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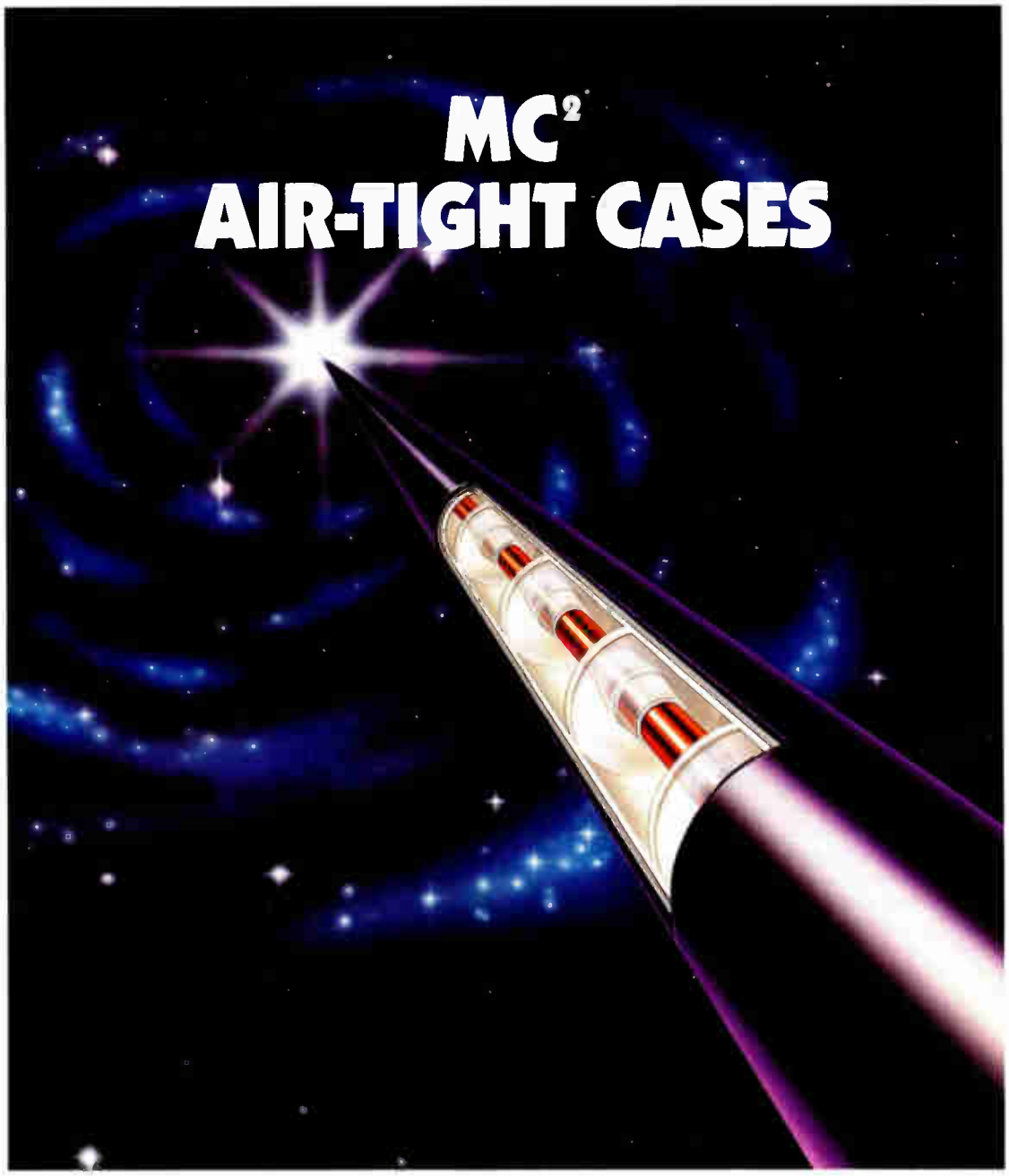

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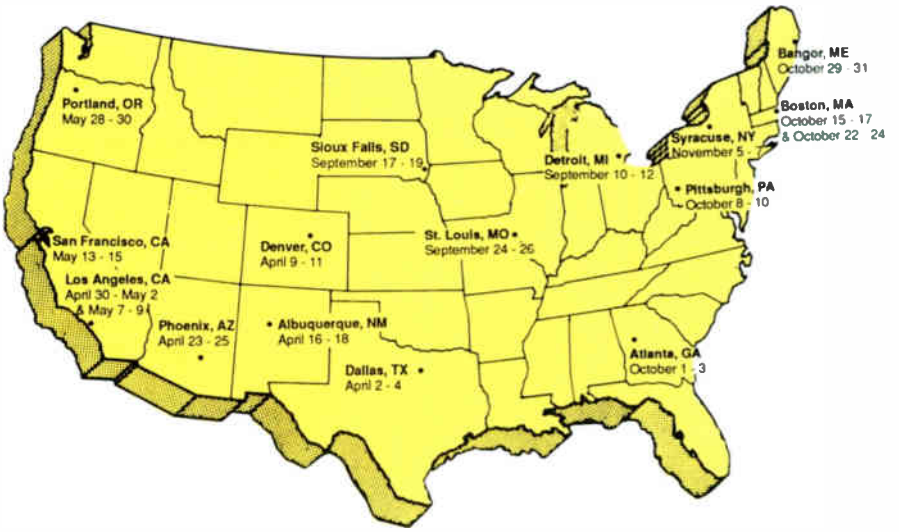

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Reader Service Number 5

EDITOR'S LETTER

What's in a word?

Our industry has long been one that has existed without concise standards — not only in technology, but also our terminology. For example, it's not unusual to see the spelling of *headend* as I have it here, but it also appears as *head end* or *head-end*. Occasionally it even shows up as *head-in* (normally in a non-technical publication). I'd like to propose the following standardization:

Headend — This should be one word. No hyphens, and certainly not head-in.

Decibel — Probably the most misused word in cable, by itself a decibel (dB) expresses a ratio between two values. It cannot be used to represent an absolute value such as signal level, but how often do we say something like "The output of the line extender is 46 dB."? To understand this, consider the following: Your stereo is capable of 50 watts output, and your neighbor's stereo a comfortable 25 watts. Your stereo is 3 dB (actually 3.01 dB) more powerful than his. But if your neighbor goes out and buys a 100-watt stereo, his is now 3 dB greater than yours! Likewise, a 5,000-watt radio station has 3 dB less power than a 10,000-watt radio station. In all of these examples we are referring to ratios between two power levels.

For us to be able to describe absolute values such as signal levels, the decibel has to be tied to a reference. In cable, that reference is a millivolt measured across a 75-ohm impedance, and is expressed as zero decibel-millivolts (dBmV). Thus, 1 millivolt is 0 dBmV (not 0 dB), 2 millivolts is 6.02 dBmV and so on. When referring to gain or loss, use dB; signal level is dBmV. Keep in mind there are other references such as dBm, dBV, dBW, etc., so be sure to use the right one.

One gain measurement that must include a reference is for antennas. Because of the nature of antennas, the gain should be expressed relative to either an isotropic radiator (dBi) or a dipole (dBd). Any expression of antenna gain with just dB is misleading.

By the way, the d in dB is always lowercase and the B is uppercase.

Distribution — This is collectively both the trunk and feeder portions of a cable system, but the term distribution often is used to describe just the feeder network. Let's stop referring to the feeder as distribution, and just call it feeder. Distribution is the whole trunk and feeder network!

Site — Webster's New World Dictionary defines site as "location or scene" as in antenna or microwave site. *Sight* has to do with seeing, as in a reference to line-of-sight between two microwave antennas.

Apostrophe — No, this isn't a technical term, but its use with certain words and acronymns can be confusing. Normally an apostrophe is used to indicate the possessive, as in "Bob's signal level meter." But when referring to things like a TV or VCR, possessive should be TV's (as in "the TV's tuner") or VCR's. Plural should be TVs (as in "The store has 15 TVs that have snowy pictures.") or VCRs.

Signal leakage — The egress of signals from our cable systems should not be called radiation. We have too many customers who might get the idea that cable system radiation will cause them to grow green tentacles or something. Let's call it signal leakage and avoid having to explain that our distribution network is not radioactive.

The last one is *CLI*. This is an acronymn for cumulative leakage index, which is a figure of merit for the severity of signal leakage from a cable system. We do not measure CLI, we calculate it after measuring signal leakage.

Ronald J. Hranac
Senior Technical Editor

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Reader Service Number 10

Comcast proposes unique PCS test

PHILADELPHIA — **Comcast Corp.** has asked the Federal Communications Commission for authority to link new personal communications services (PCS) technology with cable and cellular phone networks in five markets where the company already provides cable service.

Comcast will explore using existing cable TV networks to route calls from PCS transmitters and receivers in Baltimore; Philadelphia/Trenton, N.J.; West Palm Beach, Fla.; Indianapolis; and Los Angeles. The Trenton system also will involve cellular/cable interconnection experiments, making the experiment unique.

Cox Cable, **Cablevision Systems Corp.** and **Time Warner** also have applied for PCS test licenses.

D2B Systems enables link with Smart House

UPPER MARLBORO, Md. — London-based D2B Systems Co. agreed to design a gateway that will allow entertainment products to use the D2B protocol to communicate with Smart House LP's new enabling system for totally integrated home automation (CT, April 1990, page 30).

With the new gateway, products that don't contain a Smart House appliance chip can utilize the resources of the integrated system. Gateway availability next fall will coincide with the introduction of the complete product package for an operative Smart House system. The gateway provides a path for the audio and video products of Matsushita, Philips, Thomson and Sony, which use the D2B data communication and control system (an IEC-supported industry standard), to be compatible with the Smart House system.

C-COR expects 2nd quarter losses

STATE COLLEGE, Pa. — **C-COR Electronics** expects second quarter revenues and earnings to be lower than those reported in the first quarter ended Sept. 28, 1990. Revenues for that quarter were $10.144 million and the loss per share was 6 cents.

The anticipated losses come as a result of the continued slowdown in the cable TV industry.

☛ **Texscan Corp.** will supply the active RF distribution electronics and system passives to **Seokang Telecommunications** for the Korean Tele-communications Authority's pilot cable TV project in Seoul, South Korea.

☛ **CableLabs** approved its FY1991 budget of $11 million. In other news, CableLabs' President/CEO Richard Green was appointed chairman of Task Group 11/1 of the International Radio Consultative Committee (CCIR), which is working to establish international studio and program exchange standards for high definition TV.

☛ **M/A-COM** acquired **Light Control Systems**, a fiber-optic product manufacturer.

☛ **Corning**'s Titan fiber has been selected as one of 1990's best new products by *Popular Science* magazine.

☛ **EXFO E.O. Engineering** will donate up to C$25,000 to North American universities, colleges and training centers to promote excellence in testing methods, training and fiber-optic research.

☛ **Scientific-Atlanta** donated to the U.S. Armed Forces Radio and Television Service (AFRTS) equipment that will enable U.S. troops serving in the Gulf region to receive news and entertainment broadcasts from the United States.

☛ **Optical Networks International**'s Laser Link II equipment will be used in a full system fiber upgrade by **Cox Cable Omaha**.

☛ **Toner Cable Equipment** has provided equipment for the first C-SPAN SAP channel installation at **District Cablevision** in Washington, D.C.

☛ **Advantest America** has reduced the price of its R4131C/D portable spectrum analyzer used for mobile radio equipment, satellite broadcasts and CATV systems.

☛ **Allied**, a manufacturer of shoring equipment for 20 years, has noted an increase in contractor spending on shoring equipment as OSHA has begun to aggressively enforce its new regulations on trench shoring requirements.

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Reader Service Number 12

Conference promotes fiber planning and use

By Ron Hranac
Senior Technical Editor

ORLANDO, Fla. — If the cable industry is in a recession, you'd never know it at SCTE's third annual fiber-optics conference held here in January. Promoting a theme of "planning and using fiber optics in your cable system today," the two-day conference drew 573 attendees, up 40 percent from last year!

Following opening remarks by SCTE Executive Vice President Bill Riker, ATC's Jim Chiddix kicked off the first day's presentations with an outline of a six-stage evolution of the cable industry and its use of fiber. Chiddix stated that fiber fits in as part of the development of the "ultimate network," one that will position the cable industry to be a low-cost, wide-choice service provider. Chiddix added that the use of fiber by the cable industry "changes the basic rules of how we design cable systems."

The first stage of Chiddix's proposed evolution is already here: fiber trunked upgrades driven by refranchising. The second stage, fiber trunked two-way systems, will be driven by voice and data. This phase of cable's evolution will depart from being a purely broadcast structure, making use of home run fiber for all trunking to accommodate high volume/speed digital voice and data. Chiddix noted that personal communication networks will fit well into this scheme.

The third stage, to achieve operating efficiency and an improved customer interface, will be the automation of the cable business. Expect fiber to play a role in automated dispatch, tracking and reporting, as well as automated phone systems, addressable taps and interdiction, and better electronic program guides to handle the increased channel loading on fiber networks. The fourth stage will be fiber-trunked, extended bandwidth systems allowing 1 GHz operation on the remaining coaxial network. Near-video-on-demand and digital TV will set the stage for the fifth phase, and the final evolution will be to very high capacity switched systems, allowing full video-on-demand.

Bill Riker

Barrett: We want "a modern information infrastructure that is second to none."

Sound too good to be true? This year's conference speakers and attendees alike echoed the sentiment that fiber is no longer the exclusive domain of the laboratory scientist or engineer. Having itself evolved from being the latest buzzword, fiber trunking "has arrived" and is today enjoying the same widespread acceptance and use that national satellite feeds did in the late 1970s. Hundreds of fiber links and thousands of fiber miles are now operating in cable systems, and the variations of fiber backbone networks developed by MSOs are evolving into fiber-to-the-feeder type architectures.

Bill Riker

Jones: "Fiber is no longer a luxury, it's absolutely mandatory."

The first day of the conference concentrated on management issues: case histories examining the "dollars and sense" of using fiber, and fiber project management. Fiber deployment was shown to be cost-competitive with conventional coaxial upgrades, and several operators have benefitted from visibly improved picture quality and better perceived system reliability. Early concerns about the physical reliability of the optical electronics have faded, with the only laser failures being of the blown fuse variety. Jones Intercable's Mike Scott reported that a fiber cable in Augusta, Ga., was damaged when it was shot by a stray bullet during a nearby liquor store robbery, but his use of the coaxial redundant CAN fiber architecture kept service uninterrupted. (He added that the system is planning to reroute the fiber away from the vicinity of the liquor store.)

The second day's presentations were more engineering-oriented, with much discussion on the possible use of 1,550 nm fiber transmission and applications for erbium-doped fiber amplifiers. Current 1,550 nm technology is at a stage of development where 1,310 nm equipment was two years ago, and its use is limited by optical dispersion and increased CSO in non-dispersion shifted fibers as well as the high cost of 1,550 nm components. Synchronous Communications' Hermann Gysel discussed a recently announced electrical dispersion compensation circuit that will eliminate the need to use higher loss dispersion shifted fiber for 1,550 nm. It was generally agreed that additional developments will reduce the cost of implementing the 1,550 nm window, although according to some, "it's not quite there yet."

Both days of the conference were highlighted by luncheon keynote speeches. FCC Commissioner Andrew Barrett told the first day's gathering that regulators and operators want the same thing — "a modern information infrastructure that is second to none in the world." He added that the challenge is to get there "without harming the consumer in the process," and praised the cable industry for taking advantage of the cost-effectiveness of fiber deployment. Jones Intercable's Glenn Jones told attendees the second day that "fiber is no longer a luxury, it's absolutely mandatory," and that "fibered communications systems are a communications revolution" that will play a vital role in the delivery of information, education, entertainment and merchandise choices to consumers.

If you missed this year's conference, most of the papers presented have been published in a 194-page proceedings manual available from SCTE. The conference also was recorded, and videotapes and audio cassettes will be available from the Society. For more information, see page 64. **CT**

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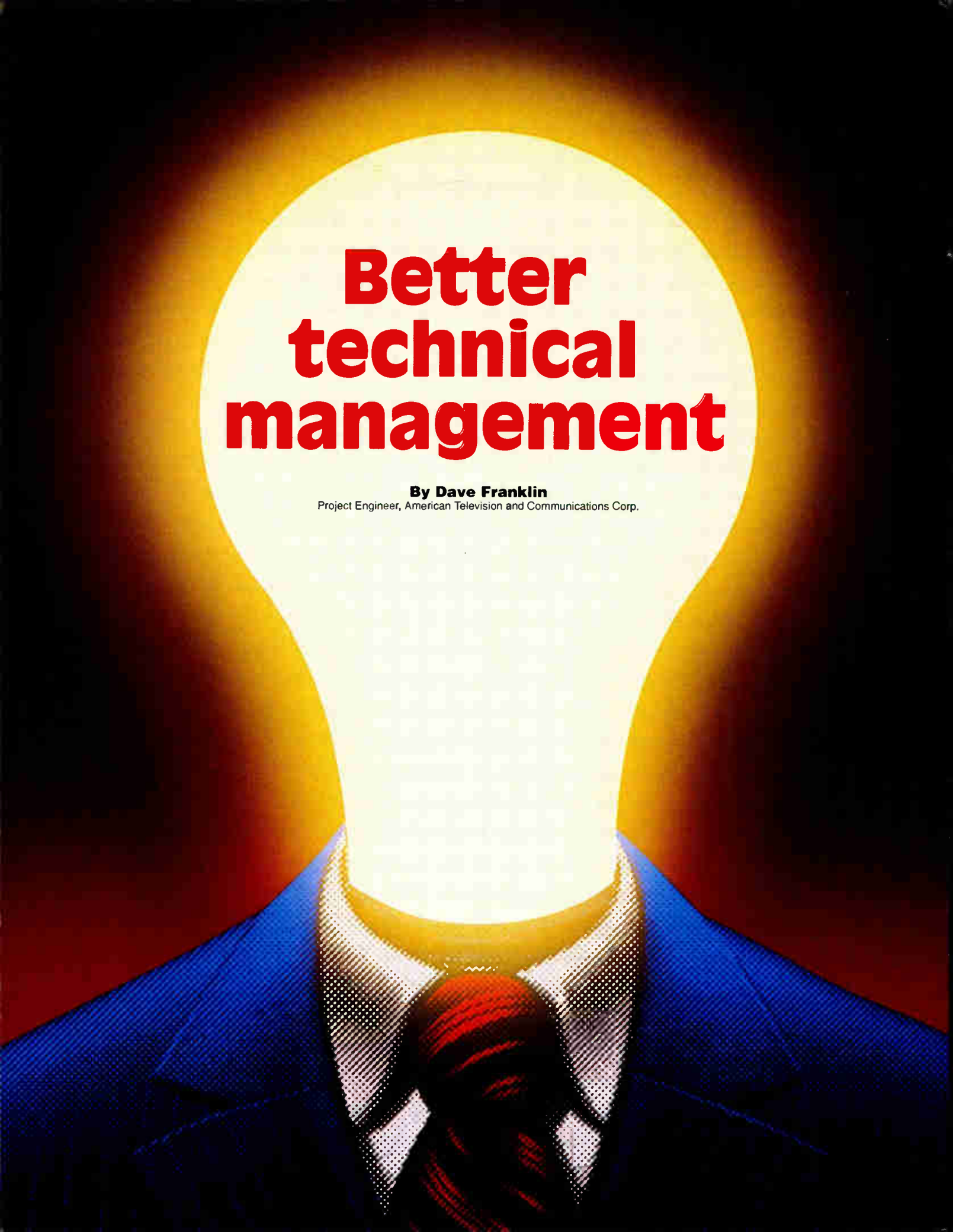
Reader Service Number 13

Better technical management

By Dave Franklin
Project Engineer, American Television and Communications Corp.



