

*You can hear a pin drop... from the back row—*

## Broadway's Smooth Clear Sound Created At El Cerrito High's Theater

*It's not easy to turn a 600-seat high school theater into a first class performing arts venue, but a great AV team at El Cerrito High School worked their magic to do just that.*

**W**ant to enjoy a good theater production? One of the newest top performance venues in the Bay Area is tucked away on an East Bay high school campus. The unlikely location of this sophisticated, state-of-the-art theater is El Cerrito High School in Contra Costa County, where the facility's design, acoustics, and sound system are generating rave reviews.

The new theater is another success story for NorCal VDV Lloyd F. McKinney Associates, of Hayward, a sound and audiovisual systems integrator that installed the new \$1.2 million audiovisual, security, card access and CCTV systems. Lloyd F. McKinney Associates is one of the Bay Area's oldest and most experienced AV integrators, known for its ability to turn complex technical projects into showcases for audiovisual productions.

The AV consultant and system

designer is Joel Lewitz, P.E., of Rosen Goldberg Der & Lewitz, Inc., a Larkspur-based acoustical and audiovisual consultant known for work on many performing arts and public venues, including Berkeley Repertory Theater, Napa Valley Opera House, and Stanford Stadium. (Read more about the details of the El Cerrito High School Theater AV system installation on pages 4-5.)

In addition to the sound and AV system, the 600-seat theater has many of the bells and whistles normally reserved for professional theaters—a deep stage that can accommodate substantial sets for plays or other productions, a platform that can be raised to be part of the stage or hydraulically lowered to serve as an orchestra pit, and a large expanse of inclined floor seating, with an ample balcony above.

The performing arts theater, reserved mainly for student and community productions, is part



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*The team from Lloyd F. McKinney Associates that worked on the theater included: (front row, left to right) Ron Taylor, technician; Andy Glock, project manager; (back row, left to right) Carl Shiflet, technician; Frits Groenhuizen, technical and managerial support.*

of a new campus unveiled by El Cerrito High School and the West Contra Costa County Unified School District earlier this year. In 2005, the high school demolished its aging campus to build a new one, including new classrooms, administrative offices, gym, library, and theater. While construction was underway, students attended classes in portables that sat adjacent to the high school site. The theater itself is housed in

a multi-purpose building that contains the library, computer lab, administrative offices, and meeting rooms.

The new theater was christened in February with a student performance of "Review of the Decades," the story of the school's history from 1941. The production was performed by the dance, music, drama, and forensics programs.

When Lewitz designed the

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Contractors Association and the  
International Brotherhood of Electrical  
Workers of Northern California.





# ICS Uses The Latest Technology To WOW Customers At Bay Area Executive Briefing Centers



PHOTOGRAPHY COURTESY OF ICS

This Executive Briefing Center has wrap around video through the use of multiple projectors and a sound system in the cars to deliver information.

## Wrap Around Video, Surround Sound, Enhance Customer Visits

Want to lower your company's operating costs by 30% or solve an especially thorny IT issue? Or do you have a software application you just can't find an answer for?

Maybe you should visit one of the Bay Area's growing number of Executive Briefing Centers, operated by large software developers and original equipment manufacturers (OEM), such as Sun Microsystems, to showcase the latest software and technology innovations for customers. During your visit, company executives

will show you their latest hardware or software and explain how they can apply existing design expertise to your particular problem.

But an Executive Briefing Center isn't a regular run-of-the-mill business center. It has a gallery effect that is more like a three-dimensional theater, complete with multimedia AV that demonstrates software as a wraparound experience. The experience is so novel that it can act as a bridge that helps you understand new application possibilities. Industry

experts say that Executive Briefing Centers are already one of the most effective tools available for closing a sale of new software or sophisticated systems hardware. In addition to the gallery, each center typically features video conference rooms, a training room, a theater, and a software development or usability lab.

Chances are that the state-of-the-art demonstration gallery you visit has been installed and wired by Integrated Communication Systems (ICS), of San Jose. ICS, a

long-time IBEW/NECA member, has built several other Executive Briefing Centers or galleries around the Bay Area and maintains the Sun Microsystems Executive Briefing Center in Menlo Park.

