VOICE DATA VIDEO
SOUND AND COMMUNICATIONS
*of Northern California*

# THE VOICE

SPECIAL SCHOOL TECHNOLOGY ISSUE

2004 VOLUME TWO

LATEST SOUND & COMMUNICATIONS TECHNOLOGY NEWS

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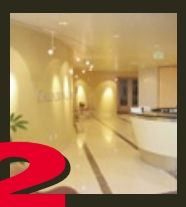



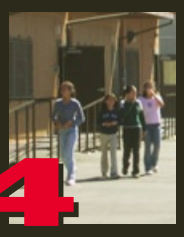



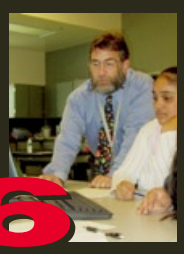





A publication of the National Electrical Contractors Association and the International Brotherhood of Electrical Workers of Northern California.

*NORCAL VDV Sound & Communications–*

# A State-of-the-Art Education

## Schools Turn to NECA/IBEW Sound and Communications Contractors to install the Latest in Technology

When Mary goes to her third grade classroom at Lincoln Elementary in Richmond, she learns numbers on the computer through a program called Muppets on Stage. She experiences the joy of reading online through Living Books software. Mary is just one of thousands of kids in the West Contra Costa Unified School District who are benefiting from a multi-million dollar technological upgrade now underway by NECA/IBEW contractors at 17 schools.

Just a few years ago, most of the District's students did not have Internet access in their classroom. Educational consultants estimate that at least 20% of all schools in N. California have limited Internet access, with Internet usage mainly at the administrative office.

Today, thanks to the passage of two local bond issues totaling $450 million and a federal program called E-Rate, the District's classrooms are receiving high-speed Internet access, state-of-the-art security systems, fiber optic backbones, and computerized energy management systems. *(To see how NORCAL VDV contractors wired Lincoln Elementary, one of the District's schools, see pg. 4-5.)*

The bond money, which was prioritized for structural and seismic improvements, is also transforming learning environments. The technology systems are being installed throughout the district under the guidelines of a Project Labor Agreement (PLA) negotiated with the Construction Trades Unions, including the IBEW (International Brotherhood of Electrical Workers). Internet, data, security, and other communications systems are being installed by local NECA (National Electrical Contractors Association) contractors and IBEW workers, primarily communication technicians in IBEW Local 302 in Martinez and Local 595 in Dublin.

***"The students become familiar with a certain technology and are not intimidated by it, so it sets the tone for the rest of their life. Technology does not drive their life, but they drive technology."***

***–Lance Jackson***
***Deputy Program Manager***
***The Seville Group***

***To contact an IBEW/NECA union contractor, visit www.norcalvdv.org***


COURTESY OF LAURA WINDISCH

***Lovonya DeJean Middle School, in Richmond, the flagship school of the Project Labor Agreement, opened its doors in 2002.***

COURTESY OF LAURA WINDISCH

***Data on the 28 security cameras at Lovonya DeJean Middle School can be tracked back up to six months.***

### *Bringing the Internet into the classroom*

"The education process is not just the books and the material in the books," said Lance Jackson of The Seville Group, Deputy Program Manager for the project. "It now involves bringing the Internet into the classroom and exposing the kids to the rest of the world. That's what education is all about. The earlier you expose kids to technology, the more they embrace it, and the better our world will be in the future."

### *Fiber optic backbones*

Each of the technologically renovated campuses functions as part of the school district's wide area network. Standardized technological improvements to the schools include fiber optic backbones that connect buildings, as well as campuses, and a voice over IP network. The voice over IP network (also called a converged network) allows voice (telephone) and data (Internet access) to be transmitted on the same system.

*continued on back page*

# NECA/IBEW VDV Contractors in High-Profile Buildings thro

COURTESY OF ANN S. HALL

COURTESY OF ED ASMUS

***Placer Electric Communications completed the tenant improvement cabling for Esquire Plaza, including the Chamber of Commerce.***

***Most high-profile buildings in the Bay Area are wired by NORCAL VDV contractors and their IBEW technicians***

From Sacramento to San Francisco, San Jose to Monterey Bay, IBEW/NECA sound and communication contractors are wiring state-of-the-art buildings as diverse as a new civic center, a landmark office tower, and one of the state's largest affordable housing developments.

