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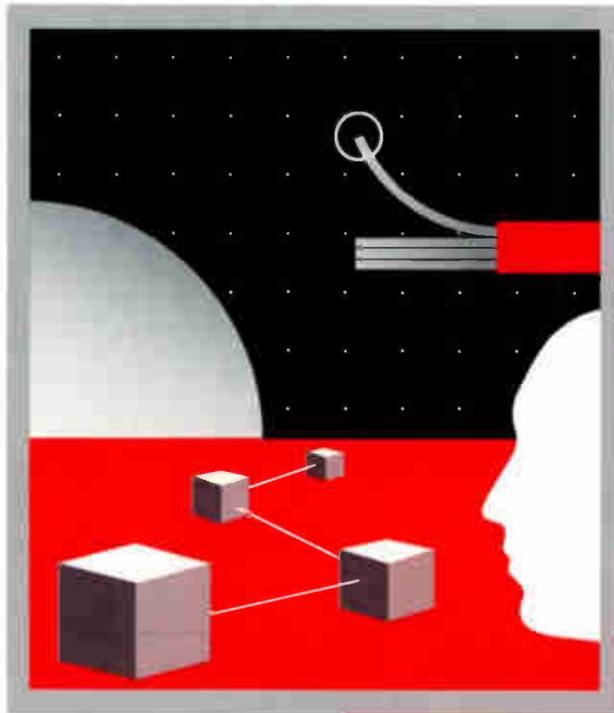
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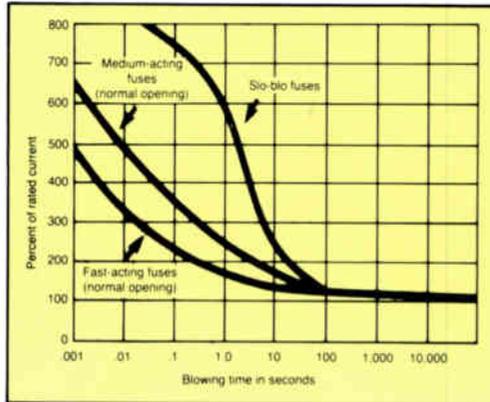
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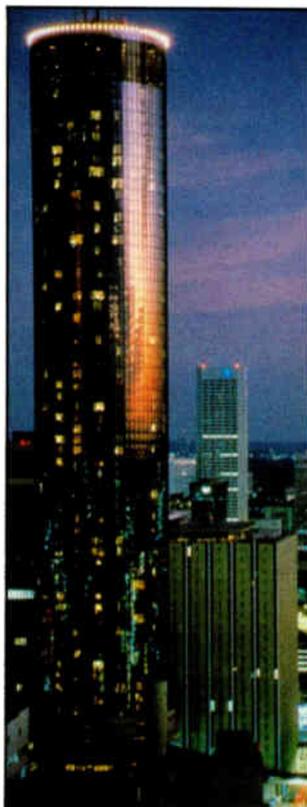
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Photographs courtesy of Magnavox CATV. Mobile Training Center taken by Mark Perstein.

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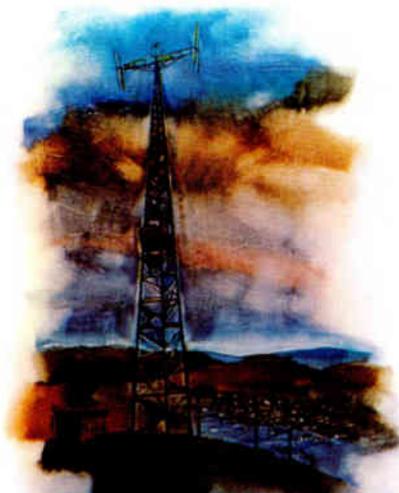
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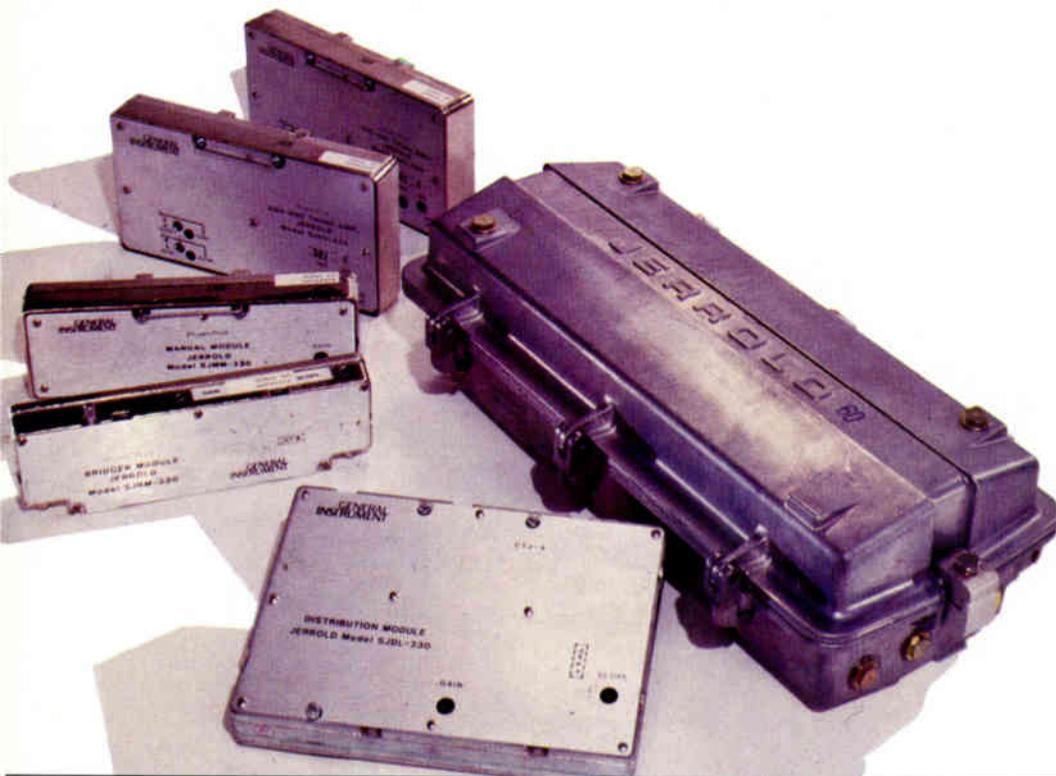
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EDITOR'S LETTER

A learning experience

Doesn't it always seem like everyone is hopping on the bandwagon, clamoring for more training programs for all employees in all sectors of our industry? This may or may not be true, but whenever we have the opportunity to bring up the "old topic" of training technical and engineering employees, we should. This is one subject that cannot be overemphasized.

In essence, there are two methods of learning: trial-and-error and structured. Those systems relying on the first approach, especially when working with new equipment, are expecting their technical personnel to learn from their mistakes. This tends to wreak havoc on the system, resulting in unnecessary expense, malfunctions, etc.

The structured approach, becoming more and more visible as MSOs either send their employees to a training facility or launch their own in-house program, has many advantages. Usually the employees are able to work hands-on with the latest technology without having to worry about how many subscribers phone the office if a circuit accidentally gets disconnected. Also, employees get an overview of the entire system operation, not just their own job function.

This issue of *CT* brings together highlights of several excellent programs. Magnavox's Mobile Training Center, covered by Tim Voorheis, has received kudos for acquainting its students not only with information on Magnavox equipment, but for the industry as well. This training facility on wheels has been around nearly five years and has grown with new technology.

A good training program spends time in the classroom on basic cable theory as well as practical application. ATC's National Training Center, like Magnavox's, recognizes this. The ATC in-residence course covers 30 hours of lecture and 50 hours of hands-on laboratory.

These two programs are to be congratulated for their cooperation with other MSOs. As the Magnavox trailer stops in each city (the schedule for the remainder of the year is given on Page 30), employees from various systems can take the three-day program. ATC's facility in Denver hosts groups from their competition who are then sent back to train their own employees. As Ralph Haimowitz of American Cablesystems writes in the sidebar to Alan Babcock's article, "The (ATC) training center has an excellent train-the-trainer course that prepares qualified individuals to become skilled trainers. . . ."

Usually these programs require additional home-study course work, such as

from the Cleveland Institute of Electronics, or other electronics schooling. According to Babcock, this assures that "the student is committed to training (and) has the basic knowledge necessary to sufficiently comprehend the classroom material."

Commitment is important for self-improvement. Being sent to a facility for extra training isn't a junket or a picnic, but a chance to grow, not only in knowledge and experience, but in salary and position as well. This brings me to the Broadband Cable Technician/Engineer or BCT/E Certification Program.

Coordinated by the Society of Cable Television Engineers (SCTE), the certification program allows technicians and engineers to raise their professional status and competency level. This is not a license in the sense of the previous FCC licensing procedures; the certificate gained is a recognition by one's peers of excellence in a particular category.

The seven BCT/E certification categories are signal processing centers; video and audio signals and systems; transportation systems; distribution systems; data networking and architecture; terminal devices; and management, professionalism and ethics. Since SCTE chapters and meeting groups hold regular seminars in preparation of each exam and administer the exam, contact the person named for your region in this month's *Interval* for more information. (The curricula for Categories II and IV have appeared in the March *Interval*.)

No one is immune from the learning experience. Even middle and upper levels of technicians and engineers need to improve themselves by attending local or regional meetings and seminars or during the various shows around the country. Office personnel, managers, installers, salespeople — everyone in the industry — have this responsibility.

An opportunity to learn, which is what classroom training, seminars and the BCT/E Certification Program offer, is a chance to advance, both personally and professionally. It also is a chance to become a more valuable asset to your company. So when opportunity knocks, answer the door, damn it!

Toni J. Baird

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Eastern Show: Packaged for results

ATLANTA—According to the Southern Cable Television Association (SCTA) Associates Director and Show Chairman Tony Ramsey, indications point to a strong Eastern Show July 24 and 25 at the Atlanta Market Center. "We are very encouraged by the way the industry is responding to many of the show's new features," he said. He also noted that almost 15 percent of the exhibitors will be new to the show.

Based on a "menu pricing" approach, the seminars will offer 36 hours of instruction during 26 sessions in six tracks. For technical sessions, see accompanying list.

The show agenda is as follows:

Wednesday, July 23

1-5 p.m.—Pre-convention activities including annual golf tournament. Pre-registrants may pick up badges at the Market Center.

3 p.m.—"TVRO and the Independent Operator," sponsored by the Independent Operators Board of National Cable Television Association (NCTA), Westin Peachtree Plaza Hotel.

4 p.m.—Tennessee Cable Television Association general membership meeting, Westin.

5 p.m.—Georgia Cable Television Association general membership meeting, Westin.

7 p.m.—Celebrity cocktail reception, Westin.

Thursday, July 24

7:30 a.m.—Registration, Atlanta Market Center.

8:45 a.m.-noon—Concurrent management/technical sessions, Market Center.

Noon—Tower Club luncheon (members

Technical sessions

Thursday, July 24

8:45-9:45 a.m.—Consumer Products. Glyndell Moore, vice president, engineering, Storer Cable Communications.

9:45-11 a.m.—Two-degree Spacing of Satellites. Steve Havey, marketing manager, Video Products, Scientific-Atlanta.

11 a.m.-noon—System Performance. Ricky Luke, vice president, engineering, Storer Cable Communications.

Friday, July 25

8:45-9:45 a.m.—Signal leakage. Speaker to be announced.

9:45-11 a.m.—Stereo TV. Alex Best, vice president, technical operations, Cox Cable.

11 a.m.-noon—FCC update. Speaker to be announced.

only), Westin Peachtree Plaza Hotel.

1-6 p.m.—Exclusive exhibit hours, Exhibit Hall, Market Center.

2:30 p.m.—State Association Executive Directors' "Idea Exchange," sponsored by the Alabama Cable Television Association, Market Center.

7 p.m.—Annual SCTA cocktail reception, Westin.

Friday, July 25

7:30 a.m.—Registration, Market Center.

8:45 a.m.-noon—Concurrent management/technical sessions, Market Center.

1-5 p.m.—Exclusive exhibit hours, Exhibit Hall, Market Center.

Evening—"Cable TV Night with the Braves," hosted by Turner Broadcasting.

high-tech product manufacture and support.

"Although we have heavily automated our subscriber product manufacturing facilities in Taiwan in the past several years, many of the components crucial to these products are still purchased from Japanese suppliers," said Hal Krisbergh, vice president of Jerrold's Subscriber Systems Division. "The value of the yen has increased over 50 percent, impacting heavily on our costs for manufacturing converters and other subscriber equipment.

"In addition," Krisbergh continued, "over the last several years the marketplace has seen a continuing price erosion in converter products, while performance capabilities and marketing support for them have significantly increased."

- Pirelli Cable Corp. has completed a 565 MBPS fiber-optic cable system for Litel Telecommunications Corp. This link stretches from Springfield to Columbus, Ohio. Plans are under way to utilize the same capacity link in other portions of the Litel network, which will span 1,600 miles when completed.

- Falcone International Inc. has signed a letter of intent to acquire Warrington Labs Inc. of Austin, Texas, according to Walter Elliott, Falcone chairman. Both companies are privately held, and the acquisition involves an exchange of Falcone shares for controlling interest in Warrington.

- Ben Hughes Communication Products Co., which recently relocated to expanded facilities (see *CT*, 5/86, p. 16), has changed its phone number to (203) 526-4337.

- Wavetek Indiana Inc. has announced the appointment of Cable TV Services of Garland, Texas, as one of its regional authorized service centers. The Texas-based company has been fully authorized to support CATV and broadband test equipment manufactured by Wavetek. Services are to include warranty repair and calibration by factory-trained technicians and local spare parts support.

- Avantek Inc. has announced the signing of a license agreement with Spectrum Digital Corp., Herndon, Va., for exclusive rights to manufacture and sell the Spectrum microwave communications system in the United States and Canada. Avantek also has been granted non-exclusive rights in most foreign countries. Spectrum retains the right to manufacture and sell the 18 GHz microwave system under the Spectrum name worldwide and market the product through Spectrum's normal distribution channels, which include OEMs and distributors.

Cable firm chosen for delegation

AURORA, Neb.—Riser-Bond Instruments was selected as one of only 22 companies nationwide to participate in Matchmaker Benelux 86, held June 8-13. This Department of Commerce trade delegation was organized in cooperation with the U.S. Small Business Administration. The participating companies were selected based on the export potential of their products or services. The trade delegation traveled to Luxembourg, Belgium and Holland, and promoted U.S. high-tech goods and services.

Riser-Bond demonstrated its latest test instrument, the Model 2901B digital time domain reflectometer, cable fault locator. The company had been chosen last year as one of only 50 companies who partici-

pated in the 1985 conference in London, and was the only company to have been selected two consecutive years.

Price increases on cable equipment

HATBORO, Pa.—Prices on cable TV equipment manufactured by the Jerrold and TOCOM Divisions of General Instrument Corp. have been increased, effective June 1. Many are in the 10 to 15 percent range, according to a company announcement. The raises reflect the growth in the strength of the Japanese yen versus the U.S. dollar, as well as increases in other costs associated with

