C-ED

Western Show Issue

Special Video Issue
Quality Checks and Daily Operations

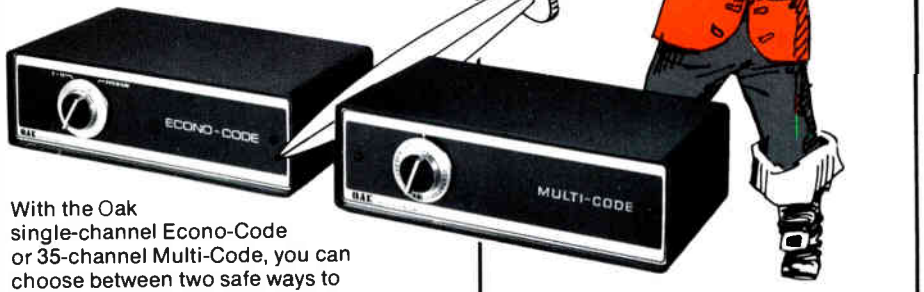
Communications-Engineering Digest
Reporting the Technologies of Broadband Engineering

December 1978
Volume 4, No. 12

Oak banishes pay-TV piracy!

A double-edged attack on pirates

Pay TV pirates can cost you a great percentage of your profits, especially if you fall into the "trap" and trust soft security.



With the Oak single-channel Econo-Code or 35-channel Multi-Code, you can choose between two safe ways to guard your profits. Either of these hard security systems offers the greatest protection against theft of service in the industry.

Built and backed by Oak

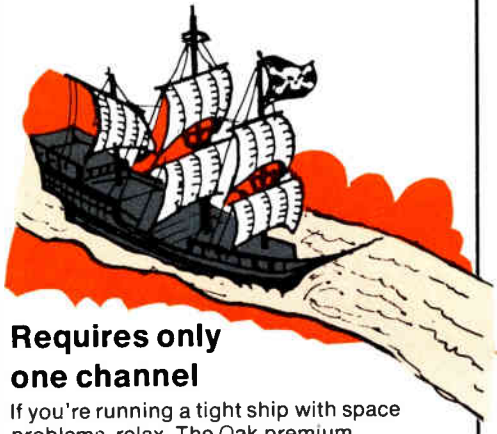
All Oak CATV products are built in company-owned facilities ... your assurance of our commitment to the industry.

Key-lock option for the captain

When the captain demands control, you can offer the Oak key-lock option. This option gives customers the comfort of parental control of premium channels.

Smooth sailing

We follow up with prompt delivery, rapid service turn-around, and offer all customers a one-year warranty against factory defects on parts and labor.



Requires only one channel

If you're running a tight ship with space problems, relax. The Oak premium encoding/decoding information is transmitted within a standard TV channel. By using an Econo-Code, you can add pay TV to your existing 12-channel system. Econo-Code converts and decodes a mid-band channel to a low-band channel, allowing you to utilize your existing distribution system. If you require two pay channels, Oak will supply a two-channel Econo-Code as an option.

Your reward!

Oak Econo-Code and Multi-Code decoders offer you the reliability and security you need to beat the pay TV pirates. Your reward for making the right decision and choosing Oak will be smooth sailing and high profits.

A jewel case holds all

The 35-channel set top or Jewel Case Multi-Code allows you to pre-determine any combination of encoded channels, up to a total of thirty-five. Channel selection is easily accomplished with a single detented rotary control. Varactor tuning and wide range AFC provide highest reliability and stability. An attractive Jewel Case remote control is offered as an option.

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CATV DIVISION / CRYSTAL LAKE, ILLINOIS 60014
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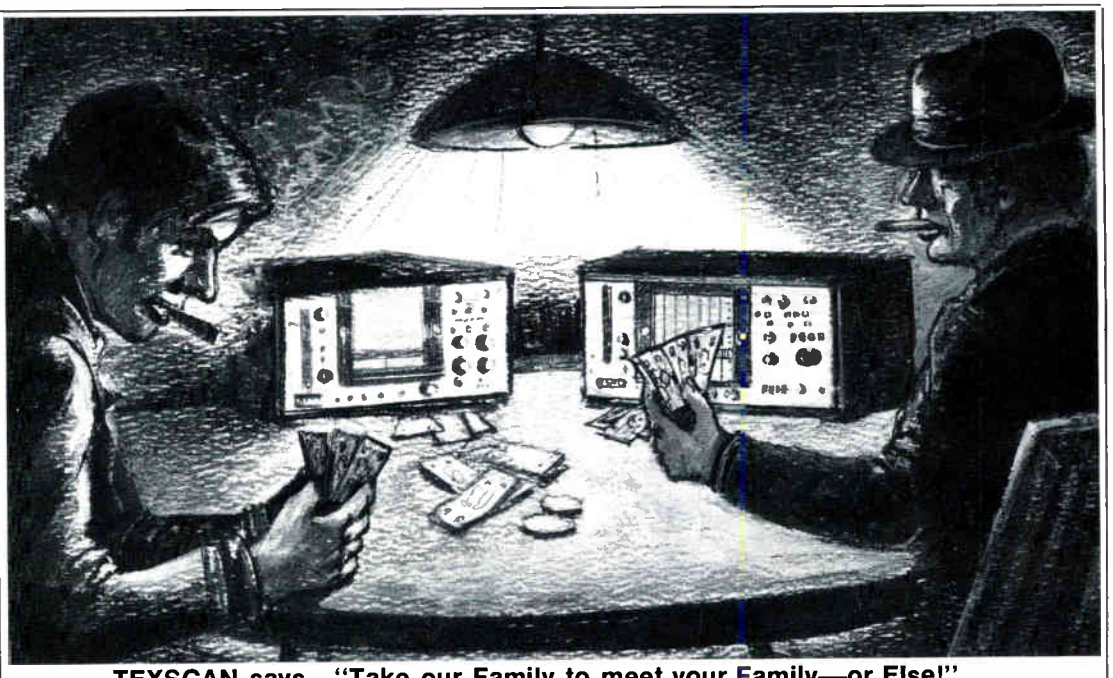
Texscan Corp. provides a full range of CATV products; line amplifiers, passives and test equipment. Texscan also provides industry technical training seminars.

The goods are produced in

Indiana and Arizona, with full national marketing services via direct regional sales personnel.



TEXSCAN says—"Take our Family to meet your Family—or Else!"

MUG SHOTS OF "THE FAMILY!"

TFC-7

Frequency Counter

The tuned frequency counter is wanted for system proof of performance, video demodulation & precise, counted variable marker functions.

This versatile instrument provides both preselector/stripper functions with a broadband 5-300 MHz counter.

Description:

- All channel performance
- 0 dBmV sensitivity
- Accurate
- Variable gate time

Wanted for $1900

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Spectrum Analyzer

The VSM-5A is wanted for complete spectrum analysis requiring phase lock and narrow resolution bandwidths. This instrument is capable of all FCC proof of performance measurements except system flatness.

Description:

- 4-350 MHz
- Crystal markers
- Amplitude calibrator
- −50 dBmV sensitivity
- Battery operated portable

Wanted for $4,250

9550T&R

"Simo" Sweep

The simosweep twins are wanted for precise system alignment and balance.

Description:

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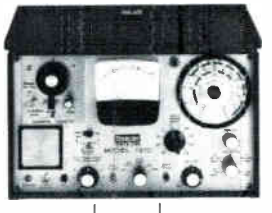
- ±0.25 dB flatness
- Remote triggering } **T**
- Battery operated
- Long persistence
- Variable frequency marker
- Storage interface } **R**

Wanted for: "T" $1,095
"R" $2,195



7270

Field Strength Meter

The 7270 is wanted for accurate level measurements. The new (pat. pend.) peak detector and rotary attenuator are identifying marks for this accurate (typically ±0.5 dB) instrument. The Ni-Cad battery provides more than 8 hours use on a charge.

Description:

- 8½" × 13¼" × 8¼" —15 lbs.
- 5-216 MHz
- 10 μV sensitivity
- Rugged construction

Wanted for $895

These instruments have "records" of proven reliability under adverse field environments. They have been on the loose for at least 5 years.

There are other members of the gang, such as frequency counters, sweep generators, oscilloscopes, bridges, attenuators, filters and passive components, as well as distribution amplifiers and passives.

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Phoenix, AZ 85017
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1. Parameter III's copper clad center conductor gives you the highest percentage of copper by volume of any low-loss cable. Plus, Parameter III's solid copper conductor has the highest quality copper commercially available.

2. The aluminum tubing is manufactured with the highest quality-control standards, thus insuring greater uniformity and better mechanicals.

3. With only virgin material used in the low density, black polyethylene jacket, high uniformity and reliability are insured.

4. A major breakthrough in cable technology, Parameter III's polyethylene dielectric has better electricals than other low-loss foam cable and has better compression resistance for better mechanicals. It is extremely clean electrically. It bonds so well to the center conductor that it totally locks out moisture, thus making the cable almost completely corrosion-proof. Yet the firmer dielectric actually strips cleaner and easier than other low-loss cables.

5. Compression and bending radius statistics document the superior quality of this cable's construction. In bend testing, Parameter III resists flattening and center conductor movement.

6. Competitive pricing makes Parameter III truly cost efficient. Just one more reason for the big gains it's achieving throughout the industry.

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See us at booth #26 at the Western Cable Television Show.

C-ED News at a Glance

WASHINGTON, D.C.—The **Federal Communications Commission is** now **accepting supplementary pleadings by parties to any pending signal carriage rule waiver proceedings.** This announcement follows the commission's decision involving the Arlington Telecommunications Corporation's carriage of Baltimore TV signals, in which the commission eliminated the need for any showing other than on the impact of a local broadcaster's ability to serve the public interest (cee *C-ED*, page 14).

WASHINGTON, D.C.—The **National Telecommunications and Information Administration** (NTIA) of the United States Department of Commerce, has submitted initial comments **endorsing the Federal Communications Commission's proposal to permit the origination of emergency warnings and contribution solicitation announcements over translators.** The proposed amendments will provide immediate benefits to rural broadcast service.

The NTIA suggested to the FCC that these proposed amendments, while narrow in scope, are of concern to many rural communities in which translators are a major source of FM and television broadcasting, and could be an important means for dissemination of emergency warnings.

The NTIA is the executive agency primarily responsible for developing telecommunications policy.

WASHINGTON, D.C.—**Superstations via cable/satellite networks, the impact of videocassettes and discs, and direct-to-home satellite transmission** are among technical issues to be **addressed in the new FCC "Inquiry into Commercial TV Network Practices."** The FCC has been undertaking such investigations of networks since 1941, and the current investigation has unanimous FCC backing.

WASHINGTON, D.C.—The **third meeting of the FCC Advisory Committee on cable signal leakage convened recently** on the present state of signal leakage. To date, little analysis has been done on the status of air and ground measurements.

Methods for analysis and display of data were discussed, and it was agreed that the most important presentation will be the probability distribution plots which have been anticipated all along. It was further suggested that a few point-by-point plots of 5,000-point samples be made to clarify the random variation characteristics of the leakage signal as well as to identify effects of impulse noise from non-cable TV sources. It was also agreed that some attempts to correlate high-leakage areas on the ground with high-signal areas in the airspace be made.

Communications-Engineering Digest is published for the Society of Cable Television Engineers by Titsch Publishing, Inc., 1139 Delaware Plaza, P.O. Box 4305, Denver, CO 80204. © December 1978. Subscription price: 1 year, $14.00. Canada and Mexico add $3.00, and foreign subscriptions add $5.00 per year. Controlled circulation paid at Denver, Colorado.

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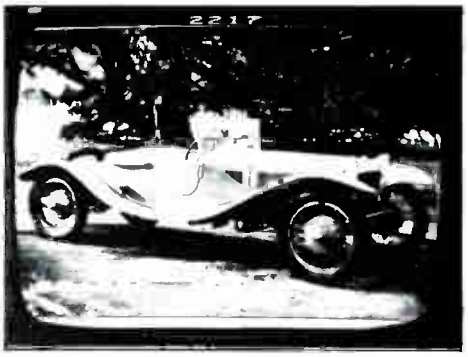

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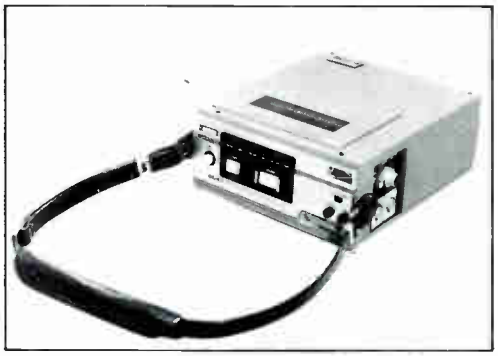

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Cover: Our December issue of C-ED features Fanfare Television's on-air control booth at its studio facilities in Houston, Texas. Photograph supplied courtesy of Fanfare.

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Editor's Letter

Los Angeles. Well, technically, it's Anaheim. No matter. With the Western Show returning to the LA area this year, we decided that an appropriate and timely cover story, given the Los Angeles site, would be on video production. First, you will find two discussions regarding Home Box Office's and Showtime's studios. Specifically, two critical areas are examined—quality control and playback and post-production editing. On an even more technical note, the two stories that follow will greatly interest those without studios of HBO's and Showtime's magnitude. We offer an historical and present-day look at television time base errors and an alternate approach to the SMPTE time code and other magnetic recording medium information. For the latest state-of-the-art in video products, we have dedicated four pages to video technology, beginning on page 68.

In addition to the latest video production techniques, there's plenty to keep you occupied. Part two of Early Monroe's *Interfacing CATV with Broadcast Subscription Television* can be found on page 16. (The first part appeared in the November issue.) Ken Foster has graciously given us his thoughts on detecting cable system signal leakage. Ken is frank in his discussion, and we highly recommend you read his piece on page 22. And, of course, there's lots, lots more in our departments, particularly "International Comments" from Great Britain.

Paul A. FitzPatrick

The "Age of Specialization" Is NOW

By Gayheart C. Kleykamp
Director of Engineering
Norwalk Cable Construction Company
Norwalk, Connecticut

This title is, of course, a cliche' . . . and a generalization, but CATV engineers and technicians *are* specialists. CATV technology is a relatively narrow segment of the radio communications field although we have seen it broaden rapidly in recent years. We have also observed a phenomenal expansion of the entire communications arena.

Keeping abreast of technological developments in the "narrow" CATV segment of communications requires more time than most of us have available. In addition to designing systems, conducting intricate electrical tests, evaluating test data and performing a variety of specialized technical activities, we are often asked to divert our attention to an equal amount of non-technical activities . . . or we volunteer for them.

I am reminded of an amusing story "young" Bob Galvin told about himself. As a newly-elected president of Motorola, succeeding his well-known father, he was touring the Phoenix Motorola electronics plant. He suddenly stopped at a technician's bench and, noting a voltmeter adjusted for 250 volts full-scale deflection and indicating approximately four volts, Galvin reached across and switched the meter to a lower range to provide a mid-scale (more easily read) indication. The technician promptly returned the meter range switch to its original position and asked, "Who the hell are you?" "I'm Bob Galvin, president of Motorola," he replied. "Well, that sounds like a pretty good job, Mr. Galvin. WHY DON'T YOU STICK TO IT?" responded the technician.

Don't get me wrong . . . some quasi-technical activities are so important as to warrant the temporary diversion for strictly technical pursuits. I like to think writing this type of article is one. I am sure the writing of technical papers and the instruction of technician trainees are. Participation in budgetary estimating, business planning and other cooperative efforts are also—if they are not engaged in to an extent as to be detrimental to the pursuit of CATV technology knowledge.

Attend the technical seminars at conventions, participate in those SCTE-sponsored seminars and conferences, read the trade journals (especially *C-ED!).* You just may find they are more interesting and stimulating than the convention hospitality suites, sports events and criticizing the system manager.

SCTE Plans Tech Meeting on CATV Towers in January

WASHINGTON, D.C.—The Society of Cable Television Engineers will sponsor a two-day meeting in Melbourne, Florida on January 8-9, 1979. This is the second in a series of six meetings and workshops throughout the year. The program will center on CATV tower construction, maintenance, inspection, FAA/FCC rules, surge protection and stand-by power. Registration includes the sessions, lunches, one reception and table-top exhibits.

Advance registration prices for the meeting are: $50 to SCTE members; $75 for personnel from CATV member systems of the Southern Cable Television Association; and $95 for non-members. Registration should be made direct with the Society of Cable Television Engineers, P.O. Box 2665, Arlington, Virginia 22202. Hotel room reservations must be made direct with the Holiday Inn-East in Melbourne, Florida (305) 723-3661.

SCTE 1978 Membership Directory Provides CATV History Lesson

WASHINGTON, D.C.—The Society of Cable Television Engineers has published a 224-page 1978 Membership Directory that includes extensive CATV industry history in the form of consumer press articles from as early as 1950. More than 70 SCTE charter members were interviewed and express their thoughts on cable history and predictions about the industry to the year 2000. A complete history of SCTE's first ten years also appears in the publication.

Every SCTE member-of-record as of October 15, 1978 will receive one copy of this first SCTE membership record. Additional copies are available for $20 to SCTE members. Non-members may purchase the SCTE 1978 Membership Directory at a cost of $30 per copy plus $2 shipping. Payment should be enclosed with the order. Order from SCTE, 1100 17th Street NW, Washington, D.C. 20036.

SCTE to Host FCC Chief Engineer at Western CATV Convention in Anaheim

WASHINGTON, D.C.—The Society of Cable Television Engineers has invited Raymond Spence, chief engineer at the Federal Communications Commission, to speak to CATV engineers and technicians on Friday morning, December 8 at 10:00 a.m. during SCTE hosted sessions arranged for the Western Cable Television Convention. Spence accepted the groups's invitation with enthusiasm saying, "I'm anxious to learn more about the changes in CATV technology." He said he'll arrive early at the Disneyland Hotel in order to have plenty of time to visit the exhibits and view the large display of cable television/broadband communications hardware.

Spence has never spoken before the CATV industry during his time with the FCC. He has been asked to talk about CATV as a component of the communications industry and its kinship to other segments of telecommunications.

Introducing two new line extenders.

When new homes get built down the road next year, you'll be mighty glad you used Scientific-Atlanta 6552 Line Extenders this year. Because our new two-in-one design lets you extend service using nothing more than a hybrid chip.

When you want to grow just plug the chip into our 6552. And get a boost from 32 dB to 35 dB just like that. Or you can buy our 6553 with the higher gain chip to begin with if you like.

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Europe: 1-7 Sunbury Cross Centre, Staines Road West, Sunbury on Thames, Middlesex TW16 7BB, England,
Telephone Sunbury on Thames 89751, Telex 896015

Western Show Schedule

ANAHEIM, CALIFORNIA—Western Show Schedule plans are very nearly completed for the 1978 Annual Western Cable Television Show and Convention to be held at the Disneyland Hotel in Anaheim, California, December 6-8.

Wednesday, December 6: The annual tennis tournament will be held at Tennisland Racquet Club adjacent to the Disneyland Hotel, and the annual golf tournament will be held at the Costa Mesa Country Club in Costa Mesa.

The convention will then kick off with the traditional financial management seminar at 2:00 p.m. The topic will be "New AICPA Accounting Standards for Cable Television—An Assessment of Their Impact." Directing the seminar will be Lawrence Shannon, Arthur Young & Company; and Bill Kingery, United Cable Television Corporation.

Thursday, December 7: The breakfast speaker will be Congressman Charles D. Rose (D-NC), Chairman of the Speaker's Broadcast Advisory Committee. Luncheon speaker on Thursday will be Tyrone Brown of the Federal Communications Commission.

The technical seminar begins at 1:30 p.m. The theme is "Current Operating Problems." J.W. Stilwell, CPI, will speak first on "Grounding and Bonding"; H. Cicconi, Sammons Communications, will speak on "Experiences with Satcom I"; Bob Tenton, HBO, will speak on "3/4-inch Cassette Standards"; and Robert Bilodeau, Suburban Cablevision, will speak on "Economics of System Powering."

Friday, December 8: Breakfast on Friday morning will feature Anne Marie Hutchison, president, Eagle North Communications, presiding. Speakers will be Hon. Daniel K. Inouye, U.S. Senator, Hawaii; and Robert W. Hughes, chairman, NCTA and president, CPI.

Friday's technical seminar on "Addressable Taps: New Era for CATV," begins at 9:30 a.m. Speakers will be Chris Cohan, Sonic Cable TV; David Fear, Delta-Benco-Cascade; Philip Merrill, MCE Corporation; and Al Varden, Oxnard Cablevision. A seminar at 10:45 will feature Raymond E. Spence, Jr., chief, office of the chief engineer, FCC, on "Cable's Relationship to other Communications Services."

Western Design Engineering Show to be Held in Anaheim

NEW YORK, NEW YORK—The first major exposition and conference in the design engineering field to be staged in the West—the Western Design Engineering Show and the accompanying A.S.M.E. Western Design Engineering Conference will take place at the Convention Center, Anaheim, California, December 5-7.

The conference (and the show,) will have four major points of interest, among many other important discussions. These include: directing the design, using materials effectively, fastening and joining, and design aids and analysis.

The highlight, however, will be many sessions devoted to the impact of microprocessors and microelectronics.

The exhibit floor will be crowded with thousands of components and materials: metals, plastics, shapes, forms, finishes, coatings, fasteners, adhesives, power transmissions, mechanical components, electrical components, fluid power components, electronic components, engineering equipment and engineering services.

Call for Nominations for Ports IEEE Engineering Award

WASHINGTON, D.C.—The Board of Governors of the Broadcast, Cable, and Consumer Electronics Society of the Institute of Electrical and Electronics Engineers has released a call for nominations for the 1979 Delmer Ports Award. In 1977, the Board of Governors approved the creation of the award for engineering leadership, in memory of the late Delmer Ports. At the time of his death, Ports was vice president of engineering of the National Cable Television Association and had been a leader in IEEE affairs for many years. Recipient of the first presentation, made in 1978, was Keneth A. Simons.

Criteria of the award includes engineering leadership, technical contributions and innovations, contributing to the engineering profession, particularly relating to the BCCE Society and invention of specific devices. The winner must be a member of IEEE and of the BCCE Society.

Delmer Ports.

Nominations may be made in the form of a letter stating the name of the nominee, the name, address and telephone number of the nominator and a short narrative describing principal achievements of the person nominated, according to the criteria given above. The nominations should be forwarded to Robert S. Powers, Secretary, Cable AdCom, Federal Communications Commission, 1919 M Street Northwest, Washington, D.C. 20554. February 15, 1979 is the deadline for nominations."

New Distant Signal Waiver Policy Announced by FCC

WASHINGTON, D.C.—The FCC has announced a major change in its distant signal waiver policy. Until now if a cable system wanted a waiver to carry more distant signals then the rules allow, it had to prove two things:

- That the additional signal(s) would not harm local broadcasters (the burden was entirely on the cable operator), and
- That the situation was unique.

