COMMUNICATIONS TECHNOLOGY

Official trade journal of the Society of Cable Television Engineers

Management and professionalism: The keys to a successful workforce

to Basics

January 1990

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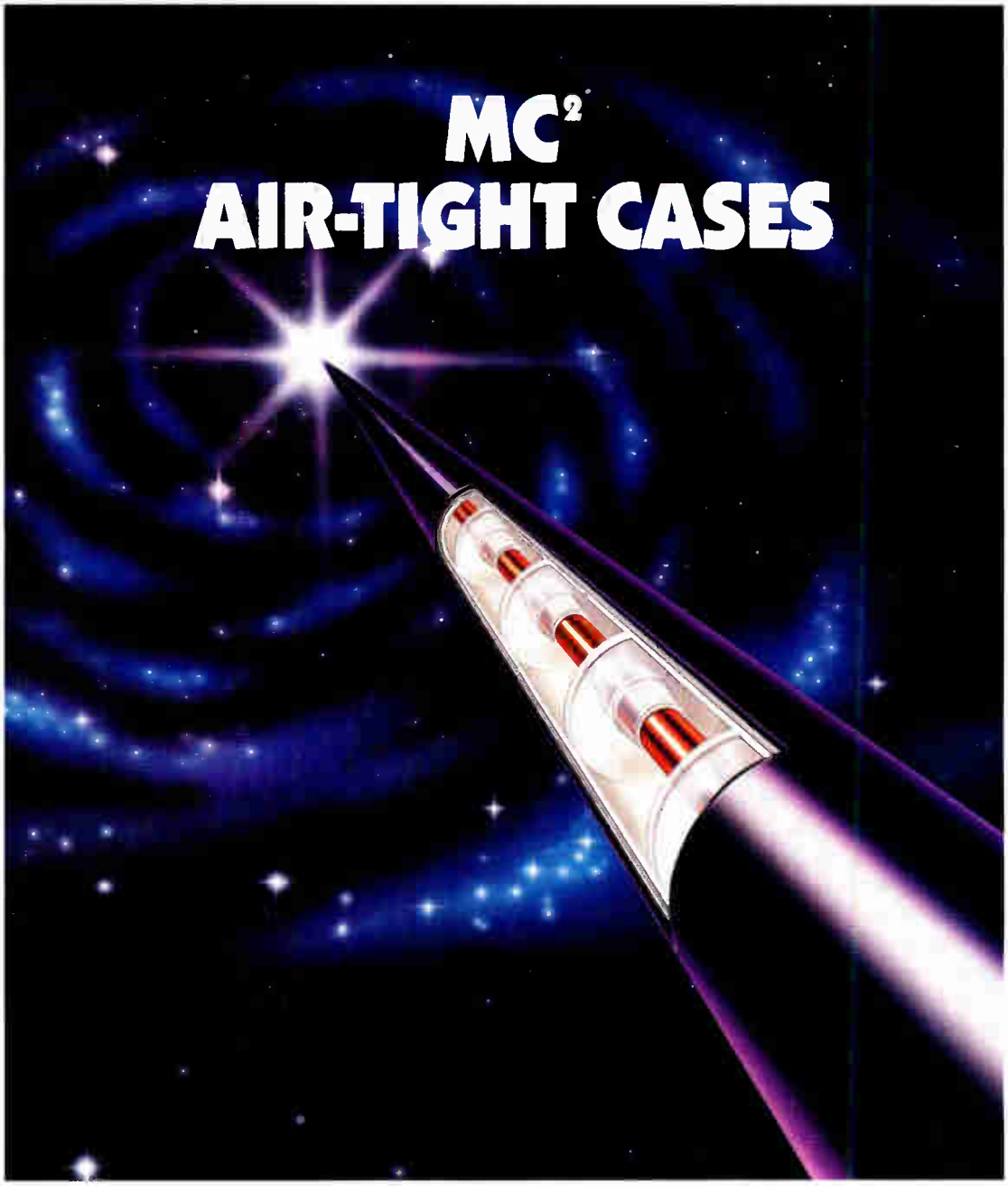

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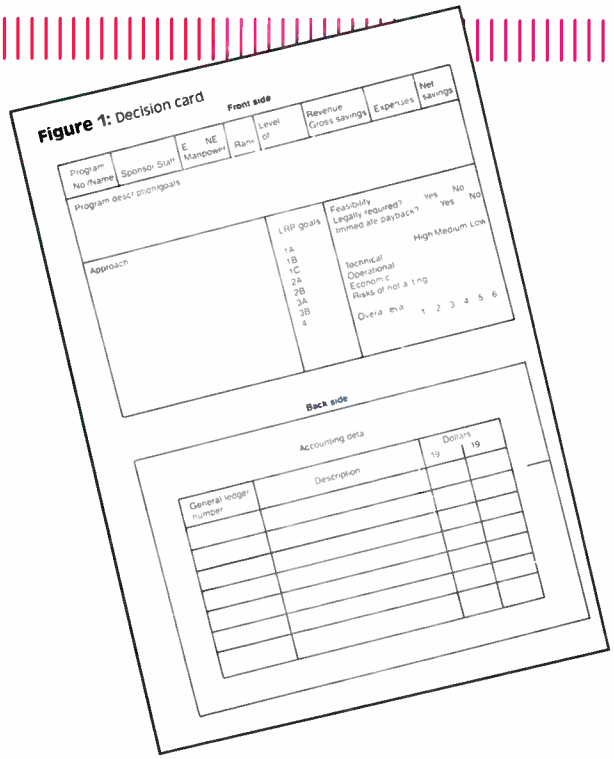
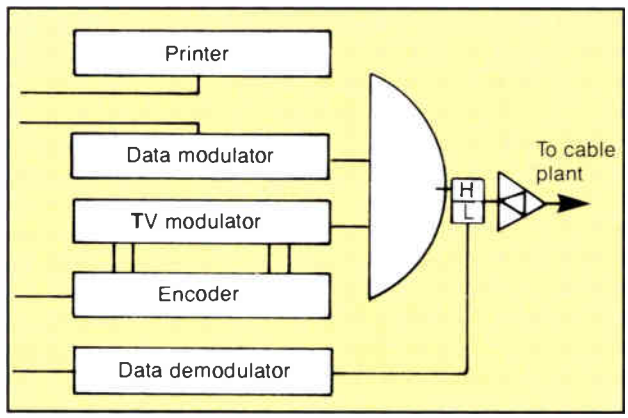
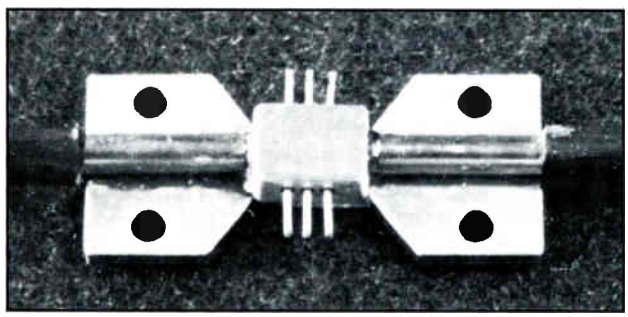


Figure 1: Decision card





Features

Cover
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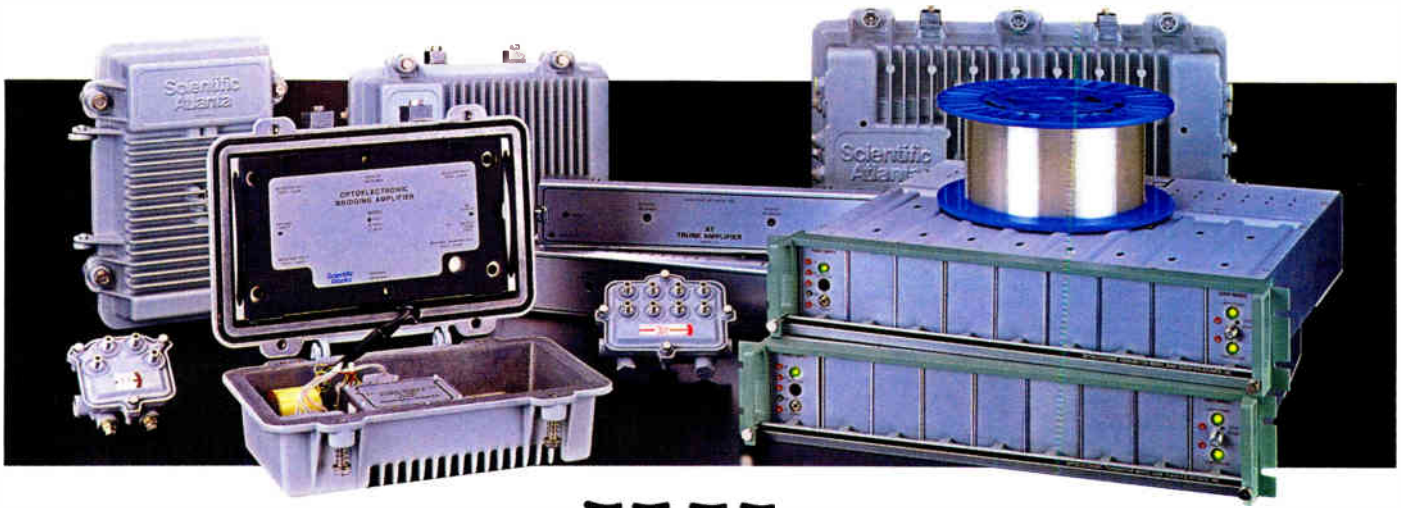
Communications Technology™ (ISSN 0884-2272) is published monthly by Communications Technology Publications Corp., 50 S. Steele St., Suite 700, Denver, Colo 80209, (303) 355-2101 January 1990, Volume 6, Number 11 Office of publication is 50 S Steele St , Suite 700, Denver, Colo 80209 Second-class postage paid at Denver, Colo. POSTMASTER: Please send address changes to Communications Technology, 50 S. Steele St., Suite 700, Denver, Colo 80209

Do You Know The Difference Between Telephone And CATV Fiber?



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Inspired by the radio wave theories of Heinrich Hertz, Guglielmo Marconi built and perfected the world's first wireless telegraph.

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He first discovered that by grounding a transmitter, the signal range was greatly increased. He then discovered that upright antennas would send messages the farthest. By 1901, transmissions from his radio towers were the first to cross the Atlantic. But perhaps Marconi's most important triumph was his ability to recognize, early-on, that technological success is totally dependent on viable commercial applications.

Today, Jerrold's own staff of "Marconies" is developing Cableoptics™. Optical broadband technology is giving cable operators the ability to send video signals farther than ever with virtually no loss in quality, supplementing their current RF systems.

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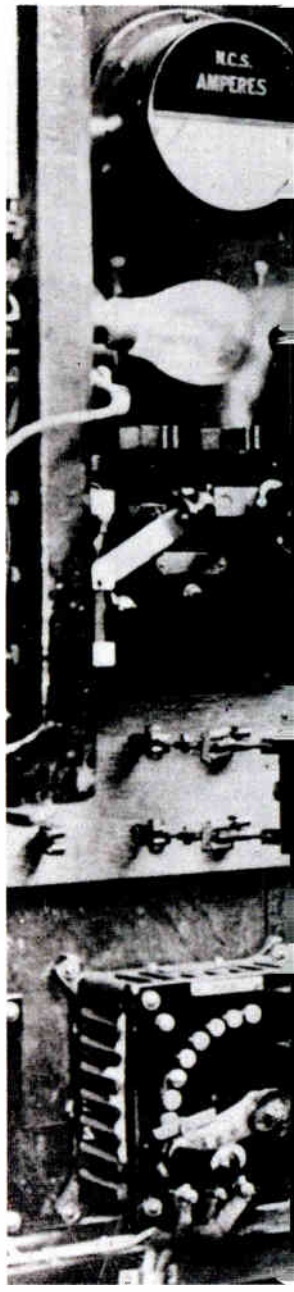

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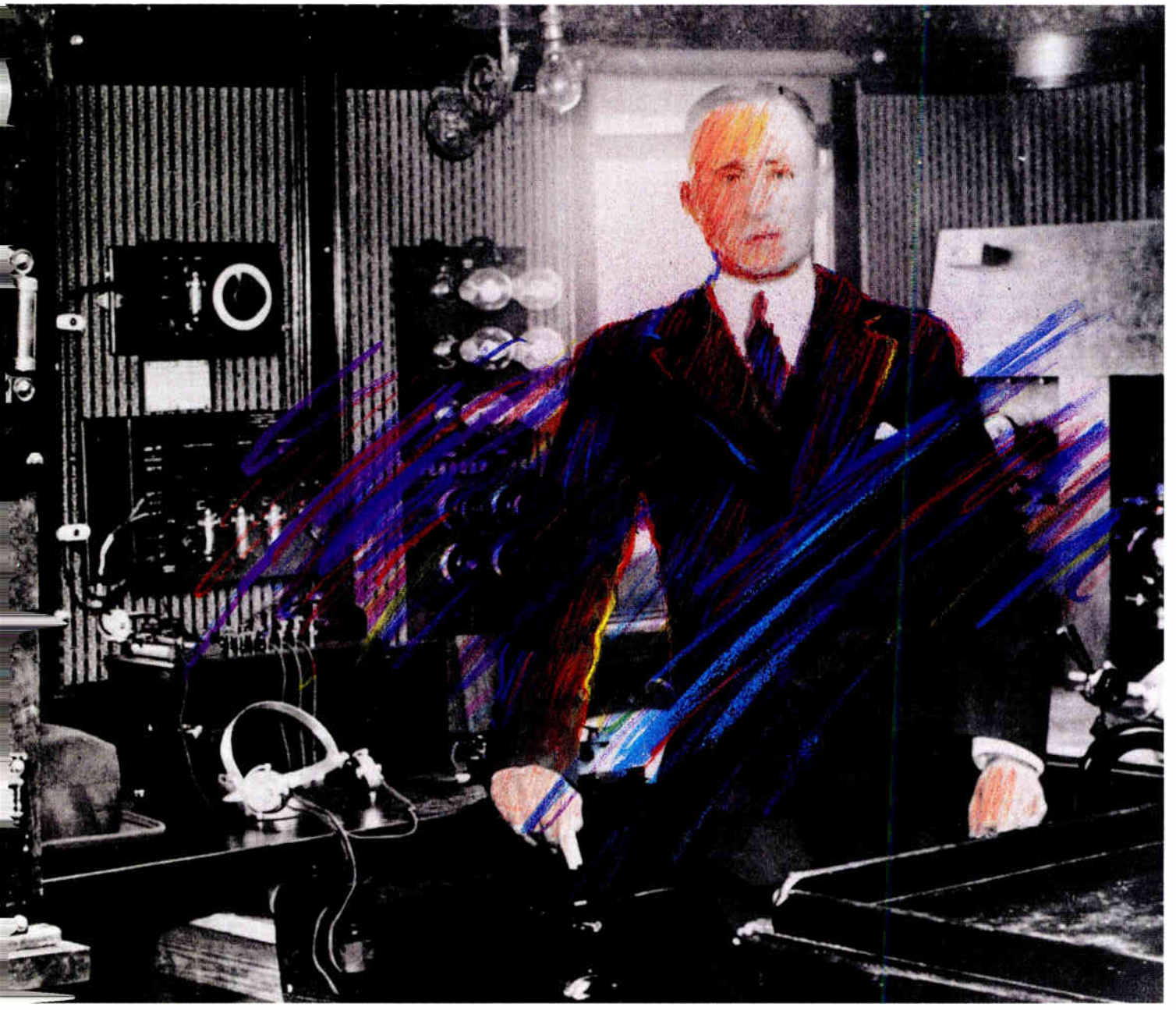

What if...

...a crisis arises and the cry goes up, "Is there an electronics engineer in the house?" And no one responds?

...you've just been kicked upstairs to a management position with a lot of decisions to be made regarding employee performance? Can you still be a good company manager and have compassion?

...you can improve the odds of your request for additional test equipment making it through the budget review process? Would you?

...one of your employees charges you with discrimination? Could it have been avoided?

...you were to take an exam on engineering management and professionalism? Could you pass?

...you wanted to find the nearest SCTE chapter or meeting group? Who do you contact?

...your system was going to install AML microwave and you had to make the decision of whether to use the customary solid-state or high powered equipment? Which would you choose?

...you were asked by management to explain the difference between on-premises and off-premises equipment and make a recommendation that could cost millions? Is there a difference?

...your system had a large base of subscribers without touch-tone telephone service? Which ordering mechanism for PPV would lead to the highest buy rates?

...you were in charge of maintaining your system's AML microwave transmitters? Do you know when it's time to install a new klystron?

...your system wants to push fiber closer to the home? Can you do it using an optical amplifier? What is it?

...the winds of change not only permit telcos to compete with cable TV but also allow cable systems to offer commercial unregulated access to the interexchange carries? Could we?

...your system has a leak measuring 20 μV/m? Does it need to be included in your annual CLI calculations?

...cost wasn't a factor and you wanted to get the best type of splitter to prevent leakage? What's available?

...July 1, 1990, rolls around and your system fails its CLI and the FCC orders you to remove the FAA band channels from the system? What's left? Will you still have a job?

You're probably thinking that's a lot of "what ifs" to start the new year off with. But they all have one thing in common—each and every one is covered in the pages of this issue of *Communications Technology*. When we decided to merge our *Installer/Technician* magazine into *CT* we wondered, what if we do it, who will benefit? I think you'll agree, it's you—the person who wants to answer "What if?"

Happy new year.

Paul R. Levine

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Reader Service Number 9.

CableLabs, S-A tackle the headend

BOULDER, Colo.—CableLabs and Scientific-Atlanta recently announced that they will cooperate in a project to research headend engineering requirements. According to CableLabs, this joint effort will provide the industry with insights and guidelines for future headend construction and product design.

S-A will provide technical support and headend equipment, including satellite antennas, satellite receivers, modulators and processors. The equipment will be delivered this month. CableLabs will research how business, regulatory, consumer demand issues and channel expansion will change headend configuration in the future.

"This type of research is absolutely necessary, especially in consideration of the increasing complexity of headend equipment within the last 15 years," said David Fellows, S-A's vice president and general manager of distribution, headend and earth station systems. "We're pleased to be able to be involved in this benchmark study."

C-COR, COMLUX close fiber deal

STATE COLLEGE, Pa.—C-COR Electronics Inc. and COMLUX finalized an agreement to jointly develop and produce a CATV digital fiber-optic transmission system. In addition, COMLUX awarded C-COR an exclusive option to acquire all of its shares in the next year. If C-COR exercises the option, all of COMLUX's principals are planned to remain with the company.

The proposed system is anticipated to be "future-proof" in that it will offer the technology needed for transmission of high definition TV. It is planned to provide digital transmission similar to current and proposed telephone and data communications systems. Also, the system will use "off-the-shelf" optical components and digital video components used in broadcast TV equipment.

SecaGraphics signs Hong Kong contract

DENVER—SecaGraphics International Inc. recently announced that it had signed an initial $1.3 million contract with Hong Kong Cable Communications Ltd. (HKCC), the company that was awarded licenses to provide CATV and telecommunications to Hong Kong and surrounding territories. The franchise potential is estimated at over 1.5 million subscribers, which would make it the largest single cable system worldwide and within the top 10 of the world's MSOs.

SecaGraphics is contracted to provide its six workstation MAGIC system to HKCC. This is a computer-aided design and drafting (CADD) system for automated drafting of geographic information, CATV network design and analysis, inventory control and project and facilities management. SecaGraphics staff in Denver have already begun entering over 700 Hong Kong maps into the system. This month staff will be on-site in Hong Kong to complete horizontal network design

and provide consulting and training for HKCC personnel.

Vision Cable, cops to put CAP on crime

BERGEN COUNTY, N.J.—Vision Cable recently developed the Cable Alert Patrol (CAP) as a boost to Crime Watch, a neighborhood crime prevention program. This statewide CAP community service program of the New Jersey Cable Television Association is supported by the state's police chiefs association and crime prevention officers' association.

Vision's field personnel who regularly drive and work in the area and the company's dispatchers have been trained by a local police chief in identifying and reporting suspicious situations. Their work in homes, on the ground and on overhead poles could add eyes and ears in more places for crime prevention. In addition, the company's radio equipped trucks will carry the Crime Watch eye logo to provide a recognized and safe haven for children needing assistance.

Society seeks Member of the Year

EXTON, Pa.—The Society of Cable Television Engineers is currently seeking nominations for the 1990 Member of the Year Award. This award, presented at the Cable-Tec Expo, is given annually by the SCTE board of directors to recognize a member for outstanding contributions to the goals and purposes of the Society.

Nominees must be SCTE active members. Nominations must be received in writing by the national headquarters no later than March 1. For more information, contact the Society at (215) 363-6888.

Technical knockout: First U.S. HDTV show

NEW YORK—It may have been a second big defeat for Roberto Duran at the hands of Sugar Ray Leonard, but it was a first for high definition TV (HDTV) in the United States.

Scientific-Atlanta provided its HDB-MAC HDTV satellite transmission for the Dec. 7 fight, which was the first-ever HDTV commercial telecast in the country. The event was presented by Platinum Sports Network and Zbig Vision, in cooperation

with International Broadcast Consortium and NHK Enterprises USA. Over 2,000 viewers at a Jacob K. Javits Convention Center and 1,600 in Miami (through Club Theater Network) became "viewers of the future."

In Canada, the event was presented through Telesat Canada, an HDTV broadcasting company, while Hughes Communications provided the international satellite transmission and Southern Bell downlinked the bout over single-mode fiber. In Japan, Leonard's victory was viewed the following day at more than 200 public locations using NHK's HDTV network.

CableLabs, Jerrold to test NTSC quality

HATBORO, Pa.—Jerrold's Applied Media Lab and Cable Television Laboratories Inc. recently agreed to perform research together in order to better understand the parameters that influence NTSC picture quality. The results of the research will allow existing, upgrading or new systems to pinpoint parameters to deliver optimal NTSC video to homes. Tests will be performed on five basic forms of degradation —noise, intermodulation, microreflections, envelope delay and phase noise—and combinations of these.

"While this testing updates previous information, we expect to break new ground in the delivery of NTSC video over CATV pathways," said Tom Elliot, vice president of science and technology for CableLabs. "The quality of television receivers and video monitors has improved dramatically in the past few years. This research will help our operators provide the optimum picture quality available today."

CATV, telcos in '90s: A joining of forces?

CAMBRIDGE, Mass.—Direct competition to provide video to the home by telephone companies with the CATV industry may not be as effective as working together, according to Dr. Peter Shapiro, a telecommunications consultant for Arthur D. Little Inc.

Shapiro pointed out in a recent issue of *Communications Week* that cable revenues are expected to exceed $16 billion this year. Half of the total subscriber base of 43 million homes are served by 10 operators; cable systems already pass more than 80 percent of the 90 million U.S. households. A telco "beat 'em" effort would be a formidable challenge because of cable's strong industry base. Shapiro suggested a "join 'em" effort would pro-

vide a better chance for telcos to participate and succeed in the market.

Collaborative opportunities could include leasing video transport facilities and providing upstream data services to cable operators, Shapiro suggested.

- AM Communications announced that Anixter signed a contract to become a stocking distributor for the AM's LANguard status monitoring and control systems. Anixter also will be entitled to distribute AM's Dropguard/Tierguard addressable taps.
- Effective Nov. 18, 1989, Cabletime moved its headquarters to Newbury Business Park, London Road, Newbury, Berkshire, RG13 2PZ, England. The telephone number remains 0635-35111; the facsimile number remains 0635-35913.
- NCS Industries announced that it was appointed as a Wavetek CATV products distributor. Wavetek's MicroSAMs, SAM 1000 and SAM 2000 meters as well as CLR-4 and RD-1 leakage monitoring instruments will be available for immediate shipment.
- Jones Cable Group Ltd. was awarded the South Hertfordshire, England, franchise by the Cable Authority of Great Britain. The franchise covers approximately 95,000 homes near Greater London; plans call for providing television, radio and (potentially) telecommunications to the area.
- CaSaT Technology of Amherst, N.H., expanded manufacturing and engineering operations to meet production demands for its new LAN media products. The company now occupies 20,000 square feet of manufacturing space, doubling its previous capacity.
- St. Thomas-St. John Cable TV, a Caribbean system destroyed by Hurricane Hugo, will purchase about $1 million of Jerrold distribution gear to rebuild its devastated 310-mile plant. The rebuild will provide the 16,000 subscribers a "showpiece," state-of-the-art system.
- Catel announced that Guam Cable TV has selected the company's TransHub III equipment for conversion of AM-on-fiber signals to VSB for coax. According to the system's president, TH III's reliability, the A/B switch backup, improved signal quality and broader bandwidth are the primary benefits of the fiber upgrade.
- Wavetek recently signed agreements with national and regional CATV distributors to make many of the company's products more readily available. Wavetek will continue to sell its products through the current manufacturers representative sales force but will supplement efforts with the assistance of the distributor network.
- Cablevision of Baton Rouge, La., announced it will begin a $36 million fiber-optic rebuild project. According to the company, the rebuild that will take several years to complete will increase channel capacity, minimize outages and improve reception.
- The first fiber-optic application offered by Denver-based Triax Communications is a completely rebuilt $2.1 million system serving Triax Cablevision USA customers in Milton, W.Va. Households will be switched over in the next five months to the fiber system that Triax developed with Anixter Cable TV and AT&T.

Corrections

In November *CT*, on page 28 of the article "How to adjust audio carrier deviation," the setting for "vertical display" (as given in the table, middle of the first column) should have read "2 dB/division," as shown in Figure 15.

In the article "The mystery surrounding converter preamplification," Figures 1 and 3 were inadvertently switched. Also, to match the color key, the lines in the new Figure 1 should be (from top to bottom) green, blue and red.

Is there an electronics engineer in the house?

By Isaac S. Blonder
President, Blonder Broadcasting Corp.

Whenever a medical crisis arises, the cry goes up, "Is there a doctor in the house?" A life could be saved if such an individual were at hand (except for the potentially litigious malpractice cases in which a doctor is wise to remain incognito). There is another crisis called *war*, in which the skills of electronics engineers are indispensable, and are there sufficient engineers to heed the call to arms? Congruently, do we possess an existing industrial complex employing said engineers capable of immediate conversion to the production and deployment of the necessary weapons of war? Surely the masters of our present and future fates (the politicians) place the security of our country first on their agenda as they go about their daily fence-mending.

However, when high tech confronts our legislators, of whom the vast majority are scientifically illiterate, the urgent necessity to cultivate a complete spectrum of weapons manufacturing is fractured in sometimes obtuse fashions. High definition TV (HDTV) is an excellent case in point.

The Department of Commerce has just announced it was dropping its focused initiative on HDTV and "would stress efforts like tax credits for research and development and relaxation of antitrust rules to allow companies to form consortiums that could make all American industries more competitive." Nice words that probably came straight out of an MBA's manual, but they have no relevance to the real-world configurations. In all the hearings held by the department and Congress, did not Congress hear loud and clear that America is no longer manufacturing televisions designed and built at home by American citizens? How on earth could the alternative as suggested by the department restore our TV factories? As a former TV manufacturer, we could not revive the dead plant with their transfusions. In my previous editorial, I commented that we had to abandon our traditional stand in

"Defense of our country is still my primary concern and that subject has not been given its just due in the HDTV debate."

favor of free trade and set up tariffs to protect vital industries as does the rest of the world. We are no longer rich enough and smart enough to enjoy the luxury of posturing as the prophet of free trade.

The major problem with scientifically illiterate masters (whether they be judges or politicians) is the inability to choose which side of the question to favor. Invariably it seems there appears at every hearing equally skilled and prestigious experts taking exactly opposite positions. While it is true that a scientific education alone will not give the judge an infallible decision, one would be better able to look behind the facade of a Ph.D. and see what bias the witness possesses.

The American Electronics Association plan to spend $1.3 billion of government funds to define a U.S. HDTV system and revive domestic TV production has been shot down and with it 10,000 engineering positions (my estimate alone). It is tough enough to persuade Americans to enroll in the punishing pursuit of an engineering degree without a job waiting for the diploma. I am sure you are all aware of the shortage of engineers and of the fact that while the engineering student enrollment is constant, foreign students are filling the places left vacant by Americans. Up to 50 percent of undergraduates and an even higher percentage of graduate students are from abroad and of a very high achievement level. For the future of our science and financial health, I hope they decide to remain and become as productive citizens as they have been students.

A war story

Defense of our country is still my primary concern and that subject has not been given its just due in the HDTV debate. Perhaps this anecdote from World War II will serve to illuminate the value of a scientific degree to the military: Before Pearl Harbor, Europe was at war in 1939 and the United States was torn with debate as to our role in helping the democracies over there. Isolationism was very strong and President Roosevelt was limited to financial support, self-defense of U.S.-owned property and shipping. You may remember that he gave England 50 old lend-lease destroyers.

Meanwhile, our armed forces were beefed up, a draft was instituted and industry was put on a semi-war footing. The Allies' position in Europe collapsed into England and the headlines shrieked horrors of the Battle of Britain. England needed more of everything and we shipped everything except manpower. However, one area was so desperate that Churchill persuaded Roosevelt to break his vow to Congress and send incognito 1,000 engineers to man the secret weapon (no one was allowed to mention the word "radar") to save England from the German bombs.

The National Research Council's Office of Scientific Personnel sent a letter to all known graduates in science subject to the draft offering an appointment as a second lieutenant in any branch of the armed forces. I responded and was interviewed at the Hotel Lincoln in New York by an Army colonel in mufti. Perhaps because I majored in physics, he said that I would be guaranteed a position in electronic research in the Signal Corps at Fort Monmouth. Wow, I was intrigued. Show me the

(Continued on page 96)

Management from the inside out

By Eric Himes
Regional Sales Manager, Magnavox CATV Systems Inc.

There are as many different forms of management styles and techniques as there are people. The number of seminars, books, philosophies and programs that deal with "how to handle" people in the workplace are numerous. Some people believe that "good" managers come by their talent naturally. Others believe that because individuals are proficient in their duties, they have the knowledge and capability to be a good manager without further training. Some companies have available to their employees a policy guide that gives directions on how to handle certain situations such as drugs, alcohol, pay raises, absenteeism, etc. Often they feel that with this tool a new manager has everything needed to fulfill the job requirements.

Why do some people make it as managers and others don't? That question can be argued until the end of time. I propose we start with the *inside* of the person: how that person thinks, feels and generally deals with life and reality on a daily basis. The key words to remember when discussing professionalism are *conduct*, *aims* and *qualities*. A question you might want to ask yourself is, "Am I a professional 24 hours a day, seven days a week; or am I just a professional during working hours?"

The art of managing is something more than ordinary talent or the forceful handling of people. *Management* defined as "means used judiciously without prejudice" is a tough statement. We are all human and therefore imperfect. We make mistakes and are subject to our own personal feelings when making decisions—be they judicious or not.

Integrity is said to be "adherence to a code of values." Have you ever sat down and wrote out what your values are? What is a value?

Let's examine some of the values that have been established over time. From the Ten Commandments: "Thou shalt not kill, commit adultery, steal, bear false witness," etc. From the Golden Rule: "Do unto others as you would have them do unto you."

Conversely, what kind or how much value do we place on material things? When do possessions take a greater priority over humanistic values? (What's more important, a telephone answering system for customer service or new brakes and tires for the installers' trucks?)

Managing other people

If we are going to manage other people, we need to have our own act together before we can even begin to guide them in the workplace. Write down what you feel are your values and principles. No one will be looking at your list except yourself, so be honest. Think of it this way: If you cannot be honest with yourself, how can you be honest with those around you?

Now that we have established an understanding of what values and principles are, we can examine the next level of

management. The following list of definitions describe leadership traits and how they apply:

- *Bearing*—general appearance, carriage, deportment and conduct. This one is relatively easy for most people to accomplish. If you require your employees to be neat and clean and to keep their vehicles clean, then it would be a very good idea to make sure you always show up to work as you expect them to. When discussing leadership, it is always good to remember leadership by example. You can talk until exhaustion, but words at some point in time become absolutely worthless when not followed by example. Few words are needed when the proper example is set.
- *Courage*—a mental quality of knowing and standing up for what is right in the face of popular disfavor. This is when your values and principles are put to the test. If you do not know what they are, how in the world will you know if you have the courage to stand up and face them?
- *Decisiveness*—to make a decision. Let's put courage, decisiveness and some easy values into an everyday work environment. Three of your four ladders are broken, but usable. The tires on the trucks need replacing and the brakes on two of your four trucks are pretty thin. Management tells you that if you try to replace those items, you'll go over budget. You are told to put the items into next year's budget. To make the situation even worse, you are the new system engineer; you've had no control over last year's budget. You're being told as the person responsible that you will have to wait until next year or maybe even a little longer. Nobody can make the decision except you.