Each project represents millions of dollars in total construction value, giving a high-profile face to VDV contractors and their technological expertise in Northern California.

### *IDEX Installs Two Million Feet of Cabling in San Jose Civic Center*

IDEX Global Services, a NECA/IBEW contractor whose local office is in San Rafael, is wiring a $3.5 million structured cabling system at the new 18-floor San Jose Civic Center. In addition to the tower, the building has three floors in a council wing that is adjacent to the tower, and another three floor wing next to the rotunda.

The 530,000 square foot Civic Center is designed by architect Richard Meier, and reaches 288 feet at its highest point. The total construction budget is $343 million, with completion scheduled for the summer of 2005. In addition to containing city offices and council chambers, the Civic Center includes a public plaza and rotunda for community events. The glass domed rotunda showcases a 110-foot high public gallery space.

IDEX is working with technicians from IBEW Local 332 in San Jose to complete the communication cabling installation. Because the Civic Center will be in use for many decades to come, IDEX is using Cat 6 cabling to meet the highest existing industry standards. Cat 6 cabling provides a better application performance than the more commonly used Cat 5 or Cat 5E, including faster speeds and more bandwidth. Cat 6 allows a tremendous amount of information to flow quickly from the server rooms and network rooms to the desktop.

The project has an extensive copper and fiber backbone, which runs through the riser closets on each floor. All the riser cabling goes through each floor and then connects each floor back to the server room, located on the third floor of the council wing. Cabling runs horizontally to each building and then vertically up the tower. There are over a million feet of horizontal cable in the structure, and more than two million feet in the entire project.

"With Cat 6, we have chosen a quality solution that has a 20-year warranty," said Natu Tuatagaloa, President of the Western Region for IDEX Global Services. IDEX, which offers turnkey technology solutions for companies, has also completed projects for UCSF, Sacramento State, CALPERS, Wells Fargo, Nextel, Netscape, Providian Financial and Accenture.

### *Sacramento's Esquire Plaza Wired by Placer Electric*

Esquire Plaza, a 22-story office building next to the Sacramento Convention Center at the end of K Street Mall, is one of the new premier downtown office spaces in the state's capital. The building also incorporates the Esquire Grill, a well-known Statehouse dining spot, as well as a new IMAX theater.

Placer Electric Communications, a NECA contractor in Citrus Heights, wired most of the 248,000 square foot building, cabling some 3000 voice and data stations for multiple tenants. Technicians from IBEW Local 340 installed the cabling, which included voice, data, and video backbone risers throughout the building.

The California Healthcare


COURTESY OF PAGANINI COMMUNICATIONS

***North Beach Place, the largest affordable housing development in the San Francisco's history, was wired by Paganini Communications.***

# Install Cutting-Edge Wiring ughout Northern California

Association, as well as many other lobbying organizations, have leased offices in the building. "All of the tenants had different requirements and different needs, so we were flexible in our design and installation strategy," said Allen Johnson, Communications Manager for Placer Electric.

"We had multiple tenants on each floor, with multiple voice lines. Some floors were half built out when we began the project, and other floors were vacant, and were leased at different times. We cabled multiple computer rooms, some spanning space on different floors. We used primarily Cat 5E cable for the voice/data installations."

Placer Electric is one of the largest electrical contractors in the Sacramento Area. The company's communications projects include Butte College/Allied Health Public Services, NEC Electronics, Sleep-Train Amphitheater, and Sonora Hospital.

### *Paganini Communications Installs Hundreds of Structured Media Centers in North Beach Place*

North Beach Place on Bay St., which recently opened its doors in San Francisco, is the largest affordable housing development in the city's history. In addition to 341 residential units for low income San Franciscans, the $106 million development also sports a Trader Joe's and other retail stores, plus a community room, child care center, and computer technology center.

