



BM/E
BROADCAST MANAGEMENT ENGINEERING

MAY 1972

CM/E
CABLE MANAGEMENT ENGINEERING



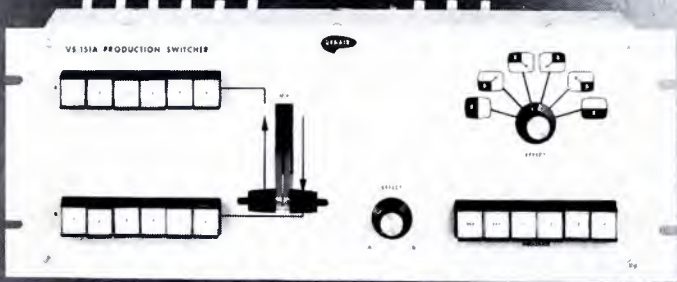
NCTA Convention Issue

**Special CM/E Report:
Wiring Markets 51-100**

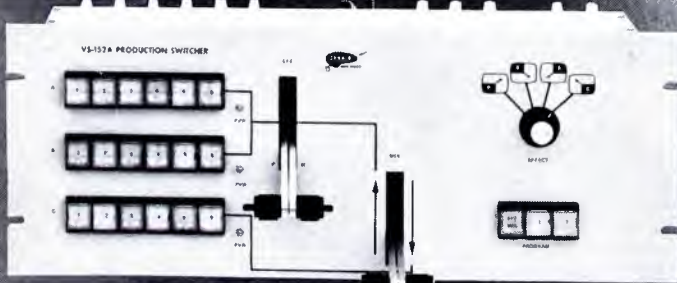
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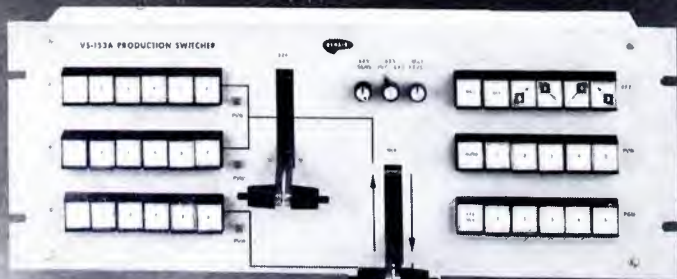
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BM/E

BROADCAST MANAGEMENT/ENGINEERING

MAY 1972/VOLUME 8/NUMBER 5



Some broadcasters and some cable operators may not feel as great affection for each other as our tattooist Sudduth implies; but as both sectors of the electronic media grow, we predict a convergence of interests. (See Editorial, page 19.)

**BROADBAND
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NEW! BORDERLINE GENERATORS

BORDER

STARTING WITH A NORMAL KEY SIGNAL,
THE GVG BORDERLINE WILL-----

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BORDER

PRODUCE A DROPSHADOW EFFECT ON
LETTERING OR TITLING OR -----

BORDER

PRODUCE OUTLINE LETTERING FROM
A SOLID TITLE SOURCE



DESCRIPTION

Grass Valley Group Borderline generators can be used to outline captions from camera video signals or character generators. The bordered inserts have excellent visibility and are particularly effective in situations requiring a white insert into a scene which is predominantly white.

Model 3273 is a complete system which provides bordered inserts into a composite video signal, such as at the output of a switching system. The unit is entirely self-contained and requires no horizontal or vertical driving signals.

Model 3271 is designed for use with GVG switching systems and special effects equipment. The keying circuitry in the special effects amplifier is utilized for the inserting function, and effects such as wipe key between bordered inserts are possible. The 3271 does not introduce system timing errors when installed in GVG switching systems.

Model 3272 is designed for use with special effects equipment of other manufacturers. It provides a widened key signal output which can be connected to the external key input of most special effects systems. The widened key output, together with a slightly delayed (H and V) title video signal, is used to achieve the border effect.

Borderline will be available for both NTSC and PAL/CCIR standards.

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BROADCAST INDUSTRY NEWS

It Was Good News At The NAB Convention

There were the usual warnings on what broadcasters had to do to survive, but they came from the insiders—NAB prexy Vince Wasilewski, chairman of the license renewal task force, Mark Evans, and others.

The outsiders brought friendly greetings. Herb Klein from the White House read a warm Nixon message. Secretary of the Treasury Connally thanked broadcasters for their "outstanding service to the nation." Clay T. Whitehead from the OTP showed that he was generally concerned about the possibility of a government-controlled broadcast system (vis-a-vis D.C. Court of Appeals ruling on the Business Executives Movement for Vietnam Peace, FTC's counter advertising, etc.). Although Whitehead saw no return to the status

quo of yesteryear, he said the answer lies in freedom in broadcasting under a private enterprise system.

The FCC, while trying to maintain a neutral stance—looking out for the public—certainly wasn't anti-broadcasting. In fact, the promise of the FCC to take a new look at all aspects of Part 73 of the rules (under the direction of Commissioner Wiley) was indeed good news. There was hope that, out of this, radio may become less regulated.

The bad news came *after* the convention when the Justice Department filed (April 14, Los Angeles District Court) a suit against the three networks and Viacom for violating the Sherman Act in their control of prime time. Justice Department would prohibit networks from producing their own programs from broadcast and holding an interest in entertainment programs be-

yond first run. The Justice Department action has been called a bad joke—"they must be kidding," is the universal reaction of the mass media industry. Time will tell if it is bad news or merely a bad joke. Bad news will have a lingering effect, but bad jokes die rather quickly.

On the exhibit floor, reaction was good as equipment manufacturers took some orders on the floor and sensed a very definite intention of many to buy needed gear in the coming months.

Network TV Hit \$1.6 Billion in 1971; 48 New Clients

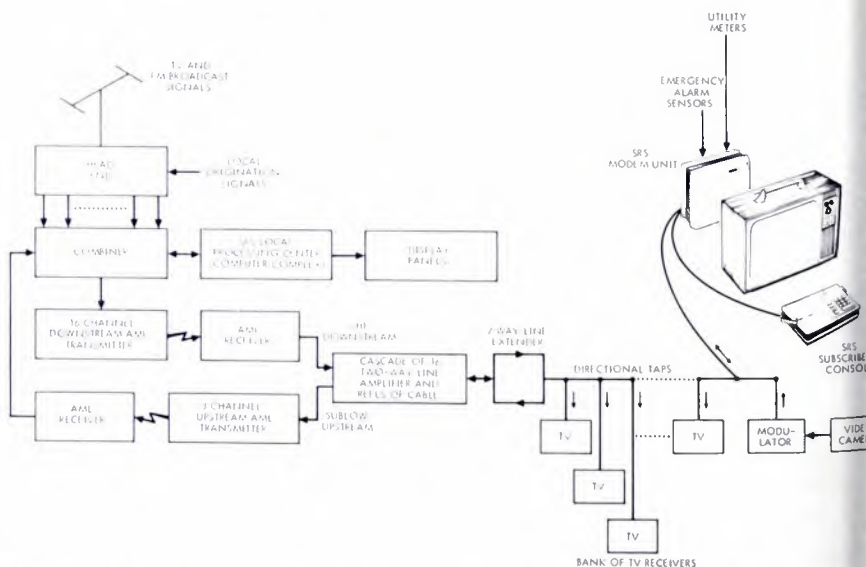
Last year 432 advertisers spent \$1.6 billion on network television, according to a report from the Television Bureau of Advertising.

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"CATV, The New Communicator" Is Theme of NCTA Meet

The 1972 convention of the National Cable Television Association, at the Conrad Hilton in Chicago, May 14 through 17, will have the theme "CATV, The New Communicator," and will hear addresses by Ralph Nader, consumer crusader, and Dean Burch, chairman of the FCC. Parallel management and technical sessions will constitute a comprehensive run-down on topics that are stirring the industry deeply today. Among the management sessions are reports on the "new" CATV from the management view, the financial view, the regulatory view, etc., with panels of experts.

Technical sessions will cover program origination, two-way system experience, multichannel microwave distribution, and many others. The exhibit of CATV equipment by manufacturers will be larger than ever, reflecting the general feeling that cable stands on the edge of at least a moderate boom.



Theta-Com of California will demonstrate live at NCTA a complete two-way CATV system shown in simplified block diagram above. It will incorporate a SRS subscriber-response system and a two-way multi-channel AML microwave link operating in conjunction with a 16-amplifier cascade of XR-2 equipment and Phoenixian coaxial and drop cable provided by its newly acquired CATV Division (formerly Kaiser CATV).

Longer Life for an Old Timer

Introduced in 1947, the EIMAC 4-400A quickly became the mainstay for the majority of broadcast, shortwave and FM transmitters. Still popular today, this power tetrode design is now available as the improved long-life 4-400C.

Get an EIMAC 4-400C — the new generation tetrode specifically designed for long-life, high-performance broadcast and FM service. This premium quality tetrode is directly interchangeable with the 4-400A in existing equipment and is recommended for new equipment design.

The EIMAC 4-400C features a low temperature filament structure which retains its initial high level of electron emission for an extended period of time, greatly reducing frequency of tube replacement. This improved filament structure, plus strict processing and quality control, combines with improved current division and low drive requirements to provide a high-quality, long-life product.

Reduce down-time and replacement cost with the EIMAC 4-400C when you re-tube. And use this improved tetrode in your new equipment design. With a maximum plate dissipation of 400 watts, the EIMAC 4-400C provides long-life and consistent performance as an amplifier, oscillator or modulator. Another example of EIMAC's continuing program of quality, reliability and service.

For further information, contact EIMAC, Division of Varian, 301 Industrial Way, San Carlos, Calif. 94070. Or any of the more than 30 Varian/EIMAC Electron Tube and Device Group Sales Offices throughout the world.



That compares with 427 clients and \$1.7 billion in 1970. Of the 1971 advertisers, 48 were new to the medium, and they represented a wide spectrum of products, indicating a continuing commitment to television throughout the business community.

Cable Scripts Tell How Law Works in Community

A series of ten scripts designed expressly for half-hour cable shows, "This Is Your Law," has been developed by the Communications Library, 1535 Francisco Street, San Francisco. Costing \$2.50 each, the scripts are adaptable to local variations in the law, and give a layman's view of the law on hair, dress, family, money, credit, drugs, and many other topics.

Massachusetts Stations Unfair, Says United Church

A comprehensive report has been issued by the Office of Communication of the United Church of Christ charging many Massachusetts television stations with discrimination against blacks and women in hiring personnel. The report has been forwarded to the FCC, along with a letter signed by that formidable crusader Dr. Everett Parker, in which he "requests" that the Commission make an inquiry into the situation, with all Massachusetts license renewals deferred in the meantime! Dr. Parker has proved over and over that we had better take him seriously, but on this particular request his chances seem remote.

Andersen Sets Up Subsidiary To Make Data, CATV Equip

Optical Communications, Inc. of Orlando, Florida, is a new subsidiary of Andersen Laboratories, Bloomfield, Connecticut. An announcement by the parent company says that Optical Communications will develop and sell short-haul communications systems and other devices using related technology. First products will be laser diode/LED links for the common carriers, to be followed by video links for the CATV and broadcast industries. Principals are Francis E. Baker, Jr., chairman; Elmer Dahl, secretary; Warren A. Birge, president and general manager; Rich-

ard Wangler, vice president for engineering

Cable Dynamics, New Cable Engineering Firm

Cable Dynamics, Inc. of Burlingame, California, is a new engineering service corporation which will supply technical advice and consultation to CATV firms. Principals are Joe E. Hale, most recently technical director of Western Communications, owner and operator of numerous cable systems in California; and Robert L. Hammett, Edward Edison and Lawrence W. Templeton, who were founders and sole partners of the consulting firm of Hammett and Edison, which has had numerous CATV consulting jobs for city governments, cable systems, and equipment manufacturers. An early assignment for Cable Dynamics is complete engineering responsibility for design, contractor selection, and supervision of construction for Buckeye Cablevision, to build a system in Toledo, Ohio.

MST Says FCC Proposals on Land Mobile EP Are Faulty

The Association of Maximum Service Telecasters has filed reply comments with the FCC on a Second Further Notice of Proposed Rule Making, Docket No. 18261, which concerns the opening of land mobile channels in the 470-512 MHz UHF television band. The FCC has proposed allowing land mobile operators to use antenna heights above 500 feet, with certain reductions in ERP to protect television stations. MST agrees with the proposal in general, but states that the reductions specified underestimate the field strength from high antennas. MST asks that the rule be amended to incorporate a universal power reduction curve like that used in the Domestic Public Land Mobile Radio Services.

Univamp To Make Miniature CATV Amplifiers, Accessories

A new firm, UnivAmp of Bisbee, Arizona, announced plans to make and market modular, miniaturized CATV amplifiers and accessories, aiming for prices at a fraction of the present "normal" level. Principals of the firm are Donn G. Nel-

son, president; Frank Kovacs, vice president; Nick Pavlovich, secretary; and W. A. Janssen, treasurer.

NAB Active on Cable Copyrights, Other Issues

The National Association of Broadcasters recently defined strong stands on a number of important public issues.

On CATV copyright rules, NAB pledged full support for legislation that embraces all applicable provisions of the cable-broadcast "compromise," in a letter to the Senate Subcommittee on Patents, Trademarks, and Copyrights. Among the provisions supported was the exemption from copyright liability of independently-owned systems now in existence with less than 3500 subscribers. In another action, NAB filed a brief with the FCC pointing out that broadcasters had consistently been held by the courts to be *not* common carriers, so they do *not* have to supply air time to all groups petitioning for access. And James H. Hulbert, executive vice president, told a broadcasting symposium at Cornell University that recent attacks on broadcast advertising were striking at the very heart of broadcasting as we know it.

NAB Attacks Violence in TV Programming, Disc Payola

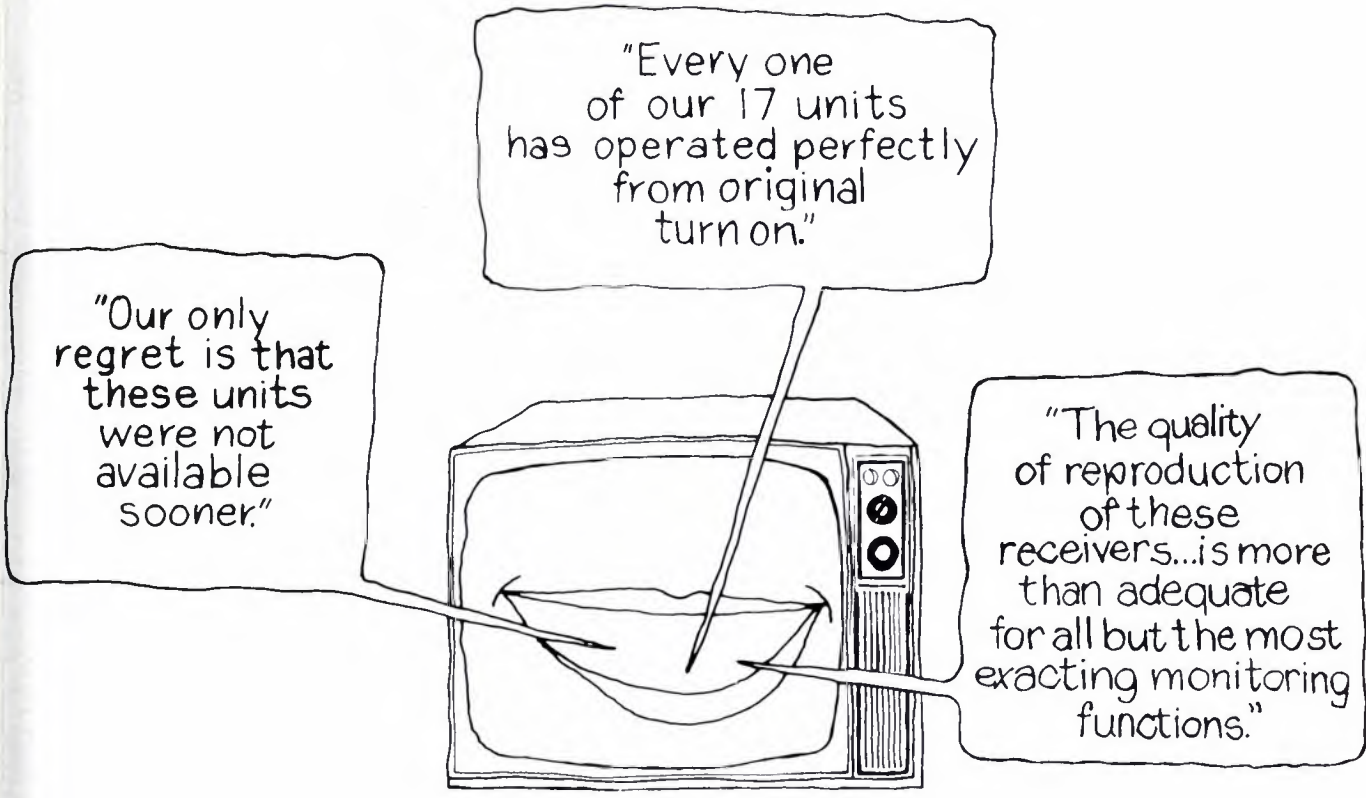
Two other subjects on which the National Association of Broadcasters took strong stands were excessive violence in TV programming, and pay-offs by recording companies to disc jockeys, the perennially recurrent "paylola."

On violence, NAB President Vincent T. Wasilewski said: "The creators and schedulers of programs have a particular responsibility to take a harder than ever look at the manner in which violence is presented. Violence which could reasonably be argued as excessive or gratuitous can and must be avoided." He pointed out that the alternative is likely to be deep government regulation of television programming.

The statement on payola was in response to claims by columnist Jack Anderson that pay-offs to disc jockeys are again rampant. Wasilewski said: "We abhor the practice described . . . If there has been a recurrence, all broadcasters should join together to eliminate such practices . . ."

COLOR MONITORING FOR UNDER \$400 ...AND THE QUALITY SPEAKS FOR ITSELF!

Listen to what Otto Claus, Chief Engineer, WBAL-TV, Baltimore, says about general purpose monitoring with RCA'S low-cost commercial color receiver:



Unlike color sets intended for home use, this receiver is equipped to accept RF or bridged direct video and audio line feed without the need for costly adaptors. For under \$400, you get every non-critical monitoring function you can ask for — picture, sound, live or tape, color or monochrome. It's especially suitable for monitoring needs backstage, for the band, for the audience, and similar applications.

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Circle 105 on Reader Service Card

KIOI Tells FCC Four-Channel Is Compatible

KIOI, San Francisco, has advised the FCC it will begin four-channel broadcasting using the Doreen Quadracast system on May 1 unless the FCC says it will be in violation of its license.

Although KIOI has earlier petitioned for a rule-making to permit a baseband spectrum of 0-95 KHz for quadrasonic broadcasting, it is now asserting a rule change is not necessary since no more interference is produced by quadrasonic than by stereo. Actually, the interference is less, Gabbert says. Station coverage will not suffer; suppression of the 38KHz and 76 KHz subscribers (inherent in the Doreen system) causes less deterioration of signal than does SCA or normal stereo broadcasting which does not suppress the carrier.

What the FCC reaction will be is not known as *BM/E* goes to press. The Commission has a number of filings before it, including another on a discrete four-channel method filed by General Electric in April.

Oak Will Finance Terminal Equipment Purchases

The CATV Division of Oak Electro/Netics announced that it was establishing a financing program to help its CATV customers buy new terminal equipment for system expansion. Carl Bradshaw, president of the CATV Division, noted that estimates put CATV capital needs at around \$1 billion a year for the next decade. "We saw both a need and an opportunity," he said. "Our service will not only help our customers . . . but will also provide the general public with excellent cable television much sooner than might otherwise have been possible."

Harvard Prof Sees Chaos in Ad "Rebuttals"

The FCC policy of requiring free rebuttal time for critics of "controversial" advertisements, under the Fairness Doctrine, is a likely road to chaos, writes Stephen A. Greyser, associate professor of the Harvard Business School, in the *Harvard Business Review*. "Almost any

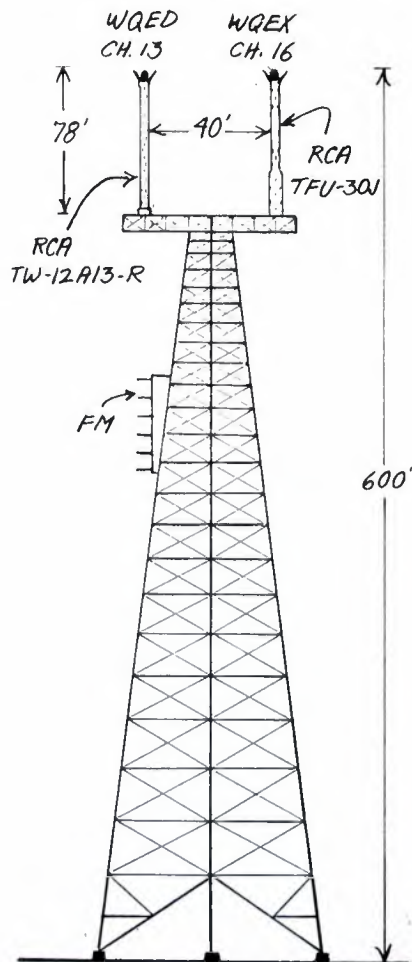
product could be considered dangerous or controversial by some critics," he notes, adding that there is a real need for advance guidelines for advertisers so they can avoid this kind of trouble. But he says advertisers must in any case learn to live "in a world of more attention, more criticism, and more regulation."

Rahall Communications Buys Stations from Time-Life

N. Joe Rahall, chairman of Rahall Communications Corp., and Barry Zorthian, president of Time-Life Broadcast, Inc., jointly announced that Time-Life had sold to Rahall stations WFBM-AM, WFBM-FM, WFBM-Muzak, and Sound Systems Inc., all in Indianapolis, Indiana. The price was \$3,050,000 plus an unannounced sum for certain inventory items. The sale is subject to FCC approval.

First T-Bar Antenna

Pittsburgh's two educational TV stations, WQED and WQEX, have ordered a half-million dollar tower and antenna system which will employ a unique T-bar structure (see diagram). Rather than stack anten-



nas above one another—as the stations presently do—the new installation will permit greater ease of maintenance. In addition, each station's antenna will be approximately the same height above ground.