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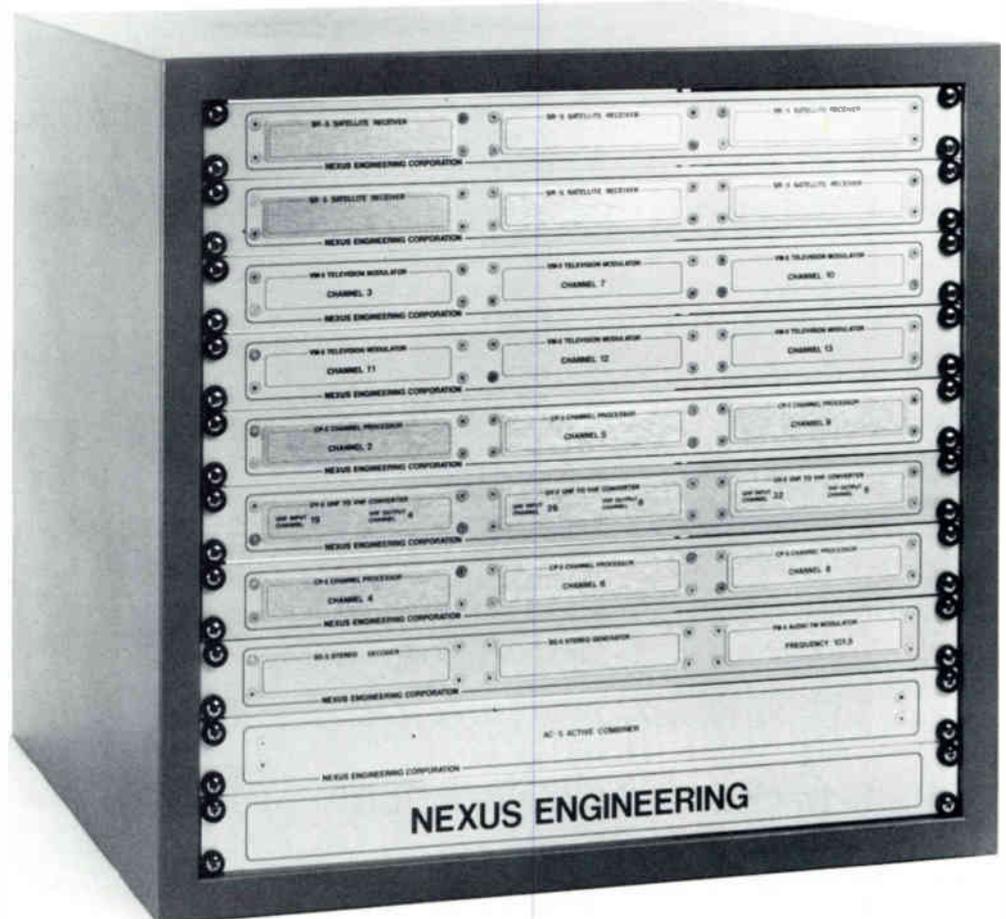
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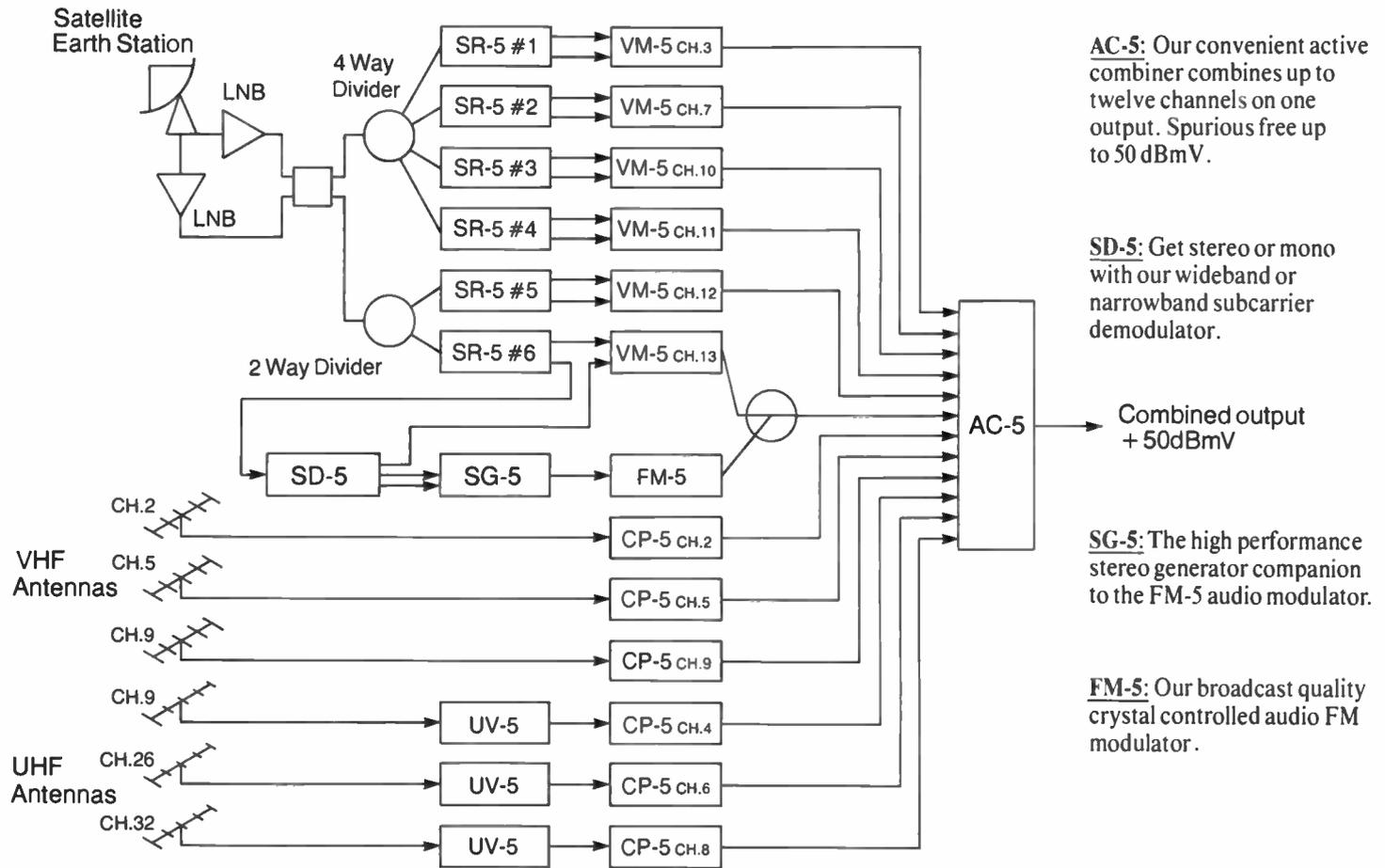
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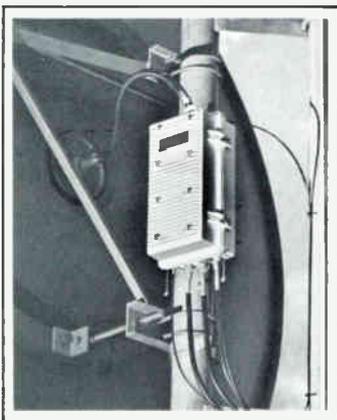
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falling into two basic types, referred to in the industry as 'normal-blo' and 'slo-blo' fuses, the principle of operation being fundamentally identical for both types. When a current larger than normal is applied to a fuse it begins to heat up and if this current is sustained, after a period of time the fusible element reaches melting temperature and the fuse blows. The time taken for the fuse to blow is proportional to the square of the current and the thermal inertia of the fuse design and its environments. Normal-blo fuses embody many variations of design of fusible elements which, depending upon their mass and

basic material, divide the fuse into a further classification, namely fast acting and medium acting. These fuses normally employ medium to high melting temperature fusible elements made as small as possible to reduce the thermal inertia and speed up the blow time."¹

Slo-blo fuses are usually designed with compound fuse elements, embodying a heat sink and low melting point alloy to increase the thermal inertia of the fuse and slow down the blow time. The "time to blow" characteristics of typical normal-blo and slo-blo fuses are shown in Figure 1.

Final guidelines

When implementing fuses one should remember the following points:

- **Current rating** — The ampere rating stamped on the fuse should exceed the normal operating current in the circuit by a minimum of 25 percent for operation in an ambient of 25°C.

- **Voltage rating** — For general circuit protection, the rating on the fuse should be equal to, or greater than, the circuit voltage. For secondary circuit protection where the short circuit is known to be not more than 50 amperes and 10 times the normal load current, fuses rated at 32, 125 and 250 volts may be used at much higher levels.

- **Fusing characteristics** — The fusing characteristics, or opening time versus current, must be within the safe time/temperature characteristic of the cable, amplifier, equipment or instrument being protected.

Use a normal-blo fuse for resistive loads or other loads when no transients or surges are encountered. Where protection against short-circuit hazard only is required, for maximum economy, a normal-blo fuse rather than a slo-blo fuse can be used. Select the highest amperage rating possible to prevent normal switching surges, transient spikes, etc., from causing premature fuse failure. Use a slo-blo fuse where protection against a sustained overload current greater than 50 percent of normal load is required and high inrush or starting loads are present.

Allow for environmental influence on the fuse. The higher the ambient temperature, the hotter the fuse will operate, and the shorter its life. Conversely, operating at low temperatures will prolong fuse life. Fuses with low melting temperature elements are more readily affected by changes in ambient temperature than fuses with high melting temperature influence on current carrying capacity.

For circuits involving vibration, high mechanical shock and acceleration, supported filament lightweight non-tensioned constructions as found in the subminiature fuse designs and certain types of slo-blo fuses give the best performance.¹

Finally, thermal current breakers can be used to replace nuisance fuse outages, especially for trunk power inserters. Although special engineering selection may be required, proper use of thermal breakers may be the answer to many unnecessary system outages. One system in Texas using RCA equipment reduced system outages and corresponding trouble calls by 85 percent by installing 10 ampere breakers, MOVs, A71-A150s and transzorb.

Reference

¹ Littlefuse catalog 19, *Circuit Protection Devices*, form No. GC-177A, pp. 46-51.

PRODUCT

CWY
electronics

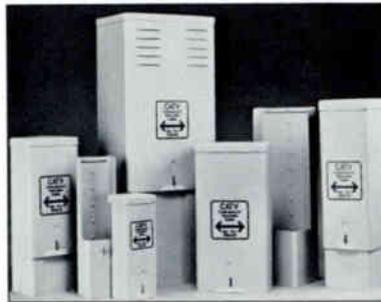
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CWY constructs cable TV pedestals from T2 aluminized steel. Which is why CWY pedestals have outstanding resistance to rust. Heavy 16 and 18-gauge steel with a hot-dip coating of aluminum gives CWY stainless steel riveted pedestals the maintenance-free surface quality of aluminum, with the superior strength of steel. In tests, T2 aluminized steel outlasts unpainted galvanized steel at least five-to-one.

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Other features: multiple knockouts for ease of mounting, interior lid guides and an innovative stake lock that keeps the pedestal where you plant it. All for a competitive price.



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	Exterior Dimensions			Lid Dimensions						
	Width	Height	Depth	Width	Height	Depth				
PED-45	5"	17 ³ / ₄ "	4 ¹ / ₂ "	5"	12 ¹³ / ₁₆ "	3 ³ / ₈ "	5	2 ¹ / ₈ "	18	\$11.20
PED-58	8"	19 ³ / ₄ "	5 ¹ / ₈ "	7 ¹³ / ₁₆ "	13"	3 ³ / ₈ "	5	2 ¹ / ₈ "	18	\$14.96
PED-69	9 ⁷ / ₁₆ "	23 ³ / ₄ "	6 ¹ / ₄ "	9 ⁹ / ₁₆ "	19"	4 ⁹ / ₁₆ "	8	2 ¹ / ₈ "	16	\$17.40
PED-77	7 ¹ / ₁₆ "	23 ³ / ₄ "	7 ¹ / ₈ "	6 ¹³ / ₁₆ "	19"	4 ⁷ / ₁₆ "	8	2 ¹ / ₈ "	16	\$16.84
PED-1014	14"	35 ³ / ₄ "	9 ¹ / ₂ "	13 ⁷ / ₈ "	23"	9 ³ / ₈ "	33	2 ¹ / ₈ "	16	\$37.36

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Reader Service Number 13.

Why we need more training

By Hugh Bramble

President, Bramble Scientific

Everyone in the cable industry is becoming aware that the boom days are over. We must find more efficient ways of conducting our business. Others fail at an alarming rate. Eighty percent of new small businesses will declare Chapter 11 in less than one year, and less than 10 percent will last 5 years.

Yet no cable TV operators seem to be going out of business. Either the industry has somehow selected only those people who are successful, or the job has been so easy that anyone can make it. Safeway, Sears and most businesses operate with no more than 10 percent cash flow, but we become concerned if ours drops below 40 percent. This indicates that the "so-easy-anyone-can-do-it" suggestion probably is right. Will this condition last?

Just look at the number of videotape and home TVRO stores, and it becomes obvious that there are real alternative entertainment methods today that did not exist five years ago. To retain our share of this business, we almost surely will have to become more price-competitive. If we are to maintain our healthy cash flows, we had better have lower operating costs and happier customers.

One of the easiest methods for achieving this goal is by properly training our employees. Good training is not easy, but we have overlooked the problem for so long and done so little that much progress can be made with minimum effort.

Theft-of-employees?

Are there any negative effects caused by training? Some people used to say that as soon as employees were trained, someone would "steal" them by offering more money. This seemed to be true especially when the industry was expanding rapidly, and therefore had a critical shortage of trained personnel. One must realize that this practice is a very expensive way of obtaining trained people. The new employer paid for the training with higher wages, and probably the other employer hired someone who was trained by another company to replace the person he lost, again paying for the previous training with higher wages.

Often, the newly trained employee would not have changed jobs if his employer had been willing to pay the wages offered to the replacement. Both companies paid even more for this situation, because even the best trained people re-

quire some time to become fully productive in a new company and position. In addition to this lost time, there are moving expenses to be reimbursed and more paperwork to be shuffled.

Everyone, including the employee, loses when this situation is allowed to occur. The bottom line is: Adequately trained people are worth more to a company, so the company must realize their only choice is whether to pay the previous employee or the replacement more money. One cannot reduce operating costs simply by paying the lower wages required by lesser-trained people.

An inadequately trained person will make more mistakes. If this occurs in the business office, the result could range from a slower installation rate to incorrect billing. If it occurs in the outside plant, it may mean a longer than necessary outage or poor picture quality. It almost always results in an unhappy customer. When we were the only game in town, the offended customer could only gripe or pay late to satisfy himself, but now he can disconnect and find virtually all his entertainment somewhere else. We became successful because we provided a service.

In many cases in the early days, rooftop antennas and rotors could duplicate the cable channels, but luckily the people selling, installing and repairing these devices rarely duplicated our service. They were slower to respond and charged more. When we went to fix our equipment, there was no additional charge, so we won the battle. We can only hope that the same people who used to sell rooftop antennas now sell TVROs and VCRs.

Type of instruction

If the decision to improve the level of training has been made, the next step is to decide exactly what type of instruction should be given to each category of employee. The front office must know how to answer the phone, operate the computer system and/or the card files, and deal with irate customers. The installation staff must know enough about the billing procedures and rates to explain them to customers, as well as how to make an installation that meets the company guidelines. They also will need to know how to deal with irate customers. The technicians must know how to troubleshoot the system, correct deficiencies in its operation and (again) deal with irate customers. The supervisors in each department must

'The most common training problem is failure to establish a method of evaluating what areas require . . . additional emphasis'

know all the above, as well as how to train the people working for them.

This list is hardly exhaustive, but it still sounds like an almost impossible job to ensure that it is done along with all the other things that go on. Each company or system has to take the time to complete and customize a list to suit its own circumstances. As with any job, when it is done right, it only has to be done once, but if done poorly, it will consume time every day.

Take heart — there is some help available. The computer billing services all have good training available for their system at the time of installation of the equipment. Most of the software is user-friendly so that unless the entire staff quits at once, the existing people can train any new people as they are hired. If necessary, for an extra charge, the billing company will return and completely retrain from scratch.

Unfortunately, the initial and continuing training on phone answering, customer relations and the other items will be a local responsibility. This usually will be a joint project between the manager and the department heads. For instance, whoever answers the phone must use a screening procedure described by the installation department to ensure that proper equipment and paperwork is given to the installer to complete the desired action in one trip. Screening trouble-call requests is even more important because often the customer can be guided to solve his own problem.

A procedure from the technical department to see that a technician and truck are sent only if really needed and that the proper equipment is taken when they are sent pays triple dividends. First, at least some of the incoming calls are resolved immediately and at very low cost. Next, double runs to get a Brand "Y" converter instead of the Brand "Z," which was already on the truck, are eliminated. Trucks driving to locations that do not really need

service are not available to go to the locations that do. Last, and probably most important, in all cases the customer is treated to professional and prompt service.

Another area often overlooked is the cooperation required between the front office and the technical staff during a major outage. Several things must happen simultaneously. The people answering the phones need to be able to inform the caller whether or not they are involved in the outage and that if they are, technicians are already dispatched to correct the problem, and visiting their house will probably not be necessary.

As soon as an estimate of the time necessary to correct the problem is known, supplying this information to the customer is good public relations. Supplying the addresses of the calls to the technical department also is a valuable aid to quickly locating the outage. Those callers who were not part of the outage must not be forgotten and forced to call again. Accomplishing all these duties and being polite while all the phones are ringing does not come naturally to most people; it requires training and practice.

Technician training

Training the technical staff is a more complex task. Traditionally, the technician level is drawn from the installation force. If this is to be done, then basic training must start at this level. Unfortunately, it is common to hire an installer, do two or three days of on-the-job training (OJT), and turn him loose with a full complement of orders to complete.

This practice has several bad effects. The new person will probably use or waste more materials than necessary. Before an efficient installation can be made, the workman needs to understand the results of improper grounding or using a longer than necessary route for the cable. This probably will be the first personal

contact between the new customer and the company, so the employee also needs to be able to correctly answer questions about rates, services available, and how the customer should resolve service or billing problems.

Many larger companies supply manuals that answer many of these questions. They should be read and understood before the OJT starts. It is unlikely that in a few days of field experience all the possible National Electric Code and National Electric Safety Code conditions will be encountered. If your company's manuals do not cover the code, the relevant sections should be covered and understood prior to the employee working without supervision.

Safe working procedures also must be covered. Many experienced installers use shortcuts that are unsafe for anyone, but are particularly unsafe for the inexperienced. A few days of classroom-type training can pay big dividends. Remember, bad or unsafe habits developed early are much harder to correct later.

Several home-study courses are available to supplement the employee's knowledge of basic electronics and math. Many towns have courses available at night from trade schools or colleges. Many of the major electronic vendors have seminars pertaining to their equipment and usually cover good operating procedures. Some MSOs have intensive courses available to take the employee to the top level of knowledge. Your corporate engineering department or a consulting company can furnish training and valuable assistance in this area. If these are unavailable to your company, there are several good textbooks and training tapes available from, or listed by, the Society of Cable Television Engineers (SCTE). The Society's Broadband Communications Technician/Engineer (BCT/E) program has the most comprehensive list available and passing the certification

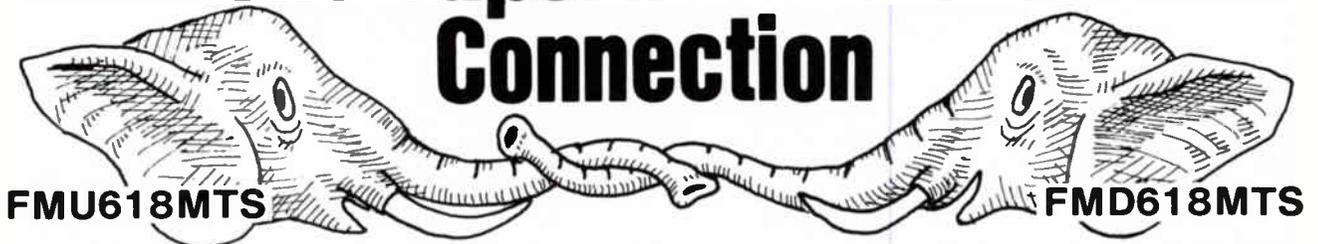
test should be a very good indicator of an employee's knowledge.

Several things still are missing even if all the training methods are used. Continuing OJT also must have available someone who can answer questions as they arise. This is particularly true on new-builds or systems that have been upgraded to use new technology such as feedforward, addressability, two-way or data transmission. The standard sources (textbooks, tapes, etc.) usually are several months to years out of date because of the time required to produce or publish them. Often, the chief is not fully aware of all the operating characteristics of this equipment. Again, the corporate engineering department or a substitute can be invaluable. Incorrect or partially correct procedures when first attempting new equipment can make the difference in a technically and financially successful project or an abandoned loser.

The most common training problem is failure to establish a method of evaluating what areas require changes or additional emphasis. The only thing that the tests given in various courses really show is whether or not the trainer could cause the students to parrot back the information. They cannot evaluate whether or not the employee can use this knowledge to handle a new or slightly different problem. Inspection of the work done by the employee is the only real way to know this. Most employees want to do good work, and if they are informed in an appropriate manner when they have made a mistake, they will correct it quickly.

While it is true that getting the work done correctly and efficiently probably will not happen without training, training does not guarantee that it will. Good employee attitude also is necessary. Well-trained employees usually have better attitudes, and if the evaluation also includes acknowledgment of the work that is done correctly, it can be enhanced. ■

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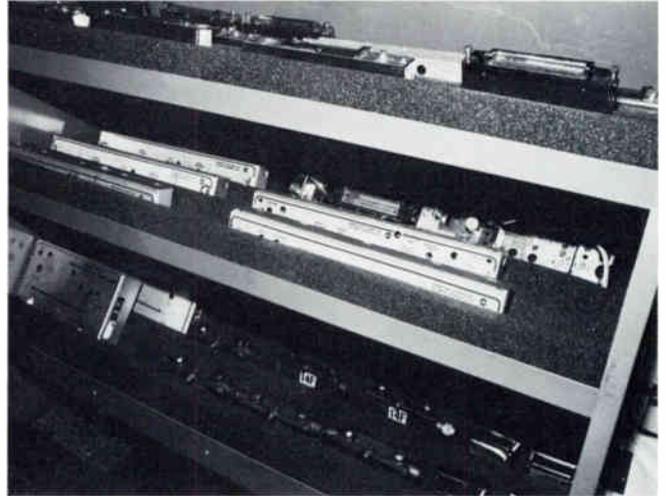


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Development of the Mobile Training Center

By Tim Voorheis
Magnavox CATV Systems Inc.