Paganini Communications, a NECA contractor in San Francisco, wired the 341 units, installing a structured media center in each of the apartments. The structured media center is designed so that all the low voltage wiring goes to one box controlling the communications within the unit, including the telephone, computer, cable, security, and AV systems. Sound and Communication Technicians from IBEW Local 6 worked for Paganini Communication on the project.

COURTESY OF ROSENDIN ELECTRIC

***Rosendin Electric installed 17.5 miles of fiber in the new Engineering Building at UC Santa Cruz.***

Paganini Communications installed high pair count cable from the Main Point of Entry (MPOE), to individual meter rooms located within the basement. From the meter rooms, Paganini installed backbone coax cables and backbone voice cables to each of the units. Within the unit itself, Paganini Communications ran voice data cables and CATV cables. There are about 270,000 feet of voice cable and some 150,000 feet of coax for CATV within the units.

"The structured media center in each unit will permit future upgrading of each apartment easily in the future," said Larry Andrini, Executive Manager of Paganini Communications. "You can add, move, or make changes within the units, all within one box. A/V and security can easily be added as an upgrade." Paganini Communications recently completed Brannan Square, a similar development in San Francisco.

### *Rosendin Electric Completes UC Santa Cruz Engineering Building*

Rosendin Electric, a NECA contractor in San Jose, has installed voice, data, copper and fiber optic cable within the new UC Santa Cruz Engineering Building. The five-story building includes classrooms, laboratories and several small auditoriums, in addition to the electrical lighting and power for the project.

Rosendin wired about 650 outlets with 100 miles of Berktek Lanmark 350 cable for voice and data locations. Each of the outlets had copper for voice, copper for data, and then fiber at each location. Rosendin installed about 17.5 miles of 2 strand multimode fiber throughout the building. The company also wired a new JBL audio system and a wireless assisted listening system for those with hearing disabilities. Technicians from IBEW Local 332 in San Jose assisted with the project.

"The project was difficult from a number of standpoints," said John Koester, VP of Special Projects for Rosendin. "Because there is no nearby parking, we had to park remotely and bus the crew each day.

"There was also a limited race way area, and a small raised floor in certain areas, so it was a challenge getting the cabling into the raised floor areas. Each of the telecom rooms was a busy place, with fiber and copper, so space planning was very critical."

Rosendin, one of the largest electrical contractors in Northern California, also recently wired voice/data for three new student residence halls at CAL State University Monterey Bay.

***For more Information:***

For more information about these projects, contact:

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ntuatagaloa@idexglobal.com

**Allen Johnson**
ajohnson@placerelectric.com

**Larry Andrini**
LarryA@pagcos.com

**John Koester**
jkoester@rosendin.com.

## *How can I find a contractor?*

*Visit the Northern California Voice-Data-Video website at 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.*

***IDEX Global Services worked with Local 332 to complete the structured cabling system for the new San Jose Civic Center.***

