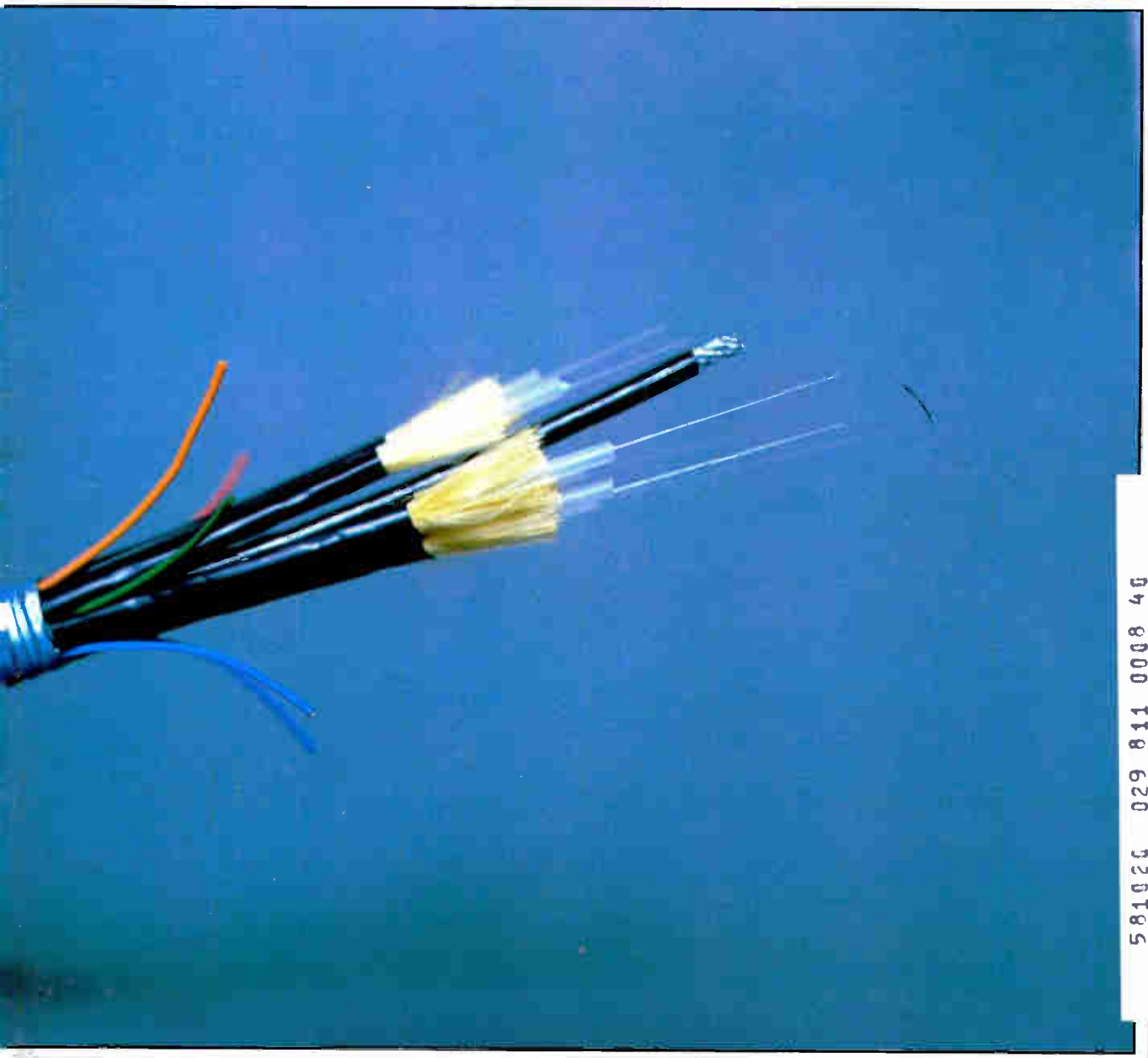
C-ED

On-Line Fiberoptic Systems
Urbanized System Development



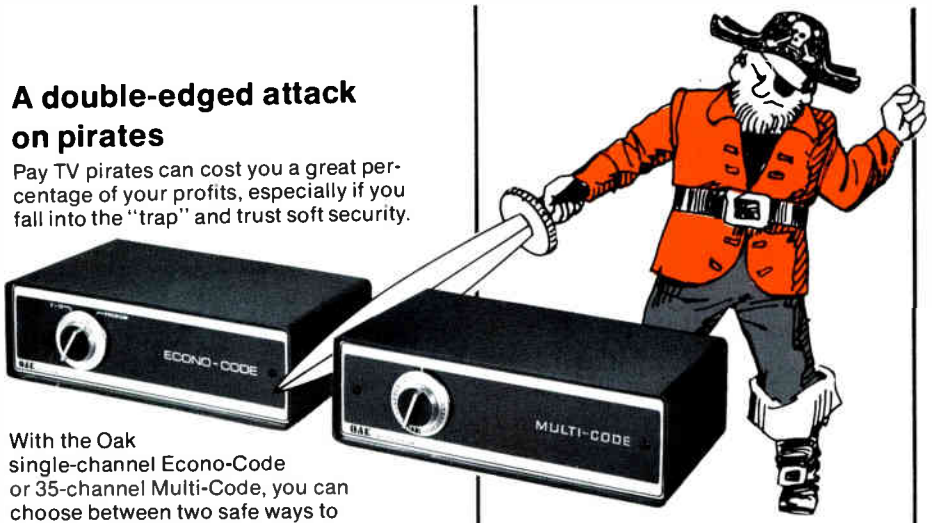
Communications-Engineering Digest
Reporting the Technologies of Broadband Communications

March 1978
Volume 4, No. 3

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

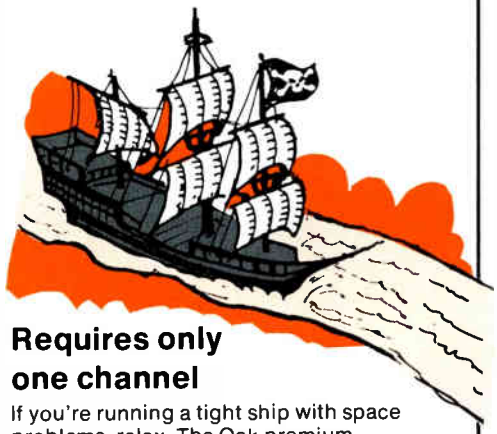
All Oak CATV products are built in company-owned facilities ...your assurance of our commitment to the industry.

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.

OAK Industries Inc.
CATV DIVISION/CRYSTAL LAKE, ILLINOIS 60014
TELEPHONE: 815-459-5000 TWX: 910-634-3353

C-ED News at a Glance

MARINA DEL REY, CALIFORNIA— **Digital Communications** now **has a single transponder capable of transmitting two video channels.** The process will be known as the Gemini II Satellite System. See *C-ED* page 16 and the May issue of *C-ED*.

WASHINGTON, D.C.— **The FCC** has acted on a proposal for reconsideration of the definition of a cable system. The commission **upheld the 500 subscriber limit**. Chairman Charles Ferris asked why stop at 1,000, when a proposal was made to raise the limit to 1,000 subscribers.

WASHINGTON, D.C.— Philip L. **Verveer replaces** James R. **Hobson as chief of** the Federal Communications Commission's **cable television bureau.** Verveer was previously with the Federal Trade Commission. See *C-ED* page 16.

WASHINGTON, D.C.— **President Carter has signed into law the Pole Bill**, passed in late February by both houses of Congress. NCTA will hold a March 9 meeting in Washington to brief cable leaders on how to best work with the new legislation. See *C-ED* page 18.

WASHINGTON, D.C.— **Syndicated exclusivity** finally **surfaced at the FCC** meeting in late February, **but definitive action** on the issue **was delayed**. The cable bureau gave an hour presentation on why the rules should be deleted. According to that bureau, if every home within a 35-mile zone were 100 percent wired and achieved a 50 percent saturation, the maximum loss in audience due to the lack of syndicated exclusivity would be four percent. Rulemaking has been delayed for approximately three months. See *C-ED* page 16.

WASHINGTON, D.C.— The **FCC has** an **inquiry and rulemaking pending on** how to deal with **what a cable operator must do if he has a 12-channel system with 12 must-carries, and a new channel comes on-air.** The FCC will specify if that operator can choose which channel to delete, if he must add converters, etc.

WASHINGTON, D.C.— The **NCTA** is **continuing** its **economic inquiry** study to offset the NAB's massive campaign to prove that cable does have an economic impact on broadcasters.

BOCA RATON, FLORIDA— The **NCTA approved** a **new** slate of **officers** at its annual winter meeting in Boca Raton, Florida. The new officers are **Bob Hughes, chairman; Douglas Dittrick, vice chairman; J. Richard Munro, treasurer;** and **William Strange, secretary.**

WASHINGTON, D.C.— **NCTA's engineering committee** (including Bob Luff) **met with** the **FCC to discuss** the **standard pilot frequency problem**. Luff and the engineering committee will work with the FCC to arrive at a mutually satisfactory recommendation.

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Inside C-ED

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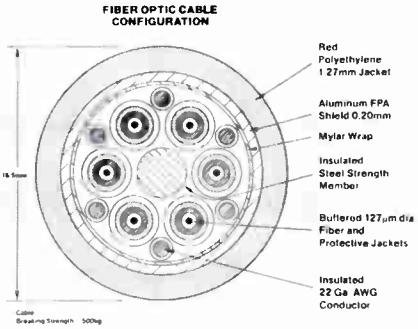

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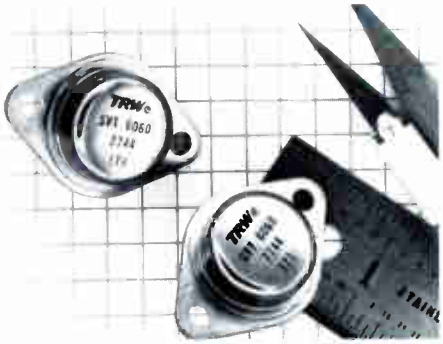

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FEATURES

DEPARTMENTS

OPINION

Cover: March's state-of-the-art fiberoptics cover connotes the emphasis of this issue of *C-ED*.

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Editor's Letter

Fiberoptics is commonly perceived as a "blue sky" kind of word. This month, *C-ED* took the bit in its mouth and found two actual on-line fiberoptic systems. We think you'll find the article on fiberoptics at the MGM Grand Hotel in Las Vegas and the story on the Kentucky Emergency Warning System extremely interesting. You can find these articles on pages 20 and 11, respectively.

In addition to fiber articles, we also have the conclusion of last month's article by D-B-C on the addressable tap. And that's on page 25.

C-ED also has a piece on one of Continental Cablevision of Ohio's cable systems, which we think you'll find useful. That article on "Urbanized System Development" can be found on page 9.

We have received a lot of comments about last month's cover. The addressable tap was superbly illustrated by TPI's own Pat Isenberg. As for this month's cover, it, too, is a TPI effort—by our advertising promotion manager, Ted Tourtelot.

Finally, we're off to St. Louis, to the SCTE's annual reliability conference, which promises to be an outstanding show. Look for managing editor Toni Barnett who will be on hand to answer any questions and gladly accept any story ideas.

Paul A. FitzPatrick

". . . it's all she wrote"

Dear Diary: My telephone rang at 7:30 this morning. It was Bob Bilodeau, hoping to catch me "before the day became too confused." What Bilodeau caught was me getting out of the shower with a wet head of hair.

By 8:15 I was at the Post Office. After a short ride on Washington's neat new Metrorail system, I was in the office, coffee-in-hand and ready to calmly face a new day.

Judy Greenberg called in with the flu. I just went about my business. Here's how I spent my day, Dear Diary. I know you'd want to know.

A Typical Working Day

I mailed all 1,123 SCTE Annual Meeting Notices; talked to Frank Bias about the Reliability Conference; went to the printer's and ordered badges for the meeting; pushed to get my stationary re-order; wrote a press release on our Senior Member promotions; mailed that; called Earl Quam about the Charter Member mix-up; talked with Tony Esposito on the same topic; released a second press release on the Charter Members with 12 additional names; mailed that, too; did design for SCTE Member of the Year Award; contacted trophy houses and asked for quotes; called St. Louis and arranged for hostesses for registration at the Conference; got package together for Toni Barnett; called Toni Barnett and told her package was on its way; called vendor and increased order on Charter Member plaques to 77; started copy for the March newsletter; explained to Sharon about telephone registrations for the Reliability Conference; talked with John McClure and told him more hotel reservations were in the mail to him; called St. Louis hotel and verified additional meeting arrangements; ordered audio-visual and taping stuff for the conference; talked to Bob Powers; talked to Archer Taylor; returned Alex Best's telephone call; answered the phone five times for my "office mate"; spoke with John Rannells about Jim Grabenstein receiving 1978 SCTE Member of the Year Award; called Lew Strock and asked him to give me some background material on Jim; called Bob Cole (he wasn't in) to ask for some help from him; wrote Cole a letter; wrote Rannels a letter; sent copies to Bilodeau, Frank Bias and Glenn Chambers; spoke with two speakers for conference; prepared proposal for client; started second proposal for another client; talked with Dick Covell; returned Mr. Dimitri's call from HBO; made out a list of what I'll do on Valentine's Day (probably nothing!); and, answered varied and sundry telephone calls.

Mr Dimitri wasn't there when I called this afternoon. He probably went home early since it's snowing again. Toni Barnett called and asked for some SCTE material and would I write something for SCTE Comments in March?

That must be why at 8:00 p.m. I'm still sitting here at my office in downtown Washington watching the snow pile up, writing this column and waiting for a fellow "cable" person to join me for dinner!

P.S. Just a normal day, Dear Diary, but it's my entry for Monday, February 13, 1978. Sorry, Toni - it's all she wrote.

By Judith Baer, executive director.

Speakers Set for CATV TECH Conference

WASHINGTON, D.C.— Frank Bias, Viacom Communications, and Archer Taylor, Malarkey, Taylor and Associates, co-chairmen of the 1978 SCTE/IEEE Conference on CATV Reliability, have announced *final* program plans for the meeting to be held this month on the 7th and 8th in St. Louis, Missouri. This is the third co-sponsored meeting hosted by the Society of Cable Television Engineers and the Broadcast, Cable and Consumer Electronics Society of the IEEE. (See February *C-ED*.)

A *System Design, Components and Reliability* session will open the two-day meeting, moderated by Alex Best of Scientific-Atlanta. Best has invited papers from Bill Ellias, Sangamo, on *Aluminum Electrolytic Capacitors: Transient Protection of CATV Amplifiers* by Peter Winch of Seimens; *Reliability Considerations in CATV Hybrids* by Al Grant and Jim Eachus of Motorola; *Reliability of Power Transformers* by Ernie Finkbeiner, Midwest Transformer; and, *Field Data and Product Reliability* by John Hastings of C-Cor Electronics.

Alex Best, S-A's engineering manager.

The afternoon of March 7 will center on *System Reliability Through Redundancy and Design*, moderated by Gayheart Kleykamp of UA-Columbia Cablevision. Kleykamp's panelists and topics include *Subscriber Device Reliability* by R.D. Peterson, General Electric Cablevision; *TVRO Reliability*, Edwin Kay, ITT Space Communications; *CATV Headend Reliability*, Nicholas Worth, TeleCable Corporation; and, *Feederline Shielding Revisited*, by Eric Winston of Jerrold Electronics.

On March 8 Frank Bias will be the moderator on *Plant Reliability, Aspects of Bonding and Grounding*. Bias will take an active part in the panel featuring James Stilwell of Communications Properties, Inc.; T. Mather of James G. Biddle Co.; and L.H. Sessler of Bell Laboratories. The final program of the two days will center on *Operating Reliablity and Economics*, moderated by Robert Bilodeau.

Bilodeau will present a paper on the *Economics of Powering* and Richard Covell of GTE Sylvania will also speak on the topic.