"Our clients want their customers to visit the Executive Briefing Center to understand the breadth of everything that they offer," said ICS President Aaron Colton. "These facilities are very effective in explaining firsthand the extent of services."

"The minute a customer gets off the elevator, they are surrounded with video and audio demonstrating software applications and product applications. As they work their

way through the gallery there are numerous projectors displaying images. They see all the many ways that technology is being applied. It helps open their mind to new solutions and ideas."



PHOTOGRAPHY COURTESY OF ICS

In one recent Executive Briefing Center Gallery, ICS had to integrate and wire a gallery that projected the client's software on floor-to-ceiling, four-sided projection "wraps." The wraps experience begins when the client enters the lobby, and live video images tell a story about the client's software as you meander through the space.



PHOTOGRAPHY COURTESY OF ICS

"Images are edge blended in the gallery, and they also wrap around support columns," said Colton. "The idea is that you could continue to view an image as you walked around the corner, which created the term 'wrap.' We may have one graphic, but to display it as a wrapped image, we had to employ three projectors."

Edge blending was achieved using TV One's C2-7100. The C2-7100 offers the ability to feather any or all of the edges, allowing multiple

images to be aligned vertically, horizontally, or in either direction to create unusual displays. Since it is dual channel, only one unit is required to blend two edges. Using multiple C2 units, a large number of images can be blended; ICS used eighteen C2 units.

In addition, video from the main theater could be sent to any wrap. The accompanying audio could be sent to a particular zone, or wrap, or it could be broadcasted over the entire Gallery.

To integrate the wraps, Nick Taylor, senior project manager of ICS, worked with NECA/IBEW technicians to install 49 NEC NPE130 LCD 1024x768 5K Lumen projectors. The projectors were hidden in clouds on the ceiling. These projectors were chosen for their optics and their ability to adjust vertical and horizontal lens shift and to correct distortion.

Typically each projector has three or four speakers associated with it.

There are 115 multi-zoned speakers in the gallery space. A master router is used to allow auxiliary feeds, such as those from the main meeting theater to be sent to any wrap.

Between client-scheduled visits to the gallery, the projectors automatically shut down several times per day to help ease their workload and extend lamp life. These programmed shut-downs are typically automatic, but can be manually overridden via the custom control system by using a touch panel, graphical user interface (GUI) at the main equipment rack.

Executive Briefing Centers that demonstrate hardware can have an almost arcade type of feel: potential customers get to play with devices while they watch and listen to educational content associated with the product on display.

**For more information, contact Aaron Colton of ICS at [aaron.colton@ics-integration.com](mailto:aaron.colton@ics-integration.com)**

## How can I find a contractor?

Visit the Northern California Voice-Data-Video website at [www.norcalvdv.org](http://www.norcalvdv.org) to view over 125 qualified contractors in the Sound and Communications industry. The large number of companies can be narrowed down to fit your specific needs by utilizing the search options, which are available alphabetically, by county, by specialty, and by zip code.



PHOTOGRAPHY COURTESY OF ICS

Customers who tour Executive Briefing Centers are more apt to purchase new software.



# Lloyd McKinney Associates And AV Consultant Joel Lewitz Make Beautiful Music At El Cerrito High School's New Theater

Some of Broadway's bells and whistles have been transplanted to the 600-seat performing-arts theater recently completed at El Cerrito High School. IBEW/NECA contractor, Lloyd F. McKinney & Associates, installed the state-of-the-art audio-visual system designed by AV Consultant Joel Lewitz, P.E., of Rosen, Goldberg, Der & Lewitz, Inc.

Because the theater is being used for a variety of performances by the school's music and drama departments, as well as for assemblies, Lewitz planned a flexible system that would maximize the clarity of sound playback and speech intelligibility. He wanted to provide uniform sound distribution throughout the auditorium so that sound was

reproduced in a broad, smooth frequency response. The AV system also had to be friendly for student users who produce and direct all of the shows. It needed to have a modulated video distribution system to TV locations throughout the technical spaces, and provide for display of video and computer-generated graphics.