The new procedure does two things. First, it eliminates the requirement that "uniqueness" be shown. Second, once the cable operator presents a good case that there will be no impact on local broacasting, the burden shifts to the broadcaster to prove the need for protection. This shifting of the burden is very important and will certainly make waivers more common.

Under the new policy the cable operator seeking additional distant signals will provide the FCC with its own analysis showing that more imports won't jeopardize the ability of local broadcasters to serve the public. The type of evidence to be presented was not specified by the commission but might include an analysis of audience impact, using the FCC's audience fractionalization formula, a description of local broadcast service and the general financial condition of broadcast operations in the market, and a description of public interest in receiving additional signals.

The local station may or may not oppose the waiver at this point. Either way, the FCC will examine the application and decide whether a good showing has been made by the cable operator. If the FCC agrees with the cable operator's analysis, an Order will be issued saying that a waiver will be granted unless the local stations can prove within 20 days that it will be harmed and supply detailed financial information supporting its claim. The cable systems will have a chance to respond to this additional information. The FCC will then evaluate the stations' showing the issue a final order granting or denying the waiver.

The new policy should not be viewed as an invitation to flood the FCC with waiver requests. Cable systems must make a good quality showing to increase its chances for waivers. In addition, NCTA expects heavy opposition from broadcasters both at the FCC and in the courts. The NCTA are certainly not discouraging waiver requests, but keep in mind that they will be hard fought and it will be a protracted process.

At this stage it isn't known how many waivers will be granted. It is the consensus, however, that the number of final grants in the next five or six months will not be large. This is partly because heavy opposition is expected by the broadcast industry. In addition, the commission itself will have to meet on each waiver at least twice. The logistics of this process will thus make the whole process a protracted one. The waivers already filed will probably be dealt with first. The FCC has given everyone with a pending waiver request 20 days from the release date of the decision, to supplement its filing to address the new standard. It is anticipated that the deadline will be around December 1.

The Tracers®

Both detect RF leakage, but which one is best for your needs?

Is RF leakage in your CATV cable system exceeding FCC limits? Is it an indication of present or potential mechanical failure which could result in costly repairs or FCC violations?

Get the answers promptly with VITEK's compact Tracer* (TR-1) or Tracer* (TR-2) RF Detection Receivers. Both locate and measure leakage and determine whether radiation exceeds FCC limits. They provide early warning of hairline cracks in expansion loops, loose connectors, leakage from electrical equipment housings, trunks and feeders due to loose covers or corrosion . . . typical leakage problems.

No separate transmitter required. Both receivers operate with any cable TV video or pilot carrier.

Both are rugged, self-contained, powered by rechargeable batteries, offer a crystal controlled local oscillator with front panel frequency trim adjustment and many other features.

The "Tracer" Model TR-1

is a calibrated receiver system which assures absolute compliance with FCC regulated radiation limits. Its 40 dB logged scale is accurate to ±1 dB.

The system includes tuned dipole antenna with magnetic base, head phones and AC adapter/charger. Gell Cell batteries provide up to 50 hours of operation on a single charge. Weight: only 5 lbs.

The "Tracer" Model TR-2

is an economical field unit that can detect and locate RF leakage and can measure radiation with sufficient accuracy for general trouble shooting. Ni-Cad batteries provide up to 15 hours of use on a single charge. Includes AC adapter/charger. Weighs only 1.5 lbs.

"Tracer" TR-2 . . . for locating RF leaks **Only $300 ea.**
"Tracer" TR-1 . . . to keep the FCC off your back. **Only $550 ea.**
We think you'll want them both.

The Tracers are built by VITEK, recognized for quality and reliability throughout the industry.

To order or for additional information, call or write:
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(201) 469-9400

VITEK

*The Tracer is a trademark of Vitek Electronics, Inc.

Cable TV Seminars

MADISON, WISCONSIN—Two cable television technical training seminars have been scheduled to begin January 3 and 5 in Platteville, Wisconsin, by the University of Wisconsin-Extension Communication Programs and the Cable Communications Institute at UW-Platteville.

The seminars, to be held on the UW-Platteville campus, are designed to meet the training needs of cable television technical personnel. They were designed after conferring with representatives of the Wisconsin Cable Communications Association from large, medium and small cable television systems.

"CATV Distribution System Operating Theory and Application," will be held 8 a.m.-5 p.m., January 3 and 4. It will cover coaxial cable; amplifiers—types and uses; characteristics of amplifiers; splitters, couplers and taps; system planning and configuration; signal levels and cascade.

"CATV System Troubleshooting and Test Equipment Use" will meet 8 a.m.-5 p.m., January 5 and 6. Topics will include troubleshooting and cable faults; testing amplifiers; powering; grounding; record keeping; testing lab activity; and FCC compliance.

Each seminar will be taught by Joe Thomas, College of Business, Industry and Communication, UW-Platteville, with assistance from a representative of a major equipment manufacturer.

For information or registration, contact Jack O'Neill, Instructional Media Specialist, UW-Platteville 53818, (608) 342-1379.

Seminar on AML Equipment Set by Hughes for January

TORRANCE, CALIFORNIA—Hughes Aircraft Company's microwave communications products will offer a technical seminar on its AML (amplitude modulated link) local distribution microwave equipment at a five-day meeting set for the second week in January, 1979.

The seminar is one of a series held by Hughes to demonstrate detailed operation and maintenance procedures for AML systems to technical personnel from CATV systems throughout the country. The AML multi-channel transmission technique is now used by several hundred CATV systems throughout the United States, Canada and Europe.

The tuition-free seminar will be held January 8 through 12 at Hughes' Torrance, California facility. Registrations will be accepted by contacting Seminar Registrar, Hughes Microwave Communications Products, P.O. Box 2999, Torrance, California 90509 (213) 534-2146, ext. 2763.

Hughes is also holding a series of similar seminars covering satellite earth terminal technology. The next such meeting is set for March, 1979.

Call for Papers for International Microcomputers Minicomputers Micro-Processors '79 Conference

GENEVA, SWITZERLAND—A call for papers has been issued for the International Microcomputers Minicomputers Microprocessors '79 Conference to be held June 19-21, 1979 at the Palais des Expositions in Geneva, Switzerland. The subject matter will include Microcomputer Technology, Software Development Systems and Tools, Advances in Software Technology, Peripherals for Minicomputers and Microcomputers, Industrial Control and Automation Applications, Small Business Systems, Military/Aerospace Applications, Communications Applications of Microcomputers and LSI Devices, Personal Computing, Testing and Standardization, Multiprocessing and Instrumentation Applications of Microcomputers.

The abstract due date is January 15, 1979. Announcement of selected papers will be made on or about March 1, 1979, and a Proceedings will be published.

Questions Remain on Signal Carriage Action

WASHINGTON, D.C.—The FCC says it will now accept any supplementary pleadings by parties to any pending signal carriage rule waiver proceedings. This announcement follows the commission's decision on the joint reconsideration petition involving the Arlington Telecommunications Corp.'s carriage of Baltimore TV signals, in which it eliminated the need for any showing other than on the impact of a local broadcaster's ability to serve the public interest (see "From Washington," *CableVision* 11/6/78).

Most questions concerning the impact of the commission's decision in reconsideration of ARTEC's signal carriage waiver remained unanswered. Publicly, broadcast attorneys say the commission's move is totally unjustified. Privately, however, there is still uncertainty as to what the next course of action might be. The petitioning Washington TV stations have been given the opportunity to rebut ARTEC's showing, but until the actual decision is released, attorneys are unable to predict what type of evidence would be sufficient. The Cable Bureau has indicated that evidence other than application of the economic impact formula developed in the ongoing "economic inquiry" may have merit.

The Cable Bureau maintains that the "policy alteration" is not a drastic one. No cable system will be empowered to carry an inconsistent signal as a result of this decision; waiver applicants will continue to be required to show that grant of the waiver will not result in negative impact on the local broadcasters' service to the public; and parties seeking waiver will still be expected to provide the FCC evidence rather than speculation in support of their case.

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Interfacing Cable Television and Broadcast Subscription Television

By Early D. Monroe, Jr.
Federal Communications Commission
Cable Television Bureau
Policy Review and Development

S-C-N-C Headend

Unscrambling at the cable system's headend for distribution purposes can be accomplished two ways. The first is to unscramble the BSTV premium signal at the headend utilizing a decoder compatible with the BSTV station's encoder and redistributing the unscrambled BSTV station's premium signal on a vacant VHF channel to all subscribers. This approach involves the least expense to the cable operator in purchasing new equipment. However, it may not be the simplest technique to administer since the cable operator may have to pay the BSTV program supplier a flat, bulk rate for the premium program. However, this unscrambling technique is the least expensive regarding equipment installation, and it appears to pose the least technical problems, since all three of the hypothetical premium systems can interface with S-C-N-C cable systems when unscrambling is accomplished in this manner (see Figure 1).

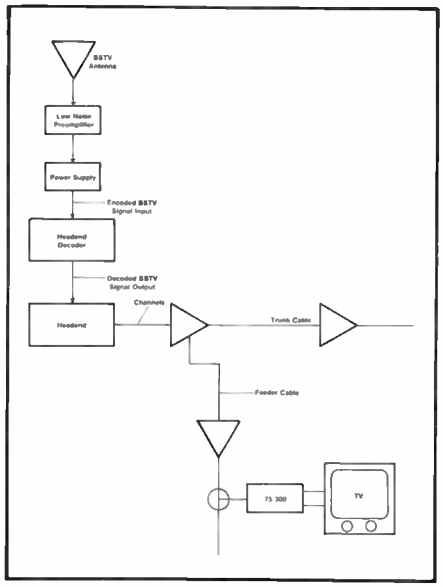

Figure 1
S-C-N-C Cable System

This approach has the disadvantage of possibly forcing all S-C-N-C subscribers to pay for and receive the BSTV premium programming whether he wishes to subscribe or not, and exempts the cable subscriber from the freedom of choice available to non-cable subscribers.

The second way unscrambling at the cable headend is accomplished is by unscrambling the BSTV premium signal at the headend using a decoder compatible with the BSTV station encoder. The S-C-N-C operator then recodes the premium signal and converts the BSTV premium signal to a vacant VHF channel for distribution to interested subscribers. This technique appears to be more practical, but it also appears to be more costly (see Figure 2). When the S-C-N-C operator uses this approach, there are two rate and service approaches used by the BSTV station, codified in the form of affiliate agreements involving the expense for purchasing, installing, and maintaining the encoder/decoder equipment on the cable system. These two approaches can be seen from an affiliate agreement between one operating BSTV station, WTVG-TV, and a cable system operating within the station service area.

Under the first approach the BSTV licensee offers the cable system an affiliate agreement for a license fee of $5.00 or 50 percent of the premium program service charged per month, per subscriber depending on which fee is greater. This agreement specifies that the cable operator will purchase and install the necessary decoding devices and maintain total subscriber service for the BSTV premium program subscribers. Moreover, when the cable operator wishes to use a decoder other than that used by the BSTV station, the station will own the master headend decoder and the cable operator will own all other headend components.

The second approach involves the same license fee; however, the BSTV station has a service agreement for cable operators, including those offering other premium program services,

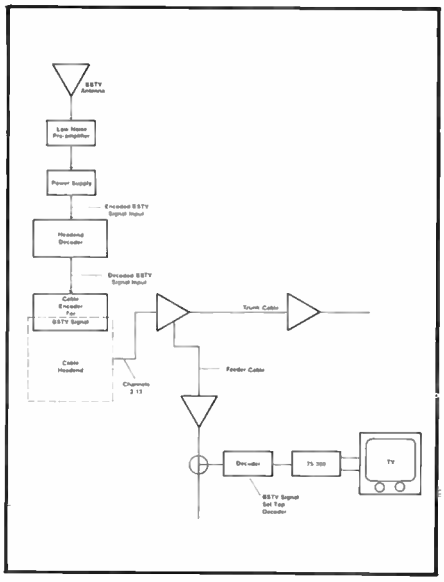

Figure 2
S-C-N-C Cable System

which states that the cable operator ". . . will purchase and install the necessary headend equipment to receive and deliver . . ." the BSTV station's premium programs, ". . . and provide all installations, servicing and disconnects." The BSTV station will market and provide the appropriate decoder for each BSTV subscriber on the system. The BSTV station will pay the cable operator $7.50 per installation and $2.00 per month per BSTV subscriber. In the event the BSTV premium program supplier sells his program to a BSTV subscriber who is passed by the cable operator and not a cable subscriber, the BSTV supplier will pay the cable operator $10.00 for the BSTV premium program installation and $3.00 per month for servicing of the single channel. If the BSTV subscriber becomes a cable subscriber, the BSTV station will then pay $2.00 per month as above. In this case the cable operator remains a contractor for installation/maintenance.

S-C-N-C Subscriber Terminal

The second way the S-C-N-C cable system can carry and unscramble a BSTV premium signal is at the subscriber terminal. The S-C-N-C opera-

tor can then install the appropriate cut-to-channel receiving antenna, low noise preamplifier, and power supply at the cable system headend, convert the BSTV encoded signal to a vacant VHF channel and deliver the coded BSTV signal to all subscribers. Subscribers wishing to view the BSTV programs must be furnished with a decoder compatible with the BSTV station's encoder. As indicated above in the second approach of the BSTV/cable system affiliate agreement, the BSTV station will market and provide the appropriate decoder for each BSTV subscriber on the system. Moreover, the BSTV station will also pay the cable operator for servicing, installation and maintenance of the BSTV decoder equipment. This approach centralizes all servicing and maintenance at the subscriber's terminal by affording the cable operator almost exclusive jurisdiction.

If the FCC were to require cable systems to carry the BSTV premium signal, placing a Grade B contour over the cable community, the commission should simultaneously address the cable system's access to and responsibility for the BSTV premium signal decoders. The S-C-N-C and the Multi-Cable-Switcher-System (M-C-S-S), unless furnishing a premium unscrambled signal to all subscribers, will have no active auxiliary equipment attached to the subscriber's receiver (see Figure 3 and 4, respectively). Therefore, a decision as to S-C-N-C and M-C-S-S operators' responsibilities for securing the decoders must be ascertained. Should the cable operator be required to purchase these decoders from the premium system manufacturer or BSTV station? Or, should the responsibility for the decoders fall on the BSTV station whose signal the cable system is required to carry. The S-C-N-C and the M-C-S-S systems can carry the premium programming on his system without installing a decoder at the subscriber's terminal. This technique involves the installation of traps at the non-premium subscriber's terminal. These traps can prevent a non-premium subscriber from receiving the premium programming being delivered, unscrambled, over the cable system.

Traps

A trap is placed in the cable drop, usually remote from the interior of the non-premium subscriber's home. In communities where the percentage of subscribers of premium programming is high, a trap system makes more sense. The trap is inexpensive, relatively easy to install and virtually maintenance-free since it is not an active device.

An economic disadvantage to using traps is illustrated by the following example.

A cable system, with 10,000 subscribers (2,500 of which are subscribing to the premium programming), must trap 7,500 homes at a cost of approximately $7.00 per home (which is the average cost of the most inexpensive trap). Therefore, approximately $70,000 is needed to purchase and install the traps. This amount must be invested before the premium channel is activated and a sale made. In this example, the cost of a trap is approximately $21.00 per premium program subscriber based upon 25 percent saturation of homes connected to the S-C-N-C and/or M-C-S-S cable systems.

Aside from the economical disadvantage, traps can easily be physically damaged by non-premium program subscribers to pirate the signal. In addition, the installation of traps requires a trained technician, However, since the non-premium program subscriber may not allow this technician access to the home it is difficult to assess whether the trap has removed the premium signal from the receiver.

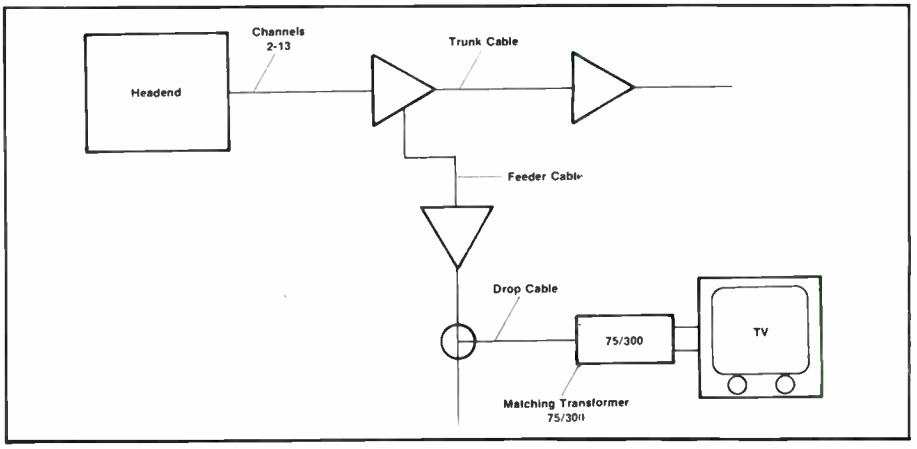

Figure 3
Single-Cable Non-Converter-System

Signal Leakage

Regardless of whether the BSTV station or the S-C-N-C and/or M-C-S-S operator has responsibility for the decoders at the subscriber's terminal, there is a potential problem of signal leakage from the BSTV signal decoders. Presently, cable systems are plagued with the fact that television receivers are not well-shielded from radiation of off-air-signals. This means that the receiver is capable of picking up a signal through the receiver's tuner and this undesired signal will cause interference to the desired cable

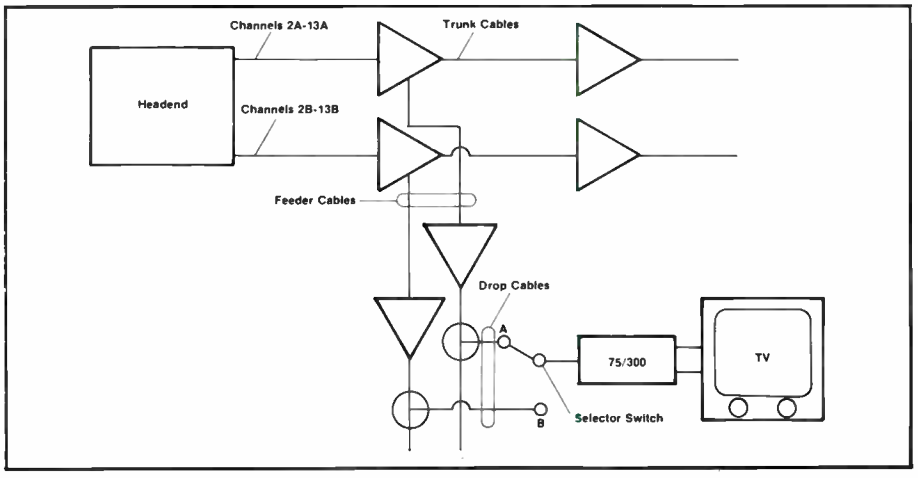

Figure 4
Multi-Cable-Switcher-System

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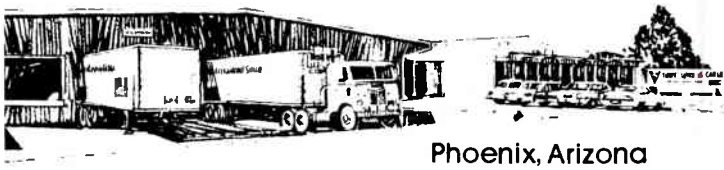

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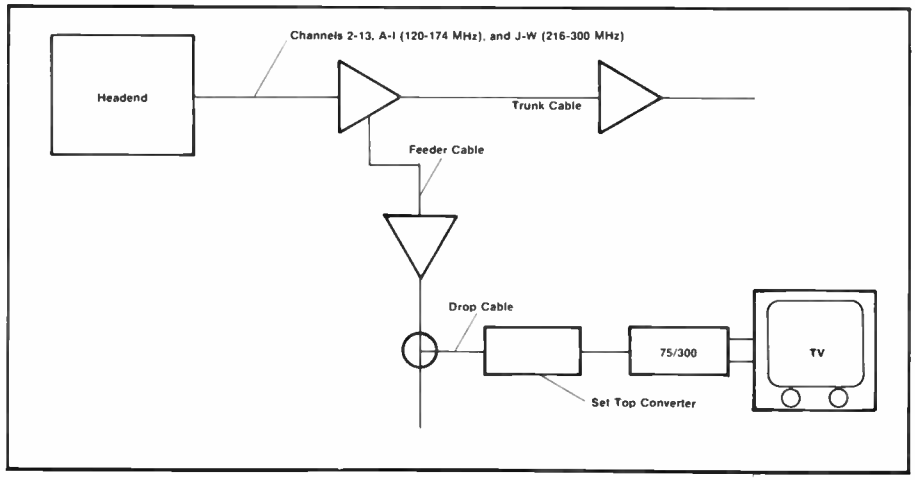


Figure 5
Converter-Cable-System

signals utilizing these same off-air-channels. The S-C-N-C and/or M-C-S-S cable systems avoid this interference by utilizing channels on the system which are not utilized off-air in the area. Television receivers also radiate signals including the cable television signal, but this is not necessarily the responsibility of the cable operator. The cable system's responsibility for cable radiation goes up to, and includes, the equipment of the cable system at the subscriber's terminal designed to interface the drop cable with the subscriber's television receiver. Nevertheless, the cable system attempts to control radiation from the receiver by delivering a minimum visual signal level of 1 millivolt and/or 2 millivolts across a 75 ohm and/or 300 ohm terminating impedance, respectively, but below a maximum level such that signal degradation due to overload in the receiver does not occur.

If radiation occurs at the point where the drop cable interfaces with the subscriber's receiver, the cable operator must take steps to insure that

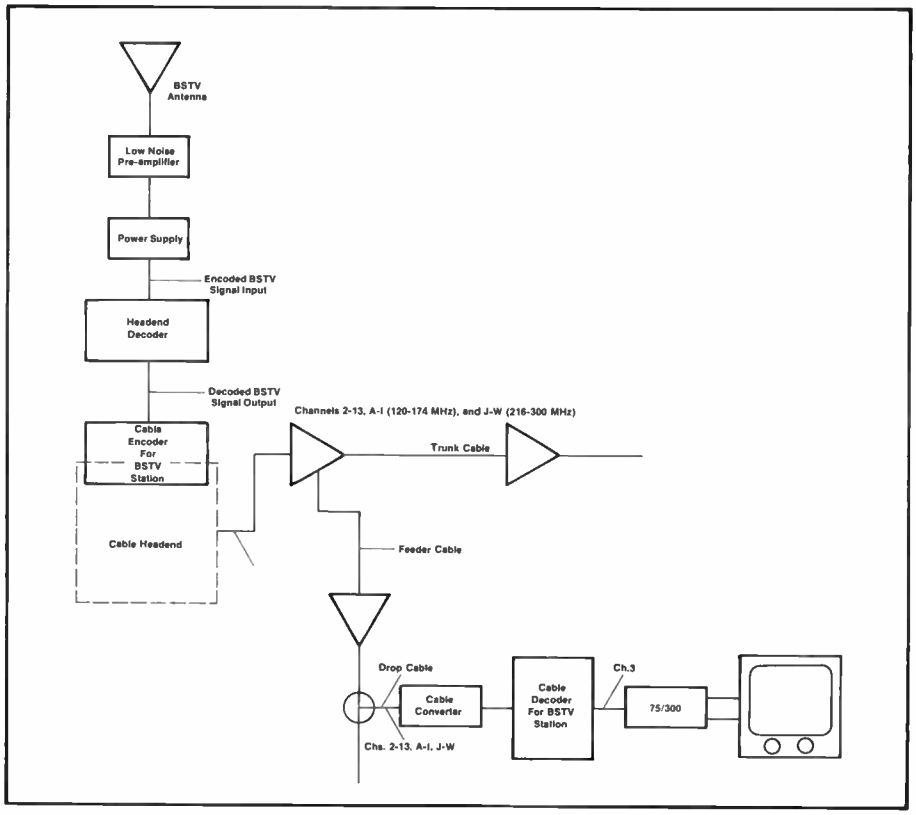


Figure 6
Converter-Cable-System and BSTV Premium Decoder

the maximum field does not exceed 20 microvolts per meter, ten feet from the cable. (See Section 76.605(a)(12) of the commission Rules).