Once the neglected stepchild of the cable television industry, training is on its way to becoming the favorite family member. Through slow and steady efforts, training quietly has been tending to basic needs and proving its value. But only recently has training begun to enjoy some long overdue attention.

In the past, the cable industry had reason to give scant attention to training. We were a young family growing rapidly, and many of the other children had needs that monopolized our energy and time. In the early days, cries from new subscribers were loud and frequent. Building new sys-

tems fast enough kept manufacturers and operators completely occupied.

tems fast enough kept manufacturers and operators completely occupied.

But the family has matured. Few new areas remain to be cabled, and the cries we must pacify now are different. A competitive marketplace, discriminating subscribers and informed city councils have demanded that we do more than just reach subscribers; we must reach them with systems that perform as promised and can be maintained dependably.

In response, manufacturers had to deliver better products and the support services to back them up. Training that helps operators choose and maintain equipment more efficiently is perhaps the broadest-reaching service a manufacturer can provide.

A crucial component

Today, most people in cable agree that training is a crucial component in maintaining the smooth operation of a cable system. It no longer can be treated as an afterthought, but must be planned for as a necessary part of equipment production, selection and operation. This attitude has

developed naturally as a result of two factors affecting our business: high tech and high turnover. Manufacturers and operators alike are kept busy trying to keep up with the technological advances affecting cable. Think of the new information we have had to absorb, understand and apply over the past five years. Since 1981, we have seen system bandwidths almost double from 330 to 600 MHz. Two-way transmission and advanced technology amplifiers are two examples of high-tech developments we have been expected to learn about quickly and with little organized training.

As if keeping up with technology was not difficult enough, high employee turn-

'Training that helps operators choose and maintain equipment more efficiently is... the broadest-reaching service a manufacturer can provide'

Over the years, Magnavox has developed a comprehensive two-tiered training program to meet the needs of the industry. Each tier was developed to fill a specific need of the industry and/or customers. Generally, our approach to training is based on the belief that a healthy industry can be perpetuated only through the sharing of knowledge.

Tier One provides general industry training. It was designed not to sell Magnavox products, but to provide basic training in general cable theory and technological advances. Tier Two addresses the specific needs of Magnavox customers. Although it may cover some of the same information as our general training program, Tier Two also deals specifically with Magnavox equipment.

Tier One: General industry training

Probably the most well-known component of our training program is the Mobile Training Center (MTC). A 45-foot long tractor-trailer equipped with state-of-the-art cable gear and test equipment, the MTC is unique in the CATV industry. It takes training out into the field where it is needed most.

At the three-day MTC seminar, students learn current information and receive technical training that applies to the entire cable industry, not just selected brands of equipment. The three-part seminar covers basics useful to all cable personnel: basic theory, practical applications and hands-on training.

Instruction in basic theory covers such topics as Ohm's law, dB and dBmV calculations, spectrum allocation, distortion parameters, system design, amplifier operation, headend equipment, transmission lines, connectors, cable parameters, splitters and distribution devices.

After presenting these theories, instructors demonstrate how they work in practical applications. For example, performing system maintenance procedures and sweeps, taking measurements with a



Students verify actual operating conditions.

over can make the situation worse. Even in the most efficient franchises, the turnover rate for technicians and maintenance personnel can be high. When staff changes are frequent, technical performance and efficiency are bound to suffer. Again, an organized and on-going training effort seems the most sensible way to handle this situation.

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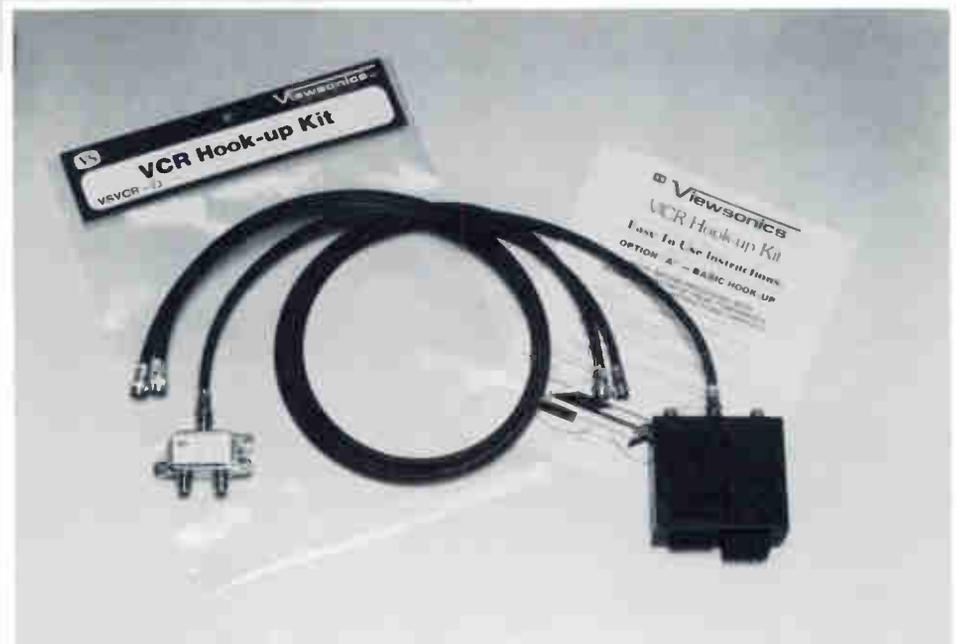
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spectrum analyzer, bench testing, balancing return amplifiers and keeping system records are explained in relation to the theories behind them.

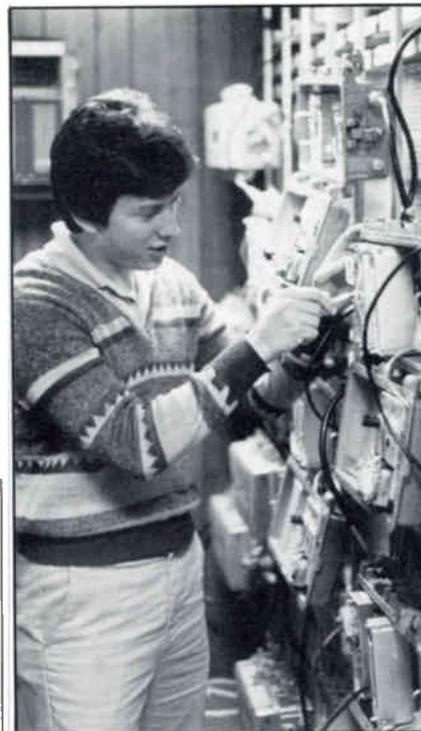
Finally, theoretical classroom learning is reinforced with practical hands-on training. Using the MTC's 450 MHz head-end, two eight-amplifier cascades, bench and field-sweep instruments, field strength meters, a spectrum analyzer and an RF leakage detection system, students learn step-by-step methods to isolate and resolve CATV problems. The chief goal is to improve efficiency, minimize errors and reinforce practical skills.

Our instructors have several years' ex-

perience in the cable industry and teach on a rotating schedule that alternates between training, field work and phone duty. This method keeps our instructors fresh with field tips that will help the students in their day-to-day responsibilities.

Positive feedback

In just five years, the MTC has trained over 3,000 cable professionals at more than 120 seminars. The feedback so far has been quite positive. In fact, some operators have made the seminar a part of their own employee training program. Continental Cablevision of Michigan Inc. is one regular user. According to Jack



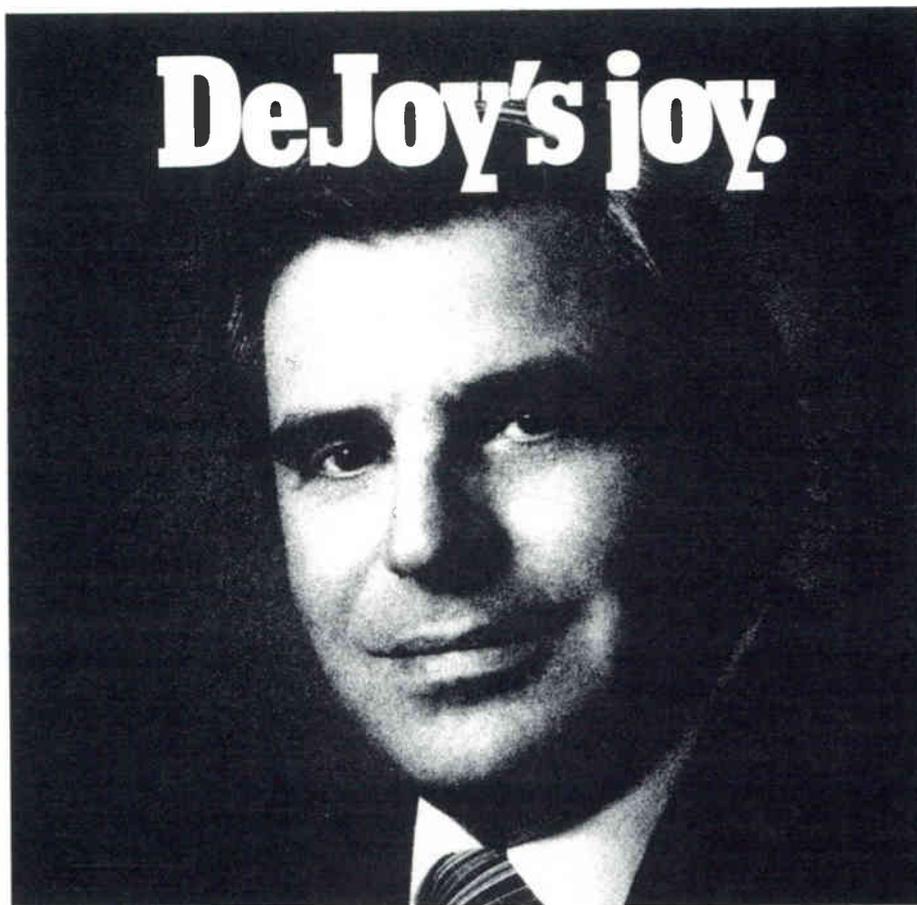
Hands-on training includes state-of-the-art equipment, such as amplifiers. A student adjusts an amp for proper operational levels.

Ramseyer, director of engineering in the company's Michigan region, "We use the MTC to augment our own in-house training and find it an excellent hands-on learning opportunity for our people. We try to send about 20 people from our region each year."

This year the general training program was expanded by providing instruction to over 100 students in Belgium, Austria, Switzerland and Norway. Although the MTC was not sent overseas, these seminars covered the same topics, as well as discussing the differences between U.S. and European techniques for distortion measurement. Our instructors found the same hunger for information in Europe as here in the United States.

Professional organizations like the Society of Cable Television Engineers (SCTE) give Magnavox another opportunity to practice general cable training. Jay Staiger and Herb Longware, two of our most active speakers, make presentations at least every other month. Recently, they have spoken on such topics as rebuild electronic selection, advanced amplifier technologies and quantifying RFI isolation. Like the MTC seminar, these presentations are developed purely for industry training, not to sell Magnavox products.

Though there is no selling involved, Magnavox does benefit by learning with everyone else at these professional gatherings. Longware explains, "Even when I am the main speaker, I always learn a lot during question-and-answer sessions.



When they put you in charge of operations for a cable system of 185,000 subscribers, you're faced with a lot of tough decisions.

Frank DeJoy, Vice President of Operations of Suburban Cable in East Orange, New Jersey can testify to that. He and his staff took a year and a half to study all the problems and considerations of addressability for a system as large as Suburban's.

When they finally made their choice, it was Sigma. "It offers security we'll be able to rely on for the next ten years," DeJoy explains, "and technically, it is far superior to anything else we looked at."

But technology wasn't the only reason DeJoy chose Sigma. "I like the cooperation

and support of the Oak organization," and later added, "Oak engineers worked with us to develop an electronic second set relationship which allows the converter of the primary set to authorize the secondary set converter to function."

Oak solved a dilemma for Frank DeJoy and Suburban Cable. And in the process, developed a technology that is now a standard part of Oak's Sigma converter-decoder.

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Reader Service Number 18.

There are many sharp technical people in this business, and we all can learn from one another."

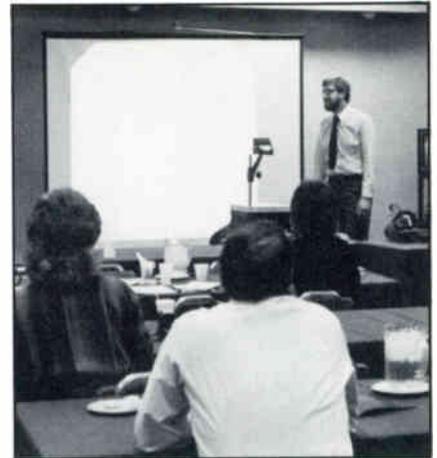
In addition to making presentations, we encourage our employees to train through publication. Often a Magnavox expert writes and publishes the text of a speech, and the company follows through by offering reprints to anyone interested. For example "A system design primer" (CT, April 1985) detailed the basic steps involved in designing a subscriber coaxial system.

Videotapes are a recent addition to our overall industry training program. At the Western Show in Anaheim last December, Magnavox donated the videotape "Choosing Advanced Amplifiers for Your

Cable System" to the SCTE. The tape was written and produced by Magnavox specifically for the SCTE's Satellite Teleseminar Program. It provides instruction on three types of amplifiers: push-pull, power-doubling and feedforward. Students watching the tape learn how these amplifiers operate and which applications each type is best suited for.

Tier Two: Customer training

Our longest-standing form of customer education is the technical training visit. During these visits, an average of one per week, Magnavox technical services representatives go out to the customers' systems and provide individually tailored training. We generally provide training on



A critical part of the Magnavox program is classroom instruction. Here, students learn about carrier-to-noise.

CATV theory, Magnavox equipment and needs of the customer's own system. Employees learn how to perform operations they will be expected to do regularly, like sweeping the system and troubleshooting.

Some of our customer training takes place in the Magnavox Advanced Test and Demonstration Facility located in our Manlius, N.Y., headquarters. This facility is equipped with the latest cable gear and testing devices.

Three two-way cascades allow training on the adjustment and maintenance of high- and regular-gain systems operating out to 330 MHz, 440 MHz and 550/600 MHz. Each cascade (containing 20 amplifiers, one bridger module and two line extenders) is located in its own thermal test chamber. The chambers give customers experience measuring and adjusting equipment in temperatures that range from -40° to 140° F.

At our in-house seminars, customers learn how to take three types of measurements: RF, baseband video and data. They get practice developing proper measurement techniques by working with the spectrum analyzer, data acquisition unit, plotter, printer, matrix carrier generators, RF transmitters, filter bank, relay switch system, vector scope, waveform monitor, noise generator and bit error tester, all located in the Manlius facility.

A special setup of the Digital System Sentry, our status monitoring system, makes it possible for our trainers to simulate typical problems, explain how the system operator can recognize them and give troubleshooting procedures to handle the situation efficiently.

In addition to customer training, we also use the Manlius facility's equipment to conduct research that benefits the entire industry. In the past, this facility has been used to test and qualify components, setting industry standards. The effects of channel loading and various sweep systems on digital information also have been examined here. Currently, the facility is

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Magnavox Mobile Training Center seminars

The following dates and locations refer to Magnavox CATV mobile training seminars for the remainder of 1986: St. Paul, Minn., July 16-18 and 21-23; Chicago, July 30-Aug. 1; Detroit, Aug. 6-8 and 11-13; Worcester,

Mass., Sept. 17-19 and 22-24; Richmond, Va., Oct. 15-17 and 20-22; Orlando, Fla., Nov. 12-14 and 17-19.

For more information, contact Amy Costello, (800) 448-5171; in New York, (800) 522-7464.

being used for local area network (LAN) testing and development of new sweep techniques for 600 MHz systems.

System design

Designing a cable system that works well is truly an art. Understanding basic

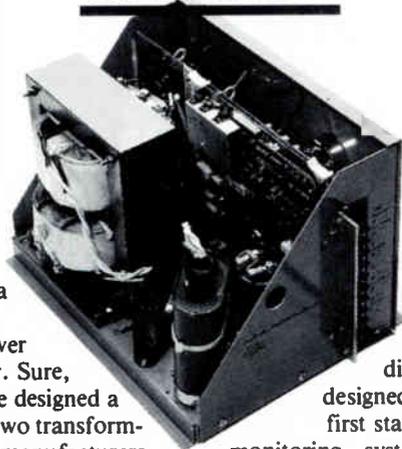
design principles can make operators better able to supervise construction and properly plan for future development. In response to this need, we offer specialized design tutorials.

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We're here to back you up.

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Reader Service Number 21.

dent, so there are no more than two design students here at the same time. Topics usually covered include headend selection, unit specification, distortion calculations, equipment selection, combining distortions, operating levels, transportation runs, forward design, reverse design, institutional loops, LAN designs, system powering and bills of material.

According to Jerry Redmond, Magnavox's systems design supervisor, this tutorial is well-received by customers, since "it eliminates potential problems because the people handling new-builds, rebuilds, upgrades and future extensions will be knowledgeable enough to make sure things are done right the first time."

Magnavox also provides customers with printed instructional materials, which supplement personal training and give customers a source of information for future reference. *Tec Tips*, initiated in 1980, is an on-going source of training concerning the care of Magnavox products. Currently, nearly 4,000 people rely on regular mailings of *Tec Tips* for instruction on such topics as setting scrambled channel audio levels, selecting line power inserter fuses and adjusting line extenders.