Lloyd F. McKinney & Associates and their team of IBEW/NECA technicians from Local 595 installed the \$1.2 million systems, including AV, CCTV, security and card access, over a 12-month period. All of the technicians had extensive training and experience in working with sophisticated AV equipment. The heart of the AV system is the main sound control room in

the back of the main floor. The main control room contains the sound control console, where the sound manager works, and the Digital Signal Processor (DSP). The processor is the brain of the sound system and processes all the signals, routing them to the correct amplifier, and then on to the appropriate loudspeaker.

A portable sound control console allows student managers to move the main control room functions by connecting to a cable in the center of the auditorium. The loudspeaker clusters are located throughout the auditorium, including a cluster in the front of the theater, a balcony delay cluster, and monitor loudspeakers in the control room.

## The Sound Control Room

- Main Control Console
- Equipment Racks
- House Equalizer
- House Projector

## Inside The Control Room

- Monitor Loudspeaker
- Tape Record/Playback Transport, Patching and Signal Processing Equipment
- Main equipment amplifier with DSP (Digital Signal Processor) where all sounds are processed and sent to the correct amplifier, which is connected to various loudspeaker clusters
- Production Intercom system for communication between technical and production spaces
- Sound control console-- handles all microphone and auditory inputs

## On-Stage

- EAW Main Loudspeaker Cluster Full-Range, Three-Way Loudspeakers Mounted On Horns
- Microphone receptacles
- Intercom receptacles
- Loudspeaker receptacles
- Stage Monitors

## The Main Theater Area

- EAW Loudspeaker Clusters
- EAW Balcony Delay Loudspeaker Cluster
- CCTV Camera--Films Stage activities
- Portable Control Console
- Seats for the hearing impaired

## Backstage

- Intercom receptacles
- Intercom stations Built in loudspeakers and mics for technical communication/paging in backstage and dressing rooms
- Video Distribution System