Those who have been successful at something many times act as if everyone else has the same skills and know the same things they do. These folks spend a lot of time being disappointed. This is especially true of technical managers in the cable TV industry.

Technical managers (installation supervisors, service call managers and chief technicians) are often individuals who have progressed through the various levels of their jobs, performed well at each subsequent level and therefore deemed worthy of promotion. However, their abilities in the various functions required do not necessarily mean they are able to train, direct and supervise others. It also is an unfortunate truism that these individuals, upon whom the successful operation of a system depends so greatly, receive little or no formal training in management arts and are thus unprepared for the problems they face. Most training consists of object lessons gained on the job, usually accompanied by a discussion of who did what wrong and a lecture as to why it had better not happen again. This situation is neither fair, effective nor constructive. Surely there is a better way. This article will offer a couple of simple suggestions that may help some to become better managers.

A major concern

Management, technical and otherwise, has two primary areas of concern — processes and personnel. Of these, processes is the one with which technical management is most involved. Fortunately, it also is the easiest to understand and control. Thus, this aspect will be the main focus of this article.

Each individual job — be it an install, a service call or a maintenance function — generally can be broken down into several distinct steps or tasks. These steps, when done in the proper sequence, form a process. The technical side of the CATV industry is comprised of several processes, each independent of the other but all related to the ultimate goals of system reliability and customer satisfaction.

Webster's New Collegiate Dictionary defines a process as "a series of actions or operations conducing to an end." This means that when a goal (an "end") is to be attained it must first be identified and then the steps (the "series of actions or operations") needed to accomplish that goal must be specified. After all of the steps are specified, the process (in part or whole) may be simplified. This sounds pretty simple, doesn't it? Identify, specify and simplify — all it takes is time, thought and effort.

Consider the process involved in a new install. The first step is to identify the desired goal, or end, with a clear statement of purpose. How many installers think their primary responsibility is to get the job done as quickly as possible so they can get on to their next job? Those who do will sacrifice other aspects of the job, such as safe and proper work practices, customer education, etc., to achieve their perceived goal.

"The technical side of the CATV industry is comprised of several processes, each independent of the other but all related to the ultimate goals of system reliability and customer satisfaction."

Whose fault is it that the installer has the wrong idea as to his charge? Management must bear this blame. Management also must work to eliminate such misunderstandings.

The next step in establishing the process for a new install work order is to specify the assorted tasks required. This can be done in different ways such as in steps by time order (first, second, third, etc.), by location (truck, pole, house, etc.) or by function (dispatch and radio contact, preparation, pole work, cable routing, external house wiring, internal house wiring, etc.). Determine which strategy works best for each employee and vary the training as needed. Use as many approaches as necessary to ensure complete understanding and acceptance. Also included in the specification of the job is the need to fully detail all of the various operations required in each task.

At this point all of the factors that must be incorporated into the individual tasks should be detailed. For instance, the "house wiring" section should specify all requirements for compliance with local and national electrical codes, and the "pole work" section should detail all of the particulars for compliance with telephone and power company practices. The importance of each necessary function should be spelled out clearly.

Finally, after all of the many and diverse requirements are detailed, the manager can begin the exercise of simplifying. A careful study of each individual step will allow the manager to consider alternatives and select the *one* best suited to meet all the conditions and standards with which the system must comply.

This is by far the most difficult task. There is always the danger of over-simplifying a job to the point where it can no longer be done successfully. Nonetheless, most functions can be limited to standard practices, eliminating confusion and restricting errors. Some jobs are more complex than others. More complex jobs may be made simpler by breaking

them into distinct tasks. Another way of simplifying a job is to eliminate as many on-site decisions as possible. The fewer the options allowed, the easier the task.

As the manager your goal should be to make those processes under your control as simple as possible. The simpler you make it, the easier your job will be. The trick is to keep the process simple without compromising the objective. As stated earlier, the ultimate objectives are system reliability and customer satisfaction. Individual managers may best demonstrate their talents by achieving both goals while keeping the process as simple as possible.

Ignorance isn't bliss

Ignorance can be dangerous and the technical manager must do all that is possible to eliminate it, in both himself and those who work for him. It's the managers' job to know the myriad specifications that apply to each area under their supervision and, of equal importance, to ensure others also know them.

There are many means for acquiring the knowledge required in this area — correspondence courses, seminars, SCTE meetings and publications. It's up to managers to use them. Also, managers must be familiar with the franchise requirements, as well as local, state and federal laws that affect their operations.

Document it

If you could automate the processes used in your job you could probably save time and money, and do better work. To automate them, however, you would first be required to detail every aspect of every task of every job you wish done. This is not as simple as it sounds; such an effort would require extensive documentation. Amazingly, some people and companies are willing to spend great sums of money to document a task for a machine, but unwilling to do so for people. (It's a strange world.) Nonetheless, the lesson to learn is that every job must be properly documented before it can be properly completed.

Documentation is essential to any process. *Proper* documentation will help in several areas, from training to job performance to problem resolution. With proper documentation you can establish a comprehensive training program that will ensure individual responsibilities are well-understood and alleviate possible oversights.

You also can gain improved job performance in that the required process is well-defined, the individual steps involved are adequately detailed and the expected results are thoroughly described — define, detail and describe. Further, with proper documentation, problems can be anticipated and thus may be avoided or, failing that, the correct responses to those problems can be previewed and practiced.

Without proper documentation these benefits are forfeit. In fact, without proper documentation you really can't be sure you know what you are doing, nor can you prove you are doing the right things in the right manner. It should be noted that although a task may be documented, if the documentation is not proper more harm than good can result.

Two tools to use

There are two effective tools management can use to identify and specify objectives and tasks. One is an outline, the other is a map.

Most of us have had some experience with outlines. We encountered them in that dreaded experience of youth, the high school English class. If you'll recall, an outline was one of those things you'd write after you had completed your book report, along with a bibliography and table of contents. It was later explained that the outline was supposed to have been written *before* the book report as an aid to coherent thought processes and to help get things organized. You still can use outlines to help in these areas. An outline can be used to detail the individual tasks within a process and to set priorities (either by importance or by order of occurrence).

"As the manager your goal should be to make those processes under your control as simple as possible."

The second tool, a map, is similar to an outline except that it gives a pictorial representation of all of the aspects of a job. A map is of great benefit in the initial stages of organizing thoughts because it allows the maximum freedom in defining the central point and then arranging key concepts and their assorted aspects. Maps permit easy additions, deletions and alterations without serious disruption to the dominant thought. Maps can be free-form and can appear in several shapes, such as stars, trees or busses — whatever works for the process or idea involved. Maps also can be useful for setting priorities and order of operation. It is possible to combine both of these tools to achieve the maximum results, using maps in the initial stages of detailing the job and its various tasks and outlines in the latter stages to set priorities and standardize procedures.

To review the fundamentals of processes, you must first *identify* the desired goal, *specify* the steps required to reach the goal and then *simplify* the process to be followed. This can be accomplished only after you have a thorough understanding of the tasks involved in the process and this understanding can best be acquired with *training*. Also, *proper documentation* is required for every process to *define*, *detail* and *describe* the job at hand. Two tools are useful in management's tasks. These are *outlines* and *maps*.

On a personnel note

Finally, just a brief note regarding personnel. We require personnel to perform our processes. Many consider this fact to be our industry's greatest weakness; such people are only making excuses for management's failure to properly train those who are most directly responsible for our industry's successes and least responsible for its failures.

The simple truth is, regardless of the task required, if it isn't well-understood by those who are required to do it there is little chance of success. Clear, concise communication is essential to understanding every element of a job. Clear communication supports proper documentation and is enabled by it. Like the two sights of a rifle, communication and documentation assure greater ease in aiming for the target and a greater probability of success in hitting it.

The personnel issue is far more complex than processes, and there are as many approaches to dealing with this area as there are ticks in Georgia. There is, however, one universal and absolute rule that can be applied to this concern: We should treat others as we, ourselves, would like to be treated. We learned this as the Golden Rule when we were growing up, and it will still serve us well, if we will use it. **CT**

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Reader Service Number 14

Managing to provide good cable service

By Alan Babcock
Technical Training Manager
Warner Cable Communications Inc.

There has been much discussion about how to provide better service for our cable customers. Technical solutions include everything from upgrading with fiber optics to installing better F connectors. These technical solutions make sense but there is another aspect to good customer service — the personnel that are dealing with the customers.

Customer service reps

When someone mentions the term CSR, what image does your mind conjure up? If you are like most people you picture a female (most likely in her early 20s) picking up a telephone to talk to a customer and accessing the customer account information on a computer terminal. This is the stereotypical person employed in the cable system front office for the job titled "customer service representative." This is not meant to be a sexist comment, only an observation of the typical cable system.

Extensive work has been done to improve the lot of CSRs in cable systems. Training programs have been designed to better qualify our CSRs to answer the phone, handle billing and service questions, mollify hostile customers and even turn downgrades into upgrades with sophisticated sales techniques. Warner Cable has even begun using an Electronic Selection System (ESS) for selecting new-hire CSRs that exhibit attitudes and decision making capabilities that are customer friendly.

"To provide good customer service ... the key may not be to criticize our employees ... but to analyze the policies, procedures and attitudes ... in the organization."

We've given CSRs better tools with which to work. ARUs, improved billing systems, better telephone systems and even addressable converters help the CSR in dealing with the customer. Most of the focus has been to improve the skills, attitudes and knowledge of the typical CSR. While no one argues that this was and is needed, there is another group of CSRs that needs some customer service focus.

The other CSRs

While most of us think of the CSR as that 23-year-old female, it isn't too difficult to envision the other CSRs that work in our cable systems. For example, the technician carrying a pouch of tools and a signal level meter into the customers' homes is also a CSR. Some operators have changed the title of the job from service technician to customer service technician to reflect the importance of the customer interface that must occur.

Other CSRs include the system's general manager, LO studio production crew, chief technician, human resource manager, dispatchers, etc. In short, every employee in the cable system is a customer service representative.

To provide good service to the paying customer, all employees need to share the common ideal that the customer is a valued commodity. It must be the vision of the organization as a whole to provide good service to its customers. Without this common vision, the organization will fall quite short of the service ideal anticipated.

Start with the customer

The long-term survival of any organization is determined by how well the organization stays in touch with the needs and wants of its customers. Short-term survival can be improved with price increases, cost controls and other operational measures but in the long run, the marketplace determines the organization's future. The quality of the relationship between an organization and its customers ultimately determines the long-term viability of the organization.

In an organization, each group has either supplier or customer relationships with other departments. For example, the warehouse is the supplier and the installers and technicians are customers of the warehouse. Each group needs to identify its customers and strive to provide that customer with the same quality of service it desires of its suppliers. Without cooperation in the supplier/customer relations within an organization there is little hope for providing quality service to the ultimate customer — the cable subscriber.

Identify your customers. Identify your suppliers. Define how you want to work with them. Here are some useful questions[1] to ask:

1) If our internal customers were the only customers we had, how would we treat them?

2) How can we use their frustration and disappointment with us as a learning experience to teach us how to improve our way of doing business? We learn how to serve our marketplace mostly through dissatisfied customers. To learn from dissatisfied customers, we have to move toward them, treat them with respect and listen to them very carefully, without being defensive.

3) How do we deliver bad news to our users? Sometimes we cannot fulfill our promises to them. How early do we tell them? When we let them down, do we blame it on someone else or take responsibility for our mistakes?

4) How do we handle situations in which our customers let us down? What do we do when they are inaccurate in defining their needs, when they owe us information and we either don't get it or get it so late that it undermines our schedules? We have the choice of

(Continued on page 40)

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Reader Service Number 15

Contest Rules: No purchase is necessary. Entries accepted from authorized representatives throughout the United States faxing their name, title and phone number and the phrase "Please enter us in the Midwest CATV Caribbean Cruise Contest" on his/her company letterhead to 1 303 643-4797. Contest entry is limited to cable television systems companies only. The prize will be awarded in the company name. The winning company will determine the individual to be given the prize. Midwest CATV, its suppliers, parent companies, subsidiaries and ad agency are not eligible. This contest is void where prohibited by law. Only one entry per company is permitted. The odds of winning will be determined by the number of entries received. No contest entries will be accepted if received by Midwest CATV after February 28, 1991. Total value of the prize is $1,420. Prize includes airfare from anywhere in the Continental United States to Miami FL, lodging, meals, and entertainment for a three-day cruise to the Bahamas - (Tips and alcoholic beverages not included.) Trip must be taken during September, October or the weekend of December 6th or 13th, 1991. No cash or prize substitutions. For more information contact Midwest CATV at 1 800 MID-CATV or write: Midwest CATV Sweepstakes, Fairways II at Inverness, 94 Inverness Terrace East, Suite 310, Englewood, CO 80112.

Bon Voyage! Win a Caribbean Cruise courtesy of Midwest CATV.

This month, the Midwest CATV Customer Incentive Contest is featuring a three-day Caribbean Cruise.

You can enter the contest in two ways. First, if you place an order for Sumitomo LitePipe™ fiber optic cable during February, your company is automatically entered. LitePipe™ is a lightweight (90 lbs. per 1,000 feet, 0.45" in diameter), rodent resistant fiber optic cable with easy access. Two to twelve color coded fibers are loosely placed in a jell-filled, water-blocked tube surrounded by corrugated steel. Aramid yarn is served over the central tube. A polyester rip cord allows you to easily remove the jacket when needed. It's the finest quality in lightweight fiber optic cable.

Another way to enter the contest is for you, the company's authorized representative, to send us on your company letterhead, via fax machine, your name, title and telephone number, and the phrase "Please enter us in the Midwest CATV Caribbean Cruise Contest," and your company is entered. It's that easy!

Only one prize will be awarded. The prize includes roundtrip airfare from anywhere in the Continental U.S., lodging, meals and entertainment for a three-day cruise to the Bahamas. The winning company will be selected by March 15, 1991, and the winner's name may be obtained by writing Midwest CATV after March 20, 1991.

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Reader Service Number 16

AVL: An operations manager's crystal ball

By Patrick Murphy
Vice President, Technical Operations, Simmons Cable TV

The time is 4:30 p.m. on the Friday before a three-day weekend. There are several service calls and reconnects to be assigned to technicians. Your dispatchers are having nervous breakdowns. They are driving you nuts! They claim that there is no one to pick up work. Then it happens — an outage that affects a major part of your system. You look around for help and there is no one to be found. Your shop resembles a ghost town.

What is an operations manager to do? I know we've all thought, "If only I had a crystal ball to look into and see where my technicians are I could get some help." Sounds farfetched, like something out of a James Bond movie, but it's not. There is a crystal ball of sorts readily available to the cable industry; it's known as an automatic vehicle location (AVL) system.

Although there are several types on the market, since our Long Beach, Calif., operation already had a Motorola two-way radio system in place, it was our decision to use the Motorola Tracknet fleet management system. It utilizes the existing U.S. government network of LORAN-C transmitters, which are maintained to provide location services for marine navigation. They utilize extremely high power, large antenna structures and a low frequency to cover most of the continental U.S. Current plans call for nationwide coverage. The major advantages of LORAN-C are:

- Installed and operating now
- Free of charge
- Owned and maintained by the U.S. government
- Maintained to an extremely high degree of reliability
- Includes redundant equipment to ensure high availability
- Covers most of the United States, with nationwide coverage planned

Vehicle location and equipment

LORAN-C accuracy is within 1,000 feet in the Los Angeles and Orange County area. The accuracy is valid over 95 percent of the radio coverage area, 95 percent of the time. Vehicle location is automatically transmitted from vehicle to the dispatch point in digital over the two-way radio system. It is transparent to the driver and requires no operator action. To provide the most accurate and timely location, it is sent in four ways:

1) PTT — The location is sent with each voice transmission when the mobile operator presses the microphone key.

2) Automatic poll — The Tracknet computer periodically polls the three vehicles with the oldest location information.

An example of the dispatcher's screen with tabular display.

The frequency of automatic polling is adjustable for the specific application. The computer monitors the radio channel and polls the three vehicles at once. It takes 2.5 seconds to complete a poll.

3) Manual poll — At any time, the dispatcher can poll a vehicle for its location. There is no indication at the vehicle of a poll.

4) Time transmissions — Each Tracknet mobile unit contains an adjustable time. If this interval elapses without the unit updating its location, it will automatically send the location. The timer resets anytime location is transmitted.

The timing of these transmission methods is adjustable to meet specific user needs. Other conditions that result in a location update are: upon powering up/down, response to a mobile emergency message and in conjunction with a status/message transmission.

The mobile unit is contained in a die cast aluminum housing designed for remote mount installation and meets military specifications for rain, vibration, dust, shock and temperature. It operates directly from the vehicle's 12 VDC battery system. A separate 18-inch long whip antenna is used to receive the LORAN-C signal.

The mobile unit performs three major functions: 1) LORAN receiver, 2) data encoding and decoding and 3) two-way radio interfacing. The receiver portion listens to the three LORAN-C transmitters and computes the time differences. These time differences are transmitted to the Tracknet computer, which uses them to determine the unit's location. The receiver portion of the mobile unit also verifies incoming signals, filters interference and computes the vehicle's direction of travel.

The data portion of the mobile unit automatically encodes and decodes all digital messages. The data format is Motorola's MDC1200, which was designed for the unique requirements and conditions found in radio frequencies. The data speed is 1,200 baud. Also included in the data portion is circuitry to prevent annoying data noise from being heard through the radio's speaker. A talk-prohibit tone is generated and the microphone inhabited to ensure the radio operator does not talk over the data. Any two-way radio not equipped with the Tracknet unit or a data-mute device could hear the data transmissions.

Radio interface circuitry is the third portion of the mobile unit. It allows connection to the two-way radio. Depending on the specific type of radio, it can control virtually every facet of the mobile radio. For example, if the radio and/or vehicle is turned off, the mobile unit automatically keeps the radio powered up for a preprogrammed time. This maintains a current vehicle location, even when apparently turned off. After the time elapses the unit sends a message to dispatch and turns off.