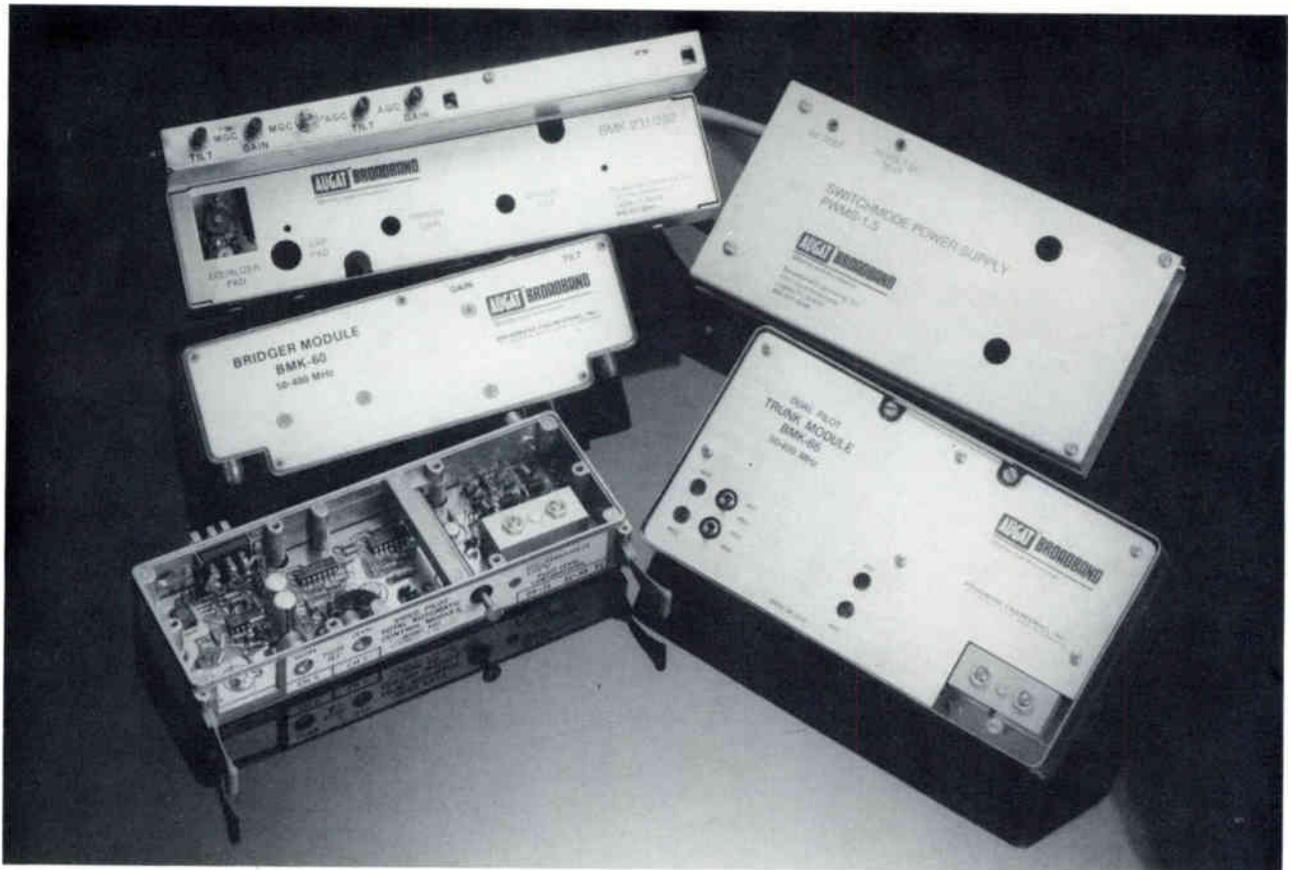
We also supply customers with system instruction manuals, which offer an equipment description, specifications, functional description, complete parts list and schematic diagrams for most Magnavox products. Our technical instruction manuals have a modular design, so that customers may quickly and easily find the information they need. Certainly, a customer who understands what our products are intended for and how they work is more likely to use them properly — and thus be pleased with the product. Manuals allow us to perform this necessary customer education.

Finally, we produce smaller documents intended to instruct and inform. A good example is the 8000 Series taps specification sheet. Questions we have received from customers indicated that a significant number of people have difficulty evaluating specifications. As a result, one-half of our new taps spec sheet is devoted to instruction. We define terms like insertion loss, flatness and hum modulation, and give guidance on how to interpret the values given for each characteristic.

Getting his due

Magnavox training programs have developed slowly over the years, each new component a response to both industry and customer needs. We are proud to be an active participant in the growth of the CATV industry by performing research and general training. We are pleased with the long-term relationships built with our customers through training activities they have come to rely upon.

Training, the unwanted step-child, is getting his due, and we'd like to think training programs are the reason why. ■



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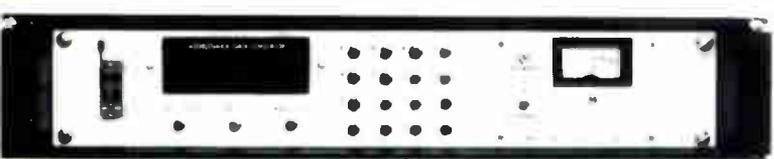
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See us at the CATA Show Booth 301.

Technical training in the 1980s

"As our industry moves inexorably from simple CATV service to the increasingly complex broadband communication service, we must provide the training and knowledge necessary to install and maintain the services we provide." This statement was made by former NCTA Chairman Edward Allen as part of an open letter to the cable industry. Few people would disagree that there is a great need for technical training within the industry. The need for highly skilled technicians will increase rapidly in the near future, created by the use of new technologies, the need for better customer service and efforts to contain rapidly increasing costs. The ability of cable companies to respond to these challenges will relate directly to the technical competency level of the installers and technicians in the field. Technical training will play a major role in ensuring this level of competency.

By Alan Babcock

Technical Instructor, National Training Center, ATC

Most middle and upper management technical people are afforded the opportunity to attend technical seminars or maybe even corporate engineering conferences. Much new information is disseminated at these events about new equipment or techniques. Unfortunately, the amount of information discussed is rarely, if ever, sufficient to provide a thorough understanding of the subjects. This is caused by two major factors:

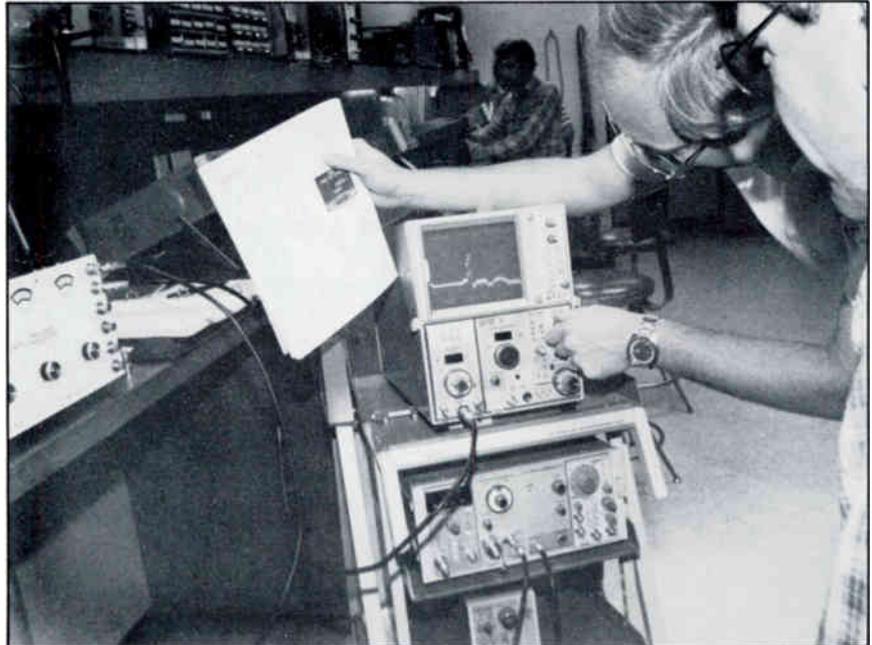
1) the agenda is designed to cover sev-

eral items very briefly, rather than one or two subjects in depth; and
2) the person presenting the material may not have effective presentation skills.

The adult learning process is very complex, but something that has been proven is that for learning to take place, a most effective tool is "learning by doing." When several subjects, largely unrelated, are covered without time to do hands-on work

with the subject, very little learning actually will occur. Technicians who work with the equipment need to get their hands on it, turn knobs, make measurements and tweak dials to really get an understanding of it. You cannot teach a technician how to align an amplifier by showing pictures. Pole climbing learned by reading a book is not effective.

(Continued on page 42.)



Instructor Alan Babcock assists Fred Bender of Fayetteville, N.C., perform a signal-to-noise measurement on a spectrum analyzer.

A view from the outside

By Ralph Haimowitz

Director of Engineering, American Cablesystems

I recently paid a visit to the ATC National Training Center in Denver to see if we could use some portion of its established training program for our technical personnel. I must admit I had some preconceived notions that there probably would not be much that we would be interested in. I was pleasantly surprised to discover that the training center is an outstanding facility, professionally operated by a highly qualified staff and provides the most extensive technical training program I have seen in the cable industry.

The training center is not designed to be the total training facility for every technician. However, I envision American Cablesystems using the center under the contracting companies agreements for several purposes.

Every system has a continuing need to train new installers, but it doesn't make good economical sense to send

newly hired installers to a centrally located area, such as Denver, to receive costly training of such a basic nature as how to climb poles and make a house drop installation. On the other hand, not everyone is capable of being a good and thoroughly knowledgeable trainer. The training center has an excellent train-the-trainer course that prepares qualified individuals to become skilled trainers of the installer training program and, for a modest fee, provides high-quality standardized material to these trainers to enable them to properly teach the installer's course at their own system locations.

The center's other technical programs provide a means for outstanding technical employees who have earned the privileges of obtaining better career training through their employer to do so. The current programs allow a technician to continue his formal education through a combination of electrical/electronics study

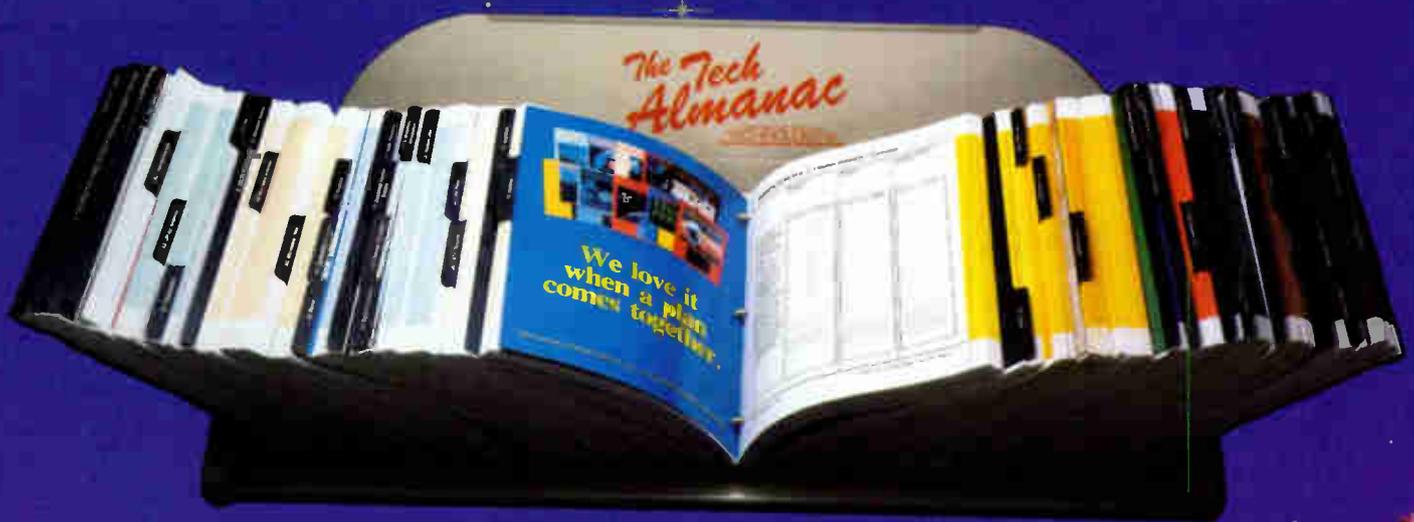
courses, available through the Cleveland Institute of Electronics and tailored to the training center's requirements, along with a number of required two-week resident classes at the center in Denver.

It is possible, at the present time, for an individual to obtain an accredited associate degree in applied science through the various programs offered. The center anticipates expansion to a full bachelor's degree program in the very near future.

I was impressed by the fact that none of the center's programs are "basket weaving" courses. If you are expecting to "slide through" any of these courses, including the train-the-trainer course, you are in for a big surprise. The center will not give you a completion certificate unless you successfully complete the course. I take my hat off to Bob Odland and his entire staff for developing a first-class cable training center, and encourage any cable system to supplement its on-the-job training program with what the ATC National Training Center has to offer.

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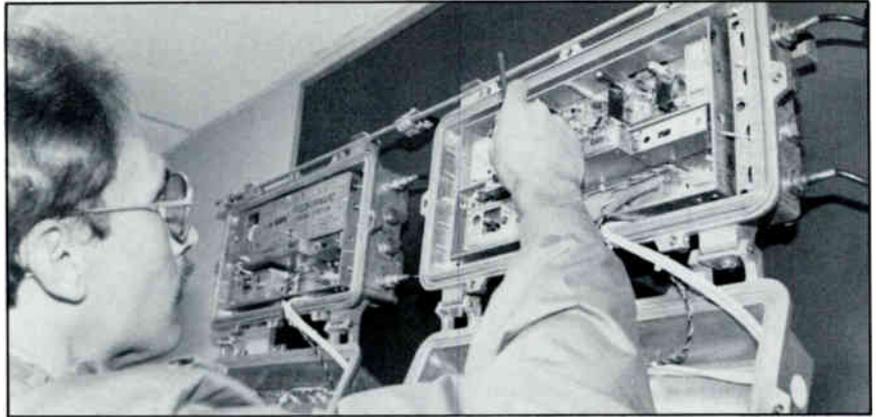
**Ralph Haimowitz
AMERICAN CABLESYSTEMS OF FLORIDA
Pompano Beach, Florida**

The Tech Almanac lists over 600 manufacturers and almost 30,000 products. Along with the manufacturers it also lists suppliers and distributors, construction firms, design houses, management services and repair facilities. The quarterly updates will inform you of the new products, product changes and product deletions to allow you to keep "on top of" the industry.

The Tech Almanac also lists manufacturers, suppliers, distributors, construction firms, design houses, management services, and repair facilities. And it is updated quarterly to allow you to keep "on top of" the industry.

subscription to cable television. An overwhelming majority said that good signal quality was the single most important reason for their purchase. The second thing expected was the ability to get a problem fixed correctly on the first call by the technician.

Proper training of the technicians definitely will have a direct impact on this area. If knowledgeable enough, the technicians not only will be able to correct a service problem on the first call, but perform the preventive maintenance necessary to pre-empt many problems from occurring. They will be armed with information necessary to solve the problem, not just treat the symptoms.



Mitch Jones of Fayetteville, N.C., balances a trunk cascade.

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Unfortunately, most operating locations see money spent on training as a liability rather than an asset. When operators start cutting costs, training often is one of the first expenses targeted. Upon careful analysis it can be seen that money spent wisely on training can improve the bottom line, not reduce it.

A well-trained technical staff can lower the number of problems in the system. Outages can be reduced, signal quality improved and mechanical problems eliminated if the staff is properly trained. These improvements have a direct impact on the level of customer satisfaction. Fewer disconnects will be evident and, consequently, revenues will level off or even increase.

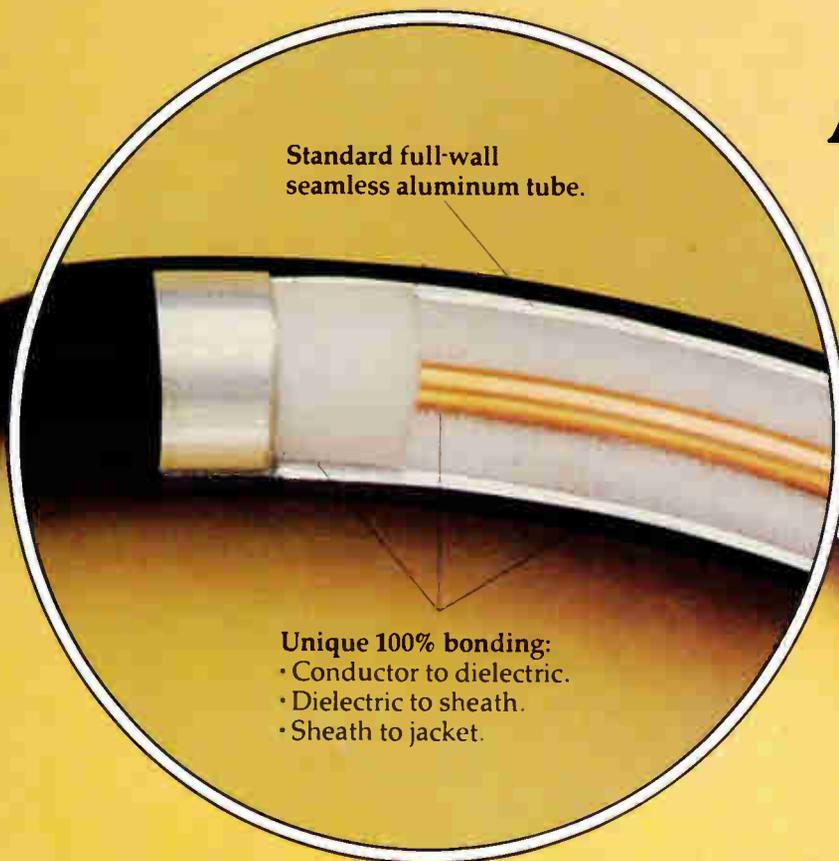
Many systems are installing data communication links, fiber optics or some of the other new technologies. If the technical staff is well versed in the operation of this equipment, the time required to make it operational can be reduced. For example, if the data equipment can be placed into service sooner, a quicker payback is realized. Reliability is very important for data service and can be assured through proper training.

There are a few methods available for training the technical staff. Each philosophy has its advantages and drawbacks, and each costs money. The decision on which to use will result in the best training for the most reasonable cost.

ATC has spent a great deal of time and money equipping and staffing its National Training Center in Denver. Students attending the center first must qualify by having previously completed some electronics schooling or enrolling in and completing an electronics correspondence course from Cleveland Institute of Electronics. The prospective student is then sent the appropriate cable home-study manual to study and test on before finally being allowed to attend the ATC National Training Center (NTC). This process assures several things:

- the student is committed to training,
- he has the basic knowledge necessary to sufficiently comprehend the class-

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room material and

- the operating location is committed to the training process.

The in-residence course is a two-week intensive program that provides on the average of 30 hours of lecture/demonstration presentation of electronics and cable theory and nearly 50 hours of hands-on laboratory work where the classroom theory can be applied.

This training method has several advantages over other philosophies:

- 1) The student is away from the office where distractions tend frequently to interrupt the training process. Students are able to associate with others who are faced with similar challenges both on the job and during class, which greatly reinforces the motivation to learn.
- 2) The equipment and facilities are devoted solely to the training process. Too often in a training program at the system location, equipment or facilities are compromised to be used for "more important work." (For instance, the classroom is needed for a management meeting or the equipment is required in the field.)
- 3) The entire staff need not be taken out of the field for training. One, two or more persons can be sent to school for two weeks without adversely impacting the work force in the system.