With the addition of a decoder between the drop cable and the subscriber's receiver, cable systems may no longer be able to meet the cable radiation standards specified in Section 76.605(a)(12) since the cable operator may not control the decoder.

The same problems pertaining to the S-C-N-C cable system would be involved with a M-C-S-S cable system and will not be covered separately. However, there are more policy and technical compatibility problems pertaining to the Converter-Cable-System (C-C-S) as will be demonstrated below.

Converter-Cable-System (C-C-S)

As can be seen from Figure 5, the C-C-S system utilizes a set top converter as an input to the subscriber television receiver. The cable converter is a well-shielded unit, containing a tuner which is utilized in place of the receiver's tuner. The Converter-Cable-System is utilized primarily in areas requiring cable systems with large channel capacities, and/or in areas where a number of television broadcast stations furnish strong off-air signals which can be picked up by the television receiver absent the receiver's own antenna. There may be a few C-C-S systems providing subscribers with converters capable of receiving a premium channel, but not yet providing that programming. In such cases the C-C-S operator could simply unscramble the signal at the headend and deliver the signal to interested subscribers on a vacant premium channel. If the system is already offering a premium program service, adding the BSTV premium signal would involve the most difficult interfacing problems and the greatest equipment expense. Additional or modified equipment at both the headend and the subscriber's receiver would be necessary because of the type of decoders and converters currently in use. Most converters now in use only have circuitry capable of decoding one scrambled channel. Therefore, the addition of a BSTV premium signal would necessitate the addition of more unscrambling equipment at the headend and a second piece of equipment, the decoder, at the subscriber's terminal (see Figure 6). **C-ED**

Part III will appear in the January issue of C-ED.

Detecting Cable System Signal Leakage

By Kenneth L. Foster
*New York State Commission on Cable Television**

The New York State Commission on Cable Television has been active in cable television interference studies since its inception in 1973. It was an active participant in FCC Docket 210066, *Cable Television Systems: Frequency Channeling and Monitoring for Signal Leakage.* Signal leakage testing is done during each cable system's technical inspection conducted by the New York State Commission staff. It is the purpose of this brief paper to share some of these testing experiences with our industry.

Despite official wording of FCC Part 76.605(a) (12) regarding "radiation," I will use the term "leakage" throughout this paper. The impact on the general public of terms such as "radiation" or "radiation leaks" is greater than some within our industry would believe. Radiation has become associated with nuclear bombs or power plants, thus, it connotes grave danger to health and physical well-being. As one who must give written opinion on the dangers of "cable radiation" I can say that the term is not well understood and causes concern at all levels within the cable system host community. Therefore, I urge that radiation, as it applies to signal egress from cable television systems, be stricken from everyone's vocabulary.

The commission test program is unique regarding leakage as it affects air navigation equipment. New York operates a fleet of multi-engine fully instrumented prop-jet aircraft which fly into all but the smallest general aviation air fields. They range over the state in traffic patterns much different from those of commercial aviation. The commission receives reports on any type of irregularity of in-flight, or ILS, instrument systems. Each report is carefully evaluated and tests conducted if that seems appropriate. Reports by pilots of interference to ILS systems have come to us from various locations in the state. Upon investigation, none have been verified as having been caused by CATV systems.

Interference to air navigation equipment can originate from many sources. One common source is broadcast FM radio transmitters. At least one manufacturer of FM transmitters fails to note in its instruction books that improper tuning of the RF stages in the transmitter can cause interference across the entire ILS localizer frequency band. The transmitter, though mistuned, still puts out its rated power; therefore it may appear to be operating normally. A quick check with a spectrum analyzer or field intensity meter will show otherwise.

In another instance of interference, the localizer indicated that a plane was on a solid centerline approach to an airport, but when the pilot established visual contact with the runway at an altitude of about 500 feet, he found that he was off-center by several hundred feet. We were unable to locate the source of that interference after three days of intensive spectrum searching.

Prior to the purchase of specialized equipment for signal leakage detection in early 1977, we were able to borrow two units from manufacturers. For a period of time, with the cooperation of cable system operators, we installed both leakage detection systems in the headend of each system we tested. Our intent was to compare the units on the basis of how well each would fit into our testing program.

*The views expressed are those of the author and do not necessarily represent those of the New York State Commission on Cable Television.

The units under test were the ComSonics "Sniffer" and the Mid State "Cuckoo". There were obvious differences in the units. For us, the price difference was not a significant factor. Our purpose was to choose a device best suited for use in many different cable systems.

The "Sniffer" detection system was noticably more sensitive. There was never a question regarding the presence of a leakage signal. The portable receiver permitted close inspection of the cable system, making possible the location of sheath cracks or poor connections in a very short time.

hearing the signal requires that the leakage be stopped. Both detection systems tested could "hear" leakage at levels well below the maximum permitted by the following FCC Rule—20 microvolts/per meter at 10 feet. For our purposes, "hearing" means measuring with a field intensity meter to determine whether the leakage is excessive.

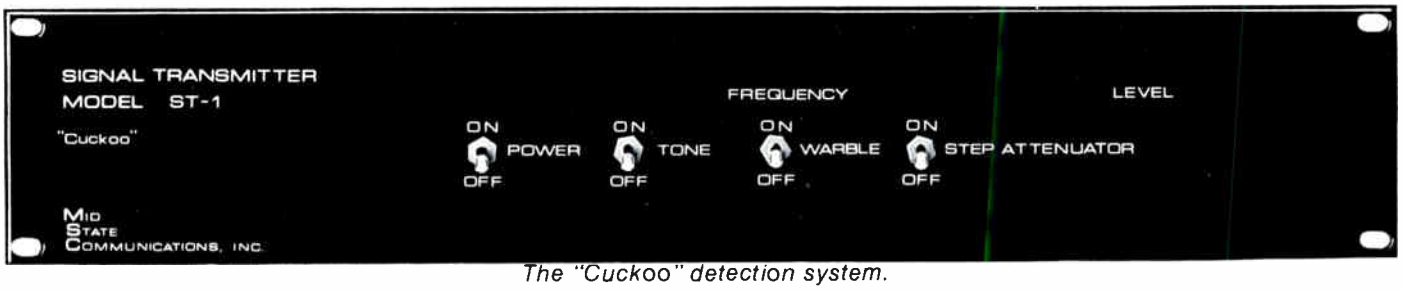
The FCC requirement for signal leakage monitoring is relatively straightforward. Where channels are carried that may interfere with air navigation equipment, the entire cable system must be monitored for leakage once each year. "Entire system" means just that. No longer are three test

The "Sniffer" detection system.

The single operating frequency of the "Sniffer" transmitter was not desirable for our use. We test systems that are only low band, others that are 12 channel and more recent systems with more than a 20 channel capability. The frequency of the unit was set to a point just above channel 13. In older systems the signal could not pass the first amplifier. In modern 20 plus channel systems it interfered with channel "J." In our situation, it was obvious that we couldn't use the same frequency successfully in 165 different systems.

locations sufficient. Therefore, monitoring should be done on a continuing basis as technicians drive throughout the system in response to service calls. This approach presumes that a unique signal is present on the cable at all times. In utilizing a signal such as the "Cuckoo," several undesirable system problems may occur. In monitoring nearly 50 systems with the "Cuckoo" signal injected at the headend, we have discovered some techniques that may be useful.

The "Cuckoo" signal is tunable in the FM radio band. It also



The "Cuckoo" detection system.

However, where the "Sniffer" will be used in only one system, a frequency can be selected that will permit effective operation throughout the system.

The "Cuckoo," with its lower design frequency and frequency agility, was a better choice. It was useful in all systems in which it has been installed. As with the "Sniffer," it has a unique signal and can't readily be confused with any normal broadcast signal. Low cost FM receivers can be used as detectors.

For most cable operators utilizing these or other units,

can be tuned slightly below and above the band. Thus, where channel 6 is carried on the system, care must be exercised so that the "Cuckoo" is not tuned into the channel. Additionally, it should not be tuned to, or close to, an FM radio carrier in the system. It is recommended that the carrier level of the "Cuckoo" transmitter be set equal to the channel 6 visual carrier. When this is done, the lower 2 MHz of the FM band should be avoided to preclude interference in the channel 6 color sub-carrier.

In 12-channel systems, where system balance is critical,

or where amplifiers are operated near maximum, the addition of the "Cuckoo" or "Sniffer" carrier may over-drive the system causing spurious signals in desired channels. Several approaches are possible when this occurs. First, a rebalance of the system is indicated and should be carried out. If this does not reduce or eliminate the spurs, the "Cuckoo" can be used only during times of minimum TV viewing. Another less desirable alternative is to reduce the "Cuckoo" carrier level to a point where the spurs are eliminated. This latter action reduces the effectiveness of the monitoring program and should be considered a "last resort".

An example of how reducing the level of the test signal works against the technician follows. If the test signal is set near channel 6 and at the channel 6 visual carrier level, the maximum permitted leakage signal (20 microvolts/meter) will indicate -39 dBmV on a signal level meter. A field intensity meter would indicate 21.3 dB above 1 microvolt. This corresponds to a voltage of 11.6 microvolts. Reduction of the test signal by 10 dB would reduce the voltage to 3.55 microvolts, or a -49 dBmV reading on the signal level meter. The field intensity meter would indicate about 6.2 dB above 1 microvolt. The noise floor of the meters is likely to prevent accurate measurements at these levels. Therefore, the test signal should not be reduced if it is at all possible to run it at visual carrier levels.

In 12-channel systems, especially of older vintage, AGC may be affected by modulation on the "Cuckoo" carrier. The modulation steps through five levels and occasionally system AGC will follow the modulation steps causing level changes of 3 to 4 dB. The obvious action is to turn off the step modulation and use only a single tone.

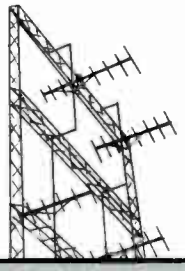
Most companies in our state have begun periodically to monitor signal leakage. There are some innovative technical people in our industry, so we find many approaches to monitoring. A few of these approaches are offered for consideration.

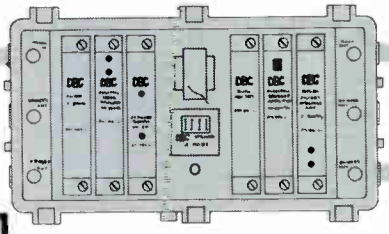
First, of course, we find many systems utilizing the "Sniffer" or the "Cuckoo." Either of these units is very effective, and since portable detectors can be utilized there is a fringe benefit that many cable operators have discovered. Illegal connections usually leak a significant amount of signal, therefore it is necessary only to walk along the hallways of apartment buildings or drive along a street to pinpoint possible illegals. In New York, unauthorized connections to cable systems or the addition of second sets are prohibited by the Penal Code. Utilizing the above method to discover covert connections can help the persuasive cable system operator sign up new subscribers.

One cable system operator has purchased a "Cuckoo" generator and has designed fixed-tuned receivers to be installed in service vehicles. Another uses readily available low-cost pocket FM receivers which are sufficiently sensitive to indicate problem leakage areas. Another modified a standard TV modulator to operate at about 109 MHz and, in conjunction with low-cost FM receivers, has a very effective monitoring program underway.

Another operator couples his need to monitor with an additional subscriber service. He receives a national weather radio signal, converts it to a standard FM channel on the cable and listens for it on his service vehicle FM radio. The subscribers receive current weather reports and he has a unique signal leakage test signal.

An operator in the lower Hudson Valley equips his service vehicles with battery-operated television receivers attached





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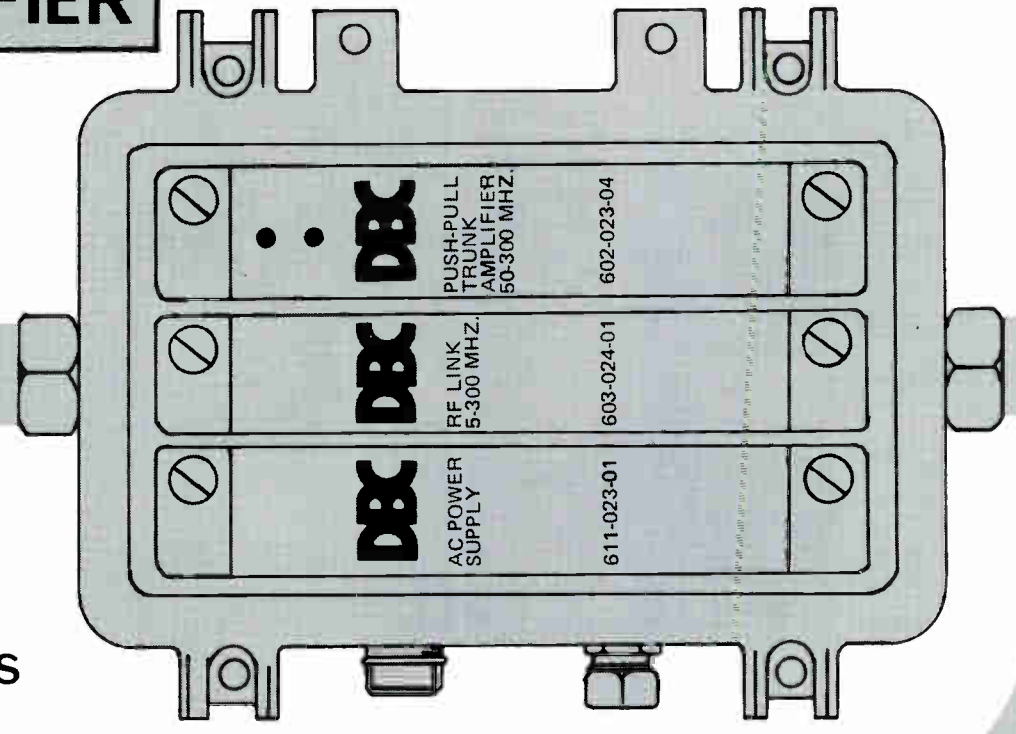

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to a simple dipole antennae mounted on the side of the vehicle. When in use the receiver is tuned to a cable channel not on-air locally, and the sound is turned up. When the vehicle passes a signal leakage point the audio hash is sharply reduced, thereby alerting the service technician that a leak is nearby.

Other methods include the use of a field intensity meter or a television receiver with a calibrated antenna and preamplifier. These methods permit only spot checks in the system, whereas the methods described earlier can effectively be implemented from service vehicles on the move throughout the system.

CB radio also is useful in detecting leakage. If signals get into the cable, other signals will get out. A spectrum analyzer is useful in identifying the ingress signal, but it is not necessary. An operator in the state has equipped trunk maintenance vehicles with CB as well as the usual business band radios. While one technician monitors the system, another drives along trunk and distribution lines transmitting on the CB band. When the CB appears at the system monitor point the driver is stopped and can identify the area of ingress.

The reader who wishes to explore signal leakage theory and measurement of leakage is referred to the short bibliography appended.

This paper is intended to provide some food for thought on the subject of signal leakage detection and to share some of the experiences gained through the commission testing program. It is hoped that this experience will make compliance with what Frank Bias recently called "admittedly severe regulations" much more tolerable. **C-ED**

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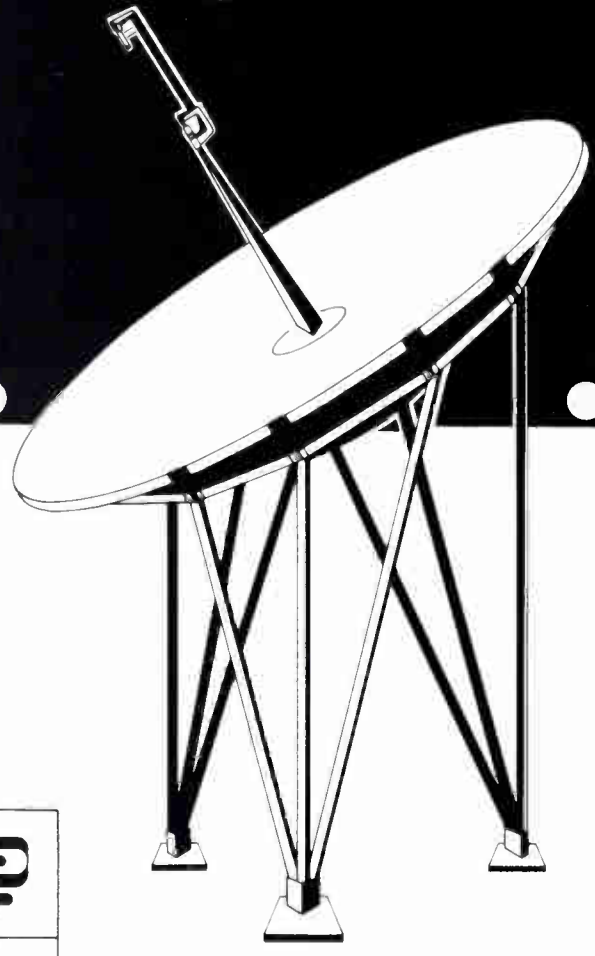

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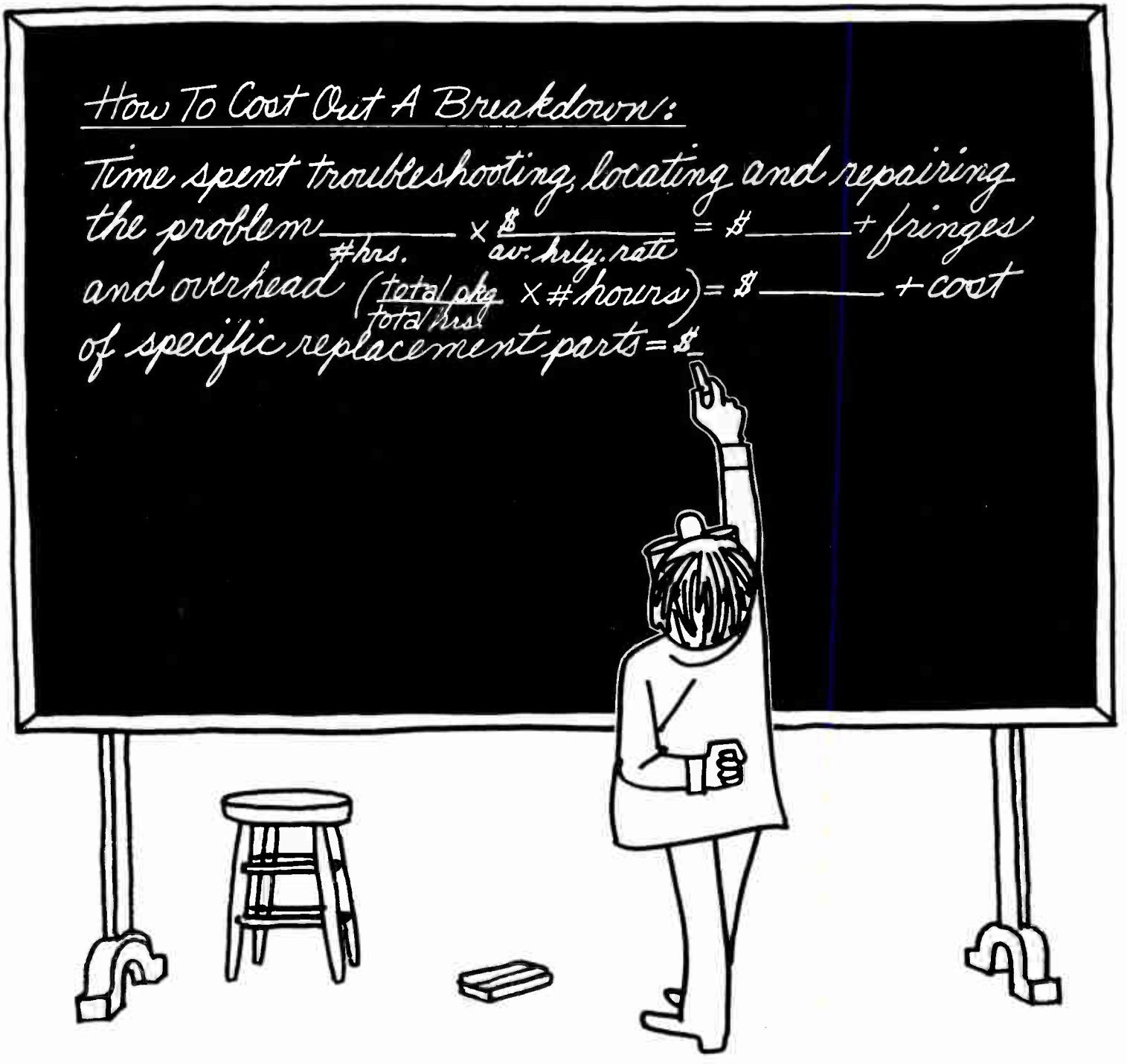

