

## *Knowledge, Skills, and Attitude:*

# NORCAL Training— In A Class All Its Own



## Customers Gain Value for Top Notch, Union-Trained VDV Workforce

**T**raining and experience make the difference in any industry, including VDV, and there is a very high bar for the IBEW/NECA VDV workforce. Northern California boasts one of the most rigorous VDV training programs in the country, with currently 350 apprentices enrolled in seven training centers around the region.

VDV students must complete 150 hours per year of classroom training each year—which means they are in day school full time for four weeks in each of the three years. The weeks of training are spread over the spring and fall semesters, allowing time for the apprentices to gain work experience. Each apprentice must also complete 4,800 hours of on-the-job training over the three year period, working under the direction of an experienced VDV Systems Technician.

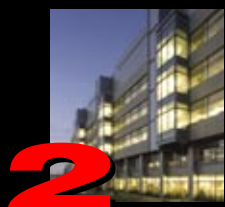
### **Best in Class**

No VDV training program in the country compares with the IBEW/NECA training program, which is required of anyone who wants to become an installer/technician. Formally called the Telecommunications Installer/Technician Apprenticeship program, the training program is established jointly by The International Brotherhood of Electrical Workers (IBEW) and the National Electrical Contractors Associations (NECA) through their National Joint Apprenticeship and Training Committee (NJATC).

In Northern California, the JATC program is monitored and funded by local electrical contractors/communication system contractors and representatives from the IBEW and NECA, who help to guide the curriculum and set apprenticeship standards. Most non-union contractors, by contrast, don't participate in a formal industry-based training program. Some non-union workers receive as little as 40 hours of training and have no experience before they join the

*continued on page 7*

TRAINING PROGRAM	NECA/IBEW	NON-UNION
Structured, performance-based classroom and on-the job training	A 3 year program is the benchmark for all NECA-IBEW VDV workers	Most never participate in a formal industry-based program.
VDV training for certification	450 hours in class and 4,800 hours on the job	Some workers receive as little as 40 hours of training
Skills upgrading for journeymen	Classes to upgrade skills offered annually	Reliable info not available.
Training for managers	NJATC National Training Institute NECA Management Education Inst. NECA Web-based learning	Reliable info not available.
Safety training	Mandatory OSHA, CPR and First-Aid training for apprentices	Reliable info not available.
Commitment to training	Nearly \$2 million invested annually for Sound & Communication Workers	Reliable info not available.



High Profile Jobs  
Completed by NORCAL



The VDV Training  
Program:  
an In-Depth Look



Q&A With Vincent  
Cosentino, Regional  
Training Director

**And  
more...**

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



# Ballparks, BioTech Research, And IBEW/NECA Contractors Hav



COURTESY OF ANHILL COMMUNICATIONS

AT&T Park, San Francisco: Semans Communications



Stockton Arena, Stockton: Pro Media



COURTESY OF JOHN DURANT

The J. David Gladstone Institutes, San Francisco: Metropolitan Electrical Construction

***“It is essential to be able to provide quality and assurance to the end user—this is what separates us union contractors from the rest of the bidding market. As union contractors we rely on the formal training program provided to the apprentices to help ensure the proper execution on project sites.”***