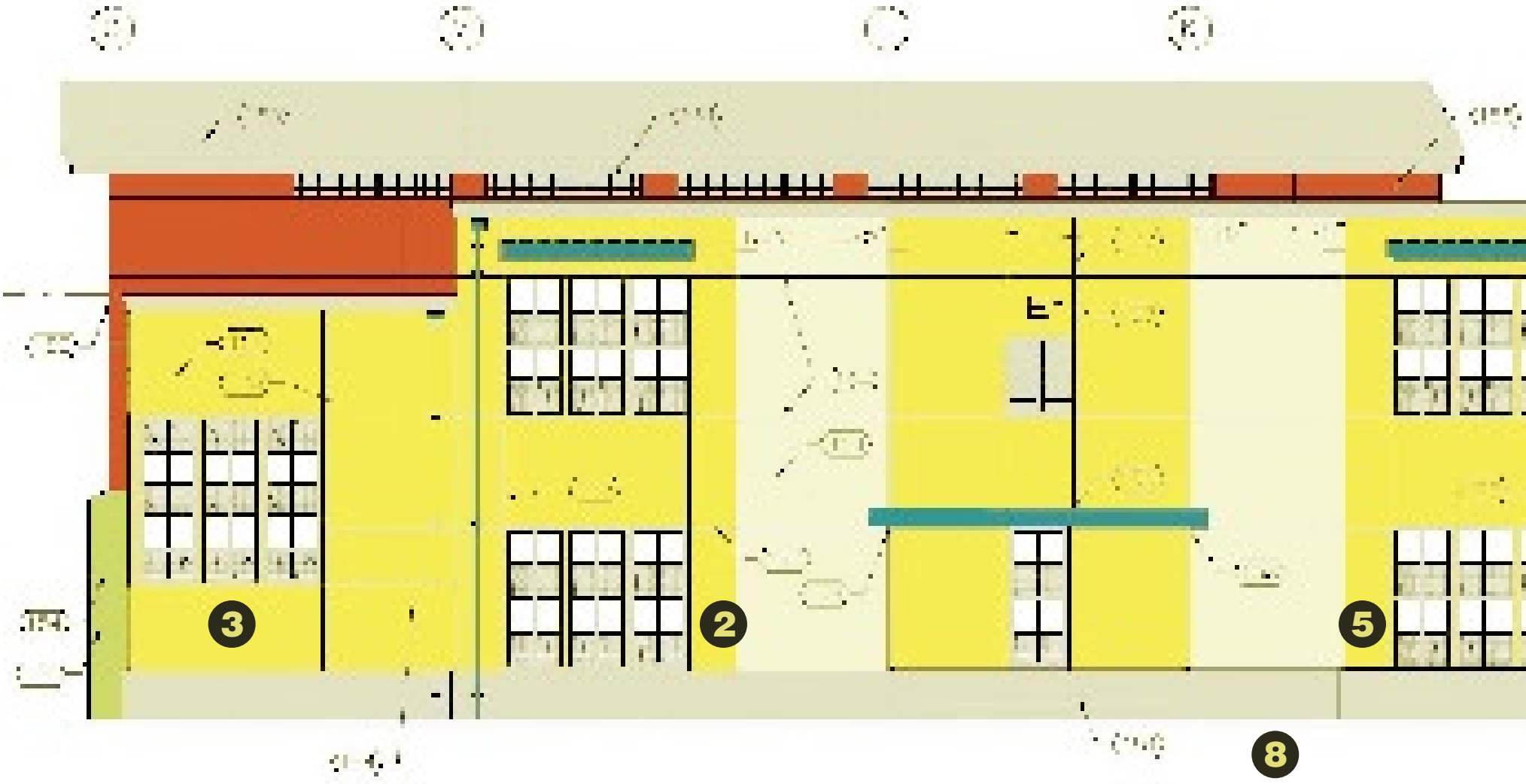
COURTESY OF THE CITY OF SAN JOSE

# NORCAL VDV Contractors
# Lincoln Elementary School into the

Technology installed by NECA/IBEW contractors in this new two story building at Lincoln Elementary School in Richmond has transformed the learning environment. Preschool and kindergarten students, as well as students in grades 1-6, have high speed Internet in every classroom and lab. A converged voice over IP System (voice over Internet Provider) allows telephone and data on the same system to each classroom. Proximity detectors at the entrance, as well as in each classroom, provide security to students and teachers through card access. Two other buildings on the West Contra Costa Unified School District campus, including the library, auditorium, and administration offices, have also been totally upgraded with new communications, A/V and security systems. Del Monte Electrical Contractors, Hayward, served as the electrical contractor to the Lincoln Elementary School project. Lloyd F. McKinney Associates, Inc., Hayward, provided Internet and Data, as well as Audio/Video services. Communication Service Co. wired the fire alarm system, the intercom and the master clock.

COURTESY OF COMMUNICATION SERVICE CO.