4) Two weeks provides enough time to really understand the concepts in-depth, rather than merely scratching the surface.

5) Because the center does not supply signals to any customers, students can work on headend equipment, amplifier cascades, satellite dishes and a microwave hop without fear of interrupting service to the customer.

6) The cost involved is minimal when compared to setting up an in-house program or other less effective programs.

ATC is very proud of its training center. Other MSOs are discovering the program is a quality one, as evidenced by the increase in enrollments outside ATC. Group W Cable has made commitments to provide enrollment opportunities for their entire technical staff and, in fact, sent nearly 50 students to NTC before the sale of Group W Cable was announced. Cox Cable of San Diego is making plans to enroll one student per month from now through 1987. Negotiations are underway at the time of this writing to make the program available to American Cablesystems (see sidebar). Other companies who have enrolled students included Trilogy Communications, Wavetek, Continental Cablevision and MultiVision.

A personal goal that may be desirable for some students would be the receipt of

an associate in applied science in electronics engineering technology degree with a cable television major awarded to persons successfully completing the entire curriculum. Discussions are underway to eventually provide a baccalaureate degree.

Personal growth is a side benefit that cannot be overlooked when considering a training program. Formal training can provide a logical method for promoting employees and, therefore, can be a very effective motivator.

A personal note

Three-and-a-half years ago, when I was hired by ATC, I knew nothing about cable television. I did not even subscribe to it. I was encouraged to get as much training as I could in as short a time as possible. Two-and-a-half years and four promotions later, I was asked to be an instructor at the ATC National Training Center. The single greatest reason for my rapid advancement was the training I received.

Not everyone can be a technical instructor, engineer or chief technician. Imagine, however, how smoothly your cable system would operate if all the technicians were that well qualified. They can become qualified to that extent if — and only if — they are afforded the opportunity and encouraged to become involved in a formal training program. ■



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**By Bruce Catter and Ron Hranac
Jones Intercable Inc.**

Occasionally, while making microwave calculations, one needs to convert from dBm to milliwatts or from milliwatts to dBm. For instance, you may encounter a power meter that gives you a reading in watts that you must convert to dBm.

The following chart should make the conversion easier for you. There are formulas and examples on the back of this page for your further understanding.

Conversion from dBm to milliwatts

(Reference level: 0 dBm = 1 mW across 50 ohms)

dBm	mW	dBm	mW	dBm	mW
-50	0.000010	-15	0.03162	20	100.0
-49	0.000013	-14	0.03981	21	125.9
-48	0.000016	-13	0.05012	22	158.5
-47	0.000020	-12	0.06310	23	199.5
-46	0.000025	-11	0.07943	24	251.2
-45	0.000032	-10	0.10000	25	316.2
-44	0.000040	-9	0.12589	26	398.1
-43	0.000050	-8	0.15849	27	501.2
-42	0.000063	-7	0.19953	28	631.0
-41	0.000079	-6	0.25119	29	794.3
-40	0.000100	-5	0.31623	30	1000.0
-39	0.000126	-4	0.39811	31	1258.9
-38	0.000158	-3	0.50119	32	1584.9
-37	0.000200	-2	0.63096	33	1995.3
-36	0.000251	-1	0.79433	34	2511.9
-35	0.000316	0	1.00000	35	3162.3
-34	0.000398	1	1.25893	36	3981.1
-33	0.000501	2	1.58489	37	5011.9
-32	0.000631	3	1.99526	38	6309.6
-31	0.000794	4	2.51189	39	7943.3
-30	0.001000	5	3.16228	40	10000.0
-29	0.001259	6	3.98107	41	12589.3
-28	0.001585	7	5.01187	42	15848.9
-27	0.001995	8	6.30957	43	19952.6
-26	0.002512	9	7.94328	44	25118.9
-25	0.003162	10	10.00000	45	31622.8
-24	0.003981	11	12.58925	46	39810.7
-23	0.005012	12	15.84893	47	50118.7
-22	0.006310	13	19.95262	48	63095.7
-21	0.007943	14	25.11886	49	79432.8
-20	0.010000	15	31.62278	50	100000.0
-19	0.012589	16	39.81072	51	125892.5
-18	0.015849	17	50.11872	52	158489.3
-17	0.019953	18	63.09573	53	199526.2
-16	0.025119	19	79.43282	54	251188.6

Application: Microwave

To convert from power in dBm to power in watts, use the following formula:

$$W = 10^{\frac{P}{10}}$$

To convert from power in watts to power in dBm, use the following formula:

$$P = 10 \log (W)$$

where P = power in dBm
W = power in milliwatts

Example:

The output of a two-bay, low power AML is 13 dBm. What is the power output in milliwatts?

$$\begin{aligned} \text{mW} &= 10^{\frac{13}{10}} \\ \text{mW} &= 10^{1.3} \\ \text{mW} &= 19.95 \end{aligned}$$

Example:

The input to a microwave receiver is -40 dBm. What is the input to the receiver in milliwatts?

$$\begin{aligned} \text{mW} &= 10^{\frac{-40}{10}} \\ \text{mW} &= 10^{-4.0} \\ \text{mW} &= .0001 \end{aligned}$$

Example:

The output of an MA-12G transmitter is 398 mW. What is the output in dBm?

$$\begin{aligned} \text{dBm} &= 10 \log (398 \text{ mW}) \\ \text{dBm} &= 10 (2.599) \\ \text{dBm} &= 25.99 \end{aligned}$$

New employee orientation

By Kip C. Hayes

Plant Manager, Group W Cable

The objectives of Group W Cable's new employee orientation are to make use of a limited time period to maximize the productivity of an entry-level employee and to provide in condensed form enough information to allow an understanding of the most important requirements and factors needed to become a contributing member of the cable system team.

Orientation is scheduled to last three weeks. Week One consists of a technical overview. Week Two is spent in the front office under the supervision of the customer service manager, business office supervisor and customer service representatives (CSRs). General office procedures, cash control, work and maintenance order requirements, and billing and customer service from the office point of view will be covered. Week Three is practical hands-on training.

Week One (technical overview)

On Day One, the employee:

- 1) Talks with the plant manager and is issued an orientation booklet.
- 2) Fills out the required government documents.
- 3) Receives the headend orientation from the headend technician, which consists of an overview of signal processing and delivery to the trunk line and a tour of the warehouse and facilities.
- 4) Lunch.
- 5) Works with the installer for the balance of the day, gaining an understanding of the town and how to route work orders.

On Day Two, the employee:

- 1) Works with the construction crew.
- 2) Becomes familiar with inventory check-out, labor and introduction to pole climbing, and clearances required.

On Day Three, he:

- 1) Is assigned hand tools.
- 2) Works with the installer on customer contact and installation and disconnect procedures.

On Day Four, the student:

- 1) Works with the installer.
- 2) Learns inventory check-out procedures in practical use.

On Day Five, the student:

- 1) Works with the service technician.

- 2) Becomes familiar with the following: customer contact, troubleshooting, and reading a field strength meter and a volt ohm meter.

Week Two (front office and CSR overview)

The second week will follow the schedule set up by the customer service manager for new CSR orientation and will give an overview of all office procedures.

On Day One, the employee:

- 1) Works with the dispatcher.
- 2) Becomes familiar with radio procedures, service calls and customer information searches.

On Day Two, the employee:

- 1) Works in the marketing department.
- 2) Becomes familiar with product knowledge, converter control and exchange procedures, counter sales and phone sales.

On Day Three, he:

- 1) Works in the business office.
- 2) Becomes familiar with converter control, customer service, work order information and daily reports.

On Day Four, the student:

- 1) Works with the CSRs.
- 2) Becomes familiar with the front counter, customer contact, phone orders and billing procedures.

On Day Five, the student:

- 1) Signs up for company benefits.
- 2) Works where needed in the marketing office, business office, phone or front counter, or dispatch.

Sample Test

These questions sometimes are asked to prove the employee's grasp of the main points covered in orientation:

- 1) What do you tell the customer when you arrive to do an install? (Be as specific as possible.)
- 2) In order of requirement, what is the procedure for checking converters out, assigning to the customer, and checking the converters back in?
- 3) What are the procedures involved in inventory control? Why are they important?
- 4) Route the following addresses given (with type of order) and explain why

'Week One consists of a technical overview. . . Week Two is spent in the front office. . . (and) Week Three is practical hands-on training'

Week Three (hands-on experience)

On Day One, the employee:

- 1) Works with the construction crew.
- 2) Becomes familiar with pole climbing.

On Day Two, the employee:

- 1) Works with the construction crew.
- 2) Gains a working knowledge of construction specifications and techniques.

On Days Three and Four, he:

- 1) Works with the installer.
- 2) Becomes familiar with paperwork, routing work orders, connects and disconnects, and radio use.

On Day Five, the student:

- 1) Talks with the plant manager.
- 2) Receives the quiz and evaluation.
- 3) Performs installations and/or disconnects for the remainder of the day.

you selected that route of travel.

- 5) List the channels we have available by channel number and name.
- 6) How often should signal levels be taken?
- 7) How should you deal with an unauthorized hookup?
- 8) When you attach a drop pole that we have not contacted before, what information should be written down?
- 9) When should a hard hat and/or body belt be worn?
- 10) What is the cable clearance: over a highway? Over a driveway? Over a flat roof?

Internal controls reduce theft

By Robert A. Boucher

President, Cable Operators Protection Services Inc.

As system manager, when Bob hung up from the telephone conversation, he was very much disturbed. It was an anonymous call. The caller, a very upset system employee, had described how system employees had been stealing from the system. From converters to cash over the counter, the caller explained he felt he had an obligation to call Bob.

So Bob decides to tour the system. He already has decided he wants to develop a format for internal control procedures. It's time to clean up his shop. Let us follow Bob on his tour, and take a look at what he sees. He walks into the front office — another busy day here. Phones are ringing and being answered, service upgrades and downgrades are being written, and cash and checks are being collected from subscribers standing at the front counter.

He decides to walk back to the warehouse; here, system employees and contractors are busy checking out converters and other active and passive equipment for the day's installation, construction and service schedules. His warehouseman is busy distributing equipment from the warehouse area.

Down the hall he walks into sales. He finds salespeople busy handing over cash and checks from last night's sales activities. A clerk receives all the money and records the information.

Evaluating the tour

Having toured the three main areas of his system — front office, warehouse and sales — he returns to his office. He writes a series of questions that pertains to each area of his system.

Front office

- Are there effective monitoring controls (i.e., security levels) for data input?
- How efficient are front counter cash control methods?

Warehouse

- Do I have adequate controls on all inventory that leaves the warehouse?

Sales

- Is accountability for all cash and checks effective?

These questions are the basis for establishing procedures for all internal controls. Ask yourself these questions and evaluate your current control procedures. You may be surprised at what you find.

- Internal theft — employees or contractors stealing hardware.
- Customer service representatives (CSRs) or other data input personnel who receive compensation for data input.
- Salespeople receiving compensation for fictitious sales orders.

Loose procedures and controls are the breeding grounds for internal theft. It's easy to get caught up in all the day-to-day activities and not take a look at the *internal* workings of your system.

During the past 18 months most of the theft-of-service issue has been focused on external situations — illegal hook-ups, black market boxes, etc. These factors certainly do have a negative impact on cash flow. But you also must initiate a program to look internally and focus on tightening controls that may be leading to employee theft.

One way to gain additional information on where internal theft problems exist is to hire an interview group to conduct one-on-one interviews with employees. Develop a format where employees are able to speak freely. You are interested in revealing problem areas (how employees feel about internal theft, where most theft areas are, etc.), not accusations on people. The introduction of such a group should be handled carefully and positively, so that a negative attitude within the system does not develop. Even though you are ensuring 100 percent anonymity during the interviewing, all employees should be aware of the



THEFT OF SERVICE

purpose of the interviews, see a format of the questions and how results of all interviews will be used.

Employee meetings

In outlining plans to curtail internal theft, one of your initial priorities should be discussing your objectives and plans with your employees. Create a spirit of understanding and awareness of the seriousness of internal theft. Discuss where the problem areas are and new procedures that will not create an underlying negative attitude. You can't afford animosity; you must create a spirit of cooperation and willingness to fight the problem.

After outlining each individual area — front office, warehouse and sales:

- Discuss specific information (i.e., facts) that you have acquired on losses from each area. Handle this carefully without attempting to point fingers.
- Provide a representation of what these losses total annually.
- Illustrate the negative impact on the bottom line by percentage of revenue loss applied to annual sales.
- Relate this to how employee benefit programs and incentives must be reduced to help cover the costs of revenue loss.

Your main message is that internal theft causes losses that impact *everyone*. Open the meeting up for discussion, and for each individual area discuss possible ways to establish improved monitors and controls. You really want participation here so that everyone has input. All of this should be written on a large easel pad. You should develop a list of action items and responsibilities that pertains to each area.

Establish follow-up meetings with key personnel to track all activities, to ensure that progress is being made in all appropriate areas. Additionally, establish tracking methods to check results of all new monitors, policies and procedures. These should be reviewed regularly and shared with all employees.

Screening employees

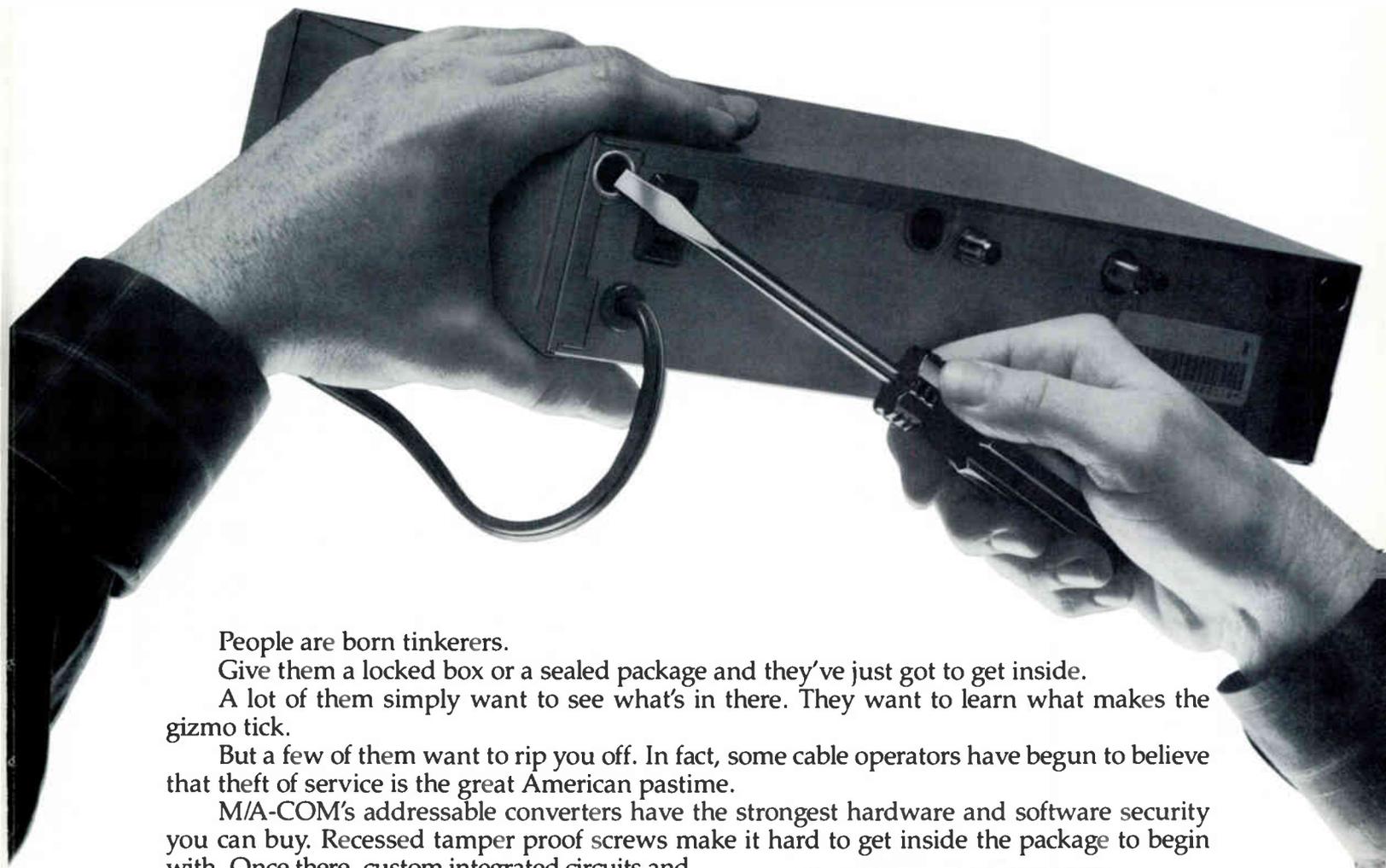
Let's take it from the beginning, when your employees are first recruited and hired. Recent studies show that internal theft in the retail industry accounts for 60 percent of total losses. Even a small portion of this percentage applied to the CATV industry could mean significant losses.

Your first consideration to eliminate losses is your *hiring process*. After a thorough interview (we recommend multiple interviews), those who qualify should go through pre-employment screening. As one corporate director of security put it, "more time hiring, less time firing." The thoroughness of the screening process depends on the position level.

The minimum amount of screening, especially with any employee who will have customer contact, is thorough reference check (work and personal), report for DMV (Department of Motor Vehicles) and police report for any criminal conviction record. We suggest enlisting the services of a reputable background search firm. Usually with varying tiers of services, they can provide all of the above information. We suggest polygraph tests for those employees who will be involved with inventory or handling cash or checks. Some systems are testing for drug usage.

Your screening criteria should be proceduralized and circulated so that all personnel with hiring authority are familiar with them. One system has had success with "hiring committees." Three

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people interview each potential job candidate. Where the group decision is affirmative, the candidate either begins a further screening process or is rejected.

Inventory control

Controls and monitors of inventory represent one of your biggest challenges. Receiving and distributing controls for everything from fittings to converters must be established and monitored. This especially is critical during new-build situations where large shipments are being received, recorded and stored. We shall look at controls on one of your most valuable assets: converters.

Immediately after receiving shipments of converters (and don't accept shipments of boxes that are not sealed), all serial numbers must be recorded. Some systems complete this task manually, while others enter information into the computer. We also recommend applying tamper-proof converter seals at the same time. This represents another control check for converters found in the field or returned tampered to the system.