What could happen if you delay your decision? If you don't make a decision? If you take it upon yourself not to allow your personnel to drive defective vehicles? If you take it upon yourself to destroy unsafe equipment? Courage of values and principles may cost you your job.

Integrity is the foundation from which you build your trust and respect. Without it, you are doomed to failure.

Compassion and unselfishness

Think about some of the problems you've encountered during your life; how often has compassion played a part in it? The lack of compassion can often make things worse. Let's discuss some real-life examples.

You have just been appointed the system engineer. The people you have worked with over the years throw a party for you. As most parties go, this one lasts well into the night. The next morning, a person you have become friends with shows up late for work. What would you do?

Your friend begins to show up late more and more. You've noticed that he is spending more and more time at the bar after work than he has in the past. His home life is going downhill because he tells you about it every day. No DUIs yet, but the odds are getting better that it is only a matter of time. What are your responsibilities as his manager? Do you have any responsibilities because it is on his time and not yours? Does a hangover affect job performance?

Now take the same scenario, except personally you really do not like the person. He does a good job, but he just rubs you the wrong way. Are you able to handle the situation the same way as you did with your friend?

Let's talk a minute about drugs and alcohol. As a manager, how much do you know about mood- or mind-altering drugs?

(Continued on page 74)

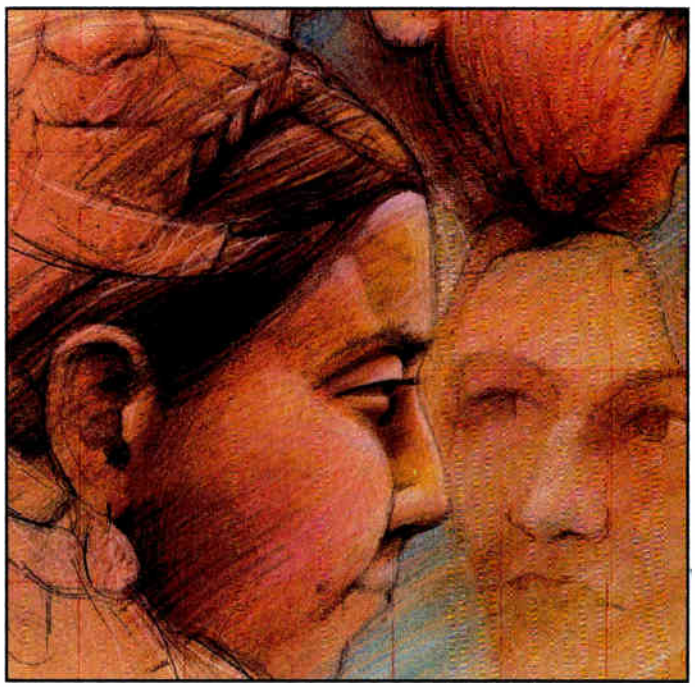
The industry must take affirmative action on EEO

By Howard M. Pardue
Vice President and Managing Partner, Broadcast Consulting Group

Vulnerability to charges of discrimination in employment, selection and promotion practices can best be minimized by results achieved through a proactive equal employment opportunity (EEO) program. To achieve meaningful, long-term results in the EEO area it is essential that all managers throughout the organization are involved and held accountable for results. In view of the Federal Communications Commission's recently increased scrutiny in the EEO area, it is essential that top management at the system, group and corporate levels be committed to and visibly supportive of the EEO/affirmative action objectives of the corporation.

Enlightened industry management who incorporate meaningful EEO objectives into their short- and long-range planning processes can bring about a heightened sense of awareness and commitment of its staff that will permeate the organization and thus help avoid ambiguity regarding its position on EEO matters.

Malcolm Farley



Malcom Farley

The first basic component of creating an effective affirmative action program is to issue a written corporate EEO policy stating the organization's position. The second step is to outline who is responsible for directing and implementing the program. The third step requires the dissemination of the company's EEO policy both internally and externally. Implementation of EEO policy may become intense because cultural beliefs, unconscious stereotypes and prejudices are being challenged.

Management awareness training programs can be useful in dealing with management sensitivities regarding the advancement of affirmative action objectives. Various approaches have been developed for awareness training, using role playing, small discussion groups, films and other audiovisual aids. Sensitizing managers to the EEO arena is an essential step in developing and implementing an effective EEO program.

The model program

A written model EEO program should at a minimum consist of the following components:

1) *Corporate equal employment policy:* This policy must support and articulate the organization's commitment to apply an aggressive good faith effort to maintain a proactive and visible atmosphere of true equal opportunity. This must include a continuing program of specific employment practice to perpetuate the principles of EEO. A crucial aspect of policy development and internal dissemination is to communicate the policy through an executive policy statement signed by the chief executive officer. The policy must outline the company executive responsible for administration of the program and effective internal complaint resolution.

2) *Policy dissemination:* The organization must commit to an aggressive outreach and internal and external dissemination program on a continuing basis. The appropriate women and minority organizations should be communicated with regularly. Internal company bulletin boards, employee newsletters, employee handbooks, periodic meetings with management personnel and new employee orientation programs are examples of effective methods of internal communication of the organization's EEO program. Examples of external communication methods should include but not be limited to notification of all recruitment sources, community organizations, agencies, local secondary schools and universities to ensure they are informed of the company's EEO policy. Written job advertisements for job openings placed in newspapers and trade journals should contain a clear reference to the company's EEO policy. All required EEO regulatory notices must be posted in conspicuous locations.

3) *Responsibility for implementation:* A senior executive should be designated as the EEO officer, whose primary responsibility is to plan, implement and audit the overall effectiveness of the EEO program. The EEO officer should also serve as the liaison between the company and women and minority organizations and community action programs concerned with EEO. The officer must be held accountable to ensure that all management personnel who make employment decisions with respect to

(Continued on page 74)

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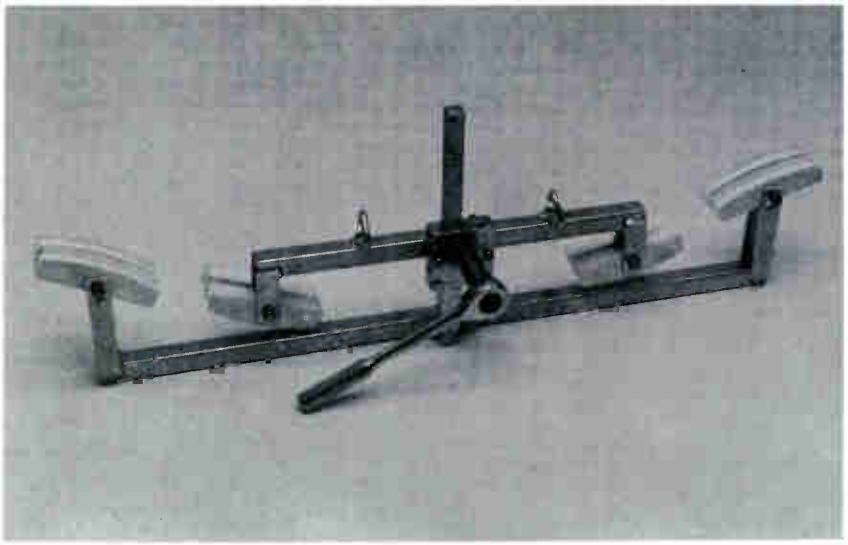

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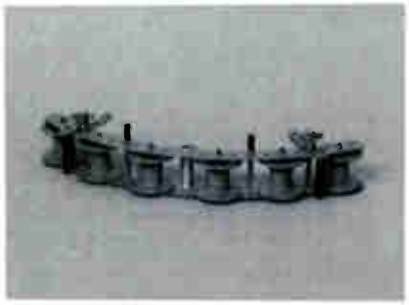
Cable Block



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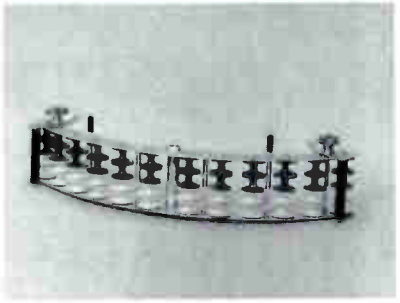

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Reader Service Number 18.

Zeroing in on budgets

By Steve Hubbard
Fund Engineer, Jones Intercable Inc.

If you are a chief engineer for an MSO you know the importance of budgeting skills. As you proceed through the annual budget review, your ability to analyze, develop and present projects determines whether they will be approved. You compete with your associates across the country for access to a limited pool of capital; the difference between approval for your projects and the next person's may be the thoroughness of your budget preparation. This article is written to help you improve your budgeting skills.

The budget review process varies between MSOs but most use the following basic pattern:

1) The annual business plan (including capital and operating budgets) is written by the system management team. Intensive detail is involved as many projects are considered, some are eliminated and the remainder are included in the budget.
2) The plan is reviewed by a regional, divisional or national management team. Changes are made. The reviewers see many budgets, reviewing them line by line.
3) The corporate finance department approves all of the budgets and authorizes money to be spent. The finance committee evaluates many budgets in a session and usually doesn't evaluate projects on a line-by-line basis if this has been thoroughly reviewed in the earlier stages.

How can you improve the odds of your project making it through these steps? The key is thorough planning and documentation with the goal of providing a compelling financial justification for every project.

Figure 1: Decision card

Front side

Program No./Name	Sponsor/Staff	E NE Manpower	Rank	Level ___ of ___	Revenue Gross savings	Expenses	Net savings
Program description/goals							

Approach	LRP goals	Feasibility
	1A ☐ 1B ☐ 1C ☐ 2A ☐ 2B ☐ 3A ☐ 3B ☐ 4 ☐	Legally required? ☐ Yes ☐ No Immediate payback? ☐ Yes ☐ No High Medium Low Technical ☐ ☐ ☐ Operational ☐ ☐ ☐ Economic ☐ ☐ ☐ Risks of not acting ☐ ☐ ☐ Overall eval. ☐ ☐ ☐ ☐ ☐ ☐ 1 2 3 4 5 6

Back side

Accounting detail

General ledger number	Description	Dollars 19___	19___

Developing the capital budget

There are two basic methods to develop the capital budget. The first is the traditional approach, called "historical budgeting"; the logic behind historical budgeting is quite simple. The budgeter reviews all projects or budget items in the current year's business plan and decides which need to be continued the following year.

Having identified the projects, estimate how much inflation, wage increases and other costs will increase next year, add that amount to what will be spent in the current year and enter the new amount for next year's budget. The justification for each project is largely assumptive; if it was necessary this year, it must be necessary next year. Historical budgeting is simple but has serious drawbacks; it is too assumptive and doesn't provide a basic justification for projects.

In recent years there has been increased interest in the approach called "zero-base budgeting." This method goes far beyond the limitation of historical budgeting. It begins with the assumption that nothing is necessary and no projects are continued simply because they exist in the current year. Next year's business plan includes zero for expenditures. While zero-base budgeting is usually associated with operating budgets, it is equally ap-

(Continued on page 70)

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- "Telephone Company Broadband Services Architectures," with Gary Kim, Multichannel News
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Reader Service Number 1.

How to improve your score on the BCT/E Category VII exam

By Ralph Haimowitz
Director of Chapter Development and Training
Society of Cable Television Engineers

Category VII—Engineering Management and Professionalism—is probably the most controversial of all of the BCT/E examinations. Most technicians and engineers are uncomfortable with this category for two reasons. First, it is not a multiple choice examination but an essay test. Second, most cable technical personnel have had very little training in the management areas.

Many companies offer some type of management training to their managers, and some include supervisory personnel as well. We feel that every cable employee will benefit from training in these areas because it is just as important to "manage up" or "manage laterally" as it is to "manage down."

Obviously, we expect managers or supervisors to manage down. This means that they lead and guide the actions of those who work directly under their supervision to see that the job is properly accomplished. But this is only part of the requirement. Everyone needs to know how to manage up; that is, to sell new ideas for budget requests.

The ability to manage up can make the lives of everyone a lot easier. For example, say an installer feels that the use of a signal leakage detector worn on the belt would help locate and repair leaks in the cable system as well as locate leakage problems in the house drops. He puts together a summary of costs for the equipment and the amount of estimated time that may be spent in this project and compares it with the cost to the company on trouble calls and correction of the problem. The final justification would include increased customer satisfaction, control of plant signal leakage for the CLI program and probable avoidance of fines. Obviously, the installer would need to obtain much of the data for this project from his supervisor or manager or perhaps just give the manager the idea to carry out and process using managing upward techniques until receiving approval to purchase the equipment.

"Most technicians and engineers are uncomfortable with this category (because they)...have had very little training in the management areas."

Managing laterally refers to getting along with your peers and co-workers—something most of us need to do better. Think of how much easier life would be (both at home and on the job) if we could get everyone to cooperate more with each other to get things done.

Finally, the course addresses the matter of professional ethics that come to play in our day-to-day work performance. Each of us needs to evaluate right and wrong, and practice what we feel is best. This is frequently where we have the greatest controversy between people and their interpretation or beliefs. Is it ethical to tell a lie? Of course not! But what about the "little white lies" that people often tell to prevent hurting someone's feelings? What about where you might tell those things that you know are facts but omit something that draws conclusions that may be incorrect?

Examine your options

To understand what the Category VII Examination Committee is looking for, you need to look at all of the possibilities of the scenario presented. Try to examine all parts of any and all of the various actions that you might take. If you choose one solution, what are the short- and long-term ramifications that may result from your actions? Perform the same analysis for all of the other possible solutions. Remember that what you are trying to accomplish in this part of your answer is to show that you have examined all of the possible reactions that you could think of.

Once you have outlined all of the actions that could be taken, it is time to select the solution that you think is proper or best. It should prove helpful to look at each solution and ask: 1) Is it good for the customer or community? 2) Is it good for the employee? 3) Is it good for the company? and 4) Is it good for yourself?

Finally, keep in mind that there may be more than one acceptable answer in some cases and there may be only one truly correct answer in others because of the seriousness of the case. An individual who can follow these methods of careful examination and evaluation of circumstances instead of making snap judgments is a more professional person.

Exam tips

By Eric Himes
Sales Manager, Magnavox CATV Systems Inc.

1) Read the entire question.
2) Think about what the question said.
3) Reread the question slowly looking for what you missed in the first reading.
4) Think about what the question is asking for.
5) Go back through the question picking out the key sentence or sentences.
6) Reread the question again with the key sentence and/or sentences in mind.
7) Organize your thoughts.
8) If needed, write yourself an outline of your answer.
9) Answer the question.
10) Reread the question.
11) Read your answer with the thought in mind "Did I answer the question?"
12) Do not worry over proper grammar, punctuation or spelling. Worry will break your train of thought and cause you to lose your concentration.
13) Keep your mind on the task at hand.
14) Remember the key words of *who, what, where, when, how* and *why.*

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Reader Service Number 19.

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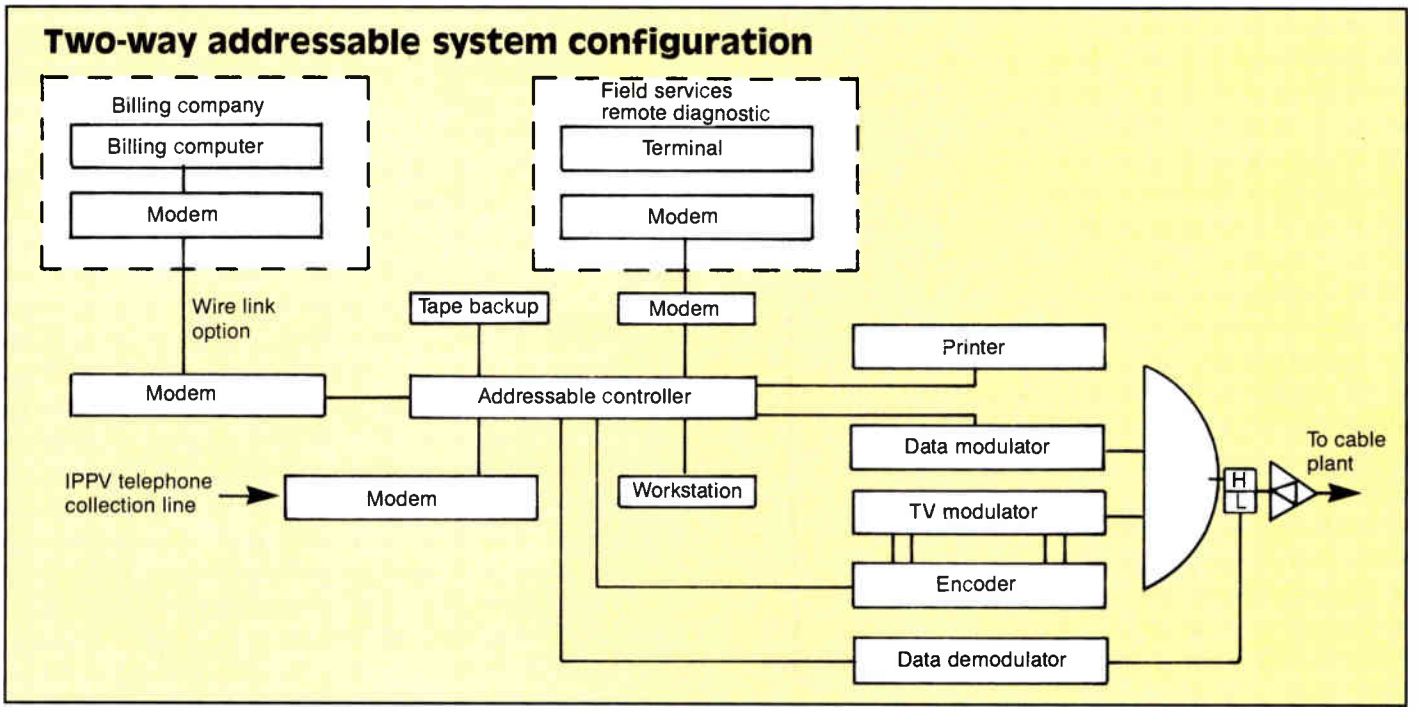

The future of IPPV

By Glenn E. Sigler
Field Service Manager, Pioneer Communications of America Inc.

Over a decade ago real-time impulse pay-per-view (IPPV) systems were in operation and providing service to cable subscribers in some large metropolitan areas. The technology worked and we have now come full circle. The recent interest in PPV is now generating renewed interest in impulse technology.

PPV buying is made available for the occasional user, IPPV buying for the frequent user. Most cable operators start addressability using one-way PPV only. Two-way IPPV is added at a later date, once the PPV services are generating revenue. (Some cable systems are more aggressive and start with IPPV technology.) Upgrading the addressable converter to IPPV is a simple process that is completed by adding a module inside the converter. This module transmits the subscriber event purchases and other collected data to the billing system for processing. Five years ago, most PPV activity was based on once a month blockbuster events. Many cable systems now offer PPV events daily on one or two channels 12 hours per day.

Limitations in the ordering mechanisms for PPV can in turn limit subscriber buy rates. The customer service representative (CSR) "call-in" method of purchasing is limited by the number of available customer service phone lines as well as transaction length of the phone order. Audio response units (ARUs) used for gathering orders, again are limited by the number of phone lines supported. A further limiting factor of ARUs is that orders must be placed on a touch-tone telephone. Subs with telephone pulse service would be excluded from using the ARU ordering mechanism. One of the fastest one-way PPV ordering systems is the automatic number identification (ANI) technology. This ordering method requires that a subscriber call a phone number to place the event purchase. The sub's telephone number is then reported back to billing for posting of the event purchase.

The ultimate subscriber ordering method would be a system that is transparent to the sub, easy to place an order with and provides true impulse buying capability. Two-way technology provides this path to the sub for purchasing of events on *impulse* using the currently available cable or sub's phone line to report back the statistics. A sub will never miss purchasing an event because of a busy signal.

The accompanying diagram illustrates a typical two-way addressable controller configuration. The addressable controller acts as the slave computer driven by billing. This diagram shows the capability of both an RF and telephone return application. Remote encoder control is accomplished via a dedicated link from the controller.

IPPV event purchases should be made as convenient and simple for subscribers as possible. With a push of a button, the buying transaction is completed from the comfort of the armchair —no account numbers to memorize, no personal identification numbers or telephone calls—keeping it simple. At a later time, event purchases can be uploaded for billing using a store and forward technology. The converter credit limit is reset after the successful upload of purchase data to billing.

The ins and outs of store and forward

Store and forward technology can be added to any system at any time. The flexibility of using either telephone return and/or RF return makes this possible. In older parts of the cable system, RF return may not be an alternative. Those areas may offer IPPV buying using the cable sub's phone line to upload event purchases. The new-build or rebuild areas that do support the sub-band would use this return RF path to upload event purchases.

Telephone return converters are instructed by the addressable controller to dial a certain number. This phone number rings a dial-up modem connected to the addressable controller. In some areas of the local phone system, telephone on-hook and off-hook voltages may not be within specification. These low voltages will inhibit some telephone return modules from going off-hook and establishing the data connection. A phone voltage calibra-

(Continued on page 68)

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Reader Service Number 20.

Reliability aspect of AML microwave systems

By Jim Randolph
Vice President, System Engineering/Customer Service
AML Specialties Inc.

AML (amplitude modulated link) microwave systems are widely used in Europe, Canada and the United States for CATV applications in lieu of conventional FM microwave or supertrunks. Microwave signal outages arise from three basic sources: propagation phenomena, equipment failures and maintenance problems. The first is controlled by proper system design appropriate to the geographical area under consideration, the second by redundancy built-in and by "fail-soft" design techniques, and the third by adequate trained personnel and appropriate spare parts on site.

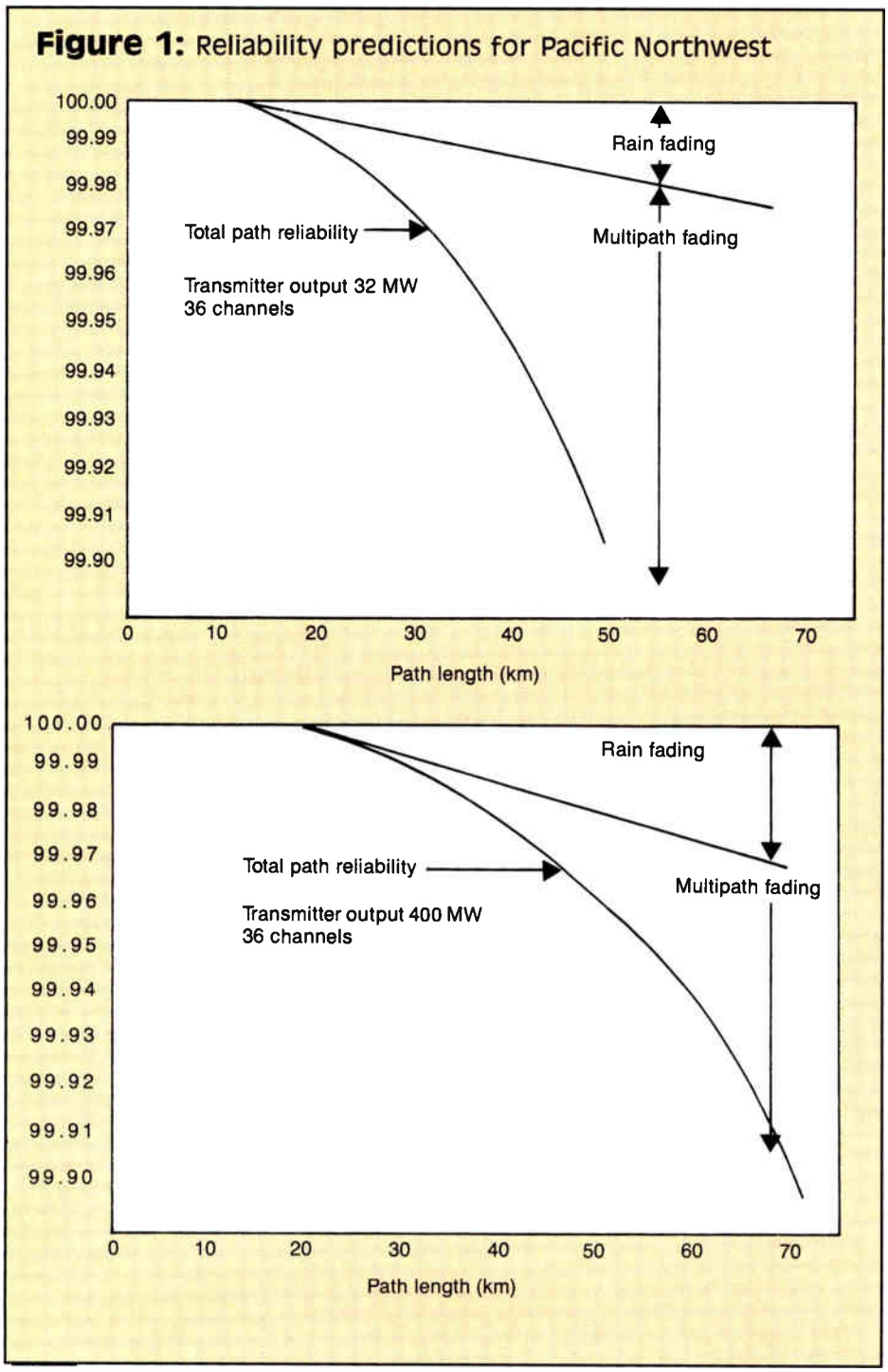
Microwave CATV distribution systems are best defined by listing their applications:

1) Distribution of signals within a cable system.
2) Interconnecting nearby systems.
3) Hubbing of systems.
4) Regional distributing of signals from satellite receiving terminal.
5) Importing distant signals.

The reason why microwave distribution systems have been so widely accepted and have enjoyed such rapid growth are:

- Lower cost than using multiple head-ends or long runs of dry trunk.
- Lower signal distortion than a long trunk line cascade. (Based on a carrier-to-noise, cross-modulation and composite triple beat tradeoff, AML microwave is equivalent to approximately three to four trunk amplifiers.)
- Ability to cover much wider geographical area.
- Ability to span terrain obstacles such as highways, lakes or rivers, rights-of-way, ease of maintainability of equipment, speed with which a new area can be served and fewer active devices.

Figure 1: Reliability predictions for Pacific Northwest



Reliability factors

This leads us to the main subject matter of this article; namely, the reliability aspects of AML microwave. These include propagation phenomena, equipment failures and the time necessary to repair equipment that may have failed for one reason or another.

There are two types of propagation phenomena to be considered. The first of these is the signal attenuation caused by rain or other forms of precipitation such as snow, hail, etc. Rain attenuation is a major factor to be considered in the design of microwave systems, such as AML systems that operate at the higher microwave frequencies in the 12-13 GHz band in this instance. Predictions of rain attenuation require knowledge of the weather statistics in a given locality. The methods of calculation are well-established. A major factor to consider is that the controlling parameter is the rate of precipitation rather than the total precipitation for a given time interval. Consequently, the types of steady drizzles characteristic of

JULY 1990

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Reader Service Number 21.

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On-/off-premises— Addressing the issues

By John E. Burke
Product Manager
Jerrold Division, General Instrument Corp.

The purpose of this article is twofold: first, to outline the differences between on- and off-premises approaches to addressable control; and second, to further point out how these differences could affect the decision-making process in selecting one approach over the other. Our intent is not to discredit either, since the various limitations that will be outlined are not insurmountable. Hopefully we will provide a clear understanding of the current state of on-/off-premises technology and offer insight into the future.

Let's first define on- and off-premises. Both provide addressable control of services with equipment located outside the home; the difference is where you locate this equipment. On-premises approaches attach the equipment to a subscriber's residence in a secured, weatherized housing. Off-premises locates the equipment in a weatherized housing on the pole or strand or in a pedestal.

The reasons why an operator might want to consider on- or off-premises are virtually the same and can be segregated into three key areas: addressable control capability, consumer friendliness and improved operating efficiencies.

On- and off-premises equipment both contain data receiving and microprocessing memory circuitry necessary for addressable control. This circuitry enables the equipment to be remotely controlled by a computer located at the headend, office or some other remote site. While the functions performed by the circuitry will vary from one approach to another, the goal is the same: remote control of services and features. These generally include service connect or disconnect, pay-per-view and premium service upgrades or downgrades. Additionally, both approaches offer remote control of security devices, including interdiction (jamming) and traps (control through switches).

Defining terminology

It may be helpful at this point to discuss an aspect of CATV technology that has long been misunderstood: The words *addressability* and *security* are not synonymous. Addressability, as outlined in the previous paragraph, can be defined as "the ability to remotely control services and/or features." Security, in the CATV world, is provided by the actual device used to supply or deny services or features. Most likely, the misunderstanding has come about as a result of the widespread use of addressable descrambling set-top converters, an in-home approach to security that utilizes a separate RF tuner and descrambling circuitry to supply or deny services and features.

On- and off-premises approaches are similar to the addressable descrambling set-top converter approach in that they both offer addressable control. The difference is in the type of security device used (jammers or switches vs. descrambling circuitry), the tuning function and the location of the device (inside vs. outside the home).

Having clarified "addressability" and "security" we can better understand the next reason why an operator might consider on- or off-premises technology: consumer friendliness. These technologies

(Continued on page 64)

January 1990

Spotlight on leakage

BACK TO BASICS

The training and educational supplement to Communications Technology magazine.

Contents

Formerly Installer/Technician

Going into training for the bout with leakage

By Dave Barrett
Colorado Area Chief Engineer, Jones Intercable

The first step is to make sure everyone understands the rules. The system will get little accomplished nor will there be motivation to repair leaks if we do not all work together toward the common goal, which is to understand and interpret the rules, then carry out the task.

It's plain and simple—the rules exist because cable operators carry signals located in critical communication bands, such as FAA aeronauticals, emergency ship survival/marine mobile, etc. If your plant is leaking there may be interference to these and other communications. The two critical aeronautical bands are 108-137 MHz and 225-400 MHz. The three other emergency frequencies that the system must avoid are 121.5 MHz, 156.8 MHz and 243 MHz.

Remember these important points:

- Frequencies on the cable system falling between 108-118 MHz and 328.6-335.4 MHz must be offset at the headend by ±25 kHz.
- Frequencies falling between 118-137 MHz, 225-328.6 MHz and 335.4-400 MHz must be offset by 12.5 kHz.

Figure 1: Planning and implementing a CLI test

Calculated
2 people × 14 days = 28 total days
5.5 hours/day × 28 days = 154 work hours
154 work hours ÷ 56.72 total plant miles = 2.72 work hours/mile
154 work hours ÷ 24 leaks = 6.42 work hours/leak
24 leaks ÷ 56.72 plant miles = 0.42 leaks/mile

Cost/repair of parts and labor:
$15 parts/leak × 45 leaks = $675
$16 labor/leak × 45 leaks = $720
$1,395 / 45 leaks = $31 cost/repair

Cost/mile:
Total parts cost = $15 parts/leak × 45 leaks = $ 675
Total labor cost = 154 work hours × $8/hour = $1,232
$1,907

$1,907 ÷ 56.72 plant miles = $33.62/mile

Actual
2 people × 12 days = 24 total days
6.5 hours/day × 24 days = 156 work hours
156 work hours ÷ 56.72 plant miles = 2.75 work hours/mile
156 work hours ÷ 30 leaks = 5.2 work hours/leak
30 leaks ÷ 56.72 miles = 0.53 leaks/mile

Cost/repair of parts and labor:
$12 parts/leak × 30 leaks = $360
$12 labor/leak × 30 leaks = $360
$720 ÷ 30 leaks = $24 cost/repair

Cost/mile:
Total parts cost = $12 parts/leak × 30 leaks = $ 360
Total labor cost = 156 work hours × $8/hour = $1,248
$1,608

$1,608 ÷ 56.72 plant miles = $28.35/mile

- There are three emergency frequencies: one at 121.5 MHz, from which cable signals must be offset by 100 kHz and carried on the system at no more than 28.75 dBmV, and the other two at 156.8 MHz and 243 MHz, from which our signals must be offset by 50 kHz and carried at a level of no more than 28.75 dBmV.