The dispatch side

The dispatch equipment consists primarily of a custom computer that automatically tracks vehicles and displays the information in an easy to use format. Upon receipt of a location message, the computer verifies the information and immediately displays it on a 13-inch color CRT. Only basic keyboard skills are needed by the operator; no programming skills whatsoever are required. All commands use the same simple four-letter format. Commonly used commands can be entered with function keys. The dispatcher can list vehicle locations in a variety of ways including:

- By ID
- By distance from a predefined site (power supplies)
- By distance from an intersection
- By distance from another vehicle
- By distance from a given point
- By class (installer or technician)
- By status/message (optional)

Information can be displayed in both tabular and map form (see accompanying photos). Movement between the tabular screen and the map screen is possible with a single key stroke. The tabular display features: 1) four-character numeric fixed ID or six-character alphanumeric variable ID; 2) class, status or message; 3) closest major intersection; 4) distance from intersection in blocks or miles north or south and east or west; 5) direction of travel or a stopped indication with minutes stopped; 6) age of information; 7) on-air radio user; and 8) driving distance to reference point (i.e., from a site)

The map display mirrors the tabular display's information and includes freeways, highways and major surface streets that are labeled and color-coded. Three levels of map sizes can be viewed: 6x4, 12x8 and 24x16 miles. With a single command the display will zoom, pan vertically or horizontally. Vehicle symbols show locations on the map. As locations are updated, the symbols will reposition on the map. Each symbol contains the unit's ID and is color-coded to indicate moving (yellow), stopped (white) or, as an option, emergency. Units in close proximity that would cause their symbols to overlap, are identified with a special overlap symbol. This will let the operator know at a glance that multiple units are at the same location. As well, individual IDs are listed along with the corresponding overlap symbol.

Three levels of map displays can be viewed on the dispatcher's screen. The maximum view is 24x16 miles (above), the minimum is 6x4 miles (below).

To assist dispatching, the operator can display the five closest vehicles to any street intersection, site or Tracknet-equipped unit stored in the computer's data base. This display can be increased to the closest 12 units with a single key stroke. The tabular display contains driving distances, listing units in ascending order (i.e., the closest one first). Under the map display the reference point (color-coded blue) is centered on the map.

The tabular data base can be increased and modified to fit specific user needs. More intersections can be added. Street names can be changed. Power supply information can be entered with up to four lines, 32 characters per line. User files and system parameters also are created by the user.

Support system hardware

The fixed equipment hardware includes radio interfacing, processing unit, CRT and an optional printer. The interface to the radio system is provided by the base station controller (BSC) located with the processing unit and a mute monitor module located in the radio base station. The BSC controls data functions while the mute monitor module controls the

(Continued on page 42)

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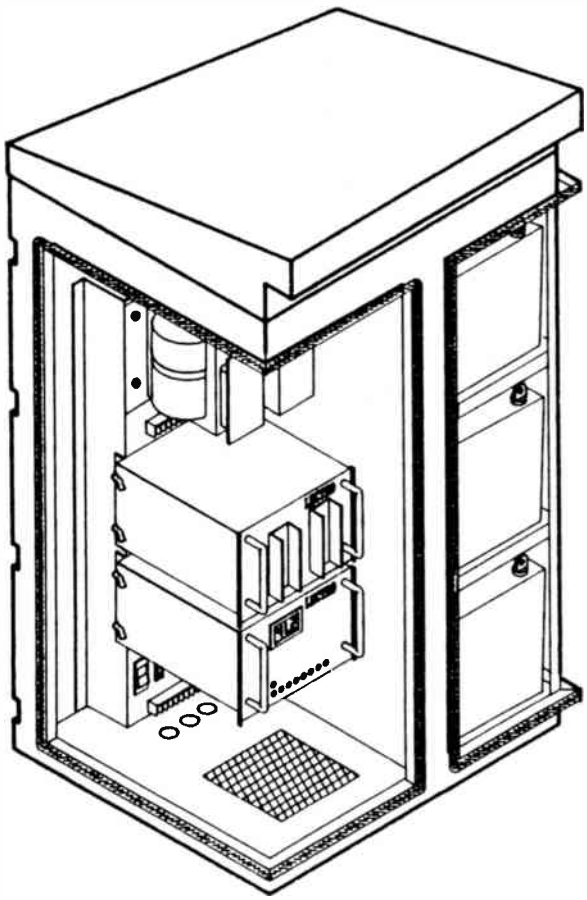

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Reader Service Number 17

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☐ Please send me further information on the Society of Cable Television Engineers, Inc.

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Official trade journal of the Society of Cable Television Engineers

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Reader Service Number 19

The importance of follow-up for managers

By Pam Nobles
Senior Staff Engineer/Technical Training
Jones Intercable Inc.

The new training program is in place. You feel satisfied that soon you'll be reaping the benefits of your hard labor. Now you can put this project behind you and set your sights on your next enterprise. During a visit to your field office on another matter you discover that the program is not being used and nothing has changed.

What happened here? Weren't you clear in your explanations and timely in your memos? Did you follow up?

Through observation of this very thing happening (as well as, I must add, a little personal experience) I discovered that much energy is expended on the initial planning of a program or procedure but, once in place, it begins to disintegrate. As so often is the case, the simple things get overlooked. Many times these little things make a big difference.

The keys to the success of any program include acquiring management support, having a dedicated training facilitator in each system to present the program to the students and the follow-up.

The technical training area of Jones Intercable operates in a centralized fashion. Training programs are developed at the corporate office, guided by system input as well as statistical and industry research. These programs include interactive video, linear videos, seminars and self-study packages. Facilitators in each system present the material to their associates. The experience of these facilitators may vary from degreed training instructors to the best installer in the bunch.

There are a number of questions that must be asked in order to prepare for a successful program:

1) Do your facilitators and students understand the importance of the training?

2) Are the guidelines for implementation clear?

3) Have you provided coaching tips for associates who need extra assistance?

4) Have you provided a mechanism to track the results?

The following is a glimpse at solutions that can be tailored to your needs.

Communicate importance

Nobody is ever as enthused about a program as the developer or originator of the program. One of your initial jobs is to communicate why a program has been developed. Go back to your initial justification for the program, since you probably used easy-to-understand terms in the beginning.

Your job is easier if the targeted group is getting a product they want. A recent study indicated that merchants quite often give their customers what the merchant feels the needed product is without asking the customer. If they had asked the customer, the merchant would have found that what the customer wanted and what the merchant thought the customer wanted were not the same. If you are in the position of providing a service such as training to your "customers," find out what they want by asking, not assuming.

One way to ensure communication is to let the intended audience get involved in each step of the process. By giving them ownership you ensure their satisfaction. It relieves you of the burden of going through the development process alone. You'll also get some great ideas!

Implementation

Once your project is ready to go, you need to tell your associates what to do with it. This, of course, has varying degrees of complexity, depending if your program is designed for one-on-one training or an entire company program.

The selection and support of the facilitator is vital in this process. This is your "number one fan." The attitude and learning ability of the students will be a direct reflection of the amount of program endorsement and enthusiasm demonstrated by the facilitator. Your involvement with facilitators will vary depending on their experience.

The implementation needs to be easy and practical. People (unfortunately) tend not to want to read a lot, so try to make any instructions short and simple, such as through bullet points. Videotape guidelines work, since video instructions accompanied by audio are more likely to be retained than text.

Sometimes the implementation can be a major undertaking. Probably the best way to design an implementation package is to have the system or group that will be using the product help you — after all, nobody knows what they can do better than they can! Take the best stab at the implementation from your end, then select a "beta test" group of users to help fine-tune the product before releasing it to the entire group.

Coaching

Before setting your training program in motion, some thought needs to be given to what happens if the associates just don't get it. Coaching and special attention needs to be given by the facilitator; you need to provide these guidelines for the facilitator to follow. When developing coaching guidelines, anticipate problems or questions that might arise and use these as your guide. This way, you can answer questions before they need to be asked as well as provide examples to work through any problems.

While preparing to launch a new program on installer training, we turned to past programs — successes and failures — for guidance. We use a sales training program at Jones that prepares CSRs and installers for selling service to our customers. The program was developed with very detailed coaching guides for facilitators' use in aiding their students.

Since we plan to model our new program after this one, follow-up was done on how well these coaching guides were working. What we discovered is that not only were people not

(Continued on page 44)

Managing technical training

By Ronald W. Wolfe
Manager, ATC National Training Center

Over the past few years, training has become a more important part of the cable TV business. New methods of signal delivery, including fiber optics, are becoming increasingly prevalent in our networks, and there is a tremendous need to build a skilled work force capable of designing, maintaining and servicing these new networks.

I spoke to several different operators who are now implementing training programs or who have been assigned this responsibility. I am encouraged to see this movement, but it's important to note that the priorities of a training program don't always coincide with those of an operating cable system.

Responsibilities

A technical training manager's responsibilities are to:

- Determine needs
- Set objectives
- Budget costs and benefits
- Evaluate results

This article will attempt to provide some basic insight into managing the technical training function. Regardless of whether training is done by a full-time instructor or by one of the technical staff members, the same responsibilities apply.

The process of identifying the training needs of an operating system involves the entire organization. The most obvious training needs usually are related to changes in the organization where a particular group of employees needs to learn new skills. A system going through a bandwidth expansion or rebuild is an example of this. The technical staff needs to be informed of new procedures if the equipment and its operating parameters have changed, and sales and customer service personnel need to be aware of new service offerings.

Holding brainstorming sessions with the senior management of the system also is important to this process. The needs of a system training program are directly determined by the long-term strategy of the system. Without access to this information, the training manager cannot hope to provide programs that serve to prepare the organization to meet its long-term goals.

Training without objectives is nothing more than the wholesale distribution of information. Objectives allow the training manager to determine which information should be covered and which skills are important for the employees to master. Setting objectives also allows us to assign priorities to each of the tasks we wish to accomplish. None of us have unlimited budgets for training and it is important to focus our limited resources on those areas where the need is greatest and the return on our training dollars is highest.

I've often heard training referred to as a "gray area" in terms of defining goals and evaluating results. In reality, technical training is fairly easy to evaluate if we provide enough detail in the goal setting process. As with any other goals, training goals need to be measurable. In other words, the objectives of a training program should be defined in terms that are easy to measure. Some examples of this include:

- The safety training program will show a reduction in workers compensation claims of 15 percent.
- The troubleshooting course will reduce repeat service calls by 10 percent and increase service department productivity by 15 percent.
- Installation training will increase department productivity by 15 percent and reduce service calls on new installations by 40 percent.

As can be readily seen, these objectives are fairly easy to measure using statistics available to the department manager. Defining objectives in terms of data already being measured by management also serves to enhance the value of a training program, as it can be shown that training has a measurable positive impact on the operating performance of the system.

"The value of any training program is closely related to the ability of the training manager to properly plan the program and monitor its results."

Reactive and proactive needs

When a training program is first established, its purpose is probably reactive. In other words, the program is put in place as a response to an immediate need. If a training program has been developed for installers due to increases in the callback rate for new installations, then this is a reactive measure. A proactive training program addressing the same situation would have been put in place due to the anticipated need to maintain quality installations and ideally would have prevented the need for the reactive program.

Each of these two types of training serve different needs. Long-term training needs generally are best served by proactive training programs designed

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Reader Service Number 20

Headend or headache?

By Fred Canzano
Manager of Technical Services, Blonder-Tongue Labs

Long before a headend is put on-line, many factors enter into its eventual success or failure. Some are rather obvious, such as the location, area to be served and choice of equipment. Others are rather insidious, pertaining to local codes, FCC requirements and customer misconceptions on what the system will provide. Perhaps the easiest way to stack the odds in your favor is to consult a reliable manufacturer who can guide you on the correct choice of equipment after helping determine the system requirements.

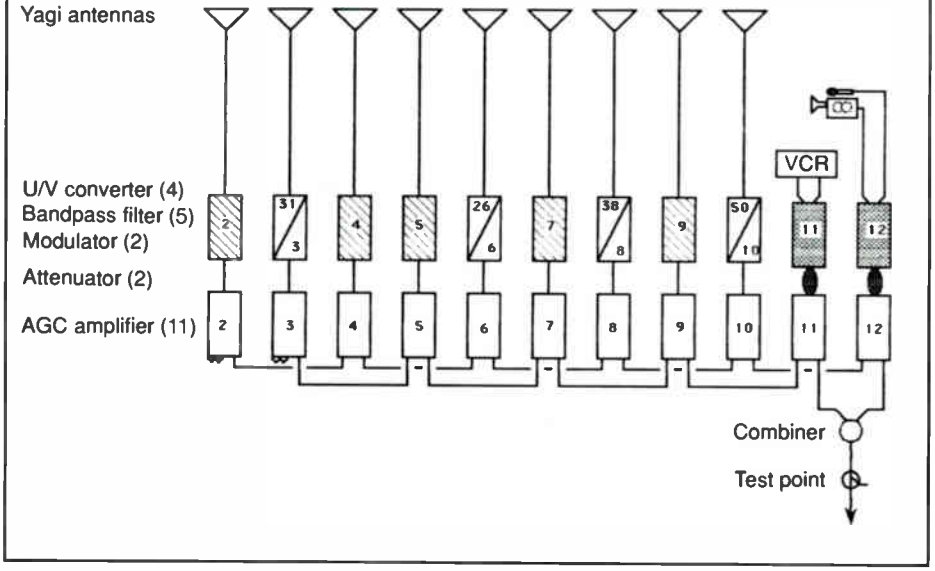
Since few people have a "blank check" available when constructing a headend, cost often becomes an important factor in balancing absolute needs against frivolous wish lists. Once necessary functions are defined, the most cost-effective method of accomplishing them can be calculated. Let's review a few of the most desired functions and explore headend variations that can provide excellent results. However, please realize that this article is intended as a review of some current problems most often encountered and not as an all-inclusive, comprehensive report.

"Since few people have a 'blank check' available when constructing a headend, cost often becomes an important factor in balancing absolute needs against frivolous wish lists."

Table 1

Channel sub-VHF	Bandwidth (MHz)	Video	Color	Sound
T-7	5.75-11.75	7.00	10.58	11.50
T-8	11.75-17.75	13.00	16.58	17.50
T-9	17.75-23.75	19.00	22.58	23.50
T-10	23.75-29.75	25.00	28.58	29.50
T-11	29.75-35.75	31.00	34.58	35.50
T-12	35.75-41.75	37.00	40.58	41.50
T-13	41.75-47.75	43.00	46.58	47.50

Figure 1



Functions

The headend serves several purposes. These functions are:
1) on-channel processing
2) off-channel processing
3) local origination
4) satellite reception
5) scrambling compatibility

• *On-channel processing:* Our first thought is do we use strip amplifiers or heterodyne processors? Do we need high (60 dBmV) or low (45 dBmV) output units? Strip amplifiers have been around longer than many of us, and have a well-deserved reputation for reliability at relatively low cost. Unfortunately, due to the strip amplifier's low selectivity, bandpass filters (BPFs) are needed when systems are expanded to include adjacent channels. A strip amplifier and BPF occupy two rack spaces vs. one for the processor.

• *Off-channel processing:* When employing strip amps for off-channel processing, we must add a UHF-to-VHF or VHF-to-VHF converter at the amplifier input and possibly a BPF between them, depending on condi-

(Continued on page 41)

Preparing your headend for fiber optics

By Mike Kelly
Manager, Technical Services
Optical Networks International

As our industry moves toward more widespread use of fiber optics as a medium for the transportation of broadband signals, it is extremely important to consider a number of things that may have been overlooked in recent years. One of the more important issues is the condition of the headend. Because fiber faithfully delivers source signal inputs, it can actually accentuate imperfections formerly masked by system noise. This article will help you prepare your headend to deliver optimal pictures over fiber.

As we begin to plan for this future marriage of technologies, we should review some of the more fundamental rules for the equipment in the headend. Although we are no longer required to do FCC proofs of the headend, with the exception of frequency offsets, it is a good practice to implement a proof of sorts to make sure this equipment is being used according to its design. This equipment can provide a wide range of performance levels, from good to bad, depending on the operational levels, the coupling methods used and the amount of isolation as a result of those coupling methods.

Table 1: Typical combiner measurements

Input return loss	≤-17 dB
Output return loss	≤-16 dB
Flatness (50-450 MHz)	±1.0 dB
Signal loss	20.5 dB (±2.5 dB)

Begin with the basics

Planning should begin with the basics such as racking requirements for the electronics, splicing cabinets and any grounding necessary to prevent sheath currents or ground loops from other equipment or racks that might lead to a failure. As always, follow the appropriate electrical and safety codes. Also, consider any space allocations necessary for future electronics and cabinetry to accommodate expansion of the system.

The next step is to make a list of all other equipment in the headend like channel processors, modulators, satellite receivers, VideoCiphers and other pieces, and make a block diagram of their uses in creating your channel lineup. Obviously, this should include not only how it is lashed up today and the plan for the current channel lineup, but any plan for additional channels. At this time, take a close look at how all these outputs are combined to feed the first trunk amplifier or the laser electronics.

Verification

This is an appropriate time to consider where these signals came from and take measurements of several vital components of the signals. The following examples are just a few of the important items that should be verified:

1) In most headends, combining networks have been put together to take care of the channel loads without proper consideration of the loss or port-to-port isolation. Be sure that combiners, directional couplers, splitters and any other devices in the wiring lash-up are designed to pass the entire frequency bandwidth of the system. (See Table 1.)