WQED, which broadcasts general educational programming on channel 13, will use an RCA traveling wave antenna. WQEX, which uses channel 16 for in-school and other educational programming, will use an RCA pylon antenna.

NET Gets Ampex High-Speed Video Duplicator

According to an announcement of NET Television, Inc., Ann Arbor, Michigan, that firm received in late October the first Ampex ADRL-150-5 high-speed video-tape duplicator. It will be used in the firm's extensive duplicating service for broadcasters, industry, and education.

GE Expanding CCTV Dealer Net

General Electric's Visual Communication Products Operation, with headquarters in Syracuse, N.Y., is currently looking for additional franchised dealers across the country to sell and service GE's CCTV products, according to R. F. Tufts, manager. "We view the closed-circuit arena as a real growth opportunity and we are gearing up to perpetuate our quality and product leadership position," Tufts said.

Non-Profit Group Pleads For Waterbury Cable Rights

The New Samaritan Corporation, a non-profit Connecticut group affiliated with the United Church of Christ, filed a petition with the Connecticut Public Utilities Commission asking for revocation of a certificate for a Waterbury cable system held by Waterbury Community Antenna Inc., and for the award of the certificate to the New Samaritan Corporation. The petition says that Waterbury Community Antenna has held the certificate for five years without starting construction, whereas Connecticut law requires construction to begin within two years; and that certificate has been sold to another corporation (Sammons Communications, Inc.) without approval of the Commission, another illegal act. New Samaritan has promised to

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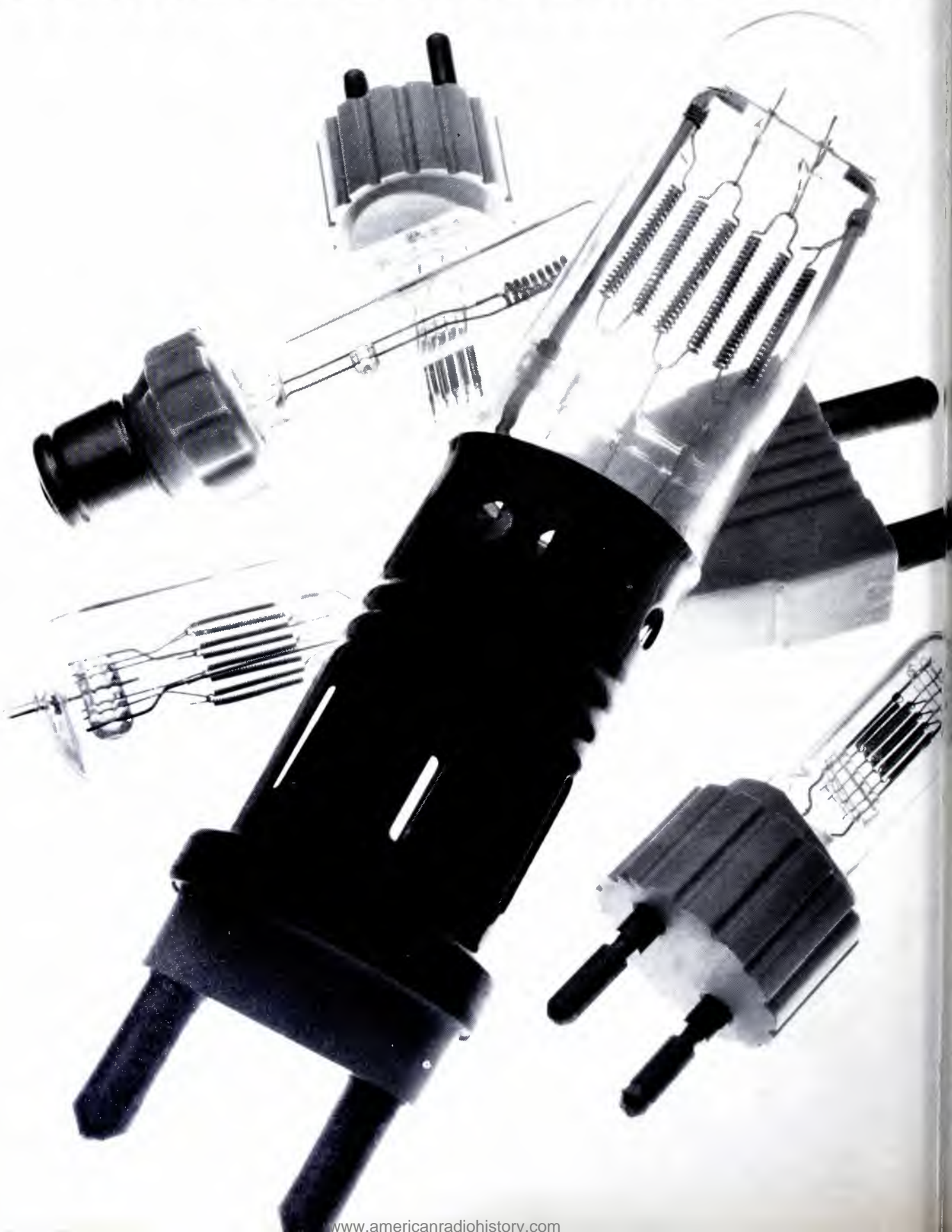
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So after we came up with our skinny, little tungsten-halogen lamps, the first thing we had to do was set them up on big, fat bases so that they'd fit the old sockets.

Which meant developing a complete line of Substitution Lamps. (You see some of them at the left.)

But soon new fixtures arrived on the

scene. These took full advantage of the inherent small size of Sylvania tungsten-halogen lamps.

(Which, by the way, outlast the fat incandescents about 3-to-1, don't blacken and lose brightness with age, and don't fall off in color temperature.)

For the new fixtures, we developed a complete new Standard Line of tungsten-halogen lamps, like the ones on the right.

Whenever studios replace their old fixtures with new ones, they can substitute

our new lamps for our Substitutes.

Which is OK with us.

Because both of these lines are so much better than the old lamps, that no matter which our customers use, we feel we've done them a world of good.

And there's just no substitute for that.

We have a brochure on each line. For your copies, write to: Sylvania Lighting Center, Danvers, Massachusetts 01923.

GTE SYLVANIA

INTERPRETING THE **FCC** RULES & REGULATIONS

New Cable Rules: Part II Operating Requirements, Non-Broadcast Channels and Technical Standards

Last month *Interpreting the FCC Rules* analyzed that portion of the Commission's new cable rules dealing with signal carriage. *The Cable Television Report and Order* (FCC 72-108, in Dockets 18397, et al.) covers a wide range of issues beyond signal importation, including 1) operating requirements, 2) use of and access to non-broadcast CATV channels, and 3) technical standards. This month's column will conclude examination of the new rules with a particular emphasis on the aforementioned three areas.

Operating Requirements

Operating requirements are spelled out for both existing and new cable licensees. *New* cable systems must, before commencing operations, file with the Commission an application for a certificate of compliance. Information contained therein must include:

- 1) The applicants name and address;
- 2) The name of the community it plans to serve and starting date of proposed service;
- 3) A list of broadcast stations expected to be carried. **Note:** Stations to be carried as "substituted" programming (i.e., those stations carried in lieu of regularly carried independents during times when the programming of same is protected by program exclusivity rules) need not be listed;
- 4) A statement of proposed use of microwave to import any signals;
- 5) A copy of revised FCC Form 325 "Annual Report Of Cable Television Systems" which requires (a) ownership data, including all holdings in other CATV systems, and/or other communications media and/or busi-

nesses in which the cable owner has a "substantial interest," (b) statistical data concerning all CATV originations and (c) statistical data re all channel services and advertising;

6) A copy of the franchise, license, permit or certificate granted by the local authority. **Note:** Once a system is certified by the Commission, it need not file numbers 5, above, and 6 (FCC Form 325 and franchise copy) pursuant to an application for a "new" certificate to add local or distant signals;

7) A statement demonstrating that the system's proposal complies with the cable television rules, including, in particular, compliance with (a) signal carriage and exclusivity regulations, (b) rules relating to access to and use of non-broadcast channels and (c) technical standards.

Separate applications for certificates of compliance must be filed for *each* community served by the cable system. However, information pertaining to a number of communities need not be refiled separately for each community, but may be incorporated by reference. Attendant to its filing, the system operator must notify (a) the local franchising authority, (b) all local TVs, (c) the superintendent of schools, and (d) all local educational authorities of such application to the Commission. The Commission will issue a public notice on all applications and interested parties will be permitted 30 days to submit objections. If objections are raised, restrictions on *otherwise permitted* signals will be imposed on the cable operator if the challenger (e.g., the station operator) can sustain his very considerable burden of showing clearly (a) that "the proposed service is not consistent with the orderly integration of cable television service into the national commu-

continued on page 16

For the long-suffering Helical VTR user: 3M's \$1800 PROC/AMP.

We know you've got enough problems already, having to make do with helical recordings made under far from ideal conditions.

Here's something to make you a lot happier with your playbacks: the 3M Mincom P-100 Video Processing Amplifier.

With our proc/amp, you get a second chance at a master tape because you can virtually rebuild all your color and monochrome helical recordings during playback and dubbing.

Just \$1800, the P-100 inserts clean new blanking and timing information to EIA specs. Adjusts burst amplitude and phase, video and chroma level, sync and setup. Cleans up all vertical interval distortion and distorted sync — even industrial — to prevent misclamping by microwave transmitter proc/amps. Cures jittering, jumping, flashing and loss of lock. (An optional plug-in AGC module adjusts

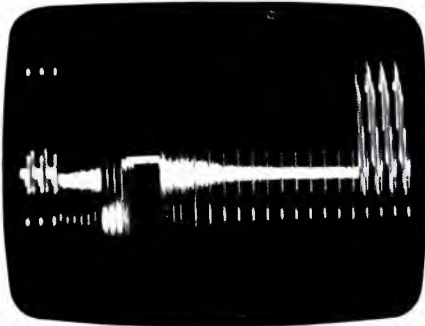
video and chroma level, sync and setup automatically.)

And if that's not enough, you can add our D-100 plug-in dropout compensator to give you a complete video processing system for any color or monochrome helical format. It replaces all lost video information with signals perfectly

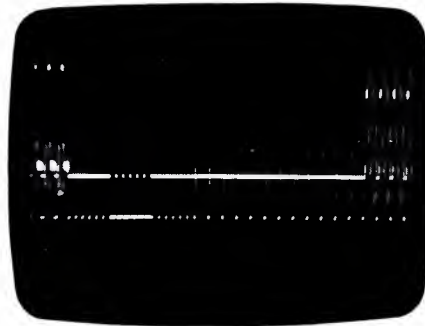
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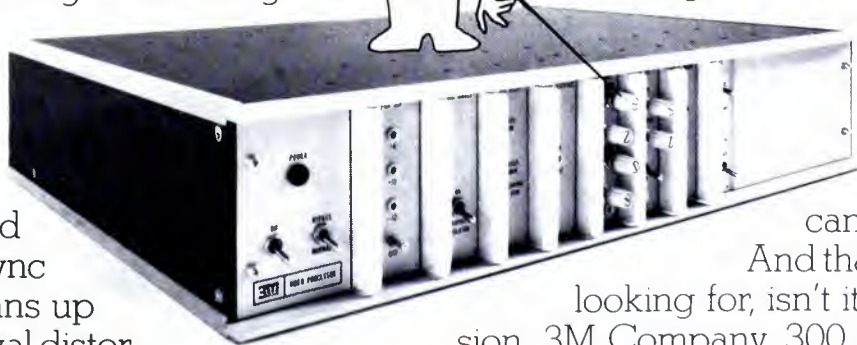
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nications structure," and (b) that "the results would be inimical to the public interest." On the other hand, the cable system may secure special relief and bring in signals *otherwise not permitted* by the rules only upon a "substantial showing," itself.

Existing systems (those operating as of March 31, 1972) need file an application for certification only if the addition of new signals is proposed. Otherwise, applications need not be filed until either (a) the system's current franchise expires, or (b) March 31, 1977, whichever comes first.

Non-Broadcast Channels

A) Franchises

Operating under a "deliberately structured dualism," the Commission indicated that it would set *minimum* standards for franchises from local authorities (e.g., construction deadlines, franchise duration, handling of service complaints and franchise fees); but that matters peculiarly *local* in nature (e.g., character qualifications for franchise applicants, determination of franchise area and subscriber rates) would continue to be in the hands of the local regulating authority. Included in the Commission's "minimum standards" for franchises are the following.

1) Construction deadlines: The Commission requires that construction "commence" within a year "after a certificate of compliance is issued" by the FCC and that the cable facilities should be completed at a rate of 20 percent per annum with some variance permitted because of local conditions.

2) Franchise duration: The Commission admonished that cable franchises generally should *not exceed* 15 years. Whatever the franchise period, the local franchising authority should provide for a renewal period of reasonable duration.

3) Service complaints: Regulations are set forth by the Commission that require a local business office or agent to handle the investigation and resolution of subscriber complaints.

4) Franchise fees: The Commission imposes a three percent ceiling on franchise fees. Any local government which desires to assess a greater fee must meet a difficult, two-pronged test that (a) requires the *government* to show that its fee is "appropriate in light of the local regulatory program," and (b) requires the *franchisee* to "demonstrate that the fee will not interfere with its ability to meet the obligations imposed by the rules."

The three key areas of local jurisdiction (i.e., (a) applicant qualifications, (b) determination of franchise area, and (c) subscriber rates) are subject to Commission standards of "fairness" and "reasonability" only and are, therefore, essentially controlled by the local franchising authority.

B) Use of and Access to Non-Broadcast Channels

The Commission concluded that, despite its intense interest in local programming by CATV systems and despite the present availability of greater channel capacities, it would require a minimum channel-capacity of only 20 channels, and this requirement would pertain solely to systems in the top-100 markets. The Commission also specified

that top-100 market systems must make available, *for non-broadcast use*, one signal for each signal carrying an off-air television station.

As to the *public service* use of non-broadcast channels, the Commission promulgated the following rules. *They are applicable to all top-100 market systems.* Existing CATVs will have five years from the effective date to comply and waiver requests will be considered.

1) Public access: CATV systems will be required to make one public access channel available on a "free," "non-discriminatory," "first come, first served" basis and maintain production facilities for those using same. "Free" means no charge for use of facilities and no charge for production costs unless the program exceeds five minutes in duration. Cable operators will not be permitted any form of censorship, program content control or discrimination on public access channels. Only lotteries, obscene or indecent matter, political spot announcements, and other forms of advertising would be prohibited. (Advertising *would* be permitted on CATV-controlled local channels at "natural breaks." **Note:** If the public user libels someone, the Commission does not believe that the courts will hold the CATV liable because, "it is doubtful that (actual) malice could be imputed to a cable operator who has no control over the given program's content." However, prudence would dictate that CATVs carry insurance for same.

2) Educational access: Cable systems will be required to make available to local educational authorities one designated channel "for instructional programming and other educational purposes."

3) Government access: Cable systems will be further required to dedicate one channel for use by the local government.

4) Leased access: Any "unused channels" on the system shall be made available for lease use. "Unused channels" include, besides the remaining bandwidth, all broadcast channels when "blacked out" by the program exclusivity rules and all education and government access channels not in use. Operators must also adopt rules proscribing the presentation of lotteries, obscene or indecent matter and advertising material not containing sponsorship identification on leased channels, as well as others. Unlike other "access" channels, commercials are permitted on *leased* access channels and may be presented at times other than "natural breaks."

We re-emphasize that only systems in the top-100 markets are required to comply with the rules on non-broadcast services. New systems must comply immediately; existing systems have a five-year grace period. In communities outside the top-100, where access channels are *not* required, the Commission permits *local* authorities to require access services so long as such services (a) are based on the above major market standards, and (b) do not exceed said standards.

Cable systems will further be required to make additional channels available as public demand increases. The Commission's test for defining the point in time when additional channels are necessary is somewhat obscure; i.e., whenever the system lacks sufficient unused channel space "to encourage public participation." This standard will likely be more clearly defined in a later rule-making proceeding.

C) Two-Way Capacity

Cable systems will be required to have a capacity
continued on page 18

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FCC RULES continued from page 16

"for return communications on at least a non-voice basis." The Commission indicated that this requirement did not extend to "two-way capacity for each subscriber," but, rather, its "return communications" standard was designed to meet the existing state-of-the-art and to provide for future two-way communications without time-consuming and costly system rebuilding.

Technical Standards

The Commission adopted a series of minimal technical standards based on its rules proposed June 24, 1970 (Docket 18894). Most contemporary CATVs already more than meet these technical requirements.

The Commission divided all CATV channels into four classes according to use:

- 1) Class I: Channels carrying standard TV signals;
- 2) Class II: Channels carrying CATV-originated programs;
- 3) Class III: Channels carrying non-TV, miscellaneous services, printed messages, etc.;
- 4) Class IV: Channels used for return (two-way communications).

Presently, *the precise technical standards apply to Class I (broadcast carriage) signals only.*

Requirements for (a) performance testing, (b) station lists, and (c) measurement data apply to all systems and are effective March 31, 1972.

A system operator must check *performance* on his system annually by testing each broadcast signal at three widely separated points, including one point at the extremis of the system input. These tests must be kept in a public file for five years. In addition, each system must keep a current *list* of (a) the cable channels it delivers and (b) the stations whose signals are delivered. Finally, *measurement* procedures are recommended to be made under "normal operating conditions." Though not mandatory, these measurements must, nevertheless, be authoritative in nature.

The system operator is held responsible for his system's interference with (a) reception of authorized radio signals, and (b) interference generated by a radio or TV receiver. He is not responsible for "receiver-generated interference;" rather, the operator may suspend service to the subscriber to remedy same.

New technical standards, particularly for Classes II, III and IV, will be the subject of future Commission rule-making.

In addition, the Commission will likely promulgate, in separate proceedings, definitive rules to prohibit 1) undue concentration of control and ownership of CATV, and 2) undesirable cross-ownership between CATV and other media and businesses (such as newspapers). Furthermore, new rulemaking proceedings relating to local governments, manufacture of special TV sets for CATV, standardized accounting for CATVs, and common carrier rules will likely be forthcoming. *Interpreting the FCC Rules* will analyze these myriad, yet related, subjects in future articles.

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MAY 1972

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Wiring Markets 51-100

For Cable TV

Overriding concern is building a system that will handle upstream signals reliably when that time comes. Next worry after that is how to interconnect subsystems.

CALL TEN CHIEF ENGINEERS or executives of MSO's and ask them, "What is the best way to build multi-channel two-way?" and the majority will respond something like this: "Why did you call me? I wish you knew."

A few will reply, "What's the problem? Today's state-of-the-art equipment can handle 27 channels. If we need a converter, we'll add one." This group will claim that two-way is no problem—just add converters and upstream amplifiers.

Others admit that there are a lot of unknowns but will provide no details on how they will tackle them since they say the solution depends entirely on the market. They may build in a particular way in one market, another way in a different market.

A very few will share their full thinking on the matter at this time. We will report on some of these system philosophies in this report.

Last issue, *CM/E* published details provided by Mac Ferguson of TeleVision Communications Inc. on the dual-cable system that is being installed in Akron. In this report, we provide details on a dual trunk, but single feeder, system adopted as something of a standard by Cox Cable Communications Inc. One trunk is downstream only and the other will handle both downstream and upstream signals.

LVO Cable has a two-phase approach which will be used in Tulsa. The basic plant is a 27-channel single cable system, but the city will be overlaid with a second system called the Metro 14-12. The latter overlaid network will accommodate two-way communications and dedicated channels. Malarkey-Taylor was a consultant to LVO in conceiving this approach.

Although we did not seek out equipment manufacturers initially for information in preparing this report, it is clear that two equipment manufacturers, Perrod and EIE, have played a major role in helping MSO's decide how they should go in planning and building future systems. Some of the futuristic systems that will be installed in '72-'73 were first planned out two years ago.

Dual cable all the way is not dead

CM/E began this report suspecting that dual cable—trunks/feeders/housedrops—was yesterday's solution. Dual cable, with an A-B switch, seemed the logical choice in the absence of an inexpensive and reliable converter, but since dual cable didn't really solve the direct pick-up problem, which is ever present in the top markets, it seemed a single

feeder/converter approach was the only real choice. Further, dual cable sounds more expensive. Dual cable shouldn't be dismissed too readily from a cost point of view. And if your system won't become fully loaded with signals for several years yet, you might determine that you can reassign channels for a time to avoid ghosts. A few years from now direct pickup will be less serious as TV sets improve.

The RCA Laboratories at Princeton, New Jersey, recently made what it called a "realistic and objective cost comparison." The conclusions were reported by Dr. Kerns H. Powers, director of communications research, at the First International Cable Television Market (MICAB) Conference. Portions of Dr. Powers' talk follow:

For the analysis, we have assumed a module of a system consisting of one of the trunks fanning out from the headend over an area of approximately five square miles. Subscriber density has been left as a parameter ranging from 500-5000 per square mile typical of the suburban/urban market. The assumed specification is for delivery of 24 channels. For the dual-cable system the standard 12 VHF channels (with an upper frequency of 216 MHz) are applied in each cable; for the single-cable system we assume the use, in addition, of eight midband channels and four superband channels extending the upper frequency limit of 240 MHz. The system layout takes into account the higher cable attenuation (at 240 MHz) as well as the 6 dB worse cross-modulation performance from the use of 24 versus 12 channels. Accordingly, the amplifiers in the single-cable system are assumed to be operated at 3 dB lower amplification and total output level than those in the dual-cable system to provide equal picture quality in both distribution methods. In a well-behaved amplifier, a reduction of output level by 3 dBs results in a reduction of cross-modulation by 6 dBs.

The higher cable attenuation and lower amplifier gain in the single-cable system results in amplifiers being spaced closer together. Our analysis has used trunk amplifier spacing of 2100 feet for the single-cable system and 2700 feet in the case of dual cable.

Unit costs for the amplifiers, power supplies, distribution cable and cable installation were obtained by averaging the prices of typical American suppliers. The dual-cable amplifier unit costs were obtained by applying a factor to the single-cable amplifier costs, that factor varying from 50 percent higher for the lower cost line extender amplifiers to almost 100 percent higher for the more expensive trunk bridging amplifiers that contain automatic gain control. In these amplifiers, the electronics dominate the cost and the electronics are duplicated in the dual amplifiers. On the other hand, in the less expensive amplifiers, the power supply and housing are a more significant fraction of the total cost resulting in the smaller factor. The set-top converter was costed at \$20 per subscriber

WIRING MARKETS 51-100

in the single-cable system and the coaxial switch for the dual-cable was estimated at \$4.00.