Luncheons during the Conference will feature representatives of the U.S. Department of Labor and OSHA on the first day and the Tenth Annual SCTE Membership Meeting during lunch on March 8. Seventy-seven industry engineers will be honored as SCTE's Charter Members, and the 1978-1979 officers and board of directors will be introduced.

Information on the SCTE/IEEE Reliability Conference is available by calling SCTE's Washington office, (202) 659-3131.

CATV Health And Safety Manual

ARLINGTON, VIRGINIA—A complete instructional manual for CATV operators and their employees based on OSHA regulations is available on a subscription basis from the SCTE. The manual is contained in a plastic looseleaf notebook and bulletins and updates from the U.S. Department of Labor are included.

Colorado Chapter to Meet

DENVER, COLORADO—Plans are being prepared for a March 9th dinner meeting of the Colorado Chapter of SCTE. Dinner will be scheduled for 7:00 p.m. at a restaurant in the vicinity of the Denver Tech Center. Afterwards, a talk and discussion will be given by Robert Dickinson, president of E-COM Corporation.

Dickinson has been involved in two-way data transmissions on CATV systems for a number of years, including the Manhatten Cable Data system. He has also given several papers at NCTA conventions.

Meeting plans will be finalized based upon the positive response to this announcement. For additional information contact Judy Scharf, (303) 771-8200, Ext. 213.

Revisions to SCTE By-Laws Approved

WASHINGTON, D.C.—The final results are in. One hundred and forty-six members of SCTE voted "Yes" on the revisions to the SCTE By-laws. Twelve members voted against the revisions. Only 16 percent of eligible SCTE members elected to participate in the balloting. The revised By-laws have already been distributed to all SCTE members.

Seventy-Seven Industry Engineers Will Be Honored As SCTE Charter Members

WASHINGTON, D.C.—Robert Bilodeau, president of the SCTE, has announced that 77 cable television industry engineers will be honored and cited as SCTE Charter Members during the group's 1978 Annual Meeting to be held in St. Louis, Missouri. The SCTE Annual Meeting will be held March 8, during the Third Annual SCTE/IEEE Conference on CATV Reliability. Each SCTE Charter Member will be presented with a special plaque citing his continued membership and participation over the last ten years. Founded in 1969, SCTE is currently the largest membership organization in the cable television industry.

"It is appropriate that SCTE honor these men at our Tenth Annual membership meeting," said Bilodeau. "Each has supported SCTE through both good times and when we've gone through difficult periods of growth," he continued. "Now, since we have more than 1,000 SCTE members representing engineering, technicians, operators, suppliers and others working with the CATV industry, we need to take the time and the opportunity to say thank you to these Charter Members." Bilodeau concluded.

Ontario SCTE Elects Members

ONTARIO, CANADA—SCTE in Ontario, Canada, has elected its new officers for 1978. Mike Weaver of Oakville Cablevision is the new president; John Ollivier of Halton Cable Systems is secretary; and Ross Robins of Grinsby Cable TV is treasurer.

THE WORLD'S LONGEST RUN

In 1929, Johnny Salo was the winner of the longest race ever staged, a Transcontinental Race (3,665 miles) from New York City to Los Angeles. Over 79 days from March 31 to June 17, his elapsed time of 525 hours 57 minutes 20 seconds gave a running average of 6.97 m.p.h. Now, that was a long run.

In 1978, Comm/Scope's Parameter II cable continues to prove itself the low-loss distance champ over the long run. With less signal loss than most other cable, Parameter II requires fewer amplifiers thereby reducing costs and maintenance.

Parameter II. An exclusive low-loss expanded polyethylene dielectric. All the resiliency of conventional polyethylene. Plus permanent moisture resistance.

When it comes to cable technology, Comm/Scope gives you the unmistakable performance of a front runner.

So if you want to end up in the winner's circle, run with the leader in low-loss cable. Comm/Scope.

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Comm/Scope Company
Light years ahead in cable innovation

Urbanized System Design

By Joseph F. Savarese, engineering design manager UA-Columbia Cablevision, Oakland, New Jersey.

Cities and their urbanized suburbs have become more attractive to the cable industry within recent years. As cable companies design and construct systems in these urban areas they are finding a unique situation. As you make the transition from rural to suburban to urban and the population density increases, more people tend to live in a single building. These multi-unit buildings and complexes are typically designed and constructed as a miniature system. The pole-line system which passes these miniature systems must have built-in allowances to accommodate their addition. To design an overall pole-line system with these built-in allowances initially appeared to be a cumbersome, difficult task. After designing quite a few individual installations, however, it became obvious that there were a few specific guidelines which can be worked into a list of general design requirements for typical types of installations. These general requirements, when worked into the overall system design, provide an efficient overall design with small, effectively placed allowances which efficiently provide for the additional work required to service the multi-unit building and complexes.

SIGNAL LEVEL REQUIREMENTS FOR APARTMENTS

UNITS	dBmV	CONFIGURATION WITH NO CABLE LOSS
0 - 8	23	11 or 11
9 - 12	26	14 11
13 - 16	27	15 11
17 - 20	27	14 15 11
21 - 24	30	18 15 11
25 - 28	30	18 17 15 11
29 - 32	31.0	18 18 15 11
33 - 36	32.0	20 18 18 15 11
37 - 40	33.0	21 18 18 15 11
41 - 44	33.0	21 18 18 15 14 11
45 - 48	33.0	21 21 18 18 15 11
49 - 52	33.0	21 21 20 18 18 15 11
53 - 56	36.0	24 21 21 18 18 15 11
57 - 60	36.0	24 21 21 18 18 15 14 11
61 - 64	36.0	24 21 21 18 18 15 15 11
65 - 68	36.0	24 24 21 21 18 18 14 15 11
69 - 72	39.0	27 24 24 21 21 21 18 15 11
73 - 76	39.0	27 24 24 21 21 21 18 15 14 11

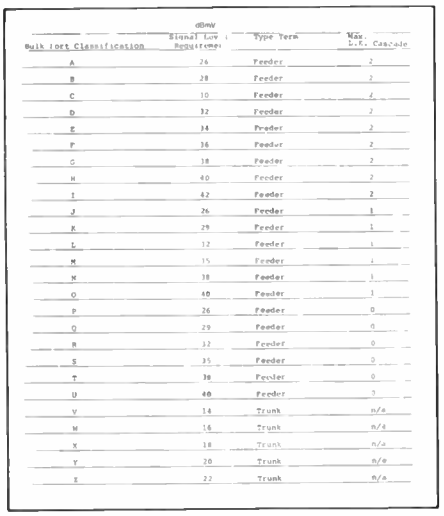
Figure 1. Tap configuration template.

Tap Configuration Template

The initial step, in determining what is typically required to service a typical building or complex, is to work out a tap configuration template. (See Figure 1.) This form lists what is considered to be the optimum directional tap configuration per the number of tap-ports desired. Also listed is the signal requirement at the input to the first tap which will provide a tap-port output adequate to service the typical, maximum drop length. This template is the foundation of our requirements.

Miscellaneous Background

In composing our guidelines it was necessary to work-up numerous statistics. These statistics were based upon previous designs and town apartment lists, which showed the number of units, floors and buildings by complex. Typical statistics required for composing a set of guidelines are average length of distribution feed, usual type of distribution cable per type of building, average number of units per floor, maximum number of buildings per unit count, average cable loss for each above-listed statistic and maximum drop length.



Bulk Tort Classification	dBmV Signal Lev. Requirement	Type Term	Max. Lt. Cascade
A	26	Feeder	2
B	28	Feeder	2
C	30	Feeder	2
D	32	Feeder	2
E	34	Feeder	2
F	36	Feeder	2
G	38	Feeder	2
H	40	Feeder	2
I	42	Feeder	2
J	26	Feeder	1
K	29	Feeder	1
L	32	Feeder	1
M	35	Feeder	1
N	38	Feeder	1
O	40	Feeder	1
P	26	Feeder	0
Q	29	Feeder	0
R	32	Feeder	0
S	35	Feeder	0
T	38	Feeder	0
U	40	Feeder	0
V	14	Trunk	n/a
W	16	Trunk	n/a
X	18	Trunk	n/a
Y	20	Trunk	n/a
Z	22	Trunk	n/a

Figure 2

Procedure for Determining Actual Requirements

The design requirement guidelines start with an eight-unit, single building. The initial case taken was then graduated by the number of units. The unit increments were determined according to the tap configuration template. A list was drawn up of signal requirements by increment from 8 to 150 units in a single building. The signal loss for the average distribution feed is added to the signal levels on the template to determine the signal level requirement for each single building case. Allowance is therefore made for loss through verticle risers.

The single building list is then taken unit-increment by unit-increment and expanded, within a reasonable range, from a single building, to two, to three, and so forth. Each time, the loss for internal distribution cable is added.

The initial requirements are signal levels only. As these levels increase they rise to a point where an amplifier must be figured into the typical design. At that point, a stipulation, limiting the maximum allowable line extender cascade to the installation, is inserted. The maximum non-trunk amplifiers allowed in our system is two. As the graduation continues and the levels increase once more to the point where another amplifier is required by the installation design, the maximum line extender cascade drops to zero. As the guidelines are again graduated, signal level requirements increase once again. Upon requirement of an additional amplifier, the signal level requirement must be supplied by trunkline.

Upon full execution of the above, a list has been generated which shows a large number of typical cases with a large number of typical requirements. The list also consists of a large number of pages and each requirement needs a large number of words to express. How can a man in the field efficiently refer to the information at hand and then note it in a small space on a crowded design map? The answer is coding and tabulation. The full reasonable range of design requirements were coded A to Z. (See Figure 2.) These codes were then tabulated per unit-increment and number of buildings. A man in the field simply refers to the coded table and notes the correct design requirement right next to the pole number and house count on the strand map. (See Figure 3.)

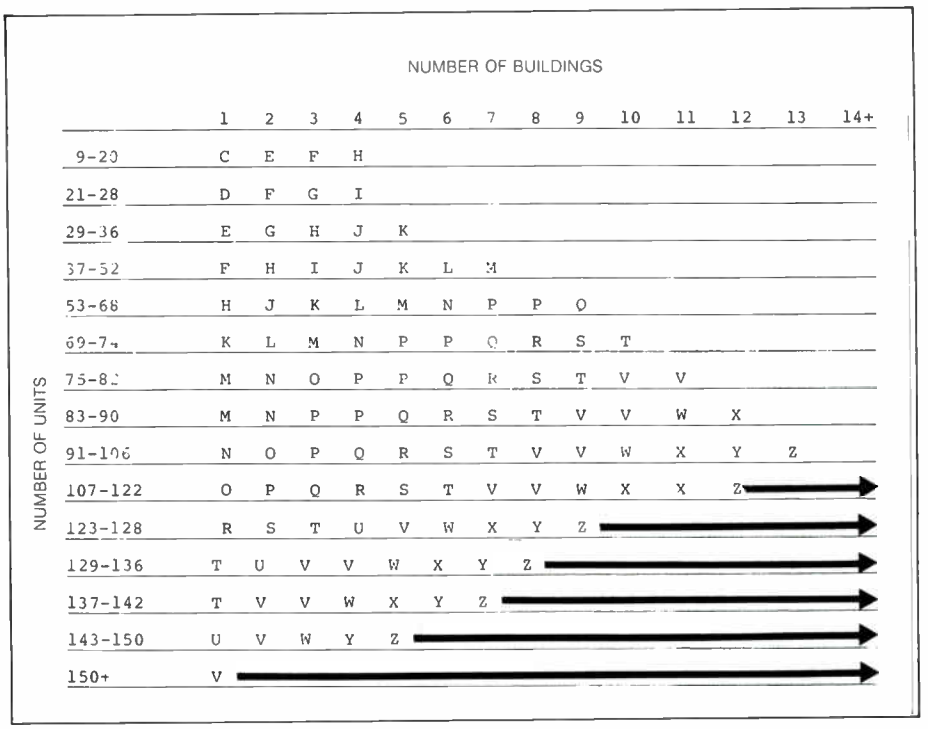


Figure 3

Example: 61052-1-D - Pole number 61052, house count: 1, design requirement: D.
D = A feeder signal of at least 32 dBmV if the source of signal is two line extenders from a trunk bridger.

When the strand map is returned to the office the designer translates these notations directly into an overall system design with built-in efficient allowances for a minimum of re-arrangement after construction.

Conclusion

It is possible to solve the problem of design requirements for special installations such as apartments by blanket overall surpluses; but the ability to use a simple procedure, to calculate accurate smaller surplus locations with a minimum of time loss and confusion, makes blanket measures initially costly and an unnecessary maintenance headache. **C-ED**

Times Building 20-Mile Fiber Optic System in Kentucky

Specifications are currently being circulated for the design and construction of 92 communications towers on behalf of the Commonwealth of Kentucky, Executive Department for Finance and Administration. The towers are to be equipped with various omni-directional and point-to-point radio systems for the Kentucky Emergency Warning system, a weather-proof communications system authorized and funded by the 1976 Kentucky General Assembly.

Serving a number of high priority communications functions, the towers will be incorporated with existing towers of the Kentucky Educational Television Authority and the Kentucky State Police along with the rooftops of high rise state owned buildings, to provide the antenna platforms necessary for installations at 189 locations throughout the state. The system will integrate base-mobile and point-to-point radio systems operated by various state agencies to enable them to mobilize efficiently in the event of a statewide or localized disaster. The Kentucky Emergency Warning System began limited operations in May 1976, with the installation of eight N.O.A.A. Weather Radio transmitters with the cooperation of the National Weather Service. Kentucky was the first state to acquire statewide coverage of the N.O.A.A. Weather Radio system, which includes the alarm capacity for predicted severe weather conditions.

The balance of the KEWS network will be used by state agencies to mobilize prior to a disaster and provide rescue and relief after a disaster. It will also provide Kentucky State Government day-to-day radio communications statewide.

The following article provides a detailed description of how the KEWS system works.

By Sol Yager, director of systems engineering, Times Fiber Communications Inc.

Construction is already underway on the world's first commercial sized fiber optics communications system. Under a turnkey contract from the Commonwealth of Kentucky, Times Fiber Communications, Inc. (parent company of Times Wire & Cable and Fiber Communications) is building a system utilizing 20 miles of optical fibers as part of a statewide communications network called the Kentucky Emergency Warning System (KEWS).