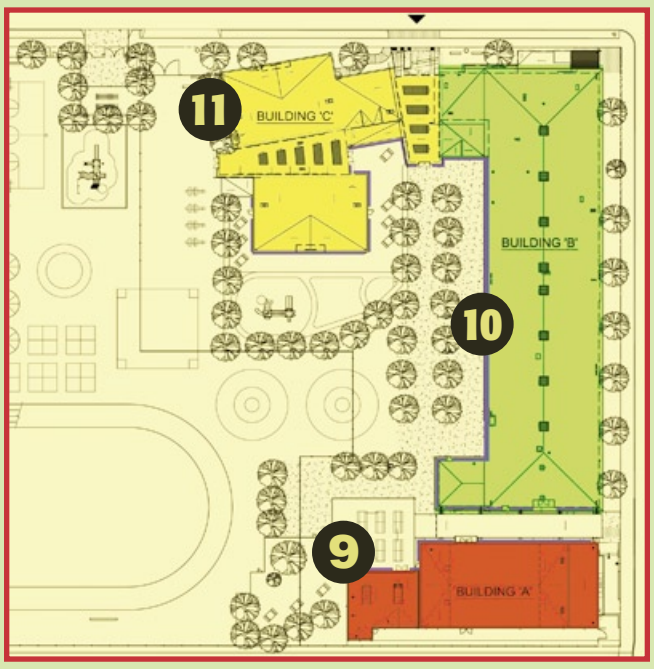
***The three buildings at Lincoln are each wired to the MDF room, located in Building C (refer to #11 on drawing).***



# s' High Tech Wiring Brings Age of Computers and Convergence

## *Technology at Lincoln*

1. Card Access Systems at the entry way are installed to provide security. Only those with correct card access can enter the building.
2. Lloyd F. McKinney Associates, Inc. ran high speed Internet to each classroom, including the preschool and kindergarten rooms, on Voice over IP cable. The Voice over IP converges voice (telephone) and data (computer) signals over a single source to each classroom and lab. The cables run across the ceiling of each classroom and terminate at the Head End Room.
3. Proximity detectors are installed throughout the building to control access through a card with a magnetic strip, allowing the system to track your presence.
4. Communication Service Co. installed a Bogen intercom system that can address the entire school at once, or individual classrooms with different messages. The system has a built-in Master Clock which allows several bell schedules for different times and locations throughout the day.
5. Lloyd F. McKinney Associates, Inc. wired each classroom, as well as the auditorium, with a state-of-the-art Ducane A/V system, which allows DVD playing and recording. The system also allows each classroom to tap into TV signals and broadcast them.
6. Communication Service Co. installed a Faraday LLC, MPC1500 Plus Panel for their addressable fire alarm system. This system is wired throughout the school and, upon arrival, gives fire department personnel the exact location (or address) of the device that triggered the alarm, simply by looking at the main control panel.
7. The systems run horizontally throughout the structure, then vertically into the head end closet. The closet contains all the controls for the systems, including computer controls for the HVAC systems. The systems can be controlled by laptop or desktop and are monitored from the administration building.
8. A fiber optic backbone runs underground from the new building to the other two campus structures. Each system has its own inter-building, underground-rated cable to connect all 3 buildings to each other in the MDF.
9. Building A consists of the Auditorium or Multi-purpose room. It also houses a full stage with back-stage dressing room areas and school kitchen.
10. Building B is a two story building that contains the administration offices along with many classrooms. Its lobby is the main entrance to the school.
11. Building C is a two-story building with an atrium in the center of both floors. The lower floors are dedicated to the Kindergarten classes.




COURTESY OF ARTHUR TAM AND ASSOCIATES

## Project Team

**Project Master Architect: WLC Architects**

**Architect of Record: Arthur Tam and Associates**

**Construction Manager: The Seville Group**

**Deputy Program Manager: Lance Jackson**

**Project Engineer: The Seville Group**

**Electrical Contractor: Del Monte Electric**

**VDV Contractor: Lloyd F. McKinney Associates, Inc.**

**VDV Contractor: Communication Service Co.**


ARTHUR TAM AND ASSOCIATES

# KC/future planning President Outlines Technology Trends in Schools

KC/future planning, San Francisco, is one of the Bay Area's best known information technology consulting firms. The firm frequently plans, designs, and implements information technologies for educational systems. KC/future planning created the master information technologies specification for the San Francisco Unified School District, planned and installed all the information technology for the new library at City College of San Francisco, and worked on the entire campus telecommunication infrastructure upgrades at San Francisco State University and San Jose State University. Kathleen Clancy, President of KC/future planning, discusses what's new in educational technology for VOICE readers.