*—Larry Andrini, Vice President, Paganini Communications*

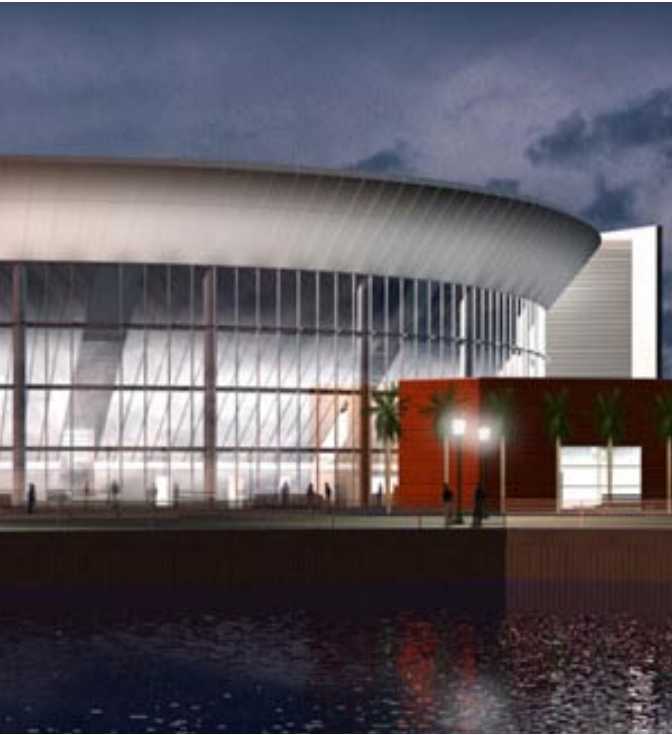
The most complex and high-profile buildings in Northern California, from high-rises to nanotechnology labs, are wired by NECA/IBEW contractors. Union contractors have a better trained and more experienced workforce with the necessary skills to do the job right the first time. To find over 125 qualified NECA/IBEW contractors in the sound and communications industry, visit [www.norcalvdv.org](http://www.norcalvdv.org) and view the contractor directory.



COURTESY OF CALTRAIN

HP Pavilion, San Jose: MCM & Associates

# Airports, Universities, High-Rises, We Have The Training and Experience.



COURTESY OF THE CITY OF STOCKTON



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*Cache Creek Casino Resort, Brooks: Ceitronics, Cupertino Electric, and River City Communications*



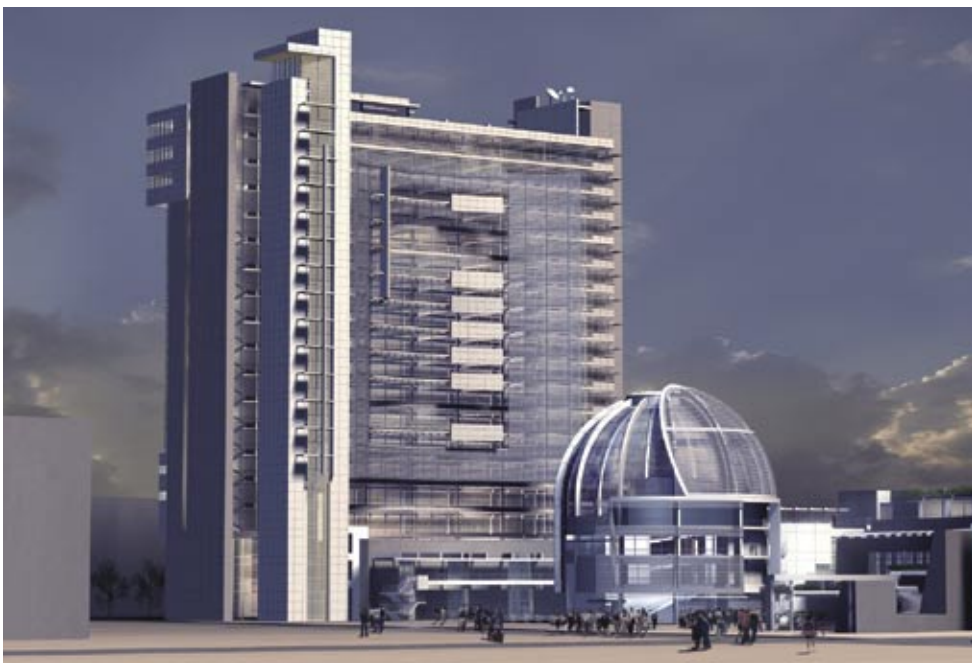
COURTESY OF OAKLAND INTERNATIONAL AIRPORT