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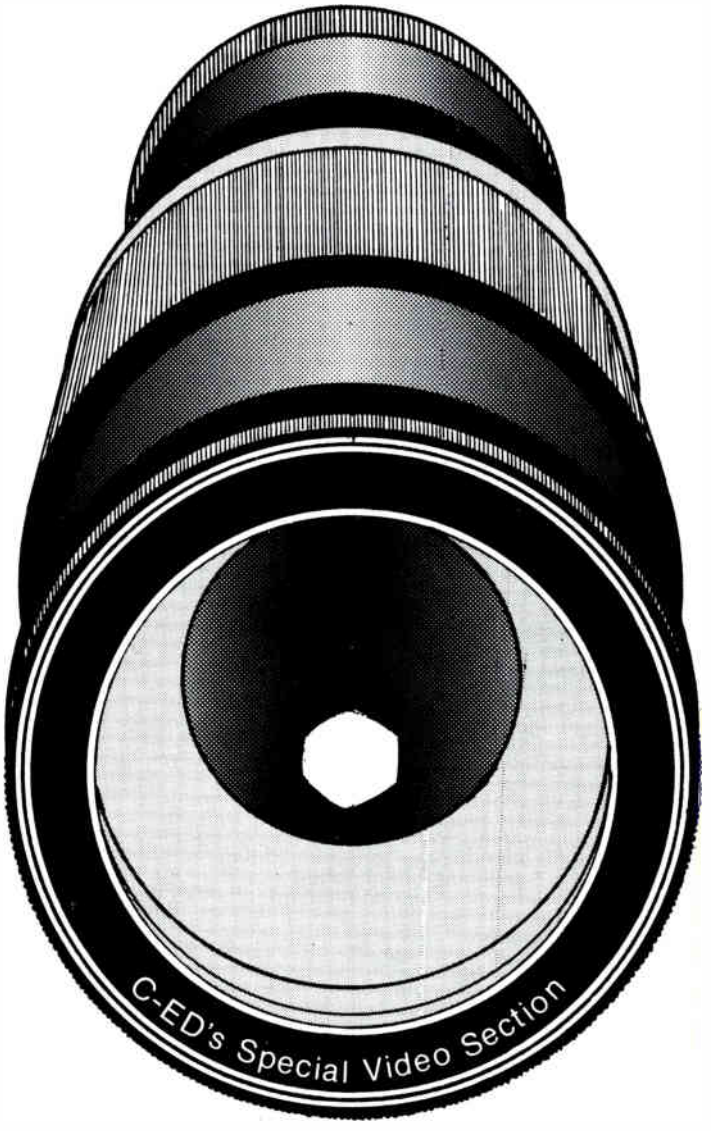


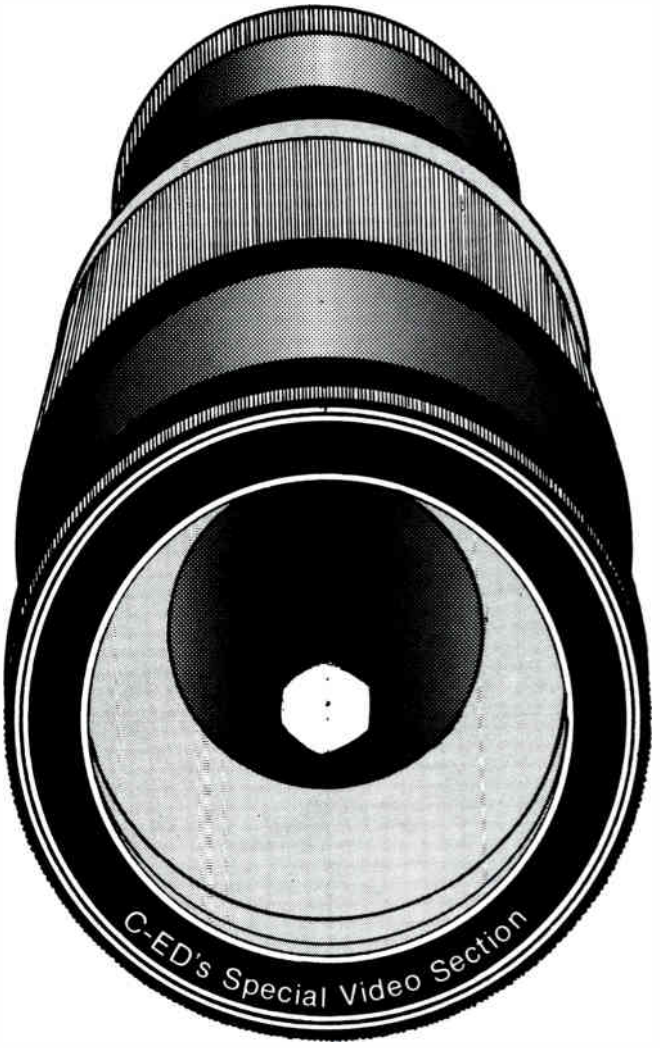
Cover Story

VIDEO

The thrust of C-ED's *December Western Show issue is video production and technology. Our cover story deals with the rapidly advancing state-of-the-art in video as it relates to the cable television industry.*

Our first two articles feature the studio facilities of Home Box Office and Showtime, respectively. In these two articles C-ED *focuses on two critical areas: quality control, and playback and post-production editing. These pieces zoom-in on daily step-by-step operations.*

On a smaller scale, the following two stories take a technical look at specific video problems. Automation Techniques Looks at Time Base Errors *discusses historical and present-day activity concerning television time base errors and how to correct them. Wrapping up our cover story is* QSI's New Time Code for the Helical Videotape Recorder. *This article provides an alternate approach to the SMPTE time code and other magnetic recording medium information.*



HBO: It Looked Good Leaving Here

By Joe Roizen, president
TELEGEN
Palo Alto, California

When the red "hot line" phone at HBO's New York network origination center rings, it's answered fast... it means that an HBO affiliate somewhere in the nearly 1000 communities that the network serves has less than a perfect image. "In the early days of satellite transmission," recalls Bob Ward, HBO's director of studio technical services, "we manned the phone 24-hours-a-day and it rang off the wall. It's still manned around the clock, but now it sounds less than five times a week with most calls turning out to be local problems at the cablecaster's receiving point or headend." How HBO keeps its programs looking and sounding good took me on a two-day excursion through some of the industry's most sophisticated technology hosted by some highly skilled engineers.

"HBO Is Something Else"

Its current promo "HBO Is Something Else" refers, of course to the program material it provides to its subscribers, but an inspection tour of the New York originating facility at 120 E. 23rd Street makes one realize that the slogan could also be used to describe the video and audio quality that goes on-line to HBO's cable affiliates all over the country.

Whether by terrestrial microwave or by satellite links, HBO delivers the best images possible from its source material, and this consistent quality does not come cheaply or easily. HBO's formula: combine broadcast level equipment with a dedicated engineering staff who adhere to rigid rules, established to achieve maximum operating performance.

The equipment at HBO's facility is the same as that in the top commercial networks: Tektronix for signal generation and measurement. Three Philips color cameras in the studio, 12 Ampex quads with all the bells and whistles in the back room, a new CMX 390 for sophisticated time code editing, Vital and Grass Valley switchers, Conrac master monitors, all tied in to a Vital computer-controlled automation system. Even the sound isn't ignored. Neve multi-channel consoles and variable equalization (which is selectively applied) help to keep HBO audio at its level best.

HBO's new CMX edit room.

HBO's film to tape transfer console.

The HBO studio's director of operations, Dom Serio (right), examines the wave form monitor during a performance test on the VTR. →


AMPEX

One of 14 two-inch quad videotape recorders used for edit and on-air transmission.

Constant Maintenance and Redundancy

Even the most modern equipment, operated haphazardly, will not produce consistently good results. HBO requires a strict maintenance schedule and constant training of its personnel.

VTR adjustments start at 6 a.m. every day with a standard alignment tape set up on all machines. Preventative maintenance is done on weekends on a rotational basis so that every piece of video and audio hardware gets its share. To make sure that all of the affiliates get a clean feed, test signals are sent out the first Monday of every month and the results of these circuit checks at the CATV system come back to HBO for analysis. Reliability is assured by the backup equipment and emergency circuits in the case of equipment outages. As an example, every quad program playback is running in parallel wih a frame-locked cassette VTR which can be switched on-line instantly.

HBO studio productions' master control coordinates HBO's schedule of movies, live sports and special events.

Program Quality Control

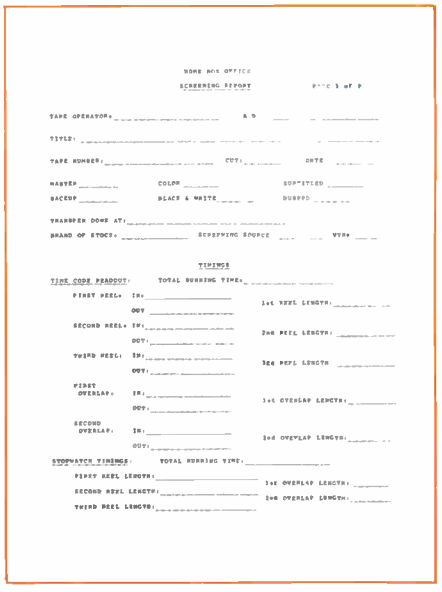
Programming people often accuse video engineers of only being interested in good color bars, a one percent K-factor and distortion-free audio tones. At HBO, engineering quality control goes beyond that. Program picture and sound quality are also carefully monitored both before and during airtime. The process is sufficiently unique to be worth a detailed review.

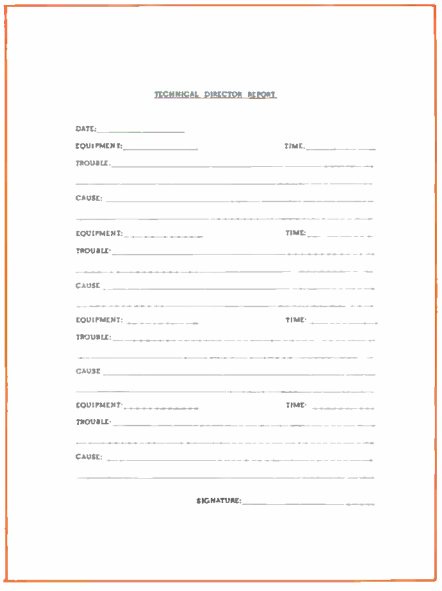
For both technical and economic reasons, all aired programs are sourced from quad VTRs. This includes the major motion pictures which are transferred to two-inch tape before delivery to HBO.

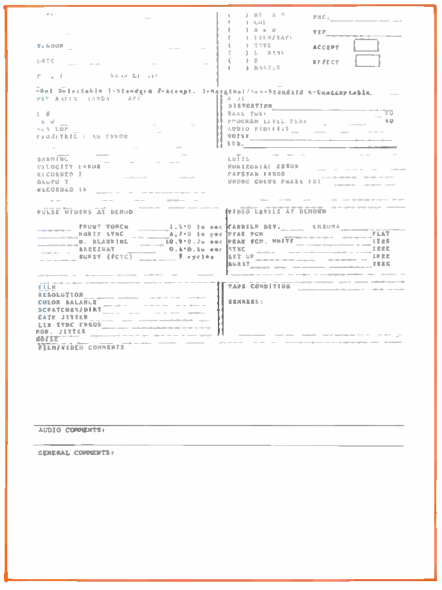
The incoming inspection of these tapes is thorough, to say the least. Each tape is subjected to an end-to-end screening, not merely spot checks. A detailed set of check sheets that the reviewer must complete covers every conceivable aspect of image and sound quality, as well as technical verification in quantitative terms. Specifications such as horizontal blanking width and program level VU's are noted. Precise timing, to the second, is entered into the program log that will eventually go to the orgination computer.

HBO's standards are the industry's toughest. Bob Ward points out that 85 percent of the film-to-tape transfers sent in by outside transfer houses fail to pass HBO's first quality screening; they are rejected and the transfer house is asked for a better copy. HBO will accept tapes in which minor video and audio corrections can be made by adjusting its own equipment, but HBO will not air a substandard tape.

Ten or twenty minutes prior to air time, the tape is loaded on the VTRs and previewed well into the program content. Color bar checks alone are







HBO studio check sheets.

not enough—often they come from a different source. Looped through Master control, a technical director checks levels and phasing, and may ask for adjustments or a machine change if something is really wrong. Return links from the trunk lines to the microwave or satellite terminals can be activated to check those paths.

Quality Checks Down The Line

Program quality check points extend even beyond HBO's origination center. At the top of the Gulf & Western Building where HBO turns over its signals via common carrier microwave to HBO affiliates, a small building houses another HBO technician who notes and corrects deficiencies by full-time program monitoring.

HBO's agreement with RCA for satellite service includes similar monitoring at the 60 Broad Street center in New York and the Vernon Valley, New Jersey earth station.

If signal degradation occurs or there is a catastrophic failure of equipment, spare circuits are always available. Special tie lines are in service for callbacks to report problems. The cable-caster on a satellite link can call RCA directly, and if the problem persists, may call HBO, where engineering advice is available. HBO's regional field engineers are on call for more complex problems.

HBO in New York has some unusual facilities that help maintain the picture quality it wants. The telecine used to insert film sections is equipped with primary color correction "paint pot" controls and a Thomson-CSF Labs image enhancer. HBO has access to direct feeds from the networks so recording national shows can be done with origination quality rather than off-air results. In fact, HBO is perhaps the only facility with direct connections to AT&T long line domestic satellites and intercontinental satellite circuits. It often tapes and feeds out programs to clients in Europe or South America.

RCA's Satcom I is the major link for the North American network. Transponder 24 services the East Coast, 42 the West and 20 is a backup channel in case of failure of either one. On January 1st, HBO on transponder 23 will go into service to augment the current facilities. Where speed is of essence, signals via satellite or tapes flown in on the Concorde get quickly edited and beamed out to the client, be it a local cable company or a TV operation in Brazil.

Program origination of such popular sports themes as "Inside NFL" combine the output of the HBO studio with NFL supplied films of game highlights which are played over the RCA TK-27 telecine and mixed with the studio images of commentators and well-known sports figures. Its studio is also used for talk shows and other local live programming. It's a small studio but adequately equipped with well-maintained Philips PC 70's and a portable IKEGAMI, which can also serve as an EFP camera for outside shots.

Microwave transmit dishes atop the Gulf and Western Building in Manhattan.

Time code generators and readers are in abundance, and the addressed tapes go on to the CMX system for frame-accurate assembly into a fast-paced presentation. A second CMX 390 is on order to keep up with the growing demand for programs.

The result of all this TLC (tender loving care) is visible on the viewers' screens in homes nationwide. Quality images are indeed HBO's hallmark, as they care enough to send the very best.

Author note: Joe Roizen is International Video Editor for *Broadcast Communications*. He recently spent two days inspecting HBO's origination facilities while attending the SMPTE conference in New York.

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HBO

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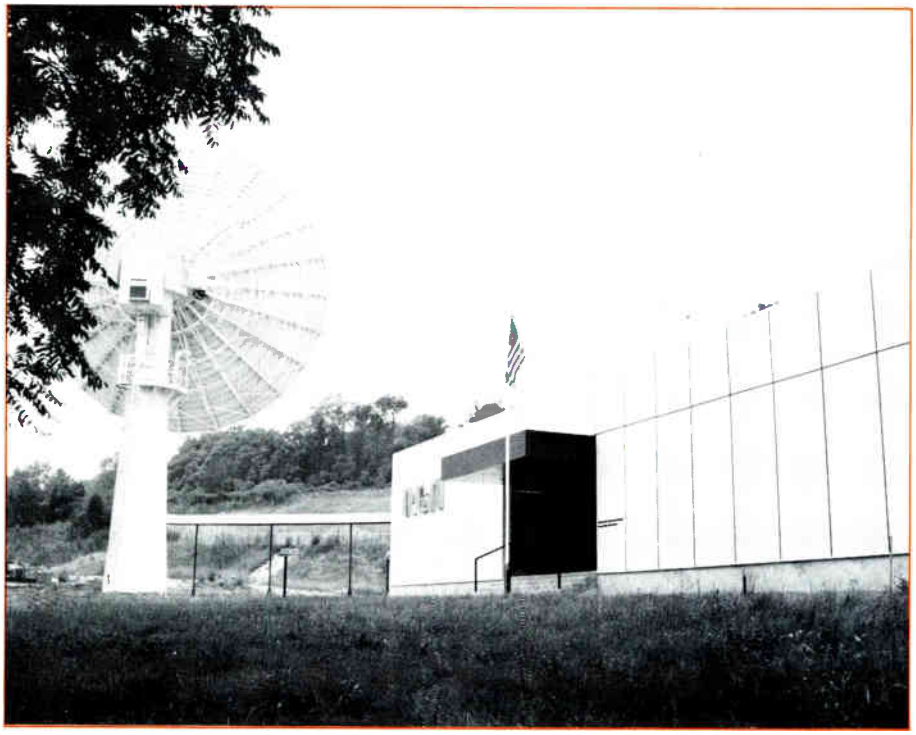
Showtime's Playback And Post-Production Studio

By Stephan Wm. Schulte
Director of Broadcasting and Operations
Showtime Entertainment, Inc.
New York, New York

Showtime, one of the nation's leading pay-cable television satellite networks, transmits a monthly pay-television service to 140 affiliated cable television systems throughout the country. It now has approximately 250,000 subscribers, and is expected to enter 1979 with close to 600,000, in a total of 250 systems, due to the conversion of most of Teleprompter's pay-cable systems to the Showtime service on January 1. On that date, Showtime, now a subsidiary of Viacom International, will become a joint venture of Viacom and Teleprompter. Showtime's monthly lineup includes recently released Hollywood feature films, night-club performances, concerts, theater presentations and children's programming.

Showtime first began its national service in July, 1976, distributing its programming via videotape cassette. Its programs are now transmitted on two transponders to cable operators via RCA Americom's satellite. Satcom I. Showtime went on satellite on March 7, 1978, originating transmission from RCA Americom's Vernon Valley satellite uplink facilities. Directly adjacent to the Satellite Operations Control Center (SOCC) at Vernon Valley, RCA Americom maintains a broadcast quality videotape playback and editing facility, leased by Showtime for program post production and playback to the satellite.

Showtime's playback and post-production editing facilities provide two 12-hour per day program feeds (for the East and West Coasts) to its affiliates. These facilities utilize the latest in two-inch VTR, film to tape transfer and computerized editing equipment. The editing facilities are primarily used for post-production of Showtime continuity, and the creation of customized affiliate promotion materials and special video projects.



An outside view of the earth station and one of the two satellite uplinks at Vernon Valley.

Co-Location of Facilities

The Vernon Valley playback site was chosen because of its unique co- location with the satellite uplink. Its immed-

The editing room at the Vernon Valley facility, displaying its post-production Grass Valley model 1600 video switcher, and the CMX 340X editing console.

iate proximity to the SOCC eliminates all problems associated with microwave transmit or receive sites, or Telco lines that would normally be required to transport the signal to the uplink. Because of the hard wire connections and this close proximity, there is no signal loss between the output of the tape center and the uplink. The possibility of power or line outages, as well as environmental interference, is effectively eliminated.

Program Materials

Most of Showtime's program materials are supplied by the major film distributors on two-inch videotape. These distributors generally arrange for the transfer of their product from film to tape through one of the major duplicating facilities around the country, such as Bell and Howell and Columbia Pictures Video Cassette Duplication in Chicago, Goldmark in Connecticut, and Studio Television Services in California. This policy, set by the distributor, is designed to maximize the distributor's quality control effort at the film and tape transfer. (In the early days of the pay-TV industry, the quality of product provided to pay services by film distributors was marginal at best. However, as our industry has grown, pay suppliers and film distributors have realized the importance of upgrading the quality of the product for pay-TV and are jointly developing higher standards for quality control.)

Similar film to tape transfer facilities are available at Showtime's Vernon Valley studio. They are normally used for the transfer of features supplied to Showtime by independent producers, and short subjects and promotional materials to be used for continuity programming.

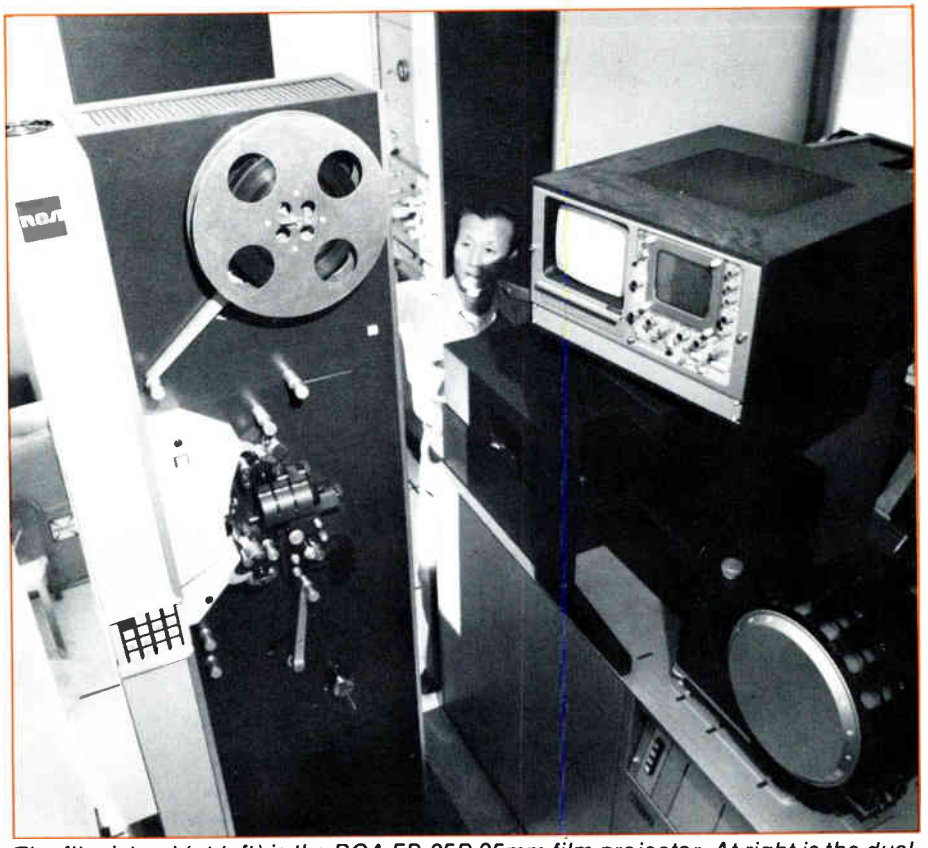
All programming is screened prior to air with a heavy emphasis on quality control. All programs are evaluated with respect to technical considerations such as video, blanking and audio levels, as well as the aesthetics of the film to tape transfer process.

Promotional materials are edited into the desired format on film, then transferred to videotape for further editing and assembly of each day's continuity.

Vernon Valley's telecine capabilities include an RCA TK-28 film chain camera mounted on an RCA TP-66 16mm film projector (with optical and magnetic sound track reproduction capability), an RCA FP-35B 35mm film projector and dual drum RCA TP-7 35mm slide projector. Also available is an RCA dual 16/35mm sound dubber with optical and muti-track magnetic capabilities which allows Showtime to utilize three-stripe magnetic sound tracks. The projectors and sound dubber may be synchronized to permit double system interlock film transfers which provide greater latitude in editing. (Picture and sound are edited independently, and the 16 or 35mm single or double system multi track format is subsequently transferred to videotape using the interlock capability of the film system).

Computerized Editing And Assembly

The primary use of Showtime's computerized editing facilities is the production of Showtime's daily continuity, utilizing promotional materials and short subjects. Once transferred to tape, all materials are coded with SMPTE time code for editing, assembly and playback. A Grass Valley model 1600 video switcher with ten inputs and key, wipe, and colorizing abilities, and a CMX 34OX computerized editing system controlling four VTRs are used to assemble Showtime's daily continuity segments. Audio is mixed in a four input RCA model BC 14 BR audio mixing



The film island (at left) is the RCA FP-35B 35mm film projector. At right is the dual drum RCA TP-7 35mm slide projector, In the background is the RCA dual 16/35mm sound dubber.

