

August 1989

Spotlight  
on safety

# IT INSTALLER TECHNICIAN

The training and educational magazine for cable television technical personnel.

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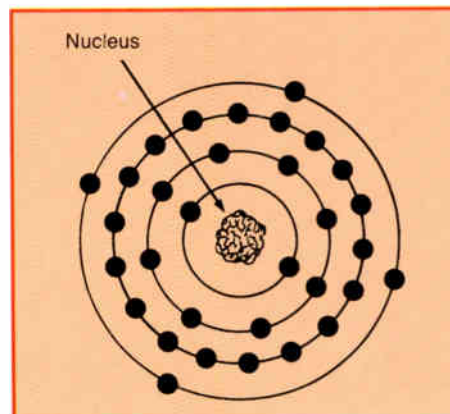
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# Premiering this month ON AN EARTH STATION NEAR YOU! **A SPECIAL SCTE DOUBLE FEATURE!**



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# From the Editor

## Summer in the Rockies

The Colorado Cable Television Association (CCTA) held its annual convention July 19-21 at Marriott's Mark Resort in Vail, Colo. While there wasn't any snow skiing, the scenery was spectacular. (Okay, so I'm a little prejudiced.)

Speaking of spectacular, the seminars and exhibits were also eye-opening. Sessions on topics from signal leakage and microwave to fiber optics and engineering management were well-attended.

### Let the games begin

The SCTE Rocky Mountain Chapter, CCTA, *Communications Technology* and *Installer/Technician* magazines, and the National Cable Television Institute presented the First Annual Cable Games, held July 20 in Vail. The events included Drop Cable Splicing, .500/.750 Cable Splicing, Amplifier Testing and TDR (time domain reflectometer) Fault Identification.

Cable Game participants included employees of Columbine Cablevision, Jones Intercable, United Cable of Colorado and Tele-Communications Inc. The officiating was done by Ted Hartson of Post-Newsweek Cable.

Sponsors of the First Cable Games included Anixter Cable TV, Comm/Scope, Gilbert Engineering, Jones Intercable, TCI, United Artists, Jerrold, Magnavox, Raychem, Scientific-Atlanta and Tektronix. The overall winner of the Cable Games,



Richard Covell judges contestants at the Cable Games in Vail.

Columbine Cablevision, will retain the "Traveling Trophy" until next year's games. Well done, Columbine!

### SCTE-style

I'd like to take a minute to urge the technical cable community to look into the SCTE's Installer Certification Program. The goal of this program is to establish minimum skill requirements for installers and techs working in CATV. Local SCTE chapters and meeting groups, under the guidance and direction of SCTE national headquarters, will conduct the exams.

Those of you applying for certification will be charged a \$25 registration fee. (Considering that's a carton of cigarettes and two six-packs, \$25 is a pretty minimal charge.) There's a lot more technical infor-

mation available from the SCTE. Please call or write them for more information.

### On the serious side

In this issue is an article titled "Midspan ladder safety" by Jones Staff Engineer Pam King (see page 18). King makes us aware of the safety hazards that can be encountered while on a pole by describing a serious accident that occurred in one of Jones' systems on May 9, 1989. In this incident, an installer was whipped off a ladder while performing a midspan extension. He was wearing a hard hat but not a chin strap nor did he have on his safety strap.

As of this writing the injured veteran installer is still in the hospital. Because of extensive injuries, he may have to be treated at a special hospital costing \$700 per day. If he must stay there for the rest of his life, can you imagine the total cost?

Please do not take shortcuts. In the end you will pay for rushing through a job. Wear your hard hat and use the chin strap. Make sure you're using a personal safety strap and be sure the ladder is secured. Being injured is not only inconvenient to you, but to your company as well. The company has a lot of time and money invested in you. Don't throw it away.

*Toni J. Baird*

In the July issue's "Products" section the correct company name for the leakage detector is Trilithic, not Texscan Instruments.



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## AN OPEN LETTER TO THE MSO'S

Dear Mr. MSO:

After having recently returned from both the N.C.T.A. show in Dallas as well as the S.C.T.E. convention in Orlando, I am continually amazed at the number of engineers and construction personnel who are unaware that companies, such as ours, exist to handle their scrap cable and electronics. This is inexcusable particularly in light of the number of years we have been advertising, attending the trade shows and, more importantly, corresponding with the corporate and division offices of all the major MSO's.

Several basic factors contribute to this phenomenon. First, many of you are "decentralized." This usually means that the "buck" for deciding what to do with the scrap gets "passed" down the line to someone at the warehouse level. This brings up the next problem.

Unfortunately, many of the field level personnel who are responsible for the scrap are more likely to be found reading almost anything other than *Communications Technology*, IT, or any of the other trade publications. When the need arises to dispose of wreckout, partial reels of cable or other materials, these guys are naturally unfamiliar with whom to contact in this regard.

More often than not they wind up flipping through the Yellow Pages to find someone who is only going to charge the system to have these items removed. If they're smart they'll take bids on the materials. The problem then arises that the company they chose, based upon the highest bid rather than a check of their references, had either left their yard a mess or not paid for the materials they removed (some of which might not be scrap!).

The principal problem behind this entire issue seems to be that of money. As long as the MSO's are making lots and lots of money, who cares about a few tens of thousands of dollars of lost revenue from scrap...it's figured into the budget as "waste factor" anyway. With all the press that has been given to signal theft of the past few years, it's amazing what is continually overlooked in the field at every cable system everyday! Until individuals such as yourself, who read the trade publications, who do attend the cable shows and who should, therefore, know of the services and companies available, make a point of getting the word out to these guys in the field, you will continue to lose money. Until the corporate offices of the major MSO's, such as yours, take issue with the cable manufacturers' recent decision to discontinue handling recycled reels, your people in the field will continue to use their expensive labor to dismantle reels and then pay dearly to have them hauled to landfill (those that will still take them). Isn't it time to stop losing money, even if it's only a few thousand out of every million you make?!

Sincerely,

Tom Wood  
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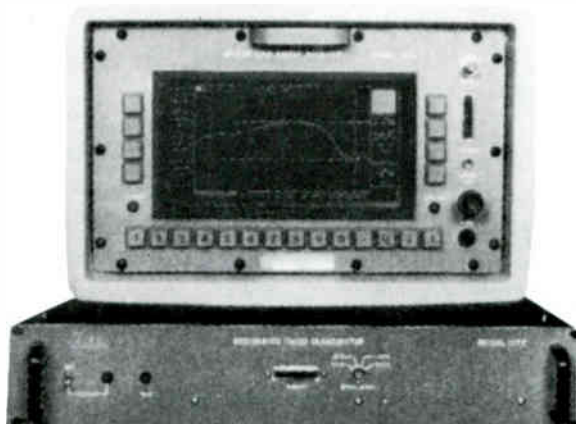
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Reader Service Number 5.

Installer/Technician August 1989

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CALAN's new File Server option expands the receiver's memory to allow the user to label (keyboard entry) and store up to ten system sweep responses. The stored responses can be called up from memory and viewed or can be sent to a printer for a permanent record. This allows the operator to gather response data from several locations using only the CALAN receiver and make permanent records at a more convenient time or location.

File Server also allows the storage of four different reference traces. The CALAN 1776 Receiver uses a normalization technique when displaying frequency response traces. This normalized trace is the difference between the reference trace and the current input response. Having several reference traces available to the technician allows him to measure degradation in response from any of several reference points and is useful when sweeping amplifier cascades. The first reference may be stored at the headend, another reference can be stored at the first amplifier in cascade. A third reference may be stored at the first bridger output, allowing measurement of feeder system response throughout the system. A fourth trace may be used to store the response of an amplifier which has been just aligned.

For more information on the CALAN File Server Memory option or the CALAN 1776/1777 Integrated Sweep System, call 800-544-3392 (in PA 717-828-2356).



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Reader Service Number 6.



## NIST establishes 75 ohm traceability

ORLANDO, Fla.—At its Annual Engineering Conference held here in June, the Society of Cable Television Engineers announced that 75 ohm traceability has been established at the National Institute of Standards and Technology (NIST), formerly the National Bureau of Standards.

"The cable television industry and other users of 75 ohm equipment will benefit from traceability because it defines and sets standards for measurement accuracy," said Ron Hranac, senior staff engineer at Jones Intercable Inc. and immediate past president of the SCTE. "If the cable industry had not undertaken this task, it probably wouldn't have happened." Hranac commended Rex Ickes, lab supervisor at Gilbert Engineering.

Until now, NIST traceability existed primarily only in 50 ohms. Seventy-five ohm traceability will impact manufacturers and users of 75 ohm test equipment, cable, connectors, and active and passive devices. Long-term benefits to the cable industry will include improved transmission performance, especially as high definition television and data transmission become a larger part of the day-to-day operations of cable systems.

This accomplishment began in late 1987 with research conducted by the Na-

tional Cable Television Association's (NCTA) Ad Hoc 75 Ohm Standards Subcommittee chaired by Hranac. The efforts of the NCTA subcommittee indicated that establishing traceability at the then National Bureau of Standards would take five years at a cost of about \$2 million. In 1988 the subcommittee's activities were moved to the Society of Cable Television Engineers' Interface Practices Committee.

Gilbert Engineering, a member of the SCTE Interface Practices Committee and a manufacturer of both cable television coaxial connectors and precision connectors for the metrology element of the U.S. electronics industry, submitted 75 ohm G 900 series product to NIST for certification. Under the direction of Ickes, products manufactured and submitted to NIST included a 30-cm airline, termination and fixed attenuator. These certified components are "secondary standards" that will be referred to in test data supplied with a new 75 ohm standards kit being manufactured by Gilbert.

## Jones activates Cable Area Network

AUGUSTA, Ga.—With the activation of a rebuilt, nine-mile trunk line serving approximately 7,000 customers, Jones Intercable was the first in the CATV industry to deploy a combined FM and AM fiber

technology along with traditional coaxial cable arranged in a Cable Area Network (CAN) architecture as the primary transmission mode to customers.

Initiated in January 1989, the Augusta project is scheduled for completion in the first quarter of 1990 and will involve a total of 17 AM links, six FM links and 1,200 fiber miles. According to Jones, its CAN design significantly reduces the number of trunk amplifiers between the customer and the system's headend at a cost comparable to traditional, coaxial-only designs. It also allows the coaxial cable to be used for usual distribution as well as for immediate backup to the adjacent CAN cell.

## Warner, S-A announce addressable field test

ORLANDO, Fla.—In a special press conference during the Cable-Tec Expo, Warner Cable Communications and Scientific-Atlanta announced that they will be field testing an off-premises addressable system in the MSO's Williamsburg, Va., operation. Warner and S-A selected Williamsburg for its proximity to their respective corporate offices, its high penetration of cable households and ability to isolate a small segment of the system. Approximately 250 households will be involved in the test.

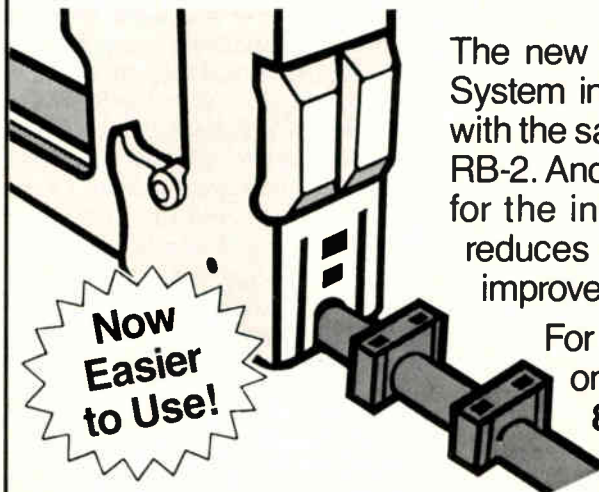
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# You and the SCTE

## Board of directors elects officers for 1989-90 term

The board of directors of the Society of Cable Television Engineers (SCTE) elected the Society's officers for the coming year at its June 14 meeting held in conjunction with Cable-Tec Expo '89 at the Stouffer Orlando Resort in Orlando, Fla. The Society's officers for the 1989-90 term are:

President: Jack Trower  
Eastern Vice President: Victor Gates  
Western Vice President: Richard Covell  
Secretary: Wendell Woody  
Treasurer: Pete Petrovich

The current SCTE board of directors consists of: Region 1 Director Pete Petrovich, Region 2 Director Ron Hranac, Region 3 Director Ted Chesley, Region 4 Director Leslie Read, Region 5 Director Wendell Woody, Region 6 Director Bill Kohrt, Region 7 Director Victor Gates, Region 8 Director Jack Trower, Region 9 Director Jim Farmer, Region 10 Director Wendell Bailey, Region 11 Director Pete Luscombe, Region 12 Director Robert Price, and At-Large Directors Richard Covell, Robert Luff and Dave Willis.

## Cable-Tec Expo '89 draws record attendance

More than 1,500 attendees gathered at the Orange County Convention Center in Orlando, Fla., June 15-18 for the Society of Cable Television Engineers' Cable-Tec Expo '89, the most well-attended and widely acclaimed SCTE expo to date.

The expo began with the Annual Engineering Conference June 15, which consisted of a full day of technical and management papers and panel discussions that were presented to a capacity crowd by many of the industry's engineering leaders. Many important topics currently facing our industry were discussed, including HDTV, fiber optics and the future of the cable television industry. Participants included: Mark Balmes, Southern Bell; Jim Chiddix, ATC; Walt Ciciora, Ph.D., ATC; Scott Esty, Corning Glass; Norman Hurst, David Sarnoff Research Center; Gary Kim, Multichannel News; Wayne Luplow, Zenith Electronics Corp.; Gary Moore, Southern Energy Consultants Ltd.; Steffen Rasmussen, ABL Engineering; and Steve Wilkerson, Florida Cable Television Association.

The Annual Membership Meeting and Luncheon also was held June 15 and featured keynote speaker Paul Weitz, a former space shuttle commander who is currently deputy director of the Johnson Space Center. The awards presented at the luncheon were announced in *IT's* sister publication *Communications Technology in the July Interval*. In addition, CT Publications presented Anna and Bill Riker with a Service in Technology Award in recognition of their significant contributions to the cable television industry's technical community. Also presented at the luncheon was a Special Recognition Award, given to Tom Hall, secretary of the British SCTE, for his contributions to the cable television industry worldwide.

Thursday, June 16 saw the beginning of Expo '89 with the opening of 11 educational workshops that were presented to enthusiastic expo attendees. The workshops and instructors included: "AM Fiber Optic Transmission" with J.R. Anderson and Wes Schick of Anixter Cable TV and Clive Holborow of AT&T Bell Labs; "Data Transmission" with Andy Paff and Don Patton of Anixter Cable TV; "Fiber Optic Test Measurements" with Norman Elsasser of 3M Photodyne Corp. and Todd Jennings of Siecor; and "Installer Certification: Assuring Quality Performance" with Richard Covell of General Instrument/Jerrold Division and Ralph Haimowitz of SCTE.