When these unit costs were then applied to the approximate system layout over the five-square-mile trunk module and the total investment cost calculated, a rather surprising result occurred for the high subscriber density. At a density of 5000 subscribers per square mile, typical of an urban area, the investment cost was found to be \$71 per subscriber for the single cable system and \$66 for the dual-cable.

At a subscriber density of 500 per square mile, the investment cost was found to be \$220 per subscriber for the single cable and \$222 for dual cable. These figures have some uncertainty in their values for a typical installation, of course, and should not be taken at face value. My purpose is not so much to report a precise cost comparison as it is to dispel the popular notion that dual-cable installations will command a premium over the single cable. This notion is simply not valid.

Now, since there is no significant premium on dual-cable, let me point out certain bonus advantages that a dual-cable installation can offer:

- 1) Because of the higher permissible output level and lower cable attenuation the dual-cable system can actually serve 70 percent greater area per trunk for a given performance level than the wideband single-cable system.
- 2) The dual-cable offers higher system reliability from the coaxial switch over the set-top converter.
- 3) And perhaps this is the most important advantage

of all: By distributing only 12 channels per cable of normal programming, the midband capacity is still available for internal system use and for leased communication services and, of course, these frequencies are not readily accessible to the normal subscribers.

In his analysis, Dr. Powers ignored degradations due to local oscillator radiation, images, and non-linear distortions in the set-top converter that might occur in the single-cable system. Other assumptions implicit in the analysis:

- 1) The systems are constructed for 100 percent penetration of the service area;
- 2) Every trunk-bridging amplifier in the distribution area feeds subscribers;
- 3) Each output from the trunk/bridgers feeds two distribution amplifiers (line extenders) in cascade per feeder line;
- 4) Alternate trunk amplifiers contain AGC;
- 5) A minimum signal level of 3 dBmV (75 ohms) is supplied each subscriber and a minimum isolation of 9 dB is maintained at the subscriber most remote from the trunk/bridger;
- 6) One cable power supply unit serves three amplifiers.

Table I gives the assumed system specifications and Tables II and III give the assumed unit costs derived from prices of typical American equipments meeting the assumed specifications. The costs of certain common items (e.g., headend equipment) are omitted. Table IV summarizes the results of the cost analysis, normalized to a per subscriber investment value.

**Table I
Specifications**

| | Single | Dual |
|-------------------------------|-----------|-----------|
| No. channels/cable | 24 | 12 |
| Bandwidth | 240 MHz | 216 MHz |
| S/N (at end of cascade) | 43 dB | 43 dB |
| Cross-mod (at end of cascade) | -51 dB | -51 dB |
| Noise figure | 12 dB | 12 dB |
| Gain/amplifier | 17 dB | 20 dB |
| Amp Spacing (Trunk) | 2100 ft.* | 2700 ft.* |

* New high-quality "Dynafoam" cable is assumed. This permits up to 35 percent increase in cable spacing over older cable types.

**Table III
Assumed Unit Costs (Uncommon)**

| | Single-Cable | Dual Cable |
|-----------------------|--------------|------------|
| Trunk Amplifier | \$314 | \$470 |
| Trunk Amplifier (AGC) | 365 | 560 |
| Trunk/Bridger | 470 | 880 |
| Trunk/Bridger (AGC) | 515 | 970 |
| Distribution Amp | 290 | 410 |
| Cable Installation | 1800/mi. | 2100/mi. |
| Set-top Converter | 20.00 | — |
| Coaxial Switch | — | 3.50 |

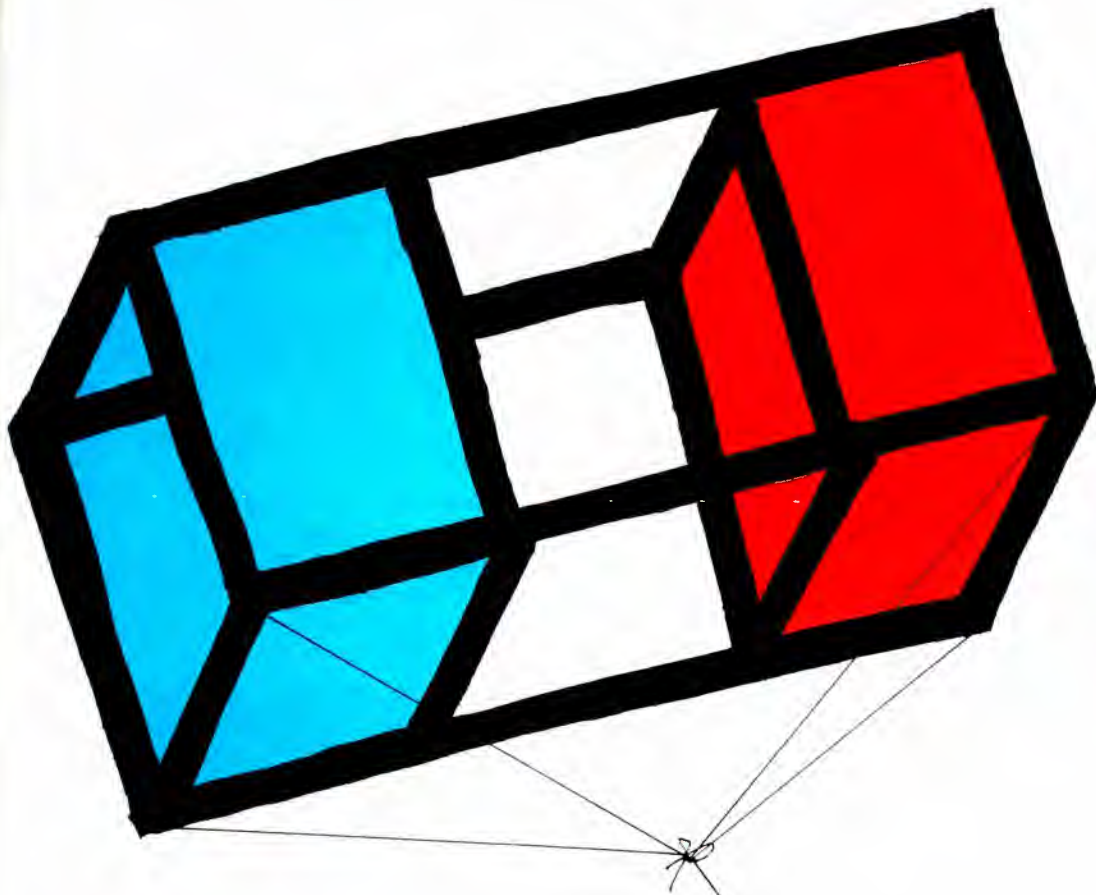
**Table II
Assumed Unit Costs (Common)**

| | |
|-----------------------|-----------|
| Trunk Cable | \$300/Kft |
| Feeder Cable | 140/Kft |
| Drop Cable | 38/Kft |
| Power Supply | 212.60 |
| 4-Way Tap | 11.50 |
| 2-Way Splitter | 17.50 |
| Line Termination | 1.05 |
| Pole Rearrangement | 500/mi |
| Pole Rental (10 year) | 880/mi |

**Table IV
CTV System Costs (\$/Subscriber)
(Excluding Headend and Dead Run)**

| Item | 500 Subscribers/ sq. mi. | | 5000 Subscribers/ sq. mi. | |
|-------------------------------|-----------------------------|---------------|------------------------------|---------------|
| | Single Cable | Dual Cable | Single Cable | Dual Cable |
| Amplifiers and Power Supplies | \$75 | \$63 | \$14 | \$13 |
| Trunk and Feeder Cable* | 24 | 44 | 6 | 11 |
| Passive Components | 4 | 8 | 3 | 6 |
| Cable Installation | 51 | 54 | 14 | 16 |
| Pole Rearrangement | 14 | 13 | 4 | 4 |
| Pole Rental (10 year) | 25 | 22 | 7 | 6 |
| Drop + Balun | 7 | 14 | 3 | 6 |
| Set-Top Converter | 20 | — | 20 | — |
| Coaxial Switch | — | 4 | — | 4 |
| Total | \$220 | \$222 | \$71 | \$66 |

* The increased amplifier spacing permits a slight reduction in the total mil of cable for the dual-cable system.



When they told me I could shoot local programs in black-and-white and show full color, I told them to go fly a kite.

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WIRING MARKETS 51-100

Can one ignore direct pickup? Dr. Powers isn't on the firing line if he makes an error in judgment that will create all kinds of subscriber discontent in the short run, so he takes the long view. The long view is that direct pickup will be no problem with new TV sets because future models will contain coax cable directly to better shielded tuners. Adding shielding will cost only pennies during manufacture and, although TV set manufacturers in the past have always maintained a few pennies crucial to profitability, times have changed and there is now a marketing advantage to be gained if a set can be advertised as including extra shielding. For this same reason, there will be, Dr. Powers feels, improvements in intermediate skirt selectivity and additional traps will be added so that adjacent channels can be received. Dr. Powers told *CM/E* that RCA TV sets will include extra shielding next year. We didn't ask for confirmation, but we suspect Zenith and Magnavox and others are headed this way. It may take five years before most sets will be direct-pickup immune, but the problem should become less severe.

There are cable operators who are not put off by direct pickup problems. Lyle Kneeskern, chief engineer for Continental Cablevision, doesn't feel it is a major factor in Stockton, California. The plan for Stockton is dual cable with an A-B switch.

Toledo, Ohio, will be built using dual cable. Buckeye Cablevision, franchise holder for Toledo, selected a new firm, Cable Dynamics of Burlingame, California, as its system consultant. Cable Dynamics' president is Joe Hale, formerly of Western Communications of South San Francisco. Hale has lived with direct pickup problems all his life. His first objective is to make the system immune from pickup by care in selecting connectors, making splices, etc. (And he will modify a customer's set, in extreme cases.) We note from the technical specifications written for Buckeye Cablevision—the system will be put out for bid—that Cable Dynamics reserves the right to unilaterally select the connectors it thinks best suited to the system. They must be "so designed to have a proven suitability for use in high ambient signal area," the spec declares.

The amplifier in the Buckeye Cablevision spec must be capable of 54-240 MHz band so the cost may not be as low as that used in Powers' RCA calculation. The specs for this system, in general, exceed the new FCC requirements. Whereas the FCC spec relaxed its requirements in some areas, the Buckeye Cablevision spec calls for the more demanding requirements included in the FCC proposals; e.g., subscriber terminal isolation should not be less than 30 dB. (Requirements for bi-directional equipment, if used, state envelope delay should be not more than 200 nsec in the longest cascade—referenced to 3.58 MHz above the visual carrier frequency for the channel of interest.)

Dual trunk, single feeder will be popular

A number of system operators have indicated that

they will build single cable systems with possibly a dual trunk. Cox Cable Communications will definitely use a dual trunk and Richard C. Hickman, vice president, engineering, Cox Cable Development Company, has a number of very good reasons for this decision. The Cox plan is shown in Fig. 1. Cable A trunk is one-way only with a bandpass of 54 to 260 MHz; Cable A feeder has provision for 5-30 MHz return signal. The returning 25 MHz is routed through a filter and directional coupler into Cable B trunk. Cable B trunk is two-way with 150-260 MHz forward and 5-108 MHz reverse. The crossover filter is a high-frequency type (in the midband) which means very little distortion is added compared to the low frequency filter in the feeder lines of Cable A.

Installation of a dual trunk is certainly more expensive than a single cable system, but Hickman is convinced a single cable two-way system is not going to work when the need arises. Hickman lists a number of potential problem areas that could arise on a single cable two-way system:

- a) How to handle automatic gain control.
- b) Spurious signals arising in the upstream path that could reflect into the forward or downstream system. The reverse system looks like a large drain field connected to the trunk system. There are expected to be high ambient signals in the 5-50 MHz region and unknown spurious signals from home attachments could cause severe problems.
- c) If the FCC implements standards, as they say they will, on envelope delay, differential phase and differential gain, one may find it difficult to prevent excesses especially near filter cutoff frequencies in the sub-channel band and the lower VHF channel frequencies. The longer the cascade (which is the case with single cable), the greater the distortion.
- d) Filter design trade-offs may increase amplitude gain ripple or cause closed-loop feedback.
- e) Maintenance problems associated with the upstream may interrupt service on the forward trunk system if there is a limit of 25 MHz bandwidth for return signals.

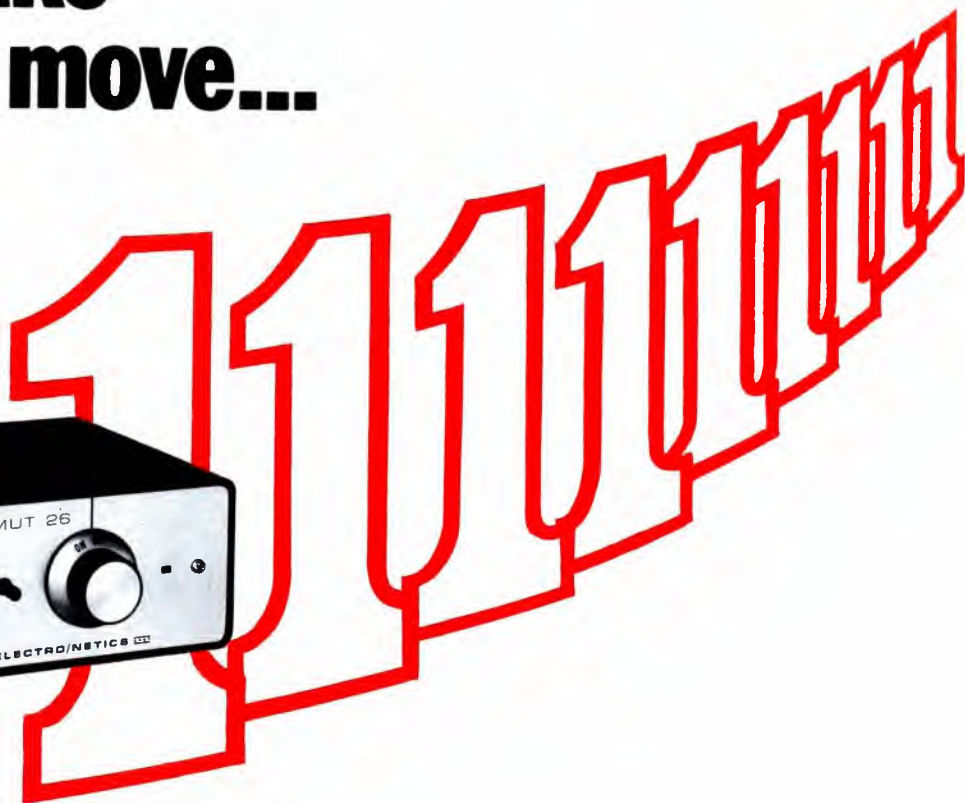
Anticipating that some or all of these problems would arise, Cox decided it could not afford to run the risk of interference with its downstream signal. After all this is the financial base on which the whole cable communication system is based.

Cox made some sample layouts with various dual cable possibilities and determined what their problems with balancing levels might be. They settled on the dual trunk single feeder compromise. Some of the advantages are:

- Cable A trunk, being one-way only, is free of filter distortions and is immune from cross-talk.
- By restricting two-way service to feeder line only, envelope delay and phase and gain distortion, caused by the low cutoff frequencies, are minimum because, at most, no more than six filters will be cascaded.
- Cable B has a great deal of capability and could be used on a common carrier basis in two directions for schools, hospitals, industrial, governmental, or

continued on page CM/E-10

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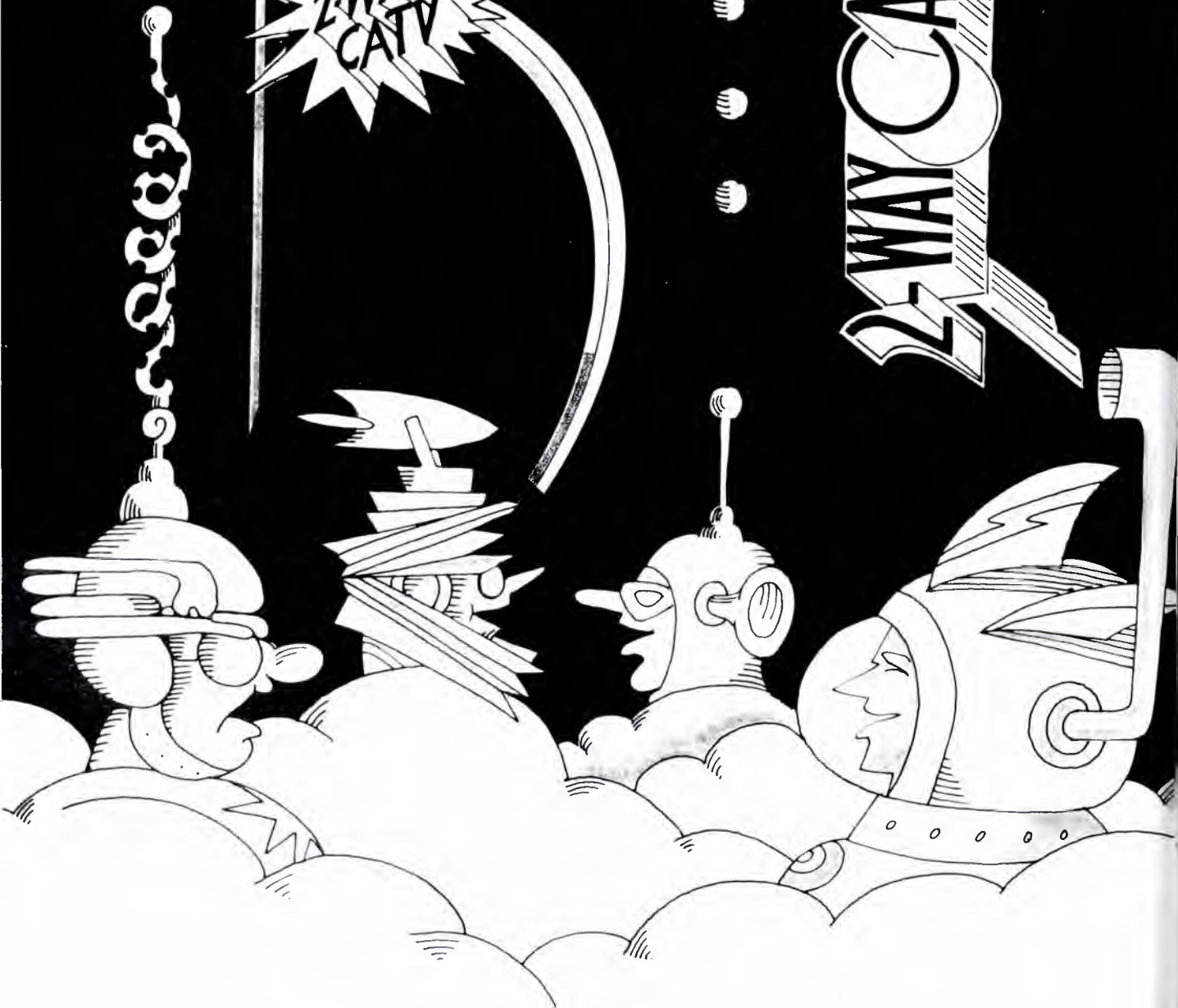
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WIRING MARKETS 51-100

other use. The high frequency cross-over filters in Cable B cause less distortion than the low-frequency type used in Cable A feeders.

- Automatic gain control for return signals can be handled in Cable B.
- Maintenance of the reverse system doesn't involve trunk Cable A.

The system just described has capability for growth and it can be built today. It has a good chance of working and it can be built with reasonable economy.

Cox will hang the trunk amplifiers for Cable A and Cable B back-to-back. This will simplify installation. Cost of this system is somewhere between \$6000 and \$6200 per mile not counting any modules in the return-trunk amplifiers which can be added as needed. This system is being installed by Cox in the Davenport-Moline market.

Another advocate of the dual trunk single feeder approach is Tom Smith, general manager of the Ca-

ble Communications Division of Scientific-Atlanta. Smith is highly conscious of two-way problems because he will be testing two-way communications originating from subscriber homes. Smith points out that 75 percent of most cable plant is the feeder system; hence use of a single cable feeder is less expensive.

Smith emphasizes that any return signal from a normal house drop passes only through the diplexing (crossover) filter associated with the line extenders and the bridger amplifier. Thus usually no more than four filters are in the reverse path and this means filter requirements can be more easily met. Smith's system diagram is similar to Cox's except that he sees the possibility of the second trunk being upstream only. A directional tap can be located in the return trunk for customers, such as schools, that need to return large bandwidths. Such signals would not pass through any diplexing filters.

Smith prefers a wide downstream bandwidth—50-300 MHz. Since the upstream bandwidth is only 5-108 MHz, smaller trunk cable could be used and fewer amplifiers required.

Fig. 1. Dual trunk single-feeder system adopted by Cox Cable Communications. Two separate back-to-back amplifier housings are used.