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console. Audio and video patching jack fields permit reconfiguration of the switcher/mixer inputs to accept non-standard requirements. A Vidifont Mark IV character generator is used to superimpose program information such as feature titles and times over the video during the editing process.

Vernon Valley's editing facilities are also used to produce customized promotional pieces for affiliates to use in promoting Showtime on its local cable channels. These pieces are tailored with audio and video information appropriate to each system, such as system name, phone number and special price offers.

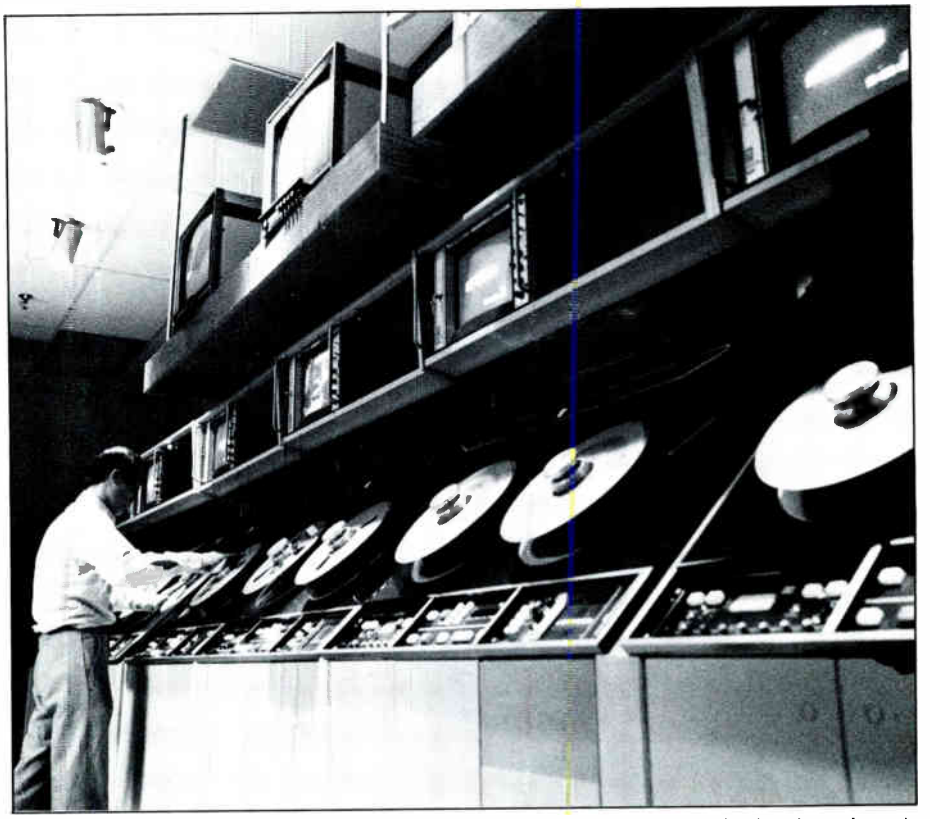
In additon to normal "on line" editing that is accomplished at Vernon Valley, the CMX editor is equipped with a paper tape reader. This gives Showtime the opportunity to utilize other "off-line" editing facilities whenever necessary and then conform to the two-inch format at Vernon Valley through the computer's auto assemble mode.

Showtime Satellite Broadcasting

Seven two-inch RCA TR-600 VTRs are used in the playback facility. As normal feature programs run in excess of one hour, two machines are dedicated to the playback of each feature to facilitate smooth, uninterrupted reel changes. A third machine is assigned to play back the material between features. Due to the three hour time difference between East and West Coast feeds, a total of six machines are required to handle both Showtime feeds. The seventh machine is kept as a primary backup in case of operational problems. In addition, as a secondary backup measure, four three-quarter-inch Sony model VO-2800 videocassette recorders and two Microtime 2020 time base correctors provide immediate protection for Showtime's programming. Both the VTR and its companion cassette recorder are started simultaneously to ensure that air and protection tapes operate in near synchronization.

Reel changes are accomplished by two two-bus 8 x 1 switchers which provide separate outputs to the East and West Coast feeds. The SMPTE time code recorded on all tapes facilitates these reel changes. A detailed program log, prepared by Showtime's Facilities Department, provides in and out cues based on the time codes. During the playback, time cues are displayed on the appropriate monitors to insure smooth changeover from reel to reel. Transitions between feature programming and continuity reels are accomplished in a similar fashion.

The Vidifont is used throughout the evening to supplement video programming with Showtime schedules and program notes. Audio cart machines provide background music to supplement all character generated information.



RCA Americom's bank of seven two-inch quad VTRs, used for playback and post-production programming.

Signal Flow

The output of the tape center is fed directly into the Satellite Operations Control Center (SOCC) by hard wire connections. Their short signal path provides significant advantages over the more traditional microwave connection. The reliability and performance specifications for the "in-house" distribution of signals gives the system vastly improved dependability compared to terrestrial interconnections. The SOCC has its own electrical generation capacity in a 250 KW diesel generator which serves as emergency standby power and frees Showtime transmission from dependence on the Northeast Power Grid for AC power.

The transmission specifications for the transponder channels leased by Showtime from RCA Americom are transparent to the video audio parameters such as frequency response, harmonic distortion, differential phase and gain. The signal quality received at the affiliate's receive-only earth station is dependent upon the noise performance of the earth station.

As a numerical example, the video peak-to-peak signal-to-rms noise ratio for the circuit from the New York studio to a receive-only earth station located in San Francisco is 51.3 dB for a system availability of 99.9 percent where an earth station G/T[1] of 27 dB/K is used. The associated audio rms signal-to-noise ratio is 52.4 dB.[2] Vertical Interval

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1. G/T is a figure of merit for indicating the performance of an earth station and is defind as:

$$10 \log 10 \frac{\text{Antenna Power Gain}}{\text{System Noise Temperatures (K)}}$$

2. *RCA Domestic Satellite System Handbook*, 1977. P. 6.

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Test Signals (VITS) are also included along with the video to insure quality control by Showtime affiliates.

Satellite Utilization

Showtime currently leases two transponders on Satcom I, each for twelve hours per day. Showtime uplinks on transponders 12 (for East and Central time zones) and 10 (for Pacific and Mountain time zones) are transmitted at 6165 MHz and 6125 MHz, respectively. Since all the channels on Satcom I have a fixed 2225 MHz displacement between the up and down link signals, with a single conversion heterodyne process without frequency inversion, the downlink frequencies for transponders 10 and 12 are 3900 and 3940 respectively. Affiliate TVROs should correspond to the appropriate downlink frequency. TV program audio is frequency modulated on a subcarrier of the video signal at 6.8 MHz. A second subcarrier of 6.2 MHz is used by Showtime to provide a special data transmission for the newly introduced mini-pay service called Front Row.

A small dish TVRO facility typical of those of most Showtime-affiliated cable systems.

Front Row

Front Row, a special Showtime concept which became operational on October 1, 1978, is a mini-pay program service which supplies cable operators with dual programming through one transponder. Front Row subscribers receive seven to eight features each month—one movie or entertainment attraction each weekday and two on weekends, "lifted" from the full Showtime schedule. An electronic character generated "dynamic marquee" supplements the Front Row channel when feature programming is not on. The marquee provides a changing display of program notes, a daily entertainment news and Hollywood gossip service provided by *Us* Magazine, and the Front Row and Showtime program schedules. Nine lines of satellite-transmitted data "pages" change every 20 seconds. A tenth line is available to the local system for either a crawl or static display message. During non-leased satellite time, a "static marquee" containing the next evening's Front Row schedule is displayed, providing a full 24-hour service.

Front Row is made possible by Showtime's Program Separator, installed at the Front Row affiliate's headend. The Program Separator receives three signals from the satellite TVRO receiver: Showtime video, Showtime audio, and data demodulated from a 6.2 MHz subcarrier. The Program Separator also has an additional audio input which can be used to receive a local audio source such as an FM station for background music for the marquee programming. The demodulated 6.2 MHz subcarrier contains both "marquee" and "control" data which provides, respectively, the alphanumerics and video switching information for the system.

In addition to the Showtime and Front Row program channels, the Program Separator will also provide a constant marquee channel which can be used in conjunction with weather or news channels to further enhance its offerings. The Separator also has the ability to remember and hold the last page received, which is used to make a program schedule available for the remaining twelve hours of the day. This is an especially important feature as it effectively isolates the subscribers from ongoing satellite traffic that may be present during non-leased transponder time.

How It Works

At the appropriate time during the course of the programming day, a series of control signals are transmitted from Showtime in New York via the 6.2 MHz subcarrier on the satellite which triggers the affiliate's Program Separator to switch Showtime video onto the Front Row channel. At the conclusion of the feature, the appropriate control signal is generated to switch back to the marquee. These switching signals can be transmited at any time from New York, enabling Showtime to allow selected segments of video promotion, as well as the Front Row programming, to pass to the system from the full Showtime service.

Both marquee and switching data is generated at Showtime's headquarters in New York City as a serial ASCII code by a composer-encoder unit. The ASCII is converted to FSK and transmitted by an ATT leased data line at approximately 300 baud to the playback center at Vernon Valley, where it is multiplexed onto the subcarrier and transmitted via satellite to the affiliate headend.

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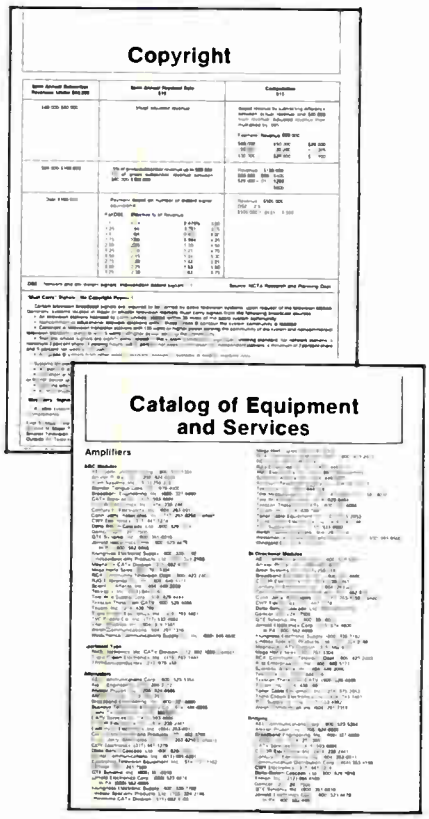

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Automation Techniques' Look At Time Base Errors

By Ed Covington, Vice President
Automation Techniques, Inc.
Tulsa, Oklahoma

Occasional horizontal sychronizing pulses can be lost or interfered with when a television receiver is located in a high noise or fringe area. If the receiver horizontal deflection is triggered on a line-by-line basis, any missing pulse can cause mistiming of the ensuing picture line. The result can be an unviewable picture. To overcome this problem, television receivers are designed with horizontal scanning systems that lock to incoming sync, but have a flywheel action. This flywheeling stabilizes the deflection system and permits occasional sync pulses to be missing. The effect is similar to the way an automobile flywheel stabilizes engine rotation. The size and weight of the automobile flywheel is the equivalent of the time-constant in the receiver horizontal circuitry.

If the synchronizing generator in a television studio has its horizontal frequency inadvertently phase modulated with 60 cycle hum, the result is a picture with "S" distortion. This condition is visible on TV receivers with long horizontal AFC time constants. This was the first "Time Base" problem and showed up in the early days of telecasting when sync generators were usually locked to power line. Such problems were little more than a passing nuisance, requiring clean-up of the sync generator lock circuits.

Quad Recorders

The first quad videotape recorders brought intense awareness of time-base error problems. Inconsistent speed or position of heads passing the tape were revealed as a series of horizontal bands of displaced picture information. During the first days of video recording, due to interchange problems, the video head assembly with which a tape was recorded was shipped with tape to the playback site.

Increasing sophistication of mechanics relating to head-to-tape velocity and tightening of tolerance brought usually consistent tapes in monochrome. When the limit of mechanical correction was reached, electronic devices evolved for further improvement. These first "Time Error Correction" (the name 'Time Base' Corrector was to be coined later) devices corrected geometric picture errors within a range of one microsecond of error (sufficient to control quad errors) and sold for $8,000. Other similar devices were developed later for color stability. At the heart of these correctors was a

lumped-constant voltage controlled delay line. The capacitors in the delay line were replaced with varicaps which responded to a control voltage with a change in capacity and a resultant change in the propagation delay of the line. The control voltage was developed from the sync timing of the input signal. Mechanical servoing of the tape machines to station sync was followed by this electronic correction to make tape machine video synchronous with studio video.

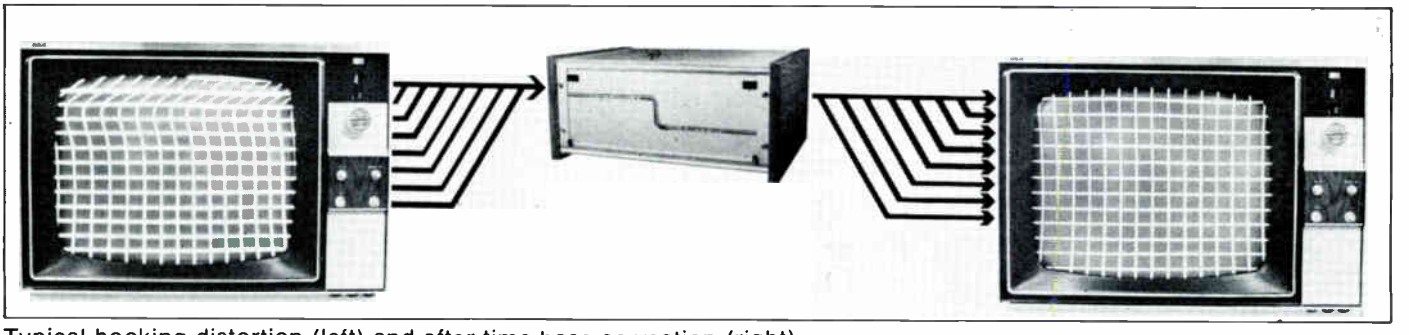
It was not until about this time that the first helical scan video recorders were developed.

Helical Scan Machines

The basic difference in helical and quad recorders is the physical way the video FM track is laid on tape. In a quad machine the video is laid in transverse paths across the tape with each path containing about 16 television lines of information. Sixteen passes across the tape are required to record on television field of 1/60 second. Helical machines record a long diagonal path across tape, recording an entire field with each pass. Within this difference lies a problem, however.

Slight differences in tape length due to expansion, contraction or stretch have little effect on quad tapes because the signal track is crossways on the tape and effects on track length are minor. With helical tapes, the track runs in an almost linear direction with the tape, and any change in tape length directly affects track length. Because the circumference of the video head drum is constant, exactly one video field will be reproduced by one pass of the playback head only if the tape is exactly the same length it was when the tape was recorded. In practice, this does not happen consistently.

The result is that the top of each picture usually starts too soon (tape stretched) or too late (tape shrunk). The effect is that the picture bends or hooks at the top of the screen. This hooking is due to the flywheel action of the horizontal AFC circuits in the TV receiver. Other, but usually less serious time-base errors, are the result of mechanical inconsistencies of the tape transport affecting head velocity or forward speed of the tape.



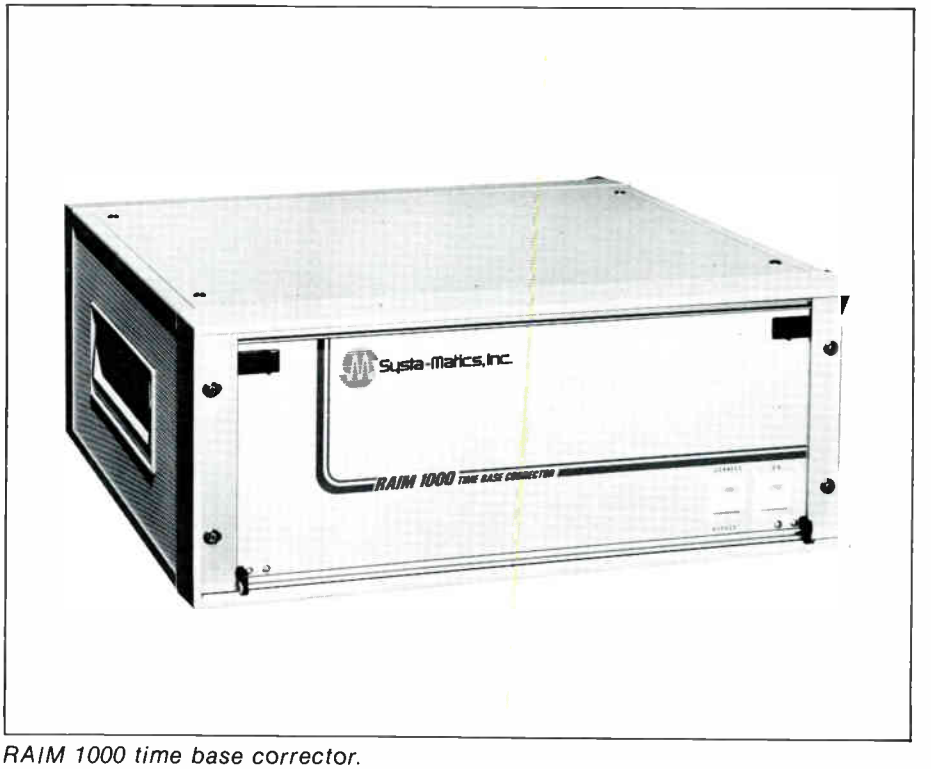
Typical hooking distortion (left) and after time base correction (right).

Mechanical Correctors

Attempts to control hooking have consisted of: (1) recording the tape with a fixed amount of stretch (or hold-back tension); then (2) making the stretch adjustable in playback with a "tension" or "skew" knob. Supplemental to (#2), automatic tape stretch controllers or skew controls have been built which adjust tape tension from reading the relative time of sync pulses off tape. Unfortunately, errors of the signal frequently exceed the limits of mechanical correction. In addition, problems can occur with the corrector which can permanently damage tapes.

Digital Correction

A major step in stabilizing helical machines occurred with the development of Digital Time Base correction. During application of this technique, video is broken into discrete segments in amplitude and time. The resulting bits are stored in shift registers, clocked out and reconverted to video at the proper time. The range of correction is limited only by the number of register stages used. The primary disadvantage of digital systems is high cost. A second problem is that the tape signal has sufficient signal degradation other than time errors. Picture breakup can occur within the corrector or its required internal proc amp which



RAIM 1000 time base corrector.

reconstructs pulses lost in the correction process. This is not a problem in broadcast or production situations but can be in industrial applications.

RAIM Technique

A system which has found widespread use in cable and distribution systems is the RAIM (Random Access Incremental Memory) technique. In the RAIM, the video signal is converted to an FM signal which is fed to a chain of propogation delay amplifiers. The time of each incoming sync pulse is analyzed and the appropriate delay amplifier is switched in during the following line of video. After delay, the FM signal is demodulated to time-corrected video.

Tel-Tec

Recent improvements in analog shift register technology make possible the controlled delay of a video signal with signal quality that rivals the expensive digital units. Automation Techniques' newest time error corrector uses such a device for in-line correction of full-field helical scan tapes such as U-matic or half-inch cassettes.

With Tel-Tec, the incoming video signal is applied to the input of the analog register and is clocked through at a speed controlled by the time error of the input signal. Thus, if an incoming line of video occurs too soon, the clocking frequency is slowed down to make the signal's trip through the device take longer than the average time of all the lines in a field. The use of a processing amplifier is optional since no destruction of the sync signal occurs.

Color Time Base Errors

When time errors occur in the tape playback process, the first place that a problem appears is in the loss of correct color. This is because a time error as low as 25 trillionths of a second can cause degradation of an NTSC color signal. Errors only slightly in excess of this render the signal unusable. If the entire video signal, including the color subcarrier portion, is time corrected at this point, a completely restored video signal results. Such a system is referred to as "direct color."

In order to provide usable color from helical tape machines, manufacturers use a number of color correction systems which extract the color information from the unstable color signal off tape. The information causes modulation of a stable color subcarrier which is placed on the luminance video signal in the place of the off-tape subcarrier. The result is a viewable color signal but one in which the sync-color subcarrier phase relationship is destroyed. In other words, what occurs is stable color on a video signal which contains time-base error. Systems such as this produce what is called "hetrodyne color" because of the frequency mixing process used to produce the signal. Any time base correction of such signal must take into account the separate character of the luminance and color signals.

In the Tel-Tec the color signal is removed from the incoming signal and demodulated to its R-Y and B-Y components. These signals are routed through analog registers in tandem with the luminance register and fed from the same clocking source. After delay, the color signal is re-encoded and placed back on the luminance signal. The result is a time corrected signal with proper color.