KEWS will be used to relay warnings of impending storms, floods and other disasters. It will also be used by state and local officials, state police and Kentucky's educational TV network to disseminate electronic news of what is happening on the spot, plus advice and

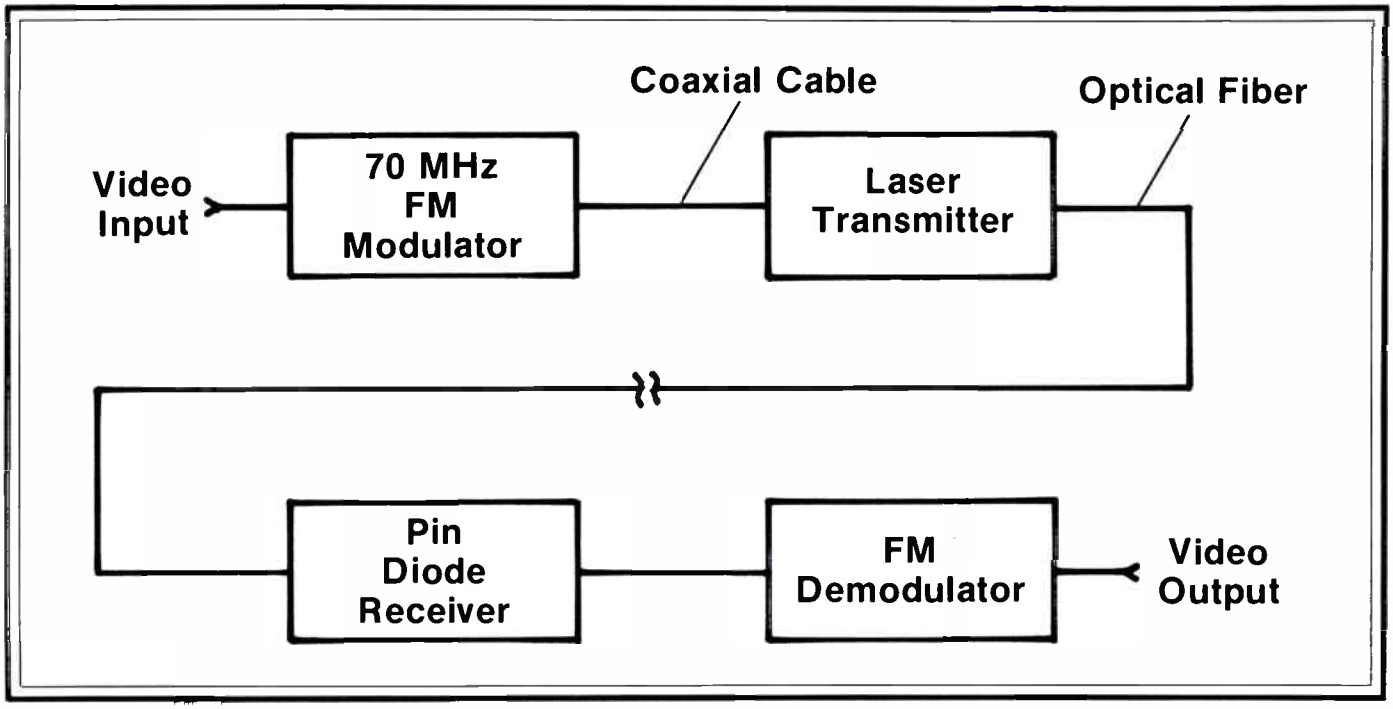


Figure 1: Typical fiber optic link.

video instruction on how to cope with emergencies.

The Times fiber optical installation will initially serve two key areas. The Richmond, Kentucky system will be used for two-way, multi-channel communications (audio via conventional cable, as well as video via fiber optical cable) between the radio and TV center at Eastern Kentucky University and other parts of the KEWS network. The Lexington, Kentucky section will interconnect the University of Kentucky, Kentucky Educational TV Headquarters, and the rest of the KEWS network.

The contract calls for 28 optical fibers. Thirteen of the fibers will be used as soon as the system is completed (sometime in May 1978) and the other 15 fibers will be held in reserve for future expansion.

Each optical fiber is 2000 to 5000 feet long. Utilizing baseband video signals in and out. the optical fiber system is

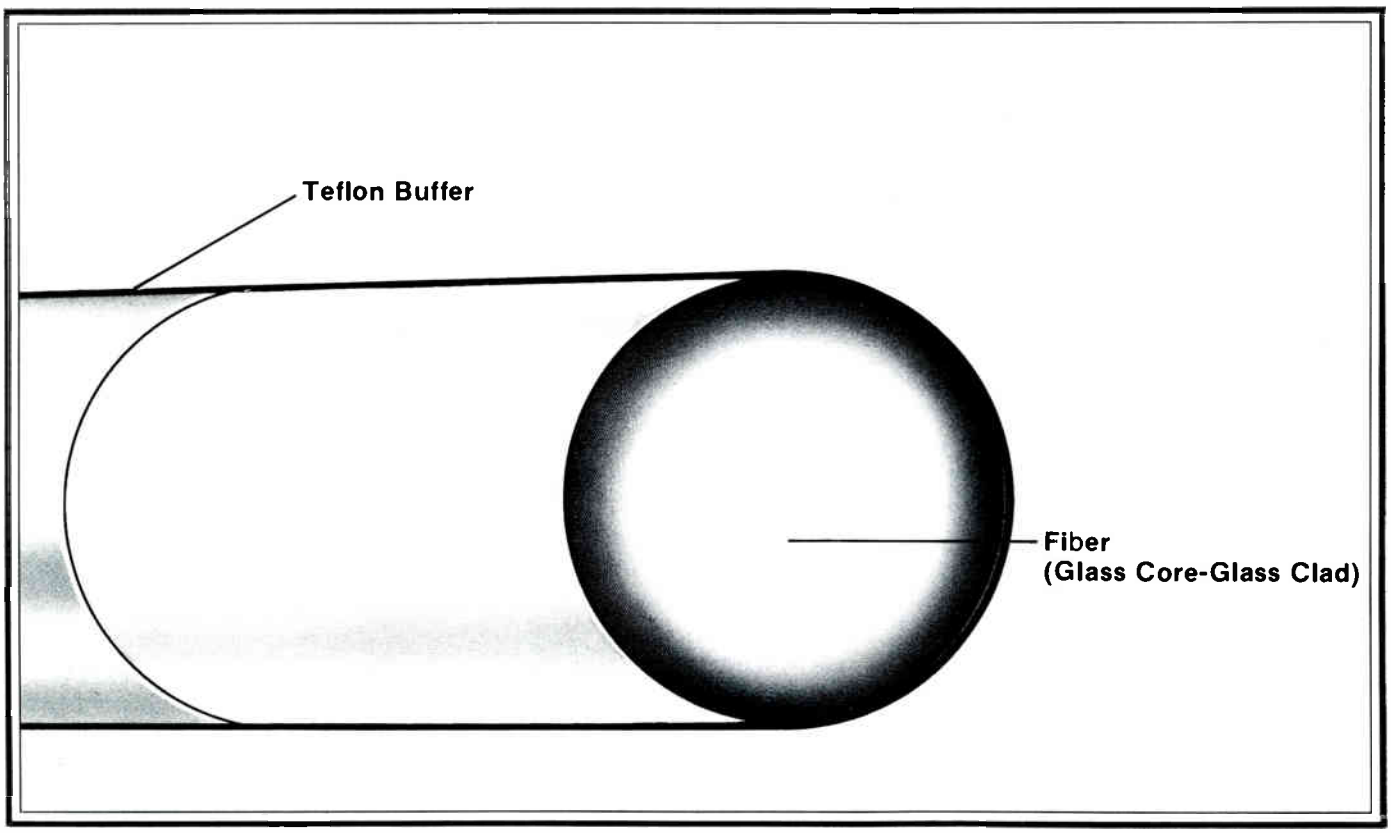
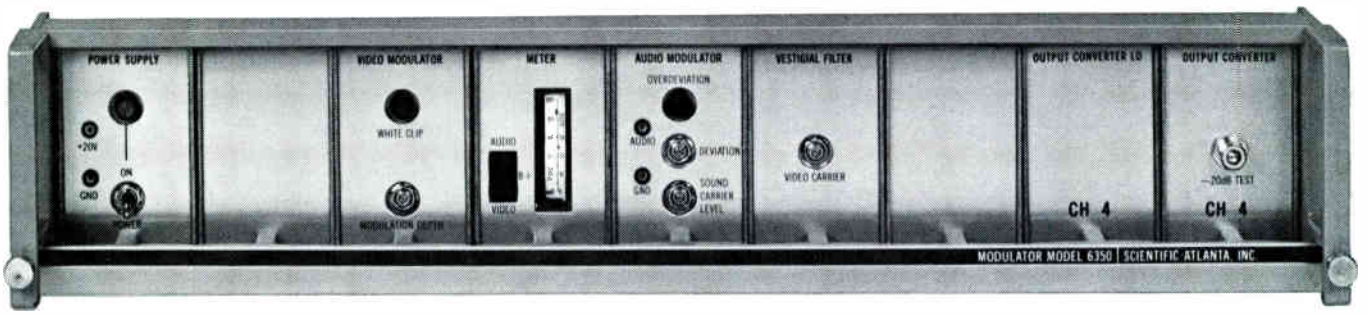


Figure 2: Typical optical fiber.

Our new Modulator. It can be what you want it to be.



Even when ordered without frills, our new 6350 Television Modulator outclasses units selling for more. Its Surface-Acoustic Wave (SAW) device as the vestigial sideband filter reduces out-of-band emission to a level unmatched in the cable industry. But when you choose any or all of the optional plug-in modules, it's then that the 6350 turns into the modulator you'd want to design yourself.

For instance, the Video Switching option detects loss of primary video and switches to alternate video output with front panel lamp indication. And has remote activation capability.

An Audio Switching module provides for selection of alternate audio source and also permits switching to emergency override audio. When override is used, the audio response is shaped to enhance voice intelligibility and reduce telephone line noise.

The IF Switching option enables composite (picture plus sound) IF to be interrupted at a point just before up-conversion to the output channel, and may be replaced by an alternate source of composite IF.

Or you can customize the 6350 with options for standby powering from positive or negative source. Audio modulation limiting. Phase lock. Video AGC and Alternate IF AGC control. Call Harry Banks at (404) 449-2000 or write us for your demonstration of the 6350. The modulator you've always wanted.

Scientific Atlanta

United States: 3845 Pleasantdale Road, Atlanta, Ga. 30340, Telephone 404-449-2000, TWX 810-766-4912, Telex 054-2898
Canada: 6511 Atlantic Drive, Mississauga, Ontario, L5T 1C8, Canada, Telephone 416-677-6555, Telex 06-983600
Europe: 1-7 Sunbury Cross Centre, Staines Road West, Sunbury on Thames, Middlesex TW16 7BB, England,
Telphone Sunbury on Thames 89751, Telex 896015

designed to meet the guidelines and specifications of network transmission committee report #7, which sets the standards for Bell Telephone system transmission of commercial network TV programming. This specification is roughly equivalent to EIA specification RS-250B.

How the Times System Works

Figure 1 is a block diagram of a typical fiber link to be used in the Kentucky system. All terminal equipment is rack mounted and AC powered. This is an analog system, utilizing FM modulators and demodulators (made by TOMCO, Inc.) For better signal quality, 70 MHz frequency modulation is used. Since the bandwidth of the fiber optic cable used is 400 MHz - km, frequency division multiplexing of each fiber is available for future expansion. Inherently, this system can also be expanded to include amplitude modulation as well as operation in digital modes.

The transmitters and receivers are made by Electro-Optic Devices, a privately held company associated closely with Times. The transmitter is built around a gallium aluminum arsenide injection laser diode. Manufactured by General Optronics, another company closely associated with Times, these diodes are unique because they combine high output power with exceptional life expectancy (on the order of 100,000 hours).

Shown above is J. Paul Warnecke, coordinator of the KEWS system, with an NOAA weather receiver.

The receivers utilize PIN diodes, chosen for speed of response, wavelength of interest, sensitivity and reliability.

Figure 2 shows a typical optical fiber waveguide, manufactured by Fiber Communications, Inc. It is a graded index glass core/glass clad fiber with a Teflon buffer. Attenuation is less than 8 dB/km at 800 nanometers, measured using a laser diode with a numerical aperture of 0.16. Bandwidth is 400 MHz - km at the -3 dB optical power points. Tensil strength is better than 100,000 psi and the fiber can operate at temperatures up to 250 degrees C.

Times Wire & Cable manufactures the optical fiber cable, utilizing individual optical waveguides. Each fiber waveguide is encased loosely in its own tube. Six of these tubes are bound around a Kevlar strength member and the whole thing is encased in a polyethylene jacket, as shown in Figure 3.

The cables are being installed by a local Lexington contractor under Times supervision. Cables are being run underground in ducts. Within buildings, cable horizontal runs will be in cable troughs. Vertical conduits will take the cable to microwave relay stations atop the buildings.

According to J. Paul Warnecke, KEWS coordinator for the Commonwealth, "The statewide communications system which Kentucky is now developing will be the

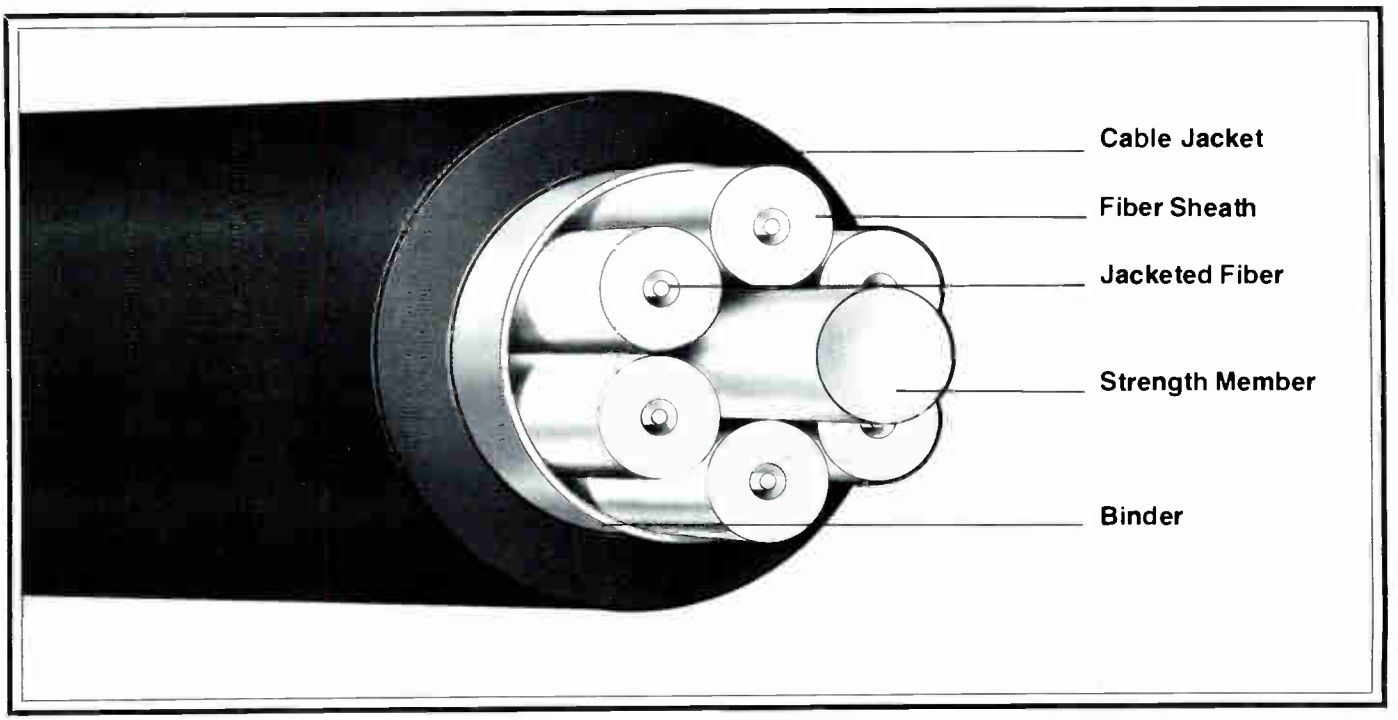


Figure 3: Typical six-fiber optical cable.

most complete facility of its kind in the nation. As we assessed our communications needs and examined the options available to us, it became evident that the use of fiber optics within our system would be the most technologically sound and most cost-effective way to proceed. In addition, an optical fiber system of the kind designed by Times Fiber Communications has the advantages of easy interface with other portions of the statewide network, a superior broadcast-quality video signal, and a unique capability for future expansion as new technology becomes available." C-ED

Digital Communications' Two-Channel Single Video Transponder

MARINA DEL REY, CALIFORNIA— Digital Communications has a patent pending for a video process that will enable a single transponder to transmit two video channels. The process is to be marketed by DCI as the Gemini II Satellite System and Digital's subsidiary, AmeriCom Satellite Network, will be the first network to utilize the new video process. For more on Digital's new two-channel transponder, read the May issue of C-*ED* for a special report.

CATA and Verveer Meet

WASHINGTON, D.C.— The Community Antenna Television Association's board meeting was held February 13. On hand was the new head of the FCC's cable television bureau, Philip Verveer. Discussions revolved around the problems of the small independent operator.

"We were very encouraged by his remarks," stated Stephen Effros, executive director of CATA. "Although he didn't promise anything, nor did we ask him to, it was an educational session. We were very encouraged by his open-mindedness," Effros continued, and by his interest and willingness to learn."