**Q. What are some of the technology trends in schools?**

**A.** The biggest thing is Internet access in the classroom. It's not so cutting edge, but in school districts it still is. Easily 20% of schools have limited Internet access. The other thing is the capability of voice over IP, which tends to be a real cost saving measure for schools. By using voice over IP, they don't have to get a separate phone system. They can build a network that has data access, voice, and video. In all of the schools we work with, we look at the convergence of those technologies that ride over the same network. We have also done a fair amount of work within school districts like Santa Rosa, where we installed fiber between schools so that they have better connectivity within the school district.

**Q. How much can voice over IP save a school?**

**A.** There are a lot of variables that go into the equation. We have seen circumstances where it is a 50% savings over buying a separate phone system, and other cases where it might be a 20% cost savings.

**Q. What are other parts of a converged network?**

**A.** In addition to data, voice and video, Intercom can be integrated into the phone set. The security system can be another layer to a converged network. Security systems are available that are IP based, so a camera or a card reader can have an IP address. Again, it represents a cost savings because it is not a separate system. The final layer is controls for building management systems. Those controls now too are IP. You can change clocks, heat and air control through a command on the computer.

**A.** The biggest thing is more and more bandwidth. There are so many programs available that can be fed to schools electronically. Schools need to look at pooling together within their districts or working with local cable companies to get broadband, working with the citizens to get an educational channel.

COURTESY OF LAURA WINDISCH

*Teacher Doug Marques helps students at Lovonya DeJean Middle School integrate technology into Home Economics.*

**Q. What is the most difficult part of building a converged network for schools?**

**A.** If you are building a new school or renovating a school, you want to build a network that is big enough to be able to handle all these layers.

**Q. What challenges do you face in installing these systems in the schools?**

**A.** There are huge challenges in installation and design. The biggest one here in the Bay Area is the age of facilities, and the use of asbestos. It is so costly to remove asbestos, but you can't work in an asbestos environment. With the age of the buildings, it is very difficult to work with the older materials and get in behind walls like we do in more corporate facilities. The other challenge is space. You need to have a network server room, and carving out even 120 square feet in a lot of schools means giving up storage or classroom space. That is a hard thing for them to do.

**Q. Is there anything coming up in the future that schools will need to implement?**

**Q. What is your opinion of the quality of the installations of the IBEW technicians that you work with?**

**A.** The training programs that NECA contractors have with the IBEW unions are terrific. We look for standards certifications, and the training programs are very good at providing that as well as product certifications. You can tell the difference the training program makes in the craftsmanship of the installations. You can see it in the workmanship that goes on.

**For more information, contact Kathleen Clancy at Kclancy@futureplanning.com**

COURTESY OF ANN S. HALL

*A Technician from Placer Electric Communications of Citric Heights installing cabling.*

## *Where can I learn more?*

**Extensive information regarding the rapidly-changing VDV industry is available at www.norcalvdv.org. Special sections are available for customers, union contractors, IBEW members, and those interested in a career as a union technician. Other features include a contractor directory, an overview of the training program, a glossary of industry terms, an overview of available services, and an industry outlook.**

**Established in 2002, www.norcalvdv.org is sponsored by the Labor Management Cooperation Committee (LMCC) of Northern California. The website received a 2002 Crystal Award of Excellence from the Communicator Awards, an international competition that recognizes outstanding work in the communications field.**

**To order additional copies, please contact laura@ahcommunications.com.**

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# Integrated Fire Alarm Systems Bring More Convergence to Buildings

Integrated fire alarm systems are one of the hottest new technologies on the market. The newest generation of fire alarm-life safety systems can be integrated with a building's security and surveillance systems, as well as with other systems such as HVAC. This new convergence breaks a traditional barrier that the fire alarm system is so important that it has to stand alone.

The push for integration of fire alarm/life safety systems has grown out of the increasingly sophisticated use of integration within the security system industry.