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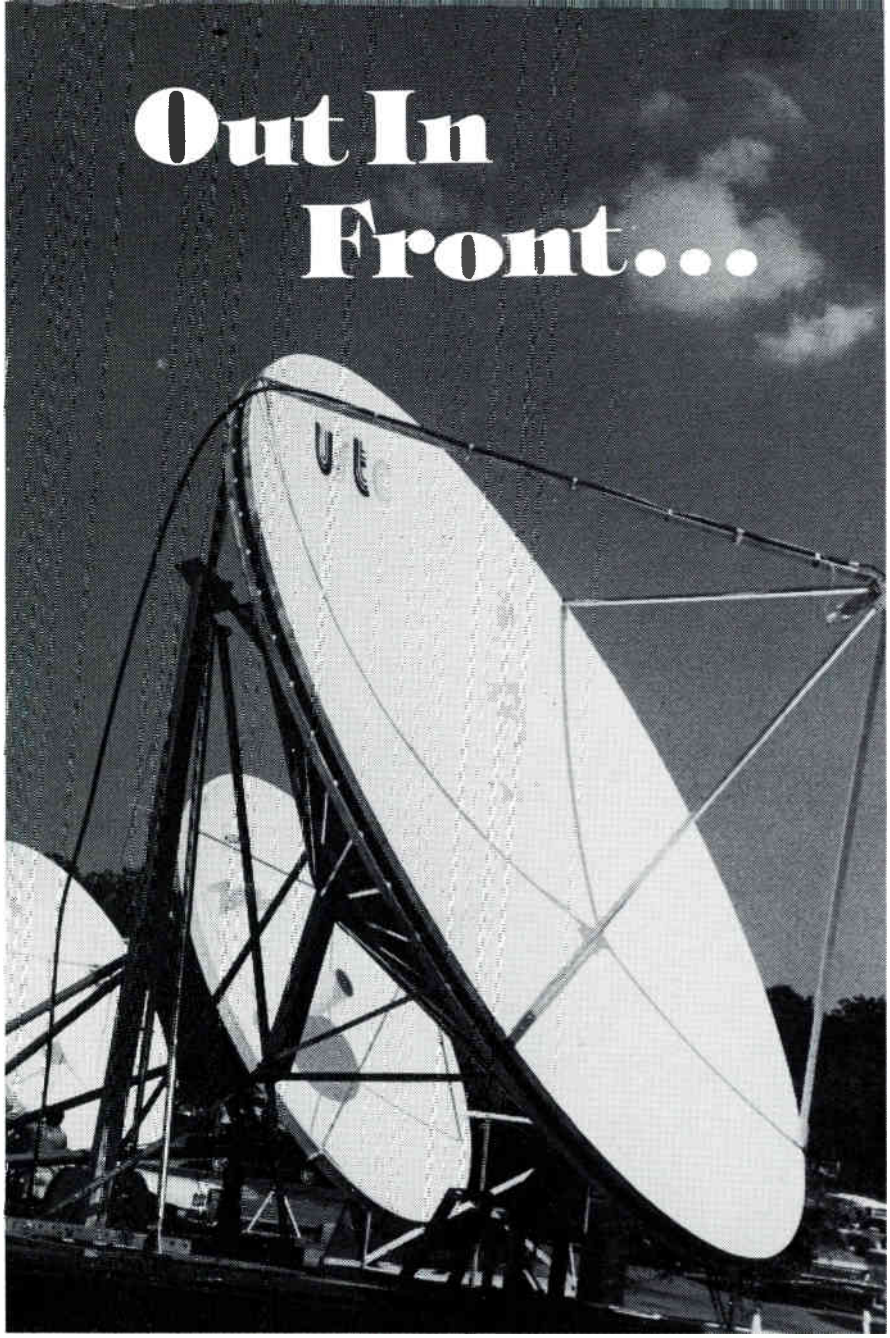

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QSI's New Time Code for the Helical Videotape Recorder

By Jim Albrycht
Chief Engineer
QSI Systems, Inc.
West Newton, Massachusetts

An alternative approach to the standard SMPTE time code and other magnetic recording medium information addressing is considered in this article.

The Q-Code is the use of numerical character generators placed in the video vertical blanking interval identifying each field or frame. This technique is analogous to film edge numbering, which changes numerical sequence at the generation of each new video field or frame, and is recorded along with its associated video picture. The Q-Code is especially beneficial when used with helical VTRs during jog and stop motion, when other logitudinally recorded codes would normally fall out. The Q-Code characters do not have to be recorded, but may be used to monitor video information. Q-Code readings are accomplished with a standard picture monitor, with recordings eliminated by a standard processing amplifier or time base corrector before broadcasting.

During the past twenty years the most popular videotape recorder, especially for the broadcasters, has been the models with the two-inch quadraplexed head format. Over 10,000 of these quad machines have been sold and most are presently in operation. Time marches on and the standard quad VTR is being updated by a new generation of helical formatted machines. The helical formatted VTR, developed over the past ten years for less demanding users than the broadcaster, has now been improved to meet all the demanding quality of the quad VTR, plus it has surpassed its capability in many areas.

The Standard Code

A standard SMPTE time code was developed and accepted to address magnetic tape for both audio and video information, specifically each frame of videotape programming. Although capable of bi-directional tape movement identification and automatic editing, the SMPTE time code is not part of the video, but is in an audio/data format on the longitudinal cue channel track. The SMPTE code all works well as long as there is a longitudinal motion of the tape. The cue track information drops out during slow shuttle, jog or stop motion.

One of the major advantages of the helical format VTR is the ability to stop, freeze frame, jog forward or backward and perform high speed shuttles. What

happens to the cue track information such as SMPTE bi-directional code during jog or stop motion? It falls out, just as the audio track falls out.

A Video Code

A major manufacturer of broadcast type helical VTRs, as well as all other helicals, has one answer to the jog and stop action frame identification. It provides frame coding in the inactive area of the video—the vertical blanking interval. This digital coded information is inserted, then decoded, providing standard SMPTE type readout. A picture monitor or LED readouts are used to display the identifying characters. During the jog or stop motion, the video coding is always available to the rotating heads. The code is part of the video which changes each frame to identify each frame.

Q-Code

QSI Systems has an alternative to any time code or addressing presently being used or considered for helical VTRs. QSI believes the people who will eventually be dealing with the new helical VTRs specifically in broadcasting electronic news gathering (ENG), as well as many other areas, will be cross-trained film people. One of the types of frame identification that film people are familiar with is the film edge numbering. Edge numbering is a photographed, or "burned-in" different number identifying each frame. Then why not videotape edge numbering? Why put special coding in prescribed lines of the vertical interval blanking, only to be decoded by expensive highly specialized equipment for later readout? Why not just use seven prescribed lines of the vertical interval of each field between standard sync and VITs, instead of lines of code, and burn-in regular film type edge numbering with different sequential numbers identifying numbers for each frame or field. These numbers are generated by standard character generators, then read out on any picture monitor with a slight vertical delay, underscanned or pulse crossed. For broadcasted material the burned-in characters can be removed from the vertical interval by a blanking regeneration processing amplifier.

Editing with Q-Code

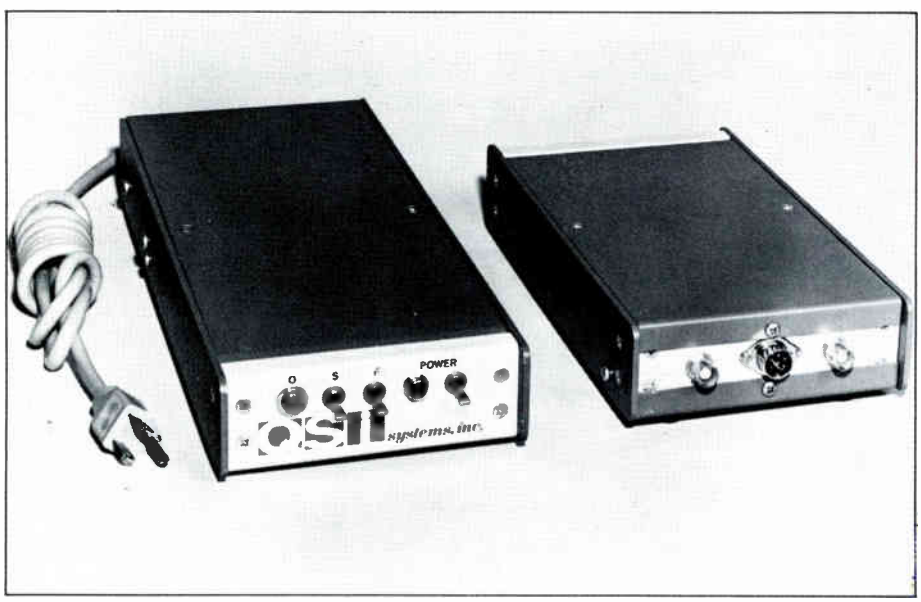
The new address (time) code, called the Q-Code, is generated by the QSI model VFF-6030 video field/frame counter which is a video up counter, incremented by each vertical interval for fields and every other vertical interval for frames, depending on the type of recording system used. This new generator has a start/stop function, a reset to zero function and field/frame selection. The field-type generator is constructed on a single high density PC card in a rugged enclosure attached to your field VTR, with power and video arriving from the VTR. Studio desk top and rack-mounted versions are also available. The Q-Code system generator has a straight numerical sequencing as opposed to 1/30 second, seconds, minutes and hours as the SMPTE code. These numerical sequences allow simple addition and subtraction of numbers by an inexpensive calculator instead of the difficult sexagesimal number system. The Q-Code makes life simple for the traditional film person in the broadcasting film department as well as the experienced video technician. The news person simply tells the assembly technician which numbers are the edit points, and the technician uses these points for assembly. If the news producer wants to know the time elapse, the edge numbers are simply divided by 30. A simple inexpensive calculator is used. For automatic editing purposes the tape is shuttled up to the correct edge number, and an edit point is applied to the cue track. Complete automatic editing can then be accomplished on the run.

Addresses All Video

The advantage of the Q-Code is that it can be used on all helical VTRs. It doesn't matter whether your system contains the latest $50K VTR with all the bells and whistles or a $500 rebuilt industrial version, the Q-Code is compatible with both. It's generated by a simple character generator and read on the picture monitor. Every system had a monitor already. When recording, the source video changes the counters at each or every other vertical interval at the leading edge of sync. The changing numbers can now be recorded with that video. This would normally be the case in the field . A VFF-6030 attaches to your portable VTR, picks up video and power via a DIN connector or BNC connector for video. The unit is only 1-¾" x 5" x 9" with a rugged enclosure only weighing a few pounds, and consumes a fraction of an AMP of power.

Used in Field or Studio

In the studio a VFF-6030P, a unit with 115 Volt capability can be useful for recording, editing or just take the place of your old mechanical counter that has plagued you for years because of its inaccuracy. The studio unit is 1¾" x 5" x 12" with the same rugged enclosure. One of the special features of these units is that any video can be routed through it and have its fields and frames counted without having recorded, but just monitored. C-ED



The QSI model VFF-6030 video field/frame counter.

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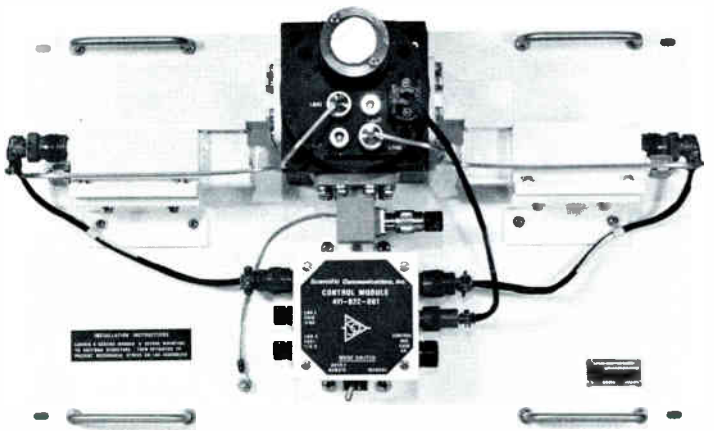
REDUNDANT FET AMPLIFIERS



The SCI Model SCF-306 Series Redundant GaAS FET Low Noise Amplifier Assembly provides amplification of RF signals in the 3.7 to 4.2 GHz frequency range. The assembly consists of two GaAs FET amplifiers, a low loss transfer switch, and a transfer switch control module. The entire system is mounted on a single plate designed for mounting near the antenna. Interface connector pins provide system status information for remote monitoring.

The two LNA's are in a redundant configuration. Either LNA may be "on line"; that is when the amplifier is connected between the RF IN and RF OUT ports of the transfer switch. The other LNA is "off line" and operating. The input and output RF ports of the off line LNA are terminated at the test ports of the transfer switch. The off line LNA may be tested or replaced without affecting the normal operation of the on line LNA.

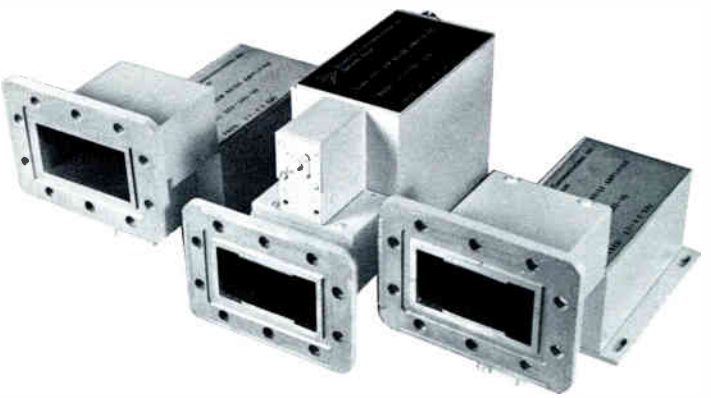
Scientific Communications offers standard 3.7 - 4.2 GHz FET amplifier models at guaranteed noise figures from 1.3 to 3.5 dB at 25°C. Waveguide input (CPR - 229G flange) and type "N" output are standard on all 50 dB gain units. Other options include 115 VAC or 15 - 28 VDC (positive or negative) operation, other gain values from 20 to 60 dB and fault monitor circuitry. All models employ specially designed bias networks for maximum power handling capability and optimum gain stability over wide ambient ranges.

SCI FET amplifiers are housed in weatherproof enclosures and utilize power connectors for installation convenience. An internal IC voltage regulator prevents gain changes due to input voltage variations, permits operation over an input voltage range of 15 - 28 VDC and rejects hum and noise on the DC input lines. The amplifiers also feature short circuit, overvoltage and reverse voltage protection. Waveguide inputs are pressurizable and all waveguide units are supportable by the input flange if desired.

MODEL	FREQUENCY RANGE (GHz)	GAIN (dB min.)	GAIN FLATNESS (+ dB max.)	NOISE (1) FIGURE (dB max.)	VSWR IN (max.)	VSWR OUT (max.)	POWER OUT AT 1.0 dB COMPRESSION (dBm Min.)
SCF-395-50	3.70-4.20	50	0.5	2.6	1.25:1	1.25:1	+10
SCF-395-50A	3.70-4.20	50	0.5	2.0	1.25:1	1.25:1	+10
SCF-395-50D	3.70-4.20	50	0.5	1.8	1.25:1	1.25:1	+10
SCF-395-505	3.70-4.20	50	0.5	1.5	1.25:1	1.25:1	+10
SCF-395-507	3.70-4.20	50	0.5	1.3	1.25:1	1.25:1	+10

(1) at 25°C

GaAs FET AMPLIFIERS



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The SR-4000 and SR-5000 Satellite Video Receivers provide quality picture and sound reception of satellite television transmissions. They have been specifically designed to cost/performance criteria for CATV earth stations.

The SR-4000 is a fully agile, synthesized 24 channel selectable model. The transponder number is selected by thumbwheel switches on the front panel with LED readout of the selected transponder number.

The SR-5000 is the fixed channel version with provision for transponder selection by a crystal change and retuning.

Both units are compact with module interchangeability between unit types except for synthesizer/L.O. source modules. They each have phase-locked loop demodulators to provide excellent FM threshold performance.

The compact design of these units allows two complete receivers to be mounted in a standard 19 inch rack only 3½ inches high. This feature minimizes the rack space required for multiple receivers when several satellite transponders are to be utilized.

A unique feature of these receivers is the availability of a second subcarrier demodulator. This feature is pre-wired on all units so that the addition of a printed circuit card can provide a second subcarrier for audio, slow scan TV or other software which may be offered by the programming originators.

The SCI receivers were specially engineered to provide simple methods for testing in an operational environment. A meter and selector switch on the front panel permit the monitoring of critical voltages and the IF monitor ouput is available at the front panel to facilitate C/N testing. An AGC/MGC switch and a manual gain adjustment are located on the front panel to further facilitate testing. The rear panel contains an auxiliary video output to allow monitoring of video performance without disrupting programming and an extra pair of audio outputs to facilitate audio monitoring.

See our card on page 32.

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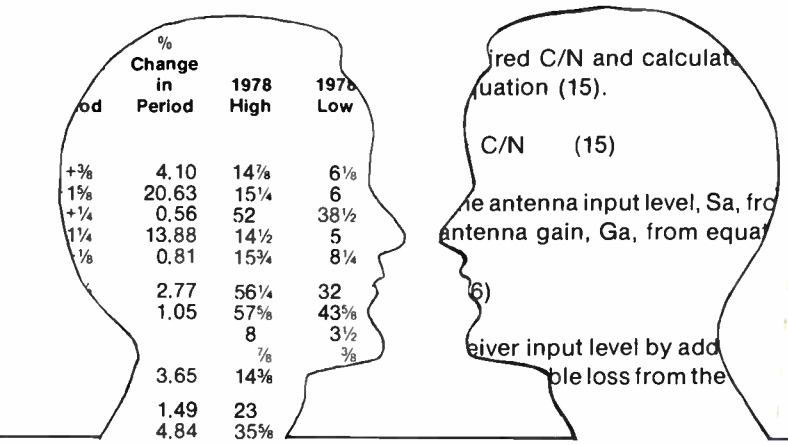


Management/Engineering: Interface

By David L. Willis, Engineer
Tele-Communications, Inc.
Denver, Colorado

Cable Television service was initially implemented by technical people applying their knowledge to fill a specific need. The early systems seem archaic today and yet they served the same purpose as the most modern and sophisticated system. The expansion of services and service channels, the increased reliability, and the vastly improved quality of service rendered by the modern system reflects the technical advances of the past quarter century. Much of the progress made in CATV engineering is the result of field experience and improved techniques. Much of it reflects the research and development efforts of manufacturers who have put forth great effort to meet the needs and desires of operating companies. Engineering, then, must be considered to be the foundation on which the industry is built. The inter-relationship between engineering and management is thus a vital part of the ongoing success of any CATV company.

In assessing the relative roles of management and engineering a clear statement of the objectives of each entity should be helpful. The prime concern of management is to operate and manage the company in such a manner as to generate a reasonable return on investment, provide for continued growth and assure the continuity of the business. In order to do this, management must control the initial investment in a cable system to assure that plant investment does not exceed the ability of the system to repay that investment. Management must structure the everyday operation so that ongoing costs don't constitute an unreasonable burden but are sufficiently liberal to permit completion of necessary routine work items. Management must be sensitive to the type of product and promotion that will succeed in each specific marketplace. The marketing approach or timing of marketing can have extreme impact on the initial success of a CATV system. The introduction of a CATV system without additional channel selection or program variety above the television fare available "off-air" can presage a financial disaster. In addition to all of these items, management must also continually monitor the political climate of all entities that can exert authorizing or controlling powers affecting the CATV operating franchise or permit. Since the makeup of these entities is inherently unstable due to elections, appointments, and changing scopes of influence, this situation is volatile and requires constant attention.

The mandate of the engineering department of a CATV company would be to provide the highest degree of quality and continuity of service to all subscribers. Thus, the design of a new system would be predicated on achieving the required number of service channels with the lowest possible "built-in" maintenance problems and a predetermined specified signal quality level. In the case of an operating system, engineering would bend its efforts to provide the necessary preventive and corrective maintenance to achieve a high level of service to the subscriber on an extremely consistent basis. The engineering department must also be flexible enough not only to accept innovations in distribution systems and headend equipment, but to accept and master entirely new disciplines such as satellite communications. Engineering must provide the expertise for continued expansion of service areas. The burden of system design for minor line extensions is normally given to the system technical personnel with review at other company levels. Major system extensions, general rebuilds and new system design is usually performed, in part, by the engineering department and by the equipment vendor. The engineering department will normally perform a design review on all outside design work.

It would seem then that many times management and engineering would be at cross purposes. Increased reliability, quality and ease of maintenance costs money. With unlimited funds, engineering would tend to strive for the nth degree achievable. Management, with fiscal responsibility, must force restraint on expenditures. The number of channels to be provided for on a system, the specified quality level and other parameters are necessarily decided by management and engineering jointly, since the functions of both are heavily involved in these decisions.

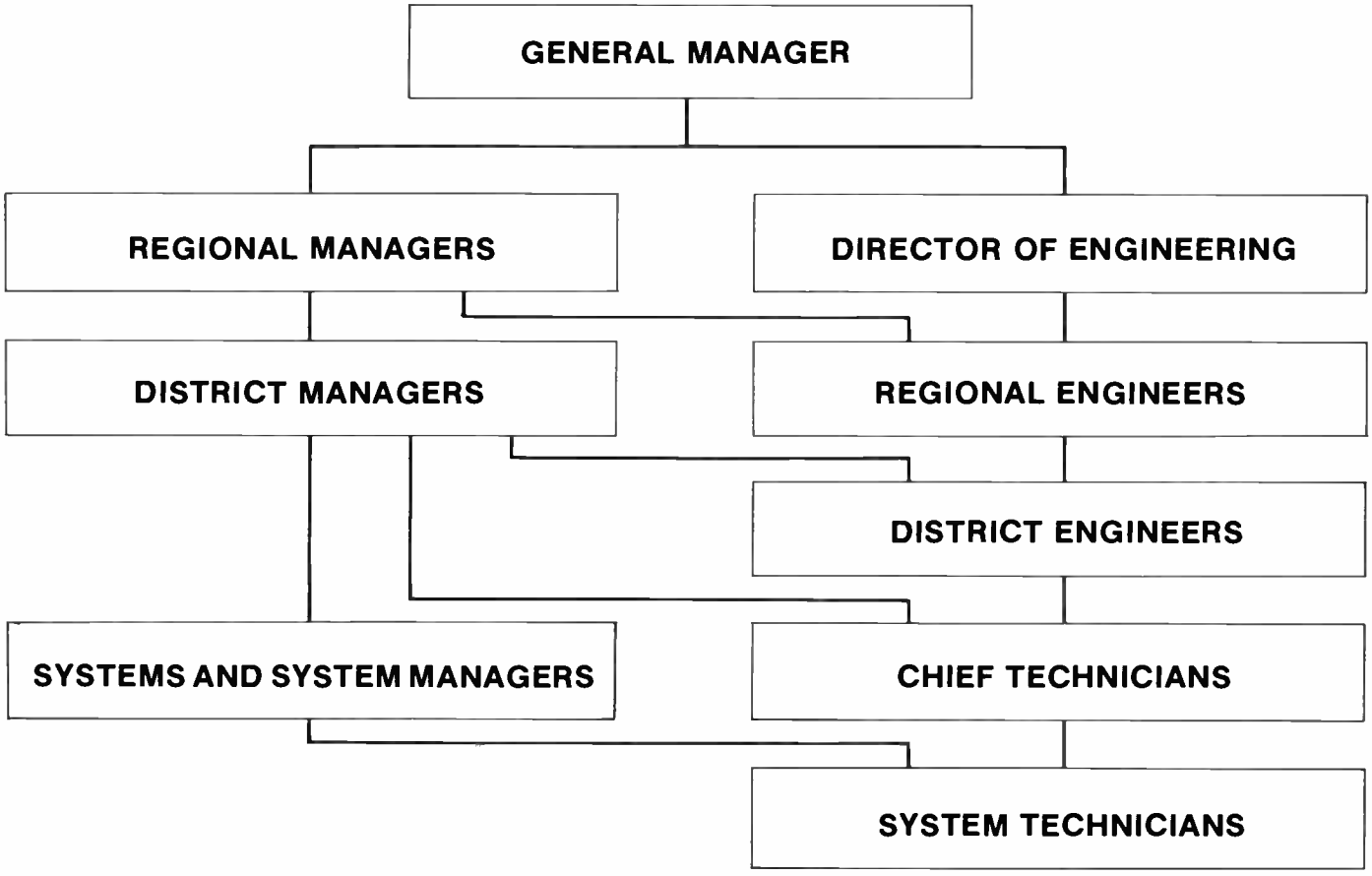
The engineering department of Community Tele-Communications, the cable division of Tele-Communications, Inc., is directly responsible to the general manager. The five regional managers are also directly responsible to him. Each of these RM's has several district managers directly responsible to him. Each district manager supervises several systems and their associated system managers. The technical

organization of CTCI is headed by the director of engineering. Each region has a regional engineer, district engineers, chief technicians and system technicians. Obviously this structure dictates a dual line of authority and responsibility. Since we determined that management has the final responsibility for the profitability and continuity of the business, it follows that final authority must rest with management. Thus, as the director of engineering is responsible to the general manager, each engineering and technical level is responsible to the corresponding management level. In practice, the everyday needs of the region, et cetera, are achieved by the technical staff under the direction of the specific supervising manager. Technical policies, techniques and technical support for the operating units comes from the engineering department in Denver.