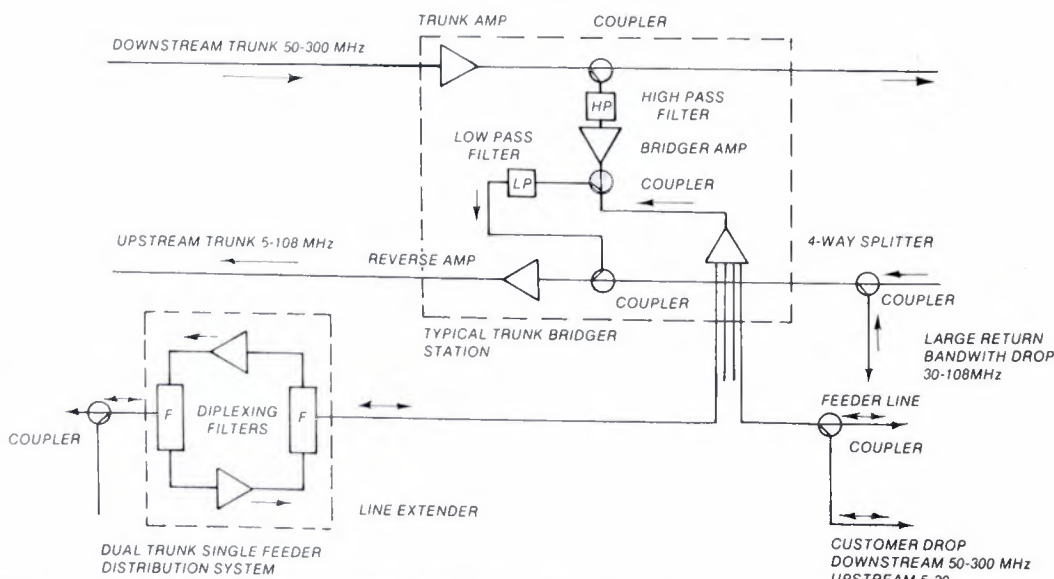
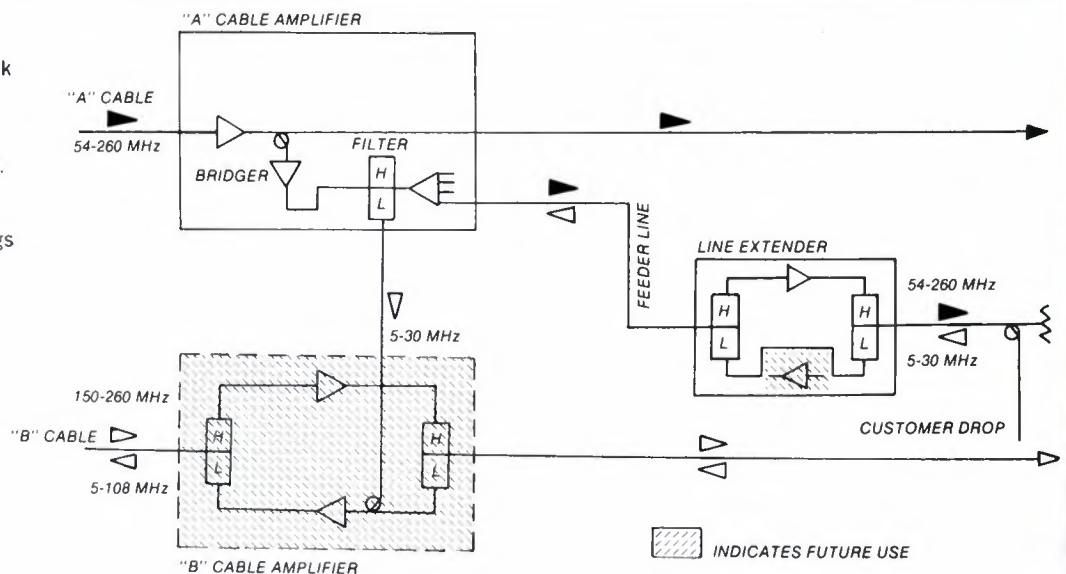


Fig. 2. Dual trunk single feeder system favored by Scientific-Atlanta reserves second trunk cable for upstream only.

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WIRING MARKETS 51-100

Hedging one's decision: single cable now with quick conversion to dual

Scientific-Atlanta will soon find out whether a single cable system will work or whether the dual reverse trunk is necessary since the company will be doing some two-way experiments on the LVO Cable Inc. system now under construction in Carpentersville and Crystal Lake, Illinois. The 27-channel single-cable system will provide the capability of carrying all foreseeable future signals at the lowest possible initial investment. It will be push-pull and bi-directional, utilizing bi-directional tapping devices, splitters and directional couplers. All amplifier housings and line extenders will accommodate bi-directional modules. Filters and reverse amplifiers will be included as needed. Initially the two-way test at Crystal Lake will involve only a few homes.

The basic distribution system, however, will be overlaid in part by a Metro 14-12 trunk (14 signals out; 12 return) which will serve key points of the community. These key points can return 12 channels of local origination signals. Although this return is envisioned to be coming from schools or institutional customers, rather than individual homes, the 14-12 system could be converted into a dual trunk basic system to accommodate upstream signals from the home. Dual feeder could then be added, depending on expanded response and interaction signals from homes. LVO says a third trunk to key points could be added also if the nature of the 14-12 system (as a dedicated service) should be maintained. If this sounds like hedging, it probably is—LVO feels it has the option to get around its single-cable system if it proves inadequate.

At Orlando, dual feeders

American Television and Communications Corp. will try two-way from some 25 homes within the coming two months. This is expected to expand to 1000 homes before the year is out. A central computer will program various services, including alarms (fire and burglar), opinion polling, in-home merchandising, subscription programming and automatic connect/disconnect. The equipment is all EIE designed. EIE systems are capable of single cable or dual cable distribution. ATC has elected to go with a dual system including dual feeders. This decision was made *after* some experimentation with two-way return on a single cable. The EIE return band is 10-30 MHz. Austin Coryell, technical director for ATC at Orlando, reports that the experiments revealed a considerable amount of RF pickup in this band. The RF ambient in Orlando is probably higher than other regions and it is enough to produce interference. ATC also experienced some second harmonic problems and crosstalk. These problems may eventually be licked, but for the upcoming large scale test, ATC wants to avoid any interference or maintenance problems that might result from the reverse communications. The second cable

will be capable of two-way communication, but in the upcoming demonstration will handle reverse signals primarily. Those homes equipped with subscriber response terminals will have dual drops.

EIE maintains that two-way, both video and data, can be handled on a single cable, but feels dual cable is usually necessary from a video-capacity point of view. If you have more than 12 channels to carry, a dual cable system with an A-B switch is economically sound.

Interconnecting the subsystems: Supertrunk or microwave?

Large markets call for hub systems; i.e., several subsystems fed from a central distribution point—simply to limit the number of amplifiers in cascade. In subdividing a city, the operator takes into account what are natural districts or areas. These may be legal political subdivisions, areas defined by school districts, or neighborhoods with common civic, cultural or social interests. If each subdivision is distinct enough, it may require its own special local programming. Thus it is desirable that some of the public channels or dedicated channels be electrically isolated from other parts of the system. But how do you feed the signals from the headend (or several headends) to the subsystems? Via a supertrunk, which may be one-inch diameter cable of the highest quality? Or local distribution via microwave? Determinants are cost, quality and reliability. The answer may come out different for different cities.

In some situations, natural terrain pushes the operator to microwave. That's the situation Cox Cable Communications is in in the Quint City area of Davenport and Bettendorf, Iowa, and Moline, East Moline and Rockford, Illinois. The Mississippi River separates the franchise area and spanning it with cable is the least attractive solution. Thus one goes with completely separate headends or interconnects different areas with microwave. Cox chose microwave and will use Theta-Com's AML system.

Other systems operators who have a choice are deciding not to go with microwave simply because they don't want to be a pioneer in a technology which is new. They anticipate some as yet unforeseen problems and want somebody else to iron out difficulties. To some extent, this caution stems from unfamiliarity with any microwave equipment. System engineers who are well-versed in microwave have confidence that such systems will present no problems.

Some operators who might feel microwave is a logical choice have been put off by the controversy, charges and counter-charges, that have been raised over amplitude modulation versus frequency modulation. There are theoretical limits to each—reserve power for AML, possible cross-modulation for FM, are those most often raised. Whether or not these limits will affect day-to-day operation depends on one's own investigation. If the engineer is not sure of himself, he can be scared by doubts raised by competitive salesmen. What questions should be asked, what facts to investigate regarding microwave, is the theme of a special report on this subject in *CM/E*

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next month. One cannot ignore microwave because it may cost less than trunk.

If the operator decides not to use microwave, he is still in a quandry over the form of super trunk, how to multiplex signals, etc. If you can't get away with a single central distribution center, how do you interconnect one spoke or subsystem to another? Will you put two-way signals on the supertrunk or run a separate one-way cable for locally-originated signals—perhaps a small-diameter cable?

We've already discussed the reasons for separate cables; A forward and B forward-and-reverse or reverse only. There is another possibility and that is a third cable for reverse (Cable B can be reserved for forward use only). Some systems are laying this third cable in.

Others are tending to favor a bundle of discrete trunks (3, 4, 5 or 6 cables—shades of Discade) between spokes. This approach buys the insurance that any contingency can be handled with minimum future disruption.

Some systems are speculating that the carrier frequency on these dedicated trunks can be below 54 MHz, thus reducing attenuation losses and the number of amplifiers needed.

Continental Cablevision is considering this approach if they get the franchise to cable the entire county of San Joaquin in addition to the city of Stockton.

The band of 5 to 50 MHz will be used by Orange Cablevision to expand services in the Orlando area. One headend site will feed the super trunk cable which serves a hub distribution point every 6 to 8 miles. Austin Coryell is planning his hub sites so that they are on a straight line. Thus, if he uses local distribution microwave, he can hit a series of hub points with one transmitter antenna dish.

To serve present franchises, Orange Cablevision plans to put three hubs on a super trunk. A franchise for the entire county is being sought (1000 square miles). The final distribution plan will depend on the outcome of this application. It may be super trunk, microwave, or both.

The first three areas on this link will get all signals from the one headend site. A reverse cable with amplifiers every 1.5 miles feeds signals from the local origination studio to the headend.

Regardless of what the final distribution area turns out to be, the number of amplifiers cascaded including the super trunk would never exceed 25. Typically the cascade will not run more than 12. On any feeder, the Coryell limit is 12.

The 5 to 50 MHz carrier equipment to be used by Orange Cablevision is the Jerrold SLA equipment. Ameco has a similar 20-40 MHz system. Coryell plans individual channel processors, placing a guard band between channels. He is interested in a converter that would not process separately audio and video carriers.

Coverage problems pose difficulties

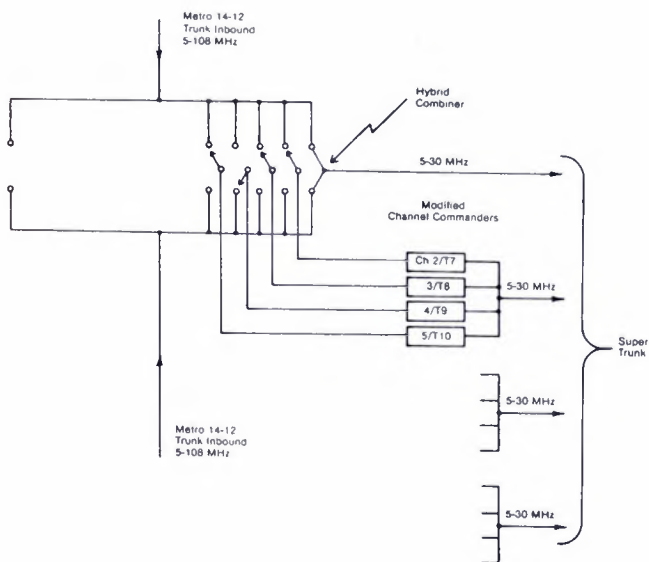
If a large number of channels are carried on a single cable, the problem of maintaining adequate quality is serious if many amplifiers are cascaded. Assuming a loss of 1 dB per 100 feet (3/4-in. cable and a frequency of 216 MHz) and 22 dB gain amplifiers, about 2.5 amplifiers per mile are required. However, because of power splitters, intermediate bridger amplifiers, etc., a closer spacing by about 10 percent is required.

Moreover, if the band is extended to 270 MHz, instead of 216 MHz, attenuation is 16 percent higher calling for more amplifiers.

The Rand study, *Cable Communications in the Dayton Miami Valley: Basic Report*, stated that cable engineers it contacted felt that signal quality is appreciably impaired when amplifiers exceed 15 to 25 in cascade. Twenty was a figure often cited to CM/E. Although careful adjustment of signal level throughout the system can largely eliminate these effects for many viewers, there is a decrease in system margin and an increase in cost as field technician man-hours mount. Cable systems strung out over 15 or 20 miles might adequately serve captive markets, but not metropolitan ones. Something in the order of five to six miles seems an urban limit; hence the need for hub systems or microwave links.


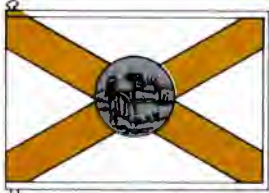


What to carry in major markets—to and from the home


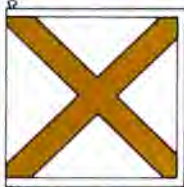

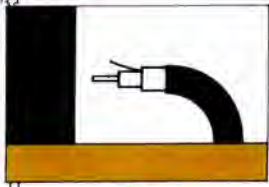
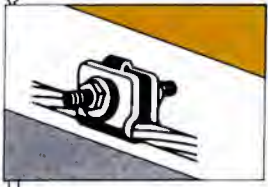


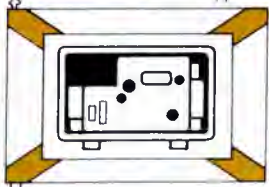
Although the new FCC rules permit cable operators to go into major markets and to import distant signals, success is not guaranteed unless that particular market was previously underserved.



Possible method for converting upstream signals to low band for transmission or super trunk.

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WIRING MARKETS 51-100

Because of leapfrogging restrictions, the independent station or stations that can be brought into some markets are not all that attractive. The independent U functioning in a small market relies on sports, old syndicated features and old movies. Sports programs may sell the man of the house, and kids will watch old syndicated shows, but how many subscribers can you sell on the basis of a baby-sitting channel? Probably not many unless it is part of a larger package. Until more is known about what will motivate a customer, the tendency will be to offer a variety of items. The programming plan for Tulsa Cable Television provides a good example. The head of Tulsa Cable Television (a joint venture with LVO Cable Inc.) is William Swanson, a former TV broadcaster. He has no delusions about any given program being magic so he is making full use of cable channel capacity to offer a smorgasbord. He has a channel for every taste—personalized TV, as Swanson prefers to call it. There is a feature movie channel, a news service channel (which will get inputs from a mobile van), a general programming channel (which will draw from various sources), a children's channel, a sports channel, a religious channel, a community affairs channel which schools can use, a business and finance channel and, on top of this, dedicated channels made possible with the Metro 14-12 overlay system described earlier.

It's a little too early to tell for sure, but Coaxial Communications of Columbus Inc., which has the franchise for the northeast portion of Columbus, Ohio, has been growing nicely without distant imports by doing a lot of special interest programs of a community service nature. Various public groups are coming into the cable studio and doing their thing, according to David Hackel, program director. Coax Cable TV offers a channel of old films; just how important this service has been is hard to tell.

If the suburbs of New York City are any criterion, sports and local news will go a long way. Madison Square Garden events sell subscribers in Wayne County, New Jersey. Good local news is of value in the suburbs, but probably will be less so in cities where the local TV stations do an adequate job.

What will cable operators do in markets that are already saturated with over-the-air TV? Can they really sell extra service to the householder—fire and burglar protection, premium movies for an extra fee, education? Can the cable operator become a video mailman of sorts by selling a direct shop-by-cable service? Will programmers or advertisers pay for polling services? Do we know enough about home terminals or system operating characteristics to even offer these services?

Premium movies for a fee will get a definite test this year and some tentative answers to other services may turn up in the next 12 months as two-way experiments commence.

Experiments at El Segundo by Theta Cable of California, using various versions of subscriber re-

Scheduling is critical

Getting the necessary cooperation from the telephone company and/or power utility is always a problem and it is of critical importance in large cities particularly when precise construction timetables must be met—for financial or franchise reasons.

Burnup and Sims says this is an important reason to use an experienced construction company such as itself. B&S, for example, as a long-time contractor to the telephone and power utility industry, has developed the working relationships which can speed approval of plans. Furthermore, a construction company with a reputation for craftsmanship has the confidence of pole-owners and this helps.

Scheduling problems are also involved in getting cable, amplifiers, and tap-off equipment on the side at the right time. On-time delivery of equipment will become a growing problem as construction accelerates. The companies that will make out best will be those who can 1) come up with reasonable delivery schedules, but 2) have working for them an effective expeditor.

A third critical scheduling problem is to have the necessary trained manpower on hand to "climb the poles." If an MOS intends to run his own construction crews, it is imperative that he have a practical on-the-job training program. If he contracts such work out, he ought to be sure his contractor can really deliver the experienced manpower.

sponse systems (SRS) developed by Hughes, will determine just how a home terminal performs under actual conditions. Theta Cable will learn more about how to program a computer. The first homes to get terminals will be "company" people so the test is more hardware-and-system-oriented rather than service-research-oriented. Similarly the test to be run at Carpentersville, Illinois, by Scientific-Atlanta for LVO Cable will be limited and will mainly test the concept of the system and will not reveal what services are viable.

Refinements in system tests and more knowledge of practical problems will be forthcoming from Overland Park, Kansas, and Reston, Virginia, as these systems (CM/E, October 1971) move into their second year of operation. A fire and burglar alarm system using a passive return cable will be tested by Davis Communications in DeKalb County, Georgia.

At Orlando, Florida, ATC hopes to get a thousand or more home subscriber terminals on stream. The test there in cooperation with EIE will, hopefully, help define both hardware configurations and service concepts.

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Texas, where TOCOM hopes to get a large scale cooperative research program going to really test what services subscribers will use. The plan is to sell shares of stock in the Irving system to a number of cable operators. If ten shares are sold, \$750,000 is available for some rather thorough tests.

Although TOCOM has a complete system for two-way availability, various pieces of equipment as

determined by shareholders will be tested.

Whether or not an urban area with no reception problems will pay extra for sports and cultural programs will be determined by Sterling Communications in a test it is running in the Hicksville-Plainview, New York, area.

How interactive cable TV can work in a new community will be tested at Jonathon, Minnesota. The nature of these tests and what they can prove or not prove will be the subject of a report in *CM/E* next month. **CM/E**

The Cost of Urban Cable Systems

Costs to wire major markets with advanced systems are high, although estimates vary widely depending on local circumstances. A fair representation of these costs appeared in the Rand study, **Cable Communications in the Dayton-Miami Valley: Basic Report**, in papers authored by N. E. Feldman, W. S. Baer and R. Bretz. Estimates from that report follow.

As a base for comparison, Rand estimates a conventional 12-channel system to cost \$50 to \$75 per home in front of the plant for a headend and distribution system. A single-drop cable from the feeder cable to the TV set costs another \$25.

Fixed capital costs for an advance system are given in Table 1. A simple computer with a limited memory and few peripherals could be procured for a little under \$40,000. Systems that permit cumulative responses to be displayed in real time cost more. In addition to hardware costs shown, are costs of software which can run \$150,000 to \$200,000. This software could be shared with common users at a cost of about \$15,000 to \$25,000 per system.

The cost of a dual cable distribution system is shown in Table 2. Costs for interconnecting five districts by FM microwave are shown in Table 3.

Some rates of return for the investment costs cited for the greater Dayton area—192,000 homes—are as shown in Table 4. This return is based on a subscriber fee of \$6 monthly. If some of the more sparsely located homes—50,000 in the suburbs—are not included, the subscription price could drop to perhaps \$3.95 per subscriber. The additional revenue from channel leasing assumes a cost of \$35,000 per channel per year, and an income of \$700,000, at least half of which would come from leasing a pay TV channel to a movie operator.

Table 1—Fixed Capital Costs For An Urban Cable Television System

| Facilities | Cost Range |
|---|----------------------------|
| Tower and Headend | |
| Land for tower | \$ 30,000-\$ 40,000 |
| Site preparation | 5,000- 10,000 |
| 300- to 500-ft guyed tower | 11,000- 20,000 |
| Microwave shack, temperature controlled | 4,000- 5,000 |
| Antennas for broadcast signals | 8,000- 12,000 |
| UHF/VHF converters and spares | 4,000- 6,000 |
| Audio-video processors plus all racks, cables, connectors, pads | 27,000- 120,000 |
| FM antennas and audio processors | 3,000- 10,000 |
| Automatic nonduplication equipment | 4,000- 8,000 |
| Office building | 15,000- 100,000 |
| | \$111,000-\$331,000 |
| Local Origination | |
| Equipment for origination | \$ 30,000-\$210,000 |
| Mobile equipment | 25,000- 85,000 |
| Time and weather equipment | 3,000- 6,000 |
| Program and announcement wheel | 2,000- 3,000 |
| Portable 1/2-inch videotape recorders for community use | 12,000- 60,000 |
| | \$ 72,000-\$364,000 |
| Miscellaneous | |
| Test equipment | \$ 10,000-\$ 35,000 |
| Spare parts and equipment | 3,000- 10,000 |
| Microwave importation of up to 3 distant signals | 25,000- 50,000 |
| Computers and real-time display | 80,000- 120,000 |
| Computer software | 15,000- 25,000 |
| Emergency power | 4,000- 8,000 |
| | \$137,000-\$248,000 |

Table 3—Investment Costs For Microwave Interconnection And Associated Headend Equipment

| Network Configuration | Number of Outbound Television Channels | | |
|----------------------------|--|------------|-------------|
| | 4 | 7 | 10 |
| 4 paths, 1 return channel | \$ 888,000 | \$ 988,000 | \$1,088,000 |
| 4 paths, 2 return channels | 924,000 | 1,024,000 | 1,125,000 |
| 5 paths, 1 return channel | 1,076,000 | 1,196,000 | 1,315,000 |
| 5 paths, 2 return channels | 1,121,000 | 1,241,000 | 1,361,000 |

Table 2—Estimated Investment Costs Of Above-Ground Cable Installation Per Mile

| | |
|---|---------------|
| Single 12-channel cable | \$4500 |
| Increasing capacity of single cable to 20-25 channels | 500 |
| Simultaneously adding a second 12-channel cable | 1500 |
| Increasing capacity of second cable to 20-25 channels | 500 |
| Adding two-way capability to one cable | 800 |
| Subtotal | \$7800 |
| Tree trimming and pole preparation | 700 |
| TOTAL | \$8500 |

Table 4—Internal Rates Of Return

| Case | Internal Rate of Return | |
|--|-------------------------|--------|
| | Total | Equity |
| 1. The base case 40 percent penetration | 14.0 | 17.0 |
| 2. One-to-one debt-equity ratio | 14.0 | 15.4 |
| 3. Thirty percent cable penetration | 3.1 | —18.2 |
| 4. Fifty percent cable penetration | 20.9 | 26.0 |
| 5. Use of converters instead of dual cable | 12.3 | 14.3 |
| 6. Subscription fee of \$4.00 | 6.5 | 1.2 |
| 7. Additional revenue from channel leasing | 19.0 | 23.8 |
| 8. Austere local program origination | 16.7 | 20.8 |

WHAT HAPPENS WHEN YOU GET A BAD REEL OF CABLE?