Obviously, all converters and other valuable assets must be kept in a locked, secured area. Responsibility for inventory usually is delegated to one person, such as a warehouseman. Make this position available only to employees who have established a good performance record and have a predetermined period of longevity with the system. Distribution of converters should be coordinated whereby the warehouse person receives work orders for the next days' connects so there is ample time to collect all converters and record serial numbers. Converters should not be distributed unless the previous day's units have been returned or installed.

Many systems have assigned responsibility of converters to a converter control check. This person is responsible for daily distribution and maintaining a daily count. At the end of the day, a match-up is completed of all converters that either were dispatched or returned. For each discrepancy, accountability rests

with the person assigned that serial number. A converter reconciliation program is the key; weekly and monthly reports reconcile converters in the field to what is inventoried.

The reports should be viewed by at least two management levels. This especially is important in systems where multiple converters are used. You need a good procedure for tracking which subscribers have which converters. Periodic, random inventory checks should be done in the warehouse by an employee other than the warehouse person. Inventory your vehicles periodically. Thoroughly inspect your yard and surrounding areas.

One method that has worked very successfully is a *dual control* method for access to the warehouse. Two different locks are used for access. Two different employees both must be present to open the warehouse. While effective in eliminating access by one person, it also may require standard hours of receiving and distribution from the warehouse. Additionally, back-up procedures may be necessary if in some cases the warehouse must be opened by one person.

Disconnect and field controls

Disconnect and field controls are operational necessities, often addressed by system operators but seldom accomplished with any regularity. Several steps can be taken to reduce the infamous "coffee-shop" disconnect rate in your system. We recommend a serial number tag on the drop to each address. The serial number should be recorded on the customer's billing records and installed at the time of installation or service. Office personnel can attach the tag when routing or scheduling daily work.

Inventory control should be kept tight and access to the tags should be limited only to those routing and scheduling. When a customer requests a disconnection or a disconnect for "non-pay" is scheduled, the serial number can be recorded on the work order. When an installer returns the work order as complete, he must attach the tag to the completed paperwork. As billing personnel record their completed daily work, the numbers can

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be compared. If the installer returns the correct tag, you know he was at least at the correct address, climbed the pole or opened the lock box, and as well might have completed the disconnect. Any discrepancy between the number on the work order and the tag number is an indication to management that verification of the disconnect may be necessary.

Most importantly, when implementing this procedure, install the tags throughout the *entire* system at one time. System continuity eliminates any "no-tag-at-this-address" excuses for not returning a tag with the work order. Accurate address tagging procedures also are an important part of field security and efficiency. An installer or service tech can save an immeasurable amount of time when all house drops are properly identified. We recommend using the last two digits of the house number to eliminate return trips for incorrect disconnection or reconnection of existing customers and tracing lines for service calls or disconnects.

Again, it is imperative to achieve plant continuity at one time and maintain a strict policy for tag maintenance. Your own quality control program is the key here. You should establish a regular procedure for checking completed disconnects.

Employee acceptance may be slow at first, but with a strong commitment to security and proper quality control, you soon will see a greater degree of respect from your employees and customers alike.

Other areas for controls

The front office counter and sales clerk who receives money from incoming sales orders are two areas where you really need tight controls. Embezzling can occur with a CSR, for example, who takes a cash payment and credits the customer's account. Let's break this into two areas: data input and front counter.

For every computer input system, you already should have procedures for security levels of input for all data information. The only people who should be capable of making credit

changes to accounts should be a data input clerk, supervisor and manager. CSRs are able to create work orders, make changes on installation dates, etc., but should not authorize credit changes. Any credit changes on paper should be signed by someone with proper authorization. Security levels also will prevent employees from randomly upgrading accounts in addressable systems. Limit this activity to one or two people with the appropriate security levels.

Maintain tight controls on the front counter to resist temptation of theft. CSRs handling cash and checks over the counter should be assigned their own lock boxes. Starting with a daily balance of \$20-\$25, they have to match all cash and checks with receipts at the end of the day. This also should apply to a sales clerk who is receiving money from salespeople.

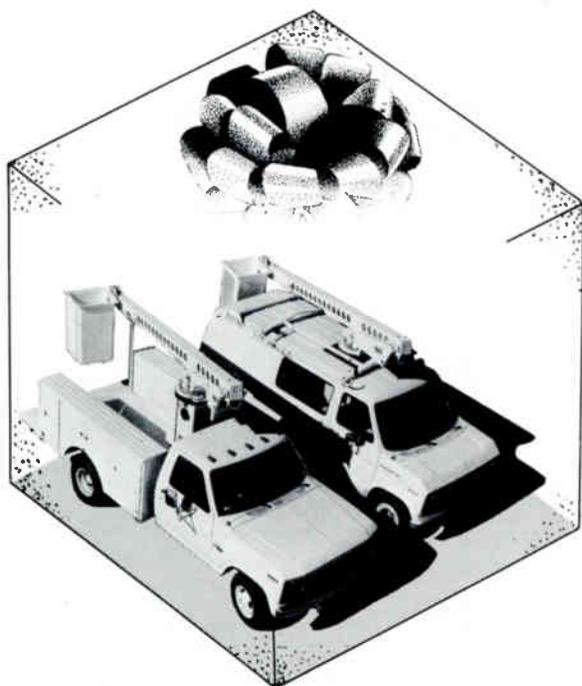
All work orders and money are matched for entry by a data input clerk before depositing at the bank. Deposits should be the responsibility of one person if the size of deposit doesn't warrant a security car pick-up. Additionally, make sure this person is using several random routes to the bank and that local police are familiar with your procedures. Keeping purses out of the front office area is a good idea. We know of one system whose employees wear smocks without pockets.

As system management it is your responsibility to make employees aware of internal theft, create an atmosphere of understanding and cooperation, reduce temptation by developing proper policies and procedures, implement effective monitoring devices, and provide continual feedback on results. Following these guidelines, you will develop an atmosphere where problems are revealed and solutions can be administered quickly. Only when your employees are working together to stop internal theft can you reduce any major impact that the problems are causing.

You have every right to expect your people to be honest, loyal employees — provided you are fair and honest with them. That kind of mutual understanding really will bring results. ■

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Consumer friendly: Yielding dollars not theft

By Dave Willis

Vice President, Engineering, Tele-Communications Inc.

The advent of computers has taught us the term *user friendly*. The complexity of today's cable TV, VCR and TV usage is rapidly teaching us about the term *consumer friendly*. This should be extremely important to anyone whose present and future are tied to the CATV industry. Cable is in competition for the viewer, and to compete successfully cable needs to bring to the viewer several specifics: high-quality service (that is, a distortion-free picture), continuity of service and a quick thorough response by the operator when problems occur. His cable channels should include all signals broadcast locally, an assortment of "narrow cast" services available by satellite and a selection of premium channels. Some systems have active and productive local origination facilities; these channels are a definite asset to the system. There are a tremendous number of systems that fit the mold. It's at this point in the cable system's parameters that we find the impact of divergent concepts.

Two systems

System #1, with the attributes previously described, is a system using standard converters with integrated descramblers for premium security. This converter/descrambler costs the system about \$65 and is reasonably reliable. John Q. Subscriber orders



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service of basic and two premium channels. He is less than thrilled when he finds that he must pay a monthly fee for a remote control to change channels on his remote-control TV set.

He still is not all that unhappy, so he proceeds to wire his VCR to this new service. Uh-oh, brick wall. The single output of the descrambler must now be disconnected from the TV set and re-routed through the VCR. Well, that's not too bad because he'd have to wire the set to the output of the VCR to watch anything from the recorder, anyway. VCRs exhibit a varying amount of through loss to the cable channels. It is not uncommon for this loss to run as high as 7 dB or more. This is a good VCR, however, and has only 1 or 2 dB of through loss.

John Q. sits back to watch TV. He decides to watch a fight on a sports channel because the fight is carried live. He wants to record a movie on a premium channel at the same time. Nope, another brick wall.

From this point you can start multiplying complexity and inconvenience to whatever magnitude your imagination can reach. Another outlet for the VCR? It costs you dearly because you need the converter/descrambler device as well as a second outlet. A dual A/B switch set-up with splitters on both the input and output of the converter? Lots of cost again and this time it's in both money and in signal level. It also has limitations since you can only decode one channel at any given time. The problems and inconvenience here illustrated clearly show that this system is totally *consumer unfriendly*.

There are systems that are even worse. If, for instance, all channels are scrambled, the options are even more restricted. Also, if the converter/descrambler is not BTSC-stereo compatible, the consumer has been robbed of an enhancement that clearly should be part of his service. The epitome of the subscriber's frustration is reached when he finds out that the new cable-ready remote-control stereo TV he purchased is not cable-ready, doesn't receive stereo and he can't change channels with its remote control.

System #2, again with the attributes described previously, is a system that uses standard converters with *no* descramblers. It has no scrambled channels whatever. This system's management understands that the consumer is used to dealing with service companies (phone, power, gas, water) that do not dictate what he does with their products within the environs of his premises. He can modify his service, hire a contractor to modify it or call the service company and have them modify the system. As with these services, #2's management has decided it is important to establish the business concept of serving the *dwelling*, not the TV set in the corner of the room.

Again, John Q. Subscriber orders basic and two premium channels. The security in this system is a combination of negative traps and interfering carriers. The converter in this case costs about \$45 and is more reliable than the converter/descrambler, simply because it has a far lower component count.

John Q. is extremely pleased when he finds that he doesn't need either the converter or the remote control since his cable-

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'It is important to establish the business concept of serving the dwelling, not the TV set in the corner of the room'

ready set is equipped with remote control. The system loses the revenue of the remote-control rental but evades all converter and remote-control repair costs and capital investment for this subscriber. Perhaps more importantly, the system will never make a converter-related service call at this home.

John Q. is very pleased and decides to connect up his VCR. At this point he has an option. Run the cable through the VCR to the TV set or split the incoming line and feed the units separately. If he elects the latter, he can install a single A/B switch and have the option of selecting cable or VCR for viewing. Nominal cost, nominal signal loss, complete flexibility of viewing and/or recording.

Now it's no problem to watch the fight and record the movie. Take the new TV set out of the two scenarios and insert a very standard television set and most of the story stays the same. It must be remembered, however, that the TV set population is moving to the remote-control cable-ready TV set rather rapidly.

Considering all aspects of the two systems described, including the cost of service calls, capital, addressable control costs, etc. I firmly believe system #2 will yield a much higher rate of return. For the sake of discussion, let's say the bottom line per subscriber is exactly equal. But system #2 will have a greatly en-

hanced image and far better subscriber perception of providing good cable service in a rational manner and thus will have more subscribers.

Consider another aspect of the two systems. John Q. has a 7-year-old daughter who loves cartoons and children's programs. John wants her to be able to view TV in her bedroom, coincident with his watching a fight in the den. With system #2 it requires only an extra outlet and a \$45 converter. With proper channel planning it can require only the extra outlet.

Fear of theft

It seems that system #2 makes so much more sense than #1 that one wonders why we still have systems being constructed that scramble all channels or use extensively scrambled channels. The motivation is fear of theft. It is mostly an irrational fear, in my experience. Several highly controlled audit/marketing programs illustrated conclusively that theft is primarily administrative failure on the part of the system and that elimination of all unauthorized subscribers and subscriber services has little if any impact on subscriber numbers.

In one situation a system similar to #2 was converted, after an extended period of operation, to a #1 format. Within the next four months subscriber count was decreased by 16 percent! The system had become unfriendly after having been a convenient, easy to use, friendly system.

There are, of course, many variations on the theme. The point is that cable TV should be convenient, compatible and easy to configure to meet the needs of the subscriber. Cable then can become the primary medium for television viewing as well as the ultimate software source for VCRs.

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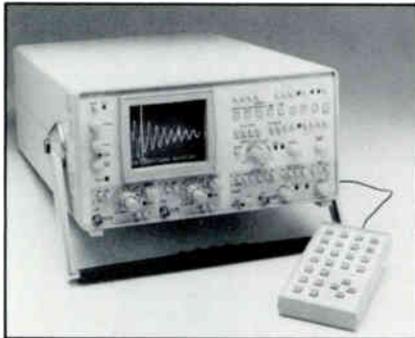
Phone (214) 271-3651

SLM carrying case

Sadelco Inc. has designed a light-weight, padded nylon carrying case that, according to the company, provides maximum protection for its signal level meters. The new case cover opens down, rather than up, with a built-in metal plate that protects all controls. The case is water resistant with one-inch foam padding all around and has a convenient zippered storage pocket in the cover. The outer shell of cordura nylon incorporates a carrying handle and shoulder strap.

The new case is available for use with the Models 719D, 733C Super, FS-3DVS and FS-3DVU. Sadelco also will upgrade existing models with the new protective case and repair and/or calibrate them to factory specs.

For more information, contact Sadelco Inc., 75 W. Forest Ave., Englewood, N.J. 07631, (201) 569-3323; or circle #90 on the reader service card.



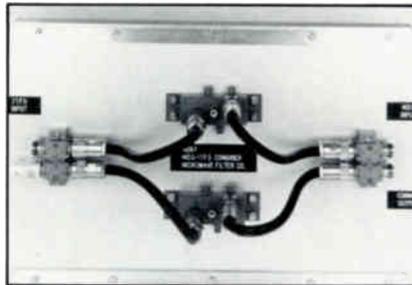
Oscilloscope

The 4050/150 digital storage oscilloscope (DSO), developed by Gould Inc., is said to expand the capabilities of its Model 4050 100 MS/sec DSO. It is designed for developing, calibrating and troubleshooting electrical and electronic products and systems. According to the company, real-time signal processing capabilities make it a flexible bench instrument that can perform both sophisticated signal processing as well as everyday measurements.

Limits testing capabilities allow it to be used in reliability engineering, fault diagnostics and calibration/test applications. IEEE-48 bus activation of signal processing functions permits it to operate as a front end in automatic testing applications. The product offers measurement of a signal's average or instantaneous RMS value, pulse width, frequency, rise or fall time, overshoot or undershoot, peak-to-peak voltage, maximum or minimum voltage, area under curve, and duty cycle.

For more details, contact Gould Inc.,

Recording Systems Division, 3631 Perkins Ave., Cleveland, Ohio 44114, (216) 361-3315; or circle #91 on the reader service card.



Combiner

Model 4697L from Microwave Filter Co. Inc. combines MDS channels (2,150-2,162 MHz) with ITFS channels (2,500-2,686 MHz) at the receiver. The unit is for low-power applications of 10 watts maximum. According to the company, it also can be used to separate MDS and ITFS channels. Insertion loss is 1 dB maximum. Return loss and isolation is 20 dB minimum. Input and output connectors are type N female. There also is a high-power version, Model 4697H, for use with 100 watts of power or more.

For more information, contact Microwave Filter Co. Inc., 6743 Kinne St., East Syracuse, N.Y. 13057, (315) 437-3953; or circle #100 on the reader service card.

Fiber-optic tool

A fiber-optic cable placement tool designed to speed long cable pulls has

been announced by General Machine Products Co. Inc. According to the company, the CCR-1 reel allows work crews to pull longer continuous lengths of cable without splicing. Constructed of all-weather aluminum, the CCR-1 attaches to the FOC-1 fiber-optic capstan with three cap screws, creating a pulling capstan with a 25-inch working diameter and a 5-inch wide face. Calibrated disks in the FOC-1 torque limiter are said to allow the operator to pull cable around the CCR-1 surface while maintaining control over pulling tension.

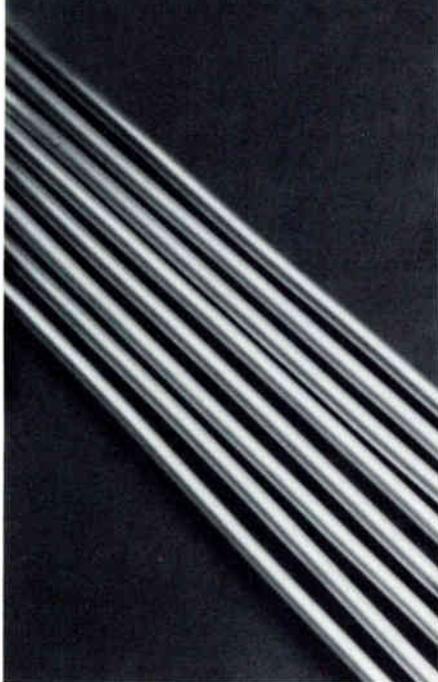
For more details, contact General Machine Products Co., 3111 Old Lincoln Hwy., Treose, Pa. 19047-4996, (215) 357-5500; or circle #98 on the reader service card.

Multiplexer-modulator

The FMT multiplexer-modulator from FM Systems is used in a headend to convert baseband (left and right) stereo or monaural sound to a multiplexed MTS-compatible carrier at 4.5 MHz or 41.25 MHz. The 4.5 MHz Model FMT633S connects to a TV modulator designed to accept baseband video and modulated 4.5 MHz sound. The 41.25 MHz Model FMT633C is designed to synthesize MTS stereo for those off-air stations not transmitting in MTS.

The baseband audio signal is processed with the DNR dynamic noise reduction system, which is said to improve TV audio signal-to-noise (S/N) up to 14 dB. This also can reduce audio noise orig-

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inating in the TV studio so that noisy, old films will sound cleaner when received via the FMT633 on cable than when received directly from the TV station.

According to the company, the multiplexer combines the left and right channel for an L + R or mono baseband channel occupying the first 15 kHz of the composite baseband. An L-R channel also is derived, and for monaural input, the mono channel is duplicated. This signal is phase rotated relative to the L + R channel, then compressed 2:1 and then double-sideband suppressed-carrier modulated with a 31.468 kHz carrier phase locked to the 15.734 kHz pilot. The sum of the L + R, L-R and pilot then are frequency modulated onto the 4.5 MHz carrier.

For more information, contact FM Systems, 3877 S. Main St., Santa Ana, Calif. 92707, (714) 979-3355; or circle #97 on the reader service card.

Videoconferencing

GEC Video Systems has added to its line of videoconference equipment the Hannover Rollabout, a complete system in a single mobile unit. It houses monitors, cameras, sound unit, codec and other equipment, such as echo canceler, split-screen unit, etc., according to require-

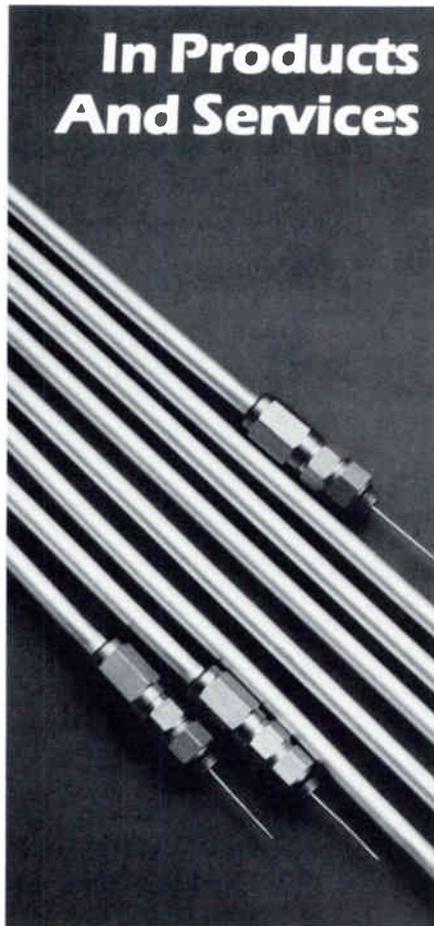
ments. Any suitable location can be converted into a studio by rolling the unit into position and connecting it to a power supply and a digital data line.