Other workshops presented at the expo included "Installing Fiber Optic Cable" with Ken Carter of ATC, Larry Nelson of Comm/Scope and Dan Pope of AT&T Bell Laboratories; "Local Origination Equipment and Its Use" with Jay Dorman of MCPS Video Industries Inc. and Lenny Melamedas of UA Columbia Cablevision of New Jersey; "Signal Leakage, CLI and the FCC" with Robert V.C. Dickinson of Dovetail Systems, Brian James of NCTA and John Wong of FCC; "Signal Level Meter Basics and Alternative Measurement Techniques" with Ron Hranac of Jones Intercable and Steve Windle of Wavetek; and "Supervisory and Management Skills" with Dr. Bill Brown of Rollins University.

Two workshops were offered as special one-day, four-hour sessions. "Remote Automated System Testing" was presented Friday, June 16 by Jim Haworth of ATC, Dwayne Lipp of Superior Electronics and Jay Staiger of Magnavox CATV Sys-

**"Overall, the expo was a resounding success that generated a very positive response."**

tems. John Cecil of Hewlett-Packard presented "Basic Spectrum Analyzer Theory and Operation" on Saturday, June 17.

Over 140 industry companies were on hand at the expo's sold out exhibit floor, which opened Friday, June 16 at the Orange County Convention Center. An exhibitor training center allowed companies to offer formal presentations of their products and related technologies. Among the companies that took part in such presentations were Anixter, Cable Connector Corp. of America, CT Publications Corp., Kalun, Loctite Corp., Long Systems, Riser-Bond and Trilithic.

Friday's Expo Evening was a resounding success, with more than 1,200 attendees converging at Sea World to enjoy a barbecue buffet and a wide variety of Sea World events in celebration of the 20th anniversary of SCTE, which was formed in 1969.

Saturday, June 17 saw the conclusion of both the workshops and the exhibit floor, but Expo '89 was far from finished. Tours of the master headend, system office and local fiber plant of ATC's Cablevision of Central Florida were taken by attendees on the following day, June 18.

Additionally, over 150 attendees participated in the BCT/E Certification Program testing session also held June 18. Most participants took tests in at least two categories, with some taking on three or more during the 4½-hour session. Sunday's testing session also saw the administration of exams in the Society's new Installer Certification Program for the first time.

Overall, the expo was a resounding success that generated very positive response, as well as a great deal of enthusiasm among both attendees and exhibitors for Cable-Tec Expo '90, to be held June 20-24 in Nashville, Tenn.

## SCTE chapters and meeting groups

As a service to SCTE members, the following is an up-to-date listing of the

Society chapters and meeting groups, with each group's contact person and phone number. Members should take this opportunity to join a local group.

For more information on becoming a member, contact Pat Zelenka at the SCTE national headquarters, (215) 363-6888.

**Appalachian Mid-Atlantic Chapter**

Contact: Richard Ginter, (814) 672-5393

**Cactus Chapter**

Contact: Harold Mackey, (602) 866-0072

**Caribbean Area Chapter**

Contact: Jerry Fitz, (809) 766-0909

**Cascade Range Chapter**

Contact: Norrie Bush, (206) 254-3228

**Central Illinois Chapter**

Contact: Tony Lasher, (217) 784-5518

**Central Indiana Chapter**

Contact: Joe Shanks, (317) 649-0407

**Chattahoochee Chapter**

Contact: Jack Connolly, (912) 741-5068

**Chesapeake Chapter**

Contact: Thomas Gorman, (301) 252-1012

**Delaware Valley Chapter**

Contact: Diana Riley, (717) 764-1436

**Florida Chapter**

Contact: Rick Scheller, (305) 753-0100

**Gateway Chapter**

Contact: Darrell Diel, (314) 576-4446

**Golden Gate Chapter**

Contact: John Parker, (408) 437-7600

**Great Lakes Chapter**

Contact: Daniel Leith, (313) 549-8288

**Greater Chicago Chapter**

Contact: Joe Thomas, (312) 362-6110

**Heart of America Chapter**

Contact: Nathan Brewster, (816) 795-1100

**Hudson Valley Chapter**

Contact: Wayne Davis, (518) 587-7993;

or Bob Price, (518) 382-8000

**Inland Empire Chapter**

Contact: Michael Lajko, (208) 263-4070

**Iowa Heartland Chapter**

Contact: Dan Passick, (515) 266-2979

**Michiana Chapter**

Contact: Thomas White, (219) 259-8015

**Miss/Lou Chapter**

Contact: Rick Jubeck, (601) 992-3377

**Mt. Rainier Chapter**

Contact: Sally Kinsman, (206) 867-1433

**New England Chapter**

Contact: Bill Riley, (617) 472-1231

**North Central Texas Chapter**

Contact: Vern Kahler, (817) 265-7766

**North Country Chapter**

Contact: Doug Ceballos, (612) 522-5200

**North Jersey Chapter**

Contact: Art Muschler, (201) 672-1397

**Ohio Valley Chapter**

Contact: Robert Heim, (419) 627-0800

**Oklahoma Chapter**

Contact: Gary Beikman, (405) 842-2405

**Old Dominion Chapter**

Contact: Margaret Harvey, (703) 238-3400

**Piedmont Chapter**

Contact: Rick Hollowell, (919) 968-4661

**Razorback Chapter**

Contact: Jim Dickerson, (501) 777-4684

**Rocky Mountain Chapter**

Contact: Rikki Lee, (303) 792-0023

**Southern California Chapter**

Contact: Tom Colegrove, (805) 251-8054

**Tennessee Chapter**

Contact: Larry Warren, (901) 352-7650

**Tip-O-Tex Chapter**

Contact: Arnold Cisneros, (512) 425-7880

**Upstate New York Chapter**

Contact: Ed Pickett, (716) 325-1111

**Big Country Meeting Group**

Contact: Albert Scarborough, (915) 698-3585

**Big Sky Meeting Group**

Contact: Marla DeShaw, (406) 632-4200

**Bonneville Meeting Group**

Contact: Roger Peterson, (801) 486-3036

**Central California Meeting Group**

Contact: Andrew Valles, (209) 453-7791

**Chaparral Meeting Group**

Contact: Bill Simons, (505) 988-9841

**Dairyland Meeting Group**

Contact: Jeff Spence, (414) 738-3180

**Dakota Territories Meeting Group**

Contact: A.J. VandeKamp, (605) 339-3339

**Dixie Meeting Group**

Contact: Greg Harden, (205) 582-6333

**Great Plains Meeting Group**

Contact: Jennifer Hays, (402) 333-6484

**Hawaiian Island Meeting Group**

Contact: Howard Feig, (808) 242-7257

**Midlands Cable Training Association**

Contact: John Page, (712) 323-0420

**New York City Meeting Group**

Contact: Andrew Skop, (201) 328-0980

**Palmetto Meeting Group**

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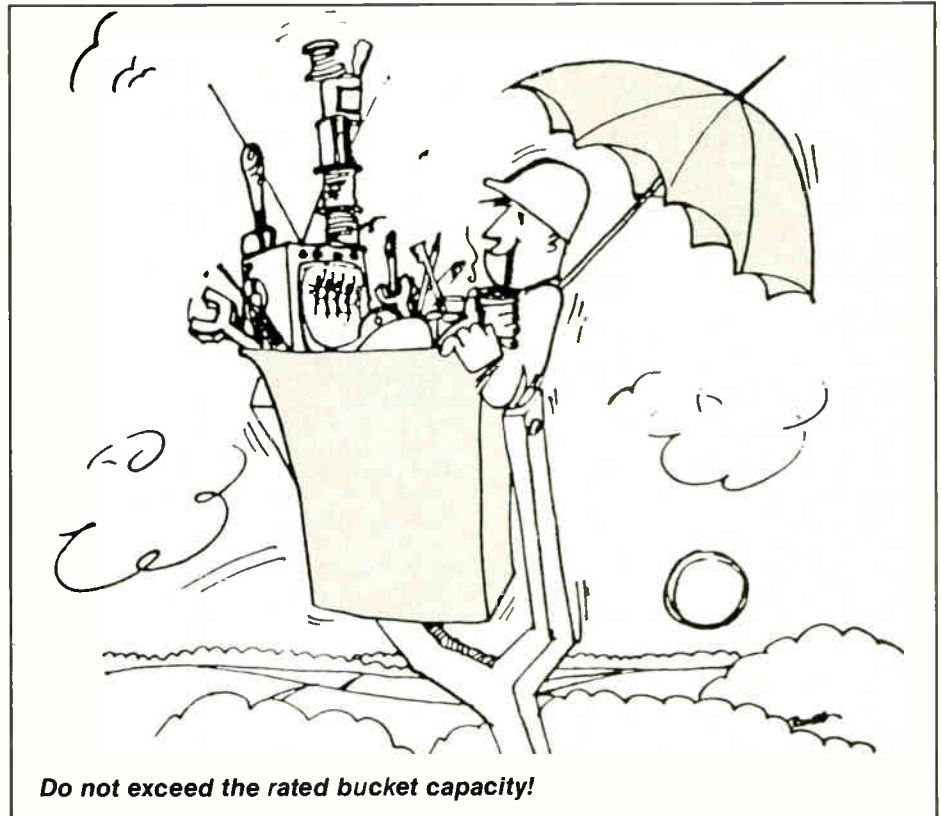
# Bucket truck safety

By Alan M. Babcock

Technical Training Manager  
Warner Cable Communications

*You must not operate this machine unless you are qualified by training and experience in its safe operation. Training includes complete knowledge of your employer's work rules, all government regulations and (the) operator's manual. Untrained or careless operators subject themselves and others to death or serious injury.*

Many cable systems and construction companies employ the use of bucket lift trucks. Use of these vehicles simplifies many tasks, including sweeping, construction, installation/maintenance of power supplies, pole change-outs, etc. Use of bucket trucks not only simplifies these tasks but makes the performance of them inherently safer if the operator is instructed in and observes the proper safe practices. Because these lift devices are very easy to operate, individuals often become complacent in their compliance



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and observation of required safety precautions.

Safety checklists should not stop with the lift/bucket. The vehicle that the device is attached to also must be maintained properly. The additional weight of a bucket installed on a truck can cause certain items such as tires and suspension components to wear out more rapidly than normally expected. Long periods of idling also can be hard on engines. Keep a regular maintenance schedule for the vehicle as well as the lift. (See accompanying table.)

### Safe operation

There are many rules and precautions that should be observed when operating a bucket truck. Here are some highlights:

- Engage the stabilizers (if so equipped) before extending boom.
- Check the tire pressure before operating.
- Set the parking brake and chock the wheels. (If chocking only one side of the vehicle, set chocks on side to which boom will be extended.)

***"Because these lift devices are very easy to operate, individuals often become complacent in their compliance and observation of required safety precautions."***

- Watch the boom to assure clearance of trees and other obstructions.
- Always wear a safety belt and hard hat.
- Store the boom before moving the truck (unless specifically designed for movement with boom extended).
- Do not exceed the rated capacity of the bucket.
- Don't park the truck on more than a 5° incline.
- Watch out for overhead lines (especially power).
- Don't use the lift as a crane.
- Stand only on the floor of the bucket; don't attempt to extend your reach by

## Maintenance schedule

### Weekly checks

- 1) Hydraulic oil level
- 2) Battery condition
- 3) Fan belt pump
- 4) Rotation chain
- 5) Bolt tightness
- 6) Stabilizers
- 7) Proper operations

### Monthly checks

- 1) Structural
- 2) Telescoping bearings
- 3) Clean telescoping boom
- 4) Rust
- 5) Hoses and wiring
- 6) Bucket override and rotation limit
- 7) Holding valves
- 8) Interior of boom
- 9) Hydraulic leveling
- 10) Decals

### Two months

- 1) Lubricate
- 2) Check gearbox oil level

### Six months

- 1) Change hydraulic filter
- 2) Inspect hydraulic oil
- 3) Check valve pressure settings

(From Versalift Operators Manual, Time Manufacturing Co.)

using ladders or standing on the side of the bucket.

- Don't climb out of the raised bucket onto poles.

These are not all of the safety precautions that need to be observed when operating a bucket truck. Use of common sense is one of your best allies in avoiding potential injuries.

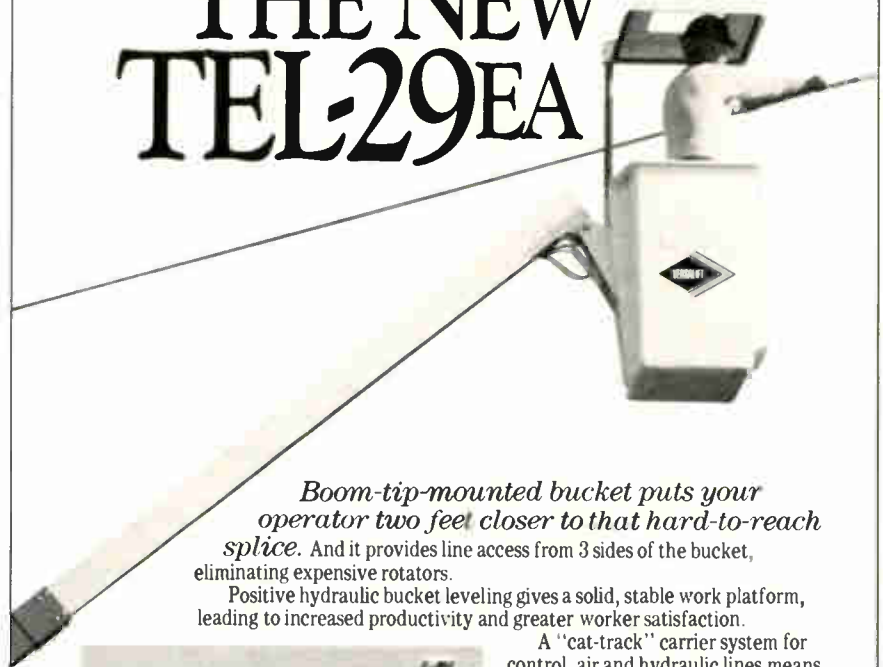
Become familiar with the operation of your bucket truck. Read the operator's manual every few weeks to make sure you don't forget how to use the features that were designed into the unit for your safety. Use of a bucket truck can make many jobs easier and safer only if you, the operator, are concerned enough about the safety of yourself and others to observe the guidelines for safe operation. ■

## Reference

Versalift Operator's Manual, Time Manufacturing Co.