If you've ever received a sub-par reel of cable, you know how costly and infuriating it can be. Sure, your supplier will take it back and give you a new reel. But that never compensates you for the time and money you lose handling a defective reel, construction delays, etc., etc.

At Cerro, we don't claim to beat competitive specifications. What we promise is that every reel of cable we send you will be top quality, rugged, and up to spec in every way.

How do we do it? With full logic automated analog/digital computer controlled extrusion lines. Every important cable parameter is monitored every step of the manufacturing process. Built-in recording facilities identify each length of cable automatically, facilitating in-process quality control. Then, every reel gets a final test before it is shipped.

With Cerro, you can forget about the possibility of ever receiving a bad reel. Make us prove our claims. Before you place your next cable order, check with Cerro.



TRY CERRO TRUNK, DISTRIBUTION AND DROP CABLES. YOU WON'T BE DISAPPOINTED!



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aluminum
center conductors
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Circle 158 on Reader Service Card

Computer CATV System Design For The Major Markets

I. T. Frisch—Network Analysis Corporation

The CATV systems in the top 51-100 markets are going to be a lot more complicated and a good deal more costly than most of their country cousins now in operation. The FCC has ruled that they must have a minimum capacity of 20 channels and be capable of two-way operation should the future demand it. The system mileage and the number of headends will be greater. Much of the mileage will be underground. What all this means is that the system owner will have to commit himself to far reaching technical and financial decisions at early stages of system design or even at the proposal stage. The consequence of poor decisions based upon imprecise information will be systems which perform poorly or cost more—or as has been the usual case in the past—both.

The computer can take the guesswork out of these decisions by carrying through actual designs or design alternatives which can be thoroughly evaluated. The system owner can then proceed with confidence that he

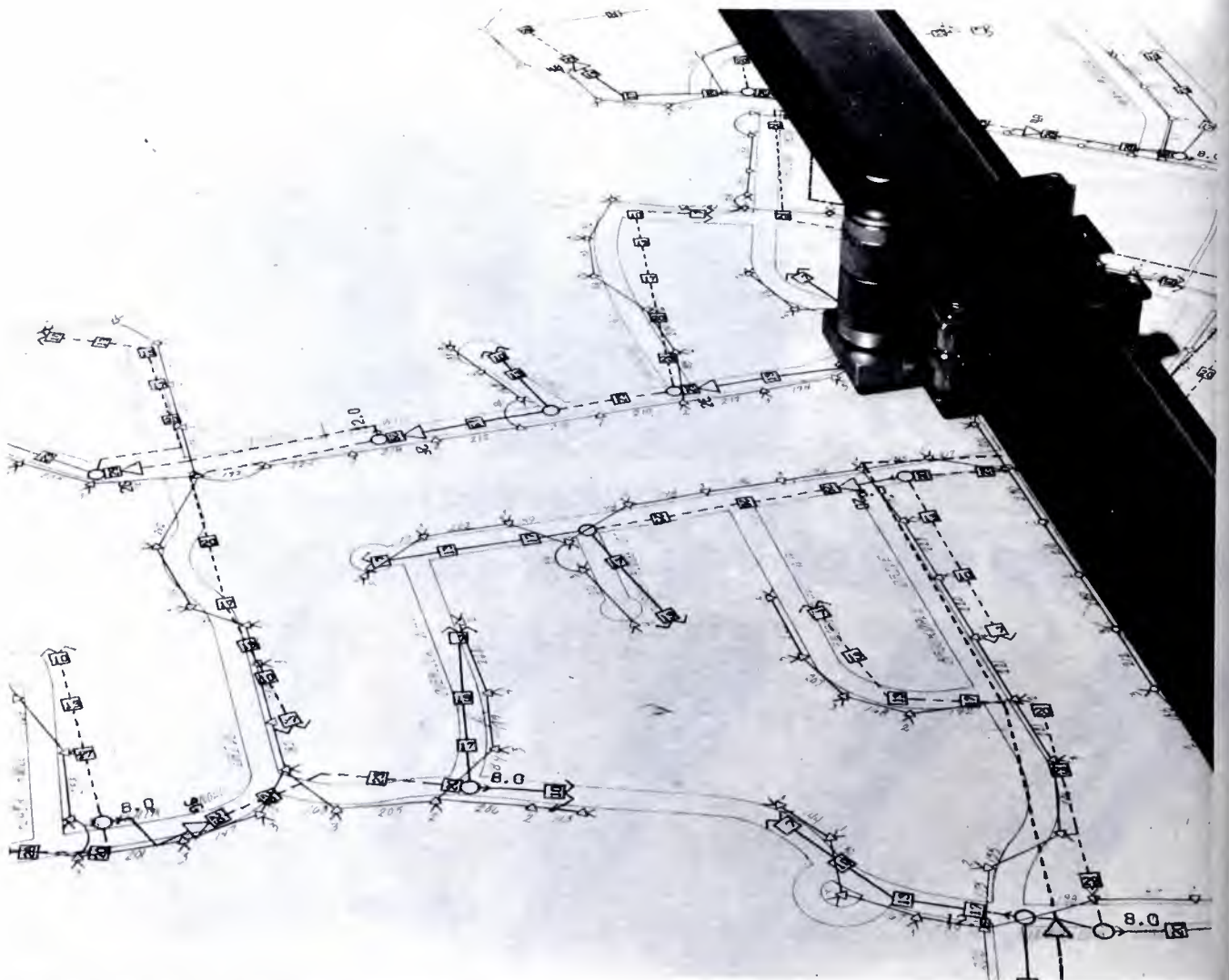
has his system under both technical and cost control.

NAC's Computer CATV System Design Service can produce a complete layout design that will have the lowest possible hardware cost and be guaranteed to meet system specifications. Equally important, it will not contain the usual human design and drafting compromises and errors.

The number of ways of using NAC's Computer Design Service for making design decisions is immense. To give you an idea of these uses I will quote a few of the actual questions that system owners have asked us and give our answers to them.

"I want to build a two-way system. Can you tell me how much extra it will cost to have two-way capability on the feeder as well as the trunk?"

The answer is yes, but we must first reformulate the question more precisely. Express the owner's concern. The reason the question is vague is that there are so



New computer-controlled automatic drafting machine.

If they talk about "the science of coaxial cable," run.

That's the kind of talk you get from the "all cable is alike" types.

Unfortunately, it isn't.

The fabrication of cable for CATV applications is still very much an art. And the artisans behind it deserve as much buyer scrutiny as the cable specifications they claim.

We'd be delighted to talk our cable specs with you in great detail.

Or the artisans behind them.

For the moment, we'll confine ourselves to our principal claim to fame: we mean to be as honest as our cable. And we've got over 10,000 miles of it out there that says we have.



**SYSTEMS
WIRE
AND CABLE
INC.**

Phoenix, Az.
(602) 268-0289

Rome, N.Y.
(315) 337-7080

All we make is cable ...

That's why we make it better.

Computer CATV System

many possible options for going two-way and so little experience with them, that system owners find it difficult to even ask the right question. For example one manufacturer offers the following two-way options: single trunk and feeder; dual trunk and feeder; dual trunk and single feeder; 5-30 MHz upstream band; 5-108 MHz upstream band; upstream and downstream signals on different cables or combinations of both on each cable. Which should be the owner use?

Naturally, the owner must make some decisions based upon the services he wishes to provide. Is the primary objective to have several studios sending 6 MHz signals to the headend or will return signals be narrow band data from, say, meter reading. However, the desired services often depend on how much they cost. Once the choices are narrowed to such viable options, NAC's CATV program is an economical way to evaluate them. Only the computer has the capability to produce designs from which rational decisions can be made with confidence.

"I am bidding on a franchise for a system for which I have a strand map and system and equipment specifications. Can you deliver by next week a drawing of the trunk layout and a section of feeder design along with a complete bill of materials?"

Yes! We feed the strand map and specifications into the computer and NAC's program generates the complete system design and bill of materials. Furthermore, to augment its CATV design service, NAC has recently completed an automated drafting program. With this new program, layouts developed by NAC's design program are drawn as complete final construction maps by an automatic drafting machine under direct command of the computer. NAC's computer designs have already been proven to give the lowest cost, and most reliable designs in the industry—without human design errors. The automated drawing program has now eliminated human drafting errors and the long checking time needed to look for drafting errors. In addition, the time to produce drawings has been reduced by a factor of 10 over a draftsman's drawing time. For a typical 100-mile system the computer has drawn complete layouts in about four hours. Parts of the design such as the trunk and sections of feeder can be extracted and drawn separately. The drawings can be made to any scale and drawings may be repeated with different scales. Different trunk routings can also be generated through high population density areas to maximize initial revenue return from the system.

"I am bidding on a franchise for a city for which I have a street map, but I do not yet have a strand map. Can you obtain an estimate of system cost?"

We can indeed, and we may even be of help in getting you the best strand map. Suppose you have a street map, the locations of poles and an estimate of the number of houses to be fed from each pole. The computer will draw the best system design along with the strand map that goes with it. This strand map will of course have to be walked to check for rights of way and other restrictions. Any changes in the strand can then be fed to the computer and the appropriate parts of the layout can be redesigned.

If you do not have pole locations, but the street map is drawn to scale or you have an aerial photograph, the program can assign poles on an average pole span basis, assign the houses to poles and obtain a dedicated design. If you do not have locations of houses, the designs can be made for different population densities and saturations.

Our experience has been that even if only the street

map, estimated population densities and selected equipment line are given, the estimated hardware cost is within 10 percent of the cost of the final design.

"I have price quotes from two manufacturers for different lines of equipment. One manufacturer seems to have better trunk equipment and the other better feeder equipment. Can you help me decide which manufacturer to use for my system?"

This is one of the most common services we perform. We simply read into the computer all the specifications for both lines of equipment including quoted prices, cross modulation, intermodulation and hum levels, noise figures, power requirements, temperature characteristics and so on; in short, all the usual relevant parameters. We also read in any unusual ones that you might have available from your own experience such as failure rates, estimated lifetime and installation costs for amplifiers. The computer produces the best layout using each line of equipment.

You can then evaluate the designs and choose the manufacturer with confidence on any basis you wish. One common criterion is system cost. In one comparison we performed, there was a 9.8 percent difference in hardware cost between two designs obtained from apparently similar lines of equipment even though the quoted prices for comparable items were very close.

"I am building a 350-mile, 27-channel system, some 20 percent of which is already receiving signal from a 12-channel system built 10 years ago. Can you help me decide whether to use the existing feeder cable or replace it?"

Yes! NAC's Computer CATV Design Service has been used to answer questions like this. The program can be restricted to use specified equipment in given locations. Thus to solve this problem we run three designs to the same specifications. In design 1 we require the computer to use existing bridgers and feeder cable. In design 2 we require the computer to use existing feeder cable. In design 3 we do not restrict the computer's choices. To illustrate how this works, the table below summarizes the results for one section of 16,130 feet of .412" and .500" feeder fed from one terminating bridger in the original system.

| | Cost of feeder Equipment (Dollars) | Cost of feeder equipment excluding cable (Dollars) |
|--|------------------------------------|--|
| Design 1, existing bridgers and feeder cable | \$9,332.14 | \$5,504.35 |
| Design 2, existing feeder cable | \$7,491.95 | \$3,715.85 |
| Design 3, unrestricted | \$5,711.83 | |

Since we need not pay for existing cable we compare the bold numbers and it is clear that in this case it is best to keep existing feeder cable and allow the computer to locate trunk bridgers and terminating bridgers. With other cost structures, the results might be very different.

I am sure you have many other design questions which have troubled you. With NAC's Computer CATV Design Service you can now have reliable conclusive answers.

Suggested Reading

- "A Computer Design of CATV Distribution Systems," Ivan T. Frisch, Bill Rothfarb, Aaron Kershenbaum, 20th NCTA Official Convention Transcript, July 6-9, 1971, Washington, D.C.
- "A Computer Design of CATV Distribution Systems," Ivan T. Frisch, Aaron Kershenbaum, *Cablecasting*, Vol. 7, No. 5, July-August 1971, pp. 20-26.
- "Network Optimization for Two-Way CATV System Design is Programmed on a Computer" New Product Applications, *IEEE Spectrum*, Vol. 8, No. 11, Nov. 1971, p. 82.
- "Stranded in the Map Maze? A Computerized Way Out," Ivan T. Frisch, *TV Communications*, Vol. 9, No. 2, February 1972, pp. 34-42.

Be sure the color you originate will compare to network quality.



This is the \$65,000 Norelco PC-70. The 3-Plumbicon* color television camera that's used to televise more live and taped network TV shows than any other camera. It is the standard of the television industry. Buy it, if you can afford it.



This is the new Norelco LDH-1 color camera. A remarkably stable, all-purpose 3-Plumbicon* (or Vidicon) camera that has major design advantages of the PC-70. It brings faithful live and film color within easy reach of any CATV station because it costs as little as \$14,970.

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*Reg. TM N.V. Philips of Holland

Circle 160 on Reader Service Card

Franchise



How to get your next CATV system off the ground, after you get the franchise.

Let GTE Sylvania do it.

You get the franchise, we'll do the rest.

We'll design, plan, engineer and install your whole CATV system. We make a full line of matched components. And we put them all together in a modular system that gives you all the capacity you need now, plus the capability to expand when you want to.

That's what we call a true "turnkey" operation.

The GTE Sylvania name is on many operating turnkey CATV systems now. More are on the way. And our experience in electronics stretches from the first vacuum tubes to the TV sets a lot of your

subscribers will use.

So we know what we're talking about.

Our latest book spells out what we can do for you. It's called "The CATV Pathmakers," and you're welcome to a copy.

It shows how far we'll go to help you grow in CATV.

Sylvania Electronic Components Group, CATV Operations, Seneca Falls, N.Y. 13148.

GTE SYLVANIA

Take five...

minutes or less to portray your entire cable system for spectrum analysis, signal level and frequency measurements, noninterfering system sweep, spurious radiation field strength, return loss, isolation and signal-to-noise ratio measurement. With Avantek's rugged, portable Remote Automatic Sweep System, it's simple and quick.



Avantek semiconductors,
a foundation for excellence.

Avantek's Remote Automatic Sweep System is the result of total vertical product integration. From transistors to radio relay and test equipment, Avantek serves the electronic communications industry.



CT-1000 Transmitter

Installed at the head end of your cable system, the CT-1000 operates continuously without interference to your normal programming.

CR-1000 Receiver

The lightweight, weatherproof CR-1000 affords simple, one-man measurement of swept frequency response or spectrum analysis at any time and at any point in your cable system.

Visit Avantek's booth, number 309, at the NCTA Convention, May 14 to 17, in Chicago and get the full particulars on this outstanding system — designed for you.

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Avantek, Inc., 2981 Copper Road, Santa Clara, California 95051. Phone (408) 739-6170. TWX 910-339-9274 Cable: AVANTEK

Circle 163 on Reader Service Card

Inexpensive Commercial Ideas

By Roberta Weinberg

You can strike a chord to oppor-tune-ity right now. It's easy to play.

AREN'T YOU STAGGERED by the reported costs of producing national television commercials? I know I'm amazed every time I read about how high they're skyrocketing.

For instance, I recall the commercial created to introduce a new model of a popular car. The locale was Utah. The scene? High atop an obviously insurmountable desert plateau. The camera, shooting from a helicopter, sweeps in, zoom lens focusing closer and closer on the gleaming, low-slung beauty. Then, suddenly, it pulls away as a full orchestra underplays the announcer's dramatic voice—"Introducing the all new, incomparable——."

Great. Fantastic. Magnificent. Unbelievable. And the 60-second spot, according to published accounts, cost in excess of \$100,000 to produce. For someone used to working in CATV, that's what I call really unbelievable.

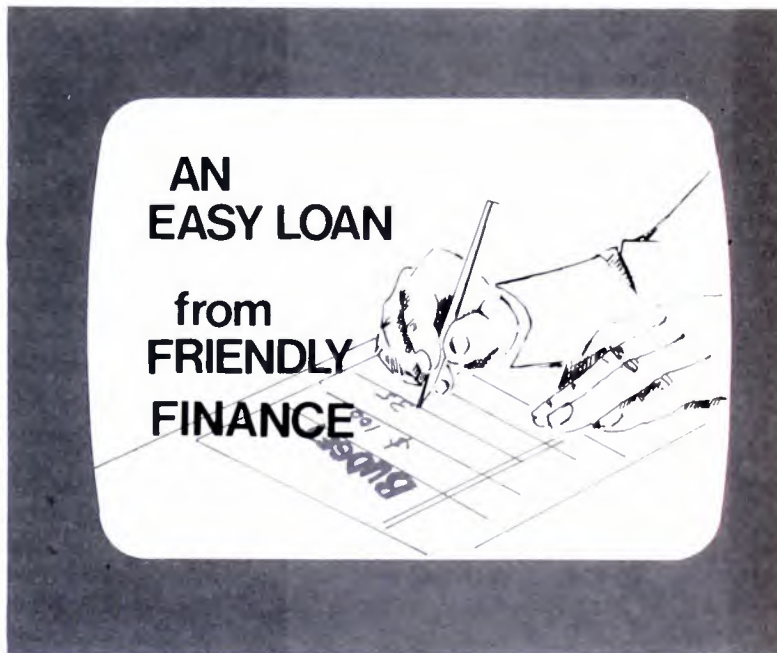
Undoubtedly, it doesn't catch you by surprise for me to say that CATV system operators don't have large bankrolls for commercial production. But you may be surprised to hear that effective commercials can be created for just a few dollars.

What's more important, your spot sales can probably be increased by presenting fairly comprehensive ideas (not finished commercials) to prospective clients at the same time you solicit their business. Successful salesmen always use this approach to attract the prospect's attention, the first step in culminating a sale. What you're really saying is, "We know how to sell your products on television. Here's a creative idea that will work."

Idea creation doesn't mean high cost. In fact, a creative commercial idea can be as close as your nearest five-and-dime, drug store, hobby shop, bank, travel agency or similar outlet. Here you can buy, even borrow, the necessary props.

Ridiculous? Not at all. Some of you may be familiar with my instant commercial kit. I've used it at several CATV regional conferences. The items in it are absurdly simple, with purposeful exaggeration. Yet, they make a point. None of them cost more than 29¢.

Roberta Weinberg is executive vice president of Good Communications, Inc., Philadelphia, Pennsylvania.



A simple visual can serve several purposes.

For instance, we have our little "clicker"—a popular child's toy since we all attended kindergarten. You simply press the little metal strip on the back to get a snappy "click." Can it be a quick commercial idea designed to "click" with a prospective client? Of course, with an introduction like, "My Lady's Boutique is having a year-end, half-price sale that's bound to click with you." Or how about, "Get clicking this Spring with a special warm weather tune-up. Just \$9.95 at Smith & Jones Chevrolet." See how easy it is. Gets to be fun after awhile.

Another prop from our instant commercial kit is a soft soap eraser. Combine it with a yellow writing pad and a pencil and you have a commercial for a finance company. Just picture this. A man's hand holding the pencil while he works on the family budget. All the dollar figures are on the paper but it's apparent that the budget is \$300 in the hole. Bring in the eraser, wipe out the debt and substitute, "An easy loan from Friendly Finance." Voila! Try it. Take the idea down to a loan company office



Inexpensive Commercial Ideas

tomorrow (make it today if you can) and discuss it with the manager. Even ask him how the idea can be made more effective. Get him involved and get that sale.

Next from our little bag of magic moneymakers is a cheap plastic bracelet. If you made it yourself it would cost less than a dime. So how do you use it? Turn the concept around completely. Mount the ugly thing on a display pillow costing much more and create a commercial for the finest jewelry store in town. Now don't recoil, because there's real madness in our method. Can you just visualize our piece of junk rotating under a single spotlight while your favorite basso bravado announcer intones, "Regardless of an item's cost, Tiffany Jewelers' service and guarantee is always the same." The thought of it just has to make your heart go pitterpat.

The final item in our grand and glorious kit is a telescope. Not the kind you find in an astronomy kit, but rather the kind you drop in a Christmas stocking knowing full well it won't last out the day. It's the kind with those spellbinding words, "Made in Hong Kong," imprinted somewhere on its surface. But let's use it well. Let's use it to "focus on the tempting menu at the Le Food Restaurant." It's an easy switch from a man and a toy telescope to a zoom-in on the menu with feature dishes highlighted with a magic marker.

Opportunities for creating commercials are as varied as your imagination. Just browsing on your lunch hour will give you many ideas. Can a wall mirror be used for a beauty shop commercial? Of course, with your copy theme running, "Mirror, mirror on the wall, who is fairest of them all?" You add the tag.

Ever seen a money bag? Your bank has hundreds of them. So get some, stuff 'em with paper and pile them high on a table. Then go out and get yourself a client who will respond to, "save piles and piles of money at the greatest sale of the year!"

Now, let's play a game.

Wherever you are right now, take a look around. What do you see? Is there an ashtray? A cup of coffee? A telephone or telephone book, coat hanger, flowers? Are you sitting on a chair?

O.K., stop! You have one picked out, right. How can it be used for a client you haven't been able to get on the air? Can you adapt that same idea for a different client?

The objectives of this little exercise are 1) to get business of course, and 2) to get those cerebral juices moving so that anyone can see that there are innumerable opportunities around for idea creation. However, don't forget that the ideas you create are to be starting points, door openers to added business. Once you get to talking to Mr. or Mrs. or Ms. Inaccessible, you're bound to strike on the perfect prop. Your own creation is apt to be the right one but feel free to borrow from our "swipe" file if you see something that fits.

"You can take a simple item like a carrot and . . .

Optician

"You've probably heard the adage, 'Carrots make you see better.' Well, maybe so, maybe not. But certainly, a pair of modern frame glasses help you see better and look better."

Fuel Oil Co.

"Donkeys often get fooled by the carrot and stick treatment. But we don't fool around. When you need oil or service, we're there 24 hours a day."

Food Market

"A single carrot. It's important to us. Just like everything else we sell, this carrot is important because you're important."

One of the businesses we are in at Good Communications is subscriber increase for CATV systems. We use exactly the same method we have outlined here for you—the attention-getting device. In our case, we tell our potential clients, "We guarantee you X percent more subscribers at this time next year." How can we do that? Because we have an idea that works.