The construction department of CTCI performs the functions of construction expediting, project coordinating and expenditure tracking. This department works closely with both management and engineering.

In order for this type of organization to function properly, it is necessary for both management and engineering personnel at all levels to exhibit a high degree of willingness to cooperate with the needs and desires of the other entity and to accommodate these needs and desires to the highest degree possible. In the final analysis the success or failure of both elements and even more importantly, the success or failure of the company itself is dependent on the ability of both to successfully achieve its goals. The most important aspect of achieving a mutually satisfactory relationship is communication. Needs and desires should be imparted as clearly as possible and the scope of these needs should be clearly defined. Responses should address the specifics as completely as possible. Written communication should be the rule, and a recapping document should follow all telephone conversations that involve inter-departmental activities. Only through clear, concise communication can mutual understanding of a specific problem or need be realized. When mutual understanding exists, the cooperation necessary for a satisfactory resolution can be readily achieved.

An important aspect of the interface is the continual change of the industry. In order to keep abreast of the latest developments and techniques it is necessary for engineering to be constantly seeking those latest innovations that can provide added dimension to the technical aspects of the CATV system. These added dimensions could provide new or better services and enhance the ability of the system to generate income. Engineering then has the responsibility to make management aware of any and all factors which would materially affect financial aspects of building or operating CATV systems.



Management/engineering flow chart.

Through all the ups and downs encountered by our industry due to tight credit, over regulation or for whatever reason, the high performance level of technical people in our industry has been its most consistent aspect. The coalition of management and engineering has brought the CATV industry into the forefront of American entertainment. I can visualize only progress and achievement in the future of our dynamic young industry.

You Read It In CableVision 1st.

A whole week went by before TIME Magazine printed the same story we reported in our December 19th issue of CABLEVISION featuring Pat Robertson and Jim Bakker.

In the fluctuating world of cable television, one week could mean finding out too late that some major MSO was bought out or that pay programming changed from one satellite to another.

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Time for a billing? Subscriber 5000 does it. Want to see a 15 day aging report? A 30 day? 60 day? Along with suggested disconnects? The reports are on your desk. But that's not all. The multipurpose Subscriber 5000 also:

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For our brochure, write Toner, 969 Horsham Road, Horsham, PA 19044. Or call tollfree: 800-523-5947. In Pennsylvania, 215-675-2053.

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Cable Equipment, Inc.

See it demonstrated at booth #23 at the Western Cable Television Convention.

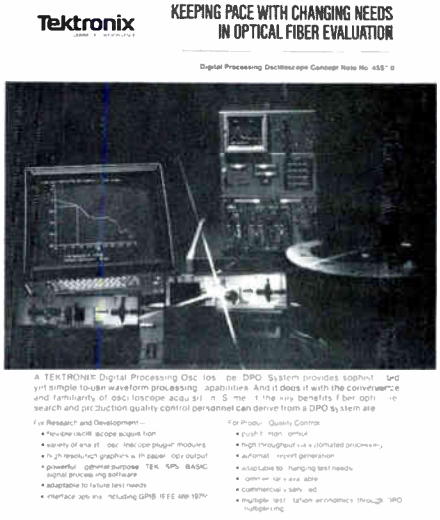
Keeping Pace with Changing Needs in Optical Fiber Evaluation

What fiberoptic performance specifications are engineers interested in? At this stage of fiberoptics development there is no single answer. A large number of performance parameters can be calculated based on the results of a small number of tests.

A test system that uses Tektronix' Digital Processing Oscilloscope, together with graphics display terminal and hardcopier, permits the user to calculate the performance characteristics of particular interest to him. Calculations are performed using Tek's SPS Basic software, designed specially for test and measurement applications.

The note describes measurement techniques, test setups and calculations. It also includes typical specification sheets prepared by the system.

Readers may ask for a free copy of application note 45S1.0 by writing: Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97077.



Tektronix' optical fiber application note.

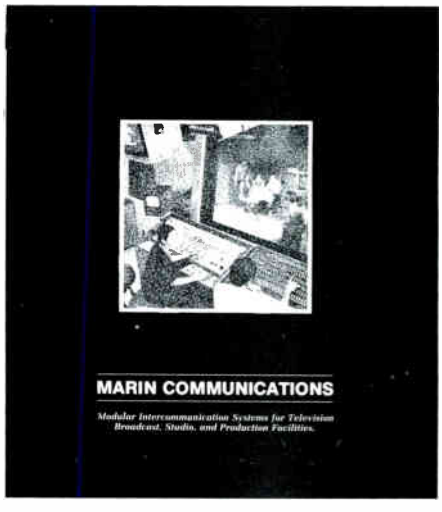
Marin Communications Offers Brochure on Modular Intercom Systems for TV Facilities

Marin Communications, a division of FRL, Inc., has made available an illustrated, four-page brochure describing its line of modular intercommunication systems designed for television broadcast, studio and production facilities.

According to the brochure, each module of a typical system is designed with generalized interfaces for versatility in system structure, and both audio and control circuits easily adapt to existing two-wire facilities. Any conceivable communications need may be met by connecting modular units and system components will work directly with foreign equipment or on a stand-alone basis.

Descriptive information and performance specifications are included in the literature on the three basic modules: the microphone, speaker and switching modules.

The free brochure is available from Marin Communications, 517 Marine View Avenue, Belmont, California 94002, (415) 591-8924.



New brochure from Marin Comm.

Introducing the "Fiber Optics Handbook and Market Guide" From Information Gatekeepers

Information Gatekeepers, Inc., has just published the first edition of the "Fiber Optics Handbook and Market Guide." This handbook is the first of its type in the fiberoptics field, containing state-of-the-art papers on fibers, cables, detectors, sources, connectors, subsystems and systems. Packed into 136 pages of this ready-reference is the first listing of manufacturers and products of fiberoptics and communications ever assembled.

Information Gatekeepers, Inc. plans to update the Handbook and Market Guide semi-annually and expand its contents to include new subject areas. The next edition, planned for spring of 1979 will be international in scope.

For a copy of this handbook and market guide, contact Information Gatekeepers, Inc., 167 Corey Road, Suite 212, Brookline, Massachusetts 02146, (617) 739-2022.

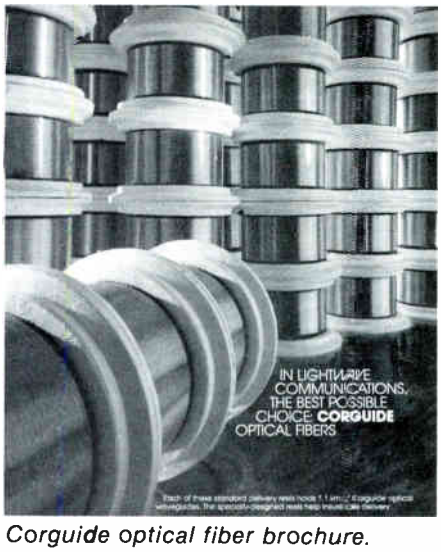
Free Brochure Describes Corguide Optical Fibers

Reproducibly high-quality optical waveguide fibers available from Corning Glass Works for communications and data links are described in a new eight-page color illustrated brochure (OWG-F2).

The brochure notes that Corning's Corguide optical waveguides feature low signal loss and high bandwidth, and that quantity production makes 20 standard fiber types ready for immediate delivery. The coated Corguide waveguides are available in 1.1 km lengths wound on specially designed reels.

Two pages of Corguide waveguide specifications present information about attenuation, bandwidth, numerical aperture and coupling efficiency. Environmental and physical properties of the fibers are also given.

For a free copy of this brochure, write to Corning Glass Works, Corning, New York 14830.



Corguide optical fiber brochure.

★ **Valtec Corporation** has appointed **Frank M. Drendel** chairman and chief executive officer. He was formerly president and chief executive officer of Valtec's subsidiary, the **Comm/Scope Company** of Catawba, North Carolina. Valtec and Comm/Scope developed and installed the first fiberoptic telephone-video system for an independent telephone company. Drendel is a veteran of 13 years in the cable television industry. His achievements include being instrumental in developing and installing, in cooperation with **Mitre Corporation,** the first two-way interactive telecommunications system in Reston, Virginia.

Frank M. Drendel

★ **R.W. (Bush) Fensterbush** is the new chief engineer of **River City CableTV, Inc.,** a subsidiary of **Communications Properties, Inc.** (CPI). River City Cable TV is being constructed to serve Louisville, Kentucky. Fensterbush's duties at River City will include responsibility for the technical operation and maintenance of the system and the earth station, along with supervision of the technical work force and service facilities.

★ Arthur D. Beard, president of **Formation, Inc.,** recently announced the appointment of **William A. Rennie** as vice president of field engineering. Rennie will be based at the Decatur, Georgia, headquarters of Formation's field engineering operation, and will be responsible for all field service and maintenance of the company's installations.

★ **GenRad, Inc.,** recently announced the formation of an advanced development group headed by **Howard O. Painter,** vice president. The group will provide marketing and engineering support for both of GenRad's product divisions—Electronic Manufacturing Test, and Acoustics, Vibration and Analysis. Responsibilities Painter held when he was engineering and marketing manager for GenRad's board test systems and component test instruments will be assumed by **Ralph P. Anderson,** test systems product line manager, and **Daniel Abenaim,** component test product line manager.

★ **Frank W. Novak** has been appointed general manager of the communications division of **Panasonic.** Novak's responsiblilities will encompass all advertising and communications activities for the entire line of Panasonic products, including overall supervision of the advertising, public relations, creative services and administrative control departments.

Frank Novak

★ **David G. Sant** will assume the newly-created position of national accounts sales manager for the telecommunications division of the **ROLM Corporation**. He will be responsible for developing and implementing sophisticated communications networks for major corporations using the ROLM CBX Business Telephone System product line.

★ **John Fellet, Jr.,** recently assumed the position of executive secretary of the **Arizona Cable Television Association.** The association represents over 40 Arizona cable television systems serving over 74,000 subscribers throughout the state.

★ **Cedar Rapids Cable Communications, Inc.,** has announced the appointment of **Richard A. Hook** as general manager. Hook has been general manager of Cox's Saginaw and Owosso systems in Michigan for the past two years. Prior to managing the Michigan systems, he was assistant manager at **Quint Cities Cablevision** in Moine, Illinois, where he started with Cox in 1973.

Richard A. Hook

★ **Jerry Marnell** has been named vice president of technical operations for **Viacom's Suffolk Cablevision.** Marnell will be responsible for the direction and implementation of new technical services for Suffolk Cablevision, and will also assume responsibilities for the technical support and guidance of **Viacom's** eastern operations. ***John C. Heck**, field engineer for **Continental Cablevision, Inc.,** has been transferred to **Continental Cablevision of Miami Valley**, located in Dayton, Ohio. Heck is responsible for microwave facilities, proof of performance tests, maintenance of highly complex electronic equipment and research innovations for all of Ohio. **Raymond P. (Rick) Clark** has been named installation supervisor for **Continental Cablevision of Miami Valley.** All residential, commercial and institutional cable installations will be supervised by Clark.

Lenco's VNM-428 Video Noise Meter ...Only if You *Really* Care About Noise.

Some people think that video noise is a bore. They just couldn't care less about it. They figure that if they ignore it, it'll go away.

On the other hand, there are some forward-thinking, dedicated video engineers who are vitally concerned about their signal quality.

If you belong to the former group, you can stop reading this ad.

However, if you're interested in making fast, accurate signal-to-noise measurements of *any* composite video signal — no matter what the source — check out our VNM-428 Video Noise Meter.

The VNM-428 is specifically designed for the video S/N measurement requirements of TV studios, CATV, satellite or microwave systems. It utilizes a tangential noise measurement technique which overcomes the problems associated with oscilloscope measurement of Gaussian noise in video waveforms.

It's a small, rugged and stable unit, with a built-in calibrator that ensures an accuracy of ±0.5 dB throughout the range of 20-55 dB. Three precision filters, conforming to EIA/CCIR standards, are built in. The large, easy-to-read LED display can be seen from across the room. And it's priced at a comfortable $1,495.

So if you're *really* concerned about video noise, call your nearest Lenco sales office today. We'll be happy to give you a no-obligation demonstration.

LENCO, INC., ELECTRONICS DIVISION

300 N. Maryland St., Jackson, MO 63755, (314) 243-3147
13620 Littlecrest Dr., Dallas, TX 75234, (214) 241-0976
Post Office Box 301, Atchison, KS 66002, (913) 367-1146
1 Elmwood Lane, Westport, CT 06880, (203) 226-4482
2390 Tiffany Circle, Decatur, GA 30035, (404) 288-2080

Want to know more about noise measurement? Write on your letterhead for a FREE copy of "Television Signal-To-Noise Measurement — A NEW APPROACH".

Chyron Introduces New 3/4-Inch Videocassette Cleaner and Evaluator

The Chyron cassette cleaner and evaluator, CCE model U-1, is a completely automatic, self-contained unit which cleans and evaluates 3/4-inch videocassette tape at a rate ten times faster than real time without altering the pre-recorded signal. The unit removes dirt and embedded particles from tape surfaces, and detects surface and edge damage which may cause VTR head clog and video dropout. A thirty-minute cassette can be processed easily and safely in less than three minutes.

The CCE model U-1 has three modes of operation. The unit can be made to automatically stop on major tape damage only, stop on minor tape damage only, or continue until the entire playing surface of the tape has been cleaned and evaluated. Two LED numeric counters on the front panel indicate the actual tape length in minutes and tenths to 99.9 minutes, and provide a count of accumulated major and minor tape damage. Eight message lamps reflect the tape and system status at each stage of the operation.

For additional information, contact Chyron Corporation, Video Products Division, 223 Newtown Road, Plainview, New York 11803, (516) 249-5202.

VMC-100 Sequencing System From Videomedia

The Videomedia VMC-1000 sequencing system was designed specifically as a professional approach to sequencing 3/4-inch videotape machines in broadcast situations.

The versatile VMC-100 sequencer is a rugged, dependable, low cost control system that interfaces to any capstan servoed helical-scan videocassette machine for precise cueing and vertical interval switching of program material.

The system derives its accuracy from counting control track pulses on standard, unmodified videotapes, obviating the need for expensive time codes.

For further information, contact Videomedia, 250 N. Wolfe Rd., Sunnyvale, California 94086, (408) 733-6500.

Slow-Motion and Slide-File Broadcast Disc Recorders Offer 10,000-Hour Head Life

Two compact, easily transported, low cost broadcast video disc recorders offering typical head/disc life of 10,000 hours have been introduced by Oktel Corporation.

The model BDR-400 Slow-Motion Disc Recorder provides 30 seconds of real time broadcast-quality color video with continuously variable slow-motion, forward and reverse. The unit also features switchable fixed rates for record and playback, single-field playback, and electronic display of elapsed time with two cue markers.

Oktel's model BDR-300 Slide-File Disc Recorder is capable of storing up to 1200 frame slides, which provide full vertical resolution. The BDR-300 features a "preset/reset" address control

that allows heads to be moved to any preselected track with a maximum search time of 3.8 seconds. Up to four fixed-head channels are available as options to provide program continuity.

For further information, contact Oktel Corporation, 1731 Dell Avenue, Campbell, California 95008, (408) 374-1811.

CRC Electronics' New Cassette Controller

CRC Electronics, Inc. has announced the introduction of the TD-100 Time Delay Cassette Controller. The TD-100 represents the application of digital technology to the flexible control of recording and playback in modern videocassette machines, including the revolutionary Sony Betamax machines. The TD-100 is designed to provide any delay from one hour up, in one-minute increments, for any program source, whether it is of a specific duration, or is a 24-hour feed. It provides for resumption of operation after VTRs have been stopped by power failure, as the TD-100's logic is battery protected. Used in conjunction with a suitable array of machines, the TD-100 becomes essentially an "Extended Delay Line" with program material emerging from the system at the desired interval after entering.

For further information, contact Jim Chiddix, CRC Electronics, P.O. Box 855, Waianae, Hawaii 96792, (808) 668-1227.

Multi-Role Lens Has Front Units For Standard, Portable Cameras

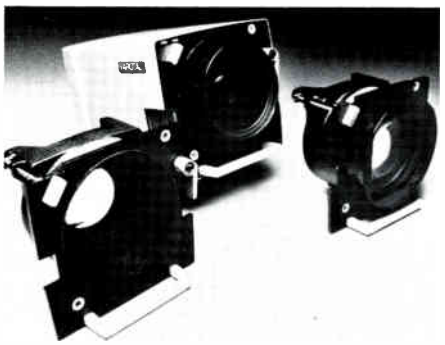
A multi-role lens that provides a common set of optical zoom lens modules for both standard and portable television cameras is available from Rank Precision Industries, Inc.

The Varotal MRL* permits the user to select lens fronts (wide, narrow or standard) to make up a system tailored to individual needs and budgets, according to the manufacturer.

The Rank lens features a compact objective with a wide specification to meet full professional broadcast standards. Three interchangeable lens fronts give wide angle, narrow angle and standard capabilities with a total focal length range of 56 to 1.

The "portable" MRL was designed basically for use with tripod-mounted portable television cameras and has

manually-controlled focus in addition to optional servo zoom. Portable lens package also offers full optical specifications available in the standard broadcast version.



For additional information, write to Rank Precision Industries, Inc., 260 N. Rt. #303, West Nyack, New York 10994.

Digital Channel Programmer from Arvin

The Arvin Digital Channel Programmer, with non-duplication and multiple channel switching, incorporates the latest in long-life solid state photo-optic scanning and integrated circuit logic. Non-duplication and multiple channel switching is accomplished via simplified programming of a plexiglass disc with 30-minute intervals for a total of seven days.

For additional information, contact Arvin Systems Inc., 1771 Springfield St.. Dayton, Ohio 45403, (513) 258-2181.

Datamedia Introduces Communications-Oriented Video Terminal

A new, low-cost, microprocessor-based, communications-oriented video terminal, designed to provide a "new level of reliability" in a range of transaction processing and inquiry response applications, was announced by Datamedia Corporation. The product is the first in a new family of microprocessor-based video terminals from the company.

The newest Datamedia video terminal—the Elite 3025A—is a buffered Teletype®-compatible CRT terminal with a single-page video memory that displays 1920 alphanumeric characters in a 24-line/80-character format.

The unit provides broad versatility in communications with a data processing system, minicomputer, or other peripherals, accommodating a standard RS232C or optional 20mA current loop interface, and supporting full or half duplex, two- or four-wire, internally or externally clocked, asynchronous communications.

For more information, contact Datamedia Corporation, 7300 N. Crescent Blvd., Pennsauken, New Jersey 08110, (609) 665-2382.

New ENG/EFP Color Monitor

A new eight-inch single-gun color video monitor from Amtron Corporation is flexible enough for portable field use or studio rack-mounted installations.

The AM-8 is identical in size to the popular Tektronix 1485 video waveform monitor and may be included in a side-by-side mount with that instrument, or two AM-8's may be used together in only 8¾-inches of standard rack mount space.

The AM-8 is equipped with professional features such as switchable A/B inputs, internal/external sync, separate RGB gun switches, plus individual background and gain controls. Horizontal and vertical scan delay (pulse cross) display is optional.

For additional information, call Bill Widera at (408) 688-4445.

Tomco Offers Automatic Non-Duplication Switcher

Tomco Communications has introduced its model ADS-1000 automatic non-duplication switcher. The unit is available with RF or I.F. switch and one or two optional VHF tuners. No manual adjustment is necessary for delay resulting from path length difference.

For further information, contact Tomco Communications Inc., 1077 Independence Ave., Mtn. View, California 94043, (415) 969-3042.

Inserter/Splitter from Vicon Industries

Vicon Industries has announced an addition to their line of video signal equipment. They are now offering the versatile model V270SP TV inserter/splitter. Either of two synchronized cameras can be displayed full screen or adjusted to occupy any portion of the screen by means of the convenient front-panel control. A display switch is used for quick changeover between camera one, full screen and camera two, full screen and inserted picture/split-screen modes.

For more information, contact Vicon Industries Inc., 125 E. Bethpage Rd., Plainview, New York 11803, (516) 293-2200.

Otari Features Full Function One-Inch Eight-Track

A new one-inch eight-track recorder, said by the manufacturer to be the first full function eight-track machine, has been introduced by Otari. Designated the MX-7800, it is said to sell at a price considerably lower than competing units and to incorporate several operating and convenience features that should prove to be of real value to the multi-channel recording studio.

All functions and operating modes can now be controlled remotely on an optional remote control unit, including selective reproduce and varispeed. This means that overdubbing on any one or a combination of the eight channels can be controlled from inside the studio by the musicians, for instance, instead of from the control room. As for varispeed, both coarse

and fine controls are incorporated in the remote control, to permit changing pitch or precisely matching selection length.

As a complement to the remote control, Otari also offers a remote tape timer with an easy-to-read LED readout and a return-to-zero feature.

For full information and specifications, contact Otari Corporation, 981 Industrial Road, San Carlos, California 94070, (415) 593-1648.

Sharp Electronics Introduces Three-Tube ENG Color TV Camera

The Professional Products Department of Sharp Electronics Corporation has introduced a three-tube Electronic News Gathering color television camera that weighs only 12.1 pounds. Suggested user net is under $5,000.

A key feature of the new camera—model XC-320U—is a rugged, unified moulded housing block which contains the lens, beam splitter, coil assemblies and tubes. The three vidicon tubes are attached directly to the dichroic mirror. As a result of the rugged design of the block, registration problems have been completely eliminated.

The camera operates at very low light levels (15-foot candles with 6 dB gain switch on), offers a minimum 400 lines horizontal resolution, and a signal/noise ratio of 46 dB.

For further details, call Ed Falk at (212) 683-4900.

Video Filters from Allen Avionics

Allen Avionics has introduced a new line of L-C filters for the video industry. Included are delay equalized NTSC lowpass filters having sharp roll-offs and good passband delay linearity with cut-off frequencies from .1 MHz to 10 MHz. The most popular of these are used to attenuate the harmonics of the NTSC color sub-carrier frequency 3.58 MHz.

Also available are NTSC reject filters, often used in color systems for monochrome transmission to prevent color flashes from appearing on the screen. Allen Avionics has also introduced an NTSC bandpass filter, a low distortion unit designed to attenuate the luminance information in color TV signals. For more information, contact Allen Avionics, Inc., 224 E. 2nd Street, Mineola, New York 11501.