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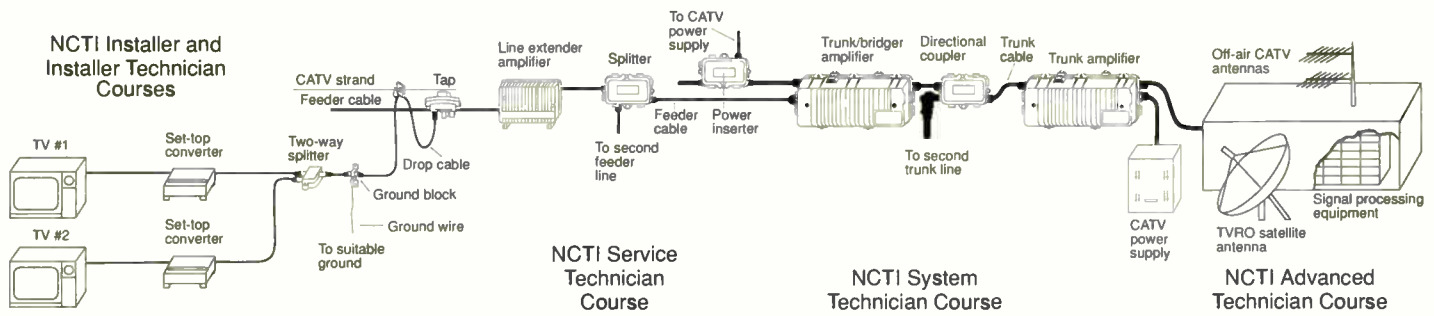
T E L - 2 9 E A

# VERSALIFT

Reader Service Number 11.

Installer/Technician August 1989 15

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IT 8/89

# Safety in the great outdoors

By Ronald W. Wolfe  
Manager, ATC Training Center

Safety training is often as neglected as it is important. The temptation to get a new employee into the field in a productive capacity is quite compelling, as is the temptation to assume that safety training does not require repetition. In fact, safety training has often been entirely ignored in some instances, and common sense and instinct are the only forces working to prevent accidents and injuries.

Accidents at and away from the workplace cost the CATV industry millions of dollars each year and in many cases can be prevented through training and awareness. It is imperative that we make safety training a normal part of our business for our field and office employees.

The ideal safety program covers all possibly dangerous situations, and provides an absolute means to avoid any and all accidents and injuries. This is, of course, not possible in an imperfect world, nor is it practical to attempt to train for all possible circumstances. The balanced safety program should concentrate on those areas where the greatest positive impact can be made given the available resources.

## Costs and benefits

Given the aforementioned realities, it sometimes becomes necessary to forego training in certain areas where the potential return on the educational resources invested is low. One of these areas is environmental hazards. Environmental hazards can be defined as all situations where individuals may be affected by environmental circumstances that are beyond their control. This can be a very broad category and cannot possibly be dealt with thoroughly in a single article. Let us then concentrate on a single portion of the environment and its potential effects on the employee.

If you live in almost any part of this country, you have probably heard of a favorite local saying that goes "If you don't like the weather, just wait a minute." I have seen times when it was sunny and in the 70s one day, only to snow the next. We ask our technical and installation staff to spend a majority of their working hours outside, yet we provide them with little training on the hazards they may encounter.

Any severe condition caused by exposure to environmental extremes should be treated by a medical professional. While first aid is often adequate, it should

be considered only a preliminary treatment, as the "first" in first aid implies.

## Cold as ice

Freezing temperatures are possible in a vast majority of the nation. When temperatures dip below 0° F, human skin can freeze in a matter of a few minutes. If your technical staff is working in the field when temperatures are this cold, you should make a point to determine that each of your employees has the necessary protective equipment in their vehicles prior to leaving the office.

**Frostbite:** This is the most common injury related to exposure to cold temperatures, occurring when ice crystals form in body tissues. Indications include a change of color in the skin of the affected area that could be from white or grayish to a gray/blue depending on the severity of the condition.

To treat frostbite, get the victim to a warm place and put the frozen areas in warm water (100-105° F). Don't use hot water! Bandage the areas loosely and don't rub or massage the affected areas.

**Hypothermia:** Symptoms of hypothermia include dizziness, confusion, weakness, impaired judgement and vision, and drowsiness.

To treat this condition, get the victim to a warm place as soon as possible and call for qualified assistance. Warm the victim slowly, without rubbing or massaging, and get him into warm, dry clothing. Do not give the victim anything to eat or drink, and monitor vital signs.

## Hot as Hades

**Heat exhaustion:** This condition generally occurs when employees perform physical activities where temperatures exceed 90° F and can be quite dangerous given the fact that much of our work involves situations that are potentially hazardous. If an employee passes out due to heat exhaustion while attempting to climb a pole, the results could be disastrous.

Once again, the prevention for this condition is an awareness of the circumstances. Be sure that your staff is aware of the potential danger. Symptoms of heat exhaustion can include heavy sweating, headache, dizziness, dilated pupils and nausea. The skin of a heat exhaustion victim is generally cool, pale and moist.

To treat heat exhaustion, get the victim to a cool place and watch for signs of shock. Place the victim on his back with



the feet slightly elevated. Use cold packs or wet cloths to cool the victim, and give him a small glass of water about every 15 minutes.

**Heatstroke:** This is a much more serious condition also caused by exposure to high temperatures and it can be life threatening. The victim's skin will be reddish and very warm. The pupils are usually small.

To treat this condition, it is necessary to get the victim out of the heat quickly. Call for medical assistance and cool the victim more quickly than in the case of heat exhaustion by immersion in a cool bath, or the use of moistened cloths. Watch closely for signs of shock as this is quite possible in the case of heatstroke.

**Sunburn:** As the name implies, sunburn is a type of burn caused by prolonged exposure to ultraviolet (UV) radiation, generally from the sun. Indications include red skin and severe pain in extreme cases.

In the case of sunburn, prevention is the key and you should be careful to use a sunscreen prior to exposure, especially at higher altitudes where there is less atmospheric diffusion and absorption of UV rays. The sunburn victim should get out of the sun and medical assistance should be obtained in severe cases. The burning sensation usually can be relieved by using various ointments and limiting exposure of the affected areas to air.

This article covers only the most common weather-related injuries and should not be considered a substitute for a good safety and first aid program. Although the treatments and indications presented in this article are generally accepted practice, the author assumes no liability for information presented. ■

## Sources

American Red Cross Standard First Aid Workbook  
SCTE First Aid Manual

# Midspan ladder safety

By Pam King

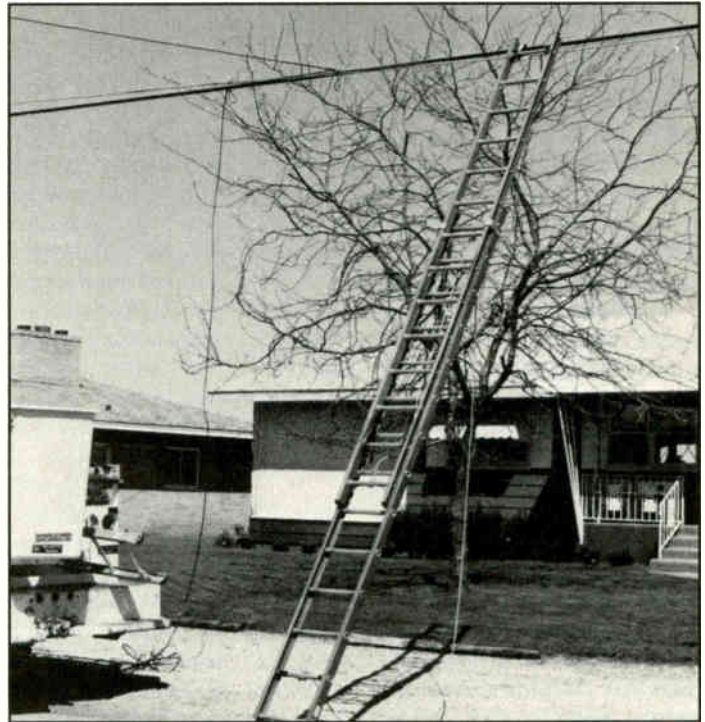
Staff Engineer/Training, Jones Intercable Inc.

On May 9, 1989, a serious accident occurred in one of Jones Intercable's systems. An installer was replacing a midspan drop that crossed a residential street. His ladder was placed on the drop side of the span clamp. He then cut the midspan drop while it was still under tension. His ladder was hooked over the strand but not secured with a safety strap. Also, he was holding the end of the drop that crossed over the street so as to prevent the drop from falling on a parked car.

As a result, when the drop was cut the ladder pitched forward and the drop pulled his arm in the opposite direction. Since the installer was not using a personal safety strap, he was thrown off the ladder and fell to the ground, severely striking his head on the concrete street. Another installer was assisting him at the time of the incident and immediately attended to him.

As of this writing in July, the injured installer is still in the hospital. The long term effects are not known. The doctors say that the only thing that can be done at this time is to "wait and see." They won't really know what his prognosis will be for a year or longer. There are still days when this installer doesn't recognize his family and friends. By the way, this is a veteran installer, not a new installer.

The purpose of this article is twofold: first of all, to describe what to do in the case of a midspan attachment, and second the importance of ongoing safety training meetings and reviews.



A ladder leaning against the strand at the accident scene.

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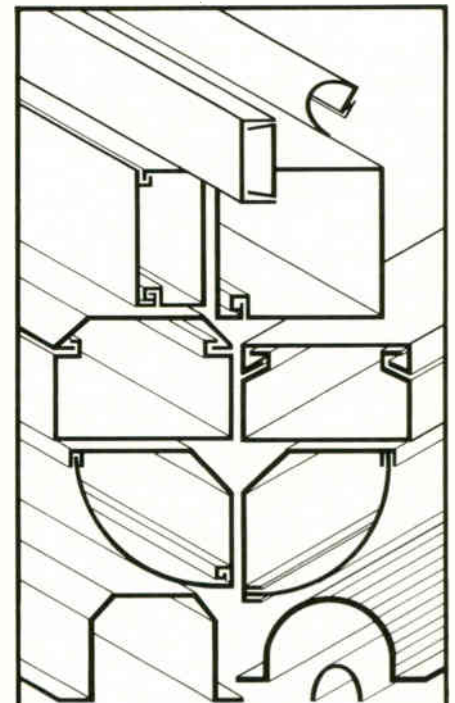


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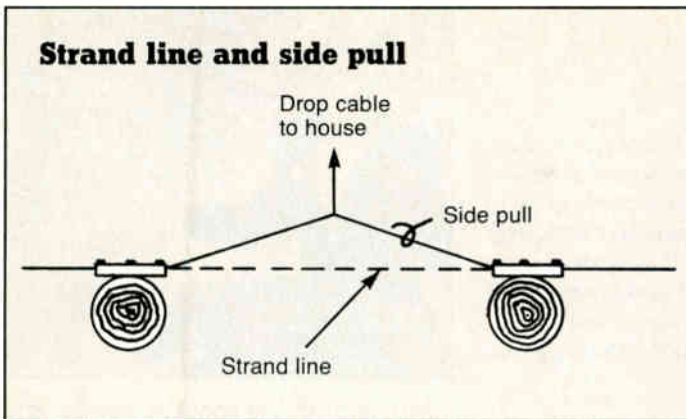
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### Points to remember

Some installer training programs that have been recently reviewed make general recommendations regarding the cutting of a drop at midspan. However, it was very disheartening to discover that very little, and in most cases nothing at all, has been written on this subject. The following specific points need to be understood by all employees who use ladders:

- Most importantly, the installer needs to examine the drop cable and relieve any tension. It is recommended that the installer first cut or loosen the drop at the house on the strand side of the P hook whenever possible.

- When at the midspan, the installer should make absolutely sure that the ladder is properly placed against the strand and the strand hooks are securely engaged before climbing.

- Wearing a hard hat should be mandatory when working from ladders. In the situation described here, the hard hat may have fallen off and would be of little use. The use of a chin strap to hold the hard hat in place is recommended.

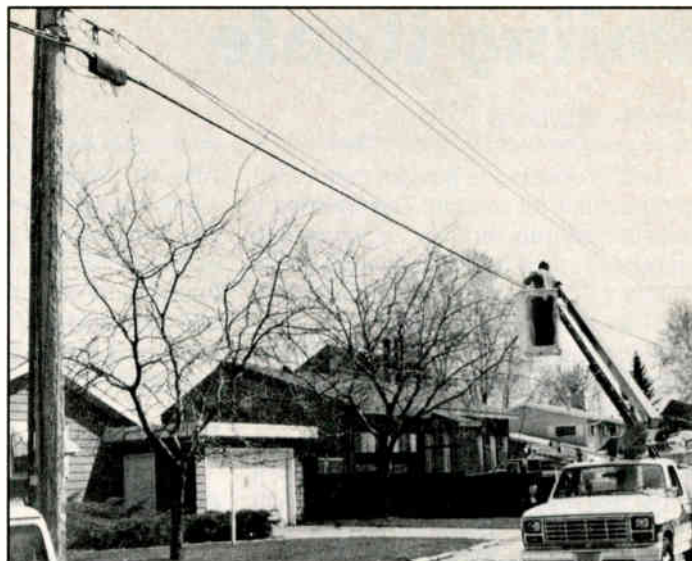
- It is particularly important when working at midspan that the climbers wear a safety belt and immediately secure both themselves *and* the ladder to the strand with the safety strap.

- The installer should *always* be prepared for a lateral whipping motion when working at midspan. A car hitting a pole a mile away or a falling tree limb can cause violent strand reaction without warning. It is recommended that the ladder be placed on the strand opposite the drop. However, this does not guarantee that the strand (and the installer) will not be whipped should a sudden release of tension occur.

- If a drop must be cut at midspan (e.g., when the drop crosses a busy street and cutting the drop at the house would cause an obstruction to passing vehicles) the climber should look at the strand line before cutting the drop. This way the climber can determine if the strand is being pulled out of lateral by drop tension (Figure 1). The amount of side pull will directly affect the amount of whip action the climber should expect if the drop is cut and suddenly released. If this side pull is obvious and excessive, the installer should call his supervisor and request that a bucket truck be provided.

### Healthy fear

As mentioned previously, this was an experienced installer. All too often the initial "healthy respect and fear" in regards to safety is lost after the job has been done routinely for a period of time. Most of us remember what it was like when we first began a new job or project. Safety is the foremost thought in the mind. There is a conscious effort to perform the job in the safest manner possible. After performing the job for a period of time, especially if no mishaps occur, this original attitude is replaced with one of not necessarily carelessness, but the in-



**A bucket truck should be used if there is excessive side pull on the drop.**

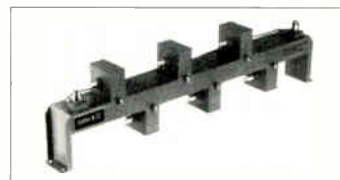
itial respect is gone. It only takes one second for a negligent move to become a disaster.