## El Cerrito High School Theater Project Team

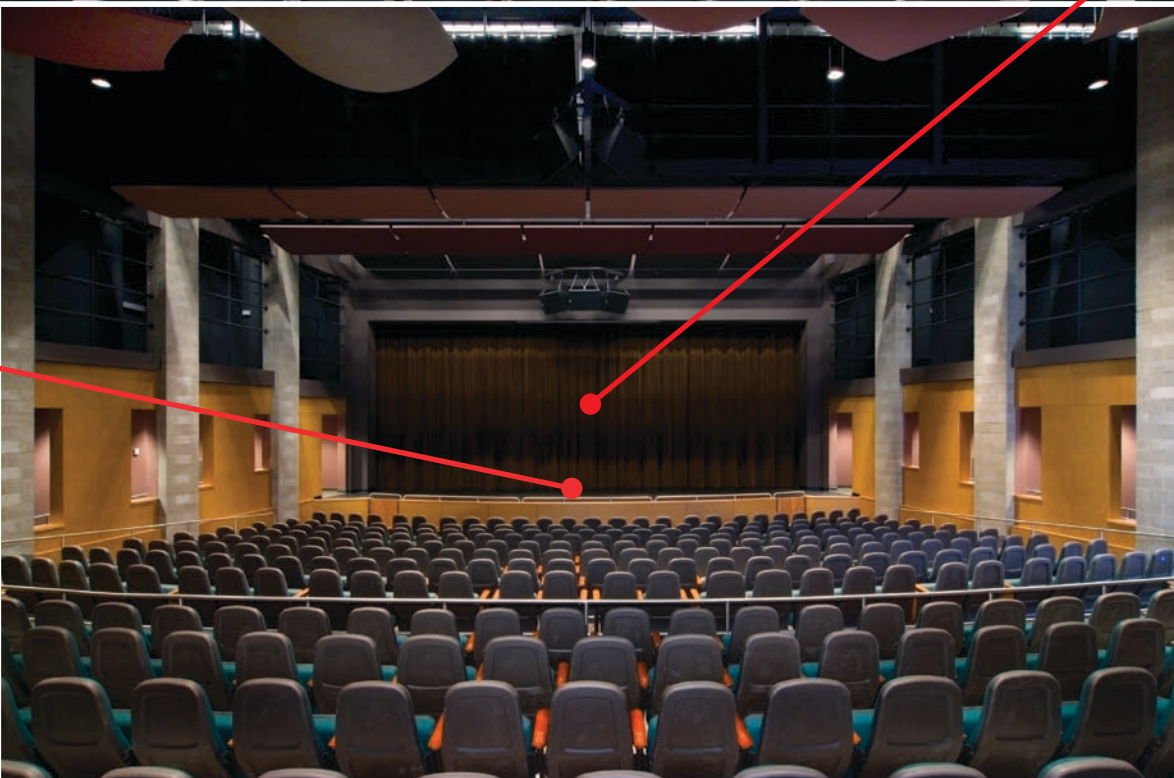
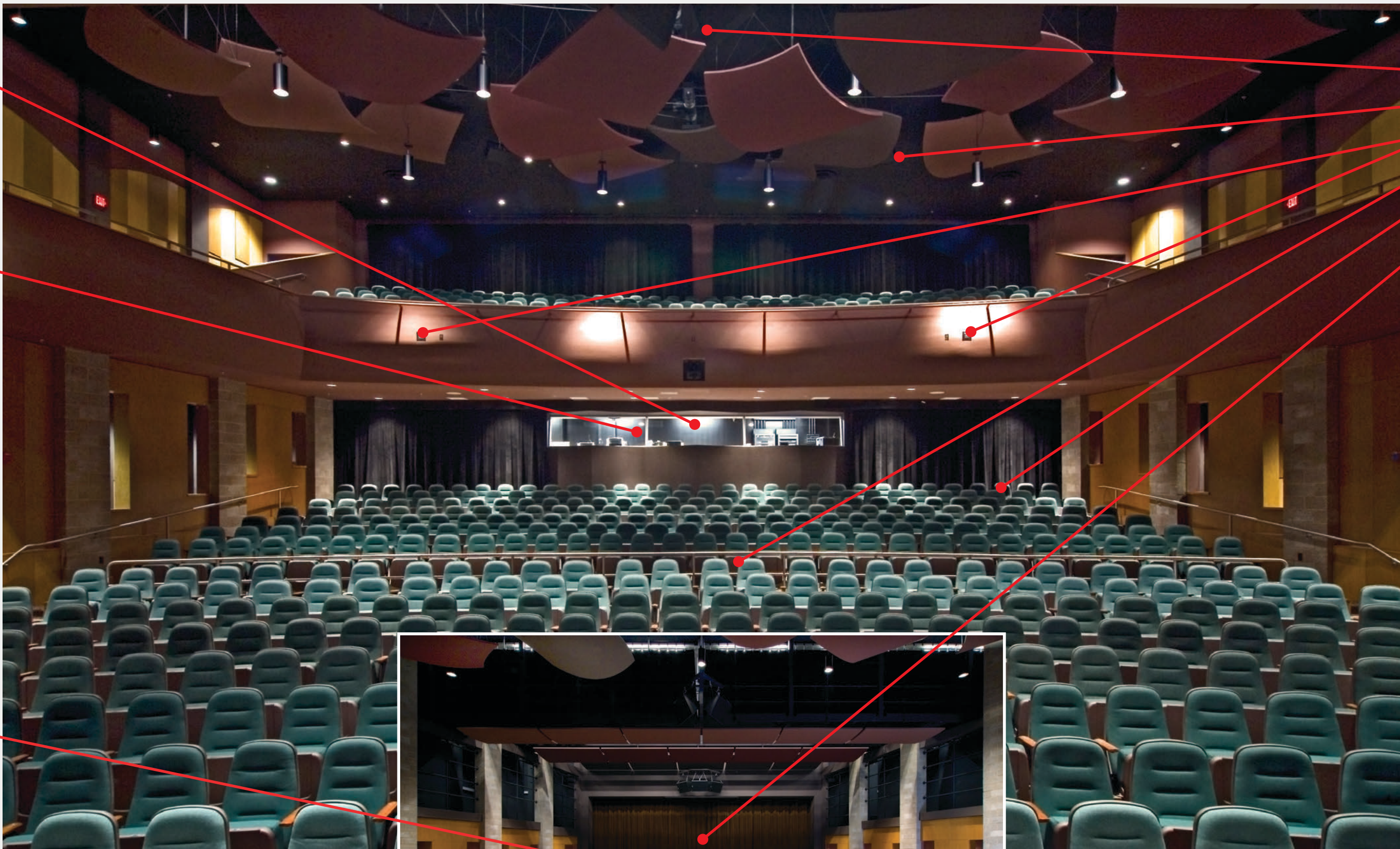
**Architect:** WLC Architects, Jackie Bassman, Project Manager

**AV Contractor:** Lloyd F. McKinney Associates, Rick McKinney, Principal-In-Charge; Steve Bailey, Frits Groenhuizen, Carl Banke, Project Management Team; Andy Glock, Lead Technician. Technicians: Carl Shiflett, Ron Taylor, Tim Osterdock, Steve Thompson, Francisco Aguilar. Apprentices: Matt Givens, Erik Trantum.