Bill Kondora, systems manager for Briggs Electric, Carson City NV, says that all of the fire-life safety systems his company has installed in the last year are integrated with card access and security systems.

"All the systems are wired to run along the same backbone," he said. "Essentially, these systems work as independent subsystems that can communicate over the same backbone. Most of the time there isn't a central data base; instead data is exchanged among these systems through software." (Unfortunately most of the systems now have proprietary protocols, although there is hope that an internationally accepted open systems network protocol will emerge).

Kondora said the integrated systems usually share a centralized control and graphical, on-screen monitoring station, which is located in the building operations center. "This reduces monitoring and staffing costs," he added. Kondora said

COURTESY OF LAURA WINDISCH

***PLA Deputy Program Mgr. Lance Jackson at Hercules Elementary School, where part of the $12 million reconstruction involved an integrated fire alarm system.***

clients also save money because they pay for wiring one system, instead of two or three separate systems.

"All these systems are interrelated anyway," Kondora said. "During a fire, the alarm system needs to communicate with the access system so that doors can be opened for fire fighters. The alarm system needs to communicate with the CCTV network, so that cameras within the fire range can give data back to the security personnel so that they can see how severe the threat is." Kondora points out those fire alarm systems can even be integrated with HVAC controls. In that case, the building ventilation systems can automatically control smoke flow or restrict air availability to a fire.

Even though the fire alarm system is integrated, Kondora points out that it must also remain independent. "No matter what happens to the other systems in the integration, the fire alarm system must remain independent if needed. It has to be able to perform its function, no matter what. These new systems provide both independence and the flexibility to interrelate."

Briggs Electric recently completed the systems integration of fire alarm/life safety, security systems, and access control system for Eagle Valley Children's Home in Carson City. The Children's Home also has a wireless nurse call system. Other recently completed integrated systems include Lake Tahoe School.

Bill Kondora can be reached at BillKondora@briggselectric.com.

COURTESY OF FRANK GARCIA

***A NECA/IBEW apprentice from Local 332 of San Jose learns the latest fire alarm technology.***

## *Some Of The Latest Innovations In Fire/Life/Safety Technology*

- Integration of fire alarm/life safety systems with security and access control systems, operating over the same backbone and sharing a centralized control and monitoring station (lowers installation and maintenance costs)
- Control panels with easy to understand LED displays and fingertip operation
- Software that can provide reporting and control functions for fire, security, access control and CCTV in one easy to use interface.
- Wireless fire alarm systems
- Three-second alarm response times
- Systems that support hundreds of devices per loop
- Smoke detectors with separate addresses
- Integration of multiple channels of multiplexed audio

***For more about the latest in fire alarm technology, contact a Norcal Fire/Life/Safety contractor at norcalvdv.org***

## *How can I find a Fire/Life/Safety systems contractor?*

**Atlas/ Pellizzari Electric Inc**
Contact: Steve Pellizzari
SteveP@atlas-pellizzari.com
450 Howland St.
Redwood City, CA 94063
Tel: (650) 364-1204
Fax: (650) 364-6193
www.atlas-pellizzari.com

**Briggs Electric Inc.**
Contact: Greg Dye
Gregdye@briggselectric.com
5138 Metric Way
Carson City , NV 89706
Tel: (775) 887-9901
Fax: (775) 887-9454

**CAL Communication Service Co.**
Contact: Randall J. Weber
randy@calcsc.com
525 Second St.
Rodeo, CA 94572
Tel: (510) 799-0300
Fax: (510) 799-0966

**Ceitronics**
Contact: Ignacio del Rio
Ignacio_delRio@cei.com
550 Parrott St
San Jose , CA 95112
Tel: (408) 452-5000
Fax: (408) 452-8953
www.ceitronics.com

**Contra Costa Electric Inc**
Contact: Chris Payne
chris_payne@emcorgroup.com
825 Howe Road
Martinez, CA 94553
Tel: (925) 229-4250
Fax: (925) 229-1672
www.ccelectric.com