Offsetting frequencies and monitoring their tolerances is done at the headend and is the first step in satisfying the FCC. Once signals are offset, the entire system must continuously be monitored. Every field associate should be equipped with a leakage detector. The system dispatcher should even be involved by recording leaks as they are detected. Many times service and install people have routed schedules that prevent them from stopping and fixing the leak as soon as it is detected. The dispatcher can log the location and level of leak then route and schedule it as a special request order so the system service call percentages are not adversely affected.

However, *any* leak above 250 μV/m (microvolts per meter) should be repaired immediately! By that I mean within 24 hours. Leaks below 250 μV/m should be repaired in a reasonable amount of time, and by that I mean within seven days. Any leak above 50 μV/m must be included in the annual CLI ground-based measurements and should also be repaired within a reasonable amount of time—again seven days. Any leak above 20 μV/m must be included in quarterly monitoring logs.

Remember, a good leakage monitoring program helps your system better prepare for the annual CLI test and reduces service calls. To get a handle on leakage and control, everyone must play by the same rules. Contract construction and install crews also are responsible for controlling signal leakage. I recommend that no new-build, rebuild or extension of plant be turned in as completed until it has been tested for leakage. I also suggest that contract installers carry leakage detectors and test each job they do. The leakage detector should be considered the most important piece of test equipment that we use.

Do the math

The CLI test must be done in the shortest time frame possible. It is designed to be a "snapshot" of the system's performance. At least 75 percent of the plant must be sampled, including the known leaky areas, when compiling the CLI data. Figure 1 shows the use of simple math in the planning and implementation of the annual CLI test.

The figure of merit or score that you must achieve on the annual CLI is 64 or less. If the system does not meet a minimum 64 CLI by July 1, 1990, it may face fines of up to $20,000 per day and/or loss of up to 34 channels! The CLI data must be kept for two years.

The following formulas are used in converting dBmV to μV/m (Formula 1), and when you have a known μV/m and frequency but want to know what the meter reading will be (Formula 2).

For example, if the meter reads -26 dBmV at 121.25 MHz, first make certain you take pre-amp gain into consideration. So if you're using a dipole with 16 dB gain, the actual level

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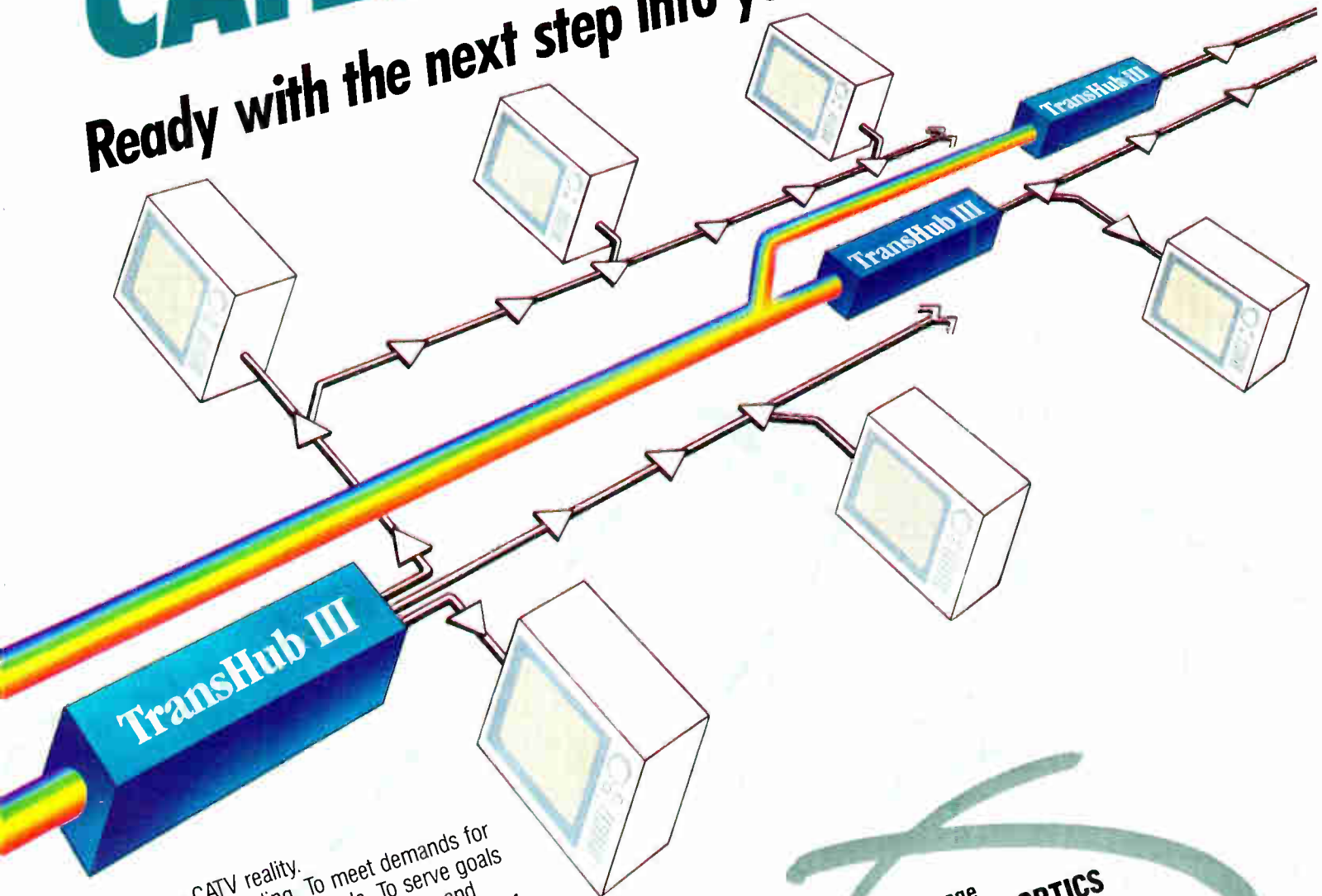

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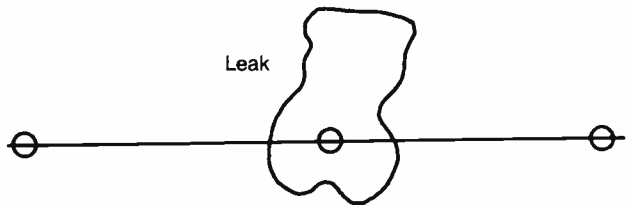
Figure 2: Radiation pattern of a leak



would be -26 dBmV + (-16) = -42 dBmV.

To convert the meter reading to μV/m:

$$10^{\left(\frac{\text{level in dBmV}}{20}\right)} \times 1000 \times .021 \times \text{freq. in MHz} = \quad (1)$$

$$10^{\left(\frac{-42}{20}\right)} \times 1000 \times .021 \times 121.25 \text{ MHz} =$$

$$10^{\left(\frac{-42}{20}\right)} \times 1000 \times 2.5463 =$$

$10^{-2.1} \times 2546.3 =$ (For $10^{-2.1}$, take the antilog of -2.1)

$.0079 \times 2546.3 =$

20.23 μV/m

If you want to know what your meter will read for a 50 μV/m leak at 121.25 MHz:

$$20 \times \log\left(\frac{\text{desired } \mu\text{V/m}}{\text{freq. in MHz} \times .021 \times 1000}\right) = \quad (2)$$

$$20 \times \log\left(\frac{50}{121.25 \times .021 \times 1000}\right) =$$

$$20 \times \log\left(\frac{50}{121.25 \times 21}\right) =$$

$$20 \times \log\left(\frac{50}{2546.25}\right) =$$

$20 \times \log(.0196) =$

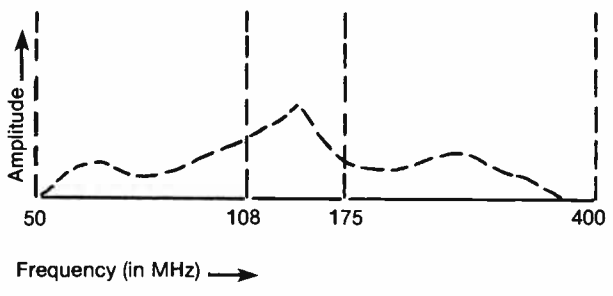
$20 \times -1.7077 =$

-34.16 dBmV

Neither your meter nor your eyeballs will be able to discern 0.16 dBmV, so it can safely be dropped to -34 dBmV. Again, adjust for gain; so if you're using a dipole with 16 dB gain, your meter will actually read -34 + 16 = -18 dBmV.

Some leakage detectors are metered and will give you the level in μV/m. For quick reference you may choose to use a conversion chart.

Figure 3: Leak strengths varying at different frequencies



Study the problem

For new associates, or anyone performing leakage monitoring for the first time, to fully understand how to perform the testing, training could include:

1) Time in the classroom:

- Develop a videotape that explains leakage and the rules, and shows how people actually detect and repair leaks.
- If a videotape is not the best way to go for your system, develop a signal leakage manual. At Jones Intercable we are fortunate to have both videotapes and a complete section of the company engineering manual dedicated to signal leakage. Both are great training tools. The manual consists of chapters on the history of leakage, legal requirements, FCC and Jones requirements, flyover CLI tests, ground-based CLI tests, a complete copy of the FCC rules on leakage, grandfathering issues, monitoring and offsetting channels AA, BB and CC.

2) Discussion of leakage in weekly one-hour technical meetings.

3) Time in the field performing hands-on training. This helps drive the point home.

Figure 2 may help you envision the actual pattern of a given leak as it radiates into the air. Leaks are not necessarily symmetrical and can vary in strength at different frequencies (Figure 3). Therefore, when you are making measurements with your dipole, make certain you find the strongest field strength at each leak measured.

When you measure a leak, you must use a horizontal dipole antenna 10 feet above the ground and positioned directly below the system components. If such placement results in separation of less than 10 feet from dipole center to system components, you must reposition the dipole to provide 10 feet of separation. The horizontal dipole is then rotated in the vertical plane to obtain maximum meter reading (Figure 4).

When measuring leakage from underground plant, you may encounter the situation in Figure 5. In this case, the cables rise into a pedestal in the *vertical* plane. Your dipole should now be held vertically so that it is parallel to the cables. Once your CLI test is complete, assign priorities to leaks found and develop a plan to repair all leaks noted.

Dipole and loop antennas may be used to detect leaks. As far as receivers go, our systems have used a variety of equipment since we began leakage testing in 1985. We first began using hand-held ham scanners, but found that once we offset our aeronauticals, the scanners were then slightly off frequency.

There have been advancements over the years on the manufacturing side. Fiber optics is a great help (no leakage) but it may be a while before we have an all fiber plant from the headend to the television set. Connectors are improving at a steady pace, however, they still must be put on the cable properly and tightened down.

Educate the customer

The cable operator has a commitment to find and fix signal leakage, wherever it originates from. Bad pre-wires, push-

Figure 4: Measuring leakage from aerial plant

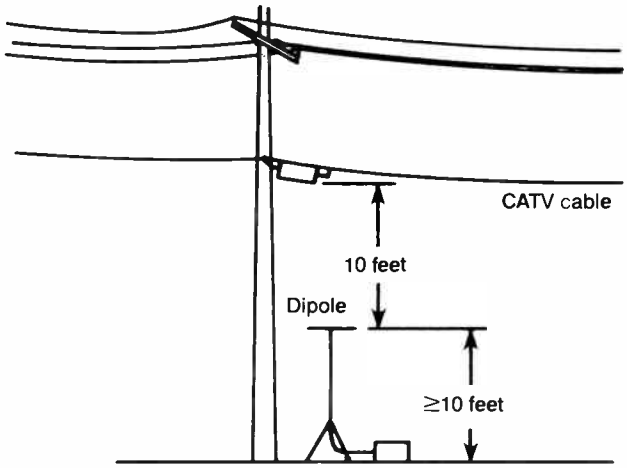
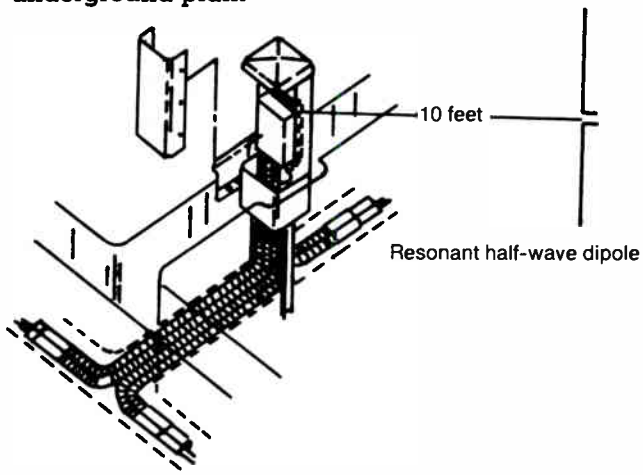


Figure 5: Measuring leakage from underground plant



on connectors and the new A/B switch rules will test our skills. If a pre-wire has poorly shielded cable there is a potential for leakage. Where there are store-bought or push-on connectors installed by do-it-yourselfers, there is potential for leakage. Where there are A/B switches, there are more fittings and more potential for leakage.

My point is it is as important to educate your customers about signal leakage as it is to educate yourself. You must do this now or be faced with educating subscribers the hard way, after the FCC has reduced their channel capacity because the system did not comply with leakage rules. If you find a leak that is being generated within a customer's home, make every attempt to contact the subscriber before you disconnect. The FCC expects you to stop the leak, no matter where it's coming from. However, this practice should not be followed when you come across an illegal connection that is leaking. Disconnect this one immediately, no matter what size leak it is.

In conclusion, if you work in the cable system as an installer, technician, construction person or any field-related position you have a responsibility to learn and become very familiar with signal leakage and why we must control it. Your future and the industry's future depend on how well this issue is handled.

A startling note: At the recent annual Society of Cable Television Engineers expo held in Florida there was a seminar hosted by representatives of the FCC. They said they have collected enough money in fines for signal leakage that they could now perform an aerial flyover CLI test in each existing cable system in the United States. So tighten up! ■

CLI myths and magic

By Terry Walthall
Regional Engineer, Galaxy Cablevision

The following are a few common myths about CLI, the facts and a few "magic" tips for a more efficient preventive maintenance program for leakage.

Myth: All your system's leaks are below the allowable level.

Fact: You cannot be assured that a maximum level at the maximum frequency was indeed measured at three meters from the cable plant. Also, time of day, humidity level and increasing corrosion will not allow a leak to improve its leakage level.

Myth: You can access more than 75 percent of your system to within three meters with a dipole antenna and field strength meter.

Fact: Due to underground cable plant, off-road utility easements or polelines and rural interconnects, most cable plant is not easily accessible to the routine monitor's service vehicle. Therefore, leakage equipment that is usually in the service vehicle must be proportionately more sensitive to the common or usual distance from the actual plant components.

Myth: Cable RF leaks are frequency selective.

Fact: Atmospheric conditions will affect the range of frequencies eminating from a leakage source.

Myth: Cable leaks are generally one way.

Fact: Any place that allows an RF leak also will allow ingress of local radio (two-way) and broadcast signals.

Myth: A hotel or MDU that subscribes to your signals is responsible for its own RF system integrity.

Fact: The Federal Communication Commission's point of view is that they are your frequencies, therefore, you are ultimately responsible and will be the offending party identified on the citation.

Magic: Use of a non-seize compound and a 7/16 wrench on all exterior connections will reduce future service calls.

Magic: A no-miss policy toward leakage in your cable plant will reap huge benefits in the future. Ultimately, tremendous amounts of time will be saved by repairing problems before the customer places a service call. (Note: This will be hard to prove or disprove because it will be impossible to track calls that are never placed.)

Magic: In cases where adjacent cable plants are frequented by other system personnel, a good neighbor policy (reporting the other system's RF leaks to its proper contact) will almost always result in more leaks being repaired. ■

CLI: The final preparation

By Andy Skop
Sales Representative, Anixter Cable TV

The deadline for reporting your cumulative leakage index (CLI) is July 1. Most CATV personnel must familiarize themselves with Docket 21006 as adopted in Part 76, Title 47 of the Federal Communications Commission's Rules and Regulations.

The FCC recently shut down three channels of a Texas system because its signals were leaking above compliance into the aeronautical spectrum. By now, most systems have implemented leakage prevention programs, and personnel should be using detection equipment.

There are sources to help with a leakage prevention program, such as vendors. Most have regional product managers with qualified field experience and technical information. Also, the final report to the FCC by the Advisory Committee on Signal Leakage provides a thorough examination of the issues and is available from the Society of Cable Television Engineers.

Managers and chief technicians (including owners and installation contractors) should check all equipment regularly. Crimpers that need adjustment and prep tools requiring blade changing should perform to specification and be maintained, repaired or replaced as needed. This means having extra tools for emergencies.

Making the connection

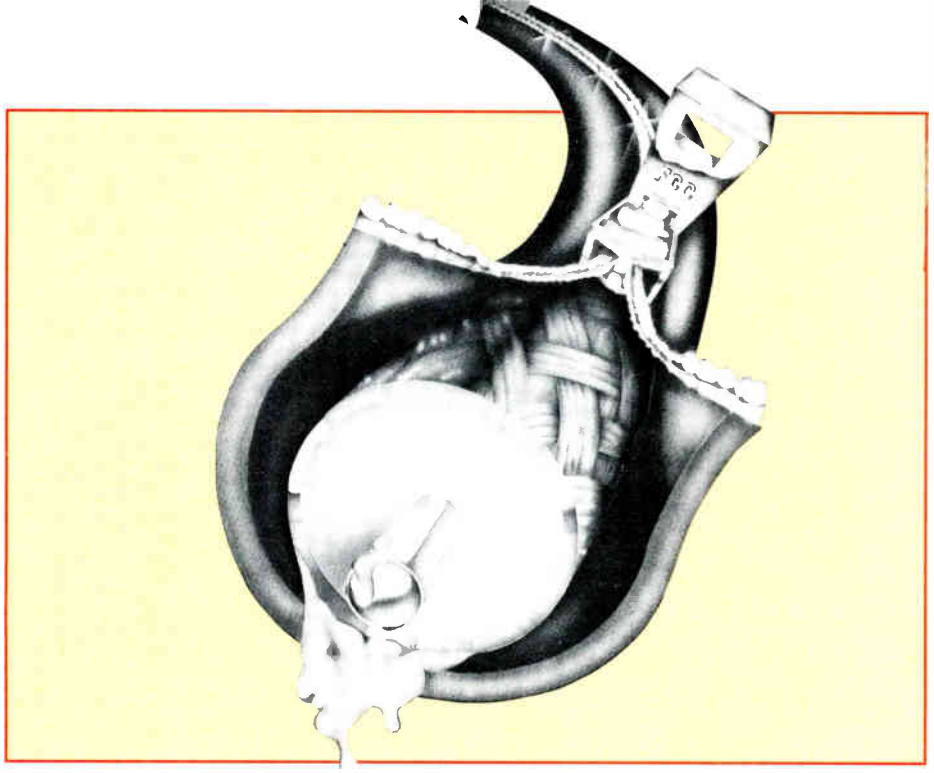
Improperly made connections are the most frequent cause of signal leakage. Signal level meters and detection equipment should be calibrated frequently. Products offering the highest possible shielding also can prevent leakage. Accurate record keeping of service problems will provide clues to what is happening in the field. A positive correlation to your CLI program will result.

"Improperly made connections are the most frequent cause of signal leakage."

The following are sealing methods and relative leakage levels of some currently available splitters:

1) MATV type, 0.5 mm Al cover, pressed and epoxied: -60 dB.
2) CATV type, 1 mm thick cover, pressed and epoxied: -70 dB.
3) CATV type, 1 mm cover, pressed and staked (four points): -80 dB.
4) CATV type, 1 mm cover, 2 mm apart serrated piercing edges, pressed and staked down (four points): -90 dB.
5) CATV type, 1 mm cover, outer case edge fully rolled and staked over: -100 dB.
6) CATV type, stainless steel cover, pressed and staked: -100 dB.
7) CATV, Japanese/European type with full RFI screen: -120 dB.
8) CATV, multiple tongue and groove edges, heavy diecast cover: -130 dB.
9) CATV, completely solder-type sealed case to cover metallically bonded: -140 dB.

Crimpless connectors have been introduced in an effort to improve ease



of installation as well as shielding and reliability. They also can help eliminate problems associated with connector and cable sizes. Drop hardware should be evaluated regularly with special attention to longevity and protection of the drop wire. This is an area that requires extra attention.

Teaching necessary skills to installers and technicians should be a priority. Training information can be obtained from many sources such as trade journals, SCTE meetings, BCT/E and Installer Certification programs and trade shows. Courses from the National Cable Television Institute offer excellent programs designed for CLI.

We must demonstrate to the FCC that the leakage problem is under control. If we fail, we risk losing the use of aeronautical navigation and communications frequencies. Controlling leakage requires specific and continuous care and monitoring of the entire coaxial plant. It is a huge project, and those systems that have not begun a CLI maintenance program must do so immediately.

The CLI regulations were issued about five years ago with the intention that the cable industry have adequate time to establish procedures and programs for compliance. Time is running out, and it is apparent that the FCC plans to make examples of those cable systems that fail to submit a passing CLI. As the industry enters the final preparation phase, a positive attitude and a well-planned approach will ensure compliance and success. Good luck! ■

References

1) FCC, *Final Report of Advisory Committee on Cable Signal Leakage.*
2) Holland, Michael, "Design, Testing and Applications of RF Splitters in CATV Market" (Pico Macom).

Picture this—The effects of a failed CLI

By Steve Johnson
Senior CATV Project Engineer
American Television and Communications

For the last five years, we've been warned about the date July 1, 1990. During that time, some of us have been gearing up for this deadline for getting our cumulative leakage index (CLI) in order, some have not. Signal leakage compliance takes resources and a conscientious effort, which translates to time and money.

Managers can be a hard sell when you try to convince them to let go of the dollars for signal leakage resources. Not spending the money now can be even more expensive in the near future.

What happens when your system fails its CLI? According to the Federal Communications Commission, you have two choices:

1) Lower the level of all your FAA (aeronautical) band channels so that these channels will not exceed 38.75 dBmV at any point in your system. There goes your carrier-to-noise ratio (not to mention your subscribers) that you've fought so hard to maintain. Will your remaining subscribers even be able to identify the video through the noise?

2) Remove the FAA band channels from your system. To dramatically illustrate this effect, show your manager the Figures 1-6. A 54 channel, 400 MHz system; 42 channel, 330 MHz system; 37 channel, 300 MHz system; and a 32 channel, 270 MHz system now all become 20 channel systems (38 to 63 percent of their former loading). All that money spent on upgrades—down the drain. Oh well, if you need more channels, the CLI rules don't apply above 400 MHz. We can always rebuild our systems to 450 MHz, 500 MHz, 550 MHz, 750 MHz or 1 GHz and regain those lost channels.

Wouldn't it be easier to just do it right the first time and make sure we can pass the CLI by July 1? The money spent on signal leakage equipment doesn't seem so excessive when compared with the consequences of non-compliance. Think about it. ■

Figure 1: 54 channel, 400 MHz system

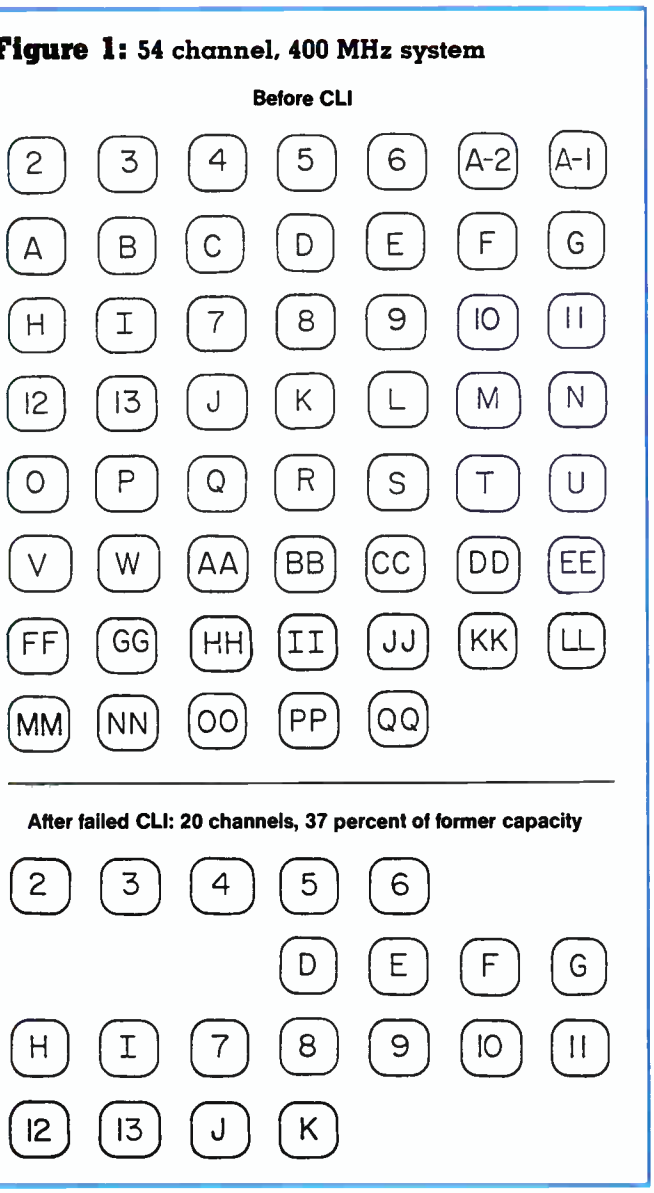


Figure 2: 42 channel, 330 MHz system

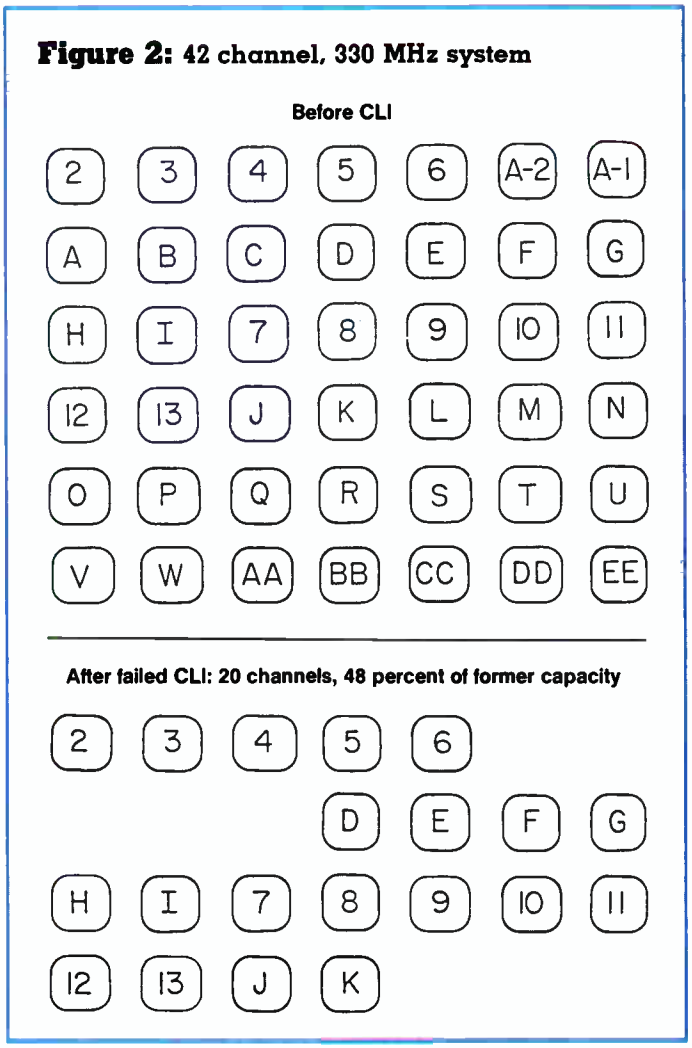
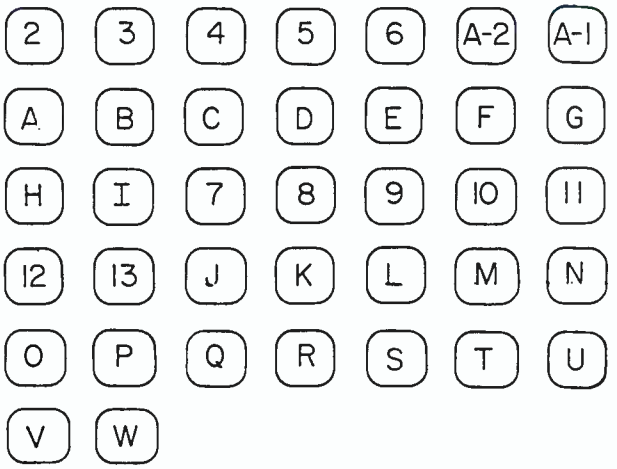


Figure 3: 37 channel, 300 MHz system

Before CLI



After failed CLI: 20 channels, 54 percent of former capacity

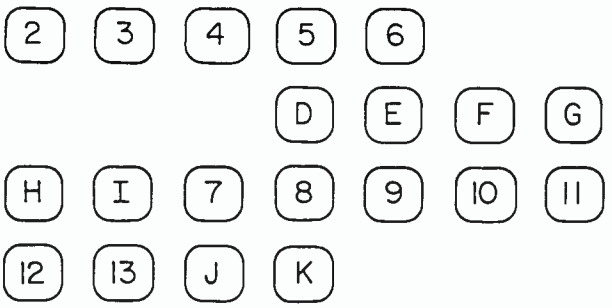
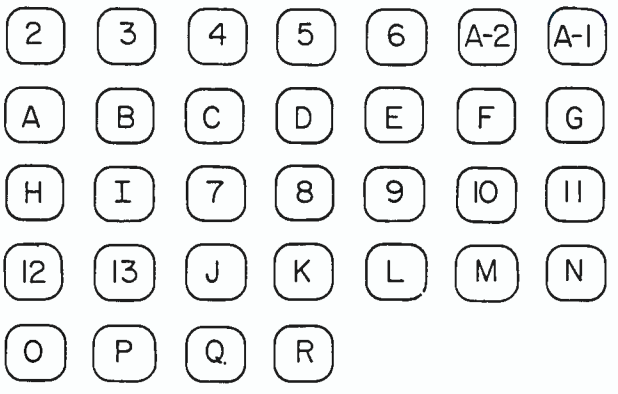
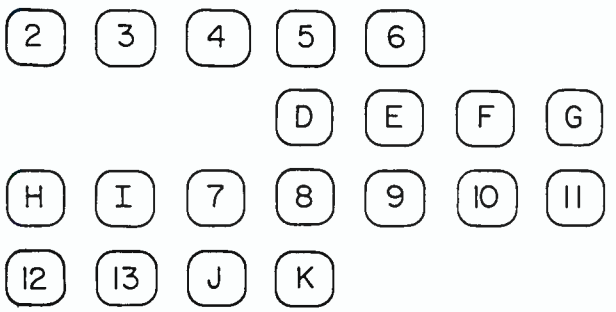


Figure 4: 32 channel, 270 MHz system

Before CLI



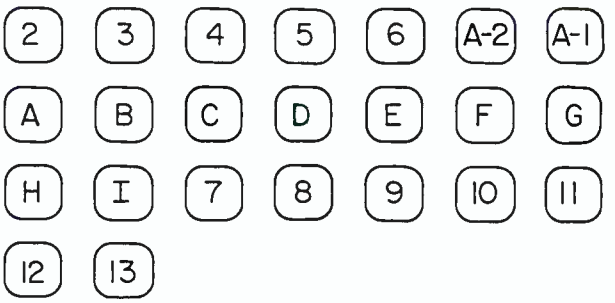
After failed CLI: 20 channels, 63 percent of former capacity



"The money spent on signal leakage equipment doesn't seem so excessive when compared with the consequences of non-compliance."