For further information, contact GEC Video Systems, 106 Purdy Ave., Portchester, N.Y. 10573, (914) 937-7450; or circle #96 on the reader service card.

TV modulator

Scientific-Atlanta Inc. has introduced the Model 9220 television modulator. Its design integrates a SAW filter for adjacent-channel filtering. The modulator's controls, indicators and an output test

In Products And Services



point are mounted on the front panel for monitoring, access and adjustment. According to the company, it has excellent spurious output specifications and an RF output level of 45 dBmV.

For additional information, contact Scientific-Atlanta Inc., 1 Technology Pkwy., Box 105600, Atlanta, Ga. 30348, (404) 441-4000; or circle #93 on the reader service card.

Power supply

Power Guard Inc. has introduced a modular design non-standby 115 amp/60 VAC power supply in a louvered 8-inch square by 26-inch tall pedestal. The low-

profile unit utilizes Power Guard's 12 to 15 amp load module. Comprised of a Pyramid Model 1100 pedestal, a Power Guard Model RFP-P plate and a Model NS-6015-0 module, the Model NSP-6015-0 sits flat on the plate, not attached to the back of the pedestal.

According to the company, features include a three-year warranty, simple installation and maintenance, convection cool operation, modularity, excellent regulation, and a wider range of operating efficiency. It also is available with options such as heavy duty 120 VAC input metal oxide varistor surge protection, transzorb surge protection on 60 VAC output, output time delay module and resettable power outage counter module to account for power failures.

For more information, contact Power Guard Inc., P.O. Box 549, Hull, Ga. 30646, (404) 354-8129; or circle #94 on the reader service card.

Connectors

Panduit Corp. has introduced a line of TNC connectors for use with RG-58, 59, 62/U plenum cable. According to the company, the connectors are designed for high-quality reliable terminations at reduced installed cost and can be terminated with a minimum of tooling.

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Three termination methods are available to meet the requirements of different applications for either original equipment or field installation. Twist-on straight plugs can be installed without soldering or crimping. The one-piece design utilizes a self-contained contact and is said to be ideal for field installation. Funnel entry helps speed installation. The wedge clamp design utilizes a soldered center contact and meets or exceeds the requirements of MIL-C-39012. The straight plugs are installed without special tools. No crimping is required. Crimp-type connectors are said to offer the strongest connections with crimped center contact and

cable retention. This type is available as a straight plug.

For more information, contact Panduit Corp., 17301 Ridgeland Ave., Tinley Park, Ill. 60477-0981, (312) 532-1800; or circle #95 on the reader service card.

Distortion meter

Leader Instruments Corp. has introduced a new semi-automatic distortion meter, Model LDM-171. According to the company, distortion measurements on all types of audio equipment are simplified by the product's automatic-nulling feature. Once the operator obtains a reading



of less than 1 percent THD, this instrument will complete the measurement, eliminating almost all manual tuning. It also features S/N measurement and AC signal level measurement capabilities.

For more information, contact Leader Instruments Corp., 380 Oser Ave., Hauppauge, N.Y. 11788, (516) 231-6900 or (800) 645-5104; or circle #84 on the reader service card.



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Surge protectors

L-COM has introduced its modem and station protectors to provide suppression and guard electronic equipment such as computers, modems and terminals from lightning and other electrical disturbances. The LP series utilizes a two-stage circuit providing high-speed, gas discharge, voltage limiting in nanoseconds, according to the company. The products are said to have fast response time, be reliable to 10K baud and introduce negligible resistance.

L-COM has provided a special cable that plugs into AC outlets found in most offices and homes, thus simplifying grounding. These protectors are said to recover automatically in preparation for the next surge.

For additional information, contact L-COM, 1755 Osgood St., North Andover, Mass. 01845, (617) 682-6936; or circle #82 on the reader service card.



Frequency agile modulator

International Satellite Systems has introduced the GL-2610 hyper-band frequency agile modulator for CATV, DBS, SMATV and MATV applications. According to the company, features of the modu-

lators include output frequency selection with the setting of a switch and large LED readouts for channel cable selection. Output channels include low-band, mid-band, super-band and hyper-band. A SAW filter is incorporated for adjacent channel performance and a SAW resonator for low phase noise and frequency stability. IF modulation with loop throughs for both audio and video are located on the rear of the unit. Audio/video level indicators and adjustments are located on the front panel.

For more details, contact International Satellite Systems, 1004 Del Norte, Menlo Park, Calif. 94025, (415) 853-0833; or circle #89 on the reader service card.



Multichannel MDS/ITFS antenna

Spatial Communications has announced the introduction of a second MMDS/ITFS antenna product, the Microtenna-ME, an ultra-compact, multi-element antenna for reception of multichannel television at distances greater than 10 miles from the transmitting antenna site. It joins the single element Microtenna-SE, recommended for distances up to 10 miles.

The ME features a four-element antenna with integrated block downconverter. The array is said to provide an additional 6 dB of antenna gain to ensure optimum signal-to-noise ratios in secondary service areas. According to the company, ME provides better than 48 dBi system gain for MMDS/ITFS channel groups in the 2500-2700 MHz band.

For more information, contact Spatial Communications Inc., 1375 S.W. 192nd Ave., Aloha, Ore. 97006, (503) 649-8288; or circle #83 on the reader service card.

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Attenuators

Kay Elemetrics has introduced two high-wattage attenuators that can handle an average of 3 watts of power. The Model 432HW has an attenuation range of

DC-1,000 MHz (50 ohms) with a minimum step of 1 dB, VSWR of 1.2:1 at DC-250 MHz, 1.3:1 at 250-500, and 1.4:1 at 500-1,000. Insertion loss is .1 at DC-250 MHz, .3 at 250-500 and .7 at 500-1,000. According to the company, the 432HW can handle 3 watts average at 12.25V RMS continuous operation at 25°C. Derating is 10 percent for each 10°C rise in temperature. The model 431HW has a range of DC-41 MHz (50 ohms) and also handles an average of 3 watts of power. Both models are available with BNC connectors.

For more details, contact Kay Elemetrics Corp., 12 Maple Ave., Pine Brook,

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Distribution amp

Blonder-Tongue Laboratories Inc. has announced its DA-21S MATV/CATV distribution amplifier, used either as a VHF-MATV amplifier or a distribution amplifier for installations served by CATV cable drops. It is designed with a fixed 6 dB slope equalizer circuit to compensate for 75 ohm coaxial cable attenuation. This feature is said to prevent output overload and minimize distortion of signals in a system.

An ICEF circuit increases the amplifier's low-band input capability by 10 dB without increasing the noise figure. Typical gain of the DA-21S is 23 dB at 300 MHz. Five-way lightning and surge protection assures no transistor burn-outs from high-voltage spikes. It weighs 1.75 pounds and measures 8.25 inches long, 3.5 inches wide and 2.25 inches high.

For more details, contact Blonder-Tongue Laboratories Inc., 1 Jake Brown Rd., Old Bridge, N.J. 08857, (201) 679-4000; or circle #99 on the reader service card.

Technical handbooks

Howard W. Sams & Co. has announced the sixth edition of its *Handbook of Electronics Tables and Formulas*, a reference book for engineers, technicians and others involved in the field of electronics.

This expanded and updated sixth edition is said to reflect the recent developments in the electronics industry. Included in the softbound book's 265 pages are computer programs for calculating electrical and electronic equations and formulas. Formulas include power units, graphical reactance relations, power triangle and decibels/voltage power diagrams. Constants include standard potentiometer tapers and the Kansas City standard. Also included in this handbook are formulas and laws important to all branches of electronics, constants and government and industry standards, symbols and codes used in the electronics industry, service and installation data, data used in service design work, and mathematical tables and formulas.

For more information, contact Howard W. Sams & Co., 4300 W. 62nd St., Indianapolis, Ind. 46268, (317) 298-5409; or circle #88 on the reader service card.

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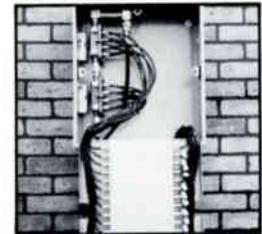
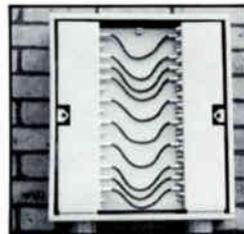
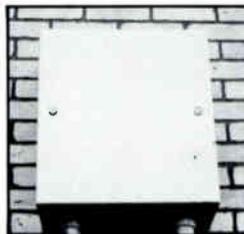
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Care and feeding of converters

By Doug Semon
 Director of Engineering in New Technology
 Viacom Cable

So, you didn't know that our little converters needed care and feeding? Well, they do; after all, converters are people too! Like any other domesticated animal, converters have a few basic needs in order to survive. Here are several things you can do to ensure a longer, healthier and more productive life for your converter.

Nutrition

Actually, a converter has only two dietary needs, both of them in the form of electrical energy. The first is supplied by your local power company. All of our converters are designed to operate on 117 volts, 60 Hz, alternating current (AC). Most of them will operate in the range of about 100 to 125 volts without any change in performance. While the box might survive on more voltage, the linear power supplies normally dump excess voltage as heat, and heat is not healthy for your box; it is better not to overfeed them. Lower voltages also can cause problems. Most converter power supplies will come out of regulation below about 100 volts. This can cause any number of problems, like 120 Hz hum bars in the picture and other nasty things. Undernourishment is a very bad thing for the boxes.

The power also should be fairly constant. Dips in the voltage can cause loss of descrambling or channels to change spontaneously. Minor power surges (like switching transients) generally are better tolerated, but in excess can cause blown fuses, or worse. And, as in most living things, direct lightning strikes are usually fatal. Good grounding practice can often prevent such violent deaths.

Speaking of grounding, most of the converters we use have polarized AC plugs. Sometimes the customer's AC outlet will not accept such plugs, and the customer cuts off the tines to make it fit. This is very bad and can be dangerous, causing everything from blown boxes and TV sets to a serious shock hazard.

Never install a box that has had its AC cord unpolarized, nor force the plug into a non-polarized outlet, including extension cords. Where necessary, use a properly grounded AC adapter, which, while inconvenient, is far better than risking the destruction of a very expensive TV set (bad public relations at the least).

The second form of power the boxes need is RF energy from our cable system. Like the AC power, the RF power level also is critical for proper performance. All

the units we use will work well if the signal level on all channels is between 0 and 10 dBmV. Some can handle more, some less, but that is a safe range for any unit. Remember, a channel carrying sync-suppressed video may read 3 to 4 dBmV lower than non-scrambled channels due to the absence of sync tip. Too high a level can cause all sorts of problems, from beats in the picture to addressing problems. Low levels can cause snowy pictures and addressing problems. It's best to play it safe here, as levels near the edge of the window may appear to work OK, but slight (and normal) variations over time may push the box outside its limits.

By the way, the converters expect these two signals to be in the proper places. RF energy on the AC line can cause strange pictures and other maladies. Sources of this high-frequency energy may be defective light dimmer switches, electric fences and high ambient fields from a nearby radio station (AM, FM, ham, etc.). A power-line filter often is helpful here. Worse than RF on the AC line is AC on the cable drop. This can cause hum in the picture, blown converters, burned houses and burned people (obviously things to avoid). AC on the drop can be caused by a poor power company neutral, among other things. In cases like these, it is a good idea to find the cause of the problem and correct it before installing a converter.

A final word on nutrition: Unlike people, converters do not need food or water to survive. The boxes cannot digest solid food. It usually just makes them look messy. Water, or any liquid for that matter, is even worse. Water reaching the insides of the box through any number of convenient orifices can cause shorts and corrosion. Short circuits are an obvious safety hazard for both you and the converter. Customers should be discouraged from watering the boxes with Coke. You need to be careful when transporting the boxes during the rainy season. Like the label says, "keep in a cool, dry place."

Caring for your pet

Like most pets, converters are sensitive to their environment; they do not like extreme heat or cold. During the very cold winter months, boxes that have been in the back of your truck should be allowed to warm to room temperature before applying AC power, if possible. On the other hand, they don't like it hot either. Boxes should be installed in a manner that allows adequate ventilation for cooling. The box should not be enclosed in a cabinet that prevents this cooling. Likewise, it is not a

'A properly grounded AC adapter . . . is far better than risking the destruction of a very expensive TV set'

good idea to cover an active box with newspapers, sweaters or a lot of program guides, as this also will prevent proper cooling. Some types of converters simply will not work if they get too hot. At any rate, excessive heat accelerates component failure.

Unlike cats, converters do not clean themselves; they enjoy a little grooming once in a while. A quick pass with a little Lemon Fresh Pledge will keep the box clean and happy and prevent dust buildup, which can cause heat buildup and generally gum up the insides of the unit. Never wash the box in the bathtub.

How to hold your new baby

Boxes do not like to be carried by their AC power cords any more than your cat likes to be carried by its tail. Excessive strain on the AC cord may damage the cord to the point where it can become a safety problem. Similarly, a three-foot jumper cable attached to the input/output connectors makes a convenient but very dangerous handle. The connectors on the jumper were not designed to hold up under such stress and will pull loose, causing a nasty fall or, at least, a poor connection when the box is installed.

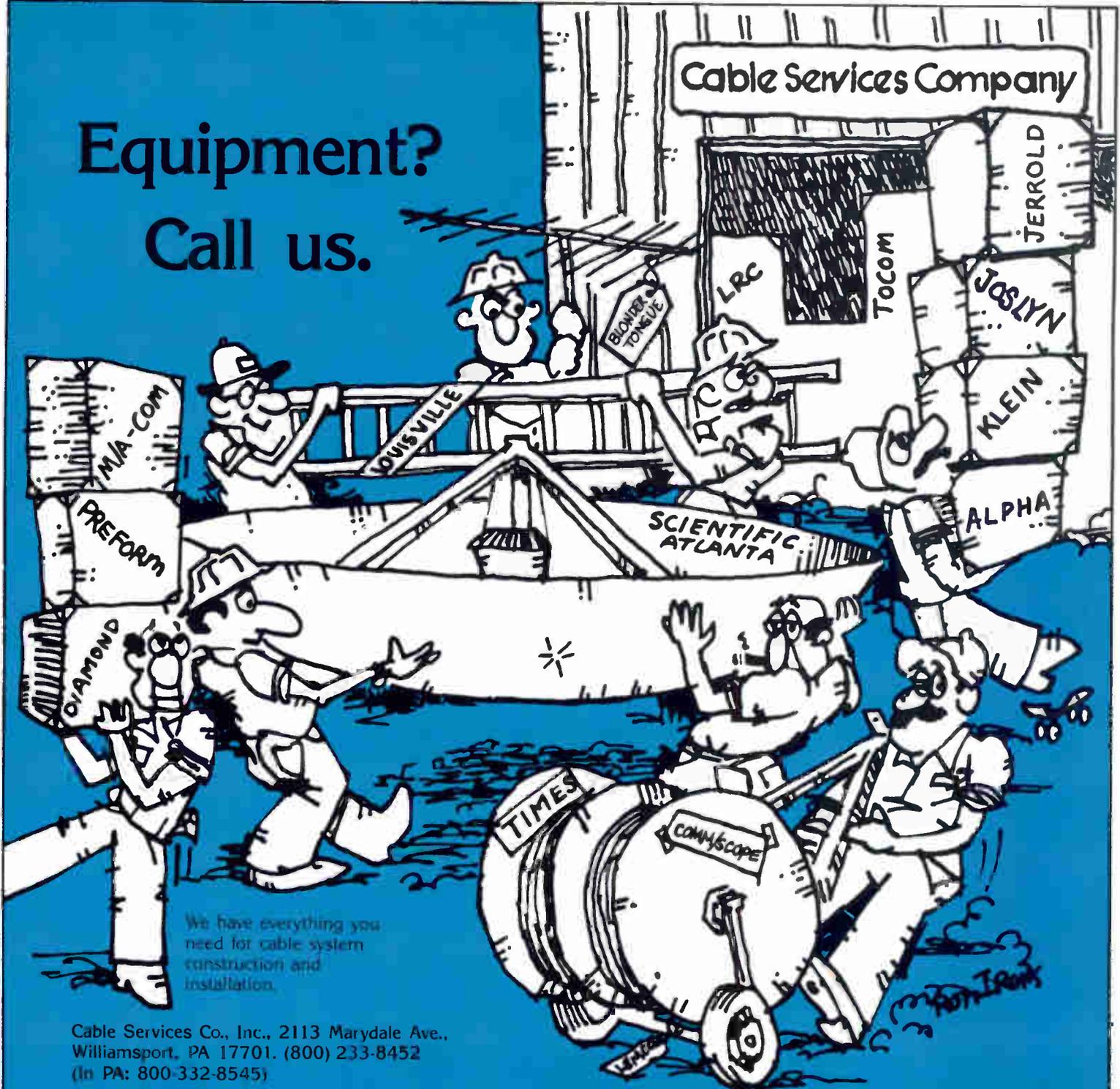
Customers like their new converters to look like new. To please them, transport the boxes carefully. Most systems have either a cardboard or styrofoam case to house the box; this helps prevent damage in the trucks from boxes banging against other boxes, ladders, cable reels and tool cabinets.

It's bad enough that we have to repair cosmetic damage caused by the customers, but we shouldn't make the problem worse by damaging the units ourselves. We spend a lot of money each year on purely cosmetic repairs; a lot of this is preventable. The average cost of a descrambler exceeds \$100. Keep this in mind when handling the boxes.

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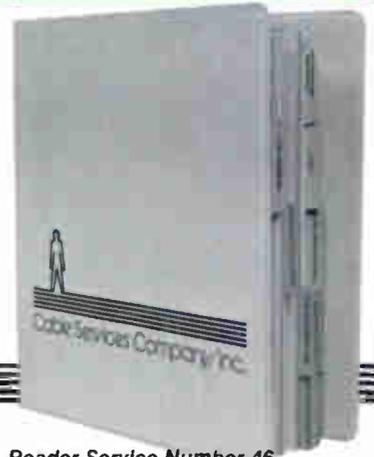
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CT-71



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place the TV on the box, as this may damage the converter case, cause it to over-heat or squish it flat. In fact, it's not a good idea to place anything that is heavier than a program guide on top of the converter. For these reasons, lamps, plants, ash-trays and the like should not be placed on the box. The customer, while undoubtedly an otherwise good parent, might not think of these things — it is your job to tell him.