You can too. Go out there and present your own ideas to your own clients. Tell them that these ideas properly presented on CATV will work. Then watch out. You're gonna be successful! **CM/1**

More of Ms. Weinberg's idea file will be found on page CM/E 30.

RCA's TV Sweep Chanalyst checks every VHF channel.

And this complete system has other features you need to restore new-set performance.



- Concerned about CATV, CCTV, MATV? WR-514A checks all VHF channels for tuner malfunction
- Precision attenuator permits peak fringe area reception adjustment
- Versatile snap-on probe allows fast, accurate alignment technique
- One-year warranty on parts and labor... local replacement parts availability

Unit combines the functions of a sweep/marker generator, marker adder. RF, IF, video and special ChromAlign sweep signals permit checking of VHF tuners and alignment of IF, video and color bandpass amplifiers. That's why we call the RCA WR-514A a complete system.

Yours for only \$380* including RF output cable, three direct cables, connector adapter, VF/IF 75-ohm input head, and two direct termination units. Ask your distributor if he offers easy payment terms.

Together with the bonus accessories offered below, you will have just what you need for TV alignment procedures.

To get the special bonus offer, simply mail the WR-514A warranty card to RCA Test Equipment Headquarters, Harrison, N.J. 07029. Offer subject to withdrawal without notice. See your RCA Distributor for a demonstration of the RCA TV Sweep Chanalyst. Application Notes and other technical data are also available — on request.

*Optional Distributor Resale Price

Special bonus offer — 3 accessories worth \$42.25* free with purchase of an RCA WR-514A



RCA

Electronic Components



Inexpensive Commercial Ideas

| | | | | | |
|---------------|-----------------|--|-------------------------|--------------------------------|---|
| Single Flower | Florist | "Just one flower can make a difference." | Lighted Candle | Newspaper | "Let the light of knowledge shine through—every day—with your local newspaper." |
| | Exterminator | "Your home can be as perfect as a flower." | | Restaurant | "A candle on the table. Special service. Special smiles. Special food. All at the _____ restaurant." |
| | Garden Shop | "This spring, plant happiness in your backyard." | | Drug Store | "A candle is old-fashioned. But so are our prices and service. We're not a drug store. We're more like an apothecary." |
| \$5 Bill | Record Store | "For less than \$5, you can have Frank Sinatra, Barbra Streisand or Elvis Presley in your home tonight." | Yardstick | Auto Garage | "When you bring your car here for service, we go over it inch by inch." |
| | Book Store | "Abraham Lincoln read all the books he could. Today his picture is on the \$5 bill. For less than five dollars, you can buy five paperbacks at _____ book store." | | Men's Clothing | "Ready-to-wear fits like a yardstick. That's why our alterations are always free." |
| | Bank | "One of these saved weekly in a Christmas Club opens the door to joys and toys." | | Insurance Agency | "A little flame can start a big fire. Is your home properly insured?" |
| Mop & Bucket | Any Store | "You can clean up during the biggest saving spree of the year." | Block of Ice | Furniture Store | "Put your worries on ice with clean plastic slipcovers." |
| | Appliance Store | "Don't be a housekeeper. Be a homemaker with a new floor waxer and polisher." | | Appliance Store | "The coldest spot in town. Inside your _____ refrigerator/freezer. And we have 'em." |
| | TV Store | "Black and white TV is as outdated as a mop and bucket. But tonite you can be watching your favorite show in glorious color . . ." | | Income Tax Preparation Service | "Don't freeze when you have that income tax form in front of you. Get professional service." |
| Doll | Gift Shop | "None of us really grows up. But our playthings change. So see the complete line of adult games at _____." | Dart Board and Darts | Formal Wear Rental | "You'll be on target day or night with the newest fashions in formal wear from _____." |
| | Dress Shop | "You'll look like a doll when you dress in the latest fashions from _____." | | Real Estate Agency | "Pick any spot—any section of town—and let us help you find the perfect house for you through multiple listing service." |
| | Savings & Loan | "Your little girl may play with dolls now. But someday she'll be grown. Isn't now the time to save for that day." | | Telephone Company | "Don't dart around. Let your fingers do the walking through the yellow pages." |
| Carrot | Optician | "You've probably heard the adage, 'Carrots make you see better.' Well, maybe so, maybe not. But certainly, a pair of modern frame glasses help you see better and look better." | Child's Building Blocks | Home-builders | "Sound construction. Piece by piece using the finest materials. That's what you get when you have _____ build your dream home." (Using photos pasted on blocks.) |
| | Fuel Oil Co. | "Donkeys often get fooled by the carrot and stick treatment. But we don't fool around. When you need oil or service, we're there. 24 hours a day." | | Camera Store | "Build a family history with photographs." (Using photos pasted on blocks.) |
| | Food Market | "A single carrot. It's important to us. Just like everything else we sell, this carrot is important because you're important." | | Stockbroker | "Blocks of stocks are traded daily around the nation. Learn more about your personal investment possibilities by calling _____." |

We make the communication system that will work best for you.

At GTE Lenkurt, we make all kinds of communication systems.

Systems for transmitting video, voice and data via open wire, cable, microwave, or coax.

Why is that fact important? It means that when you ask us to look at your communication needs, we can be completely objective in making our recommendation. Whatever kind of system will work best for you, we make the equipment that makes it work.

More than that, we can engineer and install the whole system, including things we don't make. (Like cable, antennas and such.)

When we're through you can start communicating. Whatever way is best for you.



Data modem



Coax repeater



FDM cable carrier



PCM cable carrier



Multiplex



Subscriber carrier



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Or write, GTE Lenkurt Incorporated
1105 County Road, San Carlos, CA 94070

GTE LENKURT

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All You Ever Wanted to Know About Production— Just Ask

Part Seven of a series—

The Floor Manager/Assistant Director

by Douglas Gratton

ANDRE GIDE WAS OPPOSED to the idea of analysis. He said—in French, of course—“To dissect is to murder!” Yes, old André was not one for mincing his words. But I suppose that he felt that there were some things that defied precise definition and that they just . . . existed. Such things should be enjoyed, appreciated, and left well alone!

Now, what has all this got to do with an article on the role and responsibilities of the Floor Manager/Assistant Director (FM/AD) in CATV production? Well, if you remember, Socrates used to wander around ancient Athens asking everybody if they had seen “Justice.” And while he could describe a “just” act or the behavior of a “just” man, he couldn’t isolate a definition of “justice.”

Now, while I do not wish to follow his example, I really do find it difficult to define the apotheosistic functions of the AD/FM. I can only think of the good ADs whom I have worked with in the past . . . Don, who was always there and who was ready to tackle any problem . . . Mike, who was very quiet, very polite and very efficient . . . Bruce, who really did not do too much but who kept everyone happy . . . well, before this begins to sound like a rewrite of the “Boys in the Band,” let me just tell you that if you haven’t been there, then you don’t know!

But for those amongst us who like lists:

- 1) The FM/AD is the senior “below-the-line” crewman in the studio.
- 2) His main function is to assist the Director during the principal production phase—namely, the stage of rehearsing and the transmission/taping of the production.
- 3) Another important function is, that he represents the interest of the crew and talent to the Director. (You’ve got to watch some of these little Hitlers in the Control Room!)

So, how does it all work out in practice? Well, the Director begins the rehearsal on time since the AD got the crew out of the coffee shop on time. And, as he works his way thru the program, the AD is, well, . . . he is there! The Director wants a camera position to be marked on the floor with tape . . . the “talent” has to be given a “start” mark . . . the cameraman needs a chinagraph pencil to mark a split-screen special effect level on his viewfinder monitor . . . the talent wants a cup of coffee and a six

course meal to go with it . . . Fred wants to go to the bathroom rather badly . . . the paint is peeling off the set . . . all this and more are the responsibilities of the Floor Manager/Assistant Director!


Next month, I will go over the taping records, admin. information, visual cues etc., which involve the FM/AD. But to make a final attempt to explain the devilish complexity of the job, here is a copy of the list of odds and ends which my FM/AD, John, can produce instantly—which explains why he is so good at his job!

Manicure, pinking and all sorts of scissors . . . sharp knife . . . plastic clothes pins (very handy for “on the spot” alterations) . . . darning and sewing needles . . . all colors of thread and big spools of extra-strength black and white . . . big and small safety pins . . . claw hammers . . . electric drill . . . tenon and hack saws with sharp blades . . . several Stanley knives (excellent for cutting “No-Seam” paper) . . . nails in all their various sizes (boss, brad and flat head) . . .

Band-Aids (pink and black skin tones) . . . aspirin . . . small office-type stapler . . . big factory-type staple gun . . . refills for both . . . quick-drying aerosol paint in gray, black, white and other colors (essential for quick touching-up of sets; to speed up the drying process, just roll over a 2K studio spot) . . . a regular and Phillips screwdriver . . .

Standard power extension cords (you can never have too many) . . . hi-intensity Tensor lamps (extremely useful for lighting small areas such as product shots and visuals for monochrome, and they do save theatrical lighting and power) . . . spare Tensor light bulbs (you can guarantee that they will need to be replaced during the production) . . . white gloves (essential for direct placement of hot-surfaced products and glasses without leaving fingerprints) . . . two or three pairs of asbestos gloves (why wait for a lamp to cool before moving it) . . . black gloves (still great in monochrome for creating animation) . . . one long-sleeved black wool sweater (to go with the above item) . . .

Black matte cheap cloth (you can never have too much of this stuff, it’s so useful for screening off space from the camera) . . . flashlights (yes, Virginia, there is a Con. Ed.) . . . thermos flask (to keep the dust out of the client’s favorite beverage) . . . paper clips . . . dulling spray by the gallon . . . 2”



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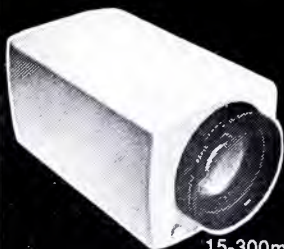
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CM / E—34

ALL YOU EVER . . .

and 1" grip tape by the mile and double-sided tape by the furlong . . . 2x4x6's (if you don't know what they are, write to me because it's very complicated and I'll have to draw you a diagram) . . .

Yellow and black grease pencils . . . some children's toys . . . Alka-Seltzer (see thermos flask above) . . . various paint brushes that *should be kept clean when used* . . . cord, twine, rope, string, and plastic-covered clothesline . . . misc. lengths of glass shelving . . . hi-jump standards . . . paper towels . . . sanitary towels . . . cloth towels . . . Kleenex . . . light and dark foundation make-up . . . powder puffs and powder . . . dental floss (not for your teeth! If you have to hang something so as to give it that invisible look, use either dental floss or fishing gut if it's something heavy) . . . wire and pliers . . .

Rubber cement and glue from Elmer . . . 35mm slide holders . . . a ruler (you'd be amazed how difficult it is to find a simple straight-edge) . . . tape measure (why move

a set to fill a corner, when you can measure it first . . . fire extinguisher (foam—NEVER, NEVER NEVER water) . . . dictionary (when you stare at a visual for hours "on system," it begins to look misspelt) . . . white India ink and brush to correct misspelling . . . Letraset catalogue . . . blank black and white visual boards . . . thumb tacks . . . lead weights and sandbags . . .

Director board . . . crew notice board . . . liability policy against possible crew and talent claims . . . happiness music (you may not like the Rolling Stones' music, but you would be amazed at the increase in productivity if the crew has something to listen to when they change the set) . . . train and bus timetables . . . coffee shop menus (I am constantly amazed by the amount of time taken by most people in their selection of lunch in a studio. If you have only one menu, you can spend an hour passing it around, then another hour waiting for delivery, and then you have ten minutes to eat—see Alka-Seltzer) . . . pens, pencils and paper . . . trash-cans (large) with liners . . . chalk . . . etc., etc!



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MAY, 1972—CM / E

FROM THE EDITOR

A Convergence of Interests

For many years broadcasters and cable operators have been on divergent paths. The adoption of the FCC's new rules on March 31 indubitably marks a turning point. From here on in, the two industries will be on a path of convergence.

The FCC has given cable an opportunity to grow in the major markets by permitting signal importation, but has protected the future of free TV by restrictive exclusivity and antisiphoning rules affecting movies and sports. The FCC has clearly said that it expects cable's ultimate development and success to depend on new services—access channels, local origination, leased channel services, etc.

Thus, the challenge of the future is to develop such services which subscribers or advertisers will pay for. This is a job not for "broadcasters," or "cablemen," but creative communicators.

In a talk before the just-concluded NAB Convention, entitled "Cable's Future Impact on Television Broadcasting," Clifford M. Kirtland Jr., executive vice president of Cox Broadcasting, did much to destroy some of the old myths. The network's evening entertainment fare will not be threatened by cablecasting.

A factor that could fractionalize the network audience would be the increased availability of alternative programming. But the producer representatives so far believe broadcast to be their prime buyer. The FCC supports this concept with rules. Sports programming that is normally televised will be protected for broadcasting. Existing blackout provisions apply to cable, so it has no edge. Although pay-TV sports programming could evolve, the FCC will rule in favor of national league events being free.

Curbing any immediate impact of cable will be a growth rate slower than that predicted. Although many project 50-60 percent by 1980, Cox feels the penetration will be closer to 30-40 percent. (Restraints are lack of money, equipment, and manpower, and a slow-down in franchise awards.)

Broadcasters are protected on theatrical film released more than two years ago. New movies can be bid for on a per-program basis, and pay-TV via cable may evolve. But this entrepreneurial game is open to all—cable operators thus far are willing to lease a channel.

Kirtland sees no erosion of the commercial TV advertising base by 1980, and he quotes the Stanford Research Institute's report which predicts only three percent going to cable within the foreseeable future. Cablecasters are restricted in advertising opportunity to the beginning and end of programs. Until the number of subscribers climbs dramatically, the national and regional advertisers will find cable unattractive. Currently advertising revenues can't offset even modest production costs. Radio shouldn't be worried. Cable is space-bound; radio is everywhere.

Channel leasing to enterprising program suppliers who promote programming that will be supported by advertisers will come about, but it's unlikely to divert any portion of the advertising budget which is allocated to moving products to millions.

The availability of channels for lease offers an oppor-

tunity to over-the-air broadcasters to better serve their audience and to, at the same time, help solve the problem of access. Kirtland suggests that over-the-air stations could lease one or more channels to repeat all or some of the day's programming at different time periods and therefore increase its accumulative audience basis. Some of the broadcasters' public service programs might be run on cable in better time slots for viewing.

Kirkland recommends a full study of total communications needs of a city, the county, and the state. In the area of politics, candidates might find closed-circuit channels better than over-the-air whether there is a limit to the time available on a fair and equitable basis. Kirkland hypothesized that candidates on leased channels answering call-in questions to be a stimulating solution to the problem of access.

With so many conduits to the home, the pressure on the broadcaster to be all things to all people will surely abate. Kirtland suggests that there may be less TV regulation in the future. With all that additional channel capacity for access or leasing, he asks, "Why should there not be common ownership of a TV station and a cable system in the same market? Monopoly of expression simply will not exist."

This is a notion this editor has long supported. The FCC could have promoted its cherished idea of a UHF outlet in every market a long time ago if it would have permitted or encouraged joint-UHF-cable ownership. A low power UHF could reach an entire metropolitan area over-the-air and with cable distribution it would be on a par with V's in ease of tuning. In Toronto, a new U station has been formed to take advantage of the distribution it will get on cable. The local programming of the station could reduce the pressure on a cable system for extensive local origination.

Toronto cable provides an example for radio. There is an ethnic FM programmer on cable that has no license because he has no transmitter. Prior to cable, he leased telephone lines—now his service is available at a lesser cost. Just recently, Vancouver Cablevision joined forces with the staff and facilities of radio CHOM to cover an extraordinary meeting of the Vancouver City Council—which ran until two in the morning. The combination of the cable company's camera and the special public affairs staff of the radio station made the meeting interesting and exciting.

The forms of convergence that will take place by radio-TV-cable, and to a lesser extent by publishers, will vary from the leasing-of-cable-by-broadcasters or contracting-of-broadcasters-services-by-cable), to joint-venture, to common-ownership. Additional special forms will include arrangement between movie theatres and producers, video cassette sources and other program producers, news agencies and sports promoters.

There has already been a considerable degree of investment in the new technology by groups comprised jointly of broadcasters, community antenna operators, newspapers, and movie producers. Now other service/leisure-oriented industries are eyeing cable. It's past the time for fighting 'em; it's time to join 'em.

James Lippke, Editor

New Stations Are Built To Fit Market Needs.

You don't just build a station by-the-book. Rather you determine carefully what your needs are and how they can best be met. *BM/E* takes a look at some of the new facilities designed by and for broadcasters.

KPRC (AM-TV), Houston, A Landmark and More

ON MARCH 21, KPRC (AM-TV), Houston, Texas, dedicated its new \$3½ million home—its third, which is a testimony to the station's progress. Floor plans of the striking new plant were published in *BM/E*, August 1971. In this report we'll look at some of the equipment that fills the two-acre (83,375 sq. ft.) "Houston Taj Mahal" as KPRC'ers jokingly refer to their gleaming white edifice—which is not made of marble, but does have a lot of mirrored glass.

KPRC is architecturally and ecologically in harmony. The broadcast center is divided into six distinct operations areas designed to minimize confusion. (Areas are radio studios, TV studios, newsroom, film lab, videotape central and administration.) To offset the windowless environment of the production studios, an arching, glassed "Galleria" runs through the center of the building from one end to the other. The 187-foot tower, necessary to house microwave antennas, is enclosed in a striking pylon made of architectural concrete.

Radio facilities include three AM studios (two air, one production) and a control room on the "terrace level"—which is largely below ground but has daylight exposure on the terrace side. New Gates equipment customized to KPRC's specs fill these studios. The production section has four-channel recording capability. All equipment is set on a computer floor.

Double-wall construction of high density concrete provides complete sound isolation for each studio. The studio windows are double, high-density Acoustipane glass. Each pane is approximately three-quarters of an inch thick and weighs approximately 300 pounds. The ceilings and all plumbing and pipes between floors are suspended on "shock hangers" to eliminate any chance of unwanted sound from vibration or noise transfer from above.

Proper acoustical control is maintained by a mixture of sound absorbing and sound reflecting materials. Large three-inch thick panels on the walls and ceilings are Tecktum, an acoustical absorber, and the solid walls form the reflecting surface. The prop-

er ratio of the absorbing surface to the reflecting surface has been determined to provide ideal acoustical properties.

Three TV studios and their control rooms take up the majority of the first floor (newsrooms which dominate the rest of the space will be discussed later). Two studios are 50 × 70 feet in size; a third is 40 × 50 feet. Control rooms look not unlike NASA's Houston Space Control Center—a separate monitor is devoted to every input which adds up to 20 monitors. Entire end walls of the control rooms are filled with monitors. Charles Hunt, engineering, bought 40 new black-and-white Conracs and eight color units which were added to the previous complement of monitors to meet the needs of the new facilities. Video switchers which can handle 42 inputs were purchased from Central Dynamics, Ltd.

There are four control rooms, two for air and two for production, although any control room can be used for any purpose or combination of purposes. The custom-built audio console accommodates 108 signal sources. Pre-select systems help directors handle the many inputs available to them.

Two unusually large announce booths to record voice-over announcements flank the control room. These are 12 × 15 foot studios with 10 foot ceilings the size deemed necessary to provide the proper acoustical properties. If a room has a dimension of less than nine feet, reproduction quality suffers, according to KPRC experts.

Between the announce studios is a glass booth which isolates a film projector. The picture is projected into the studio, sans projector noise, to enable the talent to synchronize voice to the picture sequence.

On the same floor are ample quarters for production staff people including separate facilities for visiting NBC sports announcers and news correspondents. Because of KPRC's ample facilities, production work can be handled simultaneously along with local-live and network-feeding activities.

On the floor above the TV studios and control room is master control—divided into three areas:



Once outside a confining studio, the environment is open.



Arched glass Galleria runs to other end of building.

over-the-air master, audio distribution and telco.

Master control can delegate the assignment of the station's equipment in any way it pleases. A pulse assignment system was built locally under the direction of Charles Hunt. It uses Grass Valley generators and CDL decoders, a Tracor rubidium source provides the time standard.

The audio distribution system employs Taft Communications distribution amplifiers—no more pads and bridges. Some 70 of these amplifiers can be

found in the station. A 25-station intercom system is also part of this audio switching center.

All telephone equipment is located in a room adjacent to the master control room. The switchboard is probably as large as that found in the central switching centers of small towns. Part of the telephone equipment includes a nine-channel microwave relay system. The system consists of two permanent incoming loops and one outgoing channel to the transmitter. When KPRC is connected to

NASA's Space Control Center, the six extra loops may be in service all at the same time (as they were during Apollo 11 coverage).

Crossing over the Galleria catwalk on the second floor, and opposite the master control area, are the film processing laboratory, the film production areas and the videotape and film chain room.

KPRC feels it has the finest motion picture processing laboratory to be found in any station. No expense was spared to make sure film would never get ruined in the processor. Chemicals are constantly replenished in the processor by a gravity flow system from the mixed-chemical storage room. Since the secret of good processing is "time and temperature control," the lab is provided with its own hot and chilled water supply.

The station processes from 130,000 to 140,000 feet of film a month. To alleviate the deterioration problem, all fumes from the lab are exhausted directly to the outside and spent chemicals are discharged into the city sewer system where they are quickly dissipated. The floors and walls are tile and the upper wall area is covered with a special vinyl. These materials are easy to clean and impervious to chemicals. There are two darkrooms for film handling and a chemical testing lab.

Next to the film lab is the commercial film production unit (news film editing is handled in the newsroom). This room includes fully-equipped editing benches, a film cutting area, sound displacers and recording and mixing equipment. The room is wired so that top-quality kinescope recordings can be made in the videotape room. Facilities include the new Scimens projector which has special filters and screens so that the projected image will look the same as if it were played through a film chain. This speeds up screenings.

No new equipment was added to the videotape central or the film chain projection room since they were already complete facilities—six high-band recorders and an Ampex slow-motion and stop-action recorder, along with the Ampex editing equipment. Film islands are equipped with three projectors each—two Eastmans and one RCA. (The RCA has dual automatic exciters and picture lamps.)

Back on the first floor, opposite the TV studios, are the radio and TV newsrooms, of which KPRC is most proud. Radio and TV areas are separate and each has its own directors, who command their respective areas from glass-walled offices.