Figure 5: 23 channel, 220 MHz system

Before CLI



After failed CLI: 18 channels, 78 percent of former capacity

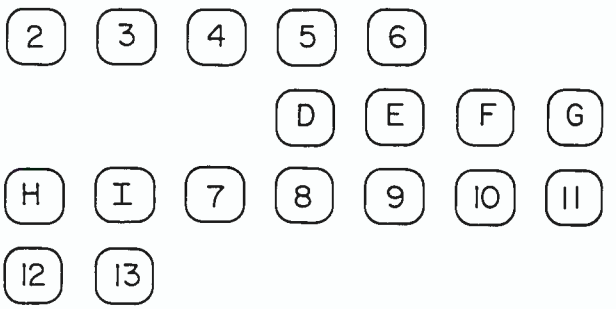
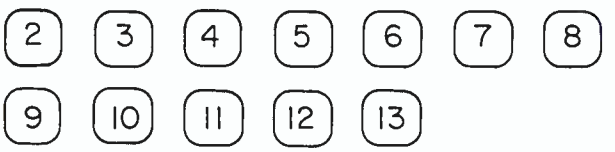
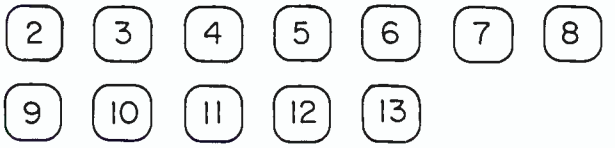


Figure 6: 12 channel, 220 MHz system

Before CLI



After failed CLI: 12 channels, 100 percent of capacity



Hands On

Why not give it a try?

By Jud Williams
Owner, Performance Technologies

Recently, I joined in a conversation with a group of fellow SCTE members and the discussion led into the subject of how membership in the Society of Cable Television Engineers had affected each of our careers. I remember thinking to myself that I quite possibly would not be involved with this magazine had I not taken the advice of Garry Donaldson of Wometco and joined the Chattahoochee Chapter in Atlanta several years ago.

For a number of years I serviced several cable systems in the Atlanta area performing repairs on their distribution equipment and power supplies. I felt as though I was not being adequately challenged because the routine was very much the same as time went on.

A step in the right direction

Soon after becoming active in the SCTE, I began to feel more professionally stimulated. I made sure that I attended most of the meetings and soon found that I was becoming acquainted with some very interesting people. I was beginning to feel as though I was a more vital part of the cable industry.

I was fortunate to be appointed to the board of directors as a result of a vacancy. This allowed me to participate more directly in the activities of the chapter. The other board members welcomed me into the group and at meetings encouraged me to contribute what ideas I might have.

Probably the area that interested me the most was training. I was given the opportunity to organize and conduct a seminar with Chuck Beckham of Voltex Batteries and Lynn Newsom of Prime Cable.

Just to let you know how participation of this sort can open doors for an individual, following the presentation of our first seminar we were asked to do the program again in another part of the state. Next I was asked, along with Guy Lee (formerly of Telescripps), to organize the technical sessions for the 1989 Eastern Show.

More than meetings

The SCTE is not just seminars and meetings either. We have gone on interesting field trips, such as the very popular tour of AT&T's fiber-optics facility. We had a field day and picnic a year ago last fall. It was a great way to meet other members. We had our first Christmas party last year and the future looks bright for more interesting events to come.

More emphasis toward basics and hands-on training is the aim for upcoming meetings. The people we hope will conduct these meetings are those among us. As a group, we have a great deal of knowledge and many skills that should be shared to build a stronger industry at the installer and technician levels.

Of course there are other activities beneficial to installers and technicians such as the Installer and Broadband Communications Technician/Engineer Certification programs. Periodically, tests are scheduled that may be taken by anyone in the SCTE. These tests cover a whole spectrum of subjects in all phases of the cable industry. As each participant successfully completes a phase of the testing series, he is awarded an appropriate certificate. The benefits of passing these tests, in addition to a feeling of accomplishment, is the recognition that you truly are an expert in your chosen profession.

All these benefits are available to anyone in our industry and at very little cost. My dues to the national organization are $40 per year. I automatically become a member of the local chapter at no additional cost. Meetings usually run between $10 and $15 each, including lunch.

By the way, lunch can be just as important a part of the meeting as the speaker. You have the opportunity to talk shop with others in your field but outside of your own system, allowing for an exchange of valuable information.

Joining the organization is a simple matter of calling the contact person for the particular chapter you are interested in. You will find these names and numbers in most issues of the Society's monthly publication, *The Interval*. The phone number for the SCTE national headquarters is (215) 363-6888. ■

Installer's Tech Book

Converting dBmV to μV/m

By Ron Hranac
Senior Staff Engineer, Jones Intercable Inc.

Channel 31 or R (265.2625 MHz)

dBmV	μV/m	dBmV	μV/m	dBmV	μV/m	dBmV	μV/m
-60	5.57	-36	88.29	-10	1761.55	16	35147.56
-59	6.25	-35	99.06	- 9	1976.49	17	39436.21
-58	7.01	-34	111.15	- 8	2217.66	18	44248.15
-57	7.87	-33	124.71	- 7	2488.26	19	49647.24
-56	8.83	-32	139.92	- 6	2791.87	20	55705.13
-55	9.91	-31	157.00	- 5	3132.53	21	62502.18
-54	11.11	-30	176.16	- 4	3514.76	22	70128.60
-53	12.47	-29	197.65	- 3	3943.62	23	78685.58
-52	13.99	-28	221.77	- 2	4424.82	24	88286.67
-51.40	**15**	-27	248.83	- 1	4964.72	25	99059.28
-51	15.70	-26	279.19	0	5570.51	26	111146.34
-50	17.62	-25	313.25	1	6250.22	27	124708.24
-49	19.76	-24	351.48	2	7012.86	28	139924.95
-48	22.18	-23	394.36	3	7868.56	29	156998.37
-47	24.88	-22	442.48	4	8828.67	30	176155.07
-46	27.92	-21	496.47	5	9905.93	31	197649.24
-45	31.33	-20	557.05	6	11114.63	32	221766.10
-44	35.15	-19	625.02	7	12470.82	33	248825.65
-43	39.44	-18	701.29	8	13992.49	34	279186.98
-42	44.25	-17	786.86	9	15699.84	35	313252.94
-41	49.65	-16	882.87	10	17615.51	36	351475.58
-40.94	**50**	-15	990.59	11	19764.92	37	394362.08
-40	55.71	-14	1111.46	12	22176.61	38	442481.54
-39	62.50	-13	1247.08	13	24882.57	39	496472.45
-38	70.13	-12	1399.25	14	27918.70	40	557051.25
-37	78.69	-11	1569.98	15	31325.29		

Channel 32 or S (271.2625 MHz)

dBmV	μV/m	dBmV	μV/m	dBmV	μV/m	dBmV	μV/m
-60	5.70	-36	90.28	-10	1801.40	16	35942.56
-59	6.39	-35	101.30	- 9	2021.20	17	40328.22
-58	7.17	-34	113.66	- 8	2267.82	18	45249.01
-57	8.05	-33	127.53	- 7	2544.54	19	50770.22
-56	9.03	-32	143.09	- 6	2855.02	20	56965.13
-55	10.13	-31	160.55	- 5	3203.38	21	63915.92
-54	11.37	-30	180.14	- 4	3594.26	22	71714.84
-53	12.75	-29	202.12	- 3	4032.82	23	80465.38
-52	14.31	-28	226.78	- 2	4524.90	24	90283.64
-51.59	**15**	-27	254.45	- 1	5077.02	25	101299.91
-51	16.05	-26	285.50	0	5696.51	26	113660.37
-50	18.01	-25	320.34	1	6391.59	27	127529.03
-49	20.21	-24	359.43	2	7171.48	28	143089.92
-48	22.68	-23	403.28	3	8046.54	29	160549.54
-47	25.45	-22	452.49	4	9028.36	30	180139.54
-46	28.55	-21	507.70	5	10129.99	31	202119.89
-45	32.03	-20	569.65	6	11366.04	32	226782.25
-44	35.94	-19	639.16	7	12752.90	33	254453.87
-43	40.33	-18	717.15	8	14308.99	34	285501.93
-42	45.25	-17	804.65	9	16054.95	35	320338.44
-41.13	**50**	-16	902.84	10	18013.95	36	359425.64
-41	50.77	-15	1013.00	11	20211.99	37	403282.20
-40	56.97	-14	1136.60	12	22678.22	38	452490.07
-39	63.92	-13	1275.29	13	25445.39	39	507702.21
-38	71.71	-12	1430.90	14	28550.19	40	569651.25
-37	80.47	-11	1605.50	15	32033.84		

Channel 33 or T (277.2625 MHz)

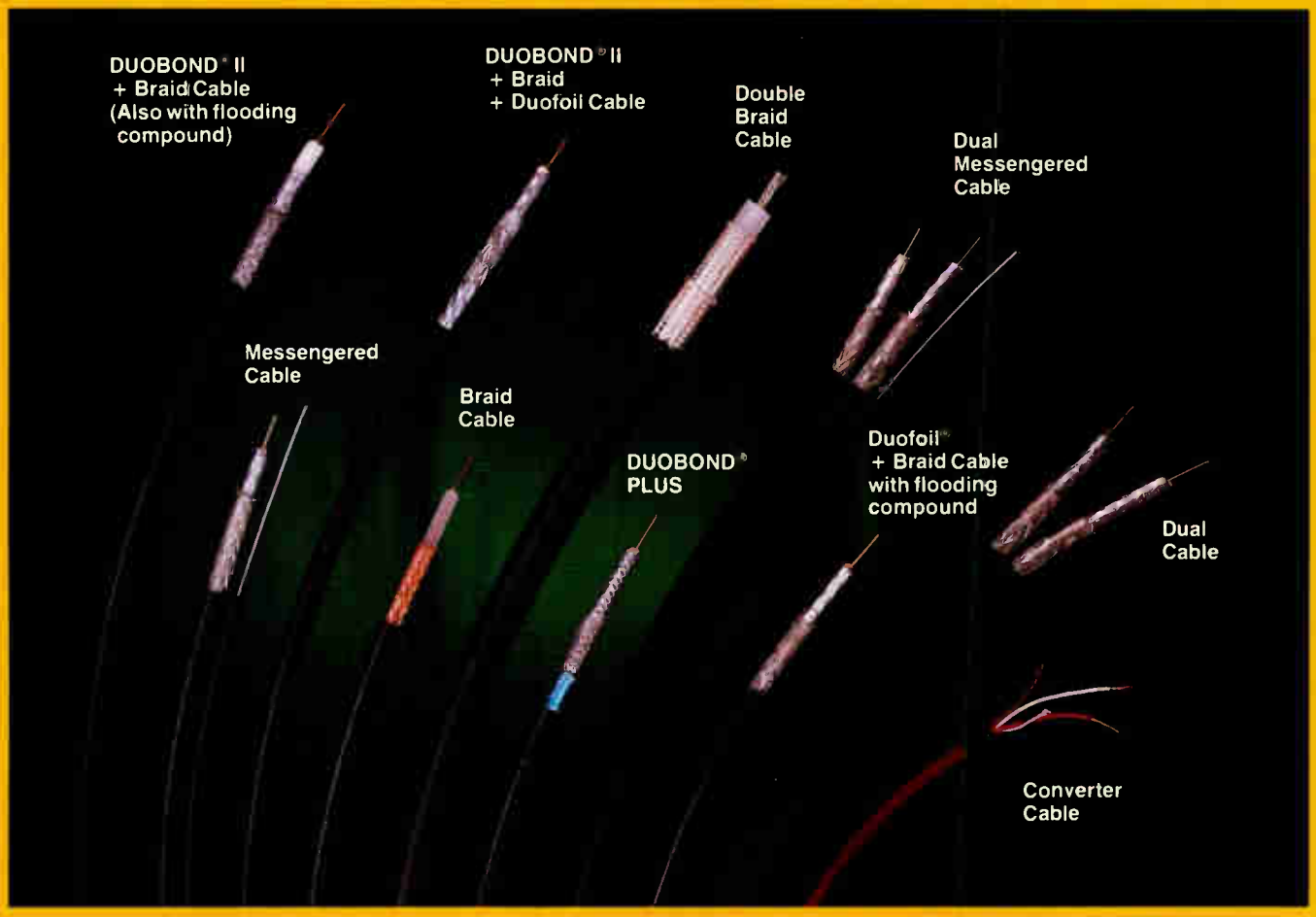
dBmV	μV/m	dBmV	μV/m	dBmV	μV/m	dBmV	μV/m
-60	5.82	-36	92.28	-10	1841.24	16	36737.57
-59	6.53	-35	103.54	- 9	2065.91	17	41220.23
-58	7.33	-34	116.17	- 8	2317.98	18	46249.86
-57	8.22	-33	130.35	- 7	2600.82	19	51893.20
-56	9.23	-32	146.25	- 6	2918.17	20	58225.13
-55	10.35	-31	164.10	- 5	3274.24	21	65329.66
-54	11.62	-30	184.12	- 4	3673.76	22	73301.09
-53	13.03	-29	206.59	- 3	4122.02	23	82245.18
-52	14.63	-28	231.80	- 2	4624.99	24	92280.60
-51.78	**15**	-27	260.08	- 1	5189.32	25	103540.54
-51	16.41	-26	291.82	0	5822.51	26	116174.40
-50	18.41	-25	327.42	1	6532.97	27	130349.82
-49	20.66	-24	367.38	2	7330.11	28	146254.90
-48	23.18	-23	412.20	3	8224.52	29	164100.70
-47	26.01	-22	462.50	4	9228.06	30	184124.01
-46	29.18	-21	518.93	5	10354.05	31	206590.54
-45	32.74	-20	582.25	6	11617.44	32	231798.40
-44	36.74	-19	653.30	7	13034.98	33	260082.08
-43	41.22	-18	733.01	8	14625.49	34	291816.89
-42	46.25	-17	822.45	9	16410.07	35	327423.94
-41.32	**50**	-16	922.81	10	18412.40	36	367375.70
-41	51.89	-15	1035.41	11	20659.05	37	412202.32
-40	58.23	-14	1161.74	12	23179.84	38	462498.61
-39	65.33	-13	1303.50	13	26008.21	39	518931.97
-38	73.30	-12	1462.55	14	29181.69	40	582251.25
-37	82.25	-11	1641.01	15	32742.39		

Channel 34 or U (283.2625 MHz)

dBmV	μV/m	dBmV	μV/m	dBmV	μV/m	dBmV	μV/m
-60	5.95	-36	94.28	-10	1881.08	16	37532.58
-59	6.67	-35	105.78	- 9	2110.61	17	42112.24
-58	7.49	-34	118.69	- 8	2368.15	18	47250.71
-57	8.40	-33	133.17	- 7	2657.10	19	53016.17
-56	9.43	-32	149.42	- 6	2981.32	20	59485.13
-55	10.58	-31	167.65	- 5	3345.09	21	66743.41
-54	11.87	-30	188.11	- 4	3753.26	22	74887.34
-53	13.32	-29	211.06	- 3	4211.22	23	84024.97
-52	14.94	-28	236.81	- 2	4725.07	24	94277.57
-51.97	**15**	-27	265.71	- 1	5301.62	25	105781.17
-51	16.77	-26	298.13	0	5948.51	26	118688.43
-50	18.81	-25	334.51	1	6674.34	27	133170.61
-49	21.11	-24	375.33	2	7488.73	28	149419.88
-48	23.68	-23	421.12	3	8402.50	29	167651.86
-47	26.57	-22	472.51	4	9427.76	30	188108.48
-46	29.81	-21	530.16	5	10578.12	31	211061.19
-45	33.45	-20	594.85	6	11868.84	32	236814.55
-44	37.53	-19	667.43	7	13317.06	33	265710.29
-43	42.11	-18	748.87	8	14941.99	34	298131.85
-42	47.25	-17	840.25	9	16765.19	35	334509.44
-41.51	**50**	-16	942.78	10	18810.85	36	375325.76
-41	53.02	-15	1057.81	11	21106.12	37	421122.43
-40	59.49	-14	1186.88	12	23681.45	38	472507.14
-39	66.74	-13	1331.71	13	26571.03	39	530161.73
-38	74.89	-12	1494.20	14	29813.19	40	594851.25
-37	84.02	-11	1676.52	15	33450.94		

(For the formula used to derive the conversion data in these charts, see May 1989's "Installer's Tech Book.")

When yesterday isn't good enough.



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WHAT'S BEHIND THE
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A company is more than a name. It's the people who make up that company. The people who back up both the name and the product. At Comm/Scope, we have the right people behind the name and the product. Dedicated. Professional. People committed to seeing that you get the best quality cable products.

These Comm/Scope employees are actively involved in our Total Employee Involvement practices which ensure that only the highest quality product standards acceptable to you, our customer, are followed. In short, the Comm/Scope name on the product is

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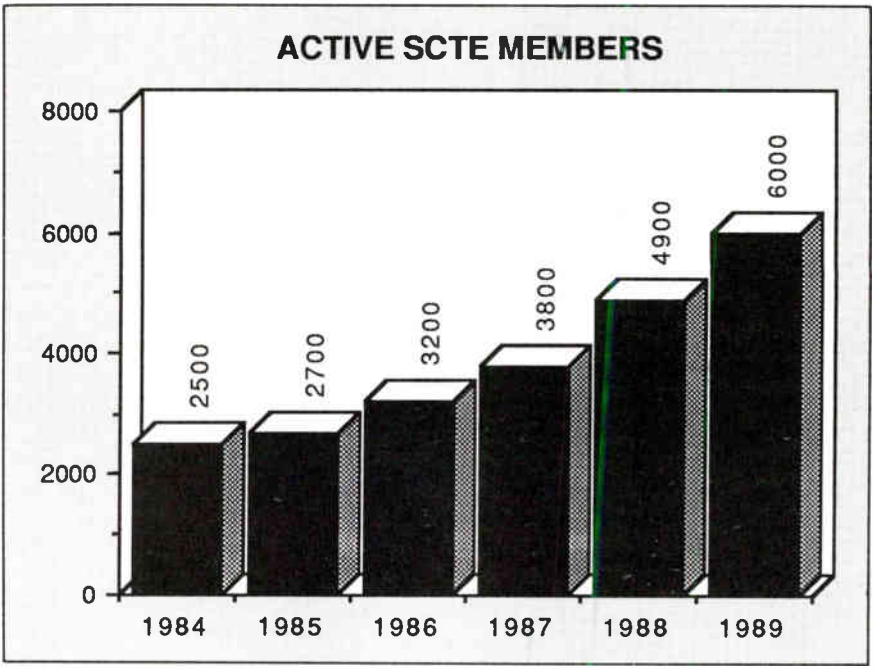
SCTE
January 1990



National Membership Tops 6,000

The national membership of the Society has passed the 6,000 mark. This represents a drastic increase from 1988's year-end membership count of 5,000 and the 1987 figure of 3,800. The figure of 6,000 members indicates growth of 1,000 in 11 months, indicating that the Society attracted an average of nearly 100 new members a month. This growth is partially attributable to the popularity and success of the Society's many programs and services, including the Chapter Development Program, Broadband Communications Technician/Engineer (BCT/E) Program and annual Cable-Tec Expo and Engineering Conference.

1989 is the year in which the Society has celebrated the 20th Anniversary of its 1969 formation. Since its formation, SCTE has established a number of programs that have become invaluable to the

industry, such as its Chapter Development Program, which develops regional groups of technical personnel to provide much-needed forums for technical discussion at the local level. SCTE now has a total of 53 local groups, with 39 chapters and 14 meeting groups. All Society members can benefit from these groups, as they expand each member's knowledge of the industry as well as aiding in individual professional development.

"Reaching the 6,000 mark is an important event in the Society's history," stated SCTE Executive Vice President Bill Riker. "It indicates the broadband industry's increased appreciation of the training and service the Society provides. Membership in the Society has become very important to industry personnel in the years since its formation, and as SCTE concludes its 20th year of existence, we will strive to sustain the excellence that has become synonymous with the Society of Cable Television Engineers."

The Board of Directors at Nashville

Bill Riker

The SCTE board of directors inspects the facilities at the Nashville Convention Center in preparation for Cable-Tec Expo `90 at its October meeting.

New Senior Members Recognized

Bill Riker

Region 3 Director Ted Chesley receives his senior member plaque from At-Large Director Dave Willis at the board's October meeting. President and Region 8 Director Jack Trower and Secretary and Region 5 Director Wendell Woody also received official senior member status.

Nominations Opened for 1990 Member of the Year Award

The Society is currently seeking nominations for the 1990 Member of the Year Award. Presented each year at the Cable-Tec Expo, this award is given by the SCTE board of directors to recognize a member for outstanding contributions to the goals and purposes of the Society.

All persons nominated for the award must be active members of the Society. Nominations must be received in writing by SCTE national headquarters no later than March 1. All nominations will be presented to the board of directors for consideration, and the selected person will receive a plaque recognizing this honor at the 1990 Cable-Tec Expo, to be held June 21-24 at the Nashville Convention Center.

Since its establishment in 1974, the SCTE Member of the Year Award has been presented to 17 individuals. Previous recipients of the award are as follows:

1989 - Paul Beeman
1988 - Mike Aloisi
1987 - Rex Porter
1986 - Sally Kinsman
1985 - Pete Petrovich
1984 - David Franklin
1983 - John Kurpinski
1982 - Clifford Paul
1981 - Yves Fortier
1980 - Thomas Polis
1979 - Kenneth Gunter and Ralph Haimowitz
1978 - James Grabenstein
1977 - Frank Bias
1976 - Glenn Chambers
1975 - James Collins
1974 - Steven Doudourfis

For further information on the Member of the Year Award, please contact SCTE national headquarters at (215) 363-6888.

SCTE Calendar

The **"SCTE Calendar"** is an *Interval* feature incorporating Satellite Tele-Seminar Program listings(*), news of upcoming national events and announcements of upcoming local SCTE chapter and meeting group seminars.

Dates for 1990

Jan. 9 Central Illinois Chapter,--Sheraton Normal Hotel, Normal, Ill. Topic: "Fiber-Optic Construction." Contact: Ralph Duff, (217) 424-8478.

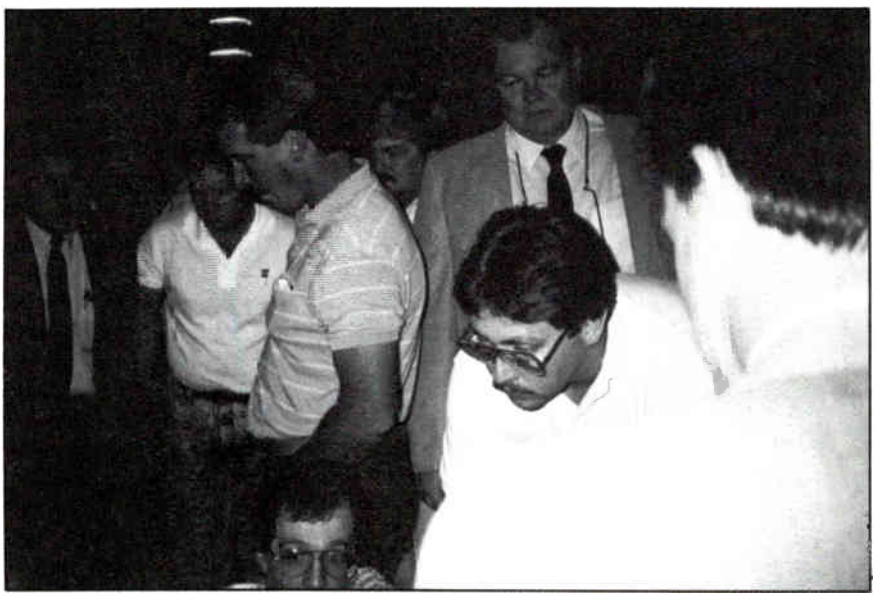
Jan. 10 Oklahoma Chapter--Applewoods Restaurant, Oklahoma City. Topic: "CLI" with Terry Bush of Trilithic. Contact: Herman Holland, (405) 353-2250.

Jan. 10-11 Dakota Territories Meeting Group--Jan. 10: Ramkota Inn, Pierre, S.D. Jan. 11: Doublewood Inn, Bismarck, N.D. BCT/E examinations to be administered (tentative) with SCTE Region 6 Director Bill Kohrt of Kohrt Communications, proctor. Contact: Rick Reed, (605) 229-1775.

(continued on page 5)

Technology for Technicians II: A hit

Thirty-five people were in attendance at Technology for Technicians II, the three-day technical seminar for maintenance technicians, chief technicians and system engineers conducted by SCTE Director of Chapter Development and Training Ralph Haimowitz, seen here answering attendees' questions. This was a very successful seminar, as the capacity for this event (which was conducted Nov. 13-15 at the Harvey Hotel in Dallas) was 40 people.



Ralph Haimowitz joins attendees for the hands-on demonstrations conducted by vendors in a laboratory-like environment.

(continued from page 3)

Jan. 11 Big Country Meeting Group--Sweetwater, Texas. Information to be supplied. Contact: Albert Scarborough, (915) 698-3585.

Jan. 13 Chaparral Chapter--Howard Johnson Plaza Hotel, Albuquerque, N.M. Topic: "SCTE Category II Review - Video and Audio Systems and Signals" with SCTE Region 2 Director Ron Hranac of Jones Intercable. Contact: Brian Throop, (505) 761-6200.

Jan. 16 Sierra Meeting Group--Oxford Suites Hotel, Roseville, Calif. Topic: "20 Year Plant" featuring sessions on "Coaxial Cable" presented by Comm/Scope, "Connectors and Interface" presented by Gilbert, "Environmental Considerations" presented by Channell Commercial and "Quality Control and Inspection" presented by Sacramento Cable. Contact: Steve Allen, (916) 786-2469.

Jan. 17 Dixie Chapter--Information to be supplied. Contact: Greg Harden, (205) 582-6333.

Jan. 17 Greater Chicago Chapter--Location to be supplied. Topic: "BCT/E Category I - Signal Processing Centers." Contact: John Grothendick, (312) 438-4200.

Jan. 17 Ohio Valley Chapter--Information to be supplied. Contact: Robert Heim, (419) 627-1371.

Jan. 17 Mount Rainier Chapter--Location to be announced. Contact: Sally Kinsman, (206) 821-7233. Topic: "Installers."

Jan. 17 Razorback Chapter--Days Inn, Little Rock, Arkansas. Topic to be announced. Contact: Jim Dickerson, (501) 777-4684.

Jan. 17 Great Plains Meeting Group--Information to be supplied. Contact: Jennifer Hays, (402) 333-6484.

Jan. 17 Dairyland Meeting Group--Information to be supplied. Contact: Bruce Wasleske, (715) 842-3910.

Jan. 18 Gateway Chapter--Information to be supplied. Contact: Darrell Diel, (314) 576-4446.

Jan. 20 Cactus Chapter--Location to be supplied. Topic: "System Design." Contact: Harold Mackey Jr., (602) 866-0072, ext. 282.

Jan. 24 Great Lakes Chapter--Information to be supplied. Contact: Daniel Leith, Second Vice President, (313) 549-8288.

***Jan. 30** Satellite Tele-Seminar Program, "Fiber Optic Technology" with Jim Chiddix of ATC and Scott Esty of Corning Glass. Recorded at Cable-Tec `89 in Orlando, Fla. →

Feb. 13 Greater Chicago Chapter--Location to be supplied. BCT/E testing to be administered (tentative). Contact: John Grothendick, (312) 438-4200.

Feb. 16 Miss-Lou Chapter--Biloxi, Miss. Information to be supplied. Contact: Dave Matthews, (504) 923-0256.

***Feb. 27** Satellite Tele-Seminar Program, "Signal Leakage. CLI and the FCC (Part One)" with Robert V.C. Dickinson of Dovetail Systems, Brian James of NCTA and John Wong of FCC. Recorded at Cable-Tec `89 in Orlando, Fla.

*Tele-Seminar Programs may be downlinked by any cable system and recorded for immediate and future employee training purposes. All Tele-Seminar Programs will air from 12-1 p.m. ET on **Transponder 2** of **Galaxy III.** ***Please note new transponder and satellite!***

1989 "Interval" Index

NCTCM Reviews Society Materials

University Photo/Graphics, Penn State
(Courtesy of The National Cable Television Center and Museum)

At the Oct. 15 meeting of the board of directors of The National Cable Television Center and Museum (NCTCM), Bill Riker examines SCTE publications and videotapes with NCTCM director Marlowe Froke and fellow board member Benjamin Conroy Jr.

Chapter and Meeting Group Reports

This section offers SCTE chapters and meeting groups the opportunity to publicize their activities, announce meeting dates and share ideas. Submissions to "Chapter and Meeting Group Reports" must be received at SCTE national headquarters prior to the first day of the month preceding the month of issue.

Appalachian Mid-Atlantic Chapter
Contact: Richard Ginter, Secretary/ Treasurer, (814) 672-5393
Report By: Richard Ginter

The Appalachian Mid-Atlantic Chapter held a meeting Nov. 16 at the Holiday Inn in Chambersburg, Pa. Dave Johnson of Siecor gave a presentation on how fiber cable is manufactured and packaged, hands-on fusion splicing, light power sources and power meters. Anixter gave a presentation on AM laser links, laser processing equipment and hands-on fiber laser linkage.

Cactus Chapter
Contact: Harold Mackey Jr., Vice President, (602) 866-0072, ext. 282

Caribbean Area Chapter
Contact: Jerry Fitz, President
(809) 766-0909, ext. 2241

Cascade Range Chapter
Contact: Norrie Bush, Director
(206) 254-3228
Report By: Peter Rumble, President

The Cascade Range Chapter presented a technical seminar on "CLI and 1990" Nov. 7 at the Holiday Inn

in Wilsonville, Ore. Speakers included Wayne Craig of FCC's Portland office, who gave a presentation entitled "Signal Leakage/FCC Update"; Don Runzo of ComSonics, who covered "CLI Revisited"; and Randy Love of Viacom and Jim Warhurst of TCI Portland, who spoke on "CLI's Impact on Customer Service."

The event also featured a panel discussion on CLI with Jim Billings of Columbia of Washington, Paul Stellmacher of Viacom, Jim King of TCI Portland, Joel Harrington of Paragon and Paul Robinson of Columbia of Oregon.

Central California Chapter
Contact: Steve Roberts, President
(209) 582-5353
Report By: John Novotny, First Vice President; and Steve Roberts

The newly elevated Central California Chapter met Oct. 19 at the Hilton in Stockton, Calif., to hold a seminar on two of the most important communications topics of the century, CLI and syndex. To help educate the entire industry, we invited managers as well as technical personnel, for they will be directly affected by these issues.

The meeting was presented by the FCC and California Cable Television Association. This was not just a technical workshop. It was a description of the laws: their purpose and their ramifications in the event of noncompliance.

Forty-eight people were in attendance at the meeting.

Central Illinois Chapter
Contact: Ralph Duff, Past President
(217) 424-8478

The Central Illinois Chapter met Nov. 14 at the Sheraton in Bloomington, Ill., for a seminar on "Amplifier Technology." The presentations included John Koczan of Magnavox on feedforward amplifiers, Jeff Pierce of Scientific-Atlanta on power doubling amplifiers, Tim Mooney of C-COR on push/pull amplifiers and Chris Frederick of General Instrument/Jerrold Division on SX amplifier/trunk amps. The event also featured a presentation by Paul Clough and Bob Kelly of GI/Jerrold on digital radio.

Central Indiana Chapter
Contact: Gregg Nydegger, Second Vice President, (812) 372-8424

Chaparral Chapter
Contact: Brian Throop, Treasurer
(505) 761-6200
Report By: Bob Baker, Secretary

The Chaparral Chapter met Oct. 21 at the Holiday Inn in Clovis, N.M., for a seminar on "Headends and Earth Stations." The speaker was Steve McConnelly of Scientific-Atlanta, who covered antennas, preamps, processors and modulators. He provided excellent handouts and was prepared to answer all questions asked. Total attendance at the meeting was 21.

Chattahoochee Chapter
Contact: Richard Amell, Chairman
(404) 394-8837
Report By: Jack Connolly, President

The Chattahoochee Chapter held its annual Vendor Meeting Oct. 10 at the Perimeter North Inn in Atlanta. This is the meeting to which vendors are invited to set up tabletop displays of their products and services. Our vendors provide us all year long with much needed financial and technical support.