*Oakland International Airport, Oakland: Intrepid Electronic Systems, Inc.*



COURTESY OF SAINT AGNES HOSPITAL

*Saint Agnes Hospital, Fresno: Contra Costa Electric*



COURTESY OF THE CITY OF SAN JOSE

*San Jose Civic Center, San Jose: Idex Global Services, Inc.*



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*University of San Francisco, San Francisco: Decker Electric*

# The IBEW/NECA VDV A Three Year Curriculum and

The IBEW/NECA training program for VDV apprentices includes 450 hours of classroom study (150 hours a year for three years), along with 4,800 hours of field experience. The program focuses on the four VDV disciplines of Data/Telephone Systems; Sound & Pro-Audio/Video Systems; Security Systems; and Fire/

## YEAR

# 1

1-2	The Attributes of an IBEW/NECA Apprenticeship	8-60	An Introduction to the National Electrical Code
1-7	Sexual Harassment	8-61	Understanding and Applying Article 110 of the NEC
1-9	Safety Never Takes A Break	8-66	Introduction to Wiring Devices
2-10	Identifying Some Basic Tools of the Trade	9-68	Introduction to Building Code
2-14	Voice-Data-Video Test Instruments	9-70	Special Requirements Based on Occupancy
2-16	The Proper Care & Use of Ladders	9-74	Structured Cabling Flexible Raceways
3-20	Safety Codes	10-75	Electrical Industry Terms
3-24	Cabling System Performance	10-77	Non-Metallic Cable Boxes
3-27	Pathways and Spaces	10-80	Weatherproof Boxes
4-29	Telecommunications Grounding and Bonding	11-82	Using Electricity Units and Ohm's Law
4-31	Configuring Structured Cabling Systems	11-83	The Properties of Power in an Electrical Current
4-32	Structured Cabling System Applications	11-85	Understanding and Calculating Resistance in a DC Series
5-37	Fiber Optics Overview	12-86	How Current Reacts in a DC Series Circuit
5-40	Testing and Certification	12-88	How Voltage Dividers Work in a DC Series Circuit
5-41	Installation Practices	12-89	How to Calculate Power in a DC Series Circuit
6-45	Hand Signals	13-90	How Voltage Functions in a DC Parallel Circuit
6-46	Hoisting Loads Properly	13-91	Understanding Resistance in a DC Parallel Circuit
6-52	Energized Circuits and the Potential Hazards they Possess	13-94	How to Calculate Power in a DC Parallel Circuit
7-54	Understanding and Drawing Architectural Views	14-96	How Current Reacts in a DC Parallel Circuit
7-56	Using Blueprint Specifications, Elevations, & Schedules	14-97	How Voltage Functions in a DC Combination Circuit
7-59	Understanding and Drawing Structured Cabling Symbols	14-99	Understanding Voltage Polarity and Voltage Drop

## YEAR

# 2

1-2	Understanding Your Local Union By-Laws	9-56	Cards, Codes, and Biometric
1-4	An Introduction the COMET Program	9-57	Doors, Gates, Turnstiles, and Electric Locks
1-8	Making Circuit Calculations for Basic Systems	9-60	Electronic Access Control System Design
2-9	Becoming Familiar with AC Resistive Circuits	10-61	Introduction to Fire Alarms Systems
2-11	Becoming Familiar with Inductive Reactance	10-64	Notification Devices
2-12	Working with Inductors that are in Series and/or Parallel	10-68	Interfaced Systems
3-13	Understanding Capacitance and How it Affects a Circuit	11-72	Network Definitions
3-14	Becoming Familiar With Capacitive Reactance	11-74	The OSI Model
3-16	Understanding Vectors and How to Use them Effectively	11-77	Viruses and Malware
4-17	Power Distribution Systems	12-79	Network Operating System
4-19	Types of Power Problems	12-82	Current Ethernet Technologies
4-20	Harmonics	12-83	Network Interface Cards and LAN Devices
5-23	Telephone Definitions	13-85	TCP/IP, Internet Addressing/Domain Names
5-27	Analog Signals vs Digital Signals	13-89	Dial Up Networking
5-28	ISDN Connection	13-90	Technologies and Protocols
6-30	Electronic Key Systems Applications	14-92	Network Security
6-33	PBX Telephone Systems	14-93	Digital Subscriber Line (DSL)
6-36	EKS/PBX Troubleshooting Practices	14-94	Wireless LAN's
7-38	Constant Voltage and Self-Amplified Systems	15-97	NEC System Grounding
7-39	Mixers, Amplifiers, and Interface Devices	15-100	The Grounding Electrode System
7-40	Sound Masking Systems	15-102	Grounding at Separate Buildings
8-48	Magnetic Contacts	16-109	Wiring Methods - General Installation
8-50	Motion Sensors	16-111	Remote Control, Signaling, Power-Limited Circuits
8-53	Security System Design	16-113	Optical Fiber Cables & Raceways