In the radio section a glassed-off room houses all telephone recording equipment. Four field editors can be recorded simultaneously. Equipment is on hand for editing and transfer to air cartridges.

A communications room serving both radio and TV news includes a lot of receiving equipment—the station's two-way gear, as well as receivers to monitor the Houston Police and Fire Departments, the Highway Department, and the Texas Department of Public Safety, airport towers, and others. The communications room is unattended, and slave units are located in the "bull pens" of both the radio and TV areas. There is also a separate wire room used by



Decor is white Glass provides isolation with visibility. Above is view of radio newsroom. Below is view into radio on-air studio.



New master TV control has at its nerve center a video routing switcher to control all inputs and VTRs. Below is a view of a TV studio control room.



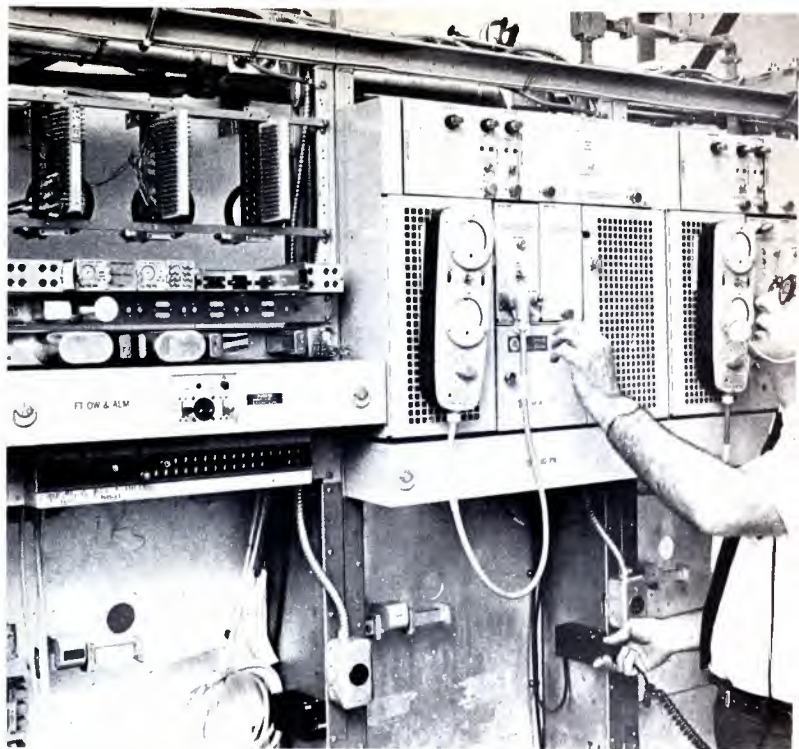
both staffs. A conference room is common to areas in which visitors can be interviewed or filmed.

Other facilities are devoted exclusively to either radio or TV functions. A radio newsroom on this floor feeds the radio station control room down on the terrace level. TV facilities include a film edit room and a news film morgue. There are separate areas or rooms for KPRC major programs: "The Five O'Clock News," the "News Documentary," and "News-Special" crews.

KPRC's own weather room is located in this area. In addition to the U. S. Weather Bureau's wire service and map service, KPRC maintains its own radar and weather station. Altogether the news area takes up 6000 square feet.

A separate wing (three levels) houses the administrative offices. Within key offices and conference rooms are stations that bring in all Houston over-the-air stations as well as the weather radar picture and the NBC line. There is also an in-house preview channel and one channel to carry inter-office visual communications.

Out in the garage, one will see the unusual sight of five remote TV trucks.



A nine-channel microwave link is part of KPRC's telecommunications center.

WYEN is Counting on Clean and Pleasant Sound to Buck 77 Competitors

IN JANUARY 1972, WYEN, a new FM-stereo station in Des Plaines, Illinois, a few miles from downtown Chicago, fired up its transmitter and studio equipment and set out to make a living in a market with 77 broadcast competitors, one of the most air-crowded metropolitan areas in the United States.

However it looks, this was *not* equivalent to jumping out of a window with both eyes closed. The management of WYEN had its eyes wide open and was making a carefully-calculated move. A study of the on-the-air radio product in the Chicago area had convinced them that there was a good chance for a new station that put out a technically superior signal, extra-clean and fresh sounding. In addition, they thought the station would increase its chances by working hard for listener participation in the selection of program material, which would be basically a wide spectrum of MOR music. In other words, WYEN would try to disprove the notion that FM listeners used radio music mainly for background listening. The station would benefit heavily, its sponsors believed, by giving listeners a more active interest in the station, a sense that it was serving them directly and individually in its broadcasts.

As this is written, after its first two months on the air, WYEN's management is convinced that the policy is *right on*: the station seems to be on its way to a secure place on the Chicago airwaves.

The good-signal part of the policy depends heavily, of course, on the selection of equipment. It would not be difficult to buy all top-of-the-line professional equipment if money were no object. WYEN shopped for equipment that put out a clean signal at competitive prices. The disc line-up starts with the Shure V15 pickup in a Shure arm. It includes the Panasonic SP-10 turntable, installed after a competitive table could not be rid of flutter and rumble. According to WYEN's engineers, the Panasonic table has proved to be outstanding for low flutter and noise, at a price (about \$360) below that of standard broadcast-station turntables. A number of sophisticated listeners have called in to ask what table is being used, so impressed were they with the low mechanical noise level.

Audio consoles are the CCA "ultimate." The audio line-up includes CBS Audimax and Volumax units for signal processing.

For production of commercials, announcements, etc., WYEN uses a variety of tape equipment. There are two Panasonic RS-275US stereo cassette recorders; a QRK cartridge recorder/player, and four Panasonic RS-736US reel-to-reel stereo decks. Ivan Bukovsky, chief engineer, admits that the cartridge system has better frequency response than the cassette system, but he likes the cassette system on general mechanical grounds and regards the cas-



Panasonic tape decks, turntables and cassette player (right) filled the requirements of WYEN.



WYEN says the SP-10 turntable replaced a more expensive professional unit which exhibited excessive rumble even after motors were reworked.

cassette, in an improved form, as the wave of the future. When cassettes are used to put material on the air, the high frequencies are boosted to restore top sheen.

One disadvantage of the cassette, the lack of provision for accurate start-cueing, is overcome at WYEN by cutting out the leader at the start of the tape and substituting live tape. The Panasonic machines come up to speed very quickly, and have no audible output when they are not running. Thus the machine can be left open and program material started right behind the stop position, for tight start-cueing.

However, there is no practical way to cue material that is away from the ends of the tape. Bukowsky, probably like many other broadcast engineers, believes—hopes, anyway—that cassette makers will soon work out a flexible cueing system.

Usually commercial and announcement programs are produced by feeding from various sources—cassette, cartridge, voice, etc.—onto a reel-to-reel recorder. The finally edited program is then most often dubbed back onto cassettes for broadcast.

WYEN uses microwave radio to get its signal to the transmitter, about ten miles from the studio. This avoids the frequency limitations of telco lines, as well as the danger of phase slippage between the two stereo channels, always a threat when two separate telco lines are used. The studio-transmitter equipment is by Moseley.

Moseley telemetry receiver and remote control units allow the operators to monitor and control the transmitter from the studio. McMartin digital frequency monitor, stereo monitor, and SCA monitor are the reading instruments.

The transmitter is a CCA 25-kw model, feeding a five-bay circularly-polarized antenna system.

Manager Ed Walters sums up the station's thinking on signal quality: "Our only product is sound, and we have tried to make it the cleanest sound in the market."

The programming is built mainly on disc jockeys who try to create strong direct links with listeners by repeated invitations to phone-in requests, and by friendly discussion of program ideas with the phoners. The basic MOR formula is often stretched to include blues, folk, light rock, light classical; the main criteria for any selection is that the station's music personnel think it is good music. Thus WYEN's programming often goes far afield as compared with a standard rock format, or a top-forty, or most MOR formats.

It works. Phone requests have gone from the initial zero to about 3000 a day. The management finds that figure extremely gratifying, and so do the advertisers. Admittedly, the experiment is in an early stage and lots more time is needed to really tell. But excellent sound, and music that specific individuals want, looks like a potent combination for this new station in a crowded market.

Independent KPHO-TV In Booming Phoenix Gets A Plant That Fits Its Size

KPHO-TV WENT ON THE AIR in Phoenix, Arizona, in 1949, the first television station in the state. It became a solid operation quite early in the game. By the mid 60's, though, KPHO had a problem: it was pushing out the walls of its downtown plant, trying to keep pace with needs and opportunities in the booming community.

This was all the more true because KPHO-TV is an independent station, with a strong slant toward local programming—local news, public service, education, sports, cultural activities, etc. There is, among many others, a daily magazine-format program that covers a wide spectrum of local interest material—personalities, home economics, do-it-yourself instruction, news, and much more.

The owning Meredith Corporation (publishers of *Better Homes and Gardens*) bought a new site in 1969. Construction of a new plant, with design and construction by the Austin Company, started in 1970. In November 1971, the new plant went into regular service. It is away from downtown Phoenix and more nearly in the center of the area's exploding population.

The building has two wings. The single-story administrative wing is connected by the main entrance lobby to the two-story production wing. The administrative wing holds the management offices, plus two conference rooms with projection booths and monitors that can be fed any studio output from a routing switcher in the engineering department.

The production wing has two studios—one 65 × 80 feet, the other 40 × 52 feet. The larger studio goes mainly for audience shows and commercial production, the smaller one mainly for the station's extensive live programming.

Each studio has an adjoining control room; either studio can be controlled from either room. The three TV color cameras are GE four-vidicon types.

There is in addition a master control room, which allows for overall routing of program material.

Control equipment includes a RCA TS-40 and two Grass Valley video switchers with special effects capabilities, and BC-7 audio consoles. Also in the master control room is a custom-built Grass Valley unit for mechanical control of telecine units.

There are three film islands, and equipment in-

cludes a General Electric PE-240 film camera, RCA multiplexer, and two RCA TP66 projectors.

Videotape machines include two Ampex VR-1200C, one VR2000, and one AVR-1. Spot programming and commercial production are rounded out with Arriflex film cameras, Siemens projector, Nagra sound recorder, and a Houston color processor for at-home development of film.

The transmitter is not new: it is an RCA TT25 CL, with 100 kw of visual signal put on the air, 15 kw of aural signal.

KPHO-TV is doing well. Of course, the station was doing well before the new plant came in. What the station gained is largely the ability to make up its own programs, from original or recorded material, far more efficiently, more rapidly, with more technical finish and editorial flexibility, and at an equipment cost fully in line with the station's operating level. That kind of top-grade production efficiency is basic to a station that wants to keep on "rolling its own" in an already large metropolitan area that is expanding like a super-nova.



KPHU located away from downtown and could go single story on a 3½ acre site. Total floor space in the new plant is about 43,000 sq. ft., compared to approximately 20,000 in the old building. There is room for an anticipated computer installation.



Typical studio control room showing new Grass Valley switcher, RCA audio console, and Gates cartridge tape equipment. Monitors are "jeeped" Sony 1201 color receivers.

From 220 to 100,000 Watts ERP On FM: Oklahoma State's KOSU-FM Makes the Leap

AN ENTIRELY NEW magnitude of operation opened up for KOSU-FM, stereo station of Oklahoma State University, when a long-planned expansion was completed in March, at a total cost of about \$100,000.

Cornerstone of the expansion is an RCA BTF-20E1 FM transmitter, rated at 20 kilowatts. With the circularly-polarized antenna, on a new 400-foot tower, helping to provide 100,000 watts of ERP, the reliable coverage of the station is expected to have a radius of more than 90 miles. The transmitter is in a new building about four miles from the studios. Both the remote control and the microwave STL are also by RCA.

Source material can be live, or from tape cartridge or disc recordings. The studio equipment is all RCA, and is designed for easy use by the station's professional staff of five and the student operators who are majoring in the university's radio-TV/film program.

The greatly expanded coverage will allow the station to reach many times its former audience with educational, cultural, and public service programs. This service to students with specific programs, and the service to the general public with cultural and public service material, are two of the main benefits the State of Oklahoma set out to buy with the money invested in the expansion.



An 18-hour day is broadcast from KOSU-FM's studios. Station is part of the National Public Radio network.

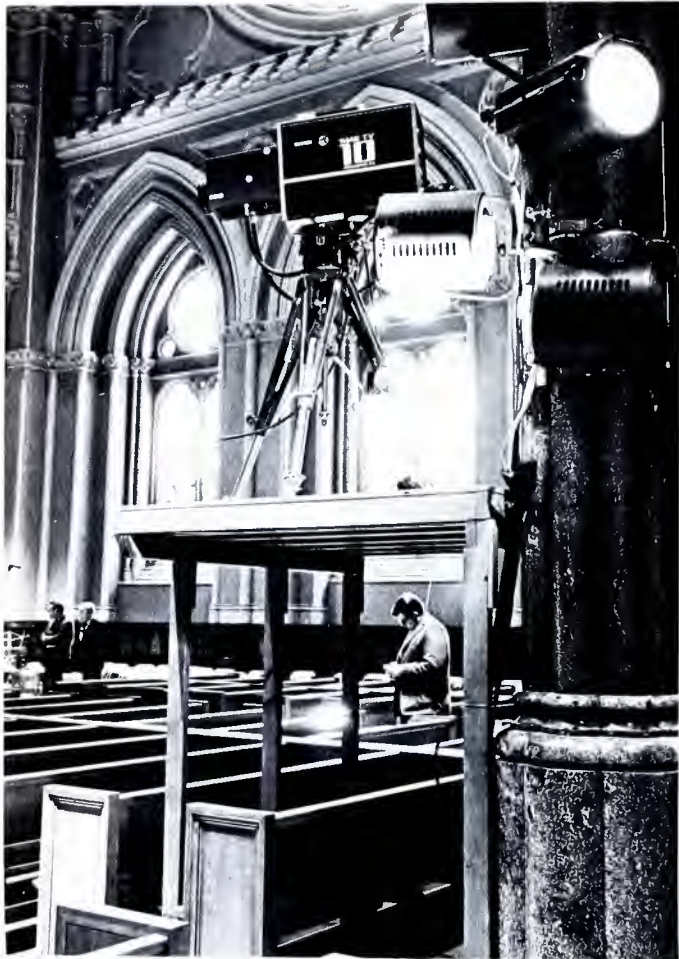
Low-Light Color Cameras Serve Ohio State Medical CCTV

RCA TK-44B COLOR CAMERAS, which produce clear pictures at light levels as low as five foot candles, are major items in a \$300,000 expansion of the CCTV system used in Ohio State University's medical education program. The system can handle up to 12 program inputs simultaneously, and a large master switching unit allows distribution of any program to any or all of more than 170 monitors in 12 different buildings. The university produces all the programs, using two RCA quad tape machines for original recording and dubbing onto helical TVC-870C for input to the system. Split-screen techniques give flexibility to teaching presentations, and an audio talk-back at each monitor allows students to ask questions during the program.

Color cameras that work with natural lighting filled medical school's need precisely.



Cathedral Is Fully Wired As Radio And TV Remote



Camera is in position for telecast, without the usual confusion of cables.

IN PROVIDENCE, RHODE ISLAND, the Cathedral of SS. Peter and Paul had for years presented radio and TV men with a whole series of headaches when they came in to originate broadcasts. Jury-rigged lights, and power for the lights, had to be strung in, making an unchurchly mess. TV camera cables snaked across the floor. Getting the signals out of the building made another mess.

Now all that is ended. The cathedral has a combined sound-reinforcement and radio-TV remote-pickup system, designed to fit most unobtrusively into the interior. Microphones and speakers are either concealed (two mikes are under cloths at the ends of the altar), or designed to match the decor, like the central ceiling-hung speaker behind a gold screen. There is a control room that serves for both the sound reinforcement and the broadcasting feed. Floor channels for TV cables have been laid to every conceivable pickup point so that only a few feet of mike cable need ever be exposed.

There are dependable feeds for up to 15 broadcasters, in two duplicate systems. Hookup facilities are installed in the wall outside the cathedral for television mobile units. The lighting was redesigned to make available when needed, a uniform 50 foot-candles across the entire cathedral from the regular lights, so that little or no fill light is needed for TV.

Wiring the cathedral for sound, radio and TV was a joint effort of Phillip Taylor, chief engineer of WJAR-TV; his assistant, Robert Gurney; David Coffey, diocesan director of radio and TV; Monsignor William J. Carey, cathedral rector; architects Kennedy, Kennedy, and Keefe; and the Gertz Company, sound engineers.



Small microphones at the ends of the altar are concealed by an altar cloth.



(Top) Cableraceways at all conceivable camera positions keep cable from being exposed to view. (Bottom) The mobile unit can be hooked up to the sound system in the cathedral from the outside, eliminating the laying of cables.



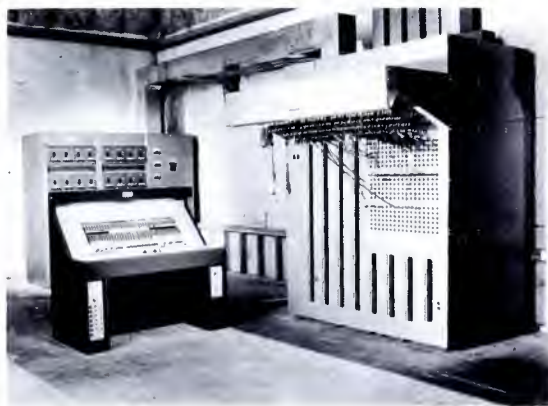
A sound engineer from the Gertz Company, who designed the cathedral sound system, instructs a priest on the use of the audio console, which controls both output feeds, the public address system and the broadcast system.

Expandable Lighting At PTV Station



Educational station WPBT (Channel 2) opened their new home in North Miami, Florida, in January 1972—a converted film facility.

Imero Fiorentino Associates was given the responsibility for the lighting and rigging facilities for the "live" studio. The first phase consisted of installing a lighting and suspension system which provides 3500 sq. ft. of net production area. The master plan called for the final studio that covers an area over twice the size of that actually outfitted. The ease of future expansion was given



priority consideration. Eventually, for example, the 36 dimmer control system can be easily expanded to a multi-preset 80-channel system.

Besides the large amount of floor area available for production and service functions, the studio has a cyclorama height of 30 feet, a distinct advantage uncommon in most present-day studios. The scene below is the opening silhouette of the WPBT local nightly news—the first show produced in WPBT's new facility. The 36-12KW dimmer system (right) controls 318 outlets.

Automation For A Medium-Small Radio Market in New Mexico



The home of KWKA-FM and KTOM-FM is a 3600 sq. ft. building made up of components produced by Stran-Steel Corp., a Subsidiary of National Steel Corp.

IN AN AREA WITH 40,000 PEOPLE, the operator of a combined AM/FM radio station will want to keep operating costs low; but he must also keep program finish and quality up if he is to compete with network outlets.

That is why Norman Petty, licensee of KWKA (AM) and KTOM (FM) in Clovis, New Mexico, in a new joint plant for the two stations, went wholeheartedly for program automation. For the AM transmitter, he got Sono-Mag equipment, including a DP-1 computer to control it. Mastertone carts hold the program units. For FM, there is a Sono-Mag chip-reading system, driving six Revox open-reel tape record-

ers. That system has the very high audio quality that can be put to use by FM stereo.

Collins equipment rounds out the stations, ending up with a Collins 500-watt AM transmitter feeding a directional antenna, and a Collins 50 Kw FM stereo transmitter which provides circularly-polarized coverage. The studio and transmitter are housed in a 3600 sq. ft. building, made up of components produced by Stran-Steel Corp., a subsidiary of National Steel Corp.

The two stations broadcast the same news and wake-up programs each morning up til 9 a.m.; then they part company, the AM station concentrating heavily on the top-40, the FM being slanted to pleasant listening MOR music. The staff consists of three programmers and an engineer, under Operations' Manager Hal Gore. During the day, material is dubbed onto the carts and the reels for later programs, the station working about three weeks in advance so that three weeks' programs are on tape at any given time. The Clovis stations draw on several disc jockeys who work at other radio stations—they record their material and send it in.

Each night after sign-off the next day's programs are set up so that the day can begin simply by pushing the start buttons. The AM day takes about 45 minutes to set up, the FM day about an hour. It is a totally rationalized operation, and it has helped to make KWKA-KTOM a success in the broadcast role the management has chosen for the stations.

WCVB-TV Tests Its On-Air Signal

Custom-designed production control console was built by Philips Broadcast for the new Boston station, WCVB-TV. CDL video switching is in center, start-stop panel on left, special effects on right. Program desk is at left of console. Audio control booth is through window at right. A full report on this station will appear in a subsequent issue. It's equipped with five of the new third-generation cameras, the digitally-controlled PC-100.



Discrete Four Channel Advocate Charges Matrix Promoters Rip-off Public

PROponents OF THE DISCRETE FOUR-CHANNEL APPROACH to quadrasonic broadcasting tangled with promoters of the matrix approach at both the NAB and NAFMB conferences in Chicago last month. Jim Gabbert, KIOI, and pioneer four-channel broadcaster, accused the matrix people of ripping off the public when they refer to their "out-of-phase" schemes as "four discrete channels of sound." He warned broadcasters not to promote matrix approaches dishonestly because the public will become jaded and won't buy true four-channel when it finally arrives.

Gabbert told *BM/E* that he departed from his prepared remarks at NAFMB after listening to "absurd" statements made by Emil Torick of CBS Laboratories. The CBS "SQ" matrix system is the leading matrix approach to quadrasonic sound. Torick claimed CBS Labs tried and discarded all discrete four-channel approaches as unworkable in practice before it settled on the SQ approach (*BM/E*, December, pages 24-27). He said the SQ matrix provides all of the acoustic information that the brain can assimilate and that the matrix approach has won the acclaim of music critics. CBS spokesmen implied that the discrete disc would not work because dust accumulation would fill the fine-tolerance 50 KHz track that carries the modulation for the extra two channels. Furthermore, he said, the recording level on four-channel discs is 5-12 dB lower than standard. (Torick was unphased by Gabbert's counterblast, since he repeated his assertions at the NAB panel which followed the NAFMB by three days.