The event also featured a training session on "Off-Premises Addressability" with Scott Henry of Midwest CATV and Jack Bryant of Scientific-Atlanta.

Chesapeake Chapter
Contact: Doug Worley, Secretary

(301) 499-2930
Report By: Keith Hennek, First Vice President

The Chesapeake Chapter met Oct. 12 at the Holiday Inn in Columbia, Md. Dewayne Lipp of Superior Inc. spoke on remote testing for headends and test points. Actual readings were demonstrated using commercial phone lines and modems at the sites. An overhead projector adapted for a computer CRT enabled all members to see actual readings take place. Fifty-three people attended the meeting.

Delaware Valley Chapter
Contact: Diana Riley, President
(717) 263-8258

Dixie Chapter
Contact: Greg Harden
(205) 582-6333
Report By: Rickey Luke, Secretary/Treasurer

The Dixie Chapter was officially elevated to chapter status by SCTE President Jack Trower at its Nov. 14 meeting, held at the Holiday Inn East in Montgomery, Ala. Thirty-three people were present for the meeting, which also featured presentations on "South Central Bell Permitting Procedures and Requirements" with Irma Bowers, "Alabama Power Permitting and NEC" with Oswald Boyd and Robert Wright of Alabama Power and "Highway Permitting" with Wayne Carrol of Alabama Highway Department.

Florida Chapter
Contact: Rick Scheller, Chairman
(305) 753-0100

Gateway Chapter
Contact: Darrell Diel, Secretary/Treasurer, (314) 576-4446
Report By: Darrell Diel

Seventy-seven people were in attendance when the Gateway Chapter met Nov. 8 at the Henry VIII Hotel in St. Louis. The topic of this meeting was "Fiber-Optic Applications for CATV" as presented by Scott Esty, Sanford Lyons and James Matthews of Corning's Telecommunications Products Division. They covered fiber-optic theory, design and testing, and demonstrated fusion and mechanical splicing.

Golden Gate Chapter
Contact: Tom Elliott, Publicity Chairman, (408) 727-5295
Report By: John Parker, President

The Golden Gate Chapter met Oct. 12 at the fairgrounds in Pleasanton, Calif. Thirty-nine people were in attendance for a presentation by Phil Kane of the FCC on issues surrounding CLI.

Great Lakes Chapter
Contact: Daniel Leith, Second Vice President, (313) 549-8288
Report By: Douglas MacLeod President

The Great Lakes Chapter met Oct. 25 at the Holiday Inn in Livonia, Mich. The topic for this meeting was "Status Monitoring and Automated Test Equipment," and technical presentations by Mike Quelly of Status Monitoring, Steve Windle of Wavetek, Terry Bush of Trilithic and Lisa Drewer of Hewlett-Packard.

Greater Chicago Chapter
Contact: John Grothendick, President
(312) 438-4200

Heart of America Chapter
Contact: Wendell Woody
(816) 454-5421

Hudson Valley Chapter
Contact: Robert Price, President
(518) 382-8000

Inland Empire Chapter
Contact: Randy Melius
(509) 484-4931

Iowa Heartland Chapter
Contact: Denis Martel, President
(319) 395-9699
Report By: Chris Toalson, Vice President - Training

The Iowa Heartland Chapter met Sept. 20 at the Holiday Inn in Muscatine, Iowa. The seminar was devoted entirely to microwave (AML) and was conducted by Dane Walker of Hughes Microwave, who covered determination of receiving locations, calculation of paths and installation and operation of microwave equipment. Twenty-seven people were in attendance at the event.

The chapter next met Nov. 8 at the Best Western in Newton, Iowa. The meeting featured a presentation on "System Powering" by Marty deAlminana of Lectro Products Inc.

Michiana Chapter
Contact: Dave Miller, President
(219) 259-8015
Report By: Scott Schieffler, Secretary

The newly elevated Michiana Chapter held a meeting Nov. 8 at the Signature Inn in South Bend, Ind. It featured a presentation by Brian Wilson of Heritage Communications on leakage detection, the effect of leakage on aircraft communication and CLI measurements, as well as a demonstration of leakage detection equipment by Terry Bush of Trilithic. Twenty-nine people were in attendance.

Miss/Lou Chapter
Contact: Dave Matthews, Vice President of Facilities and Treasury,
(504) 923-0256
Report By: Charles Thibodeaux, Vice President of Publicity

The Miss/Lou Chapter held its Oct. 20 meeting at the Seaview Resort in Biloxi, Miss. Thirty-two people attended the meeting, which started with a training seminar on plant distribution that related to BCT/E Category IV (Distribution Systems). Chris Frederick of General Instrument presented a very informative and well-received training seminar. The afternoon offered attendees BCT/E testing, as well as a seminar on power supply batteries, maintenance and storage.

Mount Rainier Chapter
Contact: Sally Kinsman, Secretary
(206) 821-7233
Report By: Sally Kinsman

The Mount Rainier Chapter held a meeting Nov. 13 at the Martha Lake Community Center. The subject was safety, and the event was attended by 59 members. The meeting was held in three sessions and featured various speakers from the state and Puget Power. The final session ended with a flagging test and cards issued to members who took the test.

We held a drawing for our final Fluke DVM meter, the sixth donated by Fluke Manufacturing Co. It was won by Jim Bingham of Cable Plus.

New England Chapter
Contact: Bill Riley, President
(508) 588-6895

North Central Texas Chapter
Contact: M.J. Jackson, President
(800) 528-5567
Report By: Terry Blackwell, Secretary

The North Central Texas Chapter met Oct. 18 at the Jaycee Center in Irving, Texas. Allan Potter, consultant to EF Data and C-COR presented a seminar on data communications. BCT/E examinations were administered by Region 4 Director Leslie Read. Thirty people were in attendance at the meeting.

North Country Chapter
Contact: Douglas Ceballos, President
(612) 522-5200, ext. 705

North Jersey Chapter
Contact: Art Mutschler, President
(201) 672-1397

Ohio Valley Chapter
Contact: Robert Heim
First Past President, (419) 627-1371
Report By: Jon Ludi, Treasurer

With 143 people attending, the Ohio Valley Chapter held its Oct. 10 meeting at the Radisson Hotel in Columbus, Ohio. This session featured presentations by Robert V.C. Dickinson of Dovetail Systems on "The History of CLI" and "How To Calculate CLI"; Brian James of NCTA on "FCC Rules - CLI and Quarterly Monitoring"; and John Wong of FCC, who answered questions regarding CLI. This meeting was held jointly with the Ohio Cable Television Association.

Oklahoma Chapter
Contact: Herman Holland, Secretary
(405) 353-2250
Report By: Herman Holland

At the Oklahoma Chapter's Nov. 10 meeting, held at the Applewoods Restaurant in Oklahoma City, Cable TV Services of Garland, Texas, presented a technical seminar for installers and technicians. Cable TV Services' personnel answered questions on everything from test equipment to trunk modules. They discussed their concepts of quality control for cable equipment and many other areas, such as headend offsets to meet current FCC requirements, distortions in cable equipment and maintenance programs. Twenty-nine people attended the meeting.

Old Dominion Chapter
Contact: Margaret Harvey, Secretary
(703) 248-3400
Report By: Margaret Harvey

The Old Dominion Chapter held back-to-back meetings Nov. 19 and 20 at the Holiday Inn in Richmond, Va. "Computer-Aided Radio Dispatch Systems (C-ARDS)" was the topic of Sunday's presentation by Dennis Giancola of CNG Energy Co., while "Microwave" was discussed by Randy Karr of Channel Master on Monday.

Piedmont Chapter
Contact: Rick Hollowell, President
(919) 968-4631
Report By: Rick Hollowell

The Piedmont Chapter met Nov. 29 at the Holiday Inn Airport in Greensboro, N.C. This full-day event began with the chapter's annual membership meeting, in which activities of the past year as well as plans for 1990 were discussed. Our seminar, "OSHA and Safety Requirements for Cable Television Operations," included a presentation by Douglas Walls of the North Carolina Department of Labor on OSHA requirements as they pertain to the cable industry. Some specific areas we covered included requirements for proper vehicle and bucket truck operation, on-board safety equipment, ladder handling, electricity, record keeping and hazard communication. Wayne Neas of Travelers Insurance gave a presentation entitled "Accidents: The Hidden Costs and How To Avoid Them!"

Following lunch, our meeting area was broken down into individual exhibit and demonstration spaces where many of our supporting vendors provided information on new products and services in the industry.

Razorback Chapter
Contact: Jim Dickerson, Secretary
(501) 777-4684
Report By: Jim Dickerson

The Razorback Chapter met Sept. 20 at the Days Inn in Little Rock, Ark. SCTE President Jack Trower of WEHCO Video Inc. spoke on the benefits and goals of the Society.

George Bollinger of Comm/Scope gave a presentation on cable manufacturing. Lawrence DuPree of DuPree and Associates and Danny Goff of GTE talked to the group on easements and rights of way. Fourteen people attended the meeting.

The chapter met again at the Days Inn Nov. 15 and featured Ken Cannon of Scientific-Atlanta, who gave an informative and informal presentation on headend theory and answered questions on other issues in the cable industry. The other featured speaker, Jim Dancy of the Arkansas Highway Department, gave a slide presentation on the proper use of signs and the proper positioning of flaggers.

Rocky Mountain Chapter
Contact: Rikki Lee, Media Director
(303) 321-7551
Report By: Rikki Lee

The Rocky Mountain Chapter held a BCT/E Category I review course, "Signal Processing Centers," Oct. 14 at the ATC National Training Center in Denver. Nearly 30 people attended.

Region 2 Director and Immediate Past President Ron Hranac began the morning with an update on news from national headquarters. He briefly expounded upon the growth of SCTE members, the 1990 fiber-optic seminar and the new installer level of membership.

For the remainder of the day, Scientific-Atlanta's Mike McCracken presented an in-depth seminar on headends and earth stations. Among the topics discussed were antenna spacing techniques, satellite receiving equipment and signal processing components. After the talk, attendees entered the ATC Training Center headend for a hands-on demonstration on setting proper levels.

The chapter subsequently administered BCT/E exams Nov. 4 at United Cable of Colorado.

Southern California Chapter
Contact: Tom Colegrove, Secretary/ Treasurer, (805) 251-8054

Tennessee Chapter
Contact: Don Shackelford, President
(901) 365-1770

Tip-O-Tex Chapter
Contact: Arnold Cisneros, President
(512) 425-9111

Upstate New York Chapter
Contact: Ed Pickett, First Vice President, (716) 325-1111
Report By: Ed Pickett

The Upstate New York Chapter met Nov. 16 at the Burgundy Basin Inn in Rochester, N.Y., for a seminar on "Transportation" that featured presentations by Roy Schultz of Magnavox on coaxial systems, Dane Walker of Hughes Microwave on microwave systems and John Holobinko of ALS on fiber-optic systems.

Wyoming Chapter
Contact: Matt Forgas, Secretary/ Treasurer, (307) 324-2286
Report By: Matt Forgas

BCT/E examinations in Categories III and IV were administered by D.R. (Bob) Johnson of TCI Cablevision of Wyoming at the Nov. 29 meeting of the newly elevated Wyoming Chapter, held at the offices of United Cable TV in Casper, Wyo.

Ark-La-Tex Meeting Group
Contact: Robert Hagan, Secretary
(214) 758-9991
Report By: Robert Hagan

The Ark-La-Tex Meeting Group met Oct. 4 at the Holiday Inn in Longview, Texas. Terry Bush of Trilithic spoke on CLI, covering receivers, frequencies and sweep systems. SCTE President and Region 8 Director Jack Trower of WEHCO Video Inc. gave a good introduction to

SCTE, encouraging everyone to get involved.

Big Country Meeting Group
Contact: Albert Scarborough
Board Chairman, (915) 698-3585
Report By: Albert Scarborough

The Big Country Meeting Group met Nov. 9 at the Brownwood Country Club in Brownwood, Texas. Presentations included "Carrier-to-Noise, CTB and Cross Modulation" with Jody Shields of United Artists Cable, "Troubleshooting Techniques" with Robert Amo of Simmons Cable and "Using Test Equipment (Headend and Cable Plant)" with Albert Scarborough of United Cable TV.

Big Sky Meeting Group
Contact: Marla DeShaw, Secretary/ Treasurer, (406) 632-4300
Report By: Marla DeShaw

The Big Sky Meeting Group held two back-to-back regional meetings Nov. 15 at Stella's in Roundup, Mont., and Nov. 16 at the Quality Inn in Great Falls, Mont. Both meetings featured a presentation by Mike McCracken of Scientific-Atlanta on "Headends" that covered modulators, receivers, antennas and the alignment of receive antennas. Seventeen people were in attendance at the Roundup meeting, while 21 people attended the Great Falls event.

Bonneville Meeting Group
Contact: Roger Peterson
(801) 486-3036

Dairyland Meeting Group
Contact: Bruce Wasleske, President
(715) 842-3910

Dakota Territories Meeting Group
Contact: Rick Reed, President
(605) 229-1775
Report By: A.J. VandeKamp, Secretary

The Dakota Territories Meeting Group attracted a total of 25 attendees to its Nov. 2 and 3 meetings, held at the Ramkota Inn in Pierre, S.D., and Sheraton Inn in Bismark, N.D., respectively.

Great Plains Meeting Group
Contact: Jennifer Hays, President
(402) 333-6484
Report By: Marshall Borchert, Secretary

The Great Plains Meeting Group held its Nov. 15 meeting at Knoll's Country Club in Lincoln, Neb. Bob Huber of Lincoln Cablevision served as the group's host, and Rick Cole and Mike Kelly of Anixter and Ron White of AT&T presented the day's program on "Fiber-Optic Links." A total of 42 people were in attendance.

Hawaiian Island Meeting Group
Contact: Howard Feig, Chairman
(808) 242-7257

New York City Meeting Group
Contact: Andrew Skop, President
(201) 328-0980
Report By: Andy Skop

"Broadcast Video" was the focus of the New York City Meeting Group's Nov. 15 meeting, which was held at the Lifetime Studios in Queens, N.Y., and featured presentations on "Baseband Video" by Mike Farina of Lifetime, "Video Scrambling Techniques" by Laura Oehler of General Instrument/Jerrold Division and "Video Formats" by Nick Dellelow of Sony.

Palmetto Meeting Group
Contact: Rick Barnett, President
(803) 747-1403, ext. 262

Sierra Meeting Group
Contact: Steve Allen, President
(916) 786-8597
Report By: Steve Allen

The Sierra Meeting Group's first meeting, held Oct. 24 at Clunie Hall in Sacramento, Calif., drew attendance of 27 people to hear Richard Covell of General Instrument/Jerrold Division do his famous "Back to Basics: Distribution System Operations" seminar, which was specifically geared to the new technician. This excellent presentation was well-received by the audience.

Snake River Meeting Group
Contact: Jerry Ransbottom, Secretary/ Treasurer, (208) 232-1879

Southeast Texas Meeting Group
Contact: Tom Rowan, Secretary
(713) 580-7360
Report By: Tom Rowan

The Southeast Texas Meeting Group met Oct. 19 at the Royalton Office of Warner Cable in Houston for a seminar on "Headend Testing" that featured Dwayne Lipp of RF Services.

The group met again Nov. 16 at the same location for a presentation on "Fiber-Optic Cable" conducted by Anixter.

Wheat State Meeting Group
Contact: Mark Wilson, President
(316) 262-4270
Report By: Mark Wilson

Sixty-eight people attended the Oct. 26 meeting of the Wheat State Meeting Group, which was held at the Canterbury Inn in Wichita, Kan. SCTE Director of Chapter Development and Training Ralph Haimowitz presented tutorials on BCT/E Categories IV, "Distribution Systems" and VII, "Engineering Management and Professionalism." We discussed the basic requirements of the BCT/E Certification Program.

SCTE

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On-premises

(Continued from page 32)

"These technologies achieve the ultimate in friendliness by providing a transparent cable service delivery system...to the entire house."

achieve the ultimate in friendliness by providing a transparent cable service delivery system (from the consumers' standpoint) to the entire house. The security devices utilized in on-/off-premises approaches (jammers or switches) do not require the inclusion of a separate RF tuner as is used in descrambling set-top converters. This enables the entire spectrum to be passed on to a cable-compatible television or VCR in the clear, thereby allowing all of their functions to be fully utilized (i.e., the TV's or VCR's handheld can be used to tune channels, viewing/taping combinations are unrestricted).

The potential savings arising from improved operating efficiencies is a third reason to consider on- or off-premises. These savings result from the fact that once the equipment is installed, one truly has an "addressable home." Since in-home equipment is not utilized, truck rolls are not necessary for connects or disconnects. Additionally, by minimizing the need for in-home equipment, equipment theft and abuse are minimized.

Areas of difference

Now that we have defined on-/off-premises technology and outlined the reasons why a cable operator may want to implement the technology, it is appropriate to point out the differences between the two.

The first area of difference, cost per subscriber, results from the single-home design of on-premises vs. the multihome design of off-premises. With off-premises, devices typically have four or more ports, each port serving a single sub. Typically they consist of shell or base electronics and plug-in modules for each sub that it is capable of serving. The cost generally relates to the base electronics, in that the per subscriber cost is minimized only if all the ports are utilized (100 percent penetration). Conversely, the cost per subscriber rises if all the ports are not fully utilized. For example, one off-premises device currently being offered has four ports and $180 in base electronics, with each plug-in module costing $65. Assuming a 100 percent penetration, the cost per sub is $110. Now assume a 50 percent penetration level; the cost per sub rises to $155. Given that the national average is around 55 percent penetration, the economics become very critical.

Assume the equipment is to be deployed in a system that passes 40,000 homes and has a 65 percent penetration level (26,000 paying subs). The initial capital outlay for the off-premises equipment would be $3.5 million.

With on-premises, the cost per sub is minimized since equipment is initially installed for paying subs only. So with 65 percent penetration, the initial capital outlay would be $2.8 million (assuming comparable equipment costs of $110/sub). On-premises offers a savings of $700,000 in initial capital costs over off-premises. However, in either approach, the average cost per sub may be higher, depending on whether or not the equipment is left in place or redeployed when a paying sub disconnects.

The second area of difference is the issue of powering. Off-premises equipment is typically powered from the cable plant. This raises two concerns: First, since the operator pays for the power that the cable plant uses, a substantial increase in annual power costs will occur (the actual dollar amount will vary). Second, at a minimum, the feeder lines of the system may have to be rebuilt (repowered and adding appropriate power passing capability) to accommodate the additional power requirements. In the previous example, 10,000 active devices would be added to the system.

On-premises equipment, on the other hand, is typically powered from the sub's home by a low voltage wall transformer. The power is either added to the coax or run on separate power wires. The advantage here is that the cable system's power bill is unaffected. The potential disadvantage (at least with coax powering) is the possibility of damaging other consumer electronics equipment connected to the coax.

The third area of difference is deployment. This is directly related to the level of commitment by the operator toward deploying one approach over the other. A much higher level of commitment is required when deploying off-premises, in that significant construction or rebuild activities are required to perform a field trial, let alone a full-scale deployment. These activities are not only costly in terms of dollars and cents but also in disruption of services. Assume, for example, that you are going to field trial 25 off-premises devices. In the best-case scenario, all 25 devices would be installed on the same feeder line. The installation process will automatically cause service disruptions to all subs on that line—test and non-test subs alike.

On-premises devices offer clear advantages in terms of deployment. Target subs can be selected regardless of where they live on the system. Installation does not affect any other subs, since the equipment is connected to the drop line, as opposed to the feeder.

Today, the on-premises approach has the advantage in cost per subscriber, powering and ease of deployment. However, ongoing engineering design efforts are expected to produce reductions in the cost of base electronics, reduced power consumption and easier system integration. This will then make it possible for these two approaches to be much more competitive in the future.

COMMUNICATIONS TECHNOLOGY

A Transmedia Publication

CT Publications Corp.,
a subsidiary of Transmedia Partners-I, L.P.
50 S. Steele St., Suite 700, Denver, Colo. 80209
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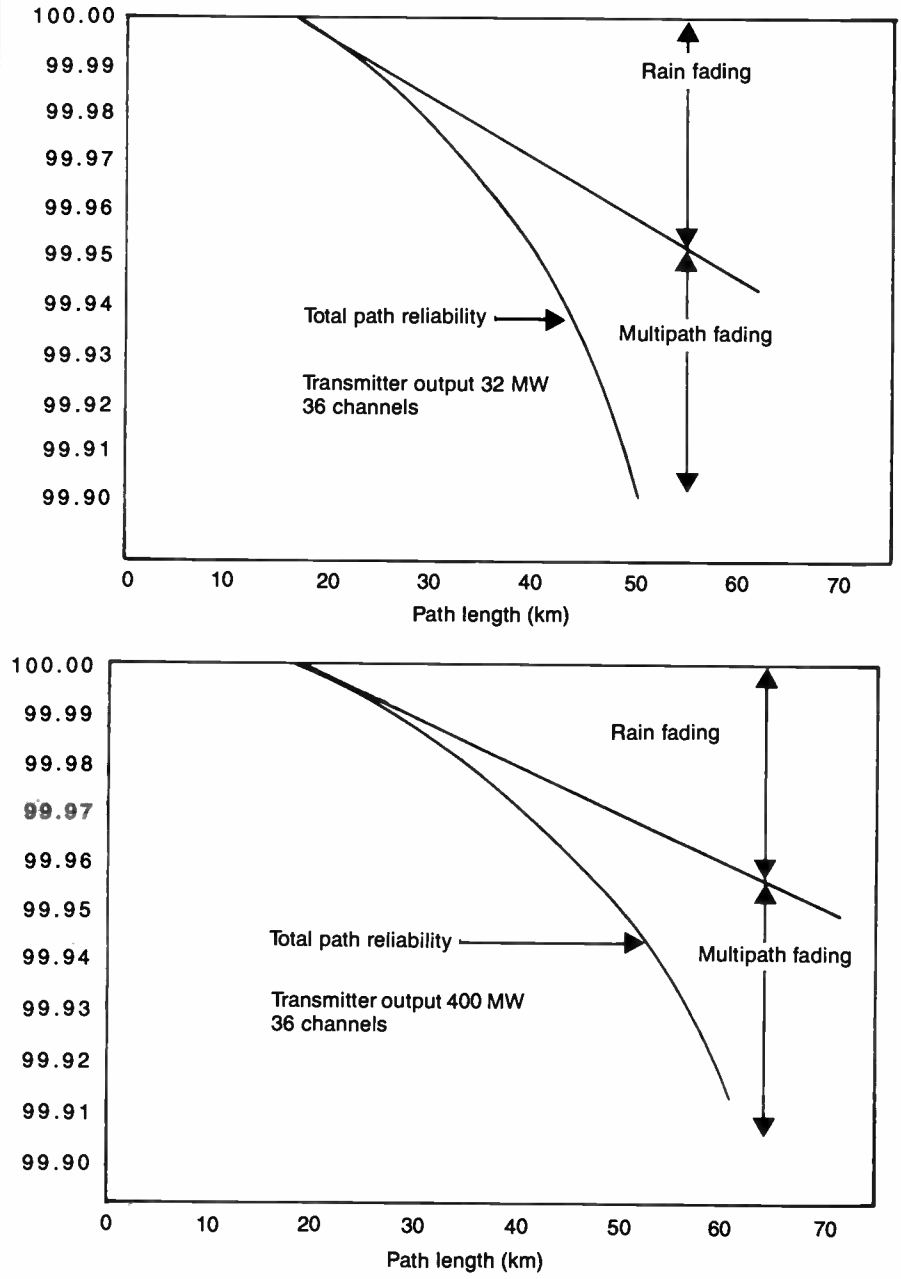
Figure 3: Reliability predictions for Middle Atlantic region



Statistical estimates of total annual duration of fades below 35 dB C/N
(In hours per year)

Distance	20 km		40 km	
Equipment	Low	High	Low	High
Region	power	power	power	power
Mid-Atlantic	0.6	0.5	1.7	1.2
Gulf Coast	2.0	1.6	5.0	3.8
Rocky Mountain	0.2	0.1	0.6	0.4
Pacific Northwest	0.3	0.2	0.7	0.5

Microwave paths

(Continued from page 30)

and the bottom set of curves is for the high powered AML equipment. Rain fading, multipath fading and total path reliability are shown separately. The conservative assumption is made that the various propagation fading modes do not occur simultaneously and, thus, the predicted outages for each are fully additive. Examination of the various curves leads to a number of conclusions.

1) Rain fading in the Pacific Northwest is relatively modest in spite of the heavy total annual precipitation because of the relatively low peak rain rates mentioned earlier. This is further demonstrated by comparison with the results for the Gulf Coast area, for instance.

2) Going to much higher powered equipment improves the rain fading much less than it improves the multipath fading. It should be noted that this consideration applies equally to conventional FM microwave equipment, where larger fade margins do not provide much benefit with regard to rain fading.

3) Multipath fading, on the other hand, is greatly reduced by going to higher powers. High powered equipment is therefore recommended for very long path lengths.

In summarizing the illustrations and assuming average terrain roughness conditions, the following path length performance characteristics would seem feasible for the typical carriage of a large number of channels.

Pacific Northwest—solid-state equipment: 30 to 35 km (18-21 miles); high powered equipment: 50 to 60 km (31-37 miles).

Middle Atlantic—solid-state: 30 to 35 km (18-21 miles); high powered: 50 to 60 km (31-37 miles).

Rocky Mountain Region—solid-state: 40 to 50 km (25-31 miles); high powered: 55 to 65 km (34-40 miles).

Gulf Coast Region—solid-state: 24 to 29 km (15-18 miles); high powered: 29 to 40 km (18-25 miles).

Typical values of predicated outages for 20 and 40 km paths for the same four regions mentioned previously are listed in the accompanying table. Actual field results could vary somewhat because of the statistical nature of some of the phenomena, the actual nature of the terrain in question and micrometeorological conditions. The results shown in the table represent statistical estimates of the total annual duration of fades below a 35 dB carrier-to-noise for both the solid-state

"High powered equipment is... recommended for very long path lengths."

multichannel equipment as well as the high powered AML. It should be noted and stressed that a fade to the 35 dB C/N level does not represent a complete loss of signal, as distinguished from the quieting threshold usually employed on FM systems.

Recommendations

System planning and design:

a) Careful path surveys and frequency coordination
b) Adequate path clearances
c) Careful stress analysis of towers
d) Conservative path design
   1) adequate antenna size
   2) waveguide with the lowest loss
   3) consider topography and climate in the area
e) Schedule work conservatively. Allow for equipment burn-in prior to start of subscriber service.

Construction:

a) Make all necessary site preparations prior to start of construction.
b) Employ construction crews skilled in microwave antennas and waveguide installation
c) Use recommended grounding practices.

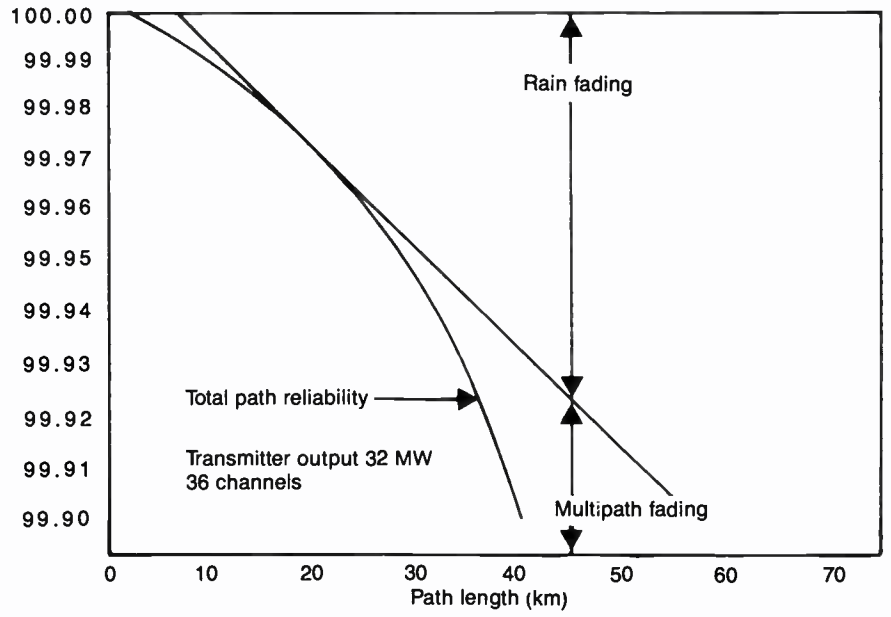
Maintenance:

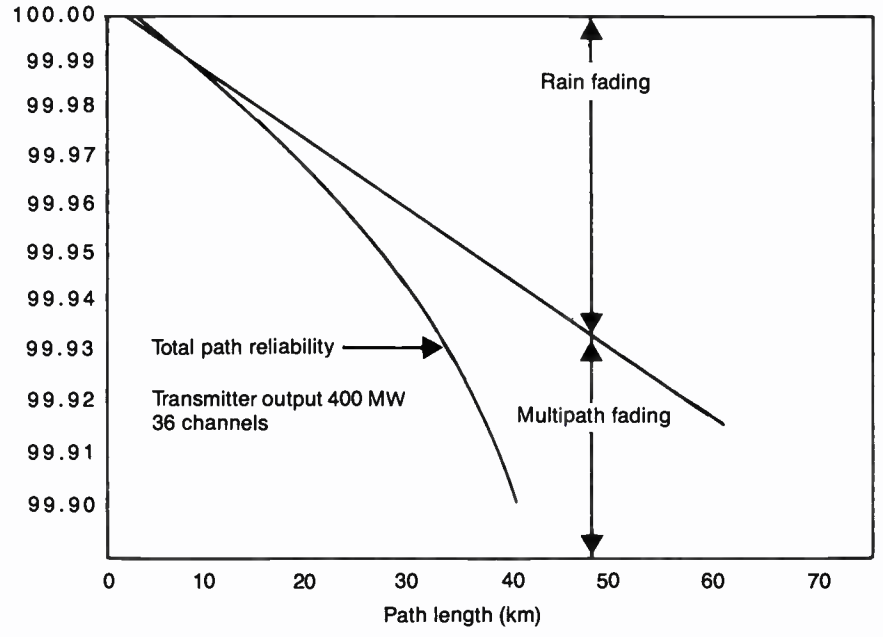
a) Select good people, preferably with microwave experience.
b) Have people trained by equipment manufacturer.
c) Provide proper test equipment.
d) Maintain operating spare parts.
e) Control level and quality of headend signals.
f) Maintain a history log of equipment.

References

1) *Engineering Considerations for Microwave Communications Systems*, GTE Lenkurt, Robert White.
2) *CARS Band Microwave System Planning*, Farinon Video, Cliff Fields.
3) *Transmission Systems for Communications*, Bell Telephone Laboratories, Chapter 13.
4) *Microwave Radio Relay System*, USAF T.O. 31R5-1-9.
5) *A Survey of Microwave Fading Mechanisms, Remedies and Applications*, ESSA Technical Report ERL 69-WPL.

Figure 4: Reliability predictions for Gulf Coast region





IPPV today

(Continued from page 26)

tion procedure should be available in the telephone return module initiated by the addressable controller.

Cable return systems use the 5 to 30 MHz sub-band spectrum for uploading of event purchases. Use of reliable modulation techniques as well as retry capabilities eliminates the need for intelligent bridger switching control. Agile RF return module frequencies also can eliminate data transmission failures. When a data path cannot be established via one return frequency, the return module can be instructed to try another frequency that is likely to be clear. Globally, the system also may be instructed to change return frequency. When signal strength is too low, a command may be issued to increase the transmission level. When the return frequency reaches the headend, a diplexer routes the sub-band carriers to a data demodulator device that strips off the data and applies it to one of the addressable controller collection lines.

When using either telephone or RF return, a test collection is recommended to verify the integrity of the installation. The two-way modules are installed within the converter. The "out of sight, out of mind" approach makes good sense. If for some reason the curious subscriber goes probing within the converter, an access trap mechanism should shut down all further operation of the unit. All event purchases are stored in a non-volatile memory device to prevent loss of data during power interruptions.