*This is a sample of lessons from the curriculum*

*This is a sample of lessons from the curriculum*



# LDV Training Program: and 4,800 Hours In The Field

Life Safety Systems. At the completion of their training, apprentices must be able to install, maintain, and integrate local area networks, telephone systems, fiber optics, security systems, CCTV, and access control. Over 350 students are currently enrolled in the program at seven training centers in Northern California.

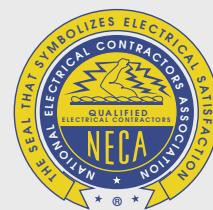
YEAR  
**3**

1-3	After Apprenticeship	9-51	Residential Structured Cabling Systems
1-6	Keys to Success: Motivation & Leadership	9-54	Telecommunications Concepts
1-7	The National Labor Relations Board	9-55	Residential Networking Technologies
2-9	Applying the Principals of Superposition to Circuit Calculations	10-58	Audio Signal Fundamentals
2-10	Kirchhoff's Laws	10-62	Video Display Technologies
2-11	Thevenin's & Norton's Theorems	10-65	Distributed Audio
3-12	Semiconductors	11-71	Integrating Home Systems
3-15	Understanding the Basic Functions of Diodes and Rectifiers	11-73	Residential Lighting Control
3-16	Power Supplies	11-74	HVAC Controls
4-17	Transistors	12-76	Residential Cabling Standards
4-19	Amplifiers I	12-77	Introduction to Structured Media Systems
4-21	Differential and Operational Amplifiers	12-79	Trim-out and Testing
5-22	Oscillators	13-80	What is a Sound System?
5-23	Integrated Circuits	13-83	Block Diagrams
5-24	Electronic Control Devices and Circuits	13-87	Loudspeakers
6-28	Logarithmic Power Ratios	14-88	Signal Processing Equipment
6-31	Filters	14-90	Sound System Interconnection
6-35	Antennas	14-92	Sound System Electronics
7-38	Video Technology	15-94	Automation Network Fundamentals
7-40	Camera Types and Characteristics	15-96	Intelligent Nodes and Network Devices
7-44	Switchers, Quads, and Multiplexers	15-97	Integrating Building Automation Networks
8-45	Video Motion Detectors	16-98	Nurse call Fundamentals
8-48	System Power Sources	16-100	Ancillary Systems
8-49	Lighting Characteristics	16-103	Future Expansion Considerations

*This is a sample of lessons from the curriculum*

## ABOUT NECA

The National Electrical Contractors Association is the voice of the \$100 billion industry responsible for lighting, power, and communication systems in buildings and communities across the United States. NECA's national office and 120 local chapters advance the electrical contracting industry through advocacy, education, research, and standards development. NECA celebrated its 100th anniversary in 2001.



## ABOUT IBEW

The International Brotherhood of Electrical Workers (IBEW) represents approximately 750,000 members who work in a wide variety of fields, including utilities, construction, telecommunications, broadcasting, manufacturing, railroads and government. Founded in 1891, the IBEW is one of the oldest, largest, and most respected unions in the world.