Maintaining a healthy respect for safety in all situations is necessary when performing an installation. This *must* be emphasized in the system safety meetings. All installers and technicians who climb need to be properly trained and aware of climbing procedures and risks. The responsibility of following safety requirements rests primarily with the climber. We all need to work hard to avoid accidents. ■

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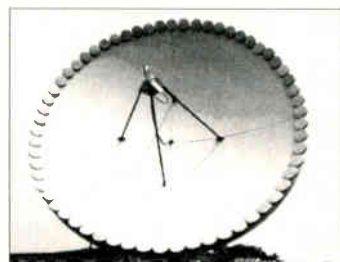
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Reader Service Number 15.

# Poling it safe

By Mike Mayberry

Construction Coordinator, Continental Cablevision

Getting dressed to go up a pole is like getting ready for combat. The necessary evils of the job require an inordinate amount of equipment suited to the cable lineman. From bottom to top it is amazing what an installer must wear to be adequately prepared: From the twisted shank climbing gaffs to the climbing pads and straps. Up to the utility belts, waist belt supports and nylon safety straps. Now on to installer pockets and pouches, to glove bags, tool buckets and utility bags. And let's not forget protector gloves and 16-inch high linemans' boots.

Now that you are dressed, let's add those ever important accessories—diagonal cutting pliers, long nose pliers, lineman's wrench, adjustable wrenches, awls, screwdrivers and nut-drivers. Then there are 3-pound sledge hammers, pump pliers, electricians' knives, splicing equipment, and brace and bit. And to top it all off, add a safety hard hat in the ever-popular white. For that leather and chain look, let's throw in a chain hoist. Well, you have probably gained about 30 pounds minimum. Feel a little heavy?

Yes, going up a pole is one place that clothes (equipment) do make the man. It's quite extraordinary how people can get used to most anything, like the unnatural act of climbing up a piece of wood over 50 feet tall with a circumference of 40½ inches. To top it off, you have high voltage lines 40 inches from your head. Not much there to inspire confidence!

However, your equipment and your ability, provided they are both of high grade quality, should be enough to get you there and back, which, besides the completion of the job, is the main objective. Your equipment, in whatever form, is necessary for your job and your survival. And from that point of view, only the best is good enough. It is important that the equipment used meets or exceeds the established standards (OSHA 1910.268) for telecommunications linemen.

It has been my experience for the most part that linemen cut corners more than companies. It's usually something to cut the weight down or time off the job, but with these shortcuts you're really cheating yourself! And isn't that the ultimate insult? You are, after all, the most important piece of equipment you own and the least replaceable. If you as a lineman are comfortable in your work and ability, part of the reason is your equipment. I'm sure that

most cable companies feel the same way. After all, the cost of a good set of hooks, a belt and tools are a reasonable price to pay for above average skill and work. The finished product is only as good as the implements behind it. The workers, tools and climbing equipment involved have to determine the end result, which should always be a good job!

## Do the pieces fit?

Linemen are a puzzle, literally. Without everything that is required for a particular CATV job, you cannot have a completed product. One missing part makes it a puzzle. When everything is completed you have a picture. The picture doesn't have to be fancy, but it should be perfect. On a day-to-day basis, nothing is as necessary as a lineman and the tools of his trade.

To the cable company, the lineman should be looked at as the single most important piece of equipment in CATV's arsenal to better serve the customer. A periodic check of linemen and their equipment should also be a constant preliminary step for both the cable company and its workers. Wear and tear, plus complacency take their toll on both man and machinery, along with productivity. W.M. Bashlin Co., a maker of lineman equipment notes that "If the condition of any equipment is questionable, it should not be used." They go on to say that "No equipment lasts indefinitely. Doubtful safety items should be discarded before any possibility of failure."

Gaffs have a tolerance, at which point they are sharp and straps must not be too well-worn or frayed. Belts must maintain a rigid form, and safety belts and D rings have to be secured. Hard hats cannot be cracked. Lineman boots, soles and heels must be maintained. W.M. Bashlin Co. states that "The estimated life of most equipment such as belts, lanyards, etc., is from five to 10 years from the date of manufacture." Hand tools must be kept clean. It is both boring and tedious. It also is necessary.

So many things can go wrong due to simple neglect of your equipment. Hooks (gaffs) not properly sharpened can cause your descent down a pole to be quicker than anticipated. Ankle or gaff pad straps that are frayed can break at an unforgiving time while up a pole. Safety belts wearing thin or problems hooking onto a D ring can cause serious injury. I'm sure everyone



who climbs thinks about accidents, and the pitfalls are there. Just about the easiest way to avoid problems is through the proper care of your climbing equipment and tools. Nobody can take better care of you than you.

Tools can cause problems when maintenance is ignored. For instance, a neglected chain hoist can be a serious accident waiting to happen. If the grip or chain slip and you're trying to maintain a 300-foot span, you could be looking at your cable on the ground or wearing a chain hoist in your face. There are enough problems and dangerous items encountered while up a pole without the cable lineman adding to them.

Failure to pay attention to the equipment you carry up a pole can affect your job performance. I saw a lineman catch his meter strap on a "grunt peg" and it almost pulled him off the pole. By not noticing how the strap hung as he climbed the pole, he almost injured himself.

As most CATV linemen know, when power drills and bucket trucks are not available or appropriate, hooks, and a brace and bit are usually the answer. I'm aware of an instance where a bit damaged a pole mounted terminal, which in turn obstructed the lineman's climbing path. Every item that you bring up the pole is a potential ingredient for danger. Keeping track of your job location, your equipment and yourself is of paramount importance when climbing. I'm not trying to frighten anyone, but problems do exist and it would be unwise to ignore them.

Another instance of something simple causing accidents involves the lineman's hard hat. I saw a lineman with his hard hat improperly adjusted on his helmet suspension. While climbing, it moved enough to obscure his vision. He ran into overhead equipment and the consequences were almost fatal.

We can all tell war stories, but some do have an important moral. A dangerous situation can be diffused simply by being aware and using the proper equipment in a professional manner. ■

# Safety: Bring it on home

By Doug Ceballos

Systems Standards Technician, Paragon Minneapolis

A day in the life of an installer/technician is filled with many interesting situations that require safety awareness. Safety awareness is a state of mind that should be constantly exercised to assure you get a job done both efficiently and safely. Proper equipment and safe procedures will ensure a job well done. When you finish your day, safe and sound, you hang up your hard hat and climbers; put away your cones, safety glasses, and gloves; secure your ladder; check your drill; and lock up the truck. The question is, do you also lock up your safety awareness?

There are many aspects of the technician's work that can be related to home life. It is the fast lane of life that many of you are in. You're in a hurry to go places and get things done and your free time is precious to you. To make sure that you are around to enjoy your free time and work, you need to remember the following important items.

## Vehicle safety

Your work vehicle and personal vehicle are a reflection of you and your attitude. Are they clean and in good working condition, or do you just let them go until they break down?

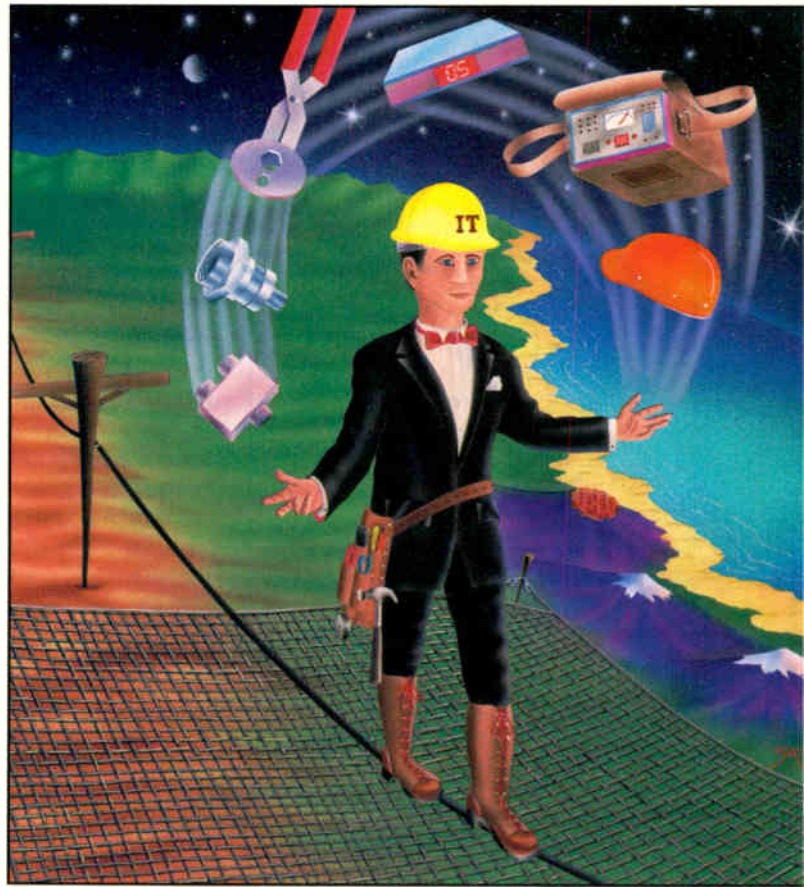
Before you start out to get in your personal vehicle, do you take the time to walk around the car/truck and make sure there is nothing in the way such as a toy, animal or child? Do you drive defensively or offensively? Are you all buckled in and do the children have the proper restraints? Is the vehicle checked out prior to operation (tires, oil, transmission fluid, etc.)? How about drinking and driving, or other chemical abuse? You aren't allowed to drive at work under the influence, so why is it okay to drive home from parties and get together in this state? The danger is just as great. Awareness should extend into your personal life as well as your work life.

## Construction

You need all of your abilities and safety equipment to do an excellent and safe job while working. While drilling, safety glasses are used, hard hat worn, equipment checked out and, most importantly, the right tools used for the required work.

While you are working around the home (i.e., putting up a garage, shed, addition), are you following the same safe practices? Are safety glasses worn when using drills, circular saws, table saws, or when hammering nails? (They also come in handy when working under cars.) Are you wearing work boots or tennis shoes? Construction sites still have hazards even if you are the only one working on a project. Do you put the tools and equipment away or do you leave it until you can return?

Ladders should come under scrutiny when working around the home. Have they been checked out lately? The proper size and type should be used. Don't take chances with ladders. Over-reaching, exceeding weight capacity and bouncing the ladder while you're on it may seem funny in movies like *Animal House*, but you would never want to hit the ground from even six feet up. Last but not least, ladders should never be left upright and unattended where small children (yours or someone else's)



could climb up and fall off.

Are there any chemical compounds that need to be put away and out of the reach of children? Responsibilities on and off the job are still the same.

## Safety meetings

One of the most effective ways to communicate job safety awareness is through training and short safety meetings. Who is to say you can't have safety meetings with your family? I can't think of a better opportunity to show your family you care than to show them the proper use of fire extinguishers, fire drills, emergency procedures, emergency numbers, first aid and CPR, severe weather procedures, emergency exits from the house, where emergency supplies are, and close neighbors they can call for help. These can be held on a monthly basis to keep them short, informative and fun.

Safety awareness is something that you need to practice all the time. It is an attitude adjustment you need to make in order for your daily life to change for the better. Awareness is contagious. By setting an example, others will eventually fall into the same way of thinking, which is important to both your fellow employees and your family. The more people you can get involved, the closer you can get to having an accident-free environment. After you achieve this, you can get down to the best part of all—enjoying your life, family, work and home. ■

# Basic electronics theory

This is Part XVI of a series about basic electrical and electronic principles, designed for the individual with little or no training in either electricity or electronics.

By Kenneth T. Deschler  
Cable Correspondence Courses

This month we will begin a study of some of the various solid-state devices that are used in modern electronic equipment. In this lesson we will look at the structure of semiconductor materials as well as the properties of P-N junctions. Semiconductors exhibit characteristics that fall between those of insulators and conductors. The most common material used in the manufacture of solid-state devices is silicon.

## Semiconductor physics

In previous lessons we found that all matter was classified as being either a gas, a liquid or a solid. We also found that matter was composed of atoms, which themselves were made up of electrons, protons and neutrons. Looking at Figure 1 we can see a representation of an atom showing the negatively charged electrons orbiting a central mass, called the nucleus, consisting of neutrons having no charge and protons having positive charges. The outermost ring, or band, of an atom is called the *valence band* and in the case of silicon can hold up to eight electrons.

Silicon atoms have the ability to share their valence electrons with neighboring silicon atoms to form a crystal lattice structure. This sharing of electrons is known as *co-valent bonding*. Figure 2 shows co-valent bonding between atoms with the atom in the center appearing to have eight electrons in its valence band. Another way to show co-valent bonding between silicon atoms is represented by Figure 3 where the bonded pairs are enclosed. In this type of drawing only the nucleus and valence

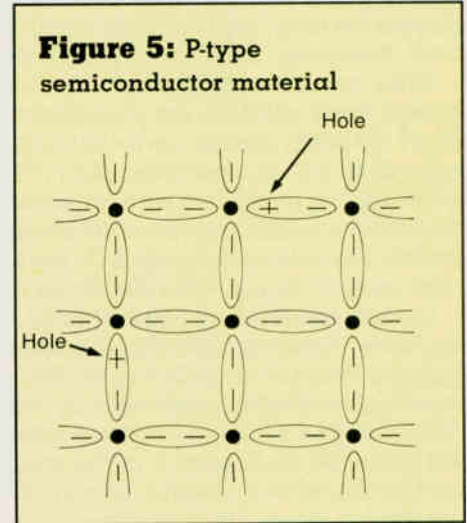
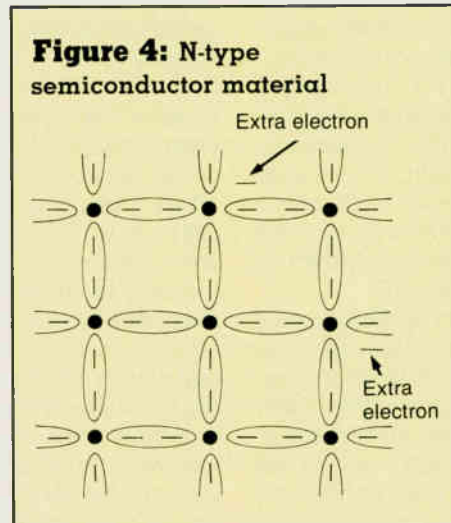
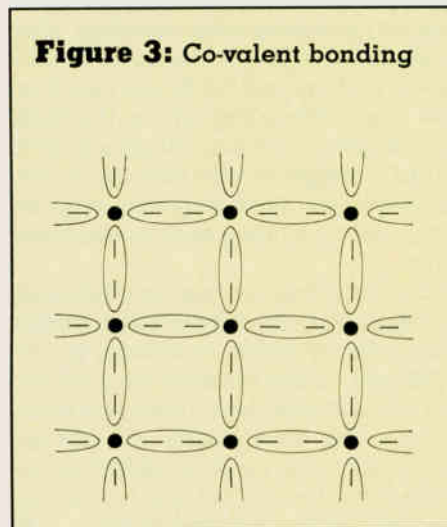
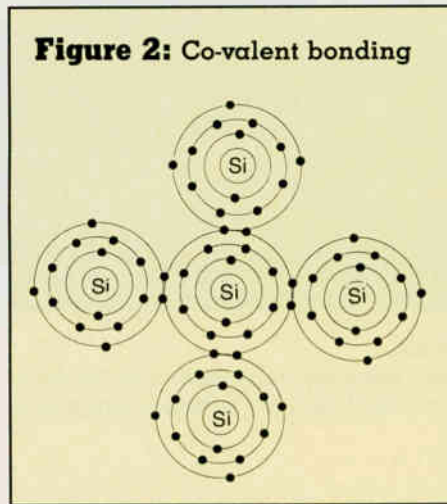
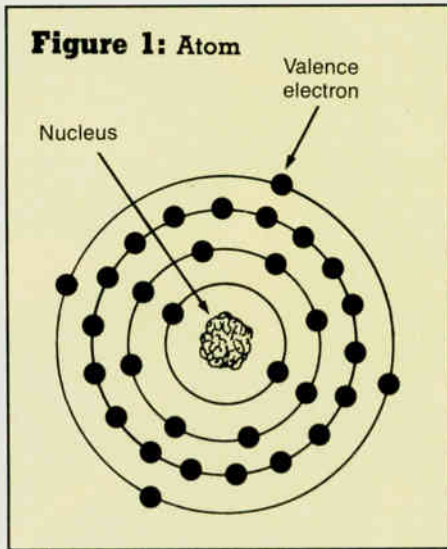
band is shown.