**AV Consultant:** Rosen, Goldberg, Der & Lewitz, Inc. Joel Lewitz, Principal in Charge; Robert Lester, Project Manager and Lead Designer

**Acoustical Consultant:** Dohn and Associates, Bill Dohn, Principal in Charge

**Theater Consultant:** Landry and Bogan, Rose Steele Principal in Charge





# Audiovisual Consultant Joel Lewitz Talks Trends In AV Systems



**Joel Lewitz, P.E., is a Principal Consultant at Rosen Goldberg Der & Lewitz of Larkspur and an expert in the design audiovisual systems. With over 35 years of experience in sound system design, Joel has provided consulting services to over 1,000 projects. His project experience includes the Stanford Stadium, Stanford; The Kingdome, Seattle; SAFECO Field (Seattle Mariners Baseball Stadium), Seattle; Maples Pavilion, Stanford; Aloha Stadium, Honolulu; Herbst Theater, San Francisco; Paramount Theater, Oakland; the Hawaii Convention Center, Honolulu; and LDS Church Assembly Building, Salt Lake City. Here he outlines ways to plan an effective AV system for a commercial venue, and discusses current AV trends.**

**Q: When a client comes to you with a request for a new AV system, what are your first steps?**

**A:** First, we define the client's requirements, including identifying the stakeholders and the end users. From there we look at the functional and performance requirements of the AV system and the type of user interface the client wants, whether it is simple or flexible. We examine their experience with previous systems, and, or course, the budget is always a key factor. Finally, we create a programming report that summarizes the needs, cost estimate and system description. This document serves as the basis of design for the AV system.

**Q: Are most of your AV installations for corporate facilities, as opposed to educational/governmental facilities?**

**A:** The pure AV installations comprised primarily of projectors, displays, and videoconferencing are equally divided between corporate and education/government. Our sound system and low voltage designs cover a much broader spectrum. These include facilities for worship, athletics, and performing arts, as well as theaters, hotels and convention centers.

**Q: What elements of an AV system are most popular today?**

**A:** In the commercial sector, the most popular elements are video conferencing, flat panel displays, high resolution and simplified control. Clients tend to focus on projectors and the user interface as well.

**Q: What are some of the current trends for AV systems?**

**A:** One trend is the use of digital HD video and conferencing. Better full motion video with 720p @ 30 frames per second and 768 kbit/second call rate, with voice over IP. In terms of monitoring and control, we are looking at simple network management for projector control, wall control, email notifications of systems status and standardization of user interface. We also see a growing interest in interactive whiteboards, signal transmission over fiber or twisted pair, long distance signal transmission with twisted pair and fiber with no degradation, telepresence, telemedicine, and remote patient/caregiver communication.



**Q: That's quite a list of trends. Are there any others?**

**A:** Yes, there is a call for open source control systems allowing a PC to be the control system rather than an AMX box with a proprietary code. There is also interest in open source solutions that you can program yourself. There is a trend toward user configurable control and low cost interface boxes.

**Q: Are there any tips on planning AV systems to reduce future upgrade costs?**

**A:** Yes, first you want to provide for electrical and structural infrastructure for future upgrades. You need to prepare for adequate bandwidth, DSP, and matrix switching capabilities for future components. To keep

costs down, choose the latest equipment models to avoid dated installations. Use twisted pair wiring, as it is more flexible than traditional coax.

**Q: What are your biggest challenges in designing and installing AV systems?**

**A:** Our biggest challenge is the client's expectation versus the budget. Other challenges include ADA compliance, network bandwidth limitations, and the consideration of aesthetics when coordinating with the interior architecture of the space. Sometimes there is a compromise between architectural requirements and AV requirements. Retrofits can be tricky as well, because we have to identify ways to provide infrastructure in a cost effective manner.