# Vincent Cosentino, NORCAL's Training Director, Answers Questions About the VDV Training Program



**Vincent Cosentino, NORCAL Regional Training Director**

Over 1,000 VDV installers/technicians have been trained since the NORCAL training program originated in 1987. In the fall of 2005, the program transitioned from night classes to day school to offer a more consistent curriculum. Vincent Cosentino, Regional Training Director of the Northern California Sound & Communication JATC, talks about the changing structure and continuing mission of the program.

**Q: How does the change in structure affect the mission of the training program?**

A: The VDV (Voice/Data/Video) industry is actually comprised of four separate crafts: Data/Telephone Systems; Sound & Pro-Audio/Video Systems; Security Systems; and Fire/Life Safety Systems. NORCAL's objective with day school is to provide the same quality and quantity of this subject material to each classroom and student, but with a more consistent delivery.

**Q: Where is the training program located?**

A: Currently, four instructors from this industry teach in five Electrical Training Center locations around Northern California. The instructors travel to the various centers in the Bay Area and Sacramento and follow a well coordinated schedule of weekly classes. Each instructor's support materials for lecture and hands-on labs are delivered to the particular teaching location for that week of classes.

**Q: How may total hours of training are completed?**

A: 150 hours per each year of a three year apprenticeship, for a total of 450 hours total classroom training. There are also homework assignments. In addition, each apprentice must complete 4,800 hours of on-the-job training

**Q: What are the benefits of the on-the-job training?**

A: On-the-job training supports the classroom training and provides apprentices with an understand-



**Judy Amorim, NORCAL Staff Member**

ing of how classroom theory and practice translates into real challenges in the field. The instructors serve as mentors to the students, as do installers, technicians, and senior technicians in the field.

**Q: What are the classroom aids?**

A: We use the CPS (Classroom Performance Systems) system in conjunction with other programs to present the subject material in an exciting format. With the CPS system, students can use remote controls to answer testing questions

presented via Examview, PowerPoint or other displays. The Examview program enables the instructors to create and grade quizzes and tests electronically, which is a tremendous productivity tool. The CPS computer program can immediately record the student's remote command and grade the complete class understanding of any presented subject material. This is the single most significant advance in the classroom teaching since the chalkboard.

**Q: Who plans the curriculum?**

A: This is a joint effort by the Apprentice Career Coordinator, Ken Miller, and all the Instructors. The basic curriculum framework is drawn from the NJATC (National Joint Apprenticeship and Training Committee).

**Q: How is the curriculum organized?**

A: Many hundreds of lessons are grouped together in related modules and spread over three years. Each module is followed by a test.

**Q: How much money is spent each year in training?**

A: In 2005-2006, \$1.5 million was spent-- all of it contributed by out IBEW/NECA electrical/sound and communications contractors. Over 75% of the income is spent directly on training and the remaining amount is spent on administration and support of the training.

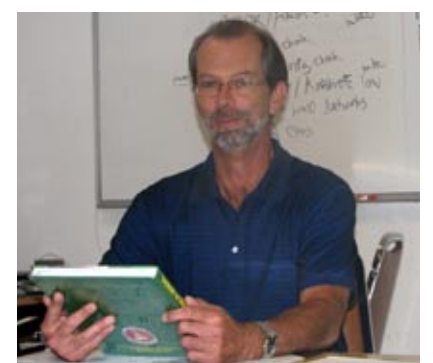
**Q: What are the requirements that are specific to California?**

A: California has a very defined apprenticeship mechanism and has recently implemented Fire/Life Safety

certification and will have VDV certification. This means a person must be certified to work in the various crafts.

**Q: What kinds of jobs would be most crucial to hire union-trained individuals?**

A: VDV is a highly technical field, with technology changing everyday. Only a thorough and comprehensive training program such as ours prepares installers to understand technology and keep up with advancements.



