the building or mechanical systems inside.

Many worship buildings, old and new, can be challenging spaces in which to achieve the right acoustical balance between music and speech requirements. A practical and sensitive design based upon solid acoustics principles, with careful attention to detail and thoroughness of purpose, can achieve excellent results.

CONSULTING PRACTICE

As specialist acoustics consultants Clayton Acoustics Group brings considerable “value-added” services to every project. Our goal is to identify and design the best solution to meet the users’ needs, within the owner’s budget, and then see the project through to proper completion.

Architectural acoustics consulting for houses of worship typically includes room interior acoustics, sound-isolation, mechanical equipment noise and vibration control, and a speech-reinforcement sound system. We view these four disciplines as highly connected parts of a whole, as they are interrelated in complex ways and all are of critical importance to the success of a high-quality worship space project.

For all projects we assemble an appropriate “project team” with just the right mix of specialist consultants to address the particular needs of each client. It is our standard practice to work vigorously for the full integration of all acoustics requirements into the architectural and liturgical fabric of each building design.

A cooperative and professional working style between consultants, engineers and architect during design, and later with the contractors during installation, helps ensure the success of any project.
Clayton Acoustics Group is an independent professional consulting firm which works only for facility owners or other design professionals. We are consultants and designers, not contractors, installers or equipment resellers. We do not have financial or business interests in the product manufacturing companies or contracting firms we may recommend. This independence allows us the necessary freedom to best represent the needs of our clients throughout a project.

For each and every project Clayton Acoustics Group brings its considerable experience and singular expertise in the highly-specialized area of worship-space acoustics fully to bear on the concept, design and implementation.

**DESIGN & CONSULTING SERVICES**

For a house of worship project having critical music and speech requirements, the specialist acoustic consultant should initially take a leading role with the architect, engineers, liturgical consultant and organ builder in design of the worship space to ensure acoustical excellence.

It is essential that strong criteria and guidelines be established for room acoustics, sound isolation, and noise and vibration control from the very beginning of the project. For these disciplines a large share of our value to the client and design team is usually realized in the early phases of design. Once these important goals are set, and the design lead moves to the architectural and engineering teams, concepts are developed into construction details and finally the bid documents are prepared.

Sound system design follows a similar but more involved and concentrated path throughout the project. Our usual work plan begins with concepts and guidelines, followed by a significant engineering and documentation effort, continuing with supervision during installation, and concluding with hands-on consultant tuning of the completed system.

We participate fully in all phases of our projects: programming, design, documentation, bidding, construction administration and on-site commissioning.

**ACOUSTICS TECHNOLOGY**

Clayton Acoustics Group has invested heavily in hardware and software technology in order to give its staff the necessary tools to work on the cutting edge of architectural acoustics. We use 2D and 3D CAD drafting to produce all our drawings, plus we use computer modeling extensively for design and prediction of room acoustics as well as loudspeaker and audio system performance. A portable “acoustics field-measurement lab” supports all our on-site work.

**SELECTED PROJECTS FOR HOUSES OF WORSHIP**

- Church of the Redeemer (Episcopal), Chestnut Hill MA
- Congregation Beth Sholom (Orthodox), Lawrence NY
- St. Paul’s Episcopal Church, Rock Creek Parish, Washington DC
- Church of the Holy Cross (Roman Catholic), New York NY
- The Hampton Synagogue (Orthodox), Westhampton Beach NY
- Cathedral of Christ the King (Roman Catholic), Atlanta GA
- Temple Emanu-El (Reform), New York NY
- St. James-the-Less Episcopal Church, Scarsdale NY
- Congregation Shearith Israel (Orthodox), New York NY
- First Presbyterian Church, New Bern NC
- St. Martin-in-the-Fields Episcopal Church, Philadelphia PA
- Congregation Agudas Achim (Conservative), Austin TX
- Cathedral of St. John the Baptist (Roman Catholic), Savannah GA
- First Church of Christ Scientist, Greenwich CT
- Christ Church Cathedral (Episcopal), Louisville KY
- St. John’s Seminary Chapel (Roman Catholic), Brighton MA
- Presbyterian Church of Chestnut Hill, Philadelphia PA
- West Market Street United Methodist Church, Greensboro NC
- St. James’s Episcopal Church, Richmond VA
- Park Avenue Synagogue (Conservative), New York NY

**CONTACT INFORMATION**

We are always delighted to talk to prospective clients about their acoustics needs and project goals. Please contact:

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Roman Catholic Cathedral of St. John the Baptist
Savannah, GA