**Q: How closely do you work with the installing contractor, architect, and the rest of the team?**

**A:** We work very closely with the entire team, including coordination with the electrical contractor during design, site visits during construction and certification after completion.

**Q: What is your opinion of the installations of the IBEW technicians that you work with, versus their non-union counterparts?**

**A:** IBEW technicians receive excellent apprenticeship, mentoring and training. I'm impressed that IBEW technicians are well versed in safety, workmanship and ethics standards.



**Q: What role does certification play in today's market for technicians?**

**A:** Having the right certification is very important for technicians who install AV systems. Some of the certifications that are important are infocomm CTS, CTS-I and CTS-D. Several manufacturers have a certification, including Extron, Crestron, AMX, Biamp, Clear One and Tanberg.

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theater's AV system, his main goal was to create a flexible sound system that could be used for a wide variety of programs and shows. The system needed to be capable of providing voice amplification, sound reinforcement, reproduction of live music, and reproduction of pre-recorded material. It needed to support clarity of music, clarity of sound playback, and intelligibility of speech.

"It was important to have a system that provided uniform sound distribution," said Lewitz. "We wanted the same sound level everywhere, with a broad, smooth frequency response. All the sounds from low to high are reproduced. We wanted good bass, good treble, and faithful reproduction."

In addition to the sound system, the venue needed to have a projection system, in order to display video or computer generated graphics, as well as a video distribution system, so that actors and stage producers could see and hear what was going on from any spot backstage.

Because students are the ones who control and use the systems, the equipment had to be user-friendly, with an interface that would be comfortable and instructive for student users. Six technicians from Lloyd McKinney Associates installed all the components of the AV system during the year long project. The technicians, all highly trained and experienced AV integrators, are from the International Brotherhood of Electrical Workers (IBEW) Local 595 in Alameda County.

"It takes very special training to do this installation," says Lewitz. "The technicians had to mount the loudspeakers in exactly the right place. The digital signal processor

is a computer, and you have to know how to program it so that it will properly route all of the signals. There are many complex calculations. Project manager Andy Glock, and the technicians did a great job."

For Lloyd F. McKinney Associates, the major components of the project included the installation of loudspeakers, installation of the Control Room, and the stage and dressing room AV system installation.

The central loudspeaker cluster, which covers the front part of the main floor, was installed in the front of the stage. The loudspeaker cluster was calibrated to have very high directional characteristics, so that the sound is projected with a high level of clarity and intelligibility. A delay cluster was installed to cover the rear of the auditorium. There are separate delayed loudspeakers that provide coverage