Never use the converter as a chair, foot-rest, ladder, jack, hammer or football. Tell the customer not to do so either.

Remote-control units make excellent toys with which to teach the puppy to fetch, are good makeshift hammers and do a reasonable job as a device to punish

errant children and pets. Unfortunately, they are not very durable in this respect. You and the customer should resist the temptation to use them for any purpose other than changing channels.

When your child is ill

Contrary to popular belief, pounding on the box is not the best way to repair it. Repairs are better left to professionals. All sick boxes should be returned to converter repair for medical treatment, surgery and/or a proper burial, if necessary. Like any other veterinarian, our converter repair specialists can do a better job of healing the sick if they have a complete, thorough and accurate description of the

pain. It is your job to provide them with this by using the tags provided for this purpose.

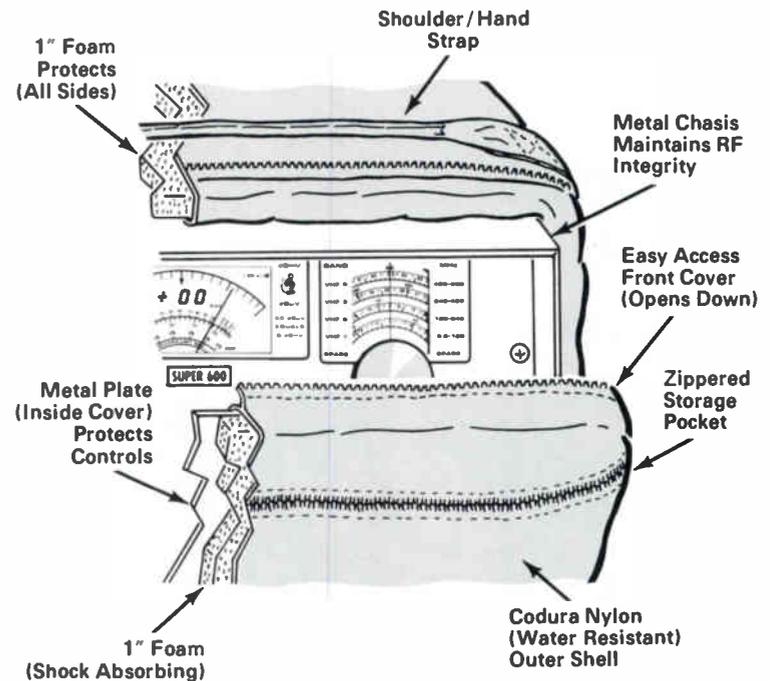
All good fables have a moral, and this one is no exception: With a little care from you and the customer, your converter will last a long time. Remember, all animals need a little TLC once in a while. A healthy pet is a happy pet, and a happy pet means less work for you in the long run. It's up to you! Thanks for listening, and good luck with your furry little friends. ■

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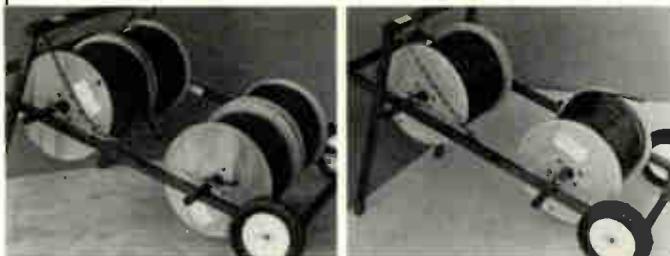
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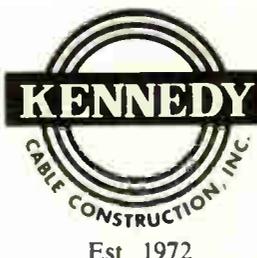
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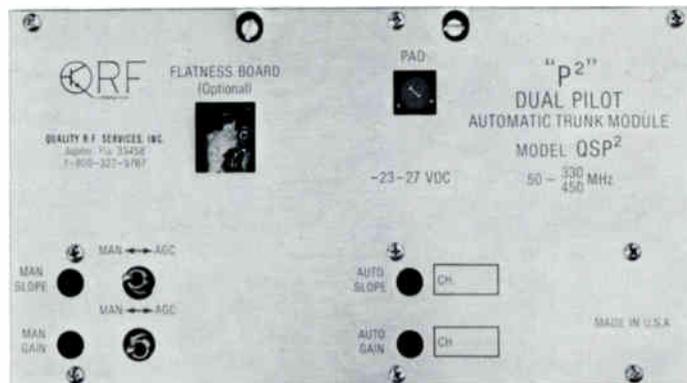
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Passband MHz	50-300	50-300	50-330	50-330	50-400	50-400	50-450	50-450
Flatness ± dB	0.2	0.2	0.2	0.2	0.25	0.25	0.25	0.25
Min. Full Gain dB	29 or 30	29 or 30	29 or 30	29 or 30	30	30	30	30
Gain Control Range dB	8	8	8	8	8	8	8	8
Slope Control Range dB	-1 to -7	-1 to -7	-1 to -7	-1 to -7	-2 to -8	-2 to -8	-2 to -8	-2 to -8
Control Pilots ASC: Turned to Ch.	"Q"	"Q"	"W"	"W"	"W"	"W"	"W"	"W"
Oper. Range dB	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable
AGC: Turned to Ch.	4	4	4	4	—	—	—	—
Oper. Range dB	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable
Return Loss dB	16	16	16	16	16	16	16	16
Noise Figure dB	6	6	6	6	6	6	6.5	6.5
Typical Oper. Level dBmV	34/30	34/30	34/30	34/30	35/30	35/30	35/30	35/30
Distortion at C/CTB	-93dB	-88dB	-92dB	-87dB	-91dB	-86dB	-89dB	-84dB
Typical Oper. XMod levels 2nd order	-94dB	-89dB	-93dB	-88dB	-91dB	-86dB	-89dB	-84dB
DC Requirement mA at -23 VDC Note 1	630-730	420-500	630-730	420-500	850-750	430-500	650-750	430-500

Note 1: DC requirements are stated as typical to maximum.

Note 2: Specifications should be referenced to the modules, not the connector chassis.

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Reader Service Number 48.

July

July 8-10: Online International Ltd.'s Cable '86, Brighton Metropole Hotel, Brighton, England. Contact (212) 279-8890 or 01-863-7726.

July 8-10: Jerrold technical seminar, Chicago. Contact Joan Thielen, (215) 674-4800.

July 9-10: Trellis Communications' seminar on fiber-optic information transport, Westford Regency Hotel, Westford, Mass. Contact (603) 898-3434.

July 11: Wavetek system sweeping seminar, the Wavetek factory, Beech Grove, Ind. Contact Steve Windle, (317) 788-5980.

July 15-17: Community Antenna Television Association annual convention, MGM Grand Hotel, Reno, Nev. Contact (703) 691-8875.

July 16-18: Magnavox CATV training seminar, St. Paul, Minn. Contact Amy Costello, (800) 448-5171.

July 17: SCTE Dairyland

Meeting Group seminar on headend products and BTSC stereo encoders, The Gobbler Restaurant, Johnson Creek, Wis. Contact (608) 273-4800.

July 17-19: Montana Cable Television Association annual convention, Grouse Mountain Lodge, Whitefish, Mont. Contact Tom Glendenning, (406) 586-1837.

July 21-22: Blonder-Tongue SMATV / MATV / CATV / TVRO technical seminar, Airport Hilton, Tampa, Fla. Contact Neville Johnson, (813) 953-9843.

July 21-23: Magnavox CATV training seminar, St. Paul, Minn. Contact Amy Costello, (800) 448-5171.

July 23: Georgia Cable Television Association membership meeting, Peachtree Plaza Hotel, Atlanta. Contact (404) 252-4371.

July 23: Tennessee Cable Television Association membership meeting, Peachtree Plaza Hotel, Atlanta. Contact (615) 256-7037.

July 23-25: Eastern Show, Atlanta Market Center, Atlanta. Contact (404) 252-2454.

July 24-26: Colorado Cable Television Association summer convention, Beaver Run Resort, Breckenridge, Colo. Contact (303) 863-0084.

July 27-28: Idaho Cable Television Association summer convention, Payette Lake, McCall, Idaho. Contact (208) 336-9121.

July 28-30: New England Cable Television Association annual convention, Dunfry Hyannis Hotel, Hyannis, Mass. Contact (617) 843-3418.

July 29: SCTE Satellite Teleseminar, chapter development workshop, 1-2 p.m. (EDT) over Transponder 7 of Satcom IIIIR. Contact (215) 363-6888.

July 30: SCTE Chattahoochee Chapter meeting on system design techniques. Contact Gary Donaldson, (404) 979-0010.

July 30-Aug. 1: Magnavox CATV training seminar, Chicago. Contact Amy Costello, (800) 448-5171.

July 30-Aug. 1: Wyoming CATV Association annual convention, Americana Snow King Inn, Jackson, Wyo. Contact Bob Meinecke, (307) 587-2219.

July 30-Aug. 1: Michigan Cable Television Association annual summer meeting, Grand Traverse Resort, Traverse City, Mich. Contact (517) 351-5800.

August

Aug. 5-7: Jerrold technical seminar, Holiday Inn, Holyoke, Mass. Contact Joan Thielen, (215) 674-4800.

Aug. 6: SCTE Rocky Mountain Chapter meeting on headend, TVRO and satellite scrambling. Contact Joe Thomas, (303) 978-9770.

Aug. 6-8: Magnavox CATV training seminar, Detroit, Mich.

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Contact Amy Costello, (800) 448-5171.

Aug. 6-9: Mississippi Cable Television Association annual convention, Royal D'Iberville, Biloxi, Miss. Contact David Bailey, (601) 437-8300.

Aug. 8: Wavetek system sweeping seminar, the Wavetek factory, Beech Grove, Ind. Contact Steve Windle, (317) 788-5980.

Aug. 11-13: Magnavox CATV training seminar, Detroit, Mich. Contact Amy Costello, (800) 448-5171.

Aug. 13-14: Trellis Communications' seminar on fiber-optic information transport, Red Lion Inn, San Jose, Calif. Contact (603) 898-3434.

Aug. 19-21: Florida Cable Television Association annual convention, Marriott Hotel, Marco Island, Fla. Contact Bob Brillante, (904) 681-1990.

Aug. 20: SCTE Delaware Valley Chapter meeting on distribution systems and BCT/E exam for signal processing

centers. Williamson Restaurant, Horsham, Pa. Contact Bev Zane, (215) 674-4800.

Aug. 20-22: Rocky Mountain and New Mexico Cable Television Association combined annual convention, Santa Fe Hilton, Santa Fe, N.M. Contact Ray Davenport, (505) 983-5885.

Aug. 21-23: C-COR Electronics technical seminar, Hartford, Conn. Contact Debra Cree, (800) 233-2267 or (814) 238-2461.

Aug. 27-28: Trellis Communications' seminar on fiber-optic information transport, Marriott Castle Harbour, Bermuda, Tenn. Contact (603) 898-3434.

September

Sept. 1-3: SPACE/STTI Show, Opryland Hotel, Nashville, Tenn. Contact (800) 654-9276.

Sept. 8-9: Wisconsin Cable Communications Association

annual fall convention, Radisson Hotel, LaCrosse, Wis. Contact Lynne Walrath, (608) 256-1683.

Sept. 9-11: Jerrold technical seminar, Columbus, Ohio. Contact Joan Thielen, (215) 674-4800.

Sept. 10-11: Trellis Communications' seminar on fiber-optic information transport, Breckenridge Hotel, St. Louis. Contact (603) 898-3434.

Sept. 12: Wavetek system sweeping seminar, the Wavetek factory, Beech Grove, Ind. Contact Steve Windle, (317) 788-5980.

Sept. 14-16: South Dakota Community Television Association annual convention, Sylvan Lake Resort, Custer, S.D. Contact Rich Davis, (605) 886-7990.

Sept. 16-18: Pacific Northwest Equipment Exposition, Clark County Fairgrounds, Vancouver, Wash. Contact (800) 624-2569.

Sept. 16-18: Alabama Cable

Planning ahead

Sept. 23-25: Great Lakes Cable Expo, Hyatt Convention Center, Columbus, Ohio.

Oct. 28-30: Atlantic Show, Convention Hall, Atlantic City, N.J.

Dec. 3-5: Western Show, Convention Center, Anaheim, Calif.

Feb. 18-20: Texas Show, San Antonio, Texas.

April 2-5: Cable-Tec Expo '87, Hyatt Hotel, Orlando, Fla.

May 17-20: NCTA annual convention, Las Vegas, Nev.

Television Association annual convention, Radisson Admiral Semmes Hotel, Mobile, Ala. Contact (205) 288-1821.

Sept. 17-19: Magnavox CATV training seminar, Worcester, Mass. Contact Amy Costello, (800) 448-5171.

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Danny O'Connell and **Michael Holland** recently were promoted by **Pico Products Inc.** O'Connell has been named executive vice president of the parent company. He will serve as liaison between Pico's corporate management and its subsidiaries. Holland was named O'Connell's successor as president and chief operating officer of Pico Macom Inc., Lakeview Terrace, Calif. He will oversee the business operations of Pico Macom and Pico's subsidiaries on the West Coast and in the Far East. Contact: 103 Commerce Blvd., Liverpool, N.Y. 13088, (315) 451-7700.

Scientific-Atlanta Inc. has appointed **Graham Mobley**, its technical director, to staff vice president. Prior to joining S-A's Electro-Products division in 1967, Mobley worked with Bell Laboratories. In 1978 he became assistant technical director for S-A and was subsequently named technical director.

Scientific-Atlanta also has appointed two new principal engineers, **William Wall Jr.** and **Jack Watson**. Wall has been assigned to the Electro-Products division of the Government Systems Group. He joined S-A after receiving a doctorate in physics at Georgia Tech. Watson joined S-A's Government Products division in 1984. He received an MSEE from Drexel University. Contact: 1 Technology Pkwy., Box 105600, Atlanta, Ga. 30348, (404) 441-4000.

Former Michigan Cable Television Association (MCTA) Executive Director and General Counsel **John Liskey** was recently appointed system manager for **United Cable TV of Mid-Michigan**. He will continue in the MCTA as a member of the board of directors. Contact: Box 918, 1070 Towbridge, East Lansing, Mich. 48823, (517) 351-8080.

C-COR Electronics Inc. has announced the hiring of two executive officers, **Jack**

Andrews and **Mark Robertson**. Andrews has been appointed vice president-finance and treasurer. Prior to joining C-COR, he worked for Bendix Corp. for 28 years. Robertson has been promoted from vice president-operations, Anaheim, to vice president-operations and manufacturing for the company. Prior to joining C-COR, he worked for American Hoechst Corp. in Camarillo, Calif., as manufacturing manager.

C-COR also has announced the election of **Dr. Wilbur Meier** as corporate secretary. He will be responsible for keeping minutes for all meetings of the board of directors, shareholders and all committees of the company. Contact: 60 Decibel Rd., State College, Pa. 16801, (814) 238-2461.

Focom Systems has announced the appointment of **Peter Frigon** as marketing director of its U.S. operations. The company, headquartered in the United Kingdom, produces fiber-optic systems designed for industry, commerce and the military. Frigon will be responsible for developing a nationwide sales and distribution organization to market Focom products in the United States and Canada. Previously, he was director of marketing for Jupiter Technology Inc., Waltham, Mass. Contact: 300 Research Parkway, Meriden, Conn. 06450, (203) 237-8873.

The **Texas Cable TV Association** has announced its officers and directors for 1986-87. Officers are **Tom Whitehead Jr.**, president; **Neil Haman**, vice president; and **Joseph DiBacco**, secretary/treasurer. Member directors are **Cal Broussard**, **Bob Coleman**, **Charles Gramlich**, **Missy Mandell**, **John Mankin Jr.**, **Bryan O'Hara**, **Bill Thomison** and **N.A. Williams**. Associate directors are **Bruce Martin** and **Tom Soulsby**. Contact: P.O. Box 13518, Austin, Texas 78711, (512) 474-2082.

Satellite Technology Management Inc. has announced

the appointment of **Kenneth Dalsing** as director of manufacturing. In the newly created position, Dalsing will be responsible for all manufacturing operations including purchasing, assembly, testing and shipping. Before joining STM, he was director of operations at Amplica Inc., Newbury Park, Calif., from 1983 to 1986. Contact: 361 Van Ness Ave., Torrance, Calif. 90501, (213) 618-6800.



Slim

Wegener Communications has announced the addition of **David Slim** as marketing manager, data communications products. Slim will be responsible for development of the company's data communications market. He was most recently employed at Scientific-Atlanta as a senior systems engineer in the Broadband Communications division. Contact: 150 Technology Park, Norcross, Ga. 30092, (404) 448-7288.

Larry Schott has been named director of association affairs at the **National Cable Television Association** (NCTA). Schott has been assistant director for state government relations since he joined NCTA in 1983. Prior to this, he was a management consultant in private practice.

Also, **Jeremy Stern**, director of corporate affairs for Continental Cablevision of Michigan Inc., joined the NCTA as director of its office of cable signal theft. He also will be executive director of the Coalition Opposing Signal Theft (COST). Since 1983, Stern has

been vice chairman and chairman of the Michigan Cable Television Association's political action committee and a member of its subscriber privacy subcommittee. Contact: 1724 Massachusetts Ave., N.W., Washington, D.C. 20036, (202) 775-3629.

First Data Resources Inc. has announced the promotion of **D. Rusty Rau** to regional sales manager for the cable system services division. Prior to this, Rau was the director of operations for the cable division. In his new position, Rau is responsible for the sales of FDR's cable control system and its PC-based micro delivery option. Rau has been with FDR for nine years, serving in various management capacities and instrumental in the development of cable products. Contact: 7301 Pacific St., Omaha, Neb. 68114-5497, (402) 399-7000.



Pastor

Lonnie Pastor has been named broadcast marketing manager for **ADC Telecommunications Inc.** In his new position, Pastor is responsible for market planning of ADC's line of broadcast products and for identifying opportunities for new and existing products in current and potential markets. Pastor was with ADC for two years as broadcast product manager. Prior to joining ADC, Pastor was with International Communication Systems, Minneapolis, where he was director of engineering. Contact: 4900 W. 78th St., Minneapolis, Minn. 55435, (612) 893-3136.

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