In order for pure silicon to have the desired characteristics necessary for use in solid-state devices, impurities must first be added. The addition of impurities to pure silicon is known as *doping*. Doping is done in order to create two different types of semiconductors, one with an excess of electrons and the other with a deficiency.

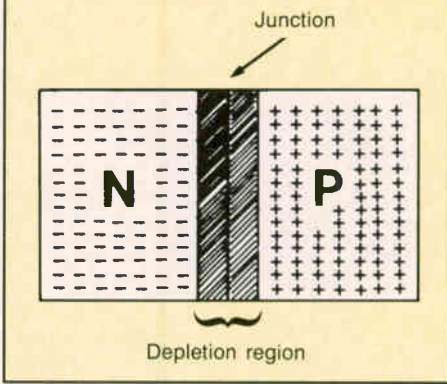
To create a semiconductor material with an excess of electrons, an impurity with five electrons in its valence band is introduced into molten silicon. When solidified, the silicon forms co-valent bonds with four of the impurity atom's electrons. This leaves one electron without a bond. Typical *pentavalent atoms* (five electrons in the valence band) are arsenic, phosphorus and bismuth. Silicon containing pentavalent (donor) atoms is known as N-type semiconductor material.

Conversely, when *trivalent atoms* (three electrons in the valence band) such as aluminum, gallium or boron are introduced into pure silicon, a P-type semiconductor material is created. Trivalent atoms also are known as acceptor atoms. When co-valent bonding occurs, one of the silicon electrons cannot bond, thus leaving a "hole" where a bond should exist. Holes are considered to have a positive charge. Figures 4 and 5 show the lattice structure of N- and P-type semiconductor materials.

The two types of current carriers found in semiconductor materials are electrons and holes. Electrons are the negative carriers and holes are the positive carriers. Because semiconductors are never purely N or P, a small amount of positive carriers are found in N-type semiconductors as well as small amounts of negative carriers in P-type semiconductors. With this in mind then, N-type semi-



**Figure 6: Barrier voltage**



conductors have electrons as majority carriers and holes as minority carriers, while P-type semiconductors have holes as majority carriers and electrons as minority carriers.

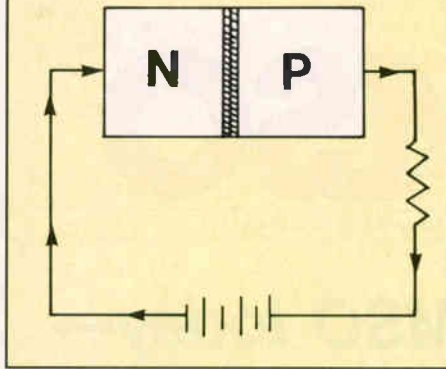
Imagine, if you will, a small block of silicon that has N-type impurities on one side of it and P-type impurities on the other. In the center would be the junction of the P- and N-type materials. At this junction, the excess holes of the P-type material and the excess electrons of the N-type material are attracted and drift toward each other leaving an area on both sides of the junction depleted of excess holes and electrons.

Figure 6 shows that on one side of this depletion region we have excess electrons that cannot migrate to the P material and on the other side, excess holes that cannot migrate to the N material. This condition effectively leaves the N side with a net negative charge and the P side with a net positive charge. This difference of charges constitutes a voltage known as a barrier potential or *barrier voltage*. The barrier voltage for silicon is 0.7 volts.

**P-N junction biasing**

In Figure 7 we see a P-N junction diode, a battery and a current limiting resistor. A diode is a device that allows current to flow in one direction with little opposition but offers a great deal of opposition to current flow in the opposite direction. With the battery in the position shown, electrons flow out of the negative terminal, into the N-type material, through the depletion region and exit the P-type material en route to the positive terminal. With the battery connected negative to N and positive to P, the junction is referred to as being *forward biased*. When a P-N junction is forward biased, the depletion region becomes thinner due to recombination of holes and electrons. The amount of current that can flow through a forward biased junction diode can be found by the

**Figure 7: Forward bias**

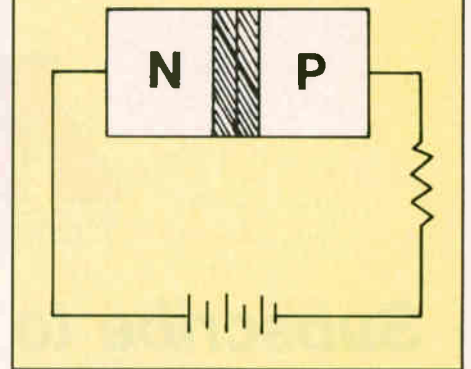


following formula:

$$I_{\text{forward}} = \frac{V_{\text{battery}} - V_{\text{barrier}}}{R_{\text{series}}}$$

Figure 8 shows a *reverse biased* junction diode. A reverse biased P-N junction has a thicker depletion region because electrons in the N material drift away from the junction and are attracted to the positive terminal of the battery and holes in the P material drift toward the negative battery terminal. Under these circumstances current flow is practically non-existent.

**Figure 8: Reverse bias**



Next month we will look at various diode devices and study their principle of operation.

**Test your knowledge**

- 1) What is a valence electron?
- 2) Explain doping.
- 3) True or false: N-type semiconductors have holes as minority carriers and electrons as majority carriers.
- 4) Explain forward biasing.
- 5) What is the barrier voltage of a junction diode using silicon as the semiconductor material? ■

(Answers on page 49)

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## Pre-wiring for cable

By **Kenny Faust**  
Installation Supervisor

And **Linda Jacobs**  
Special Projects Coordinator  
Heritage Cablevision

Would you build a home without pre-wiring for electricity and telephone service? Of course not! So why build one that isn't also pre-wired for television viewing? There are many advantages to cable TV pre-wiring, and it is a relatively simple procedure that can be incorporated into the electrical and telephone wiring process.

Cable television is now serving 53 percent of all homes in America. That's a pretty strong indicator of how many potential home buyers will be interested in a house pre-wired for cable. Even if cable is not available in a particular area at construction time, it could be only a short time before it is.

However, installation of cable television is not the only objective in pre-wiring. When done properly, a pre-wired home will be compatible for both cable and a master antenna system. There is no doubt that television viewing is a factor for buyers, since virtually every home in the country has at least one television. In addition to increasing the value of a home to the initial buyer, cable TV pre-wiring also will enhance the resale value.

When a home has not been pre-wired for a cable/antenna system, it is still possible to do post-wiring, but this requires drilling holes through walls and/or ceilings in order to bring the cable into the dwelling, an unattractive prospect to most home buyers. This can lead to a trail of disappointed customers, as very few people like finding out that the largest investment they are likely to make is not "complete."

Proper planning during construction, for just a minimum investment of time and money, can help avoid bad public relations. Make cable TV pre-wire an integral part of your construction plans.

### First things first

Now that you've decided to incorporate cable television pre-wiring into your home building, how do you do it? As in any con-

struction procedure, certain standards should be observed.

Timing is important. The time to do cable TV pre-wiring is just *after* the electrical power outlets are marked or placed and *before* the telephone wiring is completed. This will allow the pre-wiring to be done before any drywall or insulation is installed.

Several things that must be decided before you can effectively pre-wire are:

1) The point where the cable drop will enter the building. This is called the "common point," and since cable must be grounded to power service (electricity), it is our standard at Heritage Cablevision to place the common point entry 18 inches down from and to the side of the electric meter.

2) The number of outlets to be installed and physical location of outlets. Every room where television viewing is feasible should have at least one cable outlet on the most obvious viewing wall. Main viewing rooms should have at least two outlets on opposing walls to accommodate future furniture moves.

3) Where electrical wires and outlets will be located.

***"In addition to increasing the value of a home to the initial buyer, cable TV pre-wiring also will enhance the resale value."***

4) Where pipes and ducts will be placed.

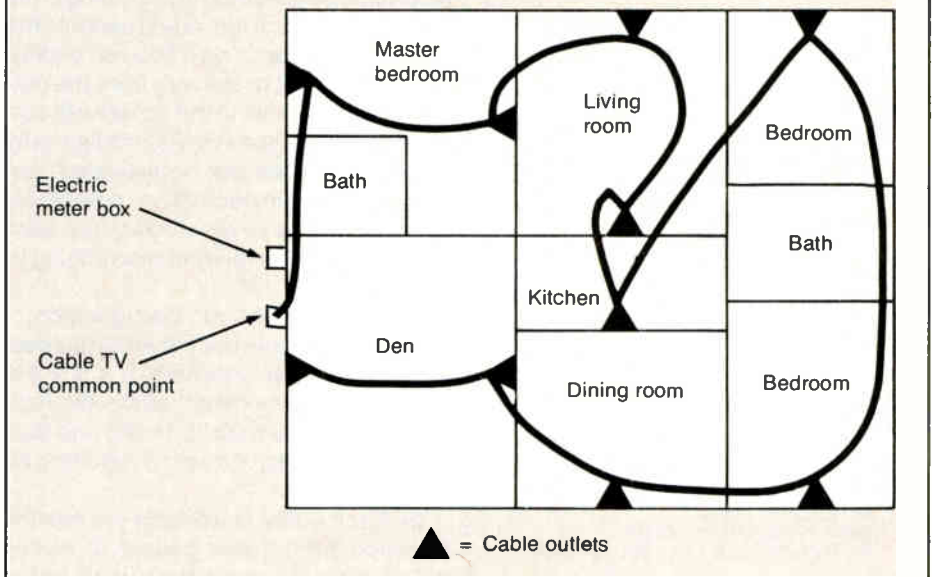
Heritage's minimum standard for the actual coaxial cable is National Electrical Code (NEC)-approved RG-59 with 67 percent braid coverage. Cost of the cable is relatively low and it can be purchased from stores that handle power and telephone supplies, hardware or electronics.

Home-builders need to supply the coaxial cable. All fittings and splitters should then be installed only by cable personnel to ensure integral fit and compatibility due to stringent FCC requirements regarding signal leakage. (This service is provided at no additional cost to the customer and will be performed on outlets that are activated when cable television is installed).

### Loop series vs. home run

Loop series wiring is *never* recommended for cable and if it is used by the

**Figure 1: Loop series wiring**



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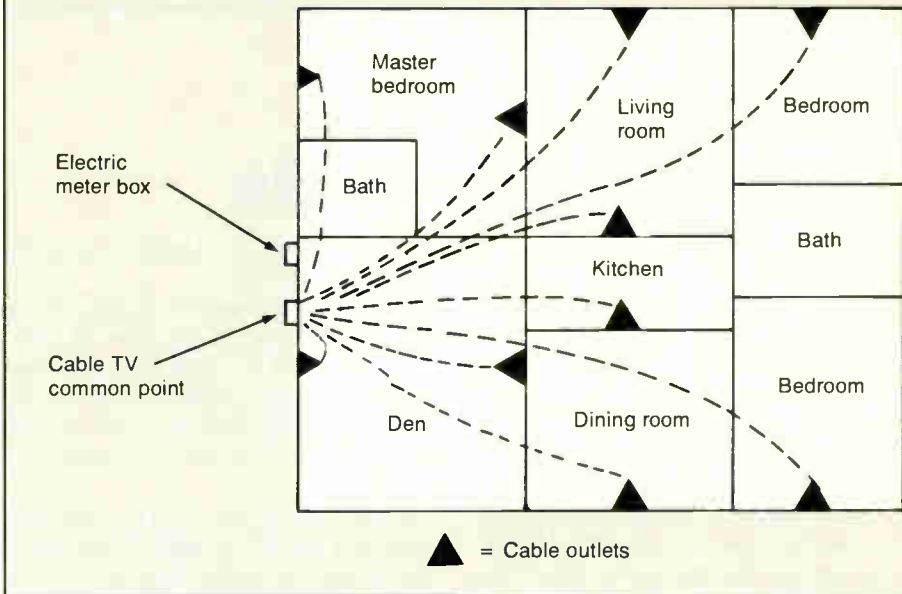
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**Figure 2: Home run configuration**



builder, it still most likely cannot be utilized by the cable company at installation time. In this procedure, the cable is brought into the home at the common point, and then at the first outlet location, a splitter is installed, the cable is run to the next outlet, another splitter is installed and so on from outlet to outlet. However, with cable, picture quality deteriorates rapidly and drastically as the loop series progresses. The further away from the first outlet location you get, the worse the picture. Because it is Heritage's policy to split the cable TV signal as few times as possible, loop series wiring would prove inadequate for cable installation and, again, it would become necessary to drill holes in walls and/or ceilings.

The home run configuration is our recommended method of pre-wiring. This requires that each individual cable outlet in the home has its own line run continuously (not split or spliced) from the outside common point to the actual wall outlet. When cable television is installed, only requested outlets will be activated, but with pre-wiring in each room, customers have the choice of which one they want to use and the flexibility of rearranging in the future.

To use the home run configuration:

- 1) Locate where outlets will be placed. Mount a "nail-up" utility box (3 x 4 x 2 3/4 inches) the same height above the floor as the electrical outlet box and one stud to the left or right of a stud supporting an electrical outlet.
- 2) Each outlet feeds from the outside common point that is placed 18 inches below and to the side of the electric meter.