NCTA/CATA to Publish Copyright Information

WASHINGTON, D.C — The NCTA and CATA will jointly produce and distribute guidelines on the new Copyright Law. The information is expected to be completed within weeks and will probably be distributed under the NCTA "System Operating Series" masthead.

CATA's Steve Effros and NCTA's Stuart Feldstein are coordinating this project.

IEEE Cable Memorial Award

WASHINGTON, D.C.— The Broadcast, Cable and Consumer Electronics Society of IEEE, through its board of governors, has approved the creation of an award for cable TV engineering leadership in memory of the late Delmer Ports. Ports, a member of the SCTE, was vice president of engineering for the NCTA at the time of his death in December 1976.

Criteria for the award includes: • engineering leadership • technical contributions and innovations • contribution to the engineering profession, particularly relating to the BCCES and • invention of specific devices.

The award will be presented during the 1978 NCTA Convention in New Orleans.

Verveer Heads Up FCC Cable Bureau

WASHINGTON, D.C.— Beginning this month, Philip L. Verveer replaces James R. Hobson as chief of the Federal Communications Commission's cable television bureau. Verveer's appointment was subject to the approval of the U.S. Civil Service Commission, but the new chief joined the FCC as of February 1 and has served as a legal assistant to chairman Charles Ferris during the interim period before his appointment became effective.

Verveer was previously with the Federal Trade Commission where he served as a supervising attorney in its bureau of competition. Verveer's prior experience also included stints in the army and with the Justice Department where he conducted investigations in Sherman and Clayton Act cases. The new chief also worked as lead counsel in a four-year investigation of and monopoly suit against the American Telephone and Telegraph Company.

Verveer stated that he has "a lot of learning to do" over the next few months, and is presently studying cable related documents from both the FCC and FTC. While admitting that his prior cable experience is somewhat limited, Verveer did look into cable's history and mechanics while working on the AT&T case and the new chief is particularly familiar with the pole attachment bill. He is "very pleased with the appointment" and is "looking forward to working with all the people in the cable bureau."

Syndicated Exclusivity Before the FCC

WASHINGTON, D.C.—Syndicated exclusivity finally surfaced at the Federal Communications Commission meeting in late February, but definitive action on the issue was delayed. The FCC had before it a draft of notice of proposed rulemaking (drawn up by the Cable Television Bureau), which advocated total elimination of the rules. The Broadcast Bureau, however, came to the table with an associate item which attempted to poke holes in the Cable Bureau's document.

Chairman Ferris, unable to get the four votes he needed for adoption of the notice of a proposed rulemaking and unwilling to accept Broadcast Bureau compromise—a compromise which sources indicate was unsupported by actual facts—delayed action. In postponing commission consideration, Ferris instructed the Broadcast Bureau to provide support for its claim that some form of rules are still necessary.

The commission now has three options: retention of current rules, total abolishment of the rules or a compromise as advocated by the Broadcast Bureau.

Three commissioners—reportedly Ferris, Brown and Fogherty—are in favor of abolishing the rules. A fourth vote, however, could not be found. Ferris is expected to look for the fourth vote before the commission again considers the issue. If he cannot find that vote within the commission's current ranks, he may delay consideration.

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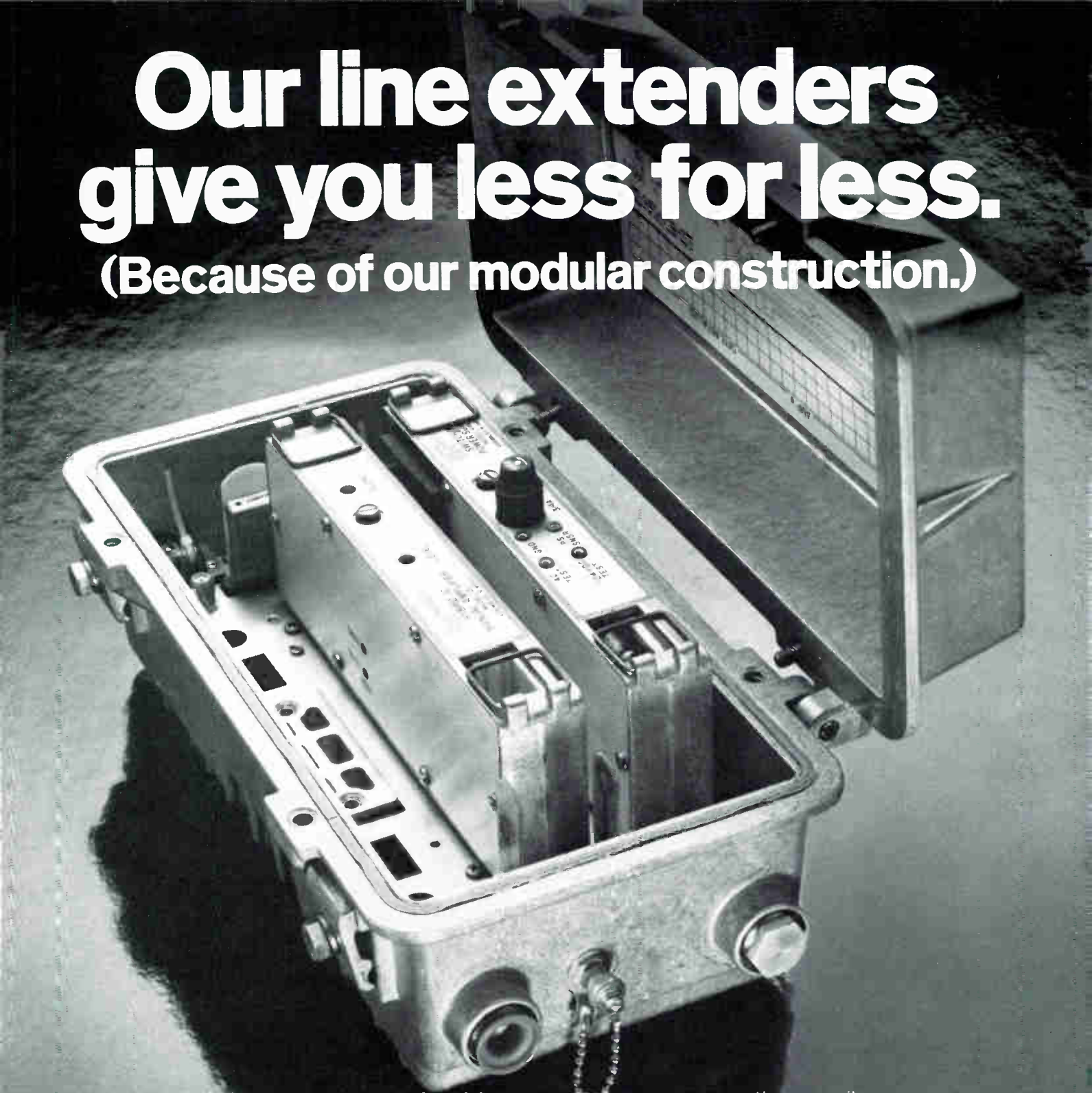

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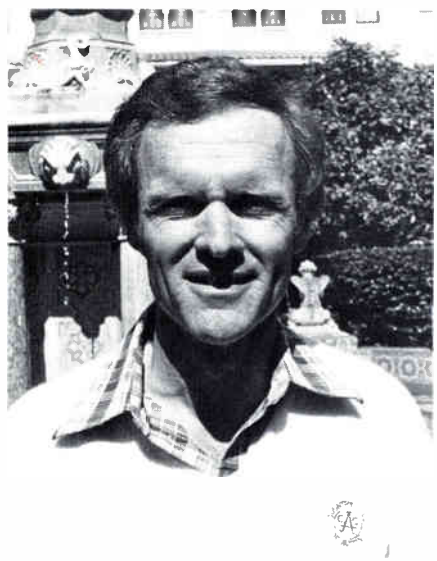
NCTA Board Approves Officers, Budget

BOCA RATON, FLORIDA—At its annual winter meeting in Boca Raton, the National Cable Television Association approved a slate of officers consisting of: CPI president Bob Hughes, chairman; Viacom Cable's Douglas Dittrick, vice chairman; J. Richard Munro, group vice president and member of the board of directors at Time Inc., treasurer; and William Strange, vice president of Sammons Communications, secretary. The officers will assume their new NCTA positions in May at the national cable convention in New Orleans.

The board of directors also approved a $1.8 million budget for fiscal year 1978-79—an increase of $200,000 over last year's budget. Sources told *C-ED* the board also agreed to give priority to three projects during the next year:

- a strike force to work with the state on implementing the provisions of the Pole Bill just signed by the president.
- "preparatory work" leading to the possible rewrite of the 1934 Communications Act.
- the FCC economic inquiry into what harm, if any, the cable industry has brought to the broadcasters.

The board also approved a by-law proposal to create a new class of "sustaining member" for former NCTA board members and adoption of a cable industry "Principles of Service" which members will be able to subscribe to by mid-March. The board has also established that Washington, D.C. will be the 1982 convention site, instead of 1981 as previously approved.



Bob Hughes, new chairman of the NCTA

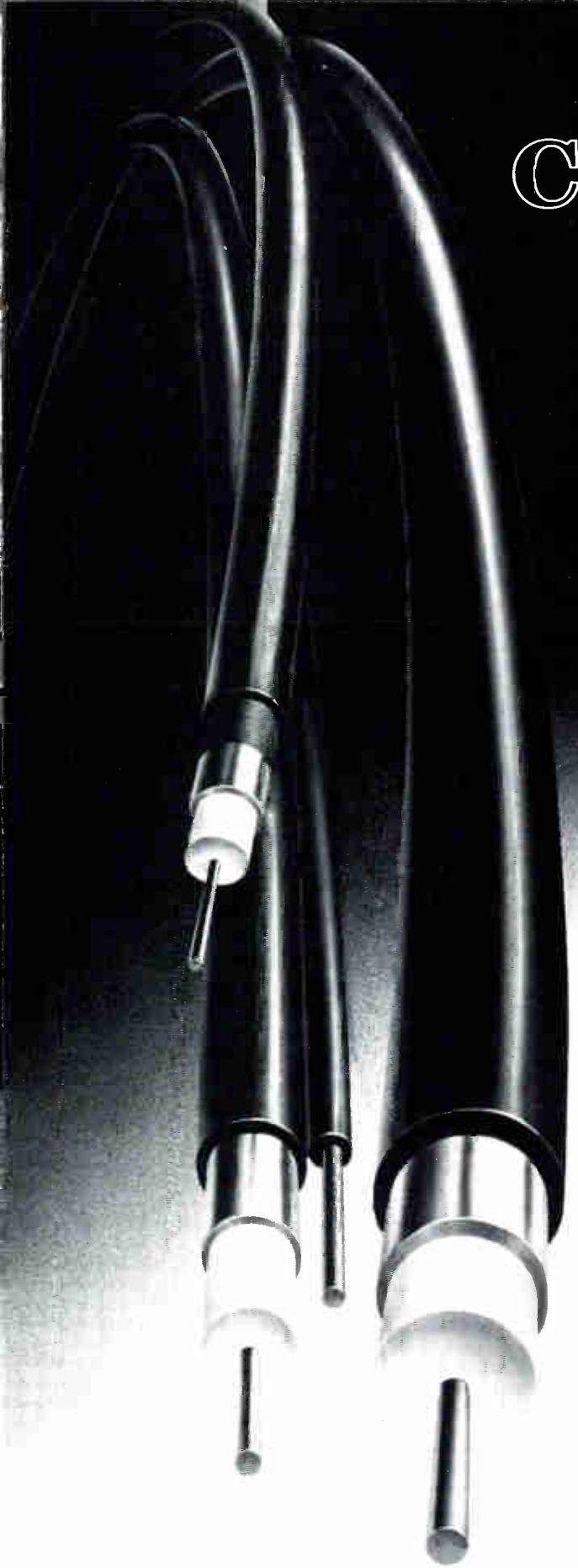
NCTA staff members began circulating draft legislation on regulation of cable last week on Capitol Hill. The proposal was billed as an "alternative to the separations principle."

Carter Signs Pole Bill

WASHINGTON, D.C.—President Carter has signed into law the Pole Bill, passed in late February by both houses of Congress.

To help state and regional associations work with state authorities that opt to enact legislation, thereby preempting the FCC's jurisdiction over the pole rates, NCTA will hold a March 9 meeting in Washington to brief cable leaders on how to best work with the new legislation. NCTA is already organizing a strike force and is preparing a primer which will explain to operators how to fight, amend or get a bill passed at the state level.

"We will help all we can from Washington," said NCTA vice president Stuart Feldstein. "We have budgeted for a strike force that will enable us to send people out to help the state associations in political situations."



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FIBEROPTICS

By Marshall C. Hudson, Ph.D., manager of New Technologies and
Eric N. Randall, Ph.D., manager of Communication Fiberoptics
Valtec Corporation
West Boylston, Massachusetts

In early December of 1977, the Nevada Division of the Central Telephone Company (Centel) hosted the national convention of the U.S. Independent Telephone Association (USITA) in Las Vegas, Nevada. Centel's management and engineering staff were anxious to incorporate optical communications in their plant. They decided in July, 1977, to service the convention area of the MGM Grand Hotel with a digital fiberoptic system extending to a central office 4.2 km (2-2/3 miles) away. (Figure 1.) A message center, courtesy phones, wire news service, and on-line computer games were available to the convention delegates—all provided by the 1.544 megabit per second T-1 digital fiberoptic system. (Figure 2.)

MGM Grand Hotel Goes Fiberoptic

Valtec Corporation and its subsidiaries, Laser Diode Laboratories and Comm/Scope Cable Company, developed and manufactured the entire fiberoptic system. Centel provided installation know-how, equipment and manpower. The installation of the underground cable, its splicing, measurement, and the hookup of all terminal equipment at both ends of the system took less than one month to complete.

The fiberoptic cable construction (Figure 3.) consists of six sub-cables, each containing a single low loss glass fiber, stranded around a plastic coated steel strength member and six copper conductors simultaneously layed into the outer inerstices. This structure is then bound together with overlapping mylar tape. The final cabling operation applies a corrugated aluminum moisture and heat shield followed by a 1.3 mm thickness of low density, bright red polyethylene outer jacket. A cable length identifier is printed every two feet along the cable length. The overall cable diameter is 16.5 mm (0.650 inches).