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## Technology Quick Takes

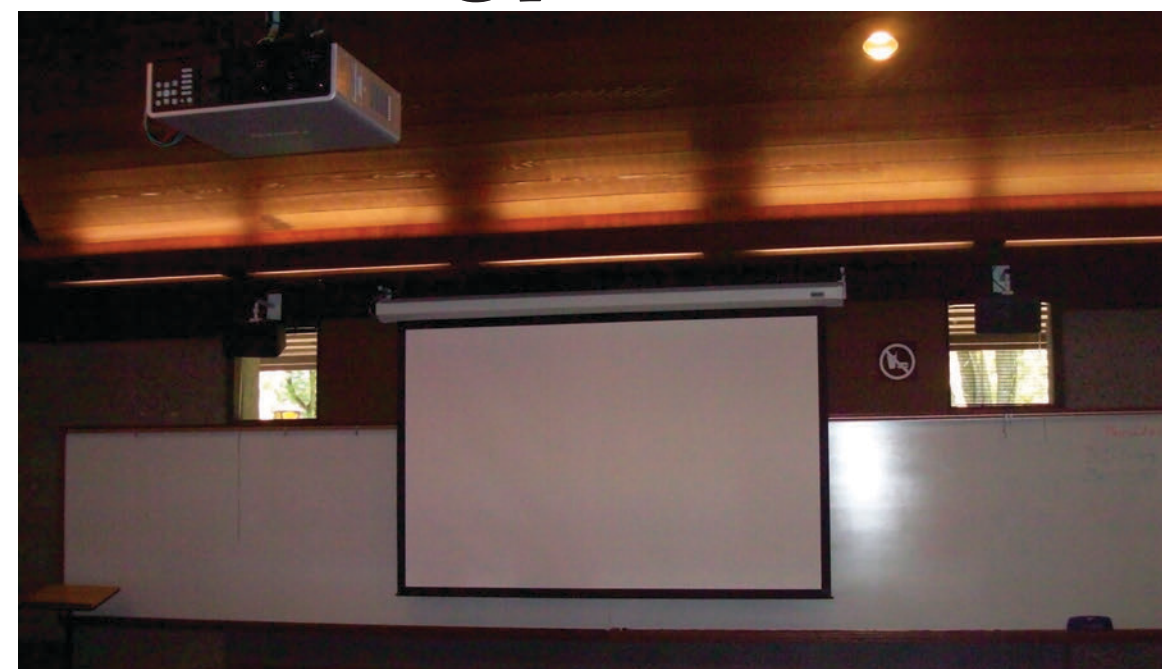


PHOTO COURTESY OF LYNCH ELECTRIC

## 25 New Presentation Rooms Installed At Foothill College And DeAnza College by Lynch Electric

The Foothill-De Anza Community College District is working with Lynch Electric + Son's, Inc of San Carlos to engineer and install AV equipment in 25 new presentation rooms at both Foothill College and DeAnza College.

Lynch Electric is assisted by technicians from IBEW Local 617. The system designer and consultant Eric Neuman of AVI-SPL's Dublin office.

According to James Toy, Technology Division Manager for

Lynch Electric, each of the rooms is equipped with AV equipment and racks, a sound system, and over head projection screens. Lynch Electric is also providing presentation equipment for a couple of small auditoriums on the two campuses.

The AV program is part of a facilities master plan and update approved by the District to enhance student learning through the appropriate use of technology.

Lynch Electric completes each

presentation room by installing AV cabling controllers and AV racks, as well as mounting ceiling projectors, seismic brace pendant speakers and in-wall speakers. Connections are usually run on standard AV cable to a mobile rack location, so that equipment can easily be moved.

**For more information, contact James Toy at [jtoy@lynchelectric.net](mailto:jtoy@lynchelectric.net)**

## Where can I find a Audio/Visual contractor?

**Briggs Electric, Inc.**  
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**Harris Electric**  
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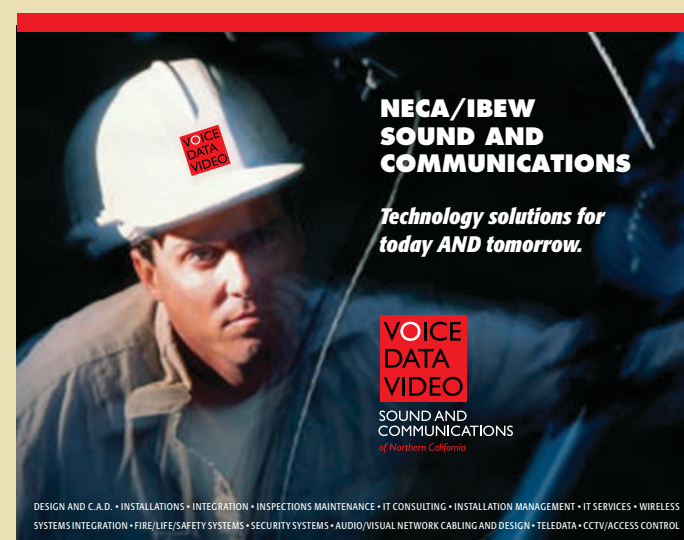
**Promedia**  
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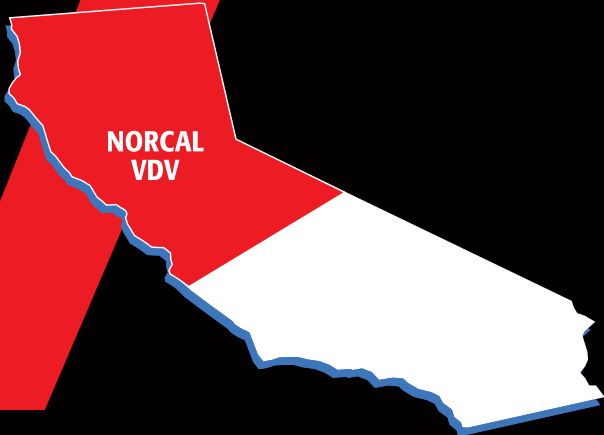
**W Bradley Electric**  
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*Bay Area Executive Briefing Center*