**Ken Miller, Apprentice Career Coordinator**

**Q: How does the training prepare for on-the-job troubleshooting?**

A: The NORCAL instructors teach solving problems by actual hands-on lab projects that have problems or conditions for the trainees to solve. This process is supplemented by providing each apprentice with a solid understanding of basic electrical theory. Fundamental NORCAL Training Rule: All problems or conditions can be solved by logical and methodical processing with an understanding of certain basic steps to be applied.

**Q: Do you offer resources for ongoing learning?**

A: NORCAL's mission is to provide upgrade instruction to all levels of workers in the VDV Sound and Communication program. Roll out of that program is scheduled for late 2006 or early 2007.

**For more information, contact Vincent Cosentino at [norcalrtd@aol.com](mailto:norcalrtd@aol.com).**

**NORCAL Staff**

- Brenda May
- Judy Amorim
- Sheri Costa

## NORCAL Training (continued from page 1)

workforce.

"These apprentices do the most, they see the most," says NORCAL JATC instructor Chris Hillyer. "They have touched it and they have installed it. Another important element is that they have the backing of the training program, so if they don't know something, they can come to us and find out. In a non union shop, you learn by fear. Here we spend a great deal of time putting them in a position to succeed."

Hillyer is one of four VDV instructors who teach at the Northern California Electrical Training Centers. Each instructor brings a varied background of relevant skills, knowledge and experiences to share with their students to prevent the trial-by-error learning method practiced by non-union workers on the job site.

### Developing the Program

Along with Ken Miller, Apprentice Career Coordinator, these instructors plan the curriculum, with input from local electrical/VDV contractors as well as IBEW members. The framework for the curriculum was established by the NJATC in the late nineties, and has evolved over the last eight years to better reflect the increasingly high tech nature of the growing VDV industry.

"In that our segment of the industry is driven by technological improvements, change is something we can count on," says Miller. "We will continue to improve our training program as technology changes."

The instructors keep up-to-date on the changing technology by constantly entering education programs themselves, from First Aid training to BICSI upgrades to Corning certification. In addition, all four instructors recently attended the annual National Training Institute (NTI), a NECA/IBEW event dedicated solely to improving and extending the training of professionals in the industry.

### Benefits to the Customer

There are a number of reasons to choose a NECA/IBEW VDV contractor, but none are more important than the quality of this training program. "A well trained, skilled expert at systems installation or service/repair is truly

the only way to insure construction budgets and construction time schedules meet their intended goals," says Vincent Cosentino, the NORCAL Regional Training Director. "Projects done right the first time save customers both time and money."

"The industry involves working with rapidly shifting, state-of-the-art technology and complex systems integration," says Cosentino. "Installations must be handled by well-trained technicians versed in the latest methods and manufacturers."

### Well Rounded Education

Sound and Communications projects encompass a wide range of areas, including data/telephone systems; sound and pro-audio/video systems; security systems; and fire/life safety systems. According to instructor Ward Reilly, this brings up another important benefit to the customer.

"We touch upon all points of voice-data-video so that our students are prepared to work in a variety of ways," he says. "The ones that don't go through the training program get

### Top 10 Training Goals in 2005

1. Leadership development
2. Safety training
3. Project management development
4. Management skills
5. Computer based software skills training
6. Increase training hours
7. Increase productivity
8. Enhance individual training
9. Sales/marketing training
10. Communication skills

Source: FMI's "2004-2005 U.S. Construction Report"

focused on just one specific part of VDV. We put our students through the apprenticeship so they are well-rounded individuals."

### Meeting Expectations

Each year construction consultant FMI surveys contractors to document their greatest challenges and concerns. This year, FMI's "U.S. Construction Training Report" cites leadership development, safety training, and project

*(continued on page 8)*

## NORCAL Instructors

### Chris Hillyer

**Subjects Taught:** The attributes of an IBEW/NECA Apprenticeship; Introduction to the COMET program.

**Bio:** Chris came to California from Nebraska in 1998—the same year he joined IBEW. He worked in the field until July 2005, when he was hired on by NORCAL. He credits Jason Whipple, a teacher in Sacramento, with mentoring him and getting him interested in the NORCAL program.

