



### Case Study: GOVERNMENT

## Enhancing Audio Intelligibility for the Judiciary of Colorado

### How DSP Solutions from Biamp® Improve Court Communication and Networked Audio Across the State

In large-scale settings, audio intelligibility is an important factor for effective communication between collaborators. For high-stakes environments such as the Judiciary of Colorado, it's absolutely essential. Testimonies, directives from judges, and real-time interpretation require a combination of crystal clear audio and dependable distribution capabilities to eliminate any chance of miscommunication during high-level proceedings. Denver's Ralph L. Carr Judicial Center and more than 100 courtrooms across the state have been fitted with Biamp Systems' innovative portfolio of digital signal processing (DSP) audio products – allowing Colorado's judicial system to implement failsafe audio within its new 12-story facility, completed in 2012, and in every connected facility within the state's court system.



## THE CHALLENGE

Historically, courtroom design has favored resonant architectural materials such as marble, concrete, and granite – causing acoustic complications and intelligibility challenges whenever audio solutions are deployed. Although microphone and speaker placement can help minimize the challenges of structural reverberation, the mission-critical requirements of courtroom environments mean satisfying reliability standards that go beyond the needs of large-sized facilities. To keep audio running consistently across the entire Judiciary of Colorado, project managers were seeking to implement an audio system that could be monitored and serviced remotely in order to provide dependable communication such as remote conferencing, judge communications, real-time interpretation, and testimonial interviews on a single digital network. This meant upgrading analog systems across Colorado while fitting the \$258 million Ralph L. Carr Judicial Center with innovative audio distribution throughout its Supreme Court courtroom, Court of Appeals, and floors providing conferencing and training sessions.

“Courtroom architecture has traditionally been a problem for effective audio delivery,” said Jason Roberts, Senior Sales/Engineer, LVW Electronics. “Although most system designers understand the basics of reverberant materials, heritage environments still need to consider factors such as number of participants, the positioning of people and furniture, and how a room’s changing temperature can affect acoustic performance. These requirements – in both retrofits and new installations – make a strong case for highly customizable audio solutions that can be tweaked to accommodate a setting’s specific structural properties, and are applicable whether we’re dealing with people speaking to each other over microphones or on a network across the state.”



## SOLUTION

To satisfy the Colorado courtrooms' acoustic environments, integrator LVW Electronics installed Biamp's DSP solutions across the statewide system. The process began with the installation at the Denver Courthouse. Once that installation was complete, networking spread to all 64 counties in the state of Colorado as each county's legacy stand-alone system was upgraded. Connection to the network was part of the upgrade project. As a result, AV staff is able to use innovations such as mix-minus, echo cancellation, and other custom audio tools to compensate for structural complications such as large convex ceilings or thick, reverberant construction materials. The ability to digitally adjust audio also enhances sound quality on digital recording equipment for better public records, improves comprehension during remote conferencing and interpretation of testimonies, and increases intelligibility within courtrooms for parties speaking via microphones. Support for distance court interpretation is a significant breakthrough for the Colorado justice system, particularly for speakers of less common languages that are not covered by a county's staff interpreters, and in areas of the state that lack a dedicated interpreter staff. All interpretation occurs in real-time. Colorado's innovative distance interpretation system represents a significant breakthrough, and serves as a model for other states that are seeking to improve language support services. Since DSP audio resides on the court's existing network, AV staff can also monitor the health of the entire Colorado-wide installation from a central location – allowing troubleshooting of audio issues before the comprehension of proceedings becomes compromised.

## SYSTEM SPECIFICS

To power the facility-wide audio system across the Judicial Center, AV the staff used two Biamp AudiaFLEX CM DSP processors. Ideal for everyday audio requirements, the Audia digital audio platform features highly customizable hardware components and audio tools that allow AV managers to fine-tune the solution to any acoustic environment, input/output requirement, or virtual telephony application. To upgrade analog audio throughout the state's historic courtrooms, a combination of Biamp's robust Nexia TC and Nexia SP professional audio systems were used for their sophisticated set of design tools and flexible data point distribution to upgrade the facilities' audio processing abilities.

"Biamp's DSP audio systems allow us to use our existing infrastructure to provide around-the-clock help desk support and push software updates to hundreds of courtrooms across Colorado," said Tom Franklin, head of court and facilities planning for Judiciary of Colorado. "In addition to more authentic-sounding audio, this type of integration reduces travel and labor costs while allowing us to respond instantly whenever any audio anomalies arise. We can also easily match output channels to audio sources, which further increases intelligibility while facilitating system management for our staff onsite. With innovations such as equalizers, zoned outputs, and mix minus, audio quality becomes even stronger, helping us to easily negotiate the idiosyncrasies of our interior designs. Since the upgrade, the difference in reliability and ease-of-use has been night and day. Every proceeding is now supported by a seamless audio infrastructure that also prepares us for the exciting AV opportunities that are just a few years away."

## CONCLUSION

For the Ralph L. Carr Center, DSP audio now ensures impeccable audio to high-level courts, conferencing capabilities, and remote training sessions within the facility's classrooms. Across the entire state, the networked sound system allows AV staff to easily monitor individual courtroom audio in order to rectify any issues. Enabling exciting innovations such as remote testimonies and real-time interpretation, the system reduces the state's travel costs, decreases onsite maintenance, and future-proofs installations against imminent technologies such as courtroom attendance via video. Every courtroom participant within the state of Colorado can now experience flawless audio capabilities – making courtroom sounds incredibly easy to hear, implement, and maintain – whether it's face-to-face communication within large chambers or networked audio across the state.



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*–Tom Franklin, Head of Court and Facilities Planning, Judiciary of Colorado*

## ABOUT BIAMP SYSTEMS

Biamp Systems is a leading provider of innovative, networked media systems that power the world's most sophisticated audio/video installations. The company is recognized worldwide for delivering high-quality products and backing each product with a commitment to exceptional customer service.

The award-winning Biamp product suite includes the Tesira® media system for digital audio networking, Audia® Digital Audio Platform, Nexia® digital signal processors, Sona™ AEC technology and Vocia® Networked Public Address and Voice Evacuation System. Each has its own specific feature set that can be customized and integrated in a wide range of applications, including corporate boardrooms, conference centers, performing arts venues, courtrooms, hospitals, transportation hubs, campuses and multi-building facilities.

Founded in 1976, Biamp is headquartered in Beaverton, Oregon, USA, with additional engineering operations in Rochester, New York, USA and Brisbane, Australia. For more information on Biamp, please visit [www.biamp.com](http://www.biamp.com).