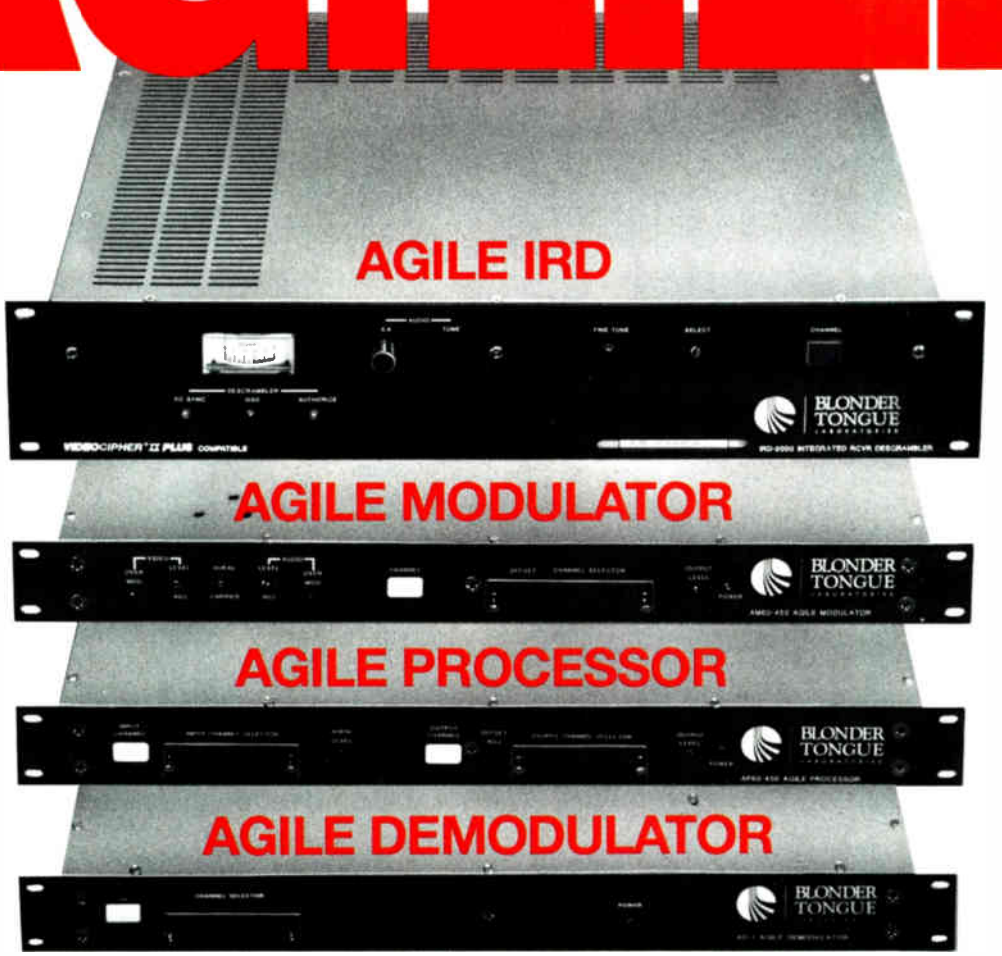
2) Test modulators for frequency stability. Input/output filters (when used) should be tested for their ability to reject interfering signals either generated internally or from sources of ingress. Set operating levels (54-60 dBmV typical) to manufacturer specifications.

The amount of noise contributed to the system by some types of agile modulators also should be investigated. *(Editor's note: This generally won't be a problem with the better CATV agile units.)* The typical out-of-band C/N of 60-65 dB degrades by 10log N, where N is the number of agile modulators in use. For example, the calculations of noise level for a system using 15 agile modulators are as follows:

Table 2: Typical modulator measurements

RF frequency stability	±5 kHz FCC channels
Spurious outputs	60 dB below video carrier with carrier at +60 dBmV and sound carrier at +45 dBmV
Output RF level	+40 to +60 dBmV continuously variable
Output impedance	75 ohms unbalanced (VSWR 1.35:1)
Audio deviation	6 volts peak-to-peak for 25 kHz deviation

AGILIZE



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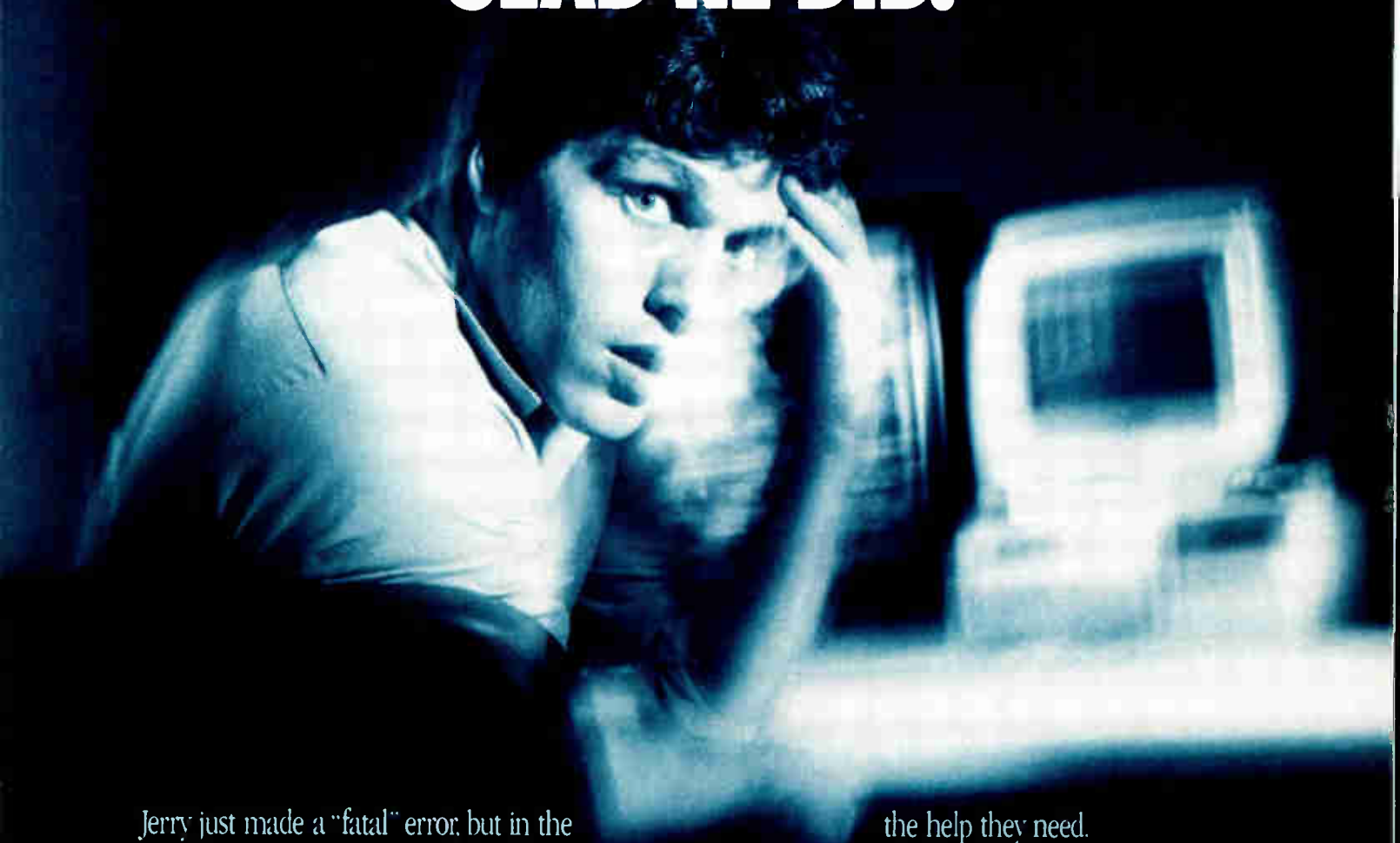

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"Because fiber faithfully delivers source signal inputs, it can actually accentuate imperfections formerly masked by system noise."

10log 15 = 11.76 - 65 = 53.25 dB C/N. It becomes increasingly obvious that the use of an excessive number of agile modulators will have a degrading effect on the overall system performance. (See Table 2.)

3) Heterodyne processors should be tested for many of the same parameters as the modulator. It is very important to verify measurements of the frequency of any aeronautical communication or navigational channels. According to FCC Part 76.605, all aeronautical communication channels should be offset 12.5 kHz and all navigational channels should be offset 25 kHz.

Depending on the age of the equipment, the ability of the internal filters to reject unwanted signals or strip off spurious beats caused by the equipment may not be good enough. In this case, it will be necessary to employ external filters either on the input and/or output of the processor to prevent intermods in other channels of the system.

4) For phase-locked systems, check to be sure that comb generators are not measurable at the output of the processor or modulator when the test channel is turned off. If this condition exists, the comb is most likely being operated at too high a level and should be adjusted to meet the manufacturer specifications. It may even be necessary to install an attenuator at the input to the modulator or processor. Once again, consult the operating manual for each piece of equipment to verify the proper settings.

Subject to various engineering techniques and practices, you will most likely add to this list of equipment and associated tests. All of this testing is aimed at getting the most out of the headend and the fiber system to which it will be coupled. Remember that while fiber is intended to improve the picture quality and reliability of your system, it can in many cases actually uncover many problems that originate in a less than perfect headend **CT**

Automatic vehicle location

(Continued from page 25)

radio system. The processing unit is contained in a 44x23x15.5-inch cabinet. Premounted in the cabinet are a VME computer chassis, calibration receiver, BSC and power supply. Included is a RS232 output port activated/deactivated by the operator. The CRT is a 13-inch color graphics terminal, eight colors for alphanumeric and 16-color capability for graphics. Depending on the Tracknet model up to five CRTs are supported.

Costs and benefits

It was our plan to install the system in 40 vehicles. The equipment cost per vehicle was $1,800. The dispatch and support system costs were $45,000. (In the future we will be able to add additional vehicles at a cost of $1,800 per vehicle, plus the cost of two-way radio.) There also was miscellaneous equipment needed for vehicles that didn't have the Tracknet system installed (data mutes). Once we had purchased the 40 AVL units, the dispatch and support systems, miscellaneous equipment, sales tax, shipping, installation and optimization, the cost of the entire system was $150,522.92. (The cost can vary depending on the needs and existing radio equipment.)

Some of the benefits of having such a system are:

- Knowing where every unit is 24 hours a day.
- Improved response time on outages.
- Increase productivity for installation department, thus indirectly cutting down on contract labor needs.
- Dispatch service calls to the nearest vehicle, ultimately working toward same-day if not same-hour service.
- Cutting down vehicle travel distance up to 10 percent a day.
- The ability to generate productivity reports based on one vehicle, group of vehicles or by departments.

"To assist dispatching, the operator can display the five closest vehicles to any street intersection, site or Tracknet-equipped unit stored in the computer's data base. This display can be increased to the closest 12 units with a single key stroke."

For our budgeting process we put together a break-even analysis, based on the following facts and assumptions:

- The installation of the Tracknet system on 40 vehicles.
- Cost to purchase system with installation: $150,522.92.
- Average vehicle operating cost per mile: 30 cents (based upon industry average in the Los Angeles area).
- Average vehicle mileage driven per month: 1,800 miles.
- Average cost of a service call or installation trip: $20 (which is on the low side, but works well for this analysis).

Savings/increased productivity:

A) A 10 percent reduction in miles driven per vehicle per month (180 miles). 180 miles x .30 per mile x 40 vehicles = $2,160 per month.

B) Three more service calls or installation trips per week, per vehicle at a cost of $20 per call or trip (120 more calls or trips per week). 120 calls or trips x $20 = $2,400 x 4.3 weeks per month = $10,320 per month in increased productivity.

Cost of Tracknet system	150,522.92
A + B divided into the cost of the system	÷12,480.00
	12 months
	(break even)

Probable payback:

C) A 16.7 percent reduction in miles driven per vehicle per month. 300 miles x .30 per mile x 40 vehicles = $3,600 per month.

D) One more service call or installation trip per day. 40 more calls or trips x $20 per call x five days = $4,000 x 4.3 weeks in a month = $17,200 per month.

Cost of Tracknet system	150,522.92
C + D divided into the cost of the system	÷20,800.00
	7.23 months
	(probable payback)

We feel the Tracknet system will be very beneficial to our Long Beach operation. The concept especially works well in a large urban market that utilizes a lot of contract labor. With this system in place finding help will never be a problem again. **CT**

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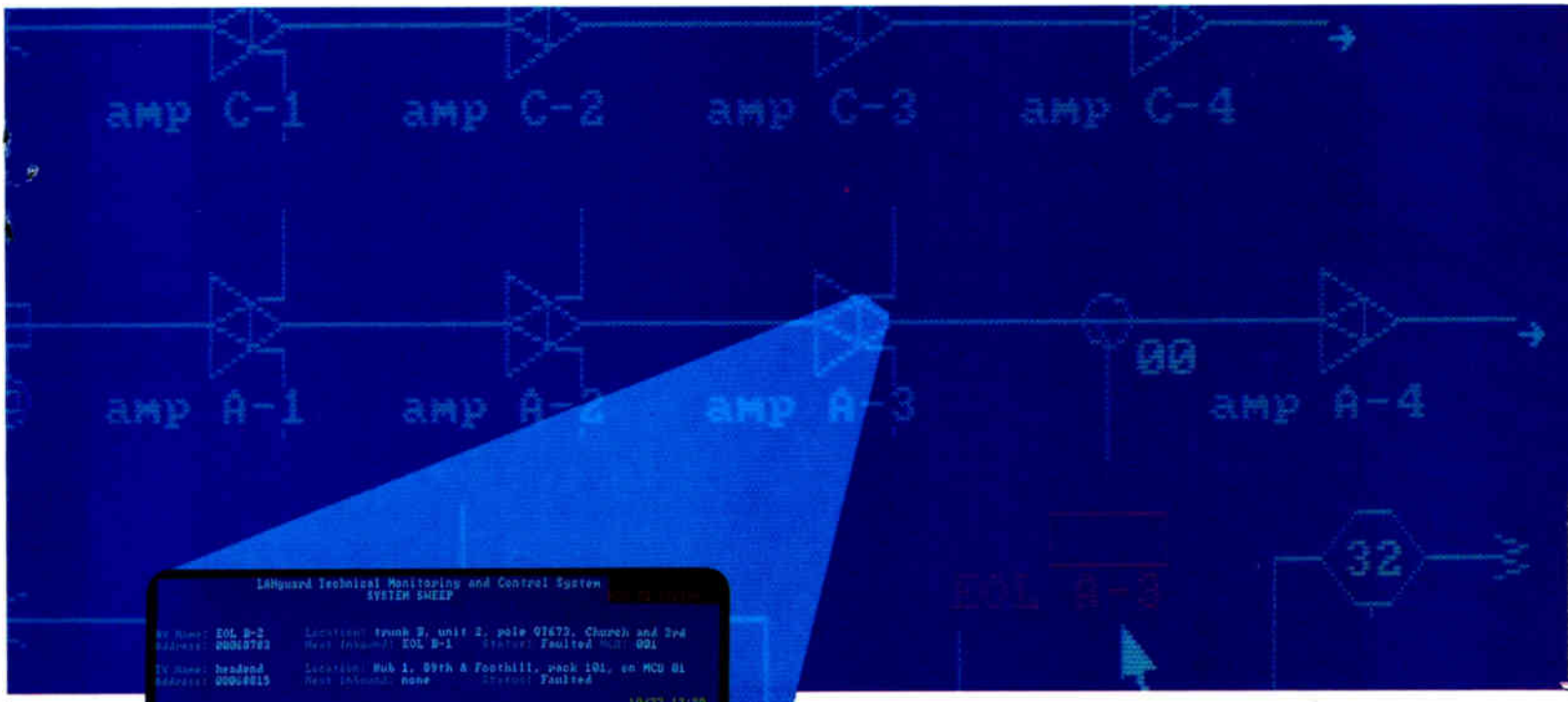

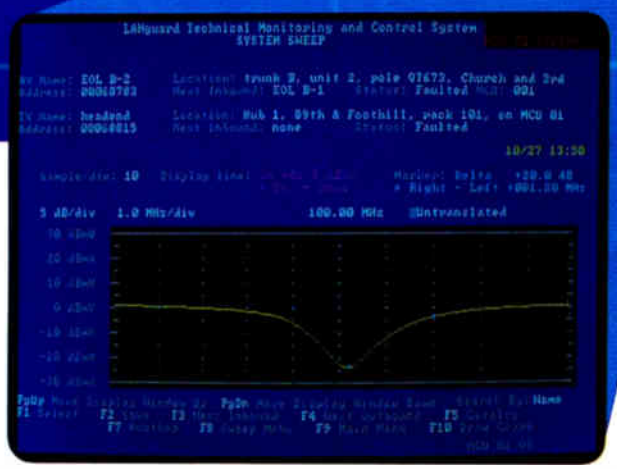

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Following up

(Continued from page 31)

using the coaching guides, they didn't know that they existed, since *they* were never coached through the process. Although the program was in place and working well, it wasn't being used to its fullest capacity since follow-up had not been conducted.

Tracking

Tracking the results is where follow-up really becomes important. A lot can go wrong between the nodding heads in the classroom and the actual work in the field. An eye on verification is necessary to ensure everything is going as planned (no assuming "they got it" the first time).

It's not enough just to give your trainers coaching steps to follow. You need to follow up on your *trainers* to make sure they indeed provide the proper coaching.

The students need to have a clear idea of what you expect from them. They need to know how they will be graded and how often. Then you have to make sure it gets done. Many people won't follow new guidelines if they are not enforced since the old ones are too comfortable. And if there are no adverse consequences for not complying, why should they? In the case of installations, their work needs to be reviewed and scored, and the results returned to the student. Often, it takes one or two initial rounds of these field checks before installers really believe that the jobs they are doing out in the field will be graded. Then they start to understand how job performance ties directly to job longevity.

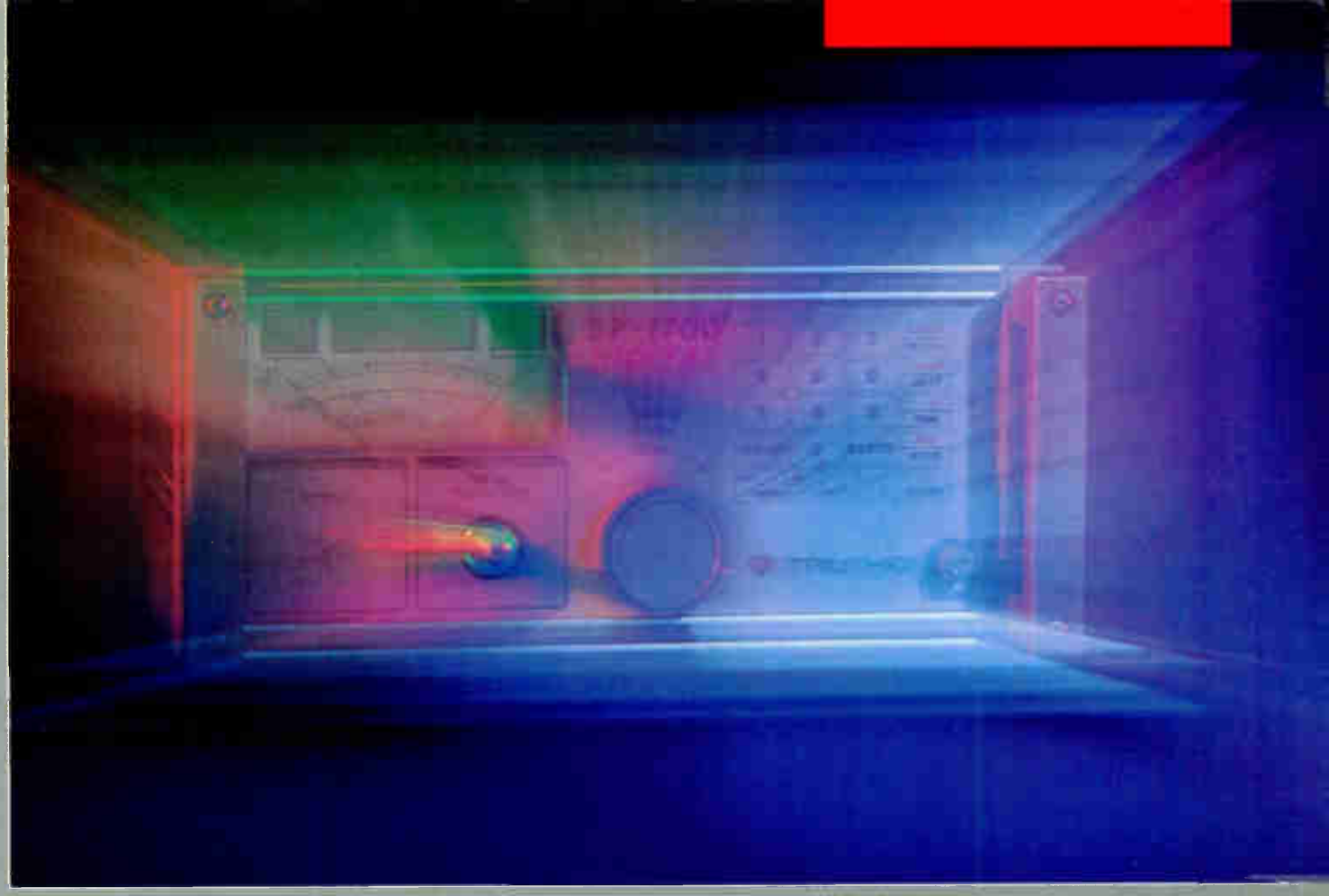
"It's not enough just to give your trainers coaching steps to follow. You need to follow up on your trainers to make sure they indeed provide the proper coaching."