The billing interface is a very important part of the two-way addressable system. The billing host initiates all transactions and analyzes the collection statistics. Some two-way addressable systems have an additional feature that stores the viewed time of each event tuned. This time viewed feature can be used in billing disputes since the converter retains a count of actual time tuned to an IPPV channel.

Using store and forward technology eliminates the need to constantly poll all converters for billing purchases. The actual amount of time needed to collect the system can be referred to as a collection cycle. The collection cycle will vary due to the amount of collection lines available on the addressable controller.

More than event purchases

Two-way addressability also makes it possible to collect viewer statistics. This application can be used to monitor viewership during prime time, for example. The addressable controller issues a global command asking all two-way converters to store the channel tuned at that instant in time. During the course of the evening, multiple "snapshots" could be taken and analyzed. The global snapshots can be automated and scheduled to be performed by the computer for unattended operation. Converter diagnostics and information on converter use are reported at the time of a collection.

Opinion polling can be used to query two-way subscribers regarding their thoughts on certain issues. An expansion of this also could include home shopping for products and services. The snapshot would be taken to store the subscriber responses and would be uploaded to billing for processing.

For the right cable system, two-way technology can provide many benefits. For the cable operator, it provides an incremental form of revenue, as well as a method for gathering viewer information, and much more. For the cable subscriber, IPPV means simple and hassle-free event purchasing, which translates into more frequent buying.

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Western Region
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Preparing budgets

(Continued from page 22)

plicable to capital projects.

To be continued in the budget, each project must be individually justified. If the budget ends up looking a lot like the current budget (including many of the same projects at similar costs), it is because the underlying needs, the cost to complete and the timing are similar.

In the book *Zero-Base Budgeting Comes of Age*, Logan Cheek explains zero-base budgeting in a technically oriented environment: "In a nutshell,

Table 1: Installation materials spreadsheet

						ANNUAL NEED	
		NEW INSTALL				QUANTITY	COST
145	FEET MESS RG 6	@	0.06 FT	=	$0.48	80,185	$4,690.82
6	F CONNECTORS	@	0.15 EA	=	$0.90	3,318	$497.70
0.5	SPAN CLAMP	@	0.60 EA	=	$0.30	277	$165.90
1	P HOOK	@	0.75 EA	=	$0.75	553	$414.75
1	MISC. FASTENERS	@	2.50 PER INSTALL	=	$2.50	553	$1,382.50
1	GROUND BLOCK	@	0.73 EA	=	$0.73	553	$403.69
5	FEET GROUND WIRE	@	0.06 FT	=	$0.28	2,765	$152.08
1	GROUNDING	@	2.20 PER INSTALL	=	$2.20	553	$1,216.60
100	FEET REG. RG 6	@	0.06 FT	=	$6.00	55,300	$3,318.00
1	WALL PLATE	@	0.13 EA	=	$0.13	553	$71.89
1	BARRELL	@	0.25 EA	=	$0.25	553	$138.25
0.75	TRANSFORMER	@	0.49 EA	=	$0.37	415	$203.23
0.5	AB SWITCH	@	3.05 EA	=	$1.53	277	$843.33
1	FEED THRU BUSHING	@	0.30 EA	=	$0.30	553	$165.90
2	TAGS	@	0.30 EA	=	$0.60	1,106	$331.80
5	FEET CONDUIT	@	0.34 EA	=	$1.70	2,765	$940.10
		TOTAL PER INSTALL		=	$27.01		$14,936.53
		RECONNECT					
2	TAGS	@	0.30 EA	=	$0.60	4,430	$1,329.00
1	SEALANT	@	0.15 PER INSTALL	=	$0.15	2,215	$332.25
4	F FITTINGS	@	0.14 EA	=	$0.56	8,860	$1,240.40
5	FEET RG 6	@	0.06 FT	=	$0.30	11,075	$664.50
0.75	TRANSFORMER	@	0.49 EA	=	$0.37	1,661	$814.01
0.5	AB SWITCH	@	3.05 EA	=	$1.53	1,108	$3,377.88
		TOTAL PER RECONNECT		=	$3.50		$7,758.04
		SERVICE CALL					
50	FEET RG 6	@	0.06 FT	=	$3.00	27,608	$1,656.49
4	F FITTINGS	@	0.14 EA	=	$0.56	2,209	$309.21
0.5	2-WAY SPLITTER	@	1.10 EA	=	$0.55	276	$303.69
0.5	GROUND BLOCK	@	0.73 EA	=	$0.37	276	$201.54
		TOTAL PER SERVICE CALL		=	$4.48		$2,470.94
		ADD OUTLET					
75	FEET RG 6	@	0.06 FT	=	$4.50	68,475	$4,108.50
1	2-WAY SPLITTER	@	1.10 EA	=	$1.10	913	$1,004.30
0.25	AB SWITCH	@	3.05 EA	=	$0.76	228	$696.16
1	WALL PLATE	@	0.13 EA	=	$0.13	913	$118.69
1	BARRELL	@	0.25 EA	=	$0.25	913	$228.25
0.75	TRANSFORMER	@	0.49 EA	=	$0.37	685	$335.53
6	F FITTINGS	@	0.14 EA	=	$0.84	5,478	$766.92
1	SEALANT	@	0.15 PER INSTALL	=	$0.15	913	$136.95
		TOTAL PER ADD OUTLET		=	$8.10		$7,395.30
		VCR INSTALL					
2	2-WAY SPLITTER	@	1.10 EA	=	$2.20	1,190	$1,309.00
2	AB SWITCH	@	3.05 EA	=	$6.10	1,190	$3,629.50
6	F FITTINGS	@	0.14 EA	=	$0.84	3,570	$499.80
10	FEET RG 6	@	0.06 FT	=	$0.60	5,950	$357.00
		TOTAL PER VCR INSTALL		=	$9.74		$5,795.30

Table 2: Manpower analysis

INSTALLATION DEPARTMENT

	# WEEKLY
NEW CONNECTS	43.0
RECONNECTS	26.0
UPGRADES	35.0
DOWNGRADES	28.0
DISCONNECTS	63.0
PREWIRES	0.0

SERVICE DEPARTMENT

	SERVICE CALL PERCENTAGE
SERVICE CALLS(North Cabletown)	4.2%
SERVICE CALLS(South Cabletown)	3.6%

	LOCATES/MONTH
LOCATES	40.0

BENCH

	# WEEKLY
CONVERTERS	130
LINE GEAR	
CABLE	
CUSTOMER SERVICE (VCR H/U, ETC.)	

WAREHOUSE

SHIPPING AND RECEIVING
PAPERWORK
MATERIAL-ISSUANCES
MATERIAL-PICKUP/DELIVERY
HOUSEKEEPING

PREVENTIVE MAINTENANCE (FROM PREVENTIVE MAINTENANCE PROGRAM

	# IN SYSTEM
TRUNK SYSTEM SWEEP (AMPS)	328.0
FEEDER SYSTEM (AMPS)	850.0
POWER SUPPLIES	55.0
SIGNAL LEAKAGE (MILES)	240.0
HEADEND(S)	2.0

	#/PERSONEL
PERSONEL TRAINING	13.0

QUALITY CONTROL
MECHANICAL INTEGRITY

	#/SITES
TOWER(S) AND ANTENNA(S)	1.00
EARTH STATION(S)	1.00
FCC PROOFS	1
CLI PROOFS	240

	HOURS/EACH	TOTAL HRS./WE
	1.00	43.0
	0.50	13.0
	0.50	17.5
	0.33	9.2
	0.33	20.7
	1.50	0.0
	TOTAL DEPT. HRS/WEEKLY	103.5
	TOTAL DEPT. PERSONEL	3.3

BASIC SUBS	HOURS/EACH	TOTAL HRS./MO
8901	0.75	280.3
1240	0.90	40.1
	0.50	20.0
	TOTAL DEPT. HRS/MONTH	300.3
	TOTAL DEPT. PERSONEL	2.2

	HOURS/EACH	TOTAL HRS./WE
	0.20	26.0
		2.5
		1.5
		1.0
	TOTAL DEPT. HRS/WEEKLY	31.0
	TOTAL DEPT. PERSONEL	1.0

		TOTAL HRS./WE
		10.5
		10.5
		5.0
		5.5
		5.5
	TOTAL DEPT. HRS/WEEKLY	37.0
	TOTAL DEPT. PERSONEL	1.2

TIMES/YEAR	HRS/EACH	TOTAL HRS./YE
4	0.75	984.0
2	0.50	850.0
4	0.50	110.0
4	3.00	2880.0
52	1.00	104.0
	HRS/WEEKLY	TOTAL HRS./YE
	2.00	104.0
	HRS/WEEKLY	TOTAL HRS./YE
	9.00	468.0
	12.00	624.0

TIMES/YEAR	HRS/EACH	TOTAL HRS./YE
12	1.00	12.0
12	1.00	12.0
1	60.00	60.0
1	1.5	36
	TOTAL DEPT. HRS/YEARLY	6464.0
	TOTAL DEPT. PERSONEL	4.0
	TOTAL FIELD PERSONEL	11.9

zero-base budgeting has been defined as: an operating planning and budgeting process that requires each manager to justify his entire budget request in detail from scratch and shifts the burden of proof to each manager to justify why he should spend any money at all. This approach requires that all activities be identified in 'decision packages' that will be evaluated by systematic analysis and ranked in order of importance."

What's obvious at first about zero-base budgeting is that it takes more preparation than the historical approach. Instead of adapting current projects, the budget must evaluate all cost components of a project and show a reason for each. In practice, however, the entire effort is not as great when a systematic approach is used for each project. Cheek suggests the use of a decision card for each budget unit (Figure 1).

Although the format of the card may change depending on your business, it always summarizes the basic financial parameters: the cost, benefits, savings or increased costs in another area if the project is not approved. The card also includes provisions for special considerations, such as a project that is legally required

Figure 2: Decision package form

C-E Power Systems	Decision package	Period:	
Division: Department: Section:	No. No.	Activity name: Activity no. Level: of	Rank

Activity purpose:	Activity resource requirements Cost analysis

Classification	Prior period	Budget period
Salaries & wages		
Other control		
Other dir. cont.		
Dir. mat'l. & svc.		
Direct travel		
Direct computer		
Indirect cont.		
Transfer out		
Activity cost		

Activity description:	Funding from outside sources
Related activities:	
Advantages of retaining activity:	Resource analysis

Period	Total cost	Exempt	Non-exempt
Budget period			

Consequences if activity is eliminated:		
Alternative methods of performing activity, costs and staffing:		
Prepared by: Date:	Approved by: Date:	Approved by: Date:

(like CLI testing). It also should include an explanation of what the alternatives are or the effect on the company if the project is not approved.

The decision card may be augmented by supporting data. You may, for instance, propose a project called "installation materials" with a simple justification on the decision card that if the project is not approved, most of next year's new cable subscribers cannot be hooked up. However, more data than that is required to justify the amount of money requested. In this case the supporting data might look something like the installation materials spreadsheet shown in Table 1.

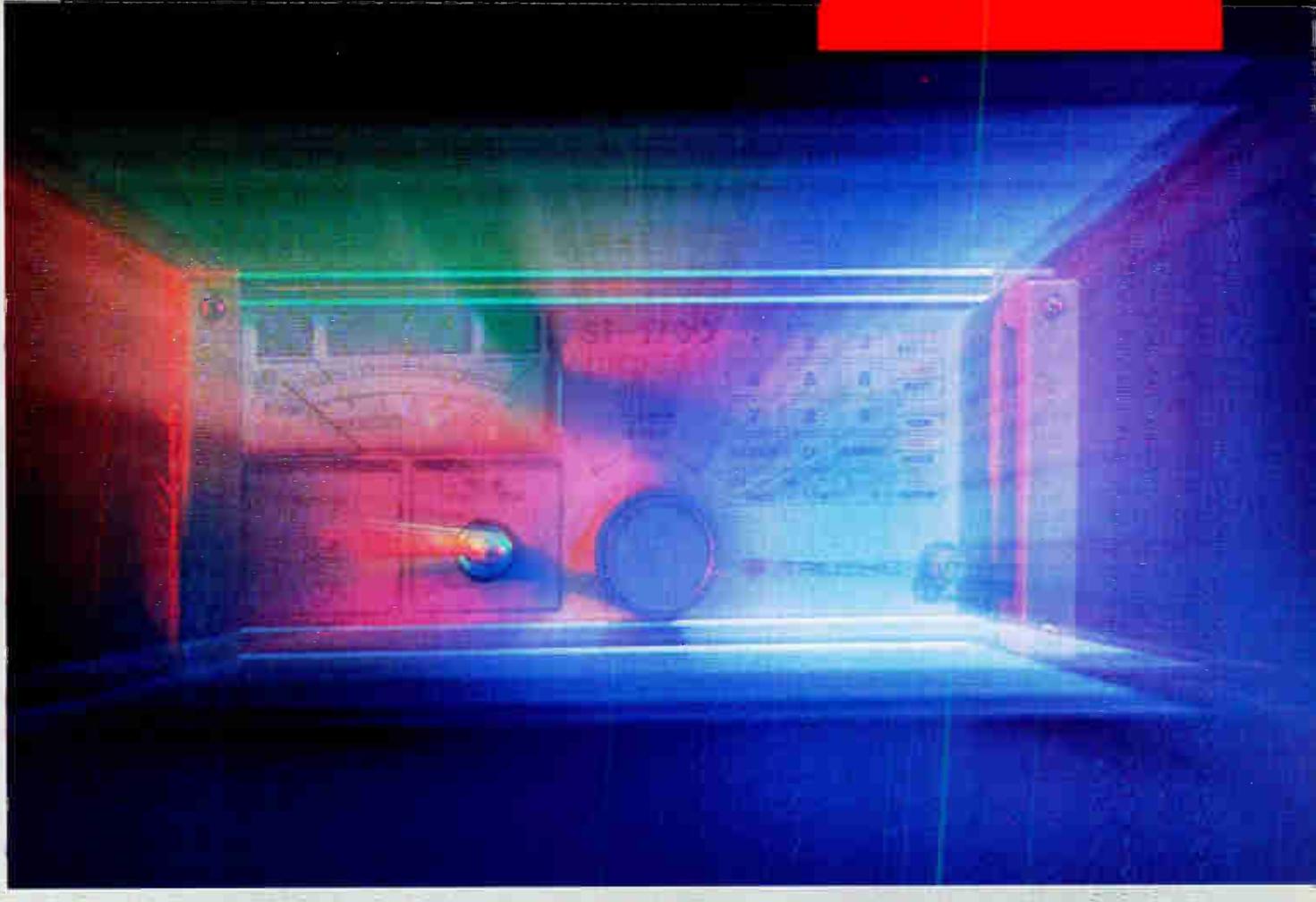
Detailed manpower spreadsheets such as the one shown in Table 2 can be very helpful in supporting your project; they form a factual basis for approval that is difficult to deny. This spreadsheet can be used to justify staffing levels for technicians and installers. It shifts the discussion from what is usually a subjective explanation ("We need this number of technicians because we can keep them busy") to a discussion based on facts and numbers ("We have X number of work orders to complete and therefore this number of technicians is required").

The decision card combined with additional data comprises the decision package. It should contain all the information needed at every level, system, divisional and national to make a quick decision to approve or disapprove. Like the decision card, the decision package should be formatted for your business. Figure 2 is a cover sheet for a decision package used by an engineering firm.

Prioritization of projects is integral to the zero-base method. Each project is numerically ranked in terms of its importance to the operation of the cable system. You might find it difficult to prioritize a list of 20 or more projects when many of them are necessary to continue your business. The value of priorities, though, is not at the top of the list where necessary projects are grouped, but at the bottom of the list where a few projects the budgeter considers not as important are clustered. If eliminations must be made for financial reasons, the relative ranking of the low priority projects makes the difficult decision easier.

Presentation and approval

Oral presentations of budgets are important and, if combined with appropriate maps, charts and graphics, make an effective introduction to the business plan. But hard decisions regarding large amounts of money are best supported by a carefully prepared written report.



0 to 600 in .035 seconds

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The smooth, analog meter movement, combined with the large digital readouts make the SP 1700 as quick to read as it is easy to use.

The SP 1700 stands up to heavy use thanks to construction that is engineered to meet the MIL STD 810D drop test. It's also highly water resistant, has a front panel replaceable F connector and comes in a padded carrying case.

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- 5 to 600 MHz frequency range
- Electro-mechanical attenuator
- 60 Hz and 120 Hz active carrier hum testing
- Highly water resistant
- Meets MIL STD 810D drop test
- Industry exclusive 2 year warranty

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800-344-2412 Outside Indiana ■ FAX: (317) 895-3613 ■ TELEX 244-334 (RCA)

TRILITHIC

Reader Service Number 37.

Management

(Continued from page 19)

Did you know that alcohol is a mood- *and* mind-altering drug and that it is the most abused drug in our society today? Is all this information useless to you because it is against company policy to drink on the job and anyone taking illegal drugs will be fired?

Company policies are fine; however, by the time an individual reaches the point of no return and is fired, that person may have caused a considerable amount of damage or a death that could have been prevented by a manager who was aware of what was going on around him. Here's another example to consider:

As the new system engineer, you're invited over to the system manager's house for dinner. After dinner the manager rolls a joint and offers you a "hit." Now what? You know company policy and it's your time not theirs. What are you going to do? Same scene, but now it's cocaine and he offers you a "line." Better yet, he offers to sell some to you. Hey, not a problem? Same setting, but now it's one of your technicians. What are you going to do? What's right and what's wrong? What are your values and principles in these situations? Do you know the aftereffects of what these drugs can do?

Today you need to know more

Just knowing how a CATV amplifier works and how cable plant should be built doesn't cut it today. Your knowledge base for a chief technician or engineer must be broader. You need a working knowledge of company policy, employee assistance plans, the effects of drugs and alcohol on individuals and you must be aware of the attitude of the people who work for you. Does this mean you have to be a counselor? In a matter of speaking, yes.

Take, for instance, a person who has worked for you a number of years and has been very reliable with an excellent work ethic. This person for no apparent reason begins to arrive late for work, becomes withdrawn and his performance begins to decline. As an eight-hour manager you are not concerned about what he does during his off-time—that's none of your business—so you talk to this individual and warn him that if he does not improve you'll have to let him go. The situation becomes worse and you feel you have no other recourse but to let him go. Just before you are ready to fire him, one of his friends informs you that this guy's child has been in a hospital some 80 miles away and that he has been commuting back and forth every day. Would you still fire the guy?

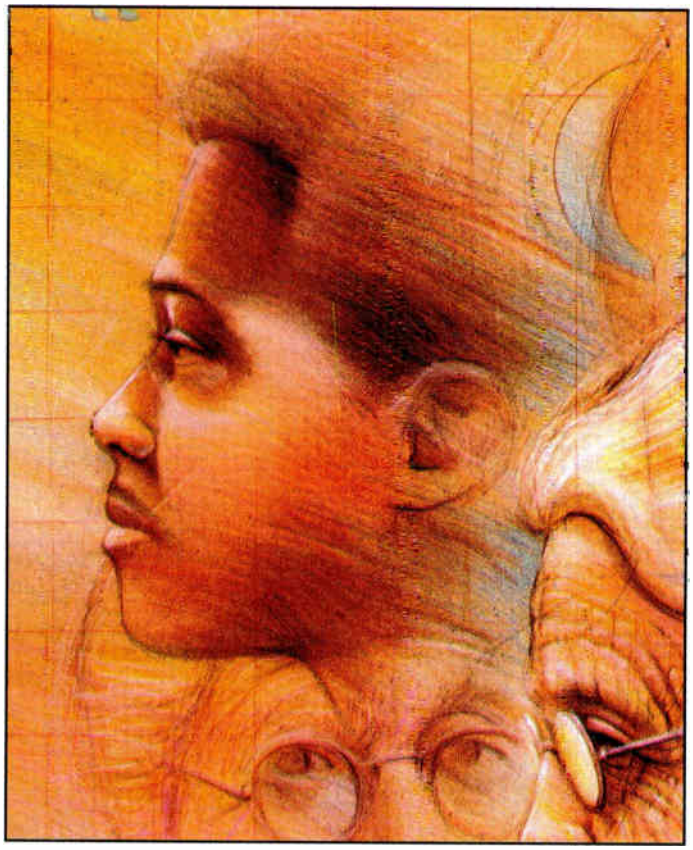
What could you do to be more aware of the personal problems that your employees face? Is it any of your business? These are questions you need to ask yourself. By showing an employee you care about their welfare at work and home it will in most cases pay off in loyalty, respect and a more productive employee.

As a guide, the following is a list of 11 simple-sounding, yet difficult steps I suggest you review on a frequent basis:

1) Know yourself and seek self-improvement,
2) Be technically proficient,
3) Seek responsibility and take responsibility for your action,
4) Make sound and timely decisions,
5) Set the example,
6) Know your people and look out for their welfare,
7) Keep your people informed,
8) Develop a sense of responsibility in your subordinates,
9) Ensure the task is understood, supervised and accomplished,
10) Train your people as a team, and
11) Employ your group in accordance with its capabilities.

EEO compliance

(Continued from page 20)



recruitment, evaluation, selection, promotion, compensation, training or termination of employees is fully cognizant of the company's commitment to EEO.

4) *Internal audit and report systems:* Probably the most critical aspect to ensure success in achieving and maintaining an in-compliance and effective EEO program is the formulation and implementation of a detailed and disciplined audit program. This program should consist of the following components:

- At a minimum a *quarterly EEO progress report* should be compiled for each system. This report should provide management a systematic method of monitoring applicant flow data, new hires and terminations, an overall summary of promotions and the utilization posture of minorities and females.
- *EEO program compliance checklist* should be completed for each vacancy. When executed properly it provides the required documentation that illustrates good faith. The compliance checklist requires that the following information be provided: 1) minority and women's organizations contacted, 2) employment services contacted, 3) educational institutions contacted, 4) general media advisements used, 5) advertisements in media with significant circulation to minorities and women, 5) current minority and female employees reviewed for promotion, and 6) current minority and female employees reviewed for on-the-job training in the available position.
- *Utilization analysis* should be recorded. A key element of the quarterly progress report process is to ensure the appropriate SMSA (standard metropolitan statistical area) or labor work force data is used in evaluation of the company's utilization posture with respect to FCC/EEO utilization requirements. Familiarity with the FCC/EEO cable regulations (Part 76.311) is essential to determine the organization's utilization compliance posture.

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Equal Opportunity Employer

Leader in the placement of Cable Television Professionals
Call Toll Free 800-433-2160; In Texas, call 817-599-7623; FAX 817-599-4483

TECH MANAGEMENT	TECHNICIANS	TECHNICIANS
REG ENG, W, 70K	HDEND/MICRO, NE, 40K	LN TCH, SE, 10/HR
DIR TCH OPS, NE, 60K	HDEND/MICRO, W, 30K	CLI TCH, SE, 10/HR
CORP ENG, S, 45K	HDEND/MICRO, NW, 30K	CLI TCH, W, 11/HR
CH ENG, SW, 45K	LD TCH, NE, 28K	AREA TCH, N, 10/HR
CH ENG, W, 35K	LD TCH, S, 10/HR	LN TCH, SW, 11/HR
TCH MGR, W, 35K	SW TCH, E, 12/HR	LN TCH, ATLC, 12/HR
TCH TRAINER, MW, 35K	LD TCH, MW, 25K	LN TCH, E, 25K
CH TCH, NE, 32K	SW TCH, E, 13/HR	SERV TCH, SE, 8/HR
CH TCH, E, 33K	LD TCH, W, 14/HR	SERV TCH, MW, 9/HR
MGR/TCH, MW, 28K	LN TCH, W, 14/HR	SERV TCH, W, 9/HR

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One Young Plaza 1235 Ranger Highway Weatherford, TX 76086
Call for information about these and many other opportunities nationwide.

SALES/MARKETING ENGINEER

High technology firm is looking for a dynamic sales/marketing engineer to market fiber optic based AM/FM data link in the CATV field. Requirements include technical degree (BSEE preferred), 5+ years sales/application engineering/ marketing experience in CATV, and knowledge of multichannel AM/FM CATV products. Please send resume, references and salary history in confidence to:

Dept. CT-1
2330 Faraday Avenue
Carlsbad, CA 92008
Principals Only

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Large MSO is seeking individual with at least 2 years experience. Challenging position, advancements, and benefits. Must have a good driving record.

McDonald Management, Inc.
P.O. Box 1245, LaGrange, GA. 30240
Attention: John Lynch
(404) 882-2584

CABLE SYSTEM ENGINEER

Dayton, Ohio

Viacom Cablevision, a leader in the Cable Television industry, has an exceptional opportunity for a talented Engineer to maintain and enhance Viacom's Dayton Cable System.

In this position you would implement the Viacom Quality Assurance Program – oversee signal requirements for all headends and the Jerrold addressable system, and perform preventive maintenance. Other duties involve supervising and training staff, and making technical recommendations for marketing programs that will improve Viacom's regional distribution system.

To qualify, you should have 3-5 years of CATV technical experience, familiarity with CATV equipment (headend, converter, descrambler, test equipment, etc.) and the ability to be on call 24 hours, analyze technical problems and provide solutions. An AA degree or college level courses in electronic engineering is preferred. We also desire an individual with BCT/BCE certification.

If this opportunity with a leading cable system provider interests you, contact Viacom now. Send your resume with salary history to: Marsha Blair, Viacom Cablevision, P.O. Box 213, Dayton, OH 45404. EOE – M/F/V/H.

Viacom Cablevision

ATREX INC.

A national installation contracting company has standing need for experienced installers. Call 1-800-874-4505 for details and locations!

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Knowledge of G.O. 95 is a must. In the San Francisco Bay Area. Send resume to: 6049 Douglas Blvd., Suite #3, Roseville, CA 95661.

MAINTENANCE TECHNICIAN

Needed for large central New Jersey cable system. Experienced for 450 MHz S-A system. Applicant must have 3-5 years experience in a CATV technical position. A thorough knowledge of system sweep, signal leakage. Preventive maintenance and outage control is a must. We offer an excellent compensation and benefit package.

Please send resume to:

TKR Cable Company
268 Cliffwood Avenue
Cliffwood, New Jersey 07721

Attention: James Capone

EOE

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Attention: Personnel

EOE

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Growing company seeks candidates for Regional engineering positions in the Northeast, Southeast and Western Regions. Also seeking Corporate Engineer in the Western Region.

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- Call (303) 355-2101 for assistance with your ad placement.
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Minimum: 1" in depth, additional ½" increments

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Typestyle same as classified or as specified by advertiser. Any display ad designed by publisher will be subject to production costs of $50 per hour. Maximum: ½-page display advertisement.

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2. Deadline will be 1st of each month prior to publication date.
3. Ad copy must be submitted in typed format.
4. Cancellation date will be the 1st of each month prior to publication date. No cancellations accepted after this date. Cancellations must be received in writing.
5. The contents of advertisements are subject to publisher's approval.

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CATV DATA LINK
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Reader Service Number 39.

AML transmitter maintenance

By Ron Hranac
Senior Staff Engineer, Jones Intercable Inc.

Maintenance of AML (amplitude modulated link) microwave transmitters is relatively straightforward, since they operate very much like heterodyne headend RF processors. A certain amount of technical expertise and familiarity with the equipment is necessary, however, because high voltages and microwave radiation are present during normal operation. Also, some specialized test equipment will be needed because of the nature of some of the measurements. This article will provide general maintenance guidelines, but it is highly recommended that individuals who work with AML transmitters and receivers attend a Hughes AML seminar. The following is a representative list of test equipment necessary for proper AML maintenance. For best measurement accuracy, your power meter and frequency counter should be calibrated annually.

- Hewlett-Packard 435B power meter
- H-P 8481A power sensor
- H-P P281C waveguide-to-N adaptor
- H-P MP 292B waveguide adaptor
- Hughes 102-594-01 20 dB calibrated crossguide coupler (for MTX-132 transmitters)
- Hughes 102-594-02 30 dB calibrated crossguide coupler (for STX-141 transmitters)
- H-P 8558B or 8590A spectrum analyzer
- Wavetek SAM I signal level meter
- Digital multimeter
- Frequency counter (80 MHz or greater, with high stability time base: One part in 10^{-7} or better)

STX-141 transmitter

The STX-141 series of transmitters are high power units; each channel has its own transmitter/klystron and high voltage power supply. A high power AML transmitter array is normally configured with four channels per 8-foot rack (bay); each bay of four channels should be fed with a separate 20 ampere circuit breaker and at least 2,000 BTUs of air-conditioning (with vigorous air circulation around the klystron heatsinks) made available for each channel. While each transmitter is capable of +33 dBm output, normal operating output is +30 dBm per channel (STX-141A transmitters operate 3 dB higher than the STX-141). Each Magic Tee in the waveguide multiplexing chain will reduce the overall output 3 dB, so the final transmitter output will be a function of the number of bays and the number of channels (Table 1).

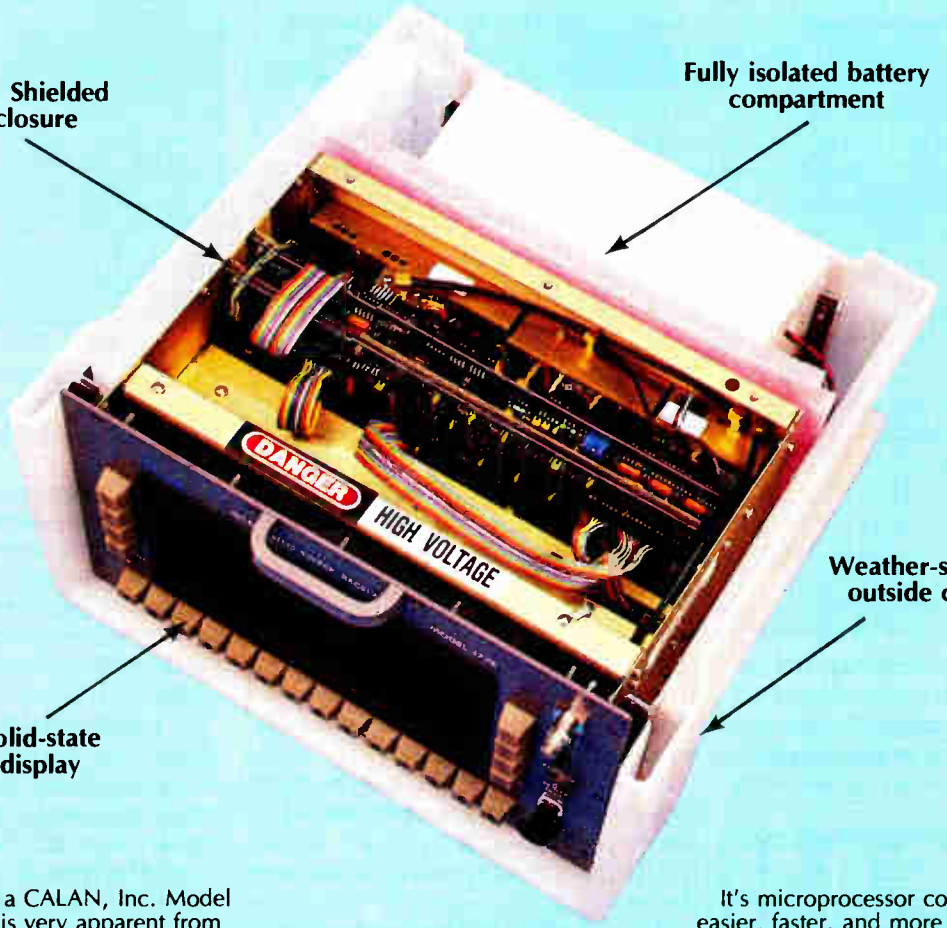
The following maintenance procedures are for transmitters in good working condition. Transmitter repair and alignment—other than power and frequency—are not covered here. You should refer to your service manual or contact Hughes directly for repair and alignment procedures.

Weekly maintenance:

1) Verify that the room temperature is normal.

2) Check the headend output. Make sure processors and modulators are operating at the correct RF output and that all spurious signals are at least 60 dB down. Verify that video depth of modulation and

The Inside Story on Reliability



Reliability built into a CALAN, Inc. Model 1776 Sweep Receiver is very apparent from the outside: the totally weather-sealed case; the ruggedized overall construction; the moisture-sealed key covers on the front panel.