**Quote:** "The best part about teaching is the gratification of seeing an apprentice that doesn't know a lot turn around. One day the light clicks on and you think, 'I did that.' It takes something to break down the material so students can understand it. Some people don't do that: they scare them to death but they don't teach."

**Contact:** cmhillyer@comcast.net, 530-693-1056



### Michael Lagrimas

**Subjects Taught:** Basic Electronics; CCTV; Semi-conductors; Nurse Call.

**Bio:** Michael received a bachelor's degree in electronics from Devry Institute of Technology in 1979, and soon after was hired by Intel Corporation as a repair technician. He was transferred to Silicon Valley in 1982 as a lab tech in customer training, also teaching the "Introduction to Microprocessors" course, and later worked as a field engineer. Michael then joined Fisher Berkeley Corporation, a Nurse Call System and Intercom manufacturer, where he offered tech support for 14 years to his customers. Later he moved on and joined Lloyd F. McKinney Associates as a sales engineer, and also taught night school to 3rd year sound and communication's apprentices. Last year, the sound and communications apprenticeship program went to full time day school and Michael became a full time instructor for NORCAL Sound & Communications JATC.

**Quote:** "I have liked to teach since was 11 years old. I taught 7 and 8 year olds how to play football. I had them doing laps, calisthenics, pass routes, running routes... What I like best about teaching here is working with those students that are enthusiastic and want to learn. That's why I am in it to begin with. I enjoy teaching and enjoy these guys."

**Contact:** gattica30@yahoo.com, 530-693-1058



### Ward Reilly

**Subjects Taught:** Fire/Life Safety; Trouble shooting of various systems (data, fire, security, etc.)

**Bio:** Ward began his career in telecommunications in 1994, and joined IBEW Local 332 in 1997. He is a 1999 graduate of the VDV training program. Due to the telecommunications boom at the turn of the century, Ward was asked to help instruct in 2000, and has been teaching since.

**Quote:** "My favorite aspect of teaching is passing what I have learned out in the field to my students, so that they might be able to use it."

**Contact:** kmdreills@yahoo.com, 530-693-1060



### Chuck Vella

**Subjects Taught:** Security; Trouble shooting of various systems (data, fire, security, etc.)

**Bio:** Chuck began working in telecommunications in 1989, first as a cable TV installer. He worked his way up to positions as a service technician and maintenance technician, where he ran multiple end sites. From there, his work with a cable company led him to the Bay Area. A friend saw how Chuck's skills could benefit IBEW, and he joined in 1999.

**Quote:** "I was given the opportunity to teach night classes. From all the feedback I received, I did a fantastic job – and loved teaching from the start. I will teach until they tell me I can't teach anymore. I am definitely in it for the long haul."

**Contact:** chuckvella@sbcglobal.net, 530-693-1059



### Terry Monroe

**Subjects Taught:** All

**Bio:** Terry joined the NORCAL Staff prior to the 2006-2007 school year as an Instructor Assistant/Substitute Teacher. Previously, Terry worked in the field for nine years after completing the apprenticeship program himself.

**Quote:** "I enjoyed being out in the field and being a foreman, and I became involved in teaching so I could invest back into the trade that has provided me a good lifestyle."

**Contact:** tmonroe@att.net, 530-693-1057



**NECA/IBEW  
SOUND AND  
COMMUNICATIONS**

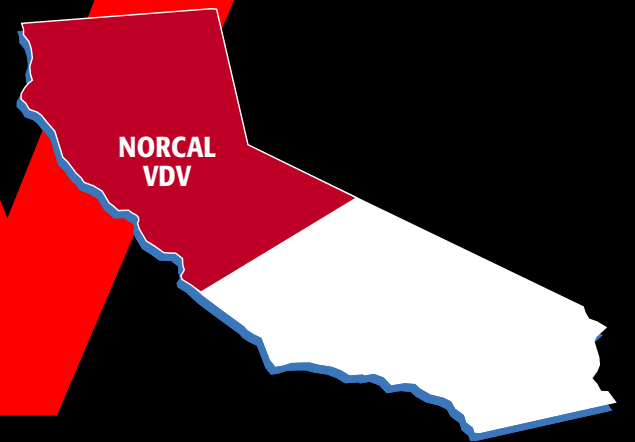
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today AND tomorrow.*