The following example illustrates the importance of continued follow-up. One of our systems implemented a training program designed to teach CSRs how to identify problems over the phone and thus prevent a truck roll. The meeting consisted of role playing, with one CSR being the customer, the other the CSR. By tracking the reduction in truck rolls (20 percent improvement the first month) the training was considered successful. However, after a few months, the number of truck rolls was almost back to where it began. Since follow-up was not done, the group "forgot" their skills. Don't be fooled by immediate results — follow up!

Barbara Wyatt, TCI Cablevision of Washington, shared her thoughts on tracking at the 1990 Western Show. Her topic, "Forty minutes a month to greater profits," consisted of these basic steps:

- Look for the obvious, the simple.
- Pay attention to the smallest detail.
- When you've got it right, change it.
- And finally, track it!

You can read more about "How's your field crew doing today?" (Parts 1 and 2) in *Communications Technology*, April and May 1990. Do *you* know how your field crew is doing today? **CT**



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TRILITHIC

Reader Service Number 30

Managing training

(Continued from page 32)

to ensure that the employee base will be able to perform the tasks necessary to operate and maintain the system over a long period of time.

On the other hand, intermittent, short-term needs are best served by reactive training programs. Reactive should not imply that the program is put in place to fix something that is already broken, but rather that the program is designed to address a specific issue that's not an everyday occurrence in the system. The previously cited upgrade or rebuild is an example of reactive training.

To determine the needs of an organization, the training manager must first analyze the tasks being performed. These should be documented in as detailed a manner as possible and evaluated to determine the effectiveness of the existing procedures. Particular attention should be paid to those areas where tasks take a great deal of time or are frequently repeated. These are the areas where even a small improvement can yield large dividends in performance and productivity. If the average installation requires assembly of 10 connectors, an improvement in productivity of only 15 seconds each can extend to a great deal of time saved.

Work with the department heads managing the employees performing the tasks and get their input on potential improvements. Consult the employees in that department as well and ask them for suggestions on how to improve their productivity and quality of work. Many times we find that the people doing the job have thought of improvements but are reluctant to offer them.

Be sure to look for areas where a training need might not be obvious to members of the department as it is not the primary focus of their jobs. Customer contact skills for installers and service technicians are an example of this. Because these employees generally think of their jobs as being technical or mechanical in nature, there is a tendency to overlook one of the skills they use at every job.

After determining the needs of the organization, examine this list and determine which needs can be addressed by training programs. This step is critical to the effectiveness of your training program as some needs cannot be solved by even the best training programs. For example, if the callback rate on installations is higher than desirable, there is a natural tendency to assume that the employees lack the necessary skills training to perform the job. An analysis of this situation might show that the callbacks are being caused by faulty hardware or a lack of the proper tools to correctly perform the job. Attempting to solve these types of problems through training programs can result in a tremendous waste of time and money, as well as a negative impact on the value of the overall training effort.

Budgeting

Once training needs have been determined, the training manager can prepare a program and budget for each of the categories. The budget should include all of the time and materials necessary to develop the program, as well as for delivery of the class, time off the job for the employees in the classroom and any associated facilities and equipment necessary for the classroom.

It also may be necessary to budget some training for the instructors who will be delivering the classes, such as a seminar on presentation skills. Although we would not think of sending a new installer into the field without any training, we often ask our technical staff to become instructors without any formal training to make them effective in the classroom.

The next step after all of the related costs have been determined is to compare these to the benefits to be derived. In simple terms, is the solution more costly than the problem? Don't be shortsighted in this analysis, however. Many times training efforts are derailed by the failure to fully consider the benefits of implementation. Often a problem in one part of an organization can affect other departments as well.

All of these aspects should be considered when determining the benefits of the training program. For instance, improved performance in the maintenance department may result in fewer service calls, thus reducing costs for that department. Or it also may have a positive impact on the number of subscribers who disconnect service because of frequent outages. By analyzing training programs in this fashion we not only can see that the real benefits of the program may extend over a long period of time, but we also exit the process with a much better understanding of how the various departments within an organization interact.

Evaluating results

Just as a marketing effort that can't show increases in sales will not survive, a training program that can't document improvements will not be supported by management. For this reason it is necessary to have a thorough understanding of the existing performance level of the system both before and after the training has been conducted. There are a number of ways available for tracking the improvements resulting from training, such as reject rates, accident-related costs, productivity rates, customer satisfaction surveys and many others. Training managers must be able to show how their efforts have affected these indicators in a positive way. This is often complicated due to outside influences on the numbers being analyzed. It is sometimes necessary to establish a control group that doesn't receive any training and track the performance of this group relative to the group trained. This will allow outside influences to be normalized out of the results.

On a smaller scale, results of a training program can be demonstrated by testing the student group before and after the class. Although this will allow instructors to determine their effectiveness in presenting the material, it is not an indication of whether the increased knowledge level will translate into improved performance on the job. Using this type of evaluation will allow the instructor and manager to determine whether less than satisfactory results are caused by course content inadequacies or by deficiencies in the presentation of the material.

Repetition and retention

Once the course has been prepared and delivered, and the results have proven to meet our initial projections we can discontinue the training program, right?

Hardly! Even in the case of the most frequently performed job functions, some refresher training is necessary to prevent a gradual return to the conditions existing prior to the implementation of the program. Employees forget information they learned in the course and develop shortcuts and bad habits over a period of time. The frequency of refresher training depends a great deal on the tasks' complexities and the frequency with which they are performed.

By continuing to track performance indicators, the training manager can determine when refresher courses are necessary and to what degree the material needs to re-emphasized. It may be possible to maintain peak performance with an occasional one-day brushup on the techniques learned in a week-long course. Or the extra time available could be used to convey more advanced topics building off the information in the original training. In fact, this practice of relating previously learned information to new information helps increase retention significantly.

The value of any training program is closely related to the ability of the training manager to properly plan the program and monitor its results. The current focus on training in our industry allows us the opportunity to demonstrate how an effective training program can show positive results in our operations. As we continue to evolve and mature as an industry, training will be an important factor in our ability to meet the technological and economic challenges of the future. **CT**

Headend or headache?

(Continued from page 41)

known as *agility,* is becoming more widely used than expected. Agile modulators and processors were originally thought of as backup units; however as their costs continue to decrease, using them as primary units can be a practical alternative.

Fabricating the headend

At this point, let's assume the question of strip amplifier vs. processor has been settled, and the output level is established. We now have to assemble these items in a rack or cabinet. Here we go again — which is better? Well, what's best depends on the situation on hand and the budget.

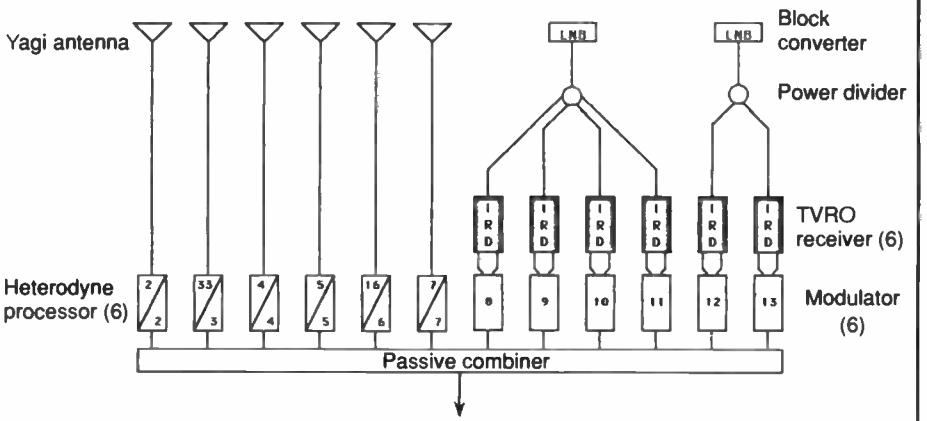
Rack: This description has a rather wide latitude, ranging from well-constructed, free-standing commercial products, to cleverly improvised pieces of angle iron or even a slab of wood to which some equipment can be bolted.

System A: This is going to deal with a commercial open relay type rack. We chose this because the headend is going into a locked room where it will be secure from unauthorized adjustments. The room is well-ventilated (air-conditioned would be ideal) and has adequate power available. The room also is conveniently located away from noise generating equipment (e.g., elevator motors and relays). Commercial racks can have 3- or 8-inch wide bolted or welded frames, and tapped or untapped rear rails.

If the headend is going to be assembled on site or within a short distance of its location, then a bolted rack may work fine. Should fabrication take place a considerable distance away, requiring truck shipment, then a strong welded frame (not likely to lean from the weight of the headend gear) is desirable. Having tapped rear rails is a time saver with a system incorporating passive devices that have to be mounted on rear panels. A real plus of using an open rack in a ventilated environment is that a ventilating fan is not needed, further reducing costs.

The selection of a 3- or 8-inch wide rack frame depends on the depth and weight of the products involved. A narrow 3-inch frame may be great with lightweight bandpass filters and some strip amps, but the 8-inch frame is more sensible for deeper, heavier satellite receivers and most CATV processors abd modulators.

Figure 3



System B: Cabinets have been mandated for this headend, which is not as cost-sensitive as System A. Cabinets are available with one door, (usually the rear door) or with front and rear doors, with or without locks. Rails are usually adjustable to accommodate different depth equipment and tapped for ease of assembly. The cabinet configuration depends on how many ideal conditions we can meet. Locking front and rear doors may be necessary if the headend is located in a low security area. However, a cabinet ventilating fan may then become a necessity, even if the room is ventilated.

On the other hand, if the cabinet is going to be against a wall with enough space at the rear for air circulation and servicing, a front-locking door and no fan may be adequate. To summarize, racks are less expensive, less attractive and provide less security than cabinets. Greater caution also must be used when transporting a rack-mounted prefabricated headend.

Assembly practices

Whether you choose a rack or cabinet, there are certain assembly practices that will avoid disaster when the headend is fired up.

"Agile modulators and processors were originally thought of as backup units; however as their costs continue to decrease, using them as primary units can be a practical alternative."

•Mechanical considerations:

1) Mechanical location of the individual components is just as crucial as the electrical hookup. Arrange everything in a logical sequence, keeping the cable runs as short as possible. For example, avoid running antenna inputs from the top of the rack to units located at the bottom and then back up to a combiner near the top.

2) When rack mounting products that run fairly hot, skipping one rack space between units might be advisable to avoid a "chimney effect" heat buildup.

3) Locate AC power strips so equipment line cords will be routed directly and in a manner enabling quick, easy disconnect.

4) Keep the heavier items near the bottom of the rack, when possible.

•Electrical considerations:

1) Use a good (preferably double-shielded) headend cable.

2) Use one-piece hex crimp or other high quality connectors. All connections should be tight and clean.

3) Route output cables away from input cables to avoid crosstalk.

4) Allow sufficient clearance, so cables are not disfigured by cabinet doors.

5) Avoid excessively sharp cable bends, which will kink the cable and affect electrical impedance.

6) Keep in mind FCC Docket 21006, which pertains to all CATV headends. Table 2 illustrates the channels involved and the magnitude of offset, which is required to prevent interference with aeronautical channels.

7) CLI (cumulative leakage index):

"When employing strip amps for off-channel processing, we must add a UHF-to-VHF or VHF-to-VHF converter at the amplifier input and possibly a BPF between them, depending on conditions."

Be aware of FCC Rules Part 76.614, which requires cable operators utilizing carriers in the 108-137 MHz and 225-400 MHz bands to set up a program to regularly monitor for signal leakage.

Is it really over?

What a relief! The headend is working, the customers are happy with the pictures and the FCC is satisfied; the installation is a solid success. Dream world? No! Just a matter of careful planning, diligent homework and perseverance in overcoming all the obstacles involved in completing another project.

Getting it on-line and approved is only part of the battle, keeping it operating properly is equally important. Critical maintenance should not be ignored, such as periodically observing the headend output on a spectrum analyzer and making any necessary adjustments. Storing a logbook in a pouch attached to the side of the cabinet is an easy way to keep your maintenance schedule available. This pouch also should contain the headend schematic, along with manuals on key components in the system. Why waste precious time searching for these items during an emergency?

As mentioned earlier, our objective was to focus on some major and minor considerations in bringing a headend on stream. In spite of all preparations, planning and coordination of activities, gremlins may still appear; but their effect will be greatly minimized.

Although no one has all the right answers, who can question the sensibility of taking a logical, methodical approach while adhering to time-tested basics in producing an acceptable headend, rather than a headache. **CT**

Writing better tech memos

By Rikki T. Lee
Consultant

Before proceeding, read the accompanying memos; any errors? As a means to communicate important information to staff, memos take the place of phone conversations or public address announcements. So why write — when you can talk and deliver the same message? To qualify as a notice worth reading and keeping (rather than tossing in the trash), your tech memo should pass these litmus tests:

• Your one-to-one written memo works best when the spoken word might fall flat, such as thanks, congratulations or "good job." Also use the personal memo to give or request detailed information or to summarize an accompanying technical paper. On the other hand, effective criticism occurs face-to-face in a closed office, not on paper.

• For people who receive the same message, it should act as a reminder of something important and as a reference later (upcoming meetings, tech procedures, office rules, pertinent industry regulation, new staff member, etc.). Only the necessary data should appear. To call a meeting include date, time, place, agenda and so on. Let your memo introduce new staff by their first day at work.

• In cases not covered by the previous two, use your judgment. If you've nothing to say, you're too busy to write or others are too busy to read, don't write a memo; you're wasting your time and your readers'.

Talk to your audience

If you absolutely must write, first think about the recipient: One or many? Technical or administrative? What tech level? Before you begin writing or inputting, pretend that person or group sits in front of you. You're required to have a vivid imagination if all the readers can't fit in your small office. Also invite the person who must approve the memo as well as anybody who will get copies.

Now have a talk. As always, you're pressed for time. So say the most important item first; this will appear on your memo as the first sentence. (If you're angry, desperate or negative, dismiss everyone and try later.) Then answer any questions you may be asked, from reasonable to ridiculous: "What do you mean?" "How can that be?" "Why are you telling me?" "What if it can't be done?" After Q & A, which should clarify your main idea and also act as the body of your memo, provide a statement of action. What do you request? When will you follow up? Now make an outline of these points in order.

After you're satisfied with the outline, compose the memo; try not to go over two printed pages. The rules of writing a memo are the same as a letter, technical report or journal article: Write clearly (zero tolerance for misunderstanding), concisely (every word essential), accurately (facts correct), concretely (with examples), fluidly (flowing text) and professionally (on your best behavior).

But keep in mind a few special tips that will improve your memo writing skills. First, use conversational language, just like that talk you had in the office with your readers. Don't write *too* friendly, because you do want to be taken seriously. Second, make your initial sentence the most important, then follow up with supporting details. Get to the point; avoid the introductory sentence ("This memo is in reference to headend monitoring procedures."). Third, write positively. Offer suggestions instead of criticism.

By now you think, "Lighten up, Rikki. It's just a memo, not an NCTA paper." OK — but remember: Everything you write (even a "harmless" memo) reveals yourself to others. When you write not only do you communicate a message, you communicate an image; in the case of a memo, it's *your* image.

Finished writing? Wait — before you send it out, take note:

1) If possible, wait a day. Then revise, rewrite or destroy it. Also ask someone you can trust who isn't affected by the memo to read it over. If the feedback you get sounds serious, rewrite the memo.

2) Resist an urge to "cc" (send copies to) half of the office. Is it necessary that each person listed should receive a copy? Or are you grandstanding — if so, you'll appear impotent, not important.

3) Despite your wish for confidentiality, your memo can get copied and circulated to staff prone to gossip. Also, that paper (with your signature) lying atop someone's desk can be scanned by a visitor's wandering eye. So don't write anything you'd deny later.

4) To spice up the same old formula memos, add a few attention getters. Experiment with eye-catchers like bullets, check marks, pointing fingers and so on. Put a color dot or use a different tint of paper depending on topic. Finally, handwrite key words like "Save this," "Reminder" or "Important" atop the memo.

Better left unwritten

If you're wondering about the two memos, their writers made these errors: Memo 1 lacks the sender's full name. No date, so when is "mañana"? In general the note sounds chummy and makes the topic of safety appear trivial. Memo 2 is derogatory, threatening, unclear. What exactly does Smith not like about Anderson's requisition? Copies go to some powerful people, so Smith also might want to plan a trip to Alaska. So some things are better left unwritten. **CT**

Memo 1

To: Technical Staff From: Pat
Re: Important Notice!!
It had to happen sooner or later, so let's get it over with: Our first department meeting on complying with OSHA guidelines is mañana at 3 in Room 210. See you there, pard'ner.

Memo 2

To: Anderson
From: T. Smith, Chief Technician
Date: Feb. 28, 1991
Subject: Your requisition for Model D355
What the hell is going on here? Are you crazy or something? One more stupid requisition like this, and you'll be climbing poles in our central Alaska system. I don't want to see any more of these!
cc: C. Lance, VP of Engineering
F. Gordon, President/CEO

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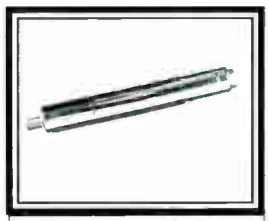

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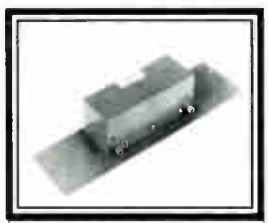

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FM Systems' VVM digital video voltmeter

By Ron Hranac
Senior Technical Editor

Since the introduction of VideoCipher technology for satellite program security and addressable converter operation in systems, our industry has had to pay a lot more attention to baseband signals. RF measurements are no longer the only skills we have to be comfortable with; we now have to understand video, audio and even data signals. More recently, fiber optics has introduced us to the world of lightwave measurements.