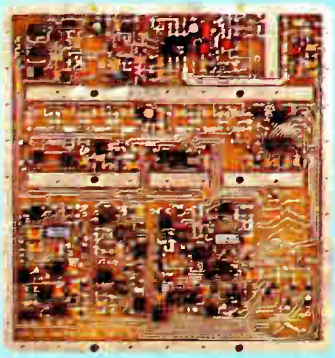
But what really makes this unique equipment reliable is on the ***inside***.

It's high-reliability components throughout the design, allowing incredible stability over temperature and humidity extremes.

It's complete RF shielding, allowing extended dynamic range for precise tests like Composite Triple Beat.

It's a solid-state Electro-Luminescent display, replacing the outdated CRTs.

It's new Surface-Mount RF Technology, making critical RF boards more reliable and more accurate than ever possible before. And a battery compartment that is totally isolated from the electronics, for absolute protection of the unit.



CALAN Surface-Mount RF Technology

It's microprocessor control, making testing easier, faster, and more accurate.

But all of these careful design criteria would be useless without the 75 years of CALAN engineering experience that went into the unit, making it the most reliable test equipment available today.

But if you ask a CALAN user, he'll most likely tell you that he hasn't seen the inside of his unit...just the outside, improving his system performance with no interference, and allowing more with his limited maintenance budget.

Maybe that's the **real** inside story.

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Reader Service Number 42.

Table 3: MTX-132 transmitter power output vs. channel/bay configuration (+40 dBmV input)

Number of bays	Number of channels	Number of output ports	Power output (dBm)
1	1-8	2	+16
1	1-8	4	+13
2	9-16	4	+13
3	17-24	4	+12
3	17-24	8	+10
4	25-32	8	+10
5	33-40	8	+ 9
6	41-48	8	+ 9
7	49-56	16	+ 7
8	57-64	16	+ 7
9	65-72	16	+ 6
10	73-80	16	+ 6

readings in your logbook. If klystron current falls below 75 mA, this is an indication that the klystron is nearing the end of its useful life.

5) Make sure there are no burned out indicator bulbs in any of the transmitter control units or high voltage power supplies. Record any repairs you make in your logbook.

6) Check the transmitter monitor output for correct RF levels on each channel. Make any necessary adjustments with the "level adjust" control on the front of each VHF driver amplifier. Also check for intermod and spurious signals. Record the transmitter monitor levels in your logbook. When transmitter output is down 3 dB or you can no longer increase operating level without severe picture impairment or adjacent channel intermod, it is time to install a new klystron. At this point, klystron current will likely be below 75 mA.

7) Look at the picture quality on each channel!

Monthly maintenance:

1) Perform weekly maintenance procedures.

2) Verify all DC voltages with a digital multimeter (except klystron high voltage and current). Record the readings in your logbook.

3) Using a frequency counter that has warmed up for at least an hour before use, measure the crystal oscillator frequency and readjust it if it is more than 180 Hz above or below its specified frequency (Table 2). Record all readings and changes made in your logbook.

4) Look at the picture quality on each channel at the transmitter monitor test point!

Annual maintenance and proof of performance:

The following will probably have to be done late at night, since it involves removing the transmitter from service:

1) Perform weekly and monthly maintenance procedures.

2) Disconnect the VHF input from each VHF driver amplifier, including the pilot tone, if used. Record the time you remove the transmitter from service in your logbook.

3) Disconnect the solid-state source

cable from each klystron (at the klystron input). Remove the klystron output monitor detector mount from the klystron output waveguide coupler tap port. Connect a calibrated power meter to that tap port, and ensure the power meter is set at maximum attenuation.

4) Reconnect the solid-state source input to the klystron you are measuring. Reduce the power meter's attenuator enough to measure the klystron output level. If necessary, adjust the klystron input level and set attenuator for the proper klystron output (nominal 0 dBm at the waveguide coupler tap port—or as otherwise marked on the coupler by the factory —corresponds to +45 dBm klystron output). When the klystron output is 2 dB low or it cannot be adjusted any higher without affecting picture quality, a new klystron is necessary. At this point, klystron current will probably be less than 75 mA. Disconnect the solid-state source input to the klystron before removing the power meter sensor.

5) After setting klystron output in each bay, reconnect the klystron output monitor detector mount on the waveguide coupler tap port; reconnect the solid state source input to each klystron. If desired, you can adjust "klystron output" front panel metering for each klystron to a convenient reference point (refer to the MTX-132 manual for location of appropriate controls inside transmitter control unit).

6) Install a 20 dB calibrated crossguide coupler at one of the multiplexed outputs and connect a calibrated power meter to the tap port of the coupler. Make sure the throughport of the coupler is either terminated with a WR-75 waveguide termination or has one of the antenna waveguides connected to it. Switch the power meter to maximum attenuation.

7) Measure the pilot tone signal level at the input to its VHF driver amplifier. It should be a nominal +40 dBmV. Reconnect the pilot tone to the PT VHF driver amplifier input. Reduce the attenuation on the power meter; measure the pilot tone's microwave RF level on the power meter and readjust it to the proper output if necessary, using the "level adjust" control on the front of the VHF driver amplifer. Record any adjustments made in your logbook.

8) Using a spectrum analyzer or signal level meter, measure the level of the pilot tone at the transmitter monitor VHF output. For optimum operation and measurement capability, it is recommended that you set the monitor output to +24 dBmV after the pilot tone VHF driver amplifier adjustment has been made. The monitor has a microwave vane attenuator that can be adjusted to vary its VHF output. If you want some VHF output other than +24 dBmV, install an in-line VHF pad on the monitor's VHF output behind the panel to achieve the desired output after the monitor has been set to +24 dBmV with the microwave vane attenuator. Record the pilot tone microwave output level and its corresponding monitor VHF level in your logbook.

9) Disconnect the pilot tone VHF input from its VHF driver amplifier. Alternatively, you can leave the RF input connected and disconnect the +DC voltage lead to the driver amplifier.

10) Set transmitter output power for each channel using the same procedure used for the pilot tone. Each channel must be done one at a time, with no other inputs connected to any other VHF driver amplifier (or all other driver amplifiers disconnected from their +DC power source). Substitute a +39 to +41 dBmV CW carrier for each video carrier when setting power. After the CW power level for each channel has been measured and set (with the power meter), measure and record the transmitter monitor VHF output for that CW carrier. This way, you will establish a reference transmitter monitor VHF output level that corresponds to the proper microwave output level on each channel. After you measure the CW carrier at the monitor output, replace the CW carrier with that channel's modulated video carrier and ensure that the modulated carrier has the same amplitude sync tips as the measured CW carrier on a spectrum analyzer. Before proceeding to the next step, make sure all VHF driver amplifier inputs are disconnected, or are deactivated by disconnecting each unit's +DC power leads.

11) After each channel's power has been set, disconnect the power meter from the crossguide coupler. Remove the crossguide coupler and install a termination or antenna waveguide in its place.

12) Reconnect each channel's VHF input to its corresponding VHF driver amplifier (including the pilot tone) after you measure and record that VHF level, or reconnect each amplifier's +DC power leads. Record the time you restore the transmitter to service in your logbook. If you want an additional signal level reference point, measure and record each VHF driver amplifier's test point level.

13) Check the monitor levels again and look for intermod and other spurious signals in the spectrum. Verify picture quality. All measurements, adjustments and repairs must be entered in your logbook, and the logbook signed by the person performing the work.

Optical amplifiers

By Lawrence W. Lockwood
President, TeleResources
East Coast Correspondent

In various wonderworks here and abroad there are significant developments occurring in the electro-optic world that will have a profound effect in future fiber-optic transmission. These effects will have especial importance as the fiber is extended in the net—is brought closer to the home—both in CATV and in the local loop, as it is termed in the telephone sphere.

A problem that must be accommodated in any fiber-optic transmission system design is the low power budget that is provided by the laser transmitters. This is especially true of amplitude-modulated laser transmitters. After a given transmission distance (and the accompanying attenuation), the optical signal must be amplified again. The amplification is provided by a repeater unit that detects the light signal, changes it to electrical, amplifies the electrical, changes it back to light and reinserts it into the fiber optics to continue its transmission. This clumsy (and expensive) process is not of overwhelming concern in the arena of the largest application of fiber optics, long haul transmission, where because of the low attenuation characteristic of fiber, the repeaters are quite far apart—and, hence, not too numerous in any given heavy traffic path. Also in the current system configurations of fiber-optic use in CATV (supertrunking and fiber backbone) the designs use relatively short point-to-point distances and the power budget is not exceeded so repeaters do not enter the picture.

However, in future network developments as the fiber reaches closer to the home both in CATV and telephone, no matter the specific network architecture, there will be tapping, splitting and other passive functions that will eat into the power budget. In other words, as we progress into the local loop reamplification of the light will be required much more than in the current long distance transmission.

Optical amplifiers

Work to simplify these repeaters has been under way for some time and notable progress has been made. Variations of devices that will take the incoming light and *optically amplify* it (without going to electrical and back to optical) have been developed. Several types of optical amplifiers that obviate the need to convert signals to electronic form have been made and tested in several laboratories. They are all variations of a laser. Developmental versions of one type—a semiconductor laser designed to amplify rather than originate signals—are being offered by BT&D Technologies Inc. (the Wilmington, Del., joint venture of British Telecom and the DuPont Corp.).

At this point, to aid in understanding light amplification by a laser, it might be well to briefly review the fundamentals of the functions of a semiconductor laser. Consider the acronym *laser*—it stands for "*l*ight *a*mplification by the *s*timulated emission of *r*adiation." A semiconductor laser is constructed with several layers of semiconductor material as shown in Figure 1.

Current is driven perpendicularly through the layers. The "stimulated emission" occurs in the central layer shown. The stimulated emission (light) is bounced back and forth between the mirrors; amplification is produced by the quantum effects in the semiconductor material in a process that is beyond the scope of this column. At any rate it is not necessary to delve deeply into the specific subatomic activity—it is sufficient to consider the device analogous to an RF oscillator. The central region provides the necessary amplification required for oscillation and the mirrors are the resonant circuit, the "tank circuit"; the oscillation is an extremely high frequency—light. From this rough analogy it becomes intuitively apparent that without the mirrors, and with some care, the device will just amplify and not oscillate. With some variations, this is the fundamental principle behind all the currently developed optical amplifiers.

Fiber laser amplifiers

Many laboratories are working on variations of the classic semiconductor laser—one being the fiber laser, a piece of optical fiber doped with rare earth ions that amplifies signals in the 1.3 or 1.55 μm windows.

Fiber lasers are essentially miniature solid-state lasers with rare earth ions in the fiber core. This core provides the stimulated emission supplied by the central region shown in Figure 1. Optical gain is

Figure 1: Semiconductor laser

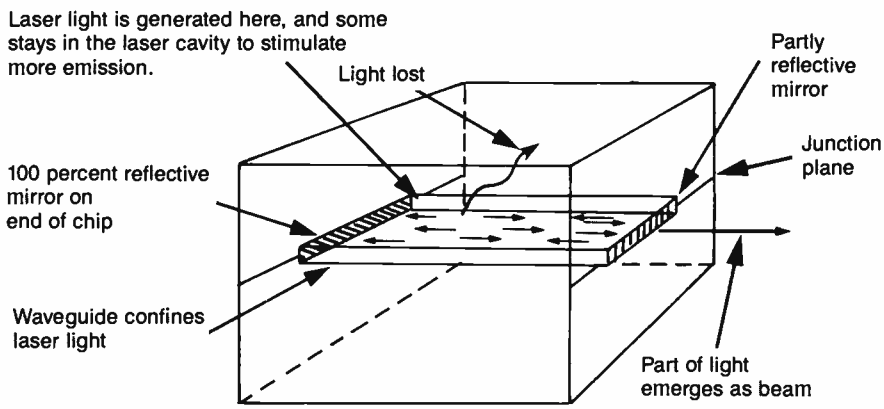
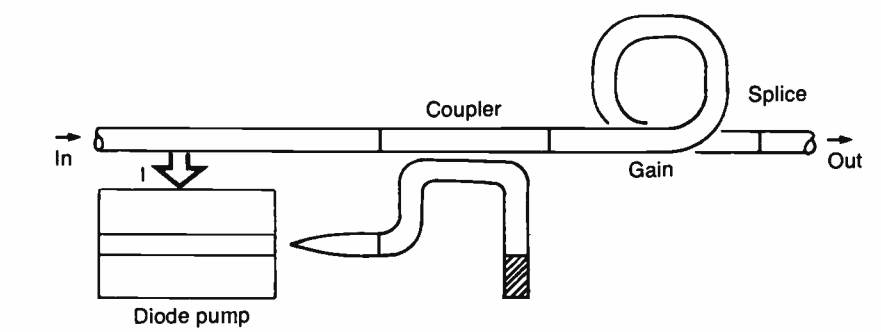
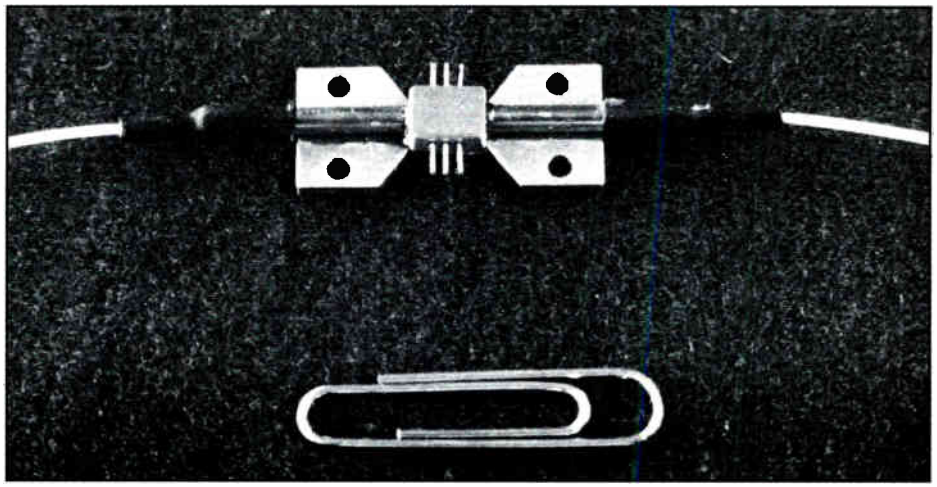


Figure 2: Fiber laser amplifier





The diode laser amplifier is the only optical amplifier commercially available.

obtained by pumping the fiber. This action is frequenty implemented by illuminating the gain medium (the doped fiber) with a wavelength that is absorbed strongly by the dopant ions. Figure 2 shows a fiber laser amplifier pumped by a light from a laser diode coupled into the fiber laser. Suitable diode laser pumps at 665, 807 or 1,480 nm with power levels sufficient to provide gains of 20 dB and saturation output above 1 mW are expected to be commercially available very soon[1].

Bell Communications Research (Bellcore) in Red Bank, N.J., has tested an erbium fiber amplifier in a coherent network, simulating distribution of 16 155 Mbps channels to 256 end-users through 102 km of fiber. Researchers at the Nippon Telegraph and Telephone (NTT) Corp.'s Transmission Systems Laboratories in Kanagawa have tested erbium fiber lasers as "pre-and-post" amplifiers for communications systems. They put one amplifier at the transmitter (to boost its power) and the other at the receiver (to boost its sensitivity). Using that approach they report sending 1.8 Gbps through 212 km of fiber without conventional repeaters. In addition, in a recent laboratory network trial they transmitted a 1.8 Gbps signal over a 561 mile path by using 12 in-line Er-doped fiber amplifiers with a total gain of 200 dB. Thus, the average amplifier gain was 16.6 dB and the average amplifier spacing was 46.8 miles.

Figure 3: Distribution of 90 FM TV to 2,048 terminals using two-stage cascaded laser amplification

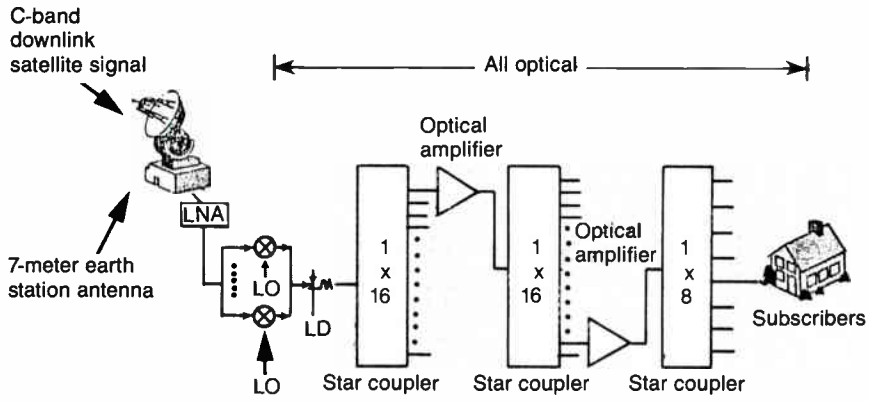
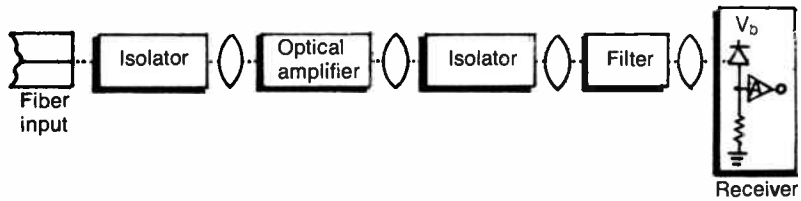


Figure 4: Optical preamplifier in front of a receiver to increase sensitivity



Diode laser amplifiers

The only optical amplifier available commercially is the previously mentioned diode laser amplifier. It resembles conventional semiconductor diode lasers but is usually longer (to increase gain length) and has *anti*reflection coatings on both ends to suppress oscillation. (See accompanying photo.) N. Anders Olsson of AT&T Bell Labs cites several advantages of semiconductor amplifiers, including large gain, low noise, independence of bit rate, large bandwidth and ability to amplify multiple channels. Typically maximum internal gain is about 30 dB from an amplifier about 500 μm long. Fiber-to-fiber gains are lower, from 10-15 dB, because of coupling losses. Antireflective coatings reduce facet reflectivities to about 0.05 percent. Gain can be increased by putting two amplifiers in series reducing the stringent requirements on antireflective coatings. The bandwidth of the BT&D laser amplifier is 40 nm and at 180 GHz/nm (at 1,300 nm) the channel bandwidth of the laser is 7,200 GHz.

Applications

Bellcore, in an experiment, using two semiconductor laser amplifiers of its own design, distributed 90 FM TV channels to 2,048 terminals[2]. (See Figure 3.) Between the 7 GHz laser and the first amplifier, there is a 1 x 16 split implemented by using several stages of optical couplers; between the first amplifier and the second amplifier, there is also a 1 x 16 split; between the second amplifier and the high-

(Continued on page 96)

Help is here

By Jack Trower
President, Society of Cable Television Engineers

We are starting a new year and at the same time a new decade. Welcome to the '90s. Will they be, as some have stated, the "decade of technology?" As an engineer I am enthused about all the technical possibilities that are ahead of us in the cable industry. The practical side of me, however, knows that none of these "new" concepts will mean a thing unless we have proven to our customers that we can and will provide good technical service. In this time of tight budgeting and with the need for improved bottom lines, the Society can play a major role in helping management achieve its desired goals.

For a starter, the chapter/meeting groups' one-day training seminars are most beneficial due to the number of people they can reach. I hear a lot of concern about these programs being a sales forum or a place where other companies will be able to steal my technicians. I have attended approximately 40 of these seminars since 1986 and have found, with very few exceptions, that they did not become a sales forum. Where the presentation could have been a little sales oriented, the person making the presentation was informed of the SCTE policy and no further violation occurred. As to the problem of someone else "stealing" technicians, I have never observed this.

Other seminars the Society is involved with include the technical seminars at many of the regional and state cable association shows and the very detailed "Technology for Technicians" series of seminars conducted by Ralph Haimowitz of the national staff.

Another area where the Society can help train technical people is through its Scholarship Program. With the cooperation of the National Cable Television Institute the Scholarship Committee is able to grant NCTI courses to technical personnel when application is made. We have also granted funds for work in degree programs.

A program that management can take very good advantage of is the BCT/E and Installation Certification Programs. These programs are both a training and evaluation tool. Properly trained personnel do a better job in less time—so the bottom line has to improve.

The Society is helping to improve technical performance through its Recommended Practices Program as well. At this time the Society has one very active committee working toward some recommended practices. This group is the Interface Recommended Practices Committee. I attended a meeting of this committee in Anaheim, Calif., at the Western Show and was very pleased to see the enthusiasm of this group.

One thing I noted was that there should be more operators or end-users at these meetings. This is a forum where everyone's ideas and suggestions are heard, so it would be very beneficial to all concerned to hear as many opinions as possible.

Another area in which we are considering forming a committee is maintenance recommended practices. Look for more in this area and be ready to submit your ideas for consideration. We welcome your input.

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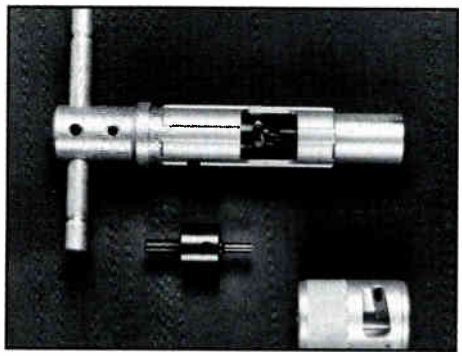
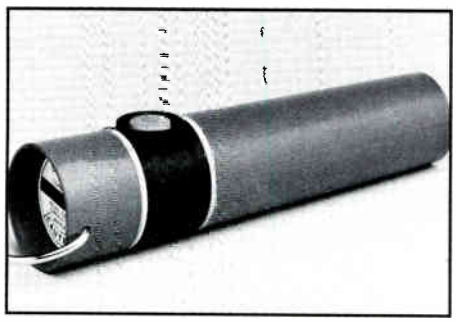


Tool kit

A tool kit for preparing Comm/Scope Quantum Reach (QR) trunk and distribution cables has been introduced by Ripley. The kits contain a CST-QR2 combination core and strip tool (with ratchet handle and drill adaptor) and a JST-QR jacket stripping tool. According to the company, the product was created to provide a kit that contains all the tools necessary for the removal of specified amounts of dielectric, aluminum sheath and polyethylene jackets from QR cables. Kits are available for sizes 500, 540, 860 and 1125.

For further information, contact Ripley Co., Cablematic Division, 46 Nooks Hill Rd., Cromwell, Conn. 06416, (203) 635-2200; or circle #137 on the reader service card.



Voltage detector

The Model V-150 hotliner voltage detector has been introduced by Fisher Research Laboratory for detecting AC voltages from 60 to 150,000 V. It detects electrical leakage to ungrounded housings on tools or appliances and inadequately grounded wires. The tool's steady beep changes to a steady tone when in the presence of the electrostatic field that surrounds all unshielded AC voltages. According to the company, current does not have to be flowing because merely a voltage potential will cause the tool to emit the steady warning tone.

Said to be as easy to use as pointing a flashlight, it is powered by an ordinary battery that provides over 200 hours of continuous operation. The tool is insulated to 1,000 V as a safeguard against accidental physical contact.

For additional details, contact Fisher Research Laboratory, 1005 I St., Los Banos, Calif. 93635, (209) 826-3292; or circle #113 on the reader service card.

Pole climbers

Klein Tools' new series of adjustable pole climbers with replaceable and interchangeable gaffs are said to eliminate the need for stocking different sizes for different jobs and people. It also eliminates the need to resharpen gaffs in the field. Replacement gaffs are available in 1½ and 1 9/16 inches for pole climbers and 2¾ inches for tree climbers.

The pole climbers feature contoured leg irons that bring the gaffs into proper position for security and comfort, broad stirrups for support and fatigue reduction, and leg-irons that can be adjusted from 15 to 19 inches or 17 to 21 inches in length in 1/4-inch increments. Also available is a model for smaller workers that adjusts from 14 to 17 inches in 1/4-inch increments.

For more information, contact Klein Tools, 7200 McCormick Blvd., Chicago, Ill. 60645-2791, (312) 677-9500; or circle #134 on the reader service card.

Amplifiers

Viewsonics introduced its 40-860 MHz apartment amplifiers for multiple dwelling units and long house drops. The amps are said to provide increased signal level without picture quality compromise. According to the company, the products provide a virtually flat 40-860 MHz response with 10 and 20 dB gain, low noise, cross-modulation, triple beat and second-order distortions.

For more information, contact Viewsonics, 170 Eileen Way, Syosset, N.Y. 11791, (516) 921-7080; or circle #138 on the reader service card.

Design kit

Catel introduced its fiber-optic design kit that provides information on the various ways that fiber optics and the company's equipment can be used in CATV. The 22-page booklet discusses problems solvable with fiber optics and answers basic questions on fiber (especially those related to tradeoff issues that vary with distance and performance). Also included is a glossary of common terms.

The kit also features the description, key elements, operation, basic design parameters and applications of FM and AM fiber systems and incoporate system design overviews. It includes planning guides for developing a general picture of the equipment needed for Catel's Trans-Hub I or III systems.

For more information, contact Catel Telecommunications, 4050 Technology Pl., Fremont, Calif. 94537-5122, (415) 659-8988; or circle #139 on the reader service card.

Fiber cutter

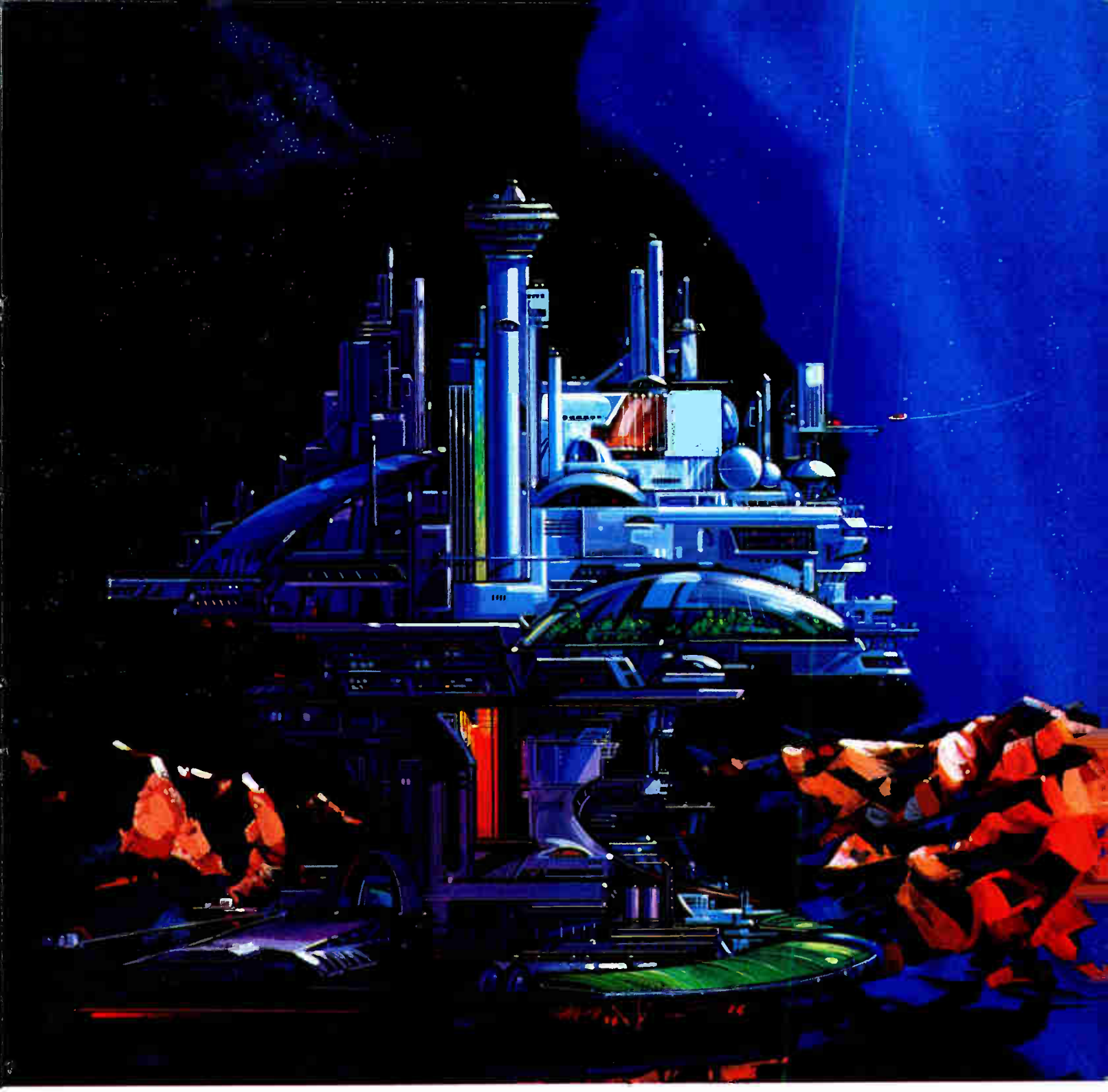
GMP has introduced its Craftwork fiber cutter for cutting through Kevlar and similar types of high-strength Aramid fibers in fiber-optic cable. According to the company, the blades stay sharp as much as 100 times longer than comparable metal blades. The finger grips are textured and the finger rests are notched for a slip-free, stable grip.

For further details, contact GMP, 3111 Old Lincoln Hwy., Trevose, Pa. 19047, (215) 357-5500; or circle #135 on the reader service card.

Adjustment modules

Lindsay announced its two midspan adjustment modules, the Models LMA 101 and LMA 102. A complete line of accessory compensators and equalizers are now available. According to the company, the modules allow the operator to upgrade to high power/high bandwidth amplifiers without respacing and up to two plug-in cards can be used to selectively attenuate peaks or change the slope of the cable spectrum.

The LMA 101 is for one-way systems and passes the entire bandwidth from 5 to 550 MHz through the plug-in locations. The LMA 102 is for two-way systems and contains diplex filters to route the subsplit



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frequencies around the plug-ins for those applications where padding and equalizing the forward signals without effecting the reverse path is desired.

For further information, contact Lindsay, 1248 Clairmont Rd. Suite 3D-231, Atlanta, Ga. 30030, (404) 633-2867; or circle #129 on the reader service card.

Network analyzer

Anritsu introduced its Model MS3606A scalar network analyzer for mobile communications and video equipment designed to simultaneously measure return loss with amplitude, return loss with delay time and return loss with phase. It makes measurements from 10 kHz to 1 GHz with resolution of 1 millihertz, dynamic range of 120 dB, an aging rate of 2×10^{-8}/day, output of −80 to +15 dBm in 0.01 dB steps and SSB phase noise of −95 dBc/Hz at a 10 kHz offset at 1 GHz.

According to the company, the high dynamic range of the unit allows it to measure the performance of crystal filters with narrow bandwidths, and SAW filters that have very high loss. Its 150 μs switching speed allows measurement speed of 400 μs/point and the delay range of the unit is adjustable in 21 steps from 100 ns to 400 ms with resolution of 0.01 percent. It also incorporates the company's Programmed Test Automation (PTA) function, which allows the instrument to function as an instrument controller when programmed with software that is resident on optical memory cards.

For more information, contact Anritsu, 15 Thornton Rd., Oakland, N.J. 07436, (201) 337-1111; or circle #132 on the reader service card.

Booklet

Ortel is offering the booklet "RF/Microwave Fiber Optic Link Design Guide," which discusses link performance characteristics, applications and advantages. The booklet provides technical descriptions of analog fiber optics with formulas, diagrams and application examples. It contains a glossary and an appendix that explains the characteristics of photodiode receivers.

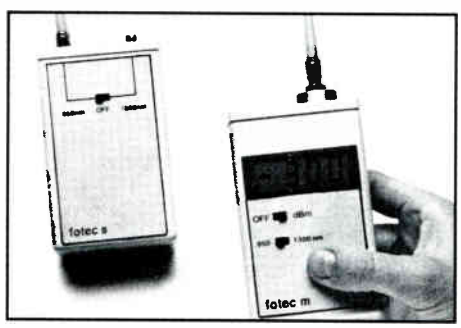
For further information, contact Ortel Corp., 2015 W. Chestnut St., Alhambra, Calif., 91803, (818) 281-3636; or circle #141 on the reader service card.