**VOICE  
DATA  
VIDEO**

SOUND AND  
COMMUNICATIONS  
*of Northern California*

DESIGN AND C.A.D. • INSTALLATIONS • INTEGRATION • INSPECTIONS MAINTENANCE • IT CONSULTING • INSTALLATION MANAGEMENT • IT SERVICES • WIRELESS  
SYSTEMS INTEGRATION • FIRE/LIFE/SAFETY SYSTEMS • SECURITY SYSTEMS • AUDIO/VISUAL NETWORK CABLING AND DESIGN • TELEDATA • CCTV/ACCESS CONTROL

**Union Contractors (IBEW/NECA) in Sound & Communications combine a skilled and trained work force with world class technology. For the best installations in voice/data/cabling, network systems, data center facilities, audio/video systems, sound systems, fiber optics, wireless, security systems, fire/life safety systems, and CATV, call a union contractor or visit [www.norcalvdv.org](http://www.norcalvdv.org).**



# norcalvdv.org

## **NORCAL Training**

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management as the major concerns.

### **Leadership**

The NORCAL VDV training program contributes to leadership by emphasizing one-on-one instruction, hands-on labs, and on-the-job-training. "Three things we teach are knowledge, skills, and attitude," says Instructor Chuck Vella. "We like to see our students take it to the next level. They can be installers if they want to be installers, but we want to encourage them to be technician."

### **Project Management**

The training program teaches professional behavior on the worksite. "We want our technicians to act like professionals on the work site," says instructor Michael Lagrimas. "If there is anything I want students to learn from me, it is discipline

and responsibility. Keep a high work ethic, make your work always neat and professional, and that is going to take you far. People will take notice."

### **Safety**

The training program emphasizes the importance of on-the-job safety. Safe job sites save money on general liability insurance, and also reduce claims and liability risks to both clients and contractors. Classes focus heavily on safety training on equipment, i.e., life and boom, CPR, First Aid, OSHA standards, and on-the-job safety awareness.

### **Belonging to the Brotherhood**

With NECA and the IBEW as partners in the training, as well as in the industry, management and labor have a relationship in which they respect each other, and receive mutual benefit. For the apprentice, this means a secure future with a true

living wage.

"Non-union companies don't take care of their workers with benefits," says Josh Ira, an apprentice with Local 617 in San Mateo. "We feel like under the union we are protected. They actually care about us rather than just making top dollar."

The NORCAL VDV training program

provides an optimal blend of post-secondary education and practical work experience. Unlike most college students who must pay for their education and training, apprentices receive wages for the work they complete on the job. They also have the option of receiving credit from a California college for their training.

## **The Northern California JATC Facilities**

**Alameda JATC** (510) 351-5282  
3033 Alvarado St., San Leandro, CA 94577

**San Mateo JATC** (650) 591-5217  
625 Industrial Rd., San Carlos, CA 94070

**Sacramento JATC** (916) 646-6688  
2836 El Centro Rd., Sacramento, CA 95833

**San Francisco JATC** (415) 587-2500  
4056 Mission St., San Francisco, CA 94112

**Santa Clara JATC** (408) 453-1022  
908 Bern Court, San Jose, CA 95112

### **Affiliate Facilities:**

**Fresno JATC** (559) 251-5174  
5420 E. Hedges Ave., Fresno, CA 93727

**Santa Rosa JATC** (707) 523-3837  
1700-F Corby Ave., Santa Rosa, CA 95407



**SOUND AND COMMUNICATIONS**  
*of Northern California*