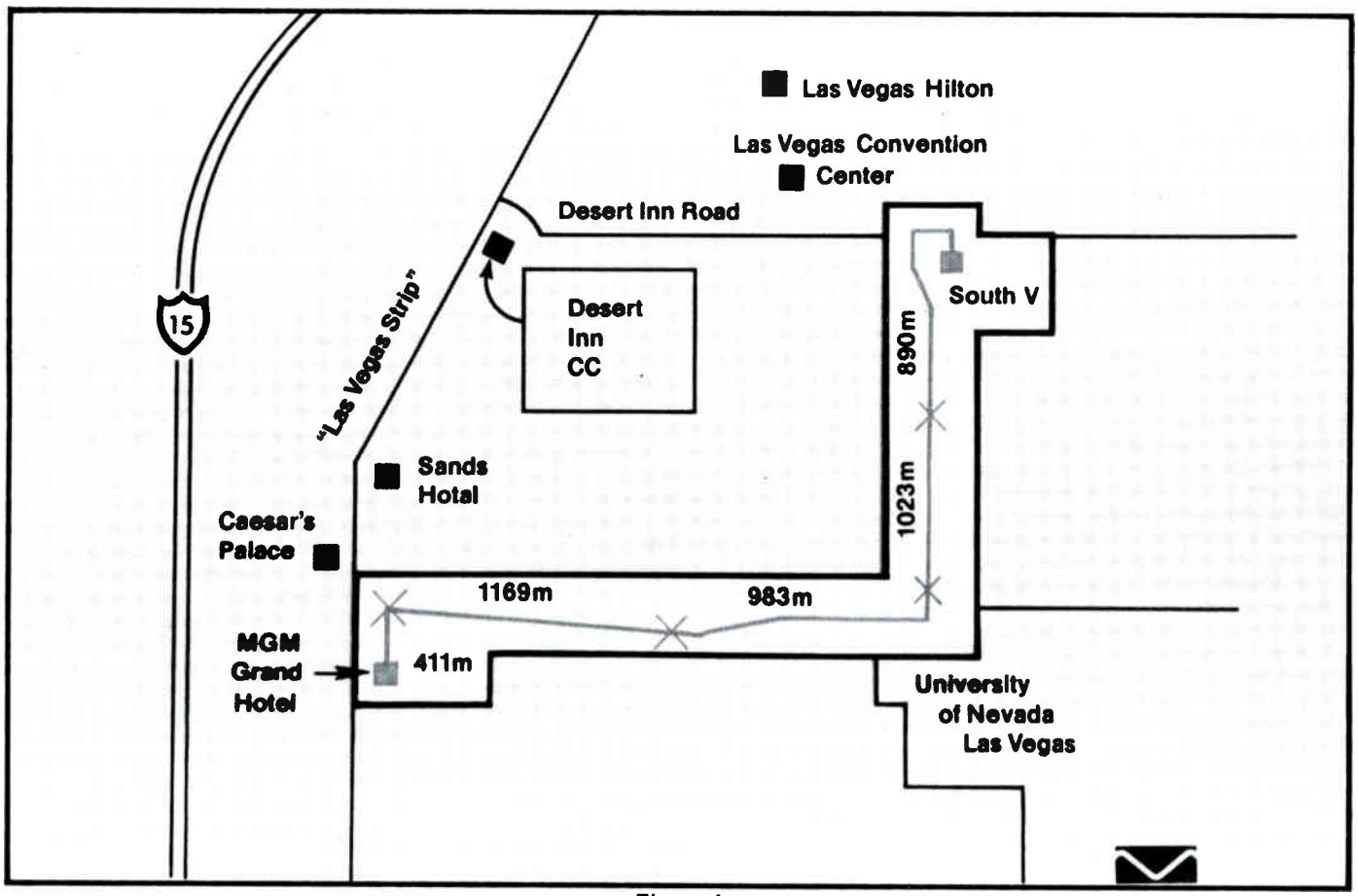

Figure 1

COMES OF AGE

Each internal sub-cable contains a single, buffered, low loss fiber which is 127 um (0.005 inches) in diameter. Surrounding the glass fiber a 2.5 mm tube covered with Kelvar® fibers, for longitudinal strengthening and a final polyurethane jacket of 3.8 mm diameter. Different printing colors are applied to each sub-cable for identification during installation.

The average loss as a function of optical wavelength for all fibers contained in this installation is shown in Figure 4. Since the injection laser transmitters were designed to operate at a wavelength of 850 nm, the average attenuation is 5.1 dB/km. The copper conductors were included in the cable to provide electrical power to repeaters for future systems.

The duct installation was performed using conventional installation techniques with the exception that lengths up to 3,800 feet were pulled instead of the usual 1,000 to 1,200 foot pulls. Pulling forces on the lubricated cable did not exceed 300 pounds although it was designed for 1,000 pounds pull.

The splices were made in conventional waterproof cases using a splice connector manufactured by Thomas & Betts of Elizabeth, New Jersey. The splice consists of three steel rods held together by an outer sleeve of heat-shrinkable tubing. The three rods provide an alignment gap through the center into which cleaved fiber ends can be inserted and brought together before shrinkable tubing is heated to confine and secure the fibers in place. A small viewing aperture is provided in the center of the splice for assuring that the fibers are properly cleaved and cleaned at their mating surface. In addition, epoxy is added through the viewing port to secure the fiber ends and provide a refractive index matching

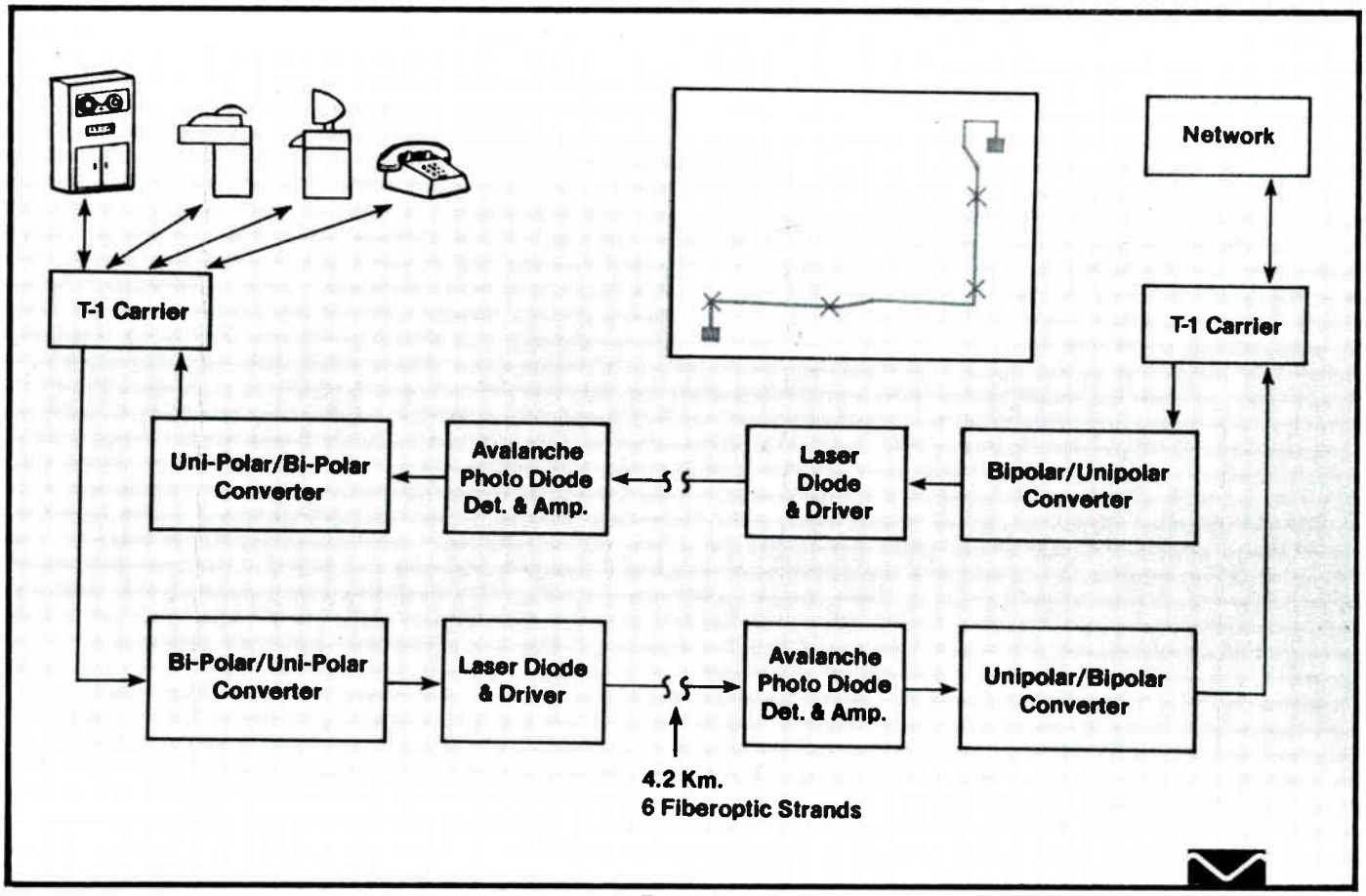

Figure 2

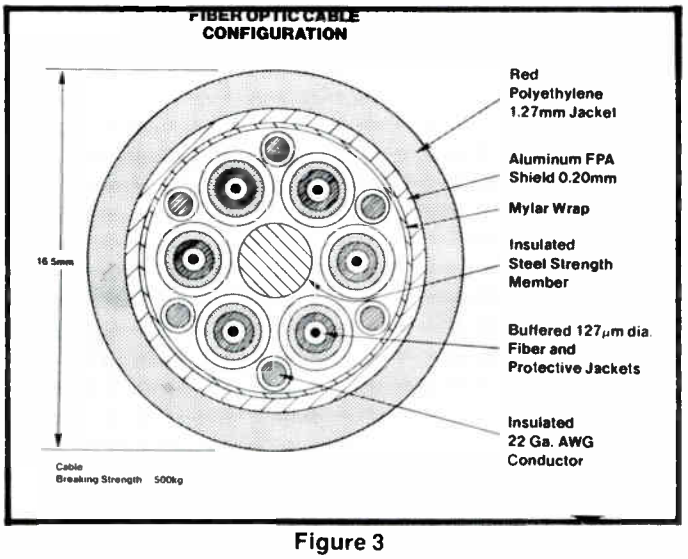

Figure 3

medium to help reduce splice losses. Field splice measurements showed that the average splice loss was approximately 1 dB.

End to end loss measurements over the entire 4.2 km distance indicated an average channel loss of 25.5 dB, including the fiber attenuation and four splice losses per channel. This loss left a 20 dB margin over and above the margin needed for the electro-optic transmitters and receivers to operate below a 10^{-9} bit error rate.

The key element in the optical transmitter is a commercially available CW laser diode manufactured by Laser Diode Laboratories. This Valtec subsidiary assembled the transmitter package so that the bipolar PCM signals available from Centel's T-1 carrier system are converted to a train of very narrow unipolar pulses. These narrow pulses in turn pulse the temperature-controlled injection laser diode at a very low duty cycle. Using this low duty cycle technique, the estimated lifetime of the laser is extended to approximately 50,000 hours rather than the 3,000-5,000 hour lifetime still characteristic of most CW lasers. (Figure 5.)

The receiver is an avalanche photodiode detector and amplifier followed by a pulse stretcher to return the narrow pulses to the width required by the T-1 carrier system. These unipolar pulses are then converted to bipolar pulses before reinsertion to the terminal carrier equipment. The entire fiberoptic system—from transmitter to fiber to receiver and back again—looked completely transparent to the common carrier equipment. This enabled Centel to test the system using conventional error measurement techniques.

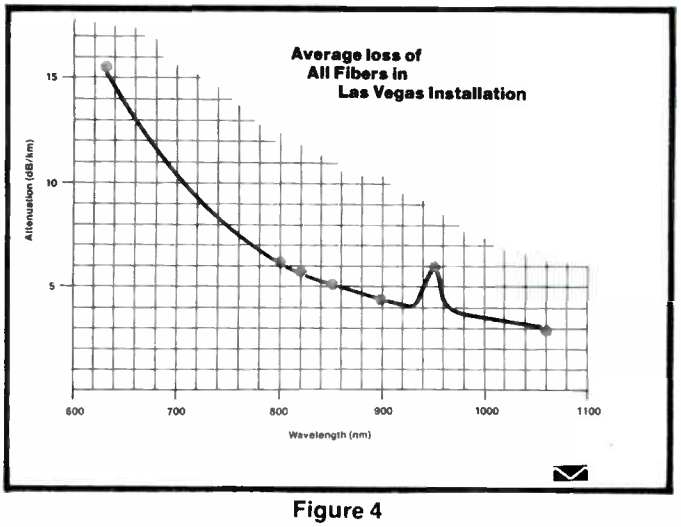

Figure 4

Although the demonstration for the USITA convention employed only a primary and backup T-1 system, the fiberoptic cable has been designed to carry DS-3 rate signals at 44.7 Mb/s. This will provide capacity to 28 T-1 systems or 672 voice channels per pair of fibers.

A revealing calculation was made following the Las Vegas telephone installation to determine the approximate percentage of time spent on the broad categories of installation. These were as follows:

Training of installation personnel	13%
Cable installation	13%
Field attenuation measurements	19%
Cable splicing and splice measurements	28%
Equipment installation and testing	27%
	100%

Much of the training time and field measurement time can be eliminated in future installations with the background documentation and improved methods derived from the Centel installation.

A major step has been taken in the design, installation, and use of this fiberoptic telephone system. Steps are being taken to increase the number of voice channels per fiber so that the per channel cost lies below the cost for conventional coaxial cable or microwave systems. A most significant, and successful, objective in this installation was to bring familiarity with optical technology to the management, engineering and linemen of the Central Telephone Company.

Shortly after the Centel installation was completed, Valtec received a request to install a demonstration fiberoptic video system in Oakland, California, for the Bay Area Rapid Transit Authority (BART). Within two weeks a team of engineers, a 3,400 foot length of fiberoptic cable identical to that installed for Centel, and a transmitter/receiver pair had arrived on-site in Oakland.

The system was intended to demonstrate a capability of providing remote video monitoring of preselected station areas to a central security area at another station without interference from the power feeders or switching equipment of the electric railway. The "Oakland City Center - 12th Street" station was chosen for the placement of both black/white and color video cameras. The television monitor was to be located at the Lake Merritt station. The distance between the two stations is about 1 km following a path through the subway tunnels.

The fiberoptic cable was installed by BART personnel with technical assistance provided by Comm/Scope and Valtec. Starting at the Lake Merritt Station, the cable was pulled from the track area into the relay rack room over conventional cable trays. The cable was then installed in overhead cableways in the tunnel connecting the two stations. At one point in the installation, the fiberoptic cable was tied directly to a 34,500 volt power line for a distance of about 50 feet as a matter of convenience. At the City Center station, the excess cable was coiled in the utility room that was to serve as the transmitter room. The time required to install the cable was just over one hour.

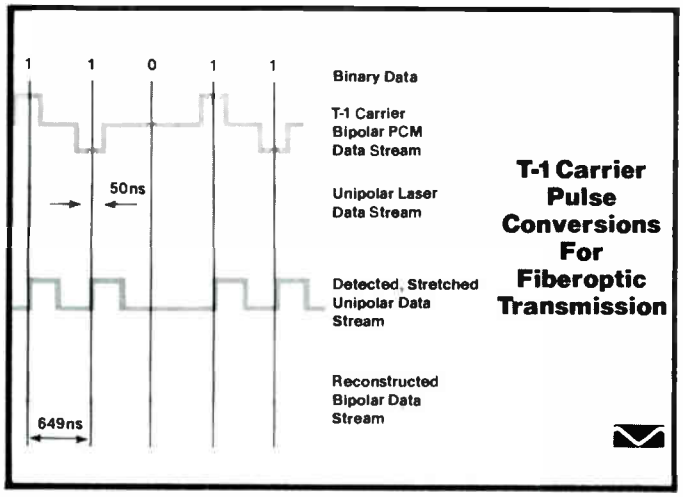

Figure 5

When the cable installation was complete, the installation of the video transmitter and receiver began. These were designed and assembled by Harris Electronics, who also provided assistance with their installation. The transmitter was designed to provide an analog signal carried on channel 2. The output from the light emitting diode (LED) was coupled into a fiberoptic pigtail. A similar pigtail was used in the receiver to couple the silicon PIN photodetector.

Valtec provided splicing hardware to complete the system. The splice connectors used were of the three rod types enclosed in protective metal sheathing.

When the system was finally completed and the minor last minute adjustments had been made to optimize the signal transmission, those who had been involved in the program could not conceal their delight. It was almost unbelievable that within two short weeks the system had been conceived, the equipment assembled and the installation completed. Yet the results were before them. . . .full color television transmission from another station without interference from the many potential sources of noise. **C-ED**

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The DBC Intelligent Tap System

(Conclusion of a Two-Part Series)

The first part of the DBC Intelligent Tap article (see C-ED, February issue) featured a system summary, theory of operation and system component operation of DBC's Intelligent Tap. The conclusion, featured in this issue, focuses on the operation of the addressable tap and the various methods of controlling and jamming premium television channels.

By Joseph L. Stern and Joseph Garodnick of Stern Telecommunications Corporation; David Fear and Paul W. Lancaster, Delta-Benco-Cascade, Ltd. Ontario, Canada.