*El Cerrito High School Theater Project*

**[norcalvdv.org](http://norcalvdv.org)**

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for the balcony. Other speakers were mounted throughout the dressing area and backstage to cue the actors.

The technicians also installed the complex control room, which is in the back of the theater and acts as a command headquarters for stage producers to monitor and regulate the sound and video systems. The control room contains a Soundcraft mixing console, equipment racks that house the amplifiers and CD players and other source components that the operator needs to access in order to facilitate the production. The control room also holds digital signal processing equipment, the video projector, power amplifiers and patch panels.

On stage, the technicians installed a moveable stage managers panel and also provided access for portable loudspeakers so that performers can hear themselves. A Clear Com intercom channel was installed

so that stage managers and stage hands can communicate with each other during productions. The Clear Com technology is carried in body packs worn by the stage managers. The technicians installed an

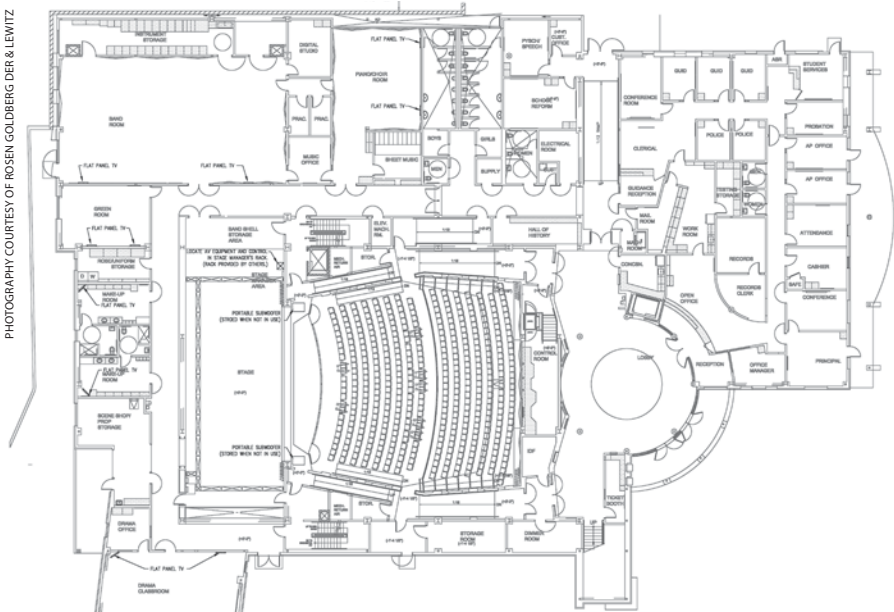
assistive listening system for the hearing impaired in the theater.

"We were really fortunate to have such an experienced crew," said Rick McKinney. "I have four technicians that have been

with us for over 15 years, and Andy Glock, the project manager, has been with us for 25 years. They know and understand audiovisual really well." Other technicians who worked on the project include Carl Shiflett, Ron Taylor, Tim Osterdock, and Francisco Aguilar, assisted by apprentices Matt Givens and Erik Trantum, with technical and managerial support by Steve Bailey and Frits Groenhuizen.

Other theaters systems installed by Lloyd F. McKinney include Foothill College, Las Positas College, and St. Mary's College of California.

**For more information about Lloyd F. McKinney Associates, contact Rick McKinney at [rick@mckinneyassoc.com](mailto:rick@mckinneyassoc.com), 510.783.8043 or Joel Lewitz at [jlewitz@rgdlacoustics.com](mailto:jlewitz@rgdlacoustics.com), 415.464.0150, ext. 322.**



*El Cerrito High School Theater Project*

**VOICE  
DATA  
VIDEO**  
**SOUND AND  
COMMUNICATIONS**  
*of Northern California*