At this outside common point, the drops should be no higher than 24 inches above the ground but no lower than 18 inches. For each outlet, leave approximately 2 to 3 feet of cable coiled up on the outside of the home, and inside the home, leave a minimum of 12 inches of cable at utility box location for interior connections. Be sure you always cap or tape the exposed cable drops to prevent moisture damage.

3) At the outside common point, plastic enclosure boxes can be used for both aesthetic and security purposes, and weatherproofing of splitter and ground block connections.

4) When pre-wiring is completed, simply cap or tape the exposed cable ends. All necessary fittings and connections will be supplied and installed by the cable company.

Important points to remember are:

- Never put splices or splitters in walls or floors, as they will be inaccessible later for installation and/or service work.
- Never use staples in coaxial cable. Even if they don't cut the wire inside, they will still pierce the cable's jacket, causing signal leakage, which leads to loss of picture quality. Use of 5/8-inch drive rings is the acceptable tacking procedure.
- Never barrel-splice drops inside the house. Each outlet requires its own continuous piece of cable.
- Never make runs through spaces reserved for structurally confined air ducts.
- Never make runs through holes used for power circuit.



August 1989

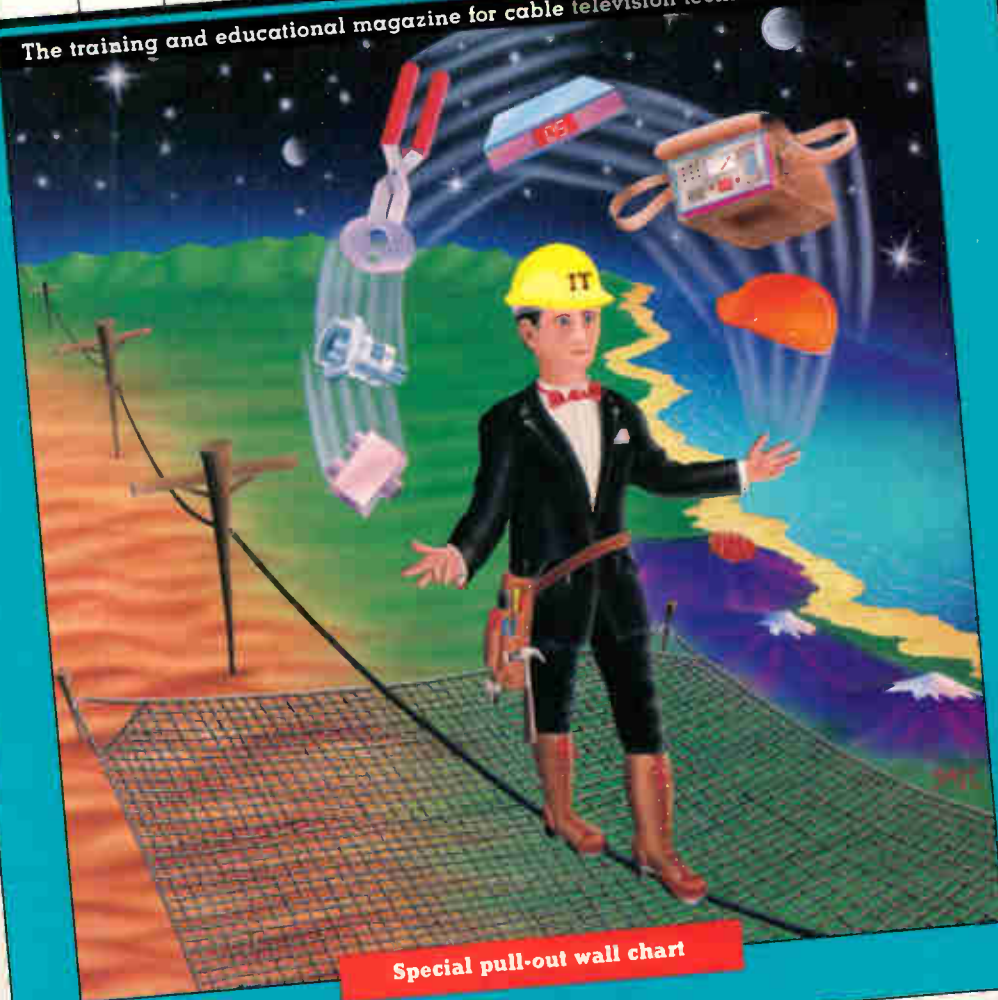
# IT INSTRUCTIONAL TECHNIQUES

The special advertorial supplement to Installer/Technician magazine

August 1989

## IT INSTALLER TECHNICIAN

The training and educational magazine for cable television technical personnel.



Spotlight  
on safety

Jackson Tools 2

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**Advertorial**

# Committed to quality and safety

**By Estel Jackson**  
Sales Manager, Jackson Tools

Jackson Tools, which has been manufacturing specialized tools for about 20 years, was an offshoot of our parent firm that first started in the cable business doing con-

struction, system design and mapping. As day-to-day problems arose in the construction field, we started designing our own tools out of necessity to solve these problems. Today, we have some 38 different products used in construction nationwide.

In any construction activity safety should be a prime concern, and cable system construction is no exception. One of the most potentially dangerous jobs is the placement of ground rods. Recognizing this, Jackson Tools set out to design a quality ground rod driver that would accomplish the task and eliminate the potential for disabling injuries. We now manufacture two models of a ground rod driver—the GRD-1 and GRD-3—that illustrate our commitment to quality and safety.

## A dangerous job made safe

Until now the typical method of driving in a ground rod included a sledge hammer, ladder and two people; one to hold the rod, while the other climbed the ladder high enough to pound the rod into the ground with the hammer. With this method, not only is there the danger of the holder being hit by the hammer, but quite often the impact of the hammer striking the rod sent metal splinters flying. Now, by using the Jackson ground rod driver one person can do the job safely and quickly.

Two main factors—soil condition and rod diameter—are important when determining which model of ground rod driver to use. The GRD-1, which weighs only 15 lbs., is designed for looser soils with ground rods up to 5/8 inch in diameter. The heavier weight GRD-3 with rubber jacketed handles is very effective in the placement of ground rods up to 3/4 inch in hard subsurfaces.

To use the ground rod driver start by digging a small hole about 6 inches deep. Place the driver over the ground rod; it will cover about 3 feet of the rod. Next, stand the ground rod up in the hole and with the slide action of the weight simply apply a downward force to drive the rod to ground level. To complete the process, just turn the ground rod driver over (it now will cover only about 6 inches of the rod) and again power the rod to ground level. Finally, remove the ground rod driver, attach a ground wire and clamp to the rod and fill the hole with dirt. No hammer, no lad-



*The Jackson ground rod driver is very safe and effective in the installation of ground rods. Just place the driver over the rod, stand it up and power it into place as shown. There is no ladder, sledge hammer or helper needed.*

der, no second helper. Quick, safe and effective.

### Safety drives design

We all know that safety is a major concern in any type of industry. That's why we at Jackson Tools not only look at the quality and durability but safety too. In addition to our ground rod drivers, this philosophy applies to all the tools we manufacture. For example:

- Our cable block pusher that is made of polyethylene. This tool's main advantages are 1) no moving parts to lose or break; 2) it is very strong, cannot be collapsed when slammed into poleline hardware; and 3) it is non-conductive, which is a big safety feature when you are working so close to power lines.

- Another tool to make your line crew safer is the Jackson strand brake. It's not only designed for the safety of your crew but that of pedestrians and personal property as well. Basically, it keeps strand from sagging down over a road, driveway or sidewalk. An added safety feature is that this product is available with a ground strap to give a positive ground to bleed off any static electricity or if the strand should happen to come in contact with a power line.

So, let's all keep one thing in mind: A safe crew is a productive crew. ■



*After the ground rod driver reaches ground level in the initial position, just turn the driver over as shown and finish driving to ground level again. The entire process is accomplished without the high risk of injury.*



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## From the NCTI

# Rolling with the changes

By Tom Brooksher

Marketing Director, National Cable Television Institute

Keeping up with technical advancements has got to be one of the biggest challenges facing installers and technicians today. Cable TV technology and practices are changing on a daily basis. Just keeping up with that change could be a full-time job for you...and us. At NCTI, change presents a unique challenge. Our challenge is to keep more than 120 lessons on all aspects of cable technology as current as possible.

To do so requires a technical training staff researching new lesson areas and updating past lessons as the technology and techniques change. In order to keep NCTI lessons current and add information in areas of growing interest to the industry, Ray Rendoff, the director of our technical training department, just announced a series of new lessons covering installation troubleshooting, several new Installer course lessons and many Installer course lesson revisions that will be the focus of NCTI's course enhancements between now and the second quarter of 1990.

During that time period, NCTI plans to produce 13 new lessons for its Installer and Installer Technician courses, and will be enhancing five key areas of its current Installer lessons. This represents the first time that NCTI has announced in advance its future lesson production and revision plans. In addition to being added to the courses as they become available, all new and revised lessons will be available to NCTI graduates under the Graduate Update Program announced by the Institute earlier this year.

### New and improved

Eight new lessons for the Installer Technician course will be among the releases. The lessons will be Picture Quality Troubleshooting Techniques I, Picture Quality Troubleshooting Techniques II, Troubleshooting TV Problems, Drop Cable Problems, Troubleshooting Passives I, Troubleshooting Passives II, Troubleshooting Passives III and Troubleshooting Actives. The eight lessons will replace Troubleshooting I and II in the current Installer Technician course.

Troubleshooting TV Problems and Drop Cable Problems will be the first lessons

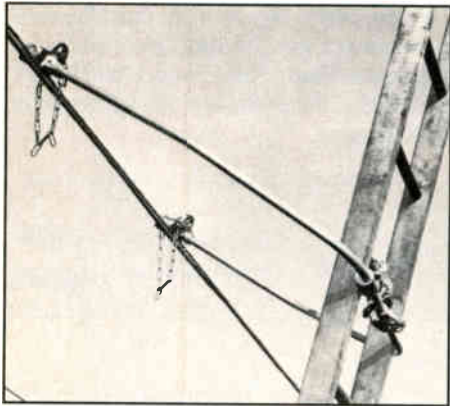
produced, and will be followed by Picture Quality Troubleshooting Techniques I. Troubleshooting TV Problems will focus on AC input voltage problems, hot chassis condition, improper RF input levels, impedance mismatch, poor tuning, unsatisfactory picture quality and stereo TV problems. Drop Cable Problems will cover crimp type F connector problems, physical damages to coaxial drop cable, abnormal RF signal levels and DC loop resistance, and subscriber-installed cable problems. Picture Quality Troubleshooting Techniques I will present techniques for troubleshooting hum modulation and flashing. Its companion lesson, Picture Quality Troubleshooting Techniques II, will teach techniques for troubleshooting ingress, egress, cross modulation, intermodulation and beats.

The first passives lesson will discuss troubleshooting matching transformers and RF switches, the second will focus on troubleshooting splitters, splices and directional couplers, and the third will cover troubleshooting traps, taps and grounding system problems.

Revisions in the Installer course will include the creation of five new lessons: Drop Cable, Signal Leakage Detectors I, Signal Leakage Detectors II, Signal Leakage Detection and Signal Level Meters. Drop Cable will cover National Electrical Code authorized cable types, physical and electrical characteristics and F connector installation procedures. Signal Leakage Detectors I will focus on the purpose, physical description and functional description of installer signal leakage detectors. Signal Leakage Detectors II will cover detector sensitivity, physical care and maintenance for the same detectors. Signal Leakage Detection will focus on detection procedures, and causes and identification techniques for false alarms. Signal Level Meters will cover physical descriptions, operating instructions, installer use, and care and maintenance of popular installer signal level meters.

In addition, as current Installer course lessons are updated, additional information will be included concerning on-premise boxes, VCR hookups, extension ladders, pole climbing techniques and AC wall outlet wiring testing. ■

# Products



## Ladder support

A ladder accessory designed to improve line worker safety is available from General Machine Products. The GMP E Ladder Support consists of two screw clamp assemblies, a U-shaped aluminum alloy member with a single rail fitting, a safety rope and two safety chains. According to GMP, the E Support can accommodate any wooden or fiberglass extension ladder up to 18 inches wide with side-rails up to 2 1/8 inches wide on any 1/4-inch diameter or larger strand.

For more information, contact General Machine Products Co. Inc., 3111 Old Lincoln Highway, Treose, Pa. 19047-4996, (215) 357-5500; or circle #115 on the reader service card.

## Drop connectors

Cable Connector Corp. introduced its XLF Series of drop cable connectors designed to help CATV systems meet the CLI requirements of July 1990. According to the company, the connectors grip as strongly as the tensile strength of the cable itself using standard cable preparation techniques; installation can be accomplished without the use of a crimping tool. Solid nut construction, metal-to-metal contacts and uninterrupted dielectric and center conductor feed-through features are designed to minimize signal radiation and reflection.

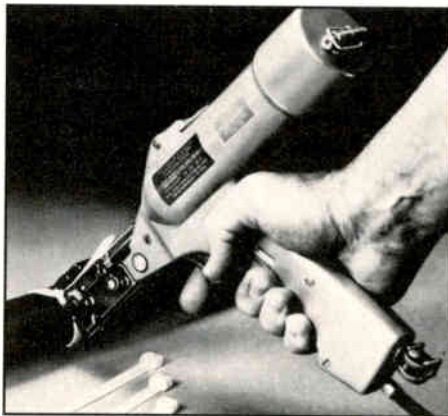
For further information, contact Cable Connector Corp. of America, P.O. Box 87, Atkinson, N.H. 03855, (800) 343-8234; or circle #134 on the reader service card.

## FO hardware

Anixter Cable TV's Rotary Splice is said to exhibit reflection performance comparable to that of fusion splices. The ARS features a polishing tool that introduces

a 10 degree angle to the ends of the fiber-optic cable being spliced. According to Anixter, these angles practically eliminate any splice reflections (previously only achieved through fusion splicing) while maintaining splice losses as low as those for the AT&T Rotary Mechanical Splice. Performance characteristics are permanently stable over a wide range of ambient temperatures and humidity ranges, and reflection levels are at -58 dB and below.

For more details, contact Anixter Cable TV, 4711 Golf Rd., 1 Concourse Plaza, Skokie, Ill. 60076, (312) 677-2600; or circle #127 on the reader service card.



## Installation tool

Panduit Corp. announced the PPTEH cable tie installation tool. The PPTEH is pneumatically operated on 85 psi non-lubricated air and is designed to install Panduit light heavy, heavy and extra heavy cross section cable ties up to 1/2-inch wide. The tool tensions hand installed ties around cable or wire bundles up to 13 inches in diameter and cuts off excess length. Replacement cutter blades and grippers are available as well.

For additional details, contact Panduit Corp., 17301 Ridgeland Ave., Tinley Park, Ill. 60477-0981, (800) 777-3300; or circle #116 on the reader service card.