Channel generator

Leader Instruments announced its Model 408 gen-lockable NTSC video test signal generator, providing over 80 test patterns in composite, S-VHS, RGB, Y, R-Y and B-Y output formats with RF channel coverage of all broadcast and cable channels. Channel frequencies and video signal level specs are set up using a menu driven, multipurpose data control panel with liquid crystal readout. Also provided is the control of key video signal levels such as sync, burst, luminance, chrominance and setup, along with RF frequency.

According to the company, up to 100 sets of video level specs and channel frequencies can be stored in memory for instant recall; the unit also offers on-screen programming. Test patterns available include multiburst, video sweep, SMPTE color bars, modulated and unmodulated staircase, raster, convergence, crosshatch, etc.

For additional information, contact Leader Instruments, 380 Oser Ave., Hauppauge, N.Y. 11788, (516) 231-6900; or circle #116 on the reader service card.

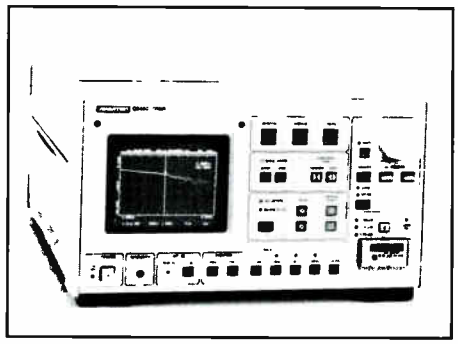


FO instruments

Fotec has introduced a new series of fiber instruments designed for those who want low cost fiber-optic instrumentation and are willing to trade off the versatility of more expensive instruments for lower costs. The instruments provide basic features.

The M712 FO minimeter plus the proper connector adapter is calibrated to read optical power in dBm at wavelengths of 850 and 1,300 nm over a range of +3 to −50 dBm with an accuracy of ±0.2 dB. Also available are versions to cover 1,300/1,550 nm, 790/850 and 665/850 nm. The companion S770 FO minisource offers dual LED outputs for multimode cable testing. LEDs at 850 and 1,300 nm cover both wavelengths used with multimode fiber and are terminated for either ST (a trademark of AT&T) or SMA-style connectors.

For more information, contact Fotec, 529 Main St., Box 246, Boston, Mass. 02129, (617) 241-7810; or circle #136 on the reader service card.



Optical TDR

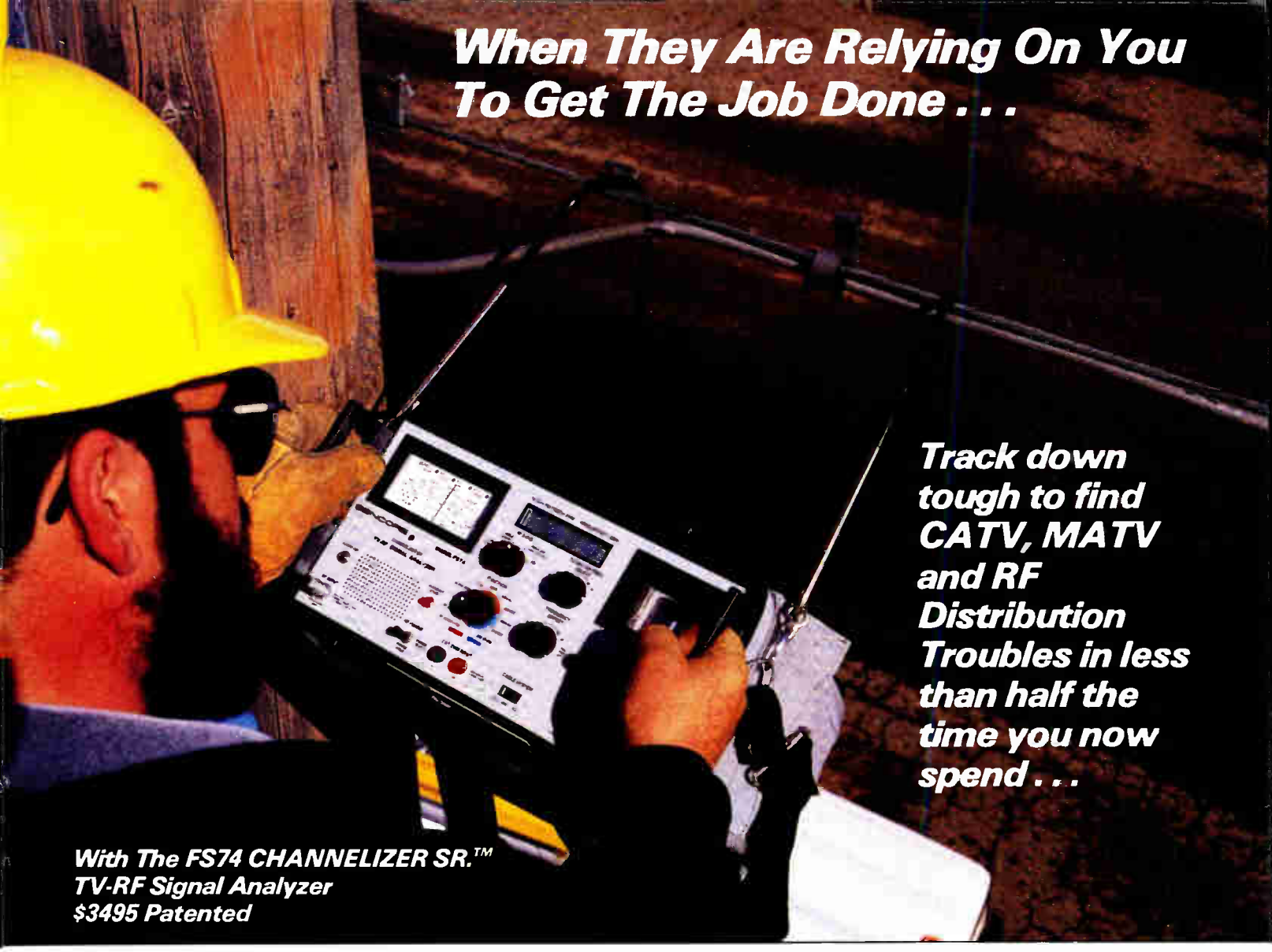
The Model Q8460 optical fiber reflectometer with distance ranges of 15, 50 and 100 km has been introduced by Advantest. It offers high-speed fault detection in optical LAN exchanges and subscriber locations as well as maritime and airborne mobile equipment. The reading resolution is 5 cm and the measuring accuracy is ±0.5 m. According to the company, the unit is said to simplify the detection of neighboring reflective faults because it has a reflection mode to minimize the dead zone.

Its 32-frame waveform memory is backed up by battery power, which is said to enable the retention of data taken on-site and makes the comparison of waveform changes easier. A built-in printer provides records of the measured data.

For additional information, contact Advantest America, 300 Knightsbridge Pkwy., Lincolnshire, Ill. 60069, (312) 634-2552; or circle #128 on the reader service card.

HDTV equipment

Tektronix introduced an optional zone plate test signal for multi-dimensional fre-



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quency response testing on the company's TSG-1000 Series HD television generators. The option is said to be fully programmable and is made specifically for application in HDTV frequency response testing in the horizontal, vertical and diagonal dimensions.

Another option for the TSG-1000 Series is the 2467 HDTV oscilloscope, which can use the generator's cross-hair triggering function for an individual pixel observation at a line, field or frame rate. Adding a pattern generator to the TSG-1000 can provide a multi-element test pattern for critical evaluation of HDTV pictures.

For more information, contact Tektronix, P.O. Box 500, Beaverton, Ore. 97077, (503) 923-4415; or circle #114 on the reader service card.

Correspondent's Report

(Continued from page 89)

speed PIN diode, there is a 1 × 8 split. The number of terminals that can receive the 90 channels is thus 2,048.

Like fiber amplifiers, semiconductor amplifiers can boost receiver sensitivity by use of an optical preamplifier in front of the photodetector to improve the detection sensitivity. (See Figure 4.)

In direct detection experiments, at 4 Gbps, Olsson said the best receiver sensitivities were −31 dBm for both avalanche photodiodes and coherent receivers—and −34 dBm for a detector preceded by an optical amplifier.

Conclusions

There has been considerable work and significant success developing optical amplifiers. Almost all of this activity has been conducted by telephone companies here and abroad. It must be noted that to date all work has been with digital or FM transmissions. However, it will be interesting to see what driving effect on network system design will be produced by the availability of small, low cost, reliable optical amplifiers—*particularly* on the subscriber portion of the network.

References

1 "Non-Coherent Photonic Frequency-Multiplexed Access Networks," I. Kaminow, *IEEE Network*, March 1989.

2 "Applications of Travelling-Wave Laser Amplifiers in Subcarrier Multiplexed Lightwave Systems," W. Way, et al., ICC'89.

Blonder's View

(Continued from page 17)

application and I would sign up immediately. And I did.

Upon arrival at Fort Monmouth I was informed that I had been assigned to the Electronics Training Group Number 6 and after a short indoctrination in (hush-hush) radar, I would leave for England on a liner (*Empress of India*) as a tourist to England. Then I would sign on with the British army as a radar officer to help in the Battle of Britain! Not only was research a fairy tale but I could be regarded as a spy by the Germans and a lawbreaker by Congress! Perhaps it was fortunate that Pearl Harbor came along and my position was legitimized as an ordinary soldier on a secret mission (radar). Churchill did get 1,000 radar officers. I spent 1942 as a Signal Corps Officer on detached duty with the Royal Marines Ack-Ack command, servicing six anti-aircraft radars in Cornwall, England.

The moral of my story is obvious—we need electronics engineers in the house and TV factories could supply them.

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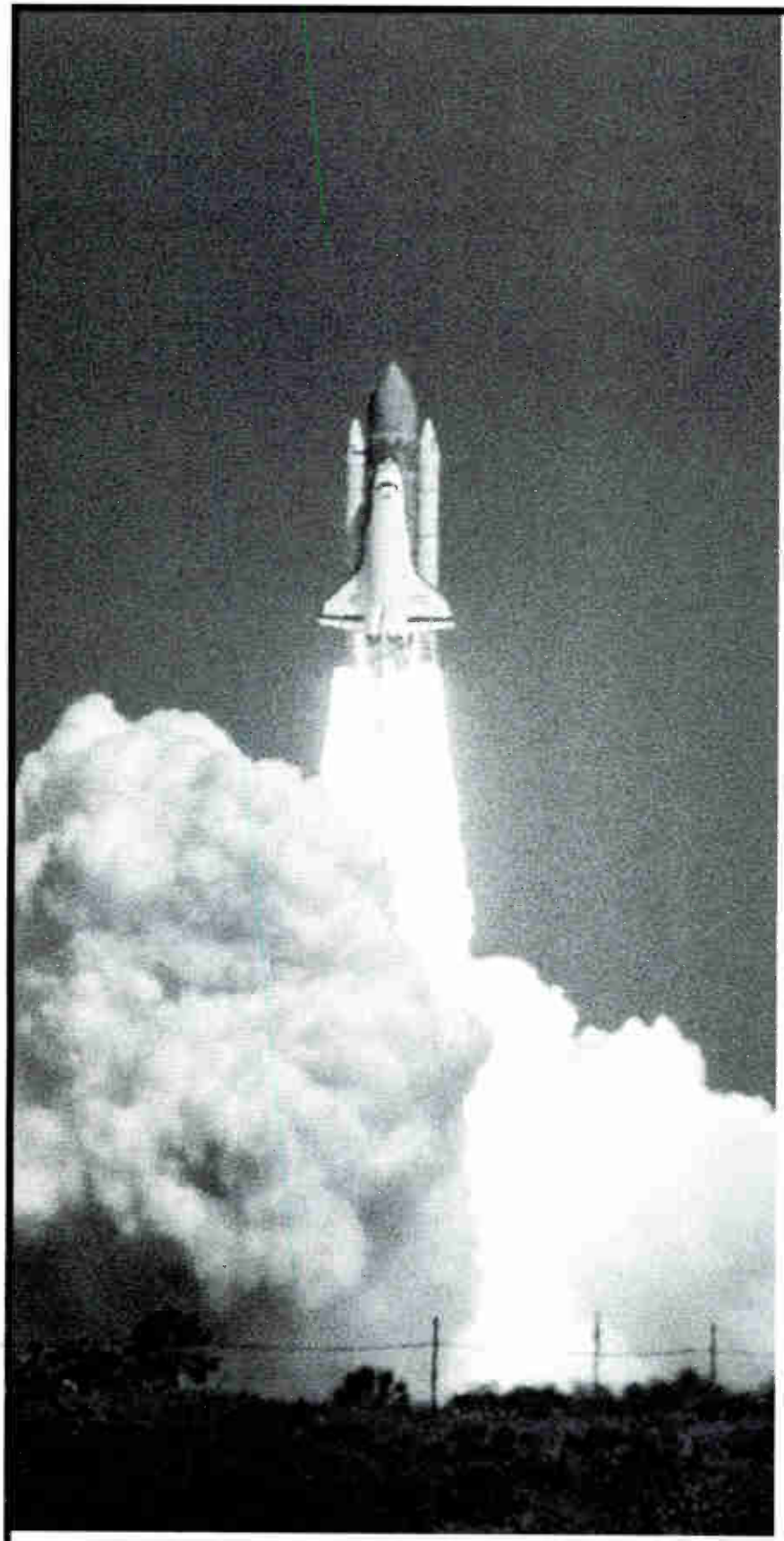

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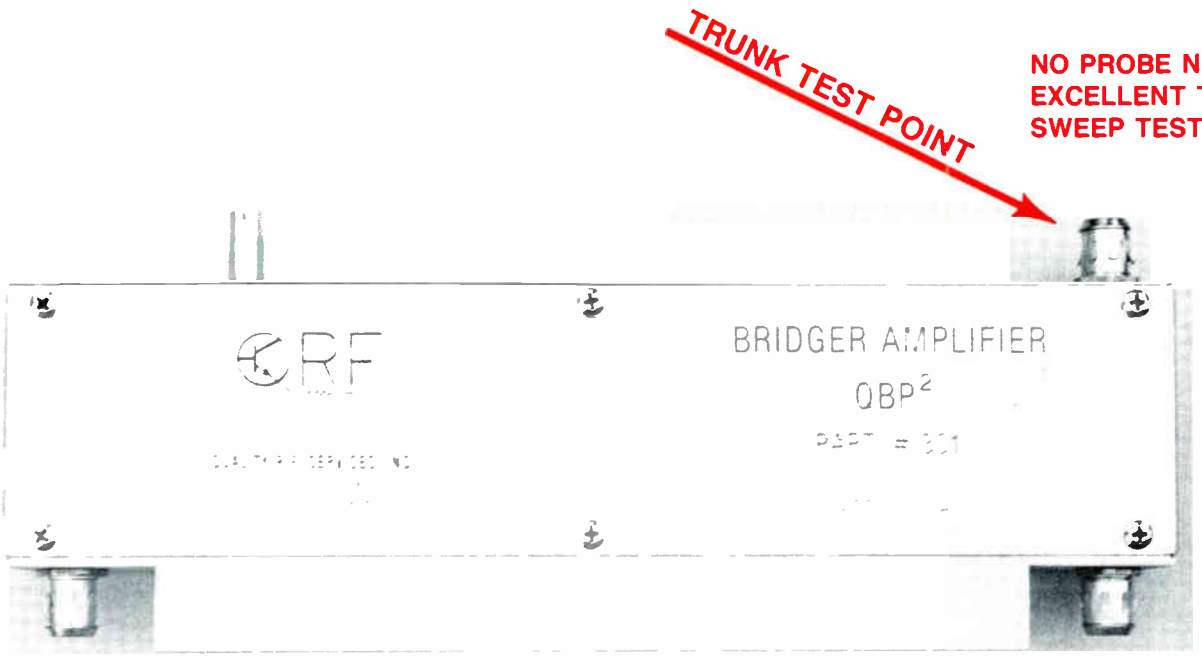

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Reader Service Number 43.

The winds of change

By Archer S. Taylor
Senior Vice President of Engineering
Malarkey-Taylor Associates Inc.

The winds of change are scattering furniture all over the landscape.

The Soviet empire crumbles even more precipitously under the rising tide of self-determination than did the British Empire years ago.

With the prospect of a United Europe to the east and the stunning economic prowess on the Pacific Rim to the west, is the once dominant United States to become as a drifting watermelon seed, beset by massive tidal waves, seemingly beyond its control?

Richmond, Va., the capital of the old Confederacy, once dedicated to preserving slavery as an institution, now enters the decade of the '90s by hosting the inauguration of the nation's first black governor, grandson of slaves.

Ma Bell sits quietly in her rocking chair as the siblings leave the nest to seek their independent fortunes in the field of entrepreneurial combat.

And now, we even have girls playing on the boys' varsity football teams! What next?

Perhaps even more astonishing is the emergence in Great Britain of cable TV companies actually providing local telephone service in direct competition with British Telecom. What is more, the Hong Kong government explicitly encourages applicants for cable TV licenses to compete directly with Hong Kong Telecom for presently unfranchised services. How far is this emerging competition likely to go?

Exclusive territory

It is not at all surprising that telephone companies in the United States would like to be in the cable TV business. Even in the 1950s, they complained that CATV was trespassing on their exclusive territory. In 1956, the Bell System signed a Consent Decree terminating protracted litigation arising, in part at least, over concern that the Bell System might manipulate, to the public detriment, the unregulated prices charged by its subsidiary, Western Electric, the sole supplier of Bell System hardware. The Consent Decree prevented the Bell companies from direct entry into the CATV business whose rates were not subject to utility tariff regulations. Non-Bell telephone companies, such as GTE, Contel, United and others, were not so restricted, and many did enter the business until forced to divest by subsequent FCC cross-ownership rules.

In 1982, the Consent Decree was replaced with the Modified Final Judgment (MFJ), which divested the Bell Companies from AT&T, Bell Labs and Western Electric, and authorized AT&T and the seven Regional Bell Operating Companies (RBOCs) to engage in certain competitive activities, subject to court approval.

The recent interest in cable TV, not only by the RBOCs but by the non-Bell companies as well, is no longer based on turf protection. The telephone industry has already installed millions of miles of optical fiber in its interexchange networks; now it wants to replace its copper pair subscriber lines with optical fiber. There is every reason to expect that technological developments and cost reductions in the next few years could bring optical fiber subscriber loops out of the pilot demonstration phase into actual replacement of existing copper pairs.

But the telephone companies think they may still have a problem. The bandwidth available on fiber, although not quite infinite, is surely enormous. Telecoms fear that it might be hard to justify to regulators (or even to shareholders) the high cost of installing optical fiber loops that would provide residential subscribers with capacity equivalent to hundreds of thousands of voice or conditioned data lines. Who needs it?

Besides, many telephone people look on cable TV as a license to steal, conveniently overlooking their own lucrative, risk-free operation based on cost plus a guaranteed profit. Nevertheless, they ask, why not use their own not inconsiderable legislative and regulatory clout to overturn the cross-ownership restrictions? Video could not only justify the cost of providing fiber to the home but could also give them a piece of the cable TV action.

Artificially restraining the telephone industry from adding video to its historic voice and data services seems a bit like King Canute trying to hold back the tides.

I wonder whether the telephone enthusiasts remember that the cross-ownership restriction in the 1984 Cable Act was actually a compromise. The *quid pro quo* was that in return for cross-ownership restriction, cable TV would be effectively precluded from the carriage of data. If the "*quid*" (cross-ownership) is repealed, shouldn't the "*quo*" then be restored by redefining cable service to include the carriage of data?

Throughout the 1970s, the Federal Communications Commission struggled mightily to resolve its strong concerns that cross-subsidization might occur between those services that enjoyed *de facto* monopoly status, and those that were subject to competition. In the end, however, FCC could not undo the Gordian Knot. Because of the intractability of this issue, a frustrated FCC—and later the courts and the Congress—decided to encourage more competition as a substitute for regulation.

Present indications are that if the cross-ownership restraints are relaxed, telco entry into cable TV is likely to be subject to various conditions designed to protect the public against cross-subsidization. The heart of the problem is allocation of capital and operating expense. Bandwidth would seem the most logical basis for allocating the cost of the outside plant; but that would be absurd, since only an infinitesimal share would be allocated to the plain old telephone service (POTS). The FCC has already discovered, like Alexander the Great, that the Gordian Knot can only be undone with a bold new approach, such as relying more on competition to control rates than on regulation.

Closer to being ready

What if the winds of change not only permit telephone companies to compete with cable TV systems but also allow cable systems to offer commercial unregulated competitive access to the interexchange carriers (IXCs) such as MCI, Sprint and AT&T? Are we ready for that? I think not; at least, not yet. But when Rogers Cablevision (in Toronto) and others adopt the ring topology for optical fiber supertrunks, they are getting closer to being ready.

Is it really inconceivable that both cable TV and POTS might be opened to competition? It is already being done in England. And the idea has been publicly encouraged in Hong Kong and elsewhere. The winds of change have already blown great holes in the Berlin Wall. Who knows what lies ahead?

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Reader Service Number 51.

Off-air Ch. 12

By Steven I. Biro
President, Biro Engineering

This is the 11th in a series of maps with technical and program parameter listings for off-air Channels 2-69, designed to be used when the cable system experiences co-channel interference. With this information, the headend technician can pinpoint the closest (i.e., the most probable) offenders, determine their directions and start the verification process with the rotor-mounted search antenna. Based on the tabulated technical information, the search can be concentrated on the most powerful stations or those that have the highest transmitting antenna towers.

The computer program for the maps was developed and data for the listings was collected by the staff of Biro Engineering, Princeton, N.J. The information is accurate as of Sept. 1, 1988.

Key to listing

Call letters: Ch. 12 station identification

City: Station location or the area served by the station

Network affiliation:

A/C	CBS and ABC programming
C/N	CBS and NBC programming
A/N	ABC and NBC programming
ACN	ABC, CBS and NBC programming
ED	Educational station (PBS)
IND	Independent station
CBC	Canadian Broadcasting Corp.
CTV	Canadian Television Network
RRQ	Reseau Radio Quebec
TVA	Canadian Independent Programming
SRC	Societe Radio-Canada
SP	Spanish language programming

Power: The effective visual radiated output power (in kilowatts)

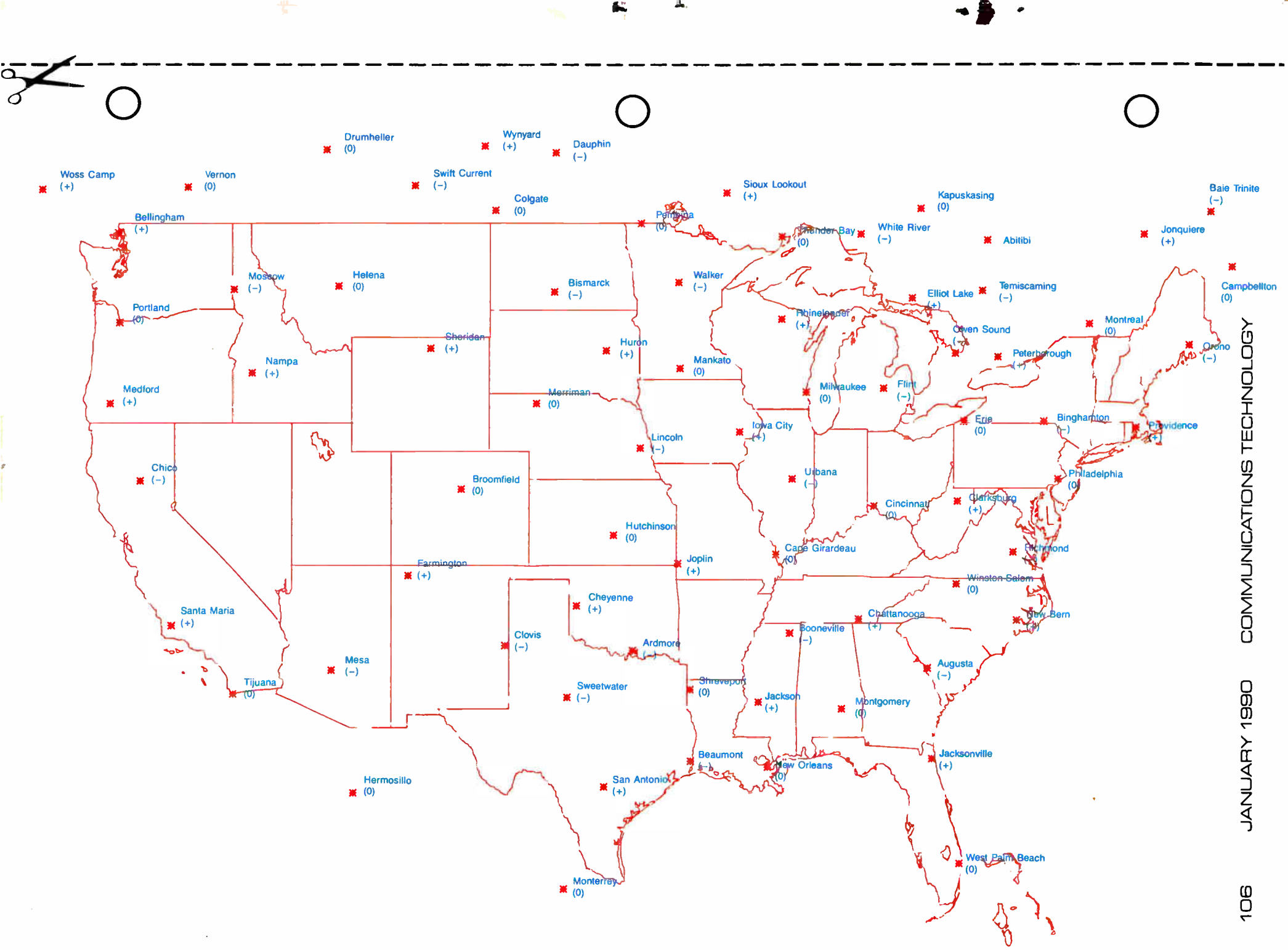
Offset: The offset frequency of the station

0	No offset
–	–10 kHz offset
+	+10 kHz offset

HAAT: Transmitting antenna height above average terrain (in feet)

Call letters	City	Network affiliation	Power	Offset	HAAT
WSFA	Montgomery, Ala.	NBC	316	0	2000
KPNX	Mesa, Ariz.	IND	316	–	1900
KHSL	Chico, Calif.	CBS	316	–	1290
KCOY	Santa Maria, Calif.	CBS	115	+	1941
KBDI	Broomfield, Colo.	ED	229	0	2420
WTLV	Jacksonville, Fla.	NBC	316	+	970
WPEC	West Palm Beach, Fla.	ABC	316	0	980
WRDW	Augusta, Ga.	CBS	316	–	1632
KMAU	Wailuku, Hawaii	ABC	37	0	5800
KUID	Moscow, Ill.	ED	115	–	1307
KTRV	Nampa, Ill.	IND	178	+	2736
WILL	Urbana, Ill.	ED	316	–	987
KIIN	Iowa City, Iowa	ED	316	+	1440
KWCH	Hutchinson, Kan.	CBS	316	0	1522
WYES	New Orleans	ED	316	0	1010

Call letters	City	Network affiliation	Power	Offset	HAAT
KSLA	Shreveport, La.	CBS	316	0	1800
WMEB	Orono, Maine	ED	316	–	990
WJRT	Flint, Mich.	ABC	316	–	940
KEYC	Mankato, Minn.	CBS	316	0	1040
KCCW	Walker, Minn.	CBS	316	–	933
WMAE	Booneville, Miss.	ED	100	–	750
WJTV	Jackson, Miss.	CBS	316	+	1630
KFVS	Cape Girardeau, Mo.	CBS	316	0	2000
KODE	Joplin, Mo.	ABC	316	+	1020
KTVH	Helena, Mont.	NBC	117	0	2250
KUON	Lincoln, Neb.	ED	316	–	825
KRNE	Merriman, Neb.	ED	316	0	1066
KVIH	Clovis, N.M.	ABC	178	–	670
KOBF	Farmington, N.M.	NBC	316	+	410
WBNG	Binghamton, N.Y.	CBS	166	–	1205
WCTI	New Bern, N.C.	ABC	316	+	1942
WXII	Winston-Salem, N.C.	NBC	316	0	1980
KXMB	Bismarck, N.D.	CBS	316	–	1580
KNRR	Pembina, N.D.	IND	316	0	1290
WKRC	Cincinnati	ABC	316	0	1000
KXII	Ardmore, Okla.	C/N	222	–	1777
KWET	Cheyenne, Okla.	ED	316	+	980
KDRV	Medford, Ore.	ABC	191	+	2701
KPTV	Portland, Ore.	IND	316	0	1780
WICU	Erie, Pa.	NBC	316	0	1000
WHYY	Philadelphia	ED	309	0	960
WPRI	Providence, R.I.	ABC	316	+	1000
KIID	Huron, S.D.	IND	316	+	160
WDEF	Chattanooga, Tenn.	CBS	316	+	1260
KBMT	Beaumont, Texas	ABC	316	–	1000
KSAT	San Antonio, Texas	ABC	316	+	1483
KTXS	Sweetwater, Texas	ABC	316	–	1400
WWBT	Richmond, Va.	NBC	316	–	790
KVOS	Bellingham, Wash.	CBS	234	+	2370
WBOY	Clarksburg, W. Va.	NBC	265	+	860
WISN	Milwaukee	ABC	316	0	1000
WJFW	Rhinelander, Wis.	NBC	316	+	1662
KSGW	Sheridan, Wyo.	ABC	316	+	1220
CFCN	Drumheller, Alberta	CTV	80	0	1080
CIFG	Prince George, British Columbia	CTV	2	0	1556
CHKL	Vernon, British Columbia	CBC	1	0	585
CBUT	Woss Camp, British Columbia	CBC	1	+	13000
CKYD	Dauphin, Manitoba	CTV	140	–	1165
CKAM	Campbellton, Maritime Provinces	CBC	130	0	1400
CBHT	Liverpool, Maritime Provinces	CBC	2	0	647
CBIT	Mulgrave, Maritime Provinces	CBC	13		611
CKAM	Upsalquitch, Maritime Provinces	CTV	230	0	1400
CBNT	Placentia, Newfoundland	CBC	12		633
CBLF	Elliot Lake, Ontario	CBC	37	+	532
CBFO	Kapuskasing, Ontario	CBC	17	0	438
CICA	Owen Sound, Ontario	ED	125	–	440
CHEX	Peterborough, Ontario	CBC	325	+	771
CBWD	Sioux Lookout, Ontario		72	+	664
CBLF	Thunder Bay, Ontario	CBC	23	0	780
CBLA	White River, Ontario	CBC	1	–	445
CIVA	Abitibi, Quebec	RRQ	246		670
CIVF	Baie Trinite, Quebec	RRQ	155	–	486
CKRS	Jonquiere, Quebec	CBC	325	+	1900
CFCF	Montreal	CTV	325	0	970
CBFS	Temiscaming, Quebec	CBC	14	–	860
CKCK	Colgate, Saskatchewan	CTV	28	0	532
CKMC	Swift Current, Saskatchewan	CTV	25	–	549
CICC	Wynyard, Saskatchewan	CTV	140	+	560
XHAK	Hermosillo, Mexico	SP	8	0	85
XHAW	Monterrey, Mexico	SP	100	0	25
XEWT	Tijuana, Mexico	SP	32	0	400
WOLE	Aguadilla, Puerto Rico	SP	316	+	1250
WTJX	Charlotte, Puerto Rico	ED	29	0	1476


Drumheller (0)
Wynyard (+)
Dauphin (–)
Woss Camp (+)
Vernon (0)
Swift Current (–)
Colgate (0)
Sioux Lookout (+)
Kapuskasing (0)
Baie Trinite (–)
Bellingham (+)
Pembina (0)
Thunder Bay (0)
White River (–)
Abitibi
Jonquiere (+)
Campbellton (0)
Moscow (–)
Helena (0)
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Walker (–)
Elliot Lake (+)
Temiscaming (–)
Portland (0)
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