Baseband video measurements used to be the exclusive domain of broadcasters, studio personnel and those seeming magicians of long-haul FM microwave. In spite of its relative simplicity, the measurement of video amplitudes has been considered by many to be more difficult than it actually is. But it's also one of the most important tasks in today's headends.

While you're certainly welcome to spend several thousand dollars for a studio-grade video waveform monitor to perform these measurements, the ordinary oscilloscope is quite capable of doing the job. (See "How to set video levels with an oscilloscope," *CT*, January 1988.) Now there's an even easier way to do it: Use FM Systems' VVM digital video voltmeter. This instrument makes video amplitude measurements as easy as using a digital multimeter to measure voltage or resistance.

The product

The VVM is a battery operated hand-held instrument that's just a bit larger than the average hand-held DMM. (See accompanying photo.) It's housed in a black plastic case that measures 3-13/16 inches wide by 7 inches long (not including switches, knobs or connectors). Since the front of the case is tapered, its thickness ranges from 1-3/8 to 1-11/16 inches. A metal stand is recessed into the back of the case, allowing for convenient tabletop use.

The VVM operates off of a single 9-volt transistor radio battery (alkaline type is recommended) that is accessible through a rear plastic cover. As an option, the meter may be used with a rechargeable NiCd battery that can be charged through a jack provided on the left side of the case. Power is turned on with a front panel momentary contact rocker switch; an automatic off feature turns the VVM off after about one minute of use. The on time can be increased by pushing the switch again before the time-out occurs. Should internal battery voltage be too low to provide accurate readings, internal circuitry prevents the meter from operating when the on switch is pressed.

Video connection to the meter is via one of the two top-mounted BNCs. Like waveform monitors, the VVM incorporates a high impedance loop-through input, so a 75-ohm termination must be installed on one of the connectors if the meter is the last device in the video chain being measured.

The amplitude indication is displayed on a 1-13/16 by 5/8-inch LCD in either volts or IRE units. The user selects one of six measurements with a front panel knob: sync, white or composite peak-to-peak voltage; or sync, white or composite peak-to-peak IRE units. Readout resolution is 0.01 volt or 1 IRE unit, and accuracy is specified as 1 percent ±0.01 volt or 1 IRE unit. The VVM will measure either PAL or NTSC (negative sync) video, and full specifications are in Table 1. List price at the time of the evaluation was $369.

Table 1: VVM digital video voltmeter specs

Measures	Sync, white and composite video
Ranges	IRE units and V p-p
IRE unit maximum	199 IRE units
IRE unit resolution	1 IRE unit
IRE measurement accuracy	1 percent ±1 IRE unit
Volts p-p maximum	1.99 V p-p
Volts p-p resolution	0.01 V p-p
Voltage accuracy	1 percent ±0.01 V
Frequency response*	IEEE Standard 23S-1
Power source	9 volt alkaline or NiCd battery
Battery charger	Available for NiCd battery (optional)

*An IRE luminance filter is built-in to provide amplitude readings consistent with waveform monitor readings with the IRE filter switched in.

Lab measurements

I used a Tektronix TSG-100 digital video signal generator as the reference video source, and (to ensure an accurate termination on the VVM's loop-through input) installed a Tektronix 011-055 precision 75-ohm video terminator on the second connector. To check the meter's response to various levels of chrominance and luminance content, I measured color bars, a 0 IRE flat field, 50 IRE flat field and an NTC 7 composite signal. Table 2 summarizes waveform monitor IRE unit and peak-to-peak voltage correlations. Since the VVM

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Table 2: Video IRE unit and peak-to-peak voltage relationships

Video parameter	IRE units	Peak-to-peak voltage
Reference	1	0.00714 volt
Sync amplitude	40	0.286 volt
Color burst amplitude	40	0.286 volt
Setup	7.5	0.054 volt
Luminance (blanking to peak white)	100	0.714 volt
Total video signal amplitude (sync tip to peak white)	140	1 volt

voltage resolution is 0.01 volt, it rounds off to two places.

The VVM easily met the manufacturer's specifications. Table 3 summarizes the meter's readouts with the various test signals used. The automatic off feature turned the meter off after 1 minute and 2 seconds (this may vary somewhat from unit to unit, depending on factory adjustment). With the meter's input unterminated, the readings were approximately twice as high as normal, consistent with unterminated oscilloscope or waveform monitor video measurements.

Comments

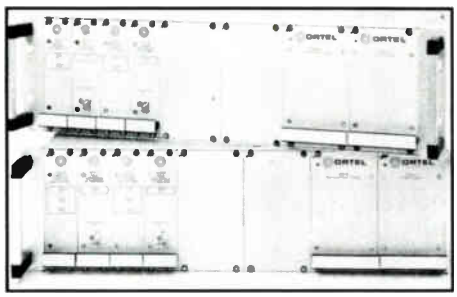
The VVM digital video voltmeter is an accurate, convenient and low-cost instrument for measuring video signal levels. If you are intimidated by oscilloscope or waveform monitor video measurements, then the VVM will be a useful tool that's pretty much foolproof to use (just make sure to terminate the output). Furthermore, its low cost makes it particularly attractive for smaller systems.

Table 3: Test results

	IRE	Volts
Color bars		
Sync	040	0.28 to 0.29
White	100 to 101	0.72
Composite	140	1.00
0 IRE flat field		
Sync	040	0.29
White	000 to 001	0.00
Composite	041	0.29
50 IRE flat field		
Sync	040	0.29
White	051	0.37
Composite	091	0.65
NTC 7 composite		
Sync	040	0.29
White	101	0.72
Composite	140 to 141	1.00

The instructions that accompany the meter are thorough, including a procedure to set VideoCipher levels. It would be nice if those instructions also included a description of the VVM's theory of operation and a schematic diagram (that's a personal preference). As it is, there are no user adjustments for calibration, and if problems occur the meter must be returned to the factory. This isn't all bad, however; it does prevent inadvertent adjustments that could affect measurement accuracy.

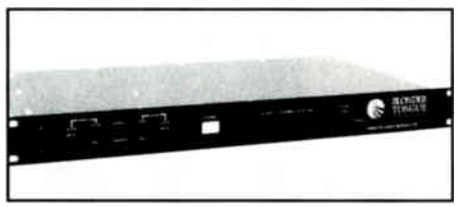
For more information contact FM Systems at 3877 S. Main St., Santa Ana, Calif. 92707; (714)-979-3355. **CT**



end over distances up to 15 miles with a single fiber cable.

The system can transmit all 12 channels from a single polarization. Each plug-in unit mounts into a standard 19-inch rack-mount chassis that includes an AC power supply, and rear panel RF and optical connectors. The system RF input also provides current-limited DC power for the LNB.

RF parameters of the 10005A are passband range of 950-1,450 MHz, typical baseband signal-to-noise ratio at 15 miles/60 dB, input/output impedance of 75 ohms. Optical parameters are a laser wavelength of 1,310 ±15 nm and 9/125 µm single-mode fiber.
Reader service #201



Headend products

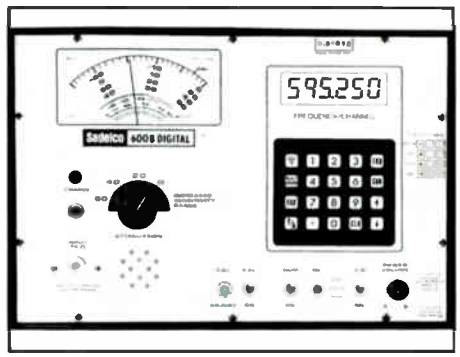
Blonder-Tongue introduced a full line of CATV performance agile headend products, including AM Series agile modulators, AP Series agile processors and the IRD-2000 agile satellite integrated receiver/decoder.

The AM and AP series modulators and processors feature an out-of-channel noise floor greater than 74 dBc and 550 MHz output capability. The output level and spurious performance are guaranteed to be better than 60 dBmV and 60 dBc respectively for all channels of operation.

The IRD-2000, a commercial grade satellite receiver with an integrated VideoCipher II commercial descrambler module, utilizes a low noise 70 MHz IF with threshold extension.
Reader service #200

Network analyzer

The R3762 Series 3.6 GHz network analyzers from Advantest America can measure amplitude, phase, group delay and impedance in frequency ranges from 300 kHz up to 3.6 GHz with a measurement speed of 0.5 ms/point. The R3762 has a built-in BASIC controller function, built-in floppy disk drive and a 9-inch CRT.
Reader service #198



Signal level meters

Sadelco's two new digital signal level meters, the Model 7600D and the Model 600B, both feature electronic relay attenuators, microprocessor corrected surface mount tuners and built-in calibration. The standard frequency range of 54-600 MHz may be extended in both models to 6.5-890 MHz. The Model 600B also provides carrier-to-noise measurement, favorite channel programming and three different hum measurements that may be taken on active audio carriers.
Reader service #199

Power supply

A 0-50 volt, 2 amp DC bench power supply with 0.01 percent regulation and

less than 1 mV RMS ripple is now available from B&K-Precision, a division of Maxtec International Corp. The Model 1611 is conservatively rated for continuous operation at maximum power output without overheating.

With two analog meters, the 1611 provides simultaneous monitoring of voltage and current output. Two current ranges are selectable with coarse and fine voltage controls provided.
Reader service #197

Surge arrestor

PolyPhaser Corp.'s Model IS-DC75LFZ-24VAC in-line surge arrestor for tower-top TV preamps with type F connectors is bulkhead mountable, provides Chs. 2 through 69 coverage with 0.3 dB loss and ≤1.2:1 VSWR. The unit separates RF and 24 VAC power, provides appropriate level of protection and then combines them together. Other DC versions also are available.
Reader service #196

Design software

ComNet's BSE-Pro CATV design software has been updated to design citywide fiber-optic systems. It can design AM or FM fiber from the laser headend source to the field receivers and will continue to design to the RF drop in either feet or meters.

Users can define the software with initial distortion parameters, either at the headend or the fiber receiver node where the trunk cascade begins. It can define star couplers and track any fiber size by color or alphanumeric notations. It also can define nominal insertion losses for fused or mechanical splices.
Reader service #195.

Screening attachment

Allied introduced its RotoSort mobile screening attachment for backhoes, wheel loaders or excavators. The attachment loads, sorts and transports materials in a single, continuous operation.
Reader service #191

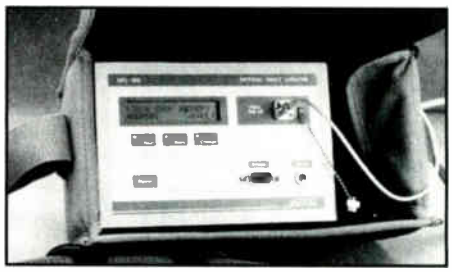
OSHA guide

Keller's *1910 OSHA Guide* is a complete reference to Subparts A-Z of OSHA'a Occupational Safety and Health Standards as contained in 29 CFR 1910. It contains word-for-word rules on issues including lockout/tagout procedures, HAZWOPER, air contaminants and personal protective equipment. It also has the recently expanded Air Contaminants Table that sets permissible exposure limits. In addition, the company offers a guide update service, published twice yearly.
Reader service #190

Satellite antenna

Channel Master's Mirage VII Model 6375 is a 7.5-foot version of its 10-foot quad mesh satellite antenna. According to the company, it was designed to provide its user with the best satellite reception possible in a smaller size, while conforming to most areas where antenna size is restricted.

The four-piece antenna is manufactured with expanded and rolled Ku-mesh aluminum. The four antenna petals are factory pre-assembled, and mesh panel inserts are preformed to the parabolic curve and attached to 20 aluminum support ribs using self-tapping screws. The antenna is packaged with a quad leg feed support and cover that accepts standard C-band or Ku-band feed assemblies.
Reader service #194



Fault locator

Noyes Fiber Systems' OFL 100 optical fault locator utilizes OTDR technology to locate problems with one-button operation. The unit is portable and ruggedized for field use and will operate for extended periods on rechargeable batteries, according to the firm.
Reader service #193

Digital link

BT&D Technologies' XMT1300-1.2 fiber-optic logic-to-light transmitter and RCV1201-1.2 fiber-optic light-to-logic receiver add a logic level fiber-optic interface. They are capable of transmitting digital data up to 1.2 Gb/s over distances of up to 10 km. According to the company, the units were designed for easy equipment interface.

The transmitter uses a gallium arsenide integrated circuit laser drive and provides 200 microwatt optical output power at 1,300 nanometers, ECL compatibility, internal diagnostics and automatic level control. The receiver also uses gallium arsenide technology, and offers ECL compatibility with alarm circuitry, an InGaAsP PIN photodiode and GaAs transimpedance amplifier.
Reader service #192

AD INDEX

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6	25	44	63	82	101	120	139	158	177	196
7	26	45	64	83	102	121	140	159	178	197
8	27	46	65	84	103	122	141	160	179	198
9	28	47	66	85	104	123	142	161	180	199
10	29	48	67	86	105	124	143	162	181	200
11	30	49	68	87	106	125	144	163	182	201
12	31	50	69	88	107	126	145	164	183	202
13	32	51	70	89	108	127	146	165	184	203
14	33	52	71	90	109	128	147	166	185	205
15	34	53	72	91	110	129	148	167	186	206
16	35	54	73	92	111	130	149	168	187	207
17	36	55	74	93	112	131	150	169	188	208
18	37	56	75	94	113	132	151	170	189	209

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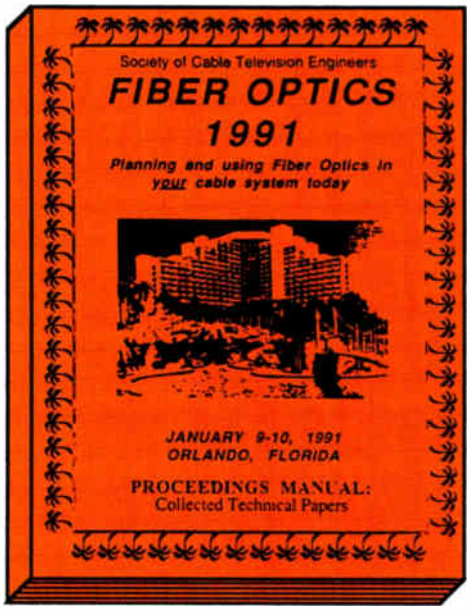

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BACK TO BASICS

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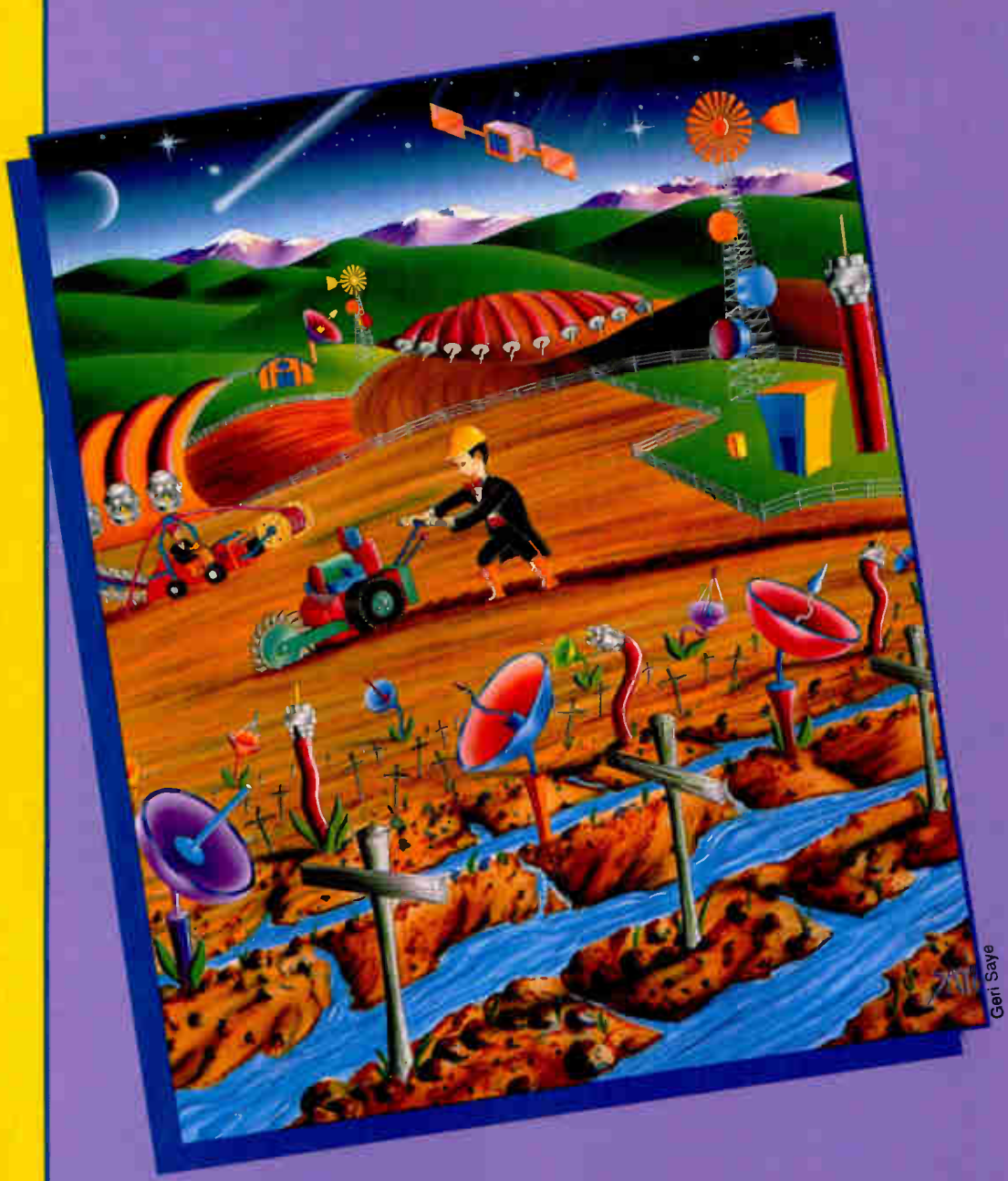

Geri Saye

Formerly Installer/Technician

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Geri Saye

Spring is in the air

By Martin J. Walker
Senior Vice President, Engineering
Simmons Communications

The winter months often are very hard on the average cable system's outside plant. Wide temperature swings, snow, ice, strong winds, road salt, animals and even humans all can create problems that have been masked by both the weather and by field technicians' desires to get out of the cold and into a nice warm vehicle, leading them to pay less attention to details.