## Signal level meter

Wavetek's FiberSAM is a signal level meter designed for cable system testing and maintenance with a built-in fiber-optic power meter. The LCD readout provides tuned frequency, channel information and measurement results. A traditional analog meter is provided for signal peaking. Features include non-volatile memory for storage of calibration information, automated measurement functions, keyboard-

configured high and low pilot frequencies. According to Wavetek, direct carrier-to-noise readings on the LCD eliminate the need for calculations.

For further details, contact Wavetek RF Products, 5808 Churchman Bypass, Indianapolis, Ind. 46203-6109, (317) 788-5965; or circle #129 on the reader service card.

## MultiPort decoder

The Jerrold Division of General Instrument Corp. announced a decoder that serves as an EIA (Electronic Industries Association) MultiPort between CATV and cable-compatible consumer electronics equipment. The Impulse 7400 (Model DPBB) allows subscribers to use all the built-in features of cable-compatible TVs and VCRs, even on scrambled channels. Now housed in a Jerrold converter shell, the device serves as an interface between the incoming cable with the TV/VCR, reading the addressable information and decoding scrambled channels.

For more details, contact Jerrold, 2200 Byberry Rd., Hatboro, Pa. 19040, (215) 674-4800; or circle #121 on the reader service card.



## Remote control

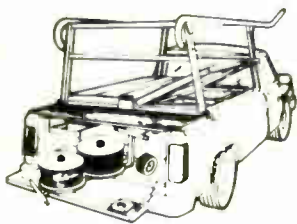
General Instrument's VideoCipher Division released the AnyWhere UHF Remote Control for use with its home satellite TV integrated receiver/descramblers (IRDs). All IRD functions may be controlled from locations in a consumer's home up to 200 feet away from the IRD regardless of physical barriers. The unit is compatible with General Instrument's infrared controls, incorporating both infrared and UHF

# WARNING

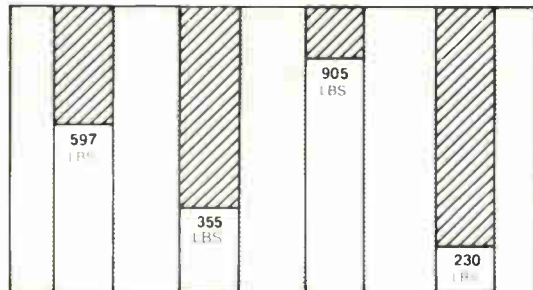
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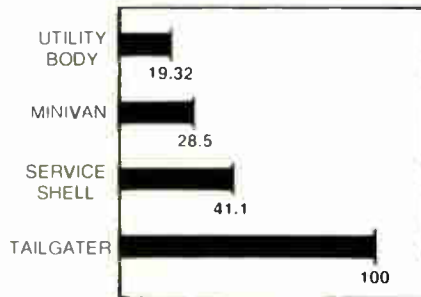
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functions in the same unit. In addition, the AnyWhere unit gives the user the ability to enjoy satellite TV on a second television without purchasing a second satellite receiver.

For further information, contact General Instrument Corp., VideoCipher Division, 6262 Lusk Blvd., San Diego, Calif. 92121, (619) 455-1500; or circle #114 on the reader service card.



## Cutter

A heavy-duty ratchet-action cutter designed for severe service use in cutting ACSR, ACAR, common guy strand, steel-wire rope, steel rod (CRS soft), and copper and aluminum cable is available from Klein Tools. The cutter features drop-forged, heat-treated, shear-type blades; 36-inch steel handles for cutting leverage; and molded heavy-vinyl grips.

For more details, contact Klein Tools Inc., 7200 McCormick Blvd., Chicago, Ill. 60645, (312) 677-9500; or circle #112 on the reader service card.

## VCR kit

Qintar is now packaging a VCR kit containing its Tab-2 top switch A/B switch. The kit contains a Tab-2 95 dB isolation A/B switch, a DS-75-2 CATV splitter with over 100 dB RFI shielding, a TR-1000 matching transformer, three 36-inch RG-59 60 percent braid jumper cables and hookup instructions.

For further information, contact Qintar Inc., P.O. Box 8060, Moorpark, Calif. 93020-8060, (805) 523-1400; or circle #125 on the reader service card.

## Pre-wire boxes

Moore Diversified Products introduced a new line of pre-wire security boxes designed to address the needs of the CATV industry. Sized to provide an attractive flush finish and maximize the use of wall space, the depth and width are fixed by the standard wall dimensions while the box height can be altered to meet specific requirements.

Boxes are manufactured from heavy gauge aluminized steel and finished in a tough powder applied polyester coating. The lid is flanged and supported by a sturdy continuous hinge. Both the lid and body are fully welded. The pre-wire box

can be outfitted with a variety of racks and locks, with the size, location and number of knockouts user-specified.

For further information, contact Moore Diversified Products, 1441 Sunshine Lane, Lexington, Ky. 40505, (606) 299-6288; or circle #122 on the reader service card.

## Security box

Available from E & E Systems, the SecuriTV Systems Sebocat security box is a plastic box that completely encloses a cable connection at any location including a system tap, ground box, splitter junction or trap. Security against tampering or unauthorized entry is provided by an embrittled plastic cover that cannot be opened in the locked position and shatters upon contact. By visual inspection of the cover, tampering can be readily detected. The enclosure provides protection against corrosion as well.

For more details, contact E & E Systems, 27751 Miller Rd., Bonita Springs, Fla. 33923, (813) 947-6765; or circle #132 on the reader service card.



## Backhoe

The LoDi 815 from International Digging Machines is designed to handle digging jobs in areas inaccessible to larger machines. The LoDi 815 features cast iron axles, rigid 1/4-inch thick main frame, a hydrostatic drive train, a Kohler "Magnum" 20 horsepower engine, eight- to 36-inch backhoe buckets, a six cubic foot front loader bucket and a safety roll bar.

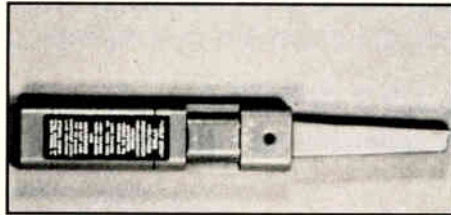
For further details, contact International Digging Machines Inc., P.O. Box 15261, Kansas City, Kan. 66115, (913) 281-1133; or circle #110 on the reader service card.

## Insulating sleeves

Insulation Systems Inc. introduced its line of air shrinkable insulating sleeves. These are pre-expanded and sealed in a foil package. Once opened and installed on a cable shrinking occurs automatically that, according to the company, produces

a 100 percent uniform covering and environmental seal. The coverings can withstand heat ranges of  $-35$  to  $105^{\circ}\text{C}$  and provide protection against abrasion as well as chemical corrosion.

For more details, contact Insulation Systems Inc., 461 Nelo St., Santa Clara, Calif. 95054, (408) 986-8444; or circle #126 on the reader service card.



## Voltage tester

Now available from Etcon Corp., the VT160 Volt Stick is a non-contact tester for voltages from 25 to 122,000 VAC. The VT160 indicates voltage with both audible and visual signals without direct physical connection and can be set to either low range (25 to 1500 VAC) or high range (1500 to 122,000 VAC).

For more information, contact Etcon Corp., 7750 Grant St., Burr Ridge, Ill. 60521, (312) 325-6100; or circle #113 on the reader service card.

## Boring system

Charles Machine Works introduced the True Trac extended-range guided boring system. The system is designed for trenchless installation of utility lines in a wide variety of soil conditions including solid rock. It is said to be ideal for boring work in highly congested or landscaped areas where conventional excavation methods are not feasible or desirable.

For further details, contact Charles Machine Works Inc., P.O. Box 66, Perry, Okla. 73077-0066, (405) 336-4402; or circle #120 on the reader service card.

## Signal generators

Sadelco introduced two reference signal generators, the Models SC-900 and SC-600. Designed as a source of reference signals used for SLM calibration and sweeping cable systems, the units both feature a flat white noise generator coupled to a patented crystal-controlled CW generator. The Model SC-900 covers the frequency range from 4.5 to 900 MHz while the SC-600 has a frequency range of 4.5 to 600 MHz, both exhibiting a  $\pm 1/4$  dB accuracy.

For additional information, contact Sadelco Inc., 75 W. Forest Ave., Engle-

wood, N.J. 07631, (201) 569-3323; or circle #119 on the reader service card.

## Oscilloscope

Now available from B&K-Precision is the Model 1422 portable dual-trace oscilloscope. The AC, DC or battery powered scope offers 20 MHz response, 10 mV/division vertical sensitivity, a high-brightness rectangular CRT and front panel X-Y operation. Eighteen sweep ranges span from  $1 \mu\text{s}/\text{division}$  to 0.5 seconds/division in a 1/2/5 sequence, variable between ranges. Sweep magnification is 10 times, extending the maximum sweep rate to 100 ns/division.

For further information, contact B&K-Precision, Maxtec International Corp., 6470 W. Cortland St., Chicago, Ill. 60635, (312) 889-9087; or circle #118 on the reader service card.

## Converter

Philips ECG introduced the Model TV-1100 to its line of cable converters. The unit upgrades any standard TV set to cable-ready status and provides infrared remote control capability as well. The product converts VHF Chs. 2-13 and cable Chs. 14-76 to a switch selectable output Ch. 2 or 3. Other features include scan up/down or direct channel access, a sleep timer remote control option, favorite 10 channels memory and last channel recall.

For additional details, contact Philips ECG Inc., Communications Dept., 1000 First Ave., Waltham, Mass. 02254, (617) 890-6107; or circle #117 on the reader service card.

## Answers to quiz

(From page 39)

- 1) An electron contained in the outer band of an atom that can be pulled out of orbit with a minimum amount of energy.
- 2) Doping is the process of adding impurity atoms containing either three or five electrons in their valence band to pure semiconductor material.
- 3) True.
- 4) When the negative terminal of the voltage source is connected to the N-type semiconductor and the positive terminal is connected to the P-type semiconductor of a junction diode.
- 5) 0.7 volt.

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BLONDER-TONGUE  
BPF, CH SINGLE  
ESM-TVRO, MODULATOR  
MCA-5, CH PROCESSOR AGC  
MCA-ETVB, CH PROCESSOR AGC  
MCX-V, XTAL CONTROL CONV  
BRAIN  
MD-43, DECODER DTMF 5FUN  
CASCADE  
CEPS-3, POWER SUPPLY  
CCOR  
CSA-300-3, EQUALIZER T4XX  
DISP-3, DISTRIBUTION SPLITTER 3-3  
EQA-1A, EQUALIZER T4XX  
EQA-220-2, EQUALIZER T4XX  
EQA-220-4, EQUALIZER T4XX  
EQA-220-6, EQUALIZER T4XX  
EQS-186-4, EQUALIZER LAN  
T-421-002, TRUNK AMP  
CENTURY 3  
3122H, AMP MODULE  
COMPUVID  
CDD-5, WEATHER COMPUTER  
CDD-51, COMPUTER INTERFACE  
CKB-1, KEYBOARD  
PS-209-1, BAROMETER  
EAGLE  
NE-E, TRAP  
NE-F, TRAP  
JERROLD  
AO-36, SURGE SUPPRESSOR, 30V  
AO-6, SURGE SUPPRESSOR, 60V  
C2-CAR-AGC, COM II  
C2-CHASSIS, COM II  
C2-CH/IF-07, COM II  
C2-CH/IF-11, COM II  
C2-IFA-2, COM II  
C2-IF/CH-04, COM II  
C2-IF/CH-10, COM II  
C2-PSC-2, COM II  
CFM-5, COM FM CHASSIS  
CFM-5FM, COM FM FM MOD  
CFM-5PS, COM FM POWER SUPPLY  
COM-MC-13, COMM II SIGNAL PROCESSOR  
FFT4-17, FEED FORWARD TAP  
FFT4-20, FEED FORWARD TAP  
FFT4-23, FEED FORWARD TAP  
FFT4-26, FEED FORWARD TAP  
FFT4-29, FEED FORWARD TAP  
FM-1, FEEDER MAKER  
FM-2, FEEDER MAKER  
FM-3, FEEDER MAKER  
FM-4, FEEDER MAKER  
JRX3102, CONVERTER  
JSM2, CONVERTER  
JSM2DIC, CONVERTER  
JSM3, CONVERTER  
JSM3DIC, CONVERTER  
LFP1S, PASSIVE FILTER  
RCG-115N, RETURN CARRIER GENERATOR  
SEP-225H, EQUALIZER-ADJ.  
SEP-250H, EQUALIZER-ADJ.  
SEP-255H, EQUALIZER-ADJ.  
SEP-260H, EQUALIZER-ADJ.  
SEP-260J, EQUALIZER-ADJ.  
SEP-260L, EQUALIZER-ADJ.  
SEP-274H, EQUALIZER-ADJ.  
SEP-274L, EQUALIZER-ADJ.  
SEP-274ST, EQUALIZER-ADJ.  
SEP-274TL, EQUALIZER-ADJ.  
TRA-108A, RETURN AMP  
MACOM  
DCW-06DB, MINITAP  
DCW-09DB, MINITAP  
DCW-12DB, MINITAP  
DCW-16DB, MINITAP  
DCW-20DB, MINITAP  
DCW-24DB, MINITAP  
DCW-30DB, MINITAP  
DSV-3, SPLITTER, 3-WAY, 5.5DB  
MAGNAVOX  
3800-30, SPLITTER  
MISC  
4-WAY, 4-WAY SPLITTER  
40-00532, MAST CLAMP  
OAK  
MARK-III, SCRAMBLER  
PECA  
1SD1212  
PHASECOM  
2105-10, MODULATOR, TV, 10 IN, IF OUT  
2105-13, MODULATOR, TV, 13 IN, IF OUT  
2106-10, MODULATOR, TV SAW, CH 10  
2106-IF, MODULATOR, TV, IF/OUT  
2175-E, MODULATOR, COHERENT, CH E  
2176-10, MODULATOR, COHERENT, CH E  
2206-E, MODULATOR, TV, CH E  
7060, CHASSIS FOR DRAWER  
7060-00, CHASSIS FOR DRAWER  
7060-03, CHASSIS FOR DRAWER  
7060-RACK, RACK FOR 7060 CHASSIS  
7120-02, MODULATOR, PHASE LOCKED, CH 2  
7161-05, MODULATOR, HRC CH 5  
7161-06, MODULATOR, HRC CH 6  
7161-09, MODULATOR, HRC CH 9  
7161-10, MODULATOR, HRC CH 10  
7161-11, MODULATOR, HRC CH 11  
7161-12, MODULATOR, HRC CH 12  
7161-168, MODULATOR, HRC CH 168  
7161-F, MODULATOR, HRC CH F  
7161-G, MODULATOR, HRC CH 10  
7161-PCG072, PILOT CARRIER, HRC, CH 72  
7161-PCG120, PILOT CARRIER, HRC, CH 120  
7161-PCG168, PILOT CARRIER, HRC, CH 168  
7170-03, MODULATOR COHERENT, CH 3  
7170-04, MODULATOR, COHERENT, CH 4



# Installer's Tech Book

## Converting dBmV to $\mu\text{V/m}$

By Ron Hranac

Senior Staff Engineer, Jones Intercable Inc.