Video Noise Meter from Lenco

A video noise meter that utilizes a new principle of noise measurement is available from Lenco, Inc., Electronics Division.

The model VNM-428 is designed specifically for video signal-to-noise measurement requirements of TV studios, CATV installations and microwave system users where portability, simplicity of operation and accurate measurements are required.

A major feature of the VNM-428 is its ability to make accurate, real-time signal-to-noise measurements of any composite video signal no matter what the source. The noise meter has a built-in calibrator that ensures accuracy of ±0.5 dB throughout the range of 20 dB to 55 dB. The signal-to-noise ratio is calibrated to EIA standards and is shown on a large LED display.

The meter may be used as a portable unit or rack-mounted with an adaptor for side-by-side use with an oscilloscope.

Complete technical specifications may be obtained from Richard N. Lawrence, sales manager, Lenco, Inc., Electronics Division, 300 N. Maryland Street, Jackson, Missouri 63755, (314) 243-3147.

Colorado Video Reduces Price of Slo-Scan Converter

Colorado Video, manufacturer of the Slo-Scan converter used in UPI's Newstime programming, has announced a price reduction for the converter. Originally costing $7,500, the Slo-Scan converter now sells for $6,000. So far, 40 of these units have been sold, and the company anticipates selling a few hundred more units in 1979.

For more information, contact Colorado Video, Inc., P.O. Box 928, Boulder, Colorado 80306, (303) 444-3972.

New Ikegami CCTV Camera Price Is High in Sensitivity, Resolution, S/N Ratio

A new CCTV camera, the ITC-44, has been introduced by Ikegami as its entry in the current competition for price-conscious surveillance installations. Yet, according to that firm's new CCTV national sales manager, Fred Bergstrasser, the ITC-44 is built to a standard of appearance, low weight and size and performance far above its price class.

The camera needs only 1/10 foot-candle at its 2/3-inch vidicon tube face for an image, which means only 1.2 foot-candles from a standard eighty-nine percent reflectance object. With a silicon-target vidicon, minimum tube face sensitivity is ten times better, or 0.01 foot-candle.

The ITC-44 is available with a choice of pickup tubes that includes Plumbicon, vidicon, separate-mesh vidicon, Newvicon, Chalnicon, or silicon-target vidicon. With gamma correction off, signal-to-noise ratio is better than 44 dB, video bandwidth 6 MHz or better, and deflection distortion less than 2 percent. Drawing only 12 watts, the ITC-44 is available for operation from 117V AC for UL installations as the ITC-44A or from 24V AC for economy installations.

All electronics are ICs. An FET Percival-circuit video amplifier first stage provides the high signal-to-noise characteristic. All semi-conductors are silicon types. Gamma correction and black clamping extend the image-

handling capability and yield clean, clear images of moderate contrast even with backlighting or light flare. Auto-sensitivity control extends the dynamic illumination range to 10,000: 1. Auto beam current control compensates for normal aging of the pickup tube.

Further data is available from Ikegami Electronics (USA) Inc., 37 Brook Avenue, Maywood, New Jersey 07607, (201) 368-9171.

Video Shopper to Specialize in New And Used Video Equipment

Video Shopper, a firm specializing in sales of new and used video equipment, was recently established in Fair Lawn, New Jersey. The firm supplies professional video equipment to broadcast, industrial and educational users nationwide. All types of video production equipment will be offered including cameras, TV film projectors, telecine' accessories, studio lighting, videotape recorders, switchers, monitors, and much more.

The first item being offered is a new model 1600 RCA 16mm film chain projector. Designed especially for film-to-TV, film-to-tape or regular projection use, the model 1600 featuers optical sound, quartz lamp, five-bladed shutter and 115V AC synchronous motor as well as all standard projector features. Priced below $1,000, the model 1600 offers all the features of competitive machines costing almost twice as much.

The RCA model 1600 does not require a dedicated film chain camera. It can be used as needed with any portable or studio color TV camera. Broadcasters use it as an extra telecine' machine, cable TV firms use it to put 16mm films on the cable system, industrial and educational personnel use it to make film-to-tape transfers and for other closed circuit applications. In addition, anyone can use it for all regular projection uses.

For further information or to be placed on Video Shopper's mailing list, contact Video Shopper, P.O. Box 331, Fair Lawn, New Jersey 07410, (201) 797-3299.

Dynasciences Introduces High Resolution Video Enhancer

Dynasciences, a unit of Whittaker Corporation, has introduced a new high resolution video enhancer to its line of television studio equipment. The model 858 is the first video enhancer specially constructed to interface with cameras and monitors operating over a 30 MHz bandwidth at a 1023 line scan rate. The 858 is designed to enhance the clarity and sharpness of an image in both horizontal and vertical transitions.

The new high resolution enhancer has a 30 MHz bandwidth and a signal-to-noise ratio of better than 46 dB. The unit features separate controls for adding up to 12 dB of horizontal and 6 dB of vertical enhancement. Also, an internal coring control, accessible through an opening in the top cover, provides for noise reduction.

The model 858 may be added to any existing high resolution, 1023 scan line system without significant interfacing problems. It requires only a video input and sync input from the camera. For more data, contact Dynasciences, Township Line Road, Blue Bell, Pennsylvania 19422, (215) 643-0250.

Video-Speed A/D Chip from TRW

TRW LSI Products has announced the introduction of a new, low-cost, analog-to-digital converter chip that features 6-bit resolution and a 30 MHz sample rate—designated TDC 1014J.

Packaged in a 24-pin ceramic DIP, the bipolar LSI device consumes only 3/4-watt, yet provides high-performance video-speed data conversion without the need for an external sample-and-hold circuit.

The TDC 1014J requires only a single "convert" command to digitize an analog waveform between zero and -1V. On-chip are 63 strobed comparators, encoding logic and a 6-bit data latch with TTL outputs. Output-mode controls provide either straight binary or two's complement data.

For more information, write to TRW LSI Products, P.O. Box 1125, Redondo Beach, California 90278, (213) 535-1831.

Twelve-Inch Rackmount Receiver/Monitor

With the redesign of the 12-inch television, the engineers at Videotek, Inc. have produced a 12-inch rackmount receiver/monitor to fit a standard 19-inch rack. The model RM-12R requires only 14-inches of rack height and features DC restoration, eight-pin VTR connector, E to E, express tuning and improved Trinitron Plus® phosphors. Also available from Videotek is a 12-inch rackmount video/monitor, model, VM-12R. This unit sells for $750.00. The model VM-12R sells for $725.00

For more information, contact Videotek, Inc., 125 North York Street, Pottstown, Pennsylvania 19464.

TeleMation Features SM-1030

TeleMation, Inc., is featuring the SM-1030 status light display, designed to operate in connection with TeleMation's TVS/TAS-1000 video/audio distribution switcher.

The SM-1030 is a tally device which monitors the TVS/TAS-1000 party line and identifies the output users through the use of LEDs. For example, if user number five selects the source being monitored by the SM-1030, number five's LED will illuminate. The identification strip on the front panel allows the operator to appropriately label the corresponding lights for identification of the users. The unit can be modified to display 40, 80 or 100 outputs simply by changing the front panel. It interfaces with the party line by a BNC connector with a standard piece of RG-59 coax. The unit contains an internal dip switch which enables it to be programmed to monitor any source in the system. As an option, a lever wheel switch can be placed on the front panel in lieu of the dip switch to provide easy selection by the operator.

For more input, contact TeleMation, Inc., P.O. Box 15068, Salt Lake City, Utah 84115, (801) 972-8000.

Marin 11 Rolls Its Own

By Toni Barnett, managing editor

Marin County in San Rafael, California, is a unique local origination cable TV station owned and operated by Viacom Communications. Marin County and the cities of San Rafael and Mill Valley voted to fund community television with a fifty cent per month increase in cable television rates. Those revenues, coupled with a $50,000 commitment from Viacom, allowed the county and the cable system to form a cooperative effort in developing a concept in local programming that involves Marin residents in program production and distribution on Viacom's system to over 41,000 subscribers. As a result, there is no commercial advertising on Marin 11.

Production Facilities

Marin 11 has a small (25-foot x 30-foot) fully color equipped studio with an adjoining control room and remote shooting capability. The studio equipment consists of three color cameras, telecine cameras, two Sony videotape recorder/players, a turntable and a reel-to-reel audio tape player.

Backing up Marin 11 is a staff of three full-time personnel and two part-time assistants. Patricia Trosclair is the director of local origination and executive producer. She has campaigned diligently, and apparently successfully, for public access. Trosclair spends a majority of her time developing ideas for programs and scouting for people with experience and talent in putting programs together.

Sony's Trinicon® portable color camera.

Working with Trosclair is Peter Rafalow, production manager. Gerry Jarocki is the crew chief and technical consultant. The staff is also aided by an active intern program coordinated with two colleges: a local junior college, College of Marin; and the San Francisco State University Broadcast Communications Department.

Signal Transmission

Signals from Marin 11 are distributed to the headend via microwave. Its main tower is located on Big Rock Mountain. Big Rock is the master antenna receiving and transmitting site. From Big Rock signals are sent to four headend substations. The headends receive the total microwave signals and feed them onto the cable.

The main distribution is microwave, but the signals from the studio are sent out on cable to a microwave dish in Marin 11's parking lot. The signal is then transmitted to Big Rock where a converter turns it into radio reception.

The major problem the staff of Marin 11 has is the demand for use of its equipment, a small budget and a small staff. Most of the programs are produced in the studio. Remote programming is also done, but because this type of show takes so much time to produce, only one show can be done at one time.

"Local Marin TV Made by and for and About Marin County"

Marin 11 features six hours of programming per week, Tuesday and Wednesday evenings from 8:00 to 11:00. The shows are produced in conjunction with people from the community, programming from the local junior college, schools and individuals.

Marin 11 is a combination of local origination and access offerings. Production is handled in a unique fashion. Persons of all ages and experience have the opportunity to become television producers, appear on camera, express their opinions and demonstrate their talents.

Those who have a programming idea, and are eligible, fill out the necessary forms. A meeting is set up with a staff member of Marin 11. The crew from the studio assists the novice-producer, offering guidelines for scripts, formatting of the program's content as well as all of the necessary production details. Although the staff advises the individual, he or she must dedicate time and effort to the project. No money is exchanged, but the individual is allowed to express his ideas. In addition, he learns a lot about television production in the process.

Marin 11 is a good place for students interested in TV production to get their feet wet. These students work with the studio staff in various capacities. The students operate the cameras, run the audio and do technical directing.

"One of the beauties of it (community participation) is that people who really know nothing about studio production will come in with an idea," stated Trosclair. "With us working with them and teaching them how to script," she added, "they really end up knowing how to put their show together." Not surprisingly, Marin 11 won the 1978 NCTA Services Committee Award in 1978.

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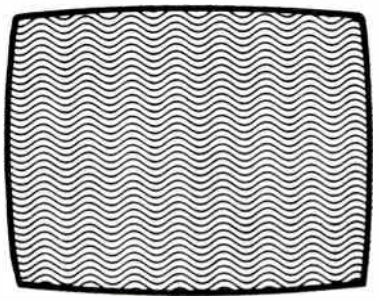

Q In designing new CATV systems, there's a question that tends to come up regarding the choice of the best aluminum cable for a certain design. Is it best to buy solid copper or copper clad aluminum center conductor cable?

A There are a lot of trade-offs involved. One is in the area of 60 Hz power transmission on cable along with the RF or TV signals. You have greater loop resistance when you choose the copper clad center. This means that generally the transfer of power down the line to the other amplifiers from a power supply location is less efficient.

The other choice is in the area of the thermal characteristic of the metals. If you have an aluminum outer sheath, and of course all of them are aluminum outers, and you choose a solid copper center conductor, you have a differential in the coefficient of expansion between the two metals of the inner and outer conductors. Therefore, the conductors are put under a stres that's undesireable from cold to hot weather. Yet, if you choose a copper clad center that's basically an aluminum center conductor, which is just a very thin layer of copper on the outside, then you've eliminated that differential of expansion and contraction in the cable.

However, there is another mechanical disadvantage of the copper clad center over the solid copper. In striping the cable and preparing it for insertion into a fitting, if you even slightly nick the center, it tends to snap off or break.

Q I recently added a short extension (two line extenders) to my system and discovered bad hum bars occurring in the extended area. What happened? And speaking of hum, I have heard that even taps and splices can cause hum in the system. Is this true?

A Regarding your first question, in all likelihood you have one of two problems with this extension. You are either asking the power supply to deliver more current than it's capable of, or the cumulative voltage drop due to I R losses has resulted in low input voltage to the line extender in question.

In answer to your second question, any oxidized connection such as splices can create a semi-conductor junction. As the junction is alternately forward and reversed bias by the AC voltage, severe impedance changes take place . . . the result is hum.

In the case of a tap, be certain to verify that the current carrying capacity of the tap is not being exceeded. Often the ferrite cores of the power chokes become saturated, with the result that additional current cannot flow and the effective impedance is changed, with hum as a result.

Cable Satellite Public Affairs Network

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The Cable Satellite Public Affairs Network is a non-profit news organization located in the Nation's Capital. For more information contact Brian Lamb or Jana Dabrowski.

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C-SPAN

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Antennas for Space and Data

By Toni Barnett, managing editor

The British Society of Cable Television Engineers was well represented at a BASC/RIC luncheon at the Connaught Rooms in London, England, in May, when speakers from both the aerial industry and the broadcasting authorities gave their views on the changing and future role of antennas in worldwide television.

British Aerial Standards Council (BASC) chairman, Tony Leadbitter, managing director of Wolsey Electronics, introduced the speakers after referring to BASC aims and objectives, and its published article *Technical Standard for VHF/UHF Television and Radio Domestic Receiving Aerials*, currently being introduced into BSI and IEC regulations.

SCTE member R.S. (Bob) Roberts, technical adviser to BASC, discussed the development of the television antenna from the first (1936) broadcast television service to the present and the future. The use of satellites for broadcasting is now well past the experimental stage. Five channels have already been allocated for British television, and a recent month-long test using actual TV programs has shown that a one-meter diameter aerial could deliver signals with a signal-to-noise ratio of 40 dB, comparable with current UHF reception.

Dr. G.J. Phillips (BBC Research Dept.) dealt with *Aerials for Domestic Satellite Reception*, and referred to the plan draw up by the 1977 Geneva Broadcasting Satellite Conference for use of the 11.7 - 12.5 GHz band for satellite broadcasting.

Because of attenuation problems, the microwave dish (around one-meter diameter) would need to incorporate a frequency changer so that signals in the downlead would be at about 1000 MHz (900-1300 MHz). The use of adaptors between the aerial and TV receiver was undesirable, and the receiver should be able to accept not only the usual UHF (and possibly VHF) AM TV signals, but also the FM signals.

Transmissions would use circular polarization to remove one variable in mounting and aligning the aerial, but good rejection of signals with the opposite circular polarization was essential. The specified sidelobe performance (-33 dB relative to the on-axis output) was necessary, not only to avoid other transmissions but to reduce the possibility of interference due to fifth harmonic radiation from microwave ovens.

Successful Launch of European Space Agency's First Communications Satellite

On the day of the BASC luncheon, OTS 2, the European Space Agency's first communications satellite, was in near geostationary orbit following a successful launch on May 11 from the Eastern Test Range, Cape Canaveral, Florida. All systems were functioning as planned.

The satellite, built by the European MESH consortium led by British Aerospace Dynamics Group's Stevenage space facility (part of the Hatfield/Lostock division) was placed in an elliptical transfer orbit by its Delta 3914 launcher, and then into a near geostationary orbit at 22,300 miles by its on-board apogee boost motor, fired May 13. Gas jets would maneuver the satellite into its final position ten degrees east, over Gabon.

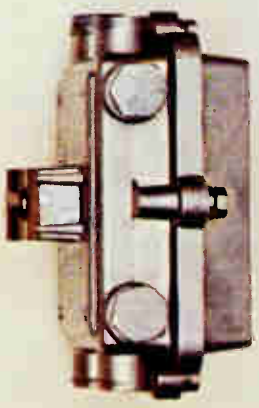
OTS 2 is the forerunner of the European Communications Satellite (ECS), a fully operational satellite communications system capable of handling a significant portion of future European telephone, telex and TV traffic. OTS 2 has a minimum design life of three years, enabling it to provide preoperational European traffic capacity until the first ECS is launched in 1981. Following the successful launch, sufficient fuel remains for more than six years operation.

OTS 2 will test transmission techniques and demonstrate the performance and reliability in orbit of on-board equipment representative of that to be used in ECS.

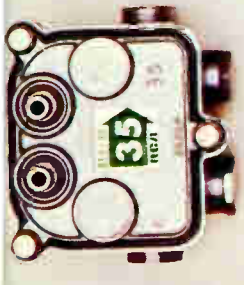
The coverage of OTS 2's six antennas includes Western Europe, the Middle East, North Africa, the Azores, the Canary Isles, Madeira and Iceland, and its capacity is the equivalent of 6,000 telephone circuits. It is one of the first communications satellites to operate in the 11-14 GHz frequency band, of particular advantage in Europe where the more usual 4-6 GHz satellite links are affected by interference.

Reprinted courtesy of the Journal of the Society of Cable Television Engineers, *Volume 11, No. 3.*

RCA Passive Components for Quality and Performance



The RCA line of passive components includes a wide range of subscriber taps and trunk passives for cable system applications. RCA Subscriber Taps are available in 2-way, 4-way and 8-way units and are used in the feeder line to distribute the signal to the subscriber. RCA Trunk Passives include directional couplers in 4, 8, 12, and 16 dB values, 2-way and 3-way splitters and a power inserter. The directional couplers and the splitters are utilized for splitting the main trunk lines in a cable system into sub-trunk lines. The power inserter combines the AC Power with the RF signal onto the coaxial cable. For more information contact RCA/Cablevision Systems, 7355 Fulton Avenue, North Hollywood, California, 91605. Toll free number: (800) 423-2404. In California: (213) 764-2411.



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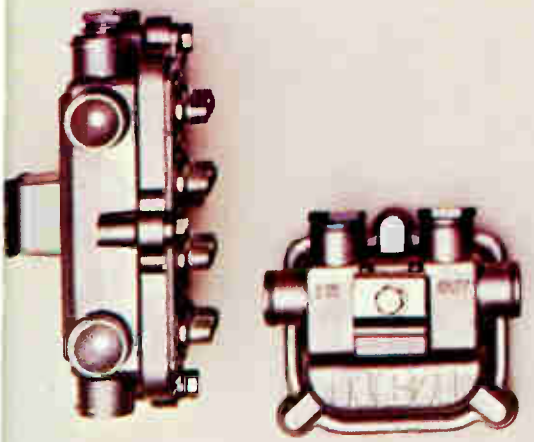

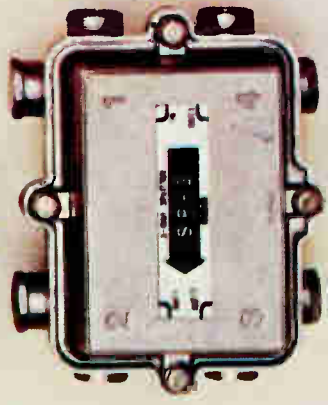

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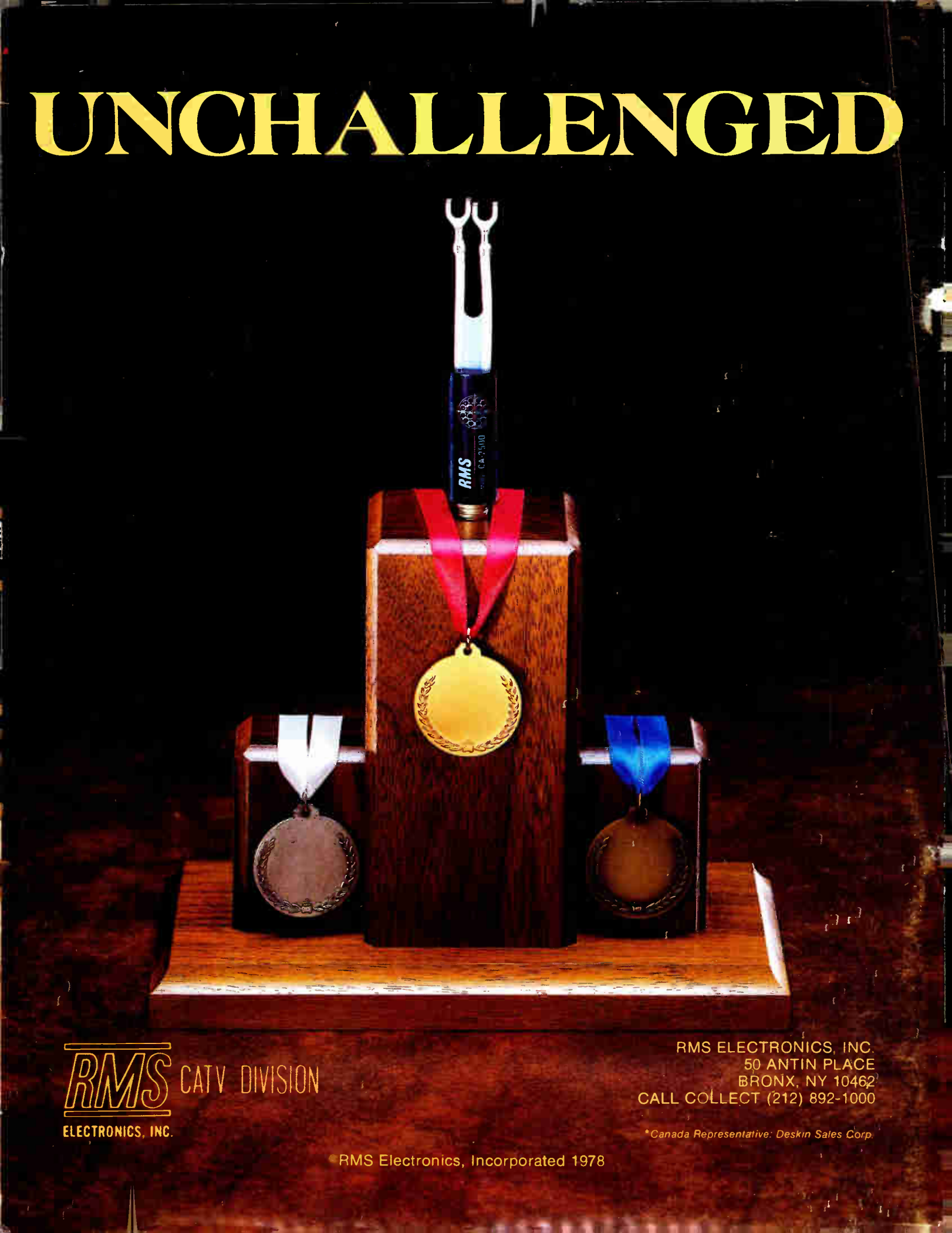

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