The Intelligent Tap system consists of four pieces of equipment installed at different locations: the office, headend, trunk sector and distribution points. The headend control system is ultimately responsible for management of the system. The level of sophistication of equipment at the headend is determined by the size of the network and a cost-performance analysis.

System Operation

At the office, a data terminal converts the subscriber's code number and switching instructions to a digital word. A large number of words will normally be stored and later transmitted together at high speed to the headend. Here each word is formatted and modulated onto a pilot carrier for distribution throughout the cable system. At a trunk sector, the data signal is demodulated, the word checked for validity and compared with the sector address programmed in the decoder. When these coincide, the instruction bits to a particular tap modulate the waveform of the AC power supply

The data is then transmitted to the distribution points (outdoor intelligent taps, apartment taps or wall plates). Here the data is processed by a single LSI chip where the word is again checked for validity and then compared with the subscriber port address, previously programmed into the unit. If they coincide, the function bits at the end of the word will cause the LSI chip to feed current to the appropriate diode switches, cutting off or restoring basic or premium service.

System Features

The data is sent to the headend where plug-in encoder modules match the particular data terminal output. (See Figure 1). A 20 kilobit rate (approximately 400 addresses per second/per trunk) is used to transmit data on the RF carrier which can be at any frequency within the passband of the trunk amplifiers. The pulse width modulation technique used requires a bandwidth of 120 kHz.

From the RF receiver/decoder (at the AC power supply location), the data is transmitted to the taps on the powering waveform. The power supply normally operates at 60 Hz, but carries a 1 or 0 as a single cycle at 60 or 120 Hz, respectively. This method seems superior to using an RF carrier directly to the taps since:

- the number of RF receivers in the system will be small and of high quality (stable, with adequate filtering and AGC).
- tap complexity is minimized.
- a secondary benefit is that the AC power supply developed for this purpose is more efficient that the conventional ferro-resonant power supplies, and is equipped with overload protection which operates in a few milliseconds.

The receiver/decoder and taps are programmed immediately before installation. A high degree of security is maintained since the exact address need be known only to the programmer. Premium service is denied to non-subscribers by switching a frequency modulated jammed signal into the premium channel. As well as destroying the picture, this obliterates the sound with a 60 Hz buzz; however, it has no effect on

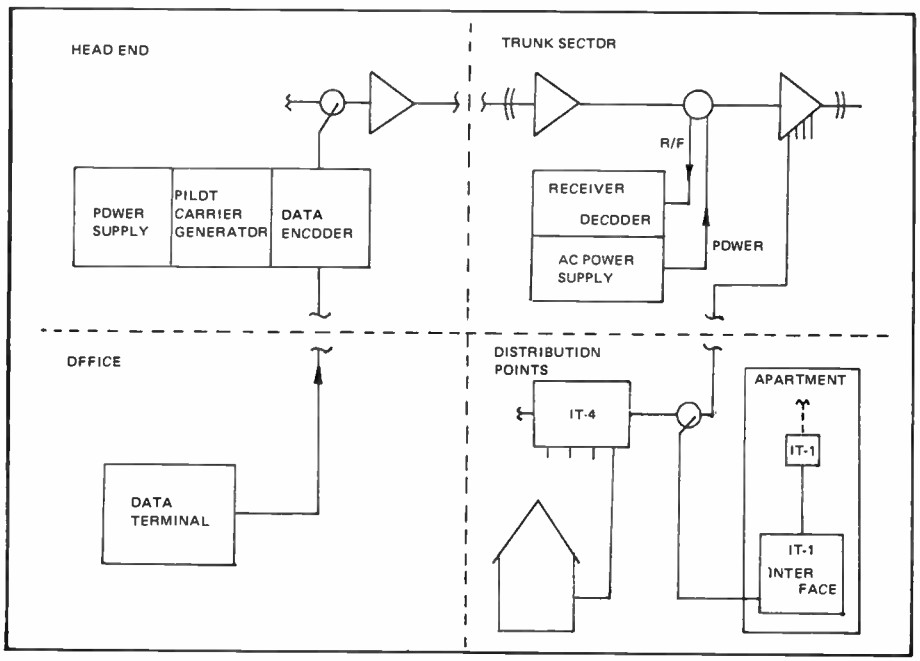

Figure 1

adjacent channels.

A capacitor provides the LSI chip with a memory of 15 seconds duration. In the event of a longer power outage, all ports receive all services until the tap is re-addressed so that paying subscribers are not affected. This can, however, take place frequently and automatically if the system is delivering premium services on a per program basis. Once installed, the tap or wall plate requires no maintenance or further attention. False switching is almost impossible; at present indications are that on the average, false switching occurs once in 100 million operations.

Power Unit

In one configuration, a standard CATV power transformer design (but including a center tap) is used to provide ± DC power. Its squared output, combined with full wave rectification, eases the DC filter requirements. Since it is a saturating type of transformer, input over-voltage protection is automatic. In the second configuration, ± DC is generated from a high-powered switching regulator. Input undervoltage, or "brownouts" in urban areas, are compensated for by (optional) automatic standby power supply units. The back-up batteries are trickle charged through the resistors, and are switched in by a drop in the AC power supply output below the battery voltage, less one diode drop. With this design, back-up batteries can be added at any time. Fuses and circuit breakers are not shown, but in all cases, the power supply unit is protected from over voltage and current.

The power switch switches either +DC or -DC to the output, with a limit on the squareness (dv/dt) to prevent harmonics and amplifier power supply problems. There is a provision for zeroing out any DC residual on the line due to the switch transistors. The drive signal is symmetrical due to its digital source and is not a problem.

Output power is connected to the feeder through a standard power inserter. A standard or resistive tap is required for the input to the pilot carrier receiver section of the power supply unit. These two functions are contained in a power inserter housing. The receiver need only detect the presence of signal, due to the PWM-ASK scheme used.

The data output of the receiver is a digital signal, of varying pulse width. In the logic, a positive-going edge triggers a one-shot, which is set for 3/8 of the 20 kbps clock period. The positive edge becomes the clock for a 25 bit shift register. The data input to the shift register is the receiver output. A long pulse = 1, a short pulse = 0. This process continues until 25 pulses have been sampled (shifted). When the Boolean equation, Start bit • Stop bit • Parity • Unit address = 1, the data is assumed valid, and transferred to the output shift register. The power unit address is switch settable to one of 128, to match a preassigned number (by the software at the headend).

A start bit and parity bit is added automatically, and the data for a tap is shifted out to the power switch according to the Boolean equation 60 Hz • data + 120 Hz • = output data. Each bit enables one full cycle of either 60 or 120 Hz. The 120 Hz clock is synchronized with the utility company power in order to ease filtering requirements and transformer secondary loading. If power fails, the circuit will free run. Power for the logic will be derived from the main power and is less than 2 watts.

Tap

This system requires a standard 4-way tap, with a power pickoff for the IT-4. For the IT-1, a standard apartment house single tap is provided with a power pickoff.

The tap is of the standard DBC low-loss type. In the IT-4, RF chokes and capacitors provide a low-pass filter to the power transformer as well as some transient suppression. The power transformer is designed to operate near saturation; hence, any input transients will not be coupled to the output. It has a high insulation rating for its own protection. The IT-1 has no transformer and derives voltages directly from the input power. The chip requires ± 5 volts and -12 volts. The IT-4 unit is designed to operate over an input voltage range of 18-32 vrms. There is an RC low-pass filter for the data input to the logic.

The logic chip is contained in a single proprietary 24 pin LSI chip. The incoming data is detected, shifted and decoded for validity in the same manner as the power unit.

There can be up to 1024 taps connected to a power unit, hence a tap address contains 10 bits. A tap address is set by cutting printed circuit paths or by a jumper plug module. When valid data is received, the 4 switch address bits are decoded by a 1-of-12 circuit to select the desired customer-function, and the data bit is stored in the selected latch. An output (current) buffer then drives the RF switch. The -12 volt input has a large filter capacitor to prevent loss of data due to short power outages in systems without battery back-up.

The on-off service is provided by a switch that terminates the tap transformer and opens the customer's drop. Excellent performance has been achieved using reliable pin diodes. The design minimum is -50 dB attenuation.

Jamming a Channel

One approach to deactivating a specific channel (X) for pay-TV control is to use an LC type of trap, with an SPST switch across it that modulates the trap depth. The trap must be well designed so that adjacent channels are not affected.

Another approach is to use a jamming oscillator tuned to the frequency of the pay-TV program picture carrier. Very effective jamming can be accomplished by changing the jamming frequency so that the resultant interfering carrier is swept just above and below the visual carrier frequency.

This type of jamming produces variable "herringbone" patterns when viewed. In addition, since television sets use intercarrier sound detection, this interfering carrier introduces a loud "hum" on the sound. The jamming frequency deviation was selected to be 200 kHz yielding a "hum" level of approximately 12 dB above peak sound. The amplitude of the jammer is approximately that of the desired visual carrier. Care must be taken to keep the interfering carrier from adjacent taps and the cable distribution system.

A third method of controlling premium TV channels is provided through the use of a coherent self-jamming technique where a portion of the channel in question is phase shifted 180 degrees and fed back into itself, providing a totally unviewable picture. Since the jamming signal is coherent, isolation from adjacent taps and the cable distribution system need only be 30 dB.

Another method for controlled viewing of TV channels, particularly in the case of the IT-1 apartment house unit, is to have as the tap logic control an electrically switchable interference carrier filter such as PROMO. (1)

Still other variations will be available in the future wherein the Intelligent Tap system logic will control the converters within the home. **C-ED**

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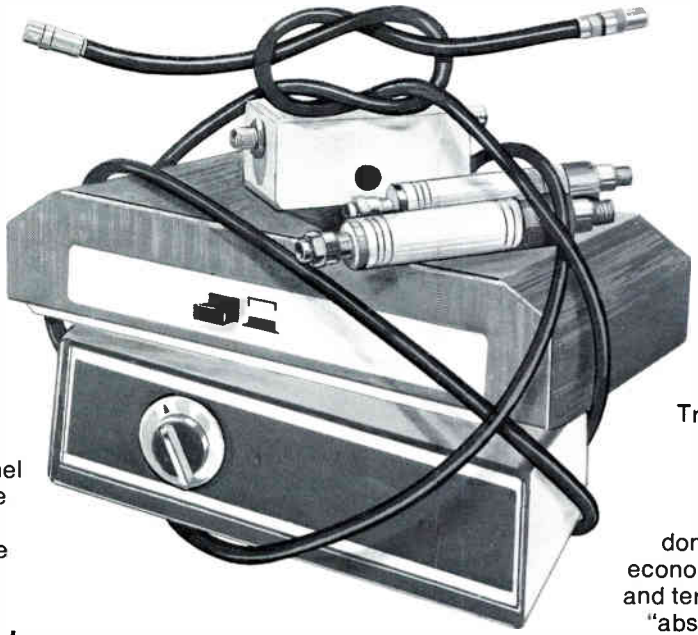
(1)
PROMO is the registered trademark of an interference filter pay-TV control system developed by Stern Telecommunications Corporation.

Negative vs Positive Systems
Audited vs Unaudited Systems
Cable Traps vs Descramblers
Lowest Overall Costs vs
Lowest Front End Costs
Single Channel or Multi-channel



Negative vs Positive System

There's no doubt about it . . . the Negs have it over the Pos. The greatest deterrent against theft of service is to not allow the premium channel into the home where it can be reconstituted . . . to trap the signal of all non-payers at the pole where it is least subject to tampering.

VITEK Cable Traps ***look like drop cable***, provide deep-notch depth (typically greater than 70dB), superior environmental stability and durability, are maintenance-free — and are ***on the pole!***

Audited vs Unaudited Systems

Auditing is easy with VITEK Cable Traps. Simply count your traps and compare with your current subscriber list. No contact with the subscriber is necessary. Since (Pos) descramblers are located in the home, installation records are your only clue as to who your "customers" really are. Gaining access to the residence can be difficult and may require numerous visits.

Cable Traps vs Descramblers

If "they" don't pay . . . reconnect the cable trap . . . on the pole! Recovery and replacement of descramblers is time consuming, costly and may require legal action.

Any way you look at it... VITEK is the answer for PAY TV Security!

VITEK

Descramblers can also be "loaned out" depriving you of additional income . . . but VITEK Cable Traps stay put . . . ***on the pole!***

Lowest Overall Cost vs Lowest Front End Costs

You get what you pay for, so don't be misled by the apparent economies of (POS) descramblers and terms like "self-amortize" and "absorbed costs". The larger the installation, the more economical VITEK Cable Traps become. You save on maintenance and service calls, recovery or replacement of equipment and in the end, there is nothing more foolproof and reliable than a VITEK Cable Trap to prevent theft of service . . . and that's what PAY TV Security is all about.

If you're successful, you'll outgrow the short-term economics and inadequacies of descramblers as others have and change over to VITEK's Cable Traps.

It's simply a matter of . . . Pay us Now . . . or Pay us Later.

For additional information call or write:

VITEK Electronics, Inc.
200 Wood Avenue, Middlesex, N.J. 08846
Tel: (201) 469-9400

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.

That's why CABLEVISION gives you the news you need ahead of TIME. We did it then and we'll do it again.

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Power Supplies

Compact Wide-Bandwidth WR62 Microwave Isolator

A compact microwave isolator with a wide bandwidth has been introduced by Microwave Development Laboratories, Inc.

The MDL Ku-Band mini-isolator is a WR62 wave guide, microwave isolating device that provides a wide bandwidth of 15.5 to 17.5 GHz and is easily integrated into system packages. It measures 0.5"L x 1.55"W x 1.34"H, weighs only 2 ounces and provides an isolation of greater than 15 dB.

The mini-isolator provides a VSWR of less than 1.4 for both ports (typically 1.3). At narrower bandwidths, VSWR's as low as 1.2 are attainable. Insertion loss of the unit is less than 0.4 dB and average power rating is 10 Watts. These devices are suitable for any application requiring efficient microwave isolation.

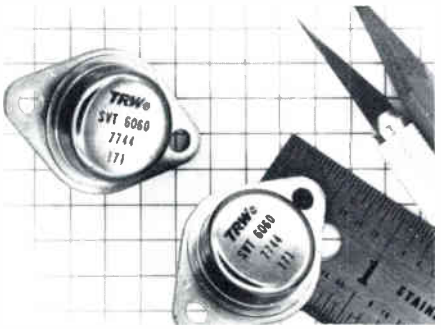
For more information, contact Ernest Bannister, marketing manager at Microwave Development Laboratories, Inc., 87 Crescent Rd., Needham Heights, Massachusetts 02194, (617) 449-0700.

TRW Power Semiconductors Offers 400V Darlington Series

A series of 400V monolithic Darlington transistors for industrial motor control and switching power supply applications is now available from TRW Power Semiconductors. With a rise time of 0.4 usec., the devices are ideally suited for high-speed power circuits that operate at switching frequencies of 10 kHz and higher.

The three Darlington transistors, SVT6060, 6061, and 6062, have a DC current gain of 30 at 15A and a peak collector current of 25A.

For additional information, contact John Power at TRW Semiconductors, 14520 Aviation Blvd., Lawndale, California 90260, (213) 679-4561.



Passives

Jerrold Economical Taps Available

Jerrold Electronics Corporation has reintroduced the essential features family of taps designated the EFT4-series. These taps provide 5 amperes of continuous current capacity for one- or two-way installation, low insertion loss, 12 tap values, excellent isolation, RFI protection, corrosion resistant chromate sealed housing, barbed collars to assure shrink boot adhesion, and hypo-seal® connectors with puncture-seal membrane to assure water-proofing.

For additional information, contact John Bullock at Jerrold Electronics Corporation, P.O. Box 487, Hatboro, Pennsylvania 19040, (215) 674-4800.