**Contra Costa Electric Inc**
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matt_furrer@emcorgroup.com
4277 W Richert #108
Fresno, CA 93277
Tel: (559) 271-3264
Fax: (559) 271-1905
www.ccelectric.com

**Cupertino Electric Inc**
Contact: Gene Ryley
1132 N Seventh St
San Jose, CA 95112
Tel: (408) 808-8000
Fax: (408) 275-6967
www.cei.com

**Dynaelectric Company**
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David_Griffy@emcorgroup.com
414 Brannan St.
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Tel: (415) 597-4700
Fax: (415) 543-1301
www.design42.com/dynalectric

**Eilbacher Electric**
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41794 Vargas Rd
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Fax: (510) 651-7885

**Facilities Group, The**
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www.facilitiesgroup-sf.com

**Groseclose Electric Company Inc.**
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Tel: (831) 424-2791
Fax: (831) 424-6132

**IDEX Global Services, Inc.**
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Tel: (408) 491-6000
Fax: (408) 998-0100

**Martinez Electric**
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Johnmtz@martinezelectric.com
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Antioch, CA 94509
Tel: (925) 757-4645
Fax: (925) 757-3826
www.martinezelectric.com

**MCM & Associates, Inc.**
Contact: Rudy Biscaino
Rudy.Biscaino@mcm-assoc.com
110 Pioneer Way
Mountain View, CA 94041
Tel: (650) 940-7560
Fax: (650) 940-6065
www.mcm-assoc.com

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www.mde-electric.com

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Ssteiny@steinyco.com
27 Sheridan St.
Vallejo, CA 94590
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Sunnyvale, CA 94089
Tel: (408) 541-9000
Fax: (408) 541-9001
www.tdnelectric.com

**Walker Comm Inc**
Contact: Gary and Donald Walker
donaldw@walkercomm.com
521 Railroad Ave.
Fairfield, CA 94533
Tel: (707) 421-1300
Fax: (707) 421-1359
www.walkercomm.com

**Young Electric Co Inc**
Contact: James Young
Jpy@youngelec.com
3317 26th St.
San Francisco, CA 94110
Tel: (415) 649-3355
Fax: (415) 648-8259
www.youngelec.com

***For a complete listing of over 125 qualified Sound and Communications contractors, please visit www.norcalvdv.org.***

## *State-of-the-Art Education* *(continued from page 1)*

The voice over IP network is a cost-saving measure for schools, eliminating the need for a separate phone system. It also allows schools to build in a video component over the same network. Consultant Kathleen Clancy of KC/future planning, San Francisco, estimates that a voice over IP network can save a school 20% to 50% of the cost over buying a separate phone system.

State-of-the-art security systems include card access systems, which may function with or without cameras. Lighting systems having high efficiency ballasts contribute to the energy savings that the district expects to realize. This direct/indirect lighting system limits shadows and improves learning by directing 60% of the light up, and 40% of the light down. The lighting system is controlled by a computer for maximum efficiency and conservation. A computerized energy management system is locally run at each school site to conserve energy and maximize savings. The temperature of all of the rooms in a school can be controlled through a central computer.

State-of-the-art fire alarm systems, A/V systems and intercom systems have also been installed at many of the schools.

IBEW contractors involved in the project include Del Monte Electric, Hayward; Red Top Electric, Hayward; Contra Costa Electric, Martinez; Lloyd F. McKinney Associates, Hayward, and Communication Service Co., Rodeo.

In addition to Lincoln Elementary, other elementary schools that are being wired include Harding, Hercules, Madera, Montalvin, Peres, Riverside, Stewart, Verde, Bayview, Downer, Ellerhorst, Kensington, Mira Vista, Murphy, Sheldon, Tara Hills, and Washington. Technological improvements are also being made at a number of high schools and middle schools, including Helms Middle School, Lovonya DeJean Middle School, Portola Middle School, Hercules High School, Delta High School, and De Anza High School.

For more information about the West Contra Costa Unified School District technological modernization project, contact Lance Jackson at ljackson@sevillegroup.com; Carl Banke, Lloyd F. McKinney Associates, carlbanke@juno.com; or Randall Weber, Communication Service Company, randy@calcsc.com.

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