The rigors of winter driving, which often require extra attention to the road ahead due to weather and road conditions, also can result in decreased vigilance on the part of the technician in keeping an eye on the plant as the journey is made from call to call. This can often lead to an accumulation of numerous small problems by the time spring arrives, resulting in a higher level of service calls than at other times of the year.

Basic steps

There are some very basic preventive maintenance steps that are beneficial for any system to perform on an annual basis, particularly in the spring. These can alleviate the problems caused in winter and reduce service calls in the upcoming months.

The first step is to perform a system sweep using either a low level sweep such as an Avantek, a high level sweep such as a Texscan or Wavetek, or even the newer non-interfering sweeps such as the CaLan and Tektronix units. In larger systems, which can justify and afford a full-time sweep technician, this is usually a year-round function, with the goal of aligning every amplifier at least twice (and preferably more often) a year. Smaller systems usually don't have enough manpower to do this, so it's a good idea to schedule a once-a-year run through the system in the spring.

All of the system trunk stations should be balanced and the response flattened, reducing the peak-to-valley problems in the trunk system and providing more consistent signal levels to all subscribers. This also is a good time to do some of the proof-of-performance tests formerly required by the FCC, which may indeed become a requirement again in the future. In particular, carrier-to-noise, hum, a 24-hour level variation and peak-to-valley response should be examined carefully. Any out of spec or abnormal conditions should be noted, their cause tracked down and corrective action taken.

This will ensure that all AGC modules are operating properly within their windows, that no hybrids have failed (in feedforward stations), and that levels are properly flat, sloped or block tilted (depending on system design). Picture quality will be maximized as well.

This also will help disclose the presence of frequency-dependent problems such as cracked cables, connector pullouts, water ingress, etc., that would not be visible to the naked eye from ground level. The more of these you can catch before subscribers call, the fewer truck rolls you'll have later and the happier your subscribers will be.

Now that you've taken care of the trunk and all the subscribers fed directly off a bridger (you did remember to balance these, didn't you?), what about your line extenders? Usually, just a balancing job will take care of these. It also is a good idea to check response and levels at as many of your feeder terminations as you can to detect problems in your feeder plant similar to those outlined previously.

CLI rideout

The second major maintenance item that should be done is your CLI (cumulative leakage index) rideout. A word of caution: If you think there's a chance you won't pass the CLI test on a first run through, make sure you start early enough to fix all your leaks and retest in time to meet the annual deadline.

In addition to fixing your leaks, while you are doing your CLI test, do a physical inspection, pole by pole, pedestal by pedestal, on your plant. You'll probably be surprised at all the little things you find — things that could add up to big headaches later.

You could conceivably find such things as:

- Broken bonds or vertical grounds
- Broken or loose downguys or guy guards
- Broken lashing wire
- Badly corroded strand
- Kinked, dented or even bullet-holed cable
- Deformed expansion loops
- Radial cracks in older, round-bottomed expansion loops
- Broken tap ports
- Broken or missing tap terminators
- Tap, passive or amplifier housing

brackets that have come loose from the strand
- Loose lashing or bonding clamps
- Broken traps (if you use them)
- Missing security sleeves on drops (if you use them)
- Missing shrink boots on drops (if you use them)
- Split shrink boots on plant connectors
- Illegal drops
- NESC clearance infractions that weren't there before (e.g., a power company service riser for a new home with insufficient riser guard or a new telco fiber-optic line)
- Missing power supply or breaker box covers
- Missing or broken power supply or breaker box locks
- Missing or broken pedestals (such as the one that got buried in the snow and leveled by a snow plow)
- Missing or broken pedestal locks
- Broken or missing apartment boxes, lids or locks
- Drop problems, such as a cross-faced pole, broken messenger, improper clearance, excess sag due to snow/ice loading, etc.

This also is an opportunity to note any new homes that have been built for which new taps, feeder cable or even plant extensions need to be added. All of these items can be checked very easily while doing your CLI rideout and will become second nature to check as you drive by. I'm sure that with minimal practice you'll form "snapshots" of the plant in your mind's eye and any problems will leap out at you. If you have standby power supplies in your system, check their batteries and make sure they're operating properly before the summer heat hits.

"At your headend, spring is a good time to inspect all your antennas, downleads, waveguides, etc., for any obvious damage such as missing elements, loose supports or wind/ice damage."

At your headend, spring is a good time to inspect all your antennas, downleads, waveguides, etc., for any obvious damage such as missing elements, loose supports or wind/ice damage. In many cases, a scan from ground level with binoculars will be sufficient, while taller towers must be climbed. If the tower is climbed, also try peaking off-air antennas and checking downlead connections.

If you have microwave paths in operation, peaking up the path(s) will probably produce some extra fade margin. Make sure your pressurization system, if any, is fully charged.

The tower guy wires (if any) should be checked for tension (have a professional tower contractor do this), and the tower structure itself checked for clogged drainage holes at the base, excessive rust and flaking or chipped paint. Your earth stations should be checked for cracks or water in the feed horns, missing or rusted hardware and secure connections in the downleads.

Finally, don't forget to give your vehicles a good going over for tire wear, rust, brakes, lights, horn and safety equipment. A good spring cleaning inside wouldn't hurt either. **CT**

The bucket truck: A versatile tool (Part 1)

This is the first in a series of articles on bucket trucks and will cover their uses and benefits. Part 2 will cover lift truck maintenance and/or lack of it, and the results of proper or improper maintenance.

By Pat Bartol
Technical Representative, Mobile Lifts Inc.

One of the handiest and most valuable tools available to the cable system is the mobile lift truck or, as it is commonly known, the bucket truck. It can be argued that one man with a bucket truck can accomplish as much work as two or three men with a ladder and/or climbing hooks. Some may disagree and maintain that it really makes no difference, that bucket trucks are mainly a luxury item with no real contributing value to the system. This article will furnish insights the latter group may not be aware of and provide the mental germs for further consideration.

A technician ascends to a typical aerial crossover for routine maintenance work.

What's the task?

The efficiency of one method vs. another depends on which techs are involved and what task they are setting out to do. For example, take splicing. A good tech who splices only taps, and climbs with hooks and a bolt bag to carry his gear, can readily outsplice another good tech in a bucket truck.

However, when it comes to splicing amplifiers or hanging power supplies, the bucket truck not only accomplishes the job faster and more easily, but usually neater and safer as well. Fewer mistakes are made when the splicer is not under physical strain while simultaneously trying to hold up a heavy piece of equipment and form expansion loops or do anything that requires leverage to accomplish. Also, the bigger the cable, the more leverage needed.

Mid-span work is the private domain (or should be) of the bucket truck. You cannot reach there safely with hooks and ladders. It can be downright hairy, especially if the ladder must be placed on the roadway or if one is climbing against figure-eight cable (self-supporting).

A situation where the bucket truck and climbing hooks work equally well, and where either is preferable to a ladder, is when working on poles where there is equipment and a big old maple tree wrapped around it. The bucket

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truck usually can be maneuvered into a decent position from which to work. A few small branches near the equipment may need to be clipped but if you trim this area on a regular basis, each time you visit this location a nice "hole" in which to park the bucket can be made in the tree.

Depending on the foliage density near the pole, it may be quite tricky for the climber to maneuver up to the working height. In the same situation it often is impossible to find a place to swing a ladder into position and, if done, the worker sometimes must be a contortionist to wiggle his way around the tree limbs and branches while climbing. By the time he has gotten up there, the tech with the bucket truck is done and down, and has conserved a lot of energy for the rest of the day.

Hail Mary poles

Consider, if you will, the value of a bucket truck for construction. In the past, cable systems were constructed by climbing each and every pole. The majority of these are fine, no problem, routine. A certain percentage, however, were called "Hail Mary" poles. These are poles on the corner with the four telco trunk lines, sagging high voltage lines, an ungrounded street light, underground dips for telephone and electric, the local fire alarm and four telco house drops (north, south, east and west) and all off the same J hook, right in the middle of your 40 inches.

You would even have problems with a bucket truck here, although a lift with an articulating arm or elbow lets you maneuver better than a straight lift. Climbing an obstacle course such as this, however, can literally be a shocking experience.

Then there is the pole that looks fine but is actually a hollowed out shell, and each step sounds like a bass drum. You get to thinking that it is telling you something. The bucket truck, of course, skips right by these unsafe conditions. And you spend less time listening to and talking to poles.

When running a single 1/2-inch feeder line down a street, there probably is no distinct advantage of a bucket truck over a pole climbing tech. In fact the tech may be just a little bit faster. However, when multiple cables or trunk lines are involved, because of the amount of construction equipment required it is considerably faster, neater and safer with a bucket truck. In either case, transferring a lashing machine from one side of a pole to the other has got to be easier, therefore faster, with a bucket truck.

"For technical and engineering maintenance, a mobile lift should be the only method considered to get aloft."

Access to tools, wrenches, torches, bending boards, etc., is much faster and easier in the bucket. With tool bins, bags, trays and pouches many of the specialized tools can be carried aloft at the same time. This reduces the number of occasions when a ground hand is required to throw a tool to a tech on a pole. Of course, it is well-known that this practice is not allowed, but we also know that, human nature being what it is, it happens all the time. You can usually determine when your crews are doing this by the number of damage claims turned in to the office for broken windshields and dented cars, and maybe the number of knots on Joe the lineman's head.

For getting a lashing machine through the trees, especially mid-span, the bucket truck just cannot be beat. Lay-up sticks, ladders, thrown ropes — all serve to slow down construction and contribute to early fatigue of the crew. It goes without saying that walking the telco strand to get to a jammed machine should definitely be out of the question for any really professional cable crew. The bucket truck can usually be maneuvered to any point on the span to permit workers to do their jobs safely and with minimum effort and time.

A longer life

Ascending a pole in a lift, rather than climbing, does much to prolong the life of the pole. Sometimes, at a troublesome location or critical juncture, a pole is climbed so often and splintered so badly from gaff marks that it looks like a porcupine's tail. By using a lift truck instead of hooks at these locations, the folks at the local electric company will certainly like you a lot better, probably making future pole applications easier to process.

There is one particular instance where a pole climbing worker can perform where it is often physically impossible for the bucket truck. That is in the easements. There is no argument here — the climbing hooks win this one hands down.

For technical and engineering maintenance, a mobile lift should be the only method considered to get aloft. Everyone agrees good engineers and technicians are hard to find, so it does not make much sense to have key employees endangering themselves by climbing poles. Although pole climbing is a relatively easy and, to some people, enjoyable skill, it requires that you do it on a regular basis to instill the confidence needed, and that the equipment be well-maintained, paying particular attention to properly sharpening the gaffs.

This is almost never the case with technical people and because of this climbing poles can become quite risky for them. Many companies flatly forbid technicians and engineers to climb poles. Holding down injuries not only keeps the company running smoothly but reduces workman's compensation claims and insurance as well.

System balancing and summation sweeping require some fairly expensive equipment today. Gone are the days of the $150 signal level meter. In today's world, with all the buzzers and bells on them, meters cost more like $1,500 each. Sweep receivers cost even more — on the order of several thousand dollars each.

I'll admit that SLMs have been dropped from bucket trucks but a heck of a lot more get dropped off ladders and/or handlines. I once watched a guy pulling a meter up a pole on a handline while it kept swinging in the wind, smack into the pole. These were construction people doing a rough-out balance of a turnkey they had just built. Their parent company sold meters, so I guess getting replacements on the job was no problem for them.

While sweeping, to function properly you need to get the sweep receiver up the pole to the equipment being worked on. That's the only way, period! Sometimes it is done by having one worker up the pole making adjustments while the sweep receiver remains in the truck with another technician who directs the first about what to do. This usually goes something like this: "Gain up a little ... little more ... little more —

oops, hold it! Too much! Down a little ... little more ... little more — hold it! Too much! (etc.)" Aside from the two techs required, it is really one of the most inefficient and inaccurate ways to sweep.

Placing pads and equalizers in some amplifiers requires the steady hands of a neurosurgeon when doing it under ideal conditions. In adverse conditions, off hooks or a ladder, it can be almost impossible or very difficult at best. Much system downtime is accumulated because of the difficulty in seating the pads and equalizers, and sometimes intermittents are created when tiny pins are not properly in place and get bent.

In some amplifiers, the equalizers must be fastened in place by little 4/40 screws and covers removed and replaced to get them in. Also, it is sometimes necessary to remove a cover with several screws even to change a fuse. In the process, many of these screws tend to get lost and are not replaced. When this happens, RF integrity within the housing suffers along with the frequency response of the amplifier due to RF feedback. This is much less of a problem when working out of a bucket truck, simply because of the more stable platform to work from and the places to put things (such as the tool tray) until you need them again.

"It can be argued that one man with a bucket truck can accomplish as much work as two or three men with a ladder and/or climbing hooks."

Snow removal

A common use for a bucket truck in recent years, especially in northern states, has been to remove snow and ice from satellite dishes in the winter months. By maneuvering the bucket truck properly, all snow and ice can be removed while hardly disturbing the antenna, including the feedhorn. This is much better than putting a ladder up against the antenna or feedhorn and thereby risking damage to the equipment or feedlines, or introducing the possibility of the technician's ladder cutting out on the ice or snow covered ground and injuring the man, as well.

Another way the cable company benefits from a clean, sharp and well-painted bucket truck is the enhancement of the company's image with the local public. When the other utilities, electric and telephone, are for the most part maintaining their plant with lift trucks of some kind, the cable company presents itself in a sort of backward, semiprofessional way when working from hooks and/or ladders. The professional bearing a well-maintained bucket truck presents should be worthy of the company it represents.

A mobile lift truck will save the cable company money in the long run by making operations much faster, more efficient and safer, and will prevent pole climbing mishaps from injuring key employees. It will help lift employee morale and contribute decidedly to the professional image of the cable TV company in the community. **CT**

Trencher maintenance tips

By Jim E. Smith
Manager, Service and Service Sales
The Charles Machine Works

The following are suggestions for routine trencher maintenance that can be implemented during uptime and are designed to extend a trencher's productivity.

• Maintenance task preparation: Wear safety glasses and clothing that is not loose. Steel-toed shoes and gloves may be needed. Don't wear jewelry or apparel that can be snagged. Tuck long hair under a hair net or cap.

• Work area preparation: Make sure you have plenty of room, light and air with a level, clean floor. Get out the right tools for the job and check their condition before beginning.

• Machine preparation: Attach a "Do not operate" tag to the machine, then lower the digging boom to the ground. Turn off the engine and remove the key.

Relieve hydraulic pressure by cycling controls, then block the drive tires before disconnecting hydraulic lines. The engine should be cool before starting, unless it is being run for tests or adjustments.

• Hydraulics: Tests should be done with oil warmed up to normal operating temperature. Be sure the hydraulic testing equipment is able to handle system flow and pressure rates. To avoid excess pressure buildup, always fully open the hydraulic tester needle valve before starting the engine. Do not run the equipment being tested for long periods with the tester in the system; too much heat may build up at higher operating flow rates.

Dirt and contamination getting into hydraulic systems during service are a major cause of failure. Never reuse old O-rings or seals; the tear-down time far exceeds the cost. Do not raise the relief valve setting to boost poor hydraulic performance. Check the filter.

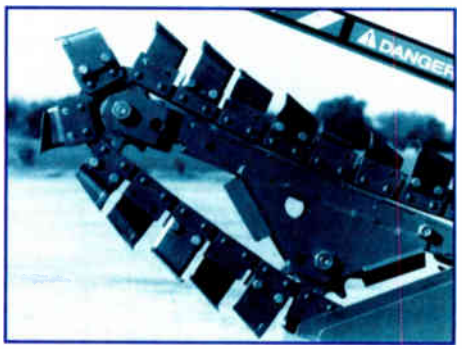
• Final drive chain tension: The up and down movement in the long span should be no more than a 1/2 inch. Tighten or loosen the chain by moving the idler sprocket. If it's still too slack, take out a half link, then check tension again. Chain wear and damage can result from running too loose or too tight.

• Digging chain tension: Correct digging chain tension helps digging efficiency and extends chain life. Most chain wear results from a chain that's too tight. At its lowest point, the digging chain should be lightly touching the wear bar on the top of the boom assembly. Tighten tension by pumping MPG in the grease cylinder. On large tail sprocket booms, loosen clamp bolts, adjust, then retighten clamp bolts. To relieve tension, release grease from the boom while standing on the side opposite the fitting.

• Chain wear criteria: A digging chain is worn out when rollers are worn to the middle and the chain can be stretched 3 percent or more of its compressed length. To test for stretch, lay the chain on a level, smooth surface and push one end of the chain toward the other end until all slack is removed; measure the length. This is the compressed length.

Next, stretch the chain to its full length by pulling one end away from the other; measure the length. This is the stretched length. For example, if the compressed length is 108 inches and the stretched length is 112 inches, the difference is 4 inches. The chain is worn out when the stretched length is more than 3 percent of the compressed length.

• Digging teeth and bits: Sharp digging teeth are important to good production and maintaining the life of other trencher components. The increased shock load from using dull teeth stretches the chain, causing the chain and sprockets to mismatch. Chain failure, premature wear on other parts and lost production will be the result. Keep extra teeth on hand and check conditions frequently in hard digging situations. Buy quality replacements; this is no place to economize.



Courtesy Ditch Witch

Sharp digging teeth are important.

• Digging teeth configuration: This is very important to trench production. Some teeth must cut the trench while others carry the soil from the trench. Teeth must cut the inside of the trench as well as the outside. Although soil conditions will determine the most effective configuration, in most cases a spearhead configuration provides the best digging efficiency. A left tooth mounted on the chain's right side is recommended for cutting roots and very tough soil. If the chain width is reduced by removing spacers, be sure teeth are remounted on the sidebar from which the adapter was removed.

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Uptime management includes the utilization of quality parts and trained service personnel. Take full advantage of the service training programs your trencher dealer and manufacturer offer.