### Channel 18 or E (145.250 MHz)

dBmV	$\mu\text{V/m}$	dBmV	$\mu\text{V/m}$	dBmV	$\mu\text{V/m}$	dBmV	$\mu\text{V/m}$
-60	3.05	-35.71	50	-10	964.57	16	19245.78
-59	3.42	-35	54.24	-9	1082.27	17	21594.12
-58	3.84	-34	60.86	-8	1214.33	18	24229.00
-57	4.31	-33	68.29	-7	1362.50	19	27185.38
-56	4.83	-32	76.62	-6	1528.75	20	30502.50
-55	5.42	-31	85.97	-5	1715.28	21	34224.37
-54	6.09	-30	96.46	-4	1924.58	22	38400.37
-53	6.83	-29	108.23	-3	2159.41	23	43085.93
-52	7.66	-28	121.43	-2	2422.90	24	48343.20
-51	8.60	-27	136.25	-1	2718.54	25	54241.97
-50	9.65	-26	152.87	0	3050.25	26	60860.49
-49	10.82	-25	171.53	1	3422.44	27	68286.59
-48	12.14	-24	192.46	2	3840.04	28	76618.82
-47	13.62	-23	215.94	3	4308.59	29	85967.73
-46	15.29	-22	242.29	4	4834.32	30	96457.37
-45	17.15	-21	271.85	5	5424.20	31	108226.95
-44	19.25	-20	305.03	6	6086.05	32	121432.64
-43.67	20	-19	342.24	7	6828.66	33	136249.66
-43	21.59	-18	384.00	8	7661.88	34	152874.64
-42	24.23	-17	430.86	9	8596.77	35	171528.16
-41	27.19	-16	483.43	10	9645.74	36	192457.76
-40	30.50	-15	542.42	11	10822.70	37	215941.16
-39	34.22	-14	608.60	12	12143.26	38	242289.97
-38	38.40	-13	682.87	13	13624.97	39	271853.82
-37	43.09	-12	766.19	14	15287.46	40	305025.00
-36	48.34	-11	859.68	15	17152.82		

### Channel 19 or F (151.250 MHz)

dBmV	$\mu\text{V/m}$	dBmV	$\mu\text{V/m}$	dBmV	$\mu\text{V/m}$	dBmV	$\mu\text{V/m}$
-60	3.18	-36	50.34	-10	1004.42	16	20040.78
-59	3.56	-35	56.48	-9	1126.98	17	22486.13
-58	4.00	-34	63.37	-8	1264.49	18	25229.85
-57	4.49	-33	71.11	-7	1418.78	19	28308.36
-56	5.03	-32	79.78	-6	1591.90	20	31762.50
-55	5.65	-31	89.52	-5	1786.14	21	35638.11
-54	6.34	-30	100.44	-4	2004.08	22	39986.62
-53	7.11	-29	112.70	-3	2248.61	23	44865.72
-52	7.98	-28	126.45	-2	2522.99	24	50340.17
-51	8.95	-27	141.88	-1	2830.84	25	56482.60
-50	10.04	-26	159.19	0	3176.25	26	63374.52
-49	11.27	-25	178.61	1	3563.81	27	71107.38
-48	12.64	-24	200.41	2	3998.66	28	79783.79
-47	14.19	-23	224.86	3	4486.57	29	89518.89
-46	15.92	-22	252.30	4	5034.02	30	100441.84
-45	17.86	-21	283.08	5	5648.26	31	112697.60
-44.02	20	-20	317.63	6	6337.45	32	126448.79
-44	20.04	-19	356.38	7	7110.74	33	141877.88
-43	22.49	-18	399.87	8	7978.38	34	159189.60
-42	25.23	-17	448.66	9	8951.89	35	178613.66
-41	28.31	-16	503.40	10	10044.18	36	200407.83
-40	31.76	-15	564.83	11	11269.76	37	224861.28
-39	35.64	-14	633.75	12	12644.88	38	252298.51
-38	39.99	-13	711.07	13	14187.79	39	283083.58
-37	44.87	-12	797.84	14	15918.96	40	317625.00
-36.06	50	-11	895.19	15	17861.37		

**Channel 20 or G (157.250 MHz)**

<b>dBmV</b>	<b>μV/m</b>	<b>dBmV</b>	<b>μV/m</b>	<b>dBmV</b>	<b>μV/m</b>	<b>dBmV</b>	<b>μV/m</b>
-60	3.30	-36	52.34	-10	1044.26	16	20835.79
-59	3.71	-35	58.72	-9	1171.68	17	23378.14
-58	4.16	-34	65.89	-8	1314.65	18	26230.70
-57	4.66	-33	73.93	-7	1475.06	19	29431.33
-56	5.23	-32	82.95	-6	1655.05	20	33022.50
-55	5.87	-31	93.07	-5	1856.99	21	37051.85
-54	6.59	-30	104.43	-4	2083.58	22	41572.86
-53	7.39	-29	117.17	-3	2337.81	23	46645.52
-52	8.29	-28	131.46	-2	2623.07	24	52337.14
-51	9.31	-27	147.51	-1	2943.13	25	58723.23
-50	10.44	-26	165.50	0	3302.25	26	65888.55
-49	11.72	-25	185.70	1	3705.19	27	73928.17
-48	13.15	-24	208.36	2	4157.29	28	82948.77
-47	14.75	-23	233.78	3	4664.55	29	93070.05
-46	16.55	-22	262.31	4	5233.71	30	104426.31
-45	18.57	-21	294.31	5	5872.32	31	117168.25
-44.36	<b>20</b>	-20	330.23	6	6588.85	32	131464.94
-44	20.84	-19	370.52	7	7392.82	33	147506.09
-43	23.38	-18	415.73	8	8294.88	34	165504.55
-42	26.23	-17	466.46	9	9307.01	35	185699.16
-41	29.43	-16	523.37	10	10442.63	36	208357.89
-40	33.02	-15	587.23	11	11716.83	37	233781.40
-39	37.05	-14	658.89	12	13146.49	38	262307.04
-38	41.57	-13	739.28	13	14750.61	39	294313.34
-37	46.65	-12	829.49	14	16550.46	40	330225.00
-36.40	<b>50</b>	-11	930.70	15	18569.92		

**Channel 21 or H (163.250 MHz)**

<b>dBmV</b>	<b>μV/m</b>	<b>dBmV</b>	<b>μV/m</b>	<b>dBmV</b>	<b>μV/m</b>	<b>dBmV</b>	<b>μV/m</b>
-60	3.43	-36	54.33	-10	1084.11	16	21630.80
-59	3.85	-35	60.96	-9	1216.39	17	24270.15
-58	4.32	-34	68.40	-8	1364.81	18	27231.56
-57	4.84	-33	76.75	-7	1531.34	19	30554.31
-56	5.43	-32	86.11	-6	1718.20	20	34282.50
-55	6.10	-31	96.62	-5	1927.85	21	38465.60
-54	6.84	-30	108.41	-4	2163.08	22	43159.11
-53	7.67	-29	121.64	-3	2427.02	23	48425.32
-52	8.61	-28	136.48	-2	2723.16	24	54334.10
-51	9.66	-27	153.13	-1	3055.43	25	60963.86
-50	10.84	-26	171.82	0	3428.25	26	68402.58
-49	12.16	-25	192.78	1	3846.56	27	76748.96
-48	13.65	-24	216.31	2	4315.91	28	86113.75
-47	15.31	-23	242.70	3	4842.53	29	96621.21
-46	17.18	-22	272.32	4	5433.41	30	108410.78
-45	19.28	-21	305.54	5	6096.39	31	121638.90
-44.68	<b>20</b>	-20	342.83	6	6840.26	32	136481.09
-44	21.63	-19	384.66	7	7674.90	33	153134.30
-43	24.27	-18	431.59	8	8611.37	34	171819.51
-42	27.23	-17	484.25	9	9662.12	35	192784.66
-41	30.55	-16	543.34	10	10841.08	36	216307.95
-40	34.28	-15	609.64	11	12163.89	37	242701.51
-39	38.47	-14	684.03	12	13648.11	38	272315.58
-38	43.16	-13	767.49	13	15313.43	39	305543.10
-37	48.43	-12	861.14	14	17181.95	40	342825.00
-36.72	<b>50</b>	-11	966.21	15	19278.47		



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 CONST MGR, NE, 40K  
 CH TCH, SE, 26K  
 CH TCH, SE, 30K  
 HDEND ENG, SE, 35K  
 STF ENG, SE, 32K  
 STF ENG, NE, 40K  
 CH TCH, W, 32K  
 TCH MGR, MW, 30K

### TECHNICIANS

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 LN TCH, SW, 10/HR

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 LN TCH, MW, 9/HR  
 LN TCH, E, 12/HR  
 LN TCH, MW, 9/HR  
 LD TCH, SE, 10/HR  
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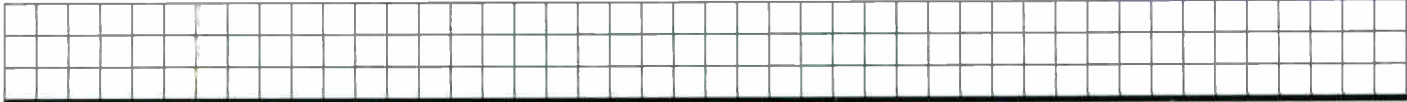


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# Calendar

## August

**Aug. 16: SCTE Ohio Chapter** technical seminar on fiber optics, Cleveland. Contact Bill Ricker, (614) 236-0523.

**Aug. 16: SCTE Golden Gate Chapter** technical seminar on CLI, Pleasanton Fairgrounds, Pleasanton, Calif. Contact John Parker, (408) 437-7600.

**Aug. 17: SCTE New England Chapter** technical seminar, Boxborough Sheraton, Boxborough, Mass. Contact Jeffery Plotter, (508) 685-0258.

**Aug. 17: SCTE Ohio Valley Chapter** technical seminar, Cincinnati. Contact Bill Ricker, (614) 236-1292.

**Aug. 18: SCTE Miss/Lou Chapter** technical seminar, Baton Rouge, La. Contact Charles Thibodeaux, (504) 641-9251.

**Aug. 19: SCTE Razorback Chapter** installer seminar, Days Inn, Little Rock, Ark.

Contact Jim Dickerson, (501) 777-4684.

**Aug. 21-23: Siecor Corp.** technical seminar for management and supervisory personnel on fiber optics for LAN, building and campus applications, Hickory, N.C. Contact (704) 327-5539.

**Aug. 23: SCTE Rocky Mountain Chapter** technical seminar on transportation systems and BCT/E testing. Contact Rikki Lee, (303) 792-0023.

**Aug. 23: SCTE Florida Chapter's** South Florida Group technical seminar, Holiday Inn, Fort Lauderdale, Fla. Contact Denise Turner, (813) 626-7115.

**Aug. 24: SCTE Florida Chapter's** First Coast Group technical seminar, Holiday Inn Airport, Jax, Fla. Contact Denise Turner, (813) 626-7115.

**Aug. 24: SCTE Upstate New**

**York Chapter** technical seminar, Rochester, N.Y. Contact Ed Pickett, (716) 325-1111.

**Aug. 27-29: Southern Cable Television Association's** Eastern Cable Show, Merchandise Mart, Atlanta. Contact (404) 252-2454.

**Aug. 29: SCTE Satellite Tele-Seminar Program**, "High definition television technology (Part II)," 12-1 p.m. ET on Transponder 2 of Galaxy III. Contact (215) 363-6888.

**Aug. 31-Sept. 1: SCTE Heart of America Chapter** technical seminar and BCT/E testing, Lodge of the Four Seasons, Lake of the Ozarks, Mo. Contact Wayne Hall, (816) 942-3715.

## September

**Sept. 6: SCTE North Country Chapter** technical seminar on signal processing centers, Sheraton Midway Hotel, St. Paul, Minn. Contact Doug Ceballos, (612) 522-5200.

**Sept. 6-9: Hawaii Cable Television Association** annual convention, Hyatt Regency, Waikoloa, Hawaii. Contact Kit Beuret, (808) 834-4159.

**Sept. 10-12: SCTE Dakota Territories Meeting Group** technical seminar on CLI, Sylvia Lake Lodge, Hills City, S.D. Contact A.J. Vandekamp, (605) 339-3339.

**Sept. 11-14: Siecor Corp.** technical seminar on fiber-optic installation and splicing for LAN, building and campus applications, Hickory, N.C. Contact (704) 327-5539.

**Sept. 12: SCTE Florida Chapter's** Central Florida Group technical seminar, Holiday Inn North, Lakeland, Fla. Contact Denise Turner, (813) 626-7115.

**Sept. 12-14: Magnavox CATV** technical seminar, Columbus, Ohio. Contact Amy Costello Haube, (800) 448-5171.

**Sept. 13: SCTE Florida**

## Upcoming

**Sept. 20-22: Great Lakes Expo**, Convention Center, Columbus, Ohio.

**Oct. 3-5: Atlantic Show**, Convention Center, Atlantic City, N.J.

**Oct. 17-19: Mid-America Show**, Hilton Plaza Inn, Kansas City, Mo.

**Dec. 13-15: Western Show**, Convention Center, Anaheim, Calif.

**Feb. 21-23: Texas Show**, Convention Center, San Antonio.

**May 20-23: National Show**, Convention Center, Atlanta.

**June 20-24: Cable-Tec Expo**, Nashville, Tenn.

**Chapter's** Gulf Coast Group technical seminar. Contact Denise Turner, (813) 626-7115.

**Sept. 14: SCTE Golden Gate Chapter** seminar on equal employment issues, Italian Gardens Restaurant, San Jose, Calif. Contact John Parker, (408) 437-7600.

**Sept. 16: SCTE Cactus Chapter** technical seminar. Contact Harold Mackey Jr., (602) 866-0072.

**Sept. 18-20: Magnavox CATV** technical seminar, Detroit. Contact Amy Costello Haube, (800) 448-5171.

**Sept. 19-21: C-COR Electronics** technical seminar, Dallas. Contact Binky Lush, (814) 238-2461.

**Sept. 20: SCTE North Country Chapter** BCT/E testing. Contact Douglas Ceballos, (612) 522-5200.

**Sept. 20: SCTE Razorback Chapter** technical seminar, Days Inn, Little Rock, Ark. Contact Jim Dickerson, (501) 777-4684.

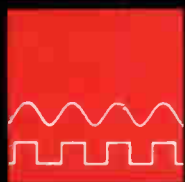
**Sept. 20: SCTE Dairyland Meeting Group** technical seminar. Contact Bruce Wasleske, (715) 842-3910.

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