Fiberoptics

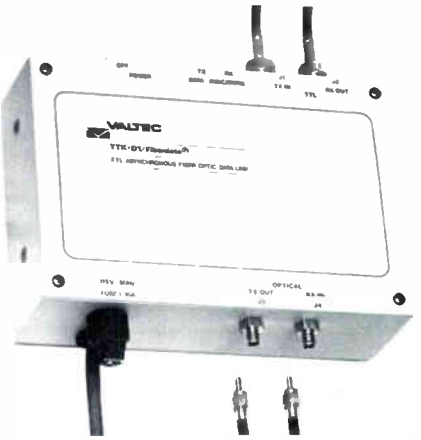
TTL Fiberoptic Duplex Data Link For Large Bandwidth Applications

A fully engineered, duplex, asynchronous, TTL fiberoptic data link is now available from Valtec Corporation, parent organization of Comm/Scope Company. Each end of the link has a self-contained optical transmitter, optical receiver and power supply. The electrical signal input and output is through standard BNC connectors. The link is powered by ordinary wall current using the power cord which is included.

The user only has to plug in the link and connect the electrical and optical cables to activate the system. No adjustments are required. Valtec sells the duplex fiberoptic cable with attached connectors for about $1.00 per foot.

Transmission capability from DC to 10 MBPS over distances up to 3000 feet is built-in. This TTL link now provides users with the advantages of immunity to EMI, low cost cable installation, secure lines and safety in hazardous areas.

For futher information, contact J. Morris Weinberg at Valtec Corporation, West Boylston, Massachusetts 01583, (617) 835-6082.



Miscellaneous

Wide Stripe Cable Ties For Identification System

PAN-TY Cable Ties, a part of the PAN-POUCH system, now have wider stripes for faster, easier identification of binder groups in PIC cable.

The system provides fast, convenient identification utilizing PAN-TY miniature cross-section cable ties in 24 striped color combinations which match the universally accepted Even-Count Color Code. Solid red, yellow and black cable ties are also available for use in conjunction with striped cable ties for identification of "Super Groups" in PIC cable having a pair count in excess of 600.

PAN-TY ties can be applied by hand or with PANDUIT® tension-controlled installation tools. They are one-piece, all-nylon and self-locking. The miniature ties accommodate a maximum bundle

(Cont'd on page 33)

WHY THE MCE NOVA ADDRESSABLE TWO-WAY TAP? BECAUSE IT IS HERE. NOW.

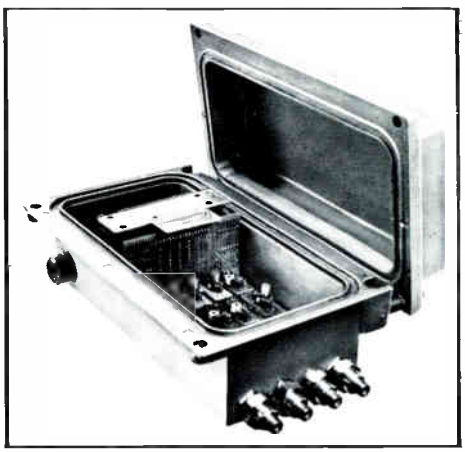
The NOVA Cap-Tap (Controlled Access Point and Tap) is a fact today. Practical. Proven in actual service. Saving money on both standard and premium TV systems with up to 65,000 subscribers. Here is what Hank Lockhart, General Manager of Sammons Communication Company of Harrisburg, PA., has to say about this advanced product:

"The NOVA taps required no new hardware or special tools to install. In appearance, they're slightly larger than old-fashioned taps.

"Neither extreme temperatures nor lightning surges have affected their performance. In fact, in the six months since installation, no NOVA tap has required any service at all.

"The remote functions have worked perfectly, such as connect and disconnect; and Accounts Receivable has used conveniences

"We also have a better handle on piracy and illegal use of signal with the NOVA taps."



The all-new 5—300 MHz NOVA Cap Tap is useable with new and existing cable systems.

Address inquiries to:

mce

Merrill Cable Equipment Corp.

2949 West Osborn Road
P.O. Box 13741
Phoenix, Arizona 85002

Sophisticated Switching of Microwave Programing

By Robert Clasen

"We have one playback center. We want to get programming on two different channels simultaneously. How do we do it?" The answer to this question was solved by Lyle Kneeskern, director of engineering for Continental Cablevision of Ohio. The following system profile will reveal how Continental's engineering staff resolved the problem.

Continental Cablevision of Ohio, Inc., has activated a regional local origination programming channel via a CARS microwave network. This system, one of the largest in the country devoted to local programming, interconnects the communities of Springfield, Fairborne, Wayne Township and Xenia with a new major cable complex in the Dayton, Ohio suburban area. In addition, the four communities north of Dayton, a new system in Harrison Township, and the six southern Dayton suburbs served by Continental are now part of this interconnected system. It's estimated that the combined subscriber count by December 1978 will reach 50,000 and will eventually exceed 75,000 subscribers.

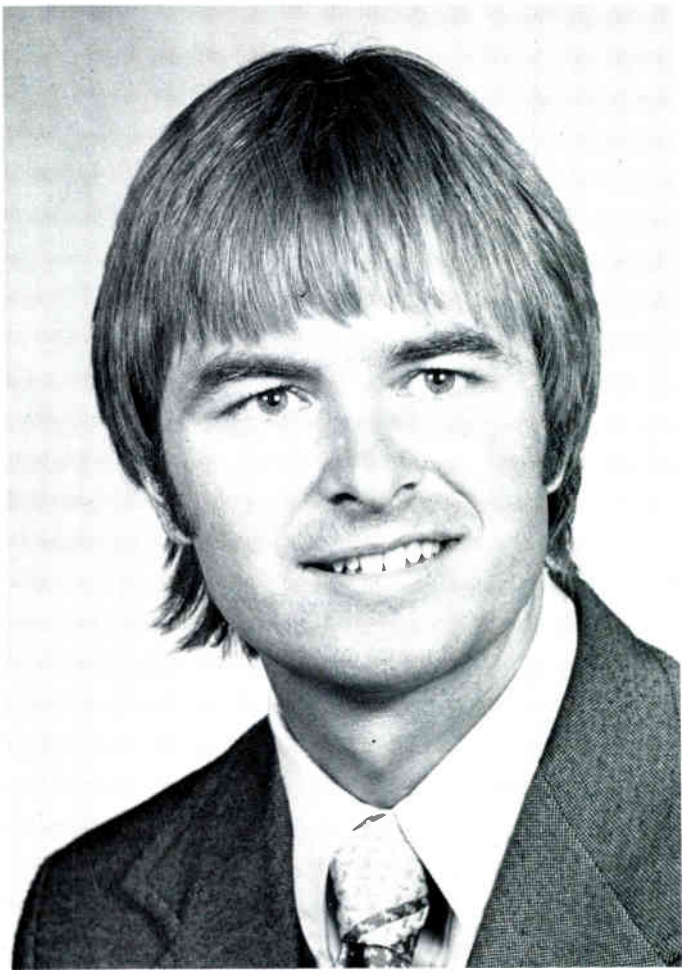
Continental Cablevision felt this was a unique opportunity to utilize its CARS system to distribute local programming on a shared-channel basis. The microwave system was primarily designed to provide distant signals from Cleveland and Indianapolis to the Dayton market. The addition of a third microwave channel to support Continental's pay-TV movie service, Sinevue, created the possibility to utilize the microwave channel throughout the day and early evening before the movie service began.

Since the channel is time-shared, a common playback center is used for both the first-run movie service and the local programming material. Each headend incorporates a character generator that is programmed from the playback center via a microwave subcarrier. The character generated message switches to the pay-TV channel in each local system when the regional local channel is utilized. When the local programming is finished for the day, the channel reverts to the pay-TV message from the playback center. Messages on the local channel are then programmed by individual systems. This method allows the pay-TV channel to carry a promotional message when the movies are not being run, even if the microwave is in use for local programming.

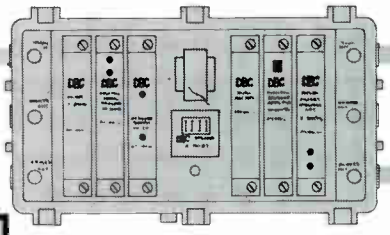
Local origination has usually suffered from the small number of programs which fail to generate audiences that keep producers, sponsors and the public interested. By interconnecting 15 cities, the base for production and viewership is greatly enhanced. Programming for the L/O channel is a composite of local programs produced by Continental, public access, leased time or special programming and educational access programming. The channel is viewed on one station already devoted to local information beginning at 6:00 p.m.

Continental Cablevision has had a long-standing interest and committment to local programming, as witnessed by its many NCTA awards and its efforts to promote access programming.

The activation of a regional local programming channel provides a unique opportunity for a number of communities with similar interests to share their locally produced programs with each other. Continental sees this step as an initial move toward allowing the special and diversed interests of these communities a very economical means of communicating with families served by cable television. The diversity of the programming will be the key to its success, and the public is being encouraged to participate. Continental produces three programs each week for the channel. Seven other weekly programs, sponsored by various community organizations, have been added since the channel was activated in January 1978. These regular shows are supplemented by public access programs that are shown during available time periods. The currently available 'ocal public educational and governmental access facilities in each individual community are unaffected. The public has an option to make their programming efforts available through a regional network or to direct their efforts exclusively to individual cable systems within the network.



Robert Clasen is the assistant vice president and southern regional manager for Continental Cablevision of Ohio, Inc.



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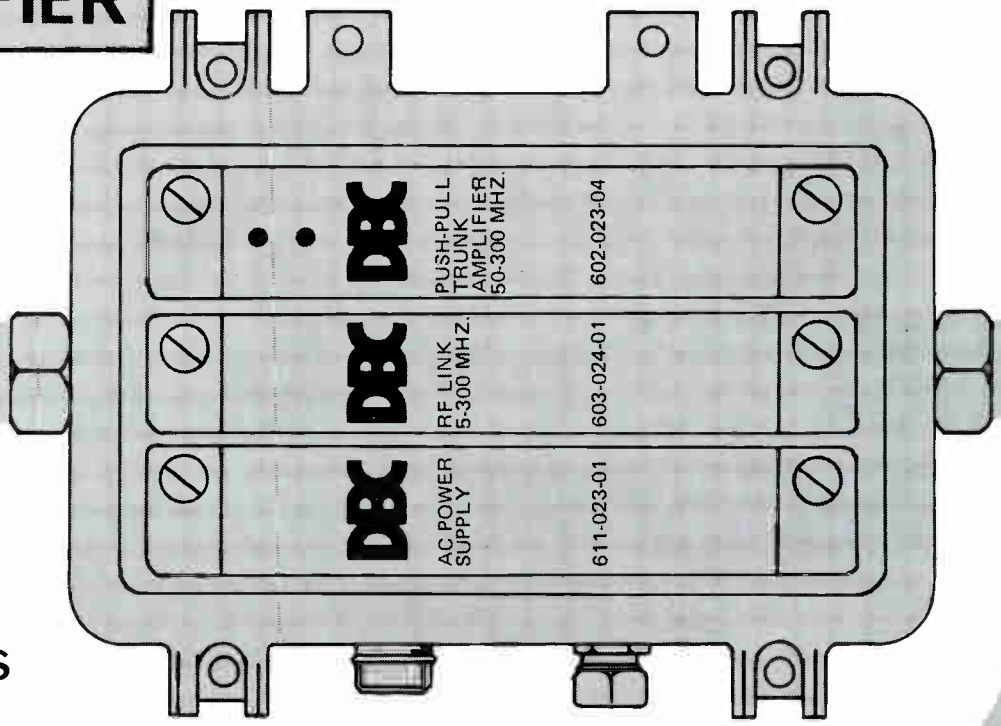

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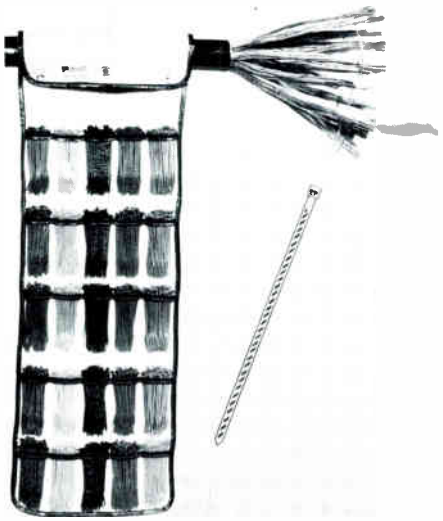
(Cont'd from page 29)
diameter of 3/4" and have bent tips for faster threading.

For further information, contact Panduit Corporation, 17301 Ridgeland Ave., Tinley Park, Illinois 60477, (312) 532-1800.



AMP Coax Cable Stripper

Now there's a small, light tool a technician can use to prepare cable for BNC and UHF connectors. The new AMP Coax Cable Stripper is now available from AMP Special Industries. Its adjustable blades allow it to be used for stripping coaxial cable in four of the most popular sizes, including RG 174, RG 58, RG 59 and BELDEN 8281.

This tool can be used in applications with test equipment, CB radios and TV and broadcasting equipment where these cables are used. The tool is easy to use and made of durable polyamid material.

New Opportunities for Linking Programmable Instruments by Tektronix

A new logic analyzer display formatter that monitors, in sequence, activity that occurs on the IEEE-488 (General Purpose Interface) Bus is now available from Tektronix, Inc. The Tektronix DF2 formatter makes it easier for users of programmable instrumentation to link different types of instruments to a digital controller for display and analysis in a variety of applications.

Century III and Manitoba Telephone System Co-Develop "First"

Broadband communications technology has taken a major step forward with the co-development of a superlinear, bi-directional broadband amplifier by Century III Electronics Inc. (formerly Anaconda CATV Ltd.) and the Manitoba Telephone System. Using MTS specifications, Century III has produced an amplifier which can transmit television and other broadband signals several hundred miles, in a unique application of coaxial cable technology. Century III will manufacture this specialized amplification equipment to be used in construction of an MTS Intercity Broadband Network (ICBN) linking Winnipeg with Selkirk, Portage la Prairie and Brandon, in Canada.

This new amplifier is designed with feed forward circuitry to reduce the cumulative noise and distortion which limits conventional broadband coaxial cable systems to about 30 miles. Performance and reliability is also improved with new features such as redundant power modules and a highly sophisticated microprocessor-based fault location and status monitoring system.

For additional information, contact Century III Electronics Inc., 1580 Rand Ave., Vancouver, B.C., Canada V6P 3G2.

the TRACKER

FROM TEXSCAN.....

• The Tracker makes dynamic measurements up to 120 db—simply and accurately. The instrument combines all the features of a high resolution (500 Hz), sensitive (−60 dBmV) spectrum analyzer with a high level (+51 dBmV) sweep generator, display scope, dual channel switcher and return loss reflection bridge.

Observe these key specifications:

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Frequency Range: 1 to 350 MHz; continuously variable center frequency.
Display Flatness: ±0.25 dB max. at full sweep width; ±0.1 dB across any 10 MHz band.
RF Output: +51 dBmV calibrated; 50 dB variable in 1 dB steps.
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Display: Long persistence CRT, P7 phosphor, useful area 5.5″ × 7.5″; sensitivity 0.2 mV/div. to 0.2 mV/div.
Power Requirements: 115/230V, 50/60 Hz, 100W
Dimensions: 13.5 × 17 × 16.75 inches 23.75 × 42.5 × 41.5 cm

SPECTRUM ANALYZER

Frequency Range: 0.4 to 350 MHz
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Noise Sidebands: Greater than 70 dB down 15 kHz or more from input signal.
Intermodulation & Harmonic Distortion: 3rd order more than 70 dB down from two +10 dBmV signals separated by 1.5 MHz, at less separation, 60 dB down. 2nd order down 55 dB from two +10 dBmV signals.
Frequency Markers: Six plug-in jacks. Accepts single frequency or harmonic markers for frequency identification. Provides frequency identification in all modes. Accurate to ±0.05% during spectrum analysis and ±0.005% during sweep testing.
Dynamic Range (On Screen); 80 dB (121 dB total possible).