Finally, uptime management means a dedication to preventive maintenance — anticipate adjustments and repairs rather than react to unexpected malfunctions. With a combination of advance planning, dedicated support and good old common sense, you'll find that an uptime management program can pay off. **CT**

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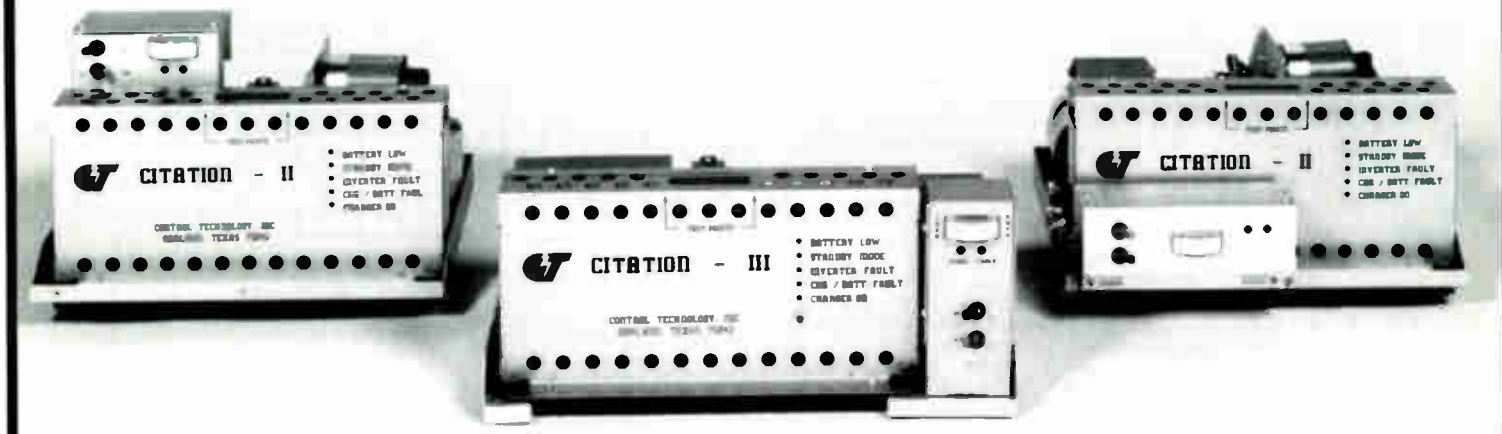

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Troubleshooting Lectro standby power supplies, Part 1

Lectro's Versatile series of standby power supplies consists of a mother board and two plug-in modules. One module serves as a battery charger and incorporates the time delay feature for the transfer relay. The other module functions as the inverter. In this article, the battery charger will be examined, describing simple and direct ways to troubleshoot it. Next month we will deal with the time delay circuit.

By Jud Williams
Owner, Performance Technological Products

Rather than troubleshooting the battery charger while it is plugged into the mother board, it is easier to work with the module as a stand-alone. (See accompanying figure.) To construct a test connector, use the same type as the one on the mother board. Solder an AC line cord to Pins 1 and 2. A second wire is soldered to Pins 4 and 5, which are joined together. This wire connects to the load and carries the 27.6-volt output on it. Another wire is connected to Pins 11 and 12, which also are joined together. It goes to the load as the ground or common lead.

The load may be a 250-ohm, 5-watt resistor. This will draw approximately 100 milliamperes, which is adequate to test the battery charger. The wires coming from Pins 4 and 5, and Pins 11 and 12 are connected across this load resistor.

Step by step

The most important aspect of troubleshooting the battery charger is to go about it systematically. As a first step, it is necessary to examine the module to determine if there are any burned, bent, broken or loose components. It is especially important to check for burned foil paths. Attach the test connector, making sure it is oriented correctly. If it is plugged in the wrong way around, the AC line will be shorted and possibly (hopefully) blow a fuse.

After connecting a DC voltmeter across the load resistor, a reading of 27.6 volts should be present when the AC is plugged in. If there is no voltage, measure the junction of R1 (1-ohm/10-watt resistor) and Rectifier D2, and check for approximately 27 to 30 volts at that point. If it is present there, but *not* at the load resistor, failure of the IC regulator or the adjacent rectifiers would be suspected since it has been verified that all components up to that point are okay.

Before concluding that the regulator has failed, check Rectifier D2 adjacent to its input, paying special attention to see that it is soldered into the PC board securely. As boards age while being exposed to the elements, components may separate from their solder joints. This may be difficult to detect. If the regulator has failed it will have approximately 40 volts DC at its input pin. The case and other pin will have 0 volts on them. This makes it an easy matter to distinguish between a good and bad regulator.

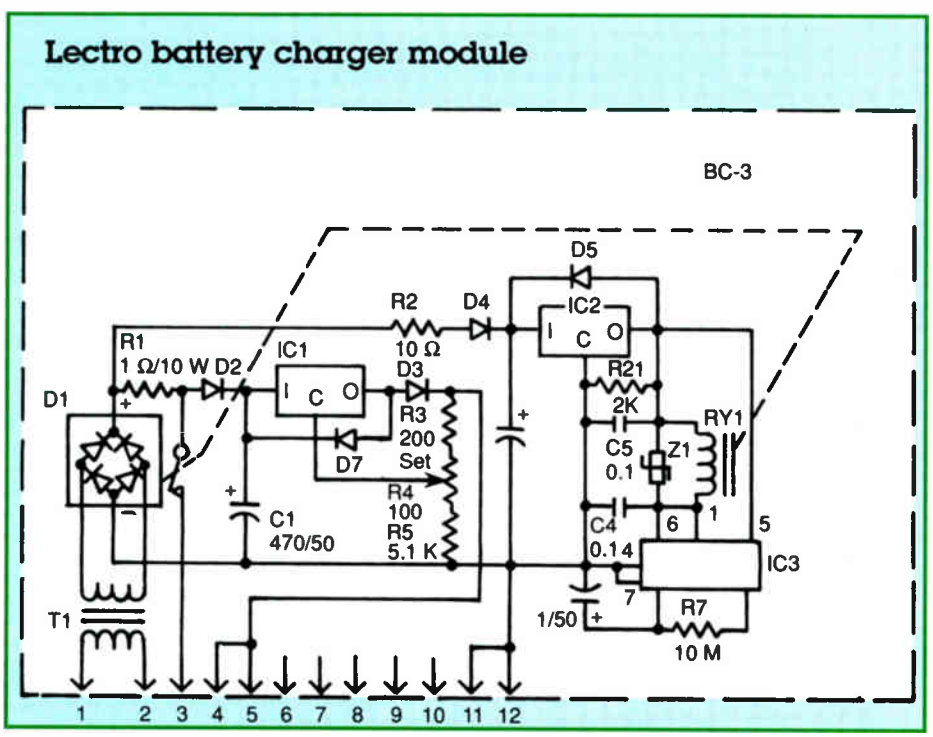
After replacing the regulator, it is necessary to adjust the output level to set the charge voltage correctly. The use of the potentiometer for this purpose is certainly convenient but is a source of instability. Its open construction allows it to deteriorate due to exposure to such an extent that it cannot maintain its voltage setting reliably. The potentiometer should be eliminated and replaced with jumpers. To trim the output voltage to 27.6 volts, Resistor R5 may be paralleled with a selected resistor with a value of 15,000 to 33,000 ohms. Use of a resistor substitution box is helpful in determining the desired value. Elimination of the trimmer potentiometer is the most significant improvement that can be made to this module.

Making measurements

When working with power supplies, one must be prepared to make voltage, resistance and current measurements. Resistance measurements are always made with the power turned off, but voltage and current require that the circuit be live.

Common components in power supplies are rectifiers. They may be

(Continued on page 84)



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BOOKSHELF

The following are some technical manuals and publications currently available by mail order through the Society of Cable Television Engineers.

☛ *System Design Program, IBM-Compatible Version* — A hard copy printout of a computer program facilitating system design. Created by Steve Johnson of ATC and the Society's Rocky Mountain Chapter. Order #TM-6A. Member: $12, non-member: $20.

☛ *CATV Wizard* — This IBM-compatible computer disk containing 30 CATV formulas is a vital resource for industry personnel. Compiled by SCTE member Jim Kuhns, *CATV Wizard* is a collection of thoroughly researched and well-tested programs submitted by SCTE members and other industry leaders. Includes formulas for CATV systems, earth stations, attenuators, decibel conversions, CLI, Ohm's and Watt's laws, microwave path clearance and many more! Order #TM-7. Member: $15, non-member: $22.

☛ **New Item!** *Apogee* — A new IBM-compatible computer disk from Jim Kuhns containing formulas for calculating microwave path loss, azimuth and elevation for earth stations, site plotting on maps' fresnel zones and a C-band transponder frequency chart. Order #TM-9. Member: $15, non-member: $22.

☛ *Biro Co-Channel Atlas* — This manual by Steven Biro shows the location of VHF TV transmission stations in the continental U.S. and Canada to help identify probable sources of co-channel TV interference. Also included is helpful theory of antennas and hints on how to reduce the effects of or eliminate co-channel interference. Order #TM-8. Member: $12, non-member: $20.

☛ **New Item!** *Installer Certification Manual* — Published as a comprehensive reference for the Society's Installer Certification Program, this manual offers recommended installation practices that will be invaluable to all installers. (Manual is included in $25 installer membership fee.) Order #TM-10. Member: $15.

☛ **Special Reprint!** *Identifying Picture Problems in CATV Systems* — A classic technical manual by noted industry authority Ken Simons, this book focuses on the effects of thermal noise and echoes on TV pictures, AM and FM, cross-modulation and overloads. It features numerous illustrations, figures and tables. Order #TM-11. Member: $15, non-member: $17.

To order: All orders must be prepaid. Shipping and handling costs are included in the continental U.S. All prices are in U.S. dollars. SCTE accepts MasterCard and Visa. To qualify for SCTE member prices, a valid SCTE identification number is required, or a complete membership application with dues payment must accompany your order. Send orders to: SCTE, 669 Exton Commons, Exton, Pa. 19341 or FAX with credit card information to (215) 363-5898.

Hands On

(Continued from page 76)

checked using either of the following two methods:

1) When the power is off, an ohmmeter may be used to check the rectifier (also called a diode) in both the forward and reverse directions. Touch the device with the meter probes one way, then reverse the probes. You will see that the resistance is quite low in one direction while very high the other. The voltage present within the ohmmeter is causing the diode to conduct and the meter interprets this as a low resistance in the forward direction, indicating that it is good.

2) When the circuit is live, the rectifier may be tested by observing the voltage drop across it. Typically the potential will be somewhere between 0.5 and 0.9 volts when conducting properly.

In this particular power supply, the output current may be conveniently measured. A large 1-ohm resistor is strapped across the back of the board; the current may be determined by setting a voltmeter to the 2-volt range to measure the potential across it and applying Ohm's law (current = voltage divided by resistance).

Let's say we measure 1 volt. Divide this by 1 ohm. The resulting current is calculated to be 1 ampere. (Notice all the 1's in this calculation and how they relate.) Since the resistor, a constant, is 1 ohm, the current may be read directly on the voltmeter by interpreting the voltage reading as current. As an example, if the drain on the power supply were increased to 1.5 amperes, then the voltmeter would read 1.5 volts, interpreted as 1.5 amperes. **CT**

CALENDAR

February

Feb. 11-13: SCTE "Technology for Technicians II" national seminar, Howard Johnson Hotel, Sacramento, Calif. Contact (215) 363-6888.

Feb. 11-15: Fiber Communications Corp. fiber-optic splicing and termination workshops, Sturbridge, Mass. Contact (800) 776-0518.

Feb. 12: SCTE Satellite Tele-Seminar Program,"CLI Ninjas (Part One)." To air from noon to 1 p.m. ET on Transponder 2 of Galaxy III. Contact (215) 363-6888.

Feb. 12: SCTE Florida Chapter, Central Florida Meeting Area, Lakeland, Fla. Contact Keith Kreager, (407) 844-7227.

Feb 12-13: NCTI seminar on OSHA compliance for CATV operators, Orlando, Fla. Contact Michael Wais, (303) 761-8554.

Feb. 13: SCTE Delaware Valley Chapter meeting. Contact Dan McMonigle, (215) 265-4233.

Feb. 13: SCTE Great Plains Chapter technical seminar on how to accomplish employee training including safety, technology and customer service, with BCT/E examinations to be administered, Quality Inn Crown Court, Bellevue, Neb. Contact Jennifer Hays, (402) 333-6484.

Feb. 14: NCTI seminar on fundamentals of supervision for CATV personnel, Orlando, Fla. Contact Michael Wais, (303) 761-8554.

Feb. 14: SCTE Chesapeake Chapter technical seminar on cable TV from A to Z, Holiday Inn, Columbia, Md. Contact Keith Hennek, (301) 731-5560.

Feb. 14-15: SCTE Sierra Chapter technical seminar on CSR and dispatcher training, Howard Johnson's, Rancho Cordova, Calif. Contact Eric Brownell, (916) 372-2221.

Feb. 16: SCTE Cactus Chapter technical seminar on construction techniques and requirements. Contact Harold Mackey Jr., (602) 866-0072, x282.

Feb. 17: OFC '91 workshop on fiber toward the customer, San Diego Convention Center. Contact Paul Shumate, (201) 829-4600 or David Fellows, (404) 925-6164.

Feb. 18-22: IEEE's Laser and Electro-Optics Society, IEEE's Communications Society and Optical Society of America OFC '91 (Optical Fiber Communication Conference), San Diego Convention Center. Contact (202) 416-1980.

Feb. 19: SCTE Greater Chicago Chapter, BCT/E examinations to be administered, Embassy Suites Hotel, Schaumberg, Ill. Contact John Grothendick, (800) 544-5368.

Feb. 20: SCTE Hudson Valley Chapter technical seminar on AML, BCT/E Category III (transportation systems), Econo Lodge, Albany, N.Y. Contact: Robert Price, (518) 355-3086.

Feb. 20: SCTE North Central Texas Chapter technical seminar on how to upgrade and tests on old cable. Contact Terry Blackwell, (214) 578-7573.

Feb. 20: SCTE North Country Chapter, testing to be conducted in BCT/E Categories I, IV, V and VII and Installer Certification Program (written and practical), Community Center, Edina, Minn. Contact Rich Henkemeyer, (612) 522-5200.

Feb. 23: SCTE Golden Gate Chapter, BCT/E examinations to be administered in Categories IV, V, VI and VII, Pleasanton, Calif. Contact Tom Elliott, (408) 727-5295.

Feb. 26-March 1: Siecor training course on fiber-optic installation, splicing, maintenance and restoration for CATV applications, Hickory, N.C. Contact Lynn Earle, (704) 327-5539.

Feb. 27: SCTE Cable-Tec Games, to be held 10:30 a.m. to noon, Mission Room, San Antonio (Texas) Convention Center. Contact Les Read, (214) 484-888 or Lynn Watson, (817) 483-5174.

Planning ahead

Feb. 27-March 1: Texas Show, San Antonio Convention Center. Contact (512) 474-2082.

March 24-27: National Show, New Orleans Convention Center. Contact (202) 775-3669.

June 13-16: SCTE Cable-Tec Expo, Convention Center and Bally's Hotel, Reno, Nev. Contact (215) 363-6888.

Are you aware?

By Wendell Woody
President, Society of Cable Television Engineers

The Society has many programs and all are for the benefit of the general membership, the growth and strength of the Society, and the support of our industry. However, the awareness of some excellent programs is limited. This fact is not a measure of the program's value or importance, but instead just its exposure.

Speak up!

The SCTE is dedicated to developing, increasing and spreading theoretical and practical technical knowledge of cable TV and broadband communications systems to our members for the overall benefit of the industry. One of the most important ways the Society realizes its goals is when accomplished members and guests give technical presentations at national, regional and local seminars, including those held by our local chapters and meeting groups. The Speaker's Bureau Program is a means to bring identified capable speakers together with those charged with organizing and putting together a technical program. It is a wonderful aid in that it serves to benefit everyone. Every SCTE chapter and meeting group officer should have a copy of this listing in their resource file.

It's our desire to update, expand and better expose this program. First, if you are currently listed as a speaker, please check the data listed for you to make sure it's still current and correct. Next, if you're available as a speaker, we would like to have you logged in our published *SCTE Speaker's Bureau Listing*. To get started, obtain and complete the form titled, "SCTE National Speaker's Bureau Listing Questionnaire." This program is managed by Howard Whitman at the SCTE Exton, Pa., headquarters office. Obtain the form by calling him at (215) 363-6888.

Traditionally, most Society speakers have been volunteers financially supported, when required, by their employers. The Society is extremely appreciative of this help and believes it serves to advance the industry. Members who speak at Society-sponsored functions gain recertification units toward their continuing certification under the BCT/E Program.

The speaker's listing encompasses people from all levels and trades who are part of our industry: cable operators, installers, technicians, design engineers, regional engineers, application engineers, sales engineers, FCC engineers, training institute personnel, trade publishers and writers — plus we want you! You are never under any obligation to speak. In fact, we hope that a wide range of qualified speakers will make it easier for chapters to find other speakers if their first choice is unavailable. Sales pitches are not appropriate or allowed in this program. You should provide a technical overview of your topic, as well as specific information pertaining to the subject in an understandable, generic format. If you are not part of this program or are not using it, now is the time to start!

International liaisons

The International SCTE Council is a new program under development. It is an extension of our current SCTE Liaison Program, which is handled by Ron Hranac. The council is a voluntary alliance serving as a mutual cooperative center for sharing, exchanging and supporting other cable TV engineering societies throughout the world to get established, expand their functions and objectives, and meet their goals.

The advisory body of the council shall consist of two ambassador delegates from each participating country, which will be those countries with an acknowledged active formalized cable TV engineering organization. At the present time participating countries are Canada, the United Kingdom and the United States. The council was founded to foster technical training and the sharing of training materials and technology, and to introduce qualification testing accompanying a certification program.

A second track of the council will be devoted to engineering recommended interface practices (standards) regarding equipment and measurements. Such documentations can be assembled, published, shared and categorized as international or referenced to the originating country. This track will complement all the work accomplished by our Interface Practices Subcommittee chaired by Tom Elliot of CableLabs.

A third track of the council will address archival publications, and the distribution and retrieval of SCTE engineering manuscripts. We are most fortunate to have a qualified person, Archer Taylor, who will chair this track for us.

The measurable achievement of the council will be the works from the committee chairmen and their respective committees: training, engineering and archival publications. Members of these committees will be unlimited and may be from any country whether or not that country currently has a recognized cable engineering organization. Committee sign-up forms are available by calling SCTE headquarters in Exton. Both the Society and our industry will benefit from your support.

Meeting the members

I presented an overview of national SCTE events and updates to the Heart of America Chapter recently. Their president, Nathan Brewster, had a program that included Rick Haub, Jerrold; Eric Kaisinger, Sumitomo; Wes Schick, TSB Inc.; and Richard Steiner, Tektronix Inc.

The Orlando "Fiber Optics 1991" seminar was an outstanding success! Our hats are off to those who worked so hard to organize the program and bring it all together. I only wish that every SCTE member could attend such a seminar. Fortunately, a proceedings manual of the technical papers given at this seminar was published again this year by CT Publications. It is available for purchase from SCTE headquarters. (For more on Fiber Optics 1991, see "SCTE News" on page 12.)

There's still time

The voting process for electing directors to the Society of Cable Television Engineers' national board is still ongoing and will not close until March 15. Have you returned your ballot yet? If not, do it today!

Once again the closing thought for this month's message is: Vote and think Reno (the location for this year's Cable-Tec Expo). **CT**

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