Roman Catholics of southern Georgia built their cathedral in 1874, rebuilt in 1899 after a fire, and fully restored and upgraded their diocesan seat in 2000. Soaring vaults and stunning liturgical decoration are a feast for the eye. Lively acoustics provide excellent support for choirs and a fine Noack pipe organ (1987), but the six-second reverberation time renders the spoken word unintelligible. We were asked to design a new speech-reinforcement sound system for this challenging space. Our solution included just two steerable line-array loudspeakers to cover the nave and transepts, plus two supplementary line-arrays for the large chancel. An innovative DSP “level-delay-mixing matrix” enhances directional realism for listeners throughout the cathedral. An independent sound system provides reinforcement for choir soloists in the rear balcony. Acoustics advice included material and finish recommendations for support of choir and organ sound, and noise control. Our role was that of “acoustics preservation”; we did not alter the natural acoustics for speech amplification, but instead designed a sound system to match the building, succeeding beyond expectation. Now, for the first time in 125 years, every listener can understand the spoken word.

Our Lady’s Chapel
Cathedral of St. John the Baptist
Savannah, GA

This 750-seat chapel was built in the undercroft of Savannah’s Roman Catholic cathedral in the early 20th century, and renovated in 2000, including liturgical reordering of the chancel, increased ceiling height, reintroduction of lost decorative elements, new architectural lighting, and new mechanical and electrical systems. The existing decades-old sound system was found to be completely inadequate in the livelier acoustics of the renovated space. We designed a new speech-reinforcement sound system to provide excellent speech intelligibility for all listeners, using existing equipment from the former cathedral sound system. Our design was engineered for an architecturally sensitive yet cost-effective retrofit into the just-completed chapel.
The parish of Christ the King was established in 1936, and elevated to Co-Cathedral status in 1937 when the Diocese of Savannah was changed to the Diocese of Savannah-Atlanta. In 1956 the Diocese (now Archdiocese) of Atlanta was created, raising the status to Cathedral of Christ the King. A French Gothic architectural style of the old world was selected for the new Cathedral, but statuary, decoration and other details were executed in an Art Deco style reflecting the building’s 1937 construction. Spiritual home to Atlanta’s growing and diverse Catholic community, Christ the King is in almost constant use throughout the week. At many masses the Cathedral’s 700 seats are filled to capacity and beyond. The equally busy liturgical music program is divided between traditional adult and children’s choirs (supported by a 1992 Goulding & Wood pipe organ in the rear balcony) and several contemporary ensembles (which perform primarily from the left transept). We designed comprehensive new sound amplification systems for speech and music reinforcement at the front and rear of the Cathedral. These systems will accommodate the wide ranging contemporary music program without sacrificing intelligibility of the spoken word. Separate “speech,” “music” and “recording” systems are implemented in a programmable digital-audio system with wireless remote control. Our design includes several future project phases: completion of the rear balcony system, two-way wireless link to a portable outdoor sound system, reverberance enhancement system for the nave, and more. Initial project completion is scheduled for Fall 2005.
ST. JOHN’S SEMINARY CHAPEL
BRIGHTON, MA

Restoration of this mid-19th century Italianate-Romanesque-style chapel in 1999 recovered an elaborately decorated marble, wood and polychromed plaster interior which had been lost under a century of soot and grime. Speech intelligibility was always difficult in this tall, narrow and highly-reverberant space, and we were asked to design a new speech-reinforcement sound system to address this considerable deficiency. Steerable line-array loudspeakers at the front of the chapel provide excellent speech intelligibility from the sanctuary. An independent sound system at the rear of the chapel provides reinforcement of the cantor or a choir soloist. Acoustics advice included exclusion of pew cushions and musical communication between choir, organ and organist. A separate refectory (dining hall) sound system was also included in the project.

CHURCH OF THE HOLY CROSS
NEW YORK, NY

As true today as when founded, the motto of this legendary New York City parish is “Serving at the Crossroads of the World since 1852.” Indeed, Holy Cross has followed the ups and downs of its West 42nd Street neighborhood over the decades: steady growth and building expansion in the 19th century, a phenomenal peak of membership and activity between the World Wars, followed by urban blight and suburban flight during the mid 20th century. Today, however, the neighborhood once known as “Hell’s Kitchen” has been transformed into a fashionable address for the performing arts and home to young professionals. Holy Cross stands poised to renew itself and continue serving New York City’s Roman Catholics for generations to come. Built in 1868, this cruciform, transition-style Byzantine church is the oldest building on 42nd Street, river to river. Still visible for blocks around, a monumental copper dome and lantern—all awaiting restoration—surmount the crossing. Inside, the church is a riot of liturgical decorative arts: marble, statuary, murals, stenciling, mosaics and stained glass. The rear balcony is graced by an unaltered 1933 Aeolian-Skinner pipe organ. We designed a sophisticated speech reinforcement sound system as part of a major renewal and restoration design project. We also provided design guidance for sound isolation of traffic noise from 42nd Street, literally at the church’s doorstep. Completion of this work is pending fund raising by the parish.