THE LOGICAL CONCLUSION: Your system test requirement can be met with one instrument—The Tracker—Texscan Model 9600—For a demonstration write or call

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TWX: 910-951-1399
TEXSCAN/OVERSEAS: 1 Northbridge Rd., Berkhamstead,
Hertfordshire, England, UK

Various Uses For the J16 Digital Photometer/Radiometer

A new, six-page brochure from Tektronix describes the characteristics and applications of their model J16 Digital Photometer/Radiometer. As described in detail in the brochure, the J16 is a lightweight, portable instrument that features a 3 1/2-digit LED readout, ruggedized construction, and ac - or battery - powered versions. Eight interchangeable probes measure illuminance, irradiance, luminance, LED output and relative intensity. The brochure also lists J16 application notes covering subjects from testing medical equipment to measuring laser output.

Readers may obtain copies of the brochure free of charge by contacting a local Tektronix field engineer or writing to: Tektronix, Inc. P.O. Box 500. Beaverton , OR 97077.

Tektronix' new six-page brochure.

TeleMation Issues TVP-1000 Literature

Literature on the TVP-1000 video processing amplifier has been released by TeleMation, Inc.

The four-page brochure outlines and briefly describes the features of the TVP-1000 which include full sync, blanking, and burst regeneration; differential input rejection of up to 30 V P-P common mode hum; operation with Helical scan and U-Matic format recorders; full remote control; a programmable pulse width digital sync generator with genlock; separate sync, luminance, chrominance and burst processing; AG-1000 AGC option; and a metallic contact bypass circuit. The TVP-1000 is available for NTSC, PAL, or PAL-M standards. Specifications and ordering information are also included in this brochure.

Copies of the TVP-1000 literature can be obtained free of charge from TeleMation, Inc., P.O. Box 15068, Salt Lake City, Utah, 84115.

New Wire & Cable Catalog Offered

A new two-color, 64-page catalog on electronic instrument wire, thermocouple wire and thermocouple extension wire and cable is now available from Delco Wire and Cable, Inc., Bristol, Pa. The construction offerings range from duplex parallel to multiconductor or twisted construction, with an almost unlimited combination of insulation, armor and shielding.

The catalog includes technical data, specifications, useful tables and ordering information. It includes such information as limits of error for various product types, ANSI color code for duplex insulated thermocouple wire, thermocouple conductor elements and nominal resistance. Other tables indicate construction and other characteristics of Delco's thermocouple and extension wire including types of insulation available.

Free Designer's Guide to Capacitance - Type Switching

A 16-page designer's guide to the use of TouchControl™ switching—a capacitance-switching technique that employs standard microcircuits—is now available free of charge from American Microsystems, Inc. (AMI).

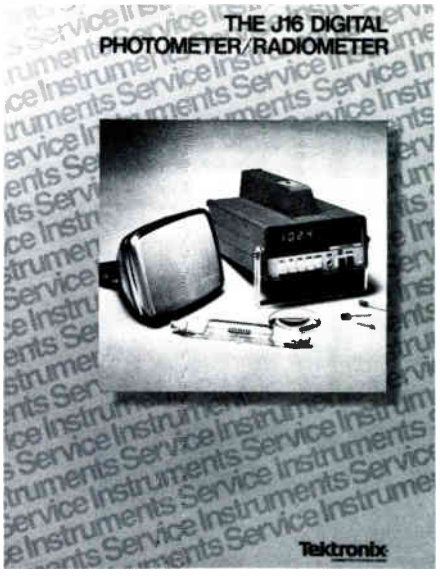
The application note describes how TouchControl works and how capacitance panel sizes, spacings, and materials are selected. It includes data on how to deal with or avoid problems such as high static environments and noise; how to interlock TouchControl switches, and generally how to design reliable touch-switching systems.

ROSCOR Offers Video Products Guide

ROSCOR Corporation, a leading supplier of professional video products, has announced the availability of their new Video Products Guide.

The Video Products Guide is a detailed custom catalog of state-of-the-art video products available from ROSCOR for broadcast, industrial and educational users. The 80 page catalog features leading brands of video recorders, color and black and white cameras, monitors, special effects generators, terminal equipment and projection television systems.

The ROSCOR Video Products Guide will be sent free of charge to qualified inquirers. Write to ROSCOR Corporation, 6160 West Oakton ST., Morton Grove, Illinois 60053.



ROSCOR's Video Products Guide

A Six-Way Tap?

You bet, and they're only available from RMS

1. Another first for the RMS CATV DIVISION—the new RMS six-way directional tap could be your answer to a number of important system design problems.
2. This new, totally unique "UNITAP™" product is available in 8-1/2, 14, 17, 20, 24, 27, 30, 34, 37 and 40 db valves. The CA-3506 bottom plate is interchangeable with the CA-3508 eight-way "UNITAP™."
3. Rounding out the RMS 2, 4, and 8-way "UNITAP™" line, this new product development offers the CATV industry the most comprehensive line of directional taps and they're available now, for immediate delivery.
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International Standards For Cable Television

By Kenneth Hancock, director of engineering, CCTA

There is a tendency both in Canada and the United States to think of cable television as a North American phenomena. In terms of sheer numbers of subscribers this is true to a large extent. However, many countries throughout the world have cable television systems of one form or another, some of them at least as advanced technically as many North American systems.

Belgium for example has, on a per capita basis, penetration equal to or exceeding those in many Canadian cities. We have all heard of the various interactive hard-copy print-out experiments in Japan, and many people have heard of the British revenue producing fiber optic trunk system that has been feeding 34,000 subscribers since 1975. Other countries with expanding cable television systems include Ireland, Holland, Italy, Germany and Mexico, and no doubt I will receive a number of letters telling me of those that I've left out.

With the cable television industry developing on a worldwide basis it makes sense that there should be moves towards international standards. This move is taking place. The organization dealing with international standards in the communications and many other fields is the International Electrotechnical Commission (I.E.C.), which was set up some 40 years ago. The IEC produces international standards on a wide variety of electrical and technical matters. These standards are used as a reference by all sponsoring countries, including the United States and Canada. I should like to make it clear that the use of IEC standards by the sponsor countries is not mandatory, but in general there must be a very good reason for national standards and regulations to be in direct conflict with IEC recommendations.

The work of the IEC is carried out by a number of committees, each covering a specific, but fairly broad field. In turn these committees break down into subcommittees, each covering a specific area of the field in question. The committee covering our general field is IEC/Technical Committee 12-'Radio Communications'. Preliminary work on cable television standards was carried out by a subcommittee of TC12, IEC/SC12A - 'Receivers'. Early in 1975 a new and separate subcommittee was formed to address the needs of the worldwide cable television industry. This is IEC/SC12G - 'Cabled Communications'.

The first meeting of this Subcommittee was held in the Hague, Holland, in September 1975. The meeting was attended by 40 delegates from 18 nations, including delegates from the United States and Canada. This attendance reflected the worldwide interest in cable television, and delegates from mainland China, Eqypt, Japan and the majority of the European nations were represented.

Although in terms of numbers, the subcommittee is dominated by our European friends, the Chairman is Jake Shekel of Jerrold Electronics, who I'm sure many of you know as a leading proponent of our industry in the United States. The secretary of the subcommittee is Vic Reed of Skyline Cable in Ottawa, Canada. Together with Ken Simmons and myself as U.S. and Canadian delegates respectively, the concerns of the North American industry are well represented.

Over its three-year history the Cabled Communications Subcommittee has drafted a number of proposed international standards. The basic work of drafting these standards is carried out by international working groups, whose members normally work through their own national organization. For example, the Canadian sponsored organization is the Standards Council of Canada, a government organization. In turn the Standards Council nominates delegates from Canadian industry, in our case from the CCTA, who in turn organizes advisory committees from within the industry. In this way all proposed standards have full input from the experts in every country. Subcommittee 12G currently has four working groups, working on standards in the following major areas:

- nonlinear distortion
- methods of measurement of hum, differential gain and phase, chrominance and luminance delay and impairment units
- measurement methods and performance requirements regarding radiation from cabled distribution systems, and immunity of ingress radiation into the system
- system performance requirements.

In April, immediately prior to the NCTA Convention at New Orleans, the full subcommittee 12G will hold a series of meetings to consider the proposals of the working groups. If consensus is reached, the draft standards will be circulated to all countries for their final approval. When all the interested countries have given their approval, the standard will be published for worldwide use.

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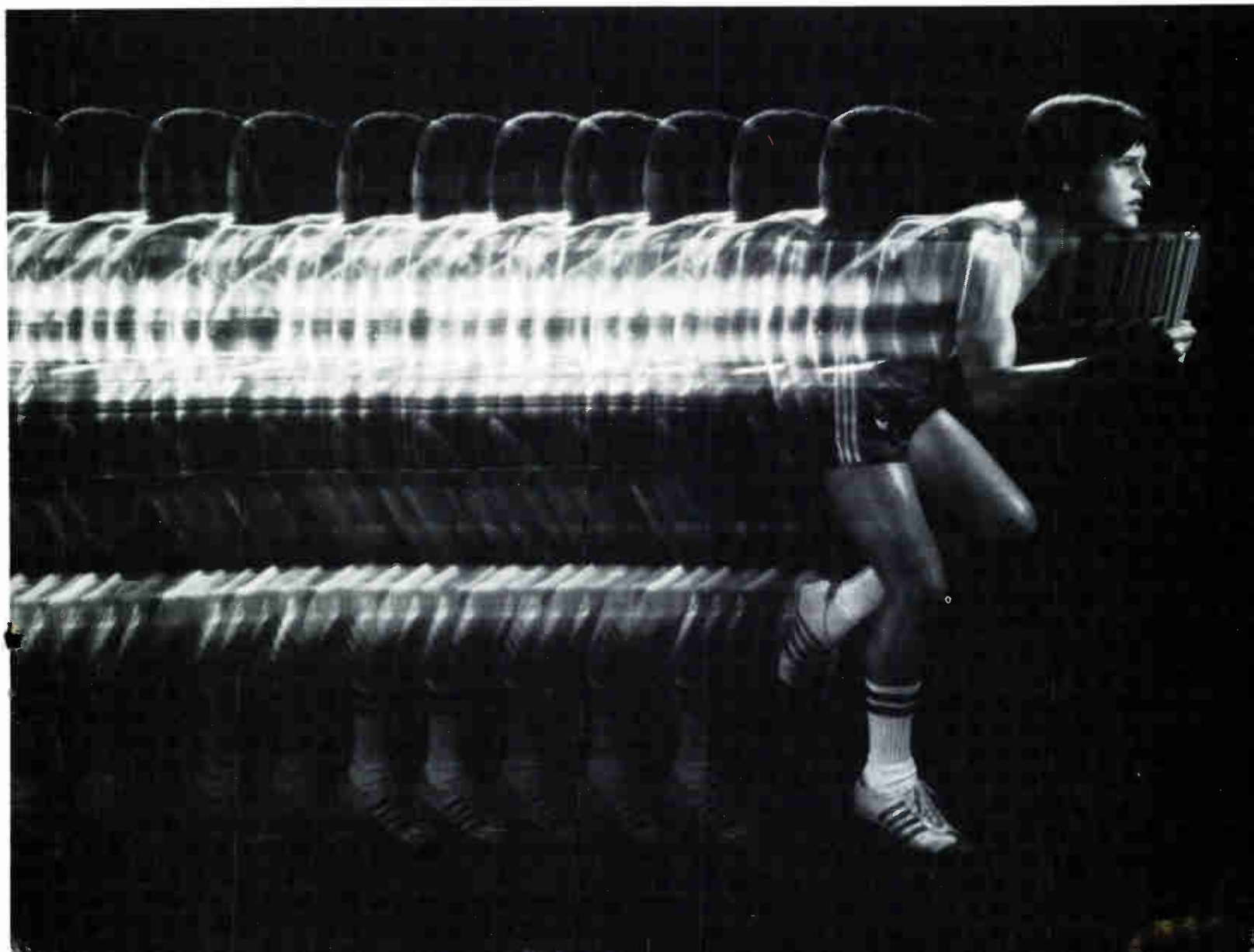

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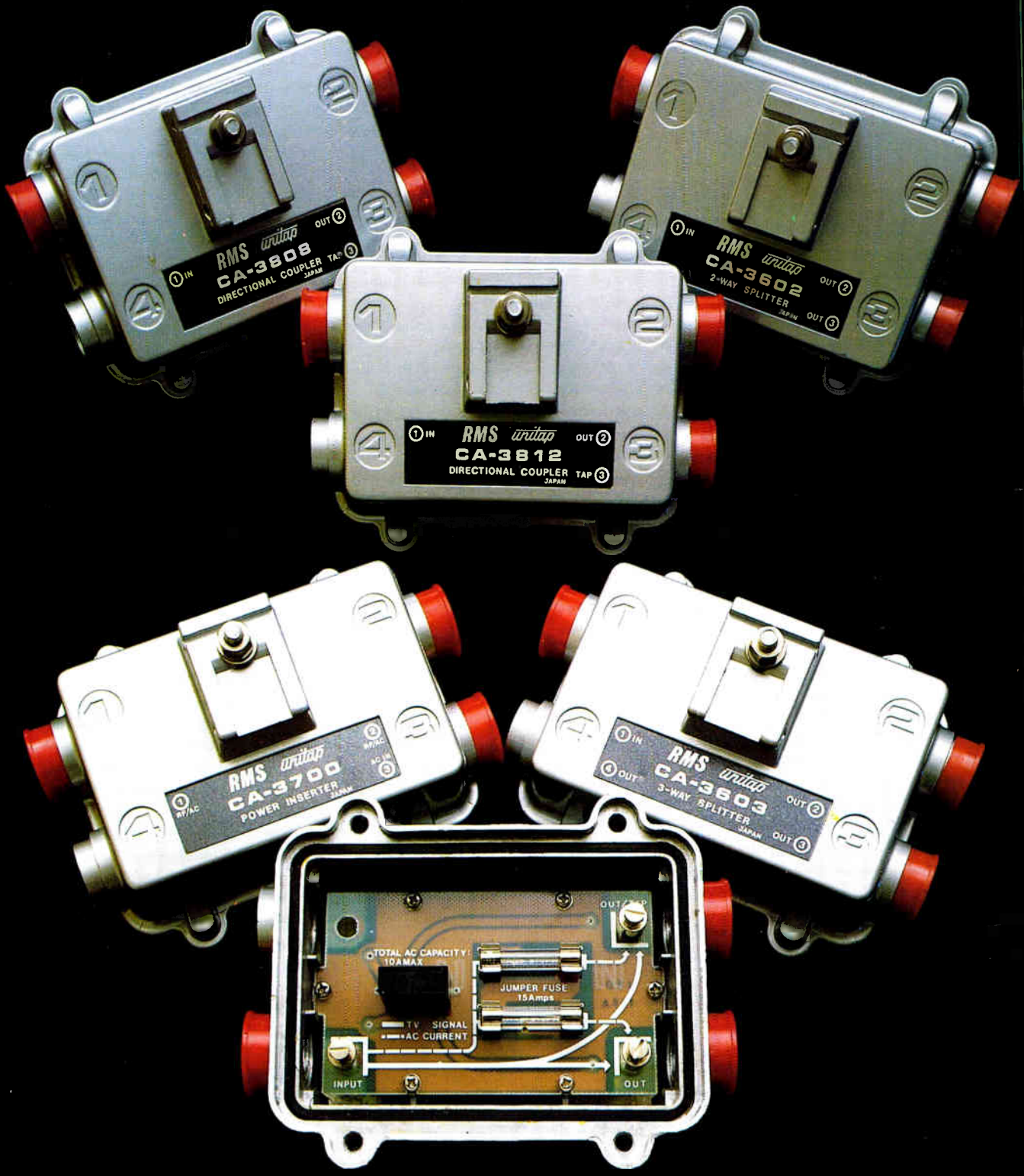

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