Lou Doreen, inventor of the Quadracast discrete four-channel system, who has also been associ-

ated with both JVC (Japan) and RCA recording people, vehemently denied that dust is a problem—and 500 plays showed no wear, he said. He claimed the recording level is only 4 dB below standard (NAB zero level) and that there is 45 dB S/N. Torick implied at the NAFMB meet that RCA is not committed to the discrete four-channel record. At NAB, Doreen dramatically flourished a number of RCA releases and said more were coming fast. RCA, said Doreen, will stamp records suitable for either quadrasonic or stereo playing whereas the SQ approach issues separate records—one for stereo, another for quadrasonic playing.

At both the NAFMB and NAB panels, the matrix proponents were on the defensive because of lack of channel separation. Matrixing can reproduce the concert hall satisfactorily because reverberations (applied to rear speakers) are correlated to sounds coming from the orchestra. And, although listeners of matrixed-quadrasonic sound are satisfied that they hear "fuller" stereo on two-channel equipment, they aren't getting all of the benefits possible. For instance, as Gabbert emphasized, you can't create new music, such as rock, recorded on four microphones, or uncompromised antiphonal choral arrangements. Furthermore, some of the program content is lost to the monophonic listener when matrixing systems are used. This is important to a station, Gabbert said, because car and kitchen FM listening is 70 percent mono. Moreover, matrixing leads to some "loss of location" (directionality) according to some critics. Sid Silver, speaking for Sansui, granted that phase shift techniques theoretically suffer such

shortings, but they may not be particularly serious because many persons have been unable to tell the difference between matrixing and four-channel tapes on A-B tests.

Four-channel discs may impact the home market, but will the FCC permit broadcasters to play them? The Quadracast system is compatible (with mono and stereo) but it does require an additional subcarrier with 15 KHz audio at 76 KHz to transmit the front-minus-rear information. It has been commonly thought that modulating this subcarrier with 15 KHz audio would produce bandwidth deviations that might interfere with adjacent FM channels. In actual practice, this apparently does not happen. There is very little sideband energy at the 91 KHz deviation point. Tests run by the DOC in Canada of actual broadcasts made by CHFI, Rogers Broadcasting Ltd., showed spectrum content at 200 KHz deviation (the maximum measured) down 26 dB. It was down 26 dB at 192 KHz—26 dB was also measured for standard stereo transmission (no quadrasonic modulation). Some 12 spectrum signatures were taken and all were within CRTC bandwidth requirements.

R. H. Turnpenny, vice president of engineering for Rogers Broadcasting, was an NAB panelist. He said that it was his opinion that discrete methods were far superior to matrixing. Rogers has petitioned the CRTC in Canada for permission to use the Doreen system regularly. Because of full compatibility with mono and stereo and because no adjacent channel interference has been detected, Jim Gabbert of KIOI said he would begin such broadcasting in the U. S. unless forbidden to do so by the FCC.

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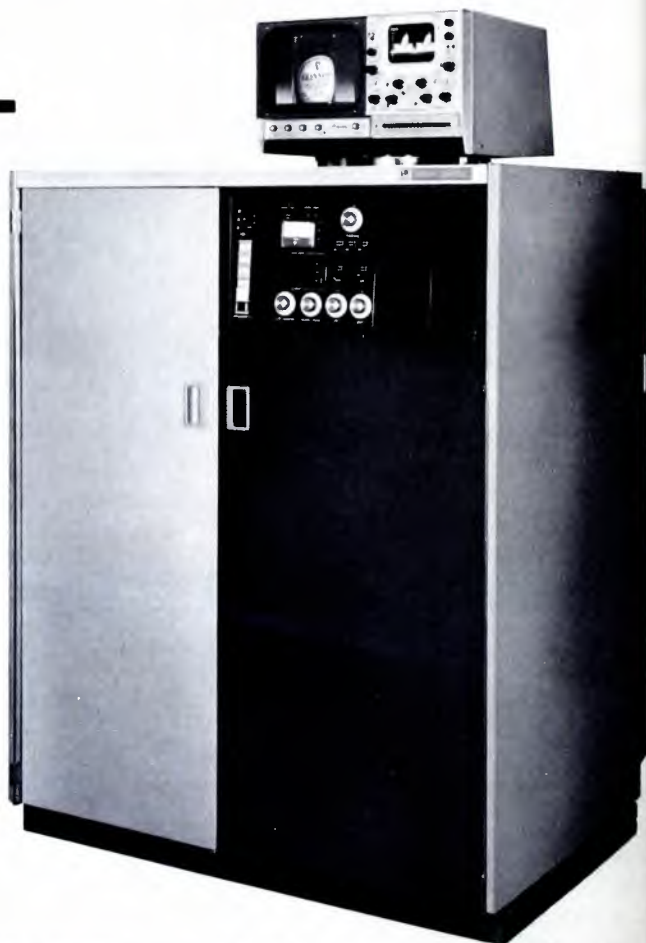
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BROADCAST EQUIPMENT

Black burst generator allows smooth fades to black without loss of color. Model 330 has burst phase, burst amplitude and sync amplitude adjustments; and two 75-ohm terminated outputs, individually adjustable from 0.2 volts to 0.6 volts. DYNASCIENCES. **276**

Tape evaluator-cleaner is designed for two-inch videotape. Hermes-Magnatek B-601 uses blade and tissue cleaning



system recommended by NASA. While cleaning it simultaneously evaluates a one-hour tape in nine minutes, with a pen recording of video dropout and another for edge damage. The tape is also erased and wound in a flat pack with constant tension. TELEVISION EQUIPMENT ASSOCIATES. **277**

Spectrum analyser has 70 dB distortion-free display from 1 MHz to 3 GHz. Model AL-60 covers range in three bands, all having -105 dBm sensitivity and 1 GHz maximum dispersion. Resolution bandwidth is switchable among 200 KHz, 10 KHz and 0.5 KHz. A birdy-bypass marker system has crystal-controlled harmonic markers through 3 GHz. \$4500. TEXSCAN. **278**

Omnidirectional dynamic microphone is designed for drums, acoustic guitars and other musical instruments requiring extended, flat, frequency response. Model 655AL has filtering to virtually eliminate pop and wind-blast noise. LTV LING ALTEC. **279**

Video-audio routing switchers connect any of 12 inputs to each output. Series RS switchers can have outputs from two to infinity. All inputs are 100 percent isolated for elimination of switching transients. NTSC color

signal is transmitted free of discernable distortion. MARCO VIDEO SYSTEMS. **286**

RF and microwave attenuators cover DC to 2 GHz, at up to 3 watts. Series 8120 uses a thick film substrate, is accurate to ± 0.3 dB at 10 dB, has insertion loss of 0.2 dB and impedance of 50 ohms. Rotary units are 1.31 in. in diameter and 2.22 in. long. \$78 and up. TELONIC INDUSTRIES. **290**

Instrument cleaning fluid removes dust, lint, atmospheric oil, moisture and carbon or oxide particles. Pura-kleen is designed for all precision instruments, including magnetic tape heads and guides, and magnetic tape itself. CRC CHEMICALS. **292**

Stainless steel splice cases for underground cable are available in 6.3- and 9.5-inch diameters. Preformed cases are 38 in. long overall, accommodate any size cable available today in the 31 in. inner length of the stretched case, and take four rows of 3M MS² units without crowding. PREFORMED LINE PRODUCTS. **294**

Bulk magnetic tape eraser handles audio, video, instrumentation tape and magnetic films from 150 mil to 2 in. widths. Taberaser is designed for tape

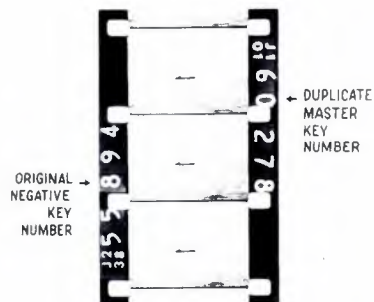


on reels or in cartridges, has a field that automatically diminishes slowly at the end of a 30-second cycle. From 30 Hz to 15 KHz, erasure is 76 dB below saturation. Automatic blower keeps heat within safe limits. \$3.95. TABER MFG. & ENG. CO. **295**

Twenty-channel event recorder uses non-impact thermal recording principle, eliminating writing pens. Model 820 will also print identifying numerical information, is intended for monitoring relays in power, utility and communications, as well as manufacturing and scientific studies. Chart

speeds from 3/4-inch/hour to 12 inches/minute are available. GULTON TECHNI-RITE ELECTRONICS. **300**

Simultaneous reproduction of original key numbers from either side of original 16mm negatives is provided by



special liquid gate optical printers. Numbers are copied onto optical master or negative. CINEMA RESEARCH CORP. **291**

UHF television translator is rated at 100 Watts, has interchangeable broadband modules to simplify maintenance. Model TU-100 is solid state except for the final amplifier, covers channels 14-83 and CCIR bands IV and V. Also available are completely solid-state 1 and 10 Watt models. EMCEE BROADCAST PRODUCTS **309**

Videocassette with "Scotch" brand tape uses 3/4-in. format, compatible with Sony, Wollensak, and all other U-Matic videocassette player/recorders. High Energy cobalt-energized tape has special formulation for high s/n ratio and crisp chroma response, and a back treatment for smooth wind. \$17 to \$35, 10 to 60 mins. 3M COMPANY. **310**

Stereo system for CCTV uses special dual lens on camera, screen on monitor, and stereo viewing accessory, for



three-dimensional images. Stereotronic system is entirely optical, requires no electronic modification. Lens, Model 5002, \$1950; screen, \$150; viewing hood, \$550. STEREOTRONIC TELEVISION CO. **303**

continued on page 34

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PRODUCTS

Optical multiplier has self-dousing, image transfer without bounce, and up to three input stations. Model



3100 has 1.8 x 2.4-in. image at field lens, 2-in. TV camera lens, 4-in. 16mm projector lens. Image transfer time is 100 msec. ZEIMARK CORPORATION. 296

Cardioid condenser microphone has FET-input amplifier. Neumann U-47 uses op amps, has 136 dB dynamic range, switchable 10 dB overload protection between capsule and amplifier, 6 dB switchable output attenuator. GOTHAM AUDIO CORP. 297

"Noise eliminator" compresses program dynamics in recording, expands in playback to give tape machine as much as 110 dB dynamic range at 15 ips. Model 2000 has three different



record characteristics, optimized respectively for 15 ips, 7½ ips, and slow-speed recording, FM broadcasts or disc records. Noise reduction is 50 dB for tape mastering and 35 dB for prerecorded tapes, records and FM. \$5300 (two-channel). BURWEN LABORATORIES. 299

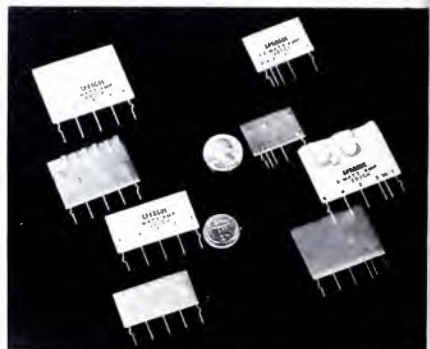
Magnetic head bracket with precision die-cast construction is intended to minimize tape guidance variations in tape cartridges. Spotmaster Model PL-HB2 reduces phase slippage be-



tween channels in stereo, can be used with any cartridge. BROADCAST ELECTRONICS. 304

Transverse videotape for four-head machines is designed for educational and commercial monochrome broadcasting and CCTV. Series 145 tape has a coating for reduced head wear, (less than two microinches per hour), and smaller oxide particles than previous monochrome tapes. \$190 for one-hour reel. AMPEX. 305

Miniature packaged hybrid audio amplifiers are available in ½ Watt, 1 Watt, 3 Watt and 5 Watt designs. Ceracircuit audio amplifiers have less than 5 percent harmonic distortion at



rated output; frequency response is essentially flat from 60 Hz to 15 KHz for 5-Watt unit, higher for others. SPRAGUE ELECTRIC. 306

Memory system for pre-programming events will handle up to 500 events on each of up to four optional devices. Model CMS-500 consists of rack-mounted memory and power



supplies, and a desk-top operator's console with simple 16-key keyboard. A six-digit readout shows all entries and deletions. Access is random, and instantaneous to any event. CYBRIX CORP. 308

Alarm system uses small unit which emits piercing sound when jostled or moved out of position. "Stop Thief" weighs less than a pound, is the size and shape of a slightly oversized cigarette package. Batteries are within unit, which needs only attachment to a surface where it will be used. NOVA INDUSTRIES, INC. 315

NEW LIT

For copies of these literature offerings, circle numbers for appropriate items on Reader Service Card.

Testing RF transmission lines, both coax and waveguide, is the subject of a new 16-page data sheet; test arrays covering 0.01 to 18 GHz are detailed for swept measurements of insertion and return loss vs. frequency, and for frequency-selective locations of faults. Hewlett-Packard. **200**

Broad line of photomultipliers, gas and vacuum photodiodes, electron multipliers, and integrated photodetection assemblies, is covered in detail in new enlarged and revised 86-page catalog, including background material on combination of solid-state and vacuum technology in the Quantacon photomultiplier. RCA. **201**

Wall chart gives quick reference data to engineers, designers, scientists and educators working with electronic instrumentation, has tables, charts, curves, nomographs, equations, such as digital codes; digital-analog conversion factors; pulse characteristics and nomenclature; universal resonance curves; time domain/frequency domain conversions; and many more. Ballantine Laboratories. **202**

Radio multiplex system capable of transmitting up to 1260 voice or data signals simultaneously over a single microwave or coax channel, up to 3000 miles or more, is described in detail with photos and diagrams in new 20-page pamphlet. GTE Lenkurt. **203**

Video, voice and data communications systems are covered in four-page pamphlet; details are given on a total of 49 different products in the field. GTE Lenkurt. **204**

Booklet covers TV master antenna system designed for multi-set installations in hotels, motels, hospitals, apartments, etc. RCA. **205**

A 96-page guide shows 120 SK series solid-state devices as replacements for over 46,000 industry types, together with performance data and application notes on the SK series. RCA. **206**

Computer terms are defined in new and updated pocket glossary, including the computer acronyms most used in the industry. General Automation. **207**

NEW from TerraCom:



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the universal one
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NEWS continued

operate a non-profit cable system in Waterbury with instantaneous access for schools, public meetings, community groups, and with a training program in cable techniques for local citizens.

Alabama Cable System Sets Up Civil Defense Alert

In what was said to be a "first" for any cable system in this country, Decatur Telecable, Decatur, Alabama, has worked closely with Civil Defense officials to develop a warning capability for its subscribers. A Retrieve and Broadcast Warning System has been set up, with origination at local CD headquarters, which sends audio and visual warning signals over the cable. The signals are also sent by cable or by microwave relay from Telecable to a number of local radio and television stations for re-broadcast, increasing the alert coverage.

Kodak Report Promises In-Camera Color Processing

Eastman Kodak Company reported world-wide sales of \$2.9 billion for 1971, up seven percent over 1970. The annual report also predicted, in the foreseeable future, color films for in-camera processing, part of a new Kodak approach to instant photography. President G. B. Zornow said: "We know where we are going [on instant photography] and we know how to get there. The system... will be based on a new Kodak approach to color forming, with such features as camera portability... and results of superior quality."

FCC Counts Five Million CATV Subscribers in U.S.

As of January 1, 1971, there were 5,008,580 CATV subscribers in 4017 communities in the United States, according to a report by the FCC derived from its annual CATV fee returns for the calendar year 1970. Some other data from the report: 50 communities had more than 10,000 subscribers each; TelePrompTer-Manhattan had the largest number in one city, 30,422; and California was the state with the largest number, 721,445.



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The solid state AD1B distributes audio signals to five separate points within a studio system or to telephone lines. Output level controls are individually adjustable. Adding our AD1B-X channel extenders allows up to 25 channels to be accommodated, with input metering and audio monitoring for all 25 provided by the AD1B. Both units meet traditional SPOTMASTER standards of performance and reliability. Response is essentially flat from 40 to 20,000 Hz with low distortion and noise and 60 db channel isolation. Input transformers are standard; the user may specify either balanced output transformers or unbalanced emitter follower outputs. Write for details:

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FTC Is Watchdog For False Ads, Says FCC

The FCC has reaffirmed, in recent responses to several petitions for FCC action against alleged false advertising on the air, that the "main thrust" of regulation against deceptive ads must come from the Federal Trade Commission. The FCC said it might act in a "clear, flagrant case," but will generally expect from broadcasters only that they police advertising with the "assiduous attention which can be expected from intelligent and informed individuals." In another response to a third-party plea, the FCC said that a broadcaster charged with airing a false advertisement is not required, under the Fairness Doctrine, to broadcast a refutation of the ad claims.

RCA Solid-State Camera Foreshadows Tiny TV Unit

A research model of a camera with a solid-state "eye," recently demonstrated by RCA, may be the precursor of a radically new style of TV camera that could be as small as a wristwatch. The research model's light sensor has 32 rows of photosensitive solid-state elements, and 44 elements in each row. By rapidly scanning the elements "bucket-brigade" style, the scene is converted into a sequential signal. Dr. William M. Webster, vice president of RCA Laboratories, said that considerable work is needed before the all-solid-state camera is ready for military or consumer applications; he looked forward to a large increase in the number of elements.

Harris to Introduce All-Electronic Newsroom

Harris-Intertype announced an all-electronic newsroom system, with reporters writing on "video typewriters" that display the news stories on a video screen, editors retrieving the copy from a central memory and amending it electronically, then pushing a "set-it" button for totally automatic, high speed photo-typesetting. Not a single piece of copy paper or punched tape is involved, and the editor has direct control of the material to be set in type. According to the announcement, the Gannett newspapers will install the system in a daily paper in Florida this year.

RCA Continuing Operations Gain; Computer Withdrawal Brings Loss

Annual report of RCA for the calendar year 1971 showed a net profit on continuing operations of \$128.6 million (against \$107 million in 1970). But the company's decision to withdraw from the general computer business entailed a net write-off of \$250 million, in addition to a loss during the year on computer operations of \$34 million.

This turned the year's overall result into a loss of \$156 million. The report hails the recovery in color set sales as the largest single factor in RCA's improved continuing operations. Also sharply higher were sales of RCA Global Communications, of components to the electronics industry (particularly TV picture tubes), and of RCA's foreign subsidiaries. However, the report noted a decline in sales and earnings of the National Broadcasting Company. Total sales for

continued on page 38

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out Dolby will simply hear a moderate brightening of tone in some music.

Conrac Corporation reported sales of \$48,931,214 and net income of \$1,925,922 for calendar 1971; profit per share was \$1.40, up 25 percent from 1970's \$1.12 per share. . . **Society of Photographic Scientists and Engineers** holds a combined conference and tutorial seminar in San Francisco, May 7 to 12, with many papers and discussions on holography, processing theory, novel photo systems, and other related topics; information comes from R. W. Wood, 1330 Massachusetts Avenue, N.W., Washington, D.C.

C-Cor Electronics completed the sale of \$400,000 of five-year, nine percent subordinated debentures, which will help supply working capital for expansion to an annual level of \$7 million in sales, according to James R. Palmer, C-Cor president. . . **Zenith Radio Corporation** sales for calendar 1971 totalled \$613 million, up seven percent from 1970, and earnings from operations were \$31.3 million, up 27 percent from 1970, according to a company announcement. . . **Cypress Cable TV of Oshkosh, Inc.**, a subsidiary of Cypress Communications Corp., received a franchise from the city of Oshkosh for construction of a cable system there; plans call for a 36-channel bi-directional broadband telecommunications network.

International Video Corporation, Sunnyvale, California, has opened a new manufacturing plant with 47,000 square feet of space, adjacent to the company's headquarters building, for production of color TV cameras and videotape recorders. . . **Ampex Corporation** reported a loss of \$86 million for the first three quarters of its fiscal year, and estimated an additional loss of \$3 million for the last quarter, which ends April 29, 1972.

TOCOM, Inc. is the new name of CAS Manufacturing Company, according to an announcement by John Campbell, company president. "Total communications" better expresses the company's wider thrust, he said, with development of a two-way computer-controlled central CATV system. . . **KNEV-FM, Reno, Nevada.** has a new phone: (702) FCC-KNEV.

continued on page 40

Checklist of Books that Belong in Every Radio & TV Station Library

MANAGEMENT, ORGANIZATION & OPERATION

- The Business of Radio Broadcasting**—By Edd Routh. Truly an all-in-one station operating guidebook. Without exaggeration—the most authoritative and useful station operating handbook ever published. 400 pps., No. 587 \$12.95
- Managing Today's Radio Station**—Encompasses management, programming, sales, training, rates, etc. 288 pps. No. 461 \$12.95
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- Planning the Local UHF-TV Station**—Covers location, equipment, organization, and operation. 296 pps. No. T-43 \$10.00
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NEWS continued

Century Strand, Inc. has opened new Eastern offices at 20 Bushes Lane, Paterson, New Jersey . . . **Mid-Texas Communications Systems** will sell to **CableVision Properties**, its cable systems in Killen, Belton, Harker Heights and Copperas Cove, Texas; Mid-Texas will continue to supply telephone service in those communities.

The Consumer Electronics Show made two announcements: the 1972 show at McCormick Place in Chicago, June 11-14, was a complete sell-out by early March and will be the largest show in history exclusively for consumer electronic products; the Winter Consumer Electronics Show, slated for the McCormick Inn, will run from January 12 through 15, 1973, a day beyond original plans, because of requests from many potential exhibitors.

People

L. Richard Fisher will fill the new position of western area sales manager for GTE Sylvania's CATV operations . . . **Dr. J. H. Vogel** was advanced to vice chairman and chief operating officer of Laser Link Corporation, and **Ken Knight** was promoted from vice president to executive vice president . . . **Robert P. Hill** was named vice president-sales of Videorecord Corp. of America, Westport, Conn.; he was formerly vice president of marketing for the CBS Electronic Video Recording Division . . . **Kerwin F. McMahon** is the new CATV sales manager for TeleMation East, Inc., with headquarters in New York City. McMahon not only has a 14-year background in CATV sales, but also was a student of music and later had years of production experience in the theatre and in radio broadcasting.

Don Shuler was elected president of the Ohio Cable TV Association; Jack Rubins became vice president and John Raines secretary-treasurer. All are associated with cable firms in Ohio . . .

William L. Kacin will be general manager of the HF Photo Systems Division of Technology Incorporated, based in Los Angeles . . . **James A. Underwood** is the new operations manager of w-two, channel 2 station in Terre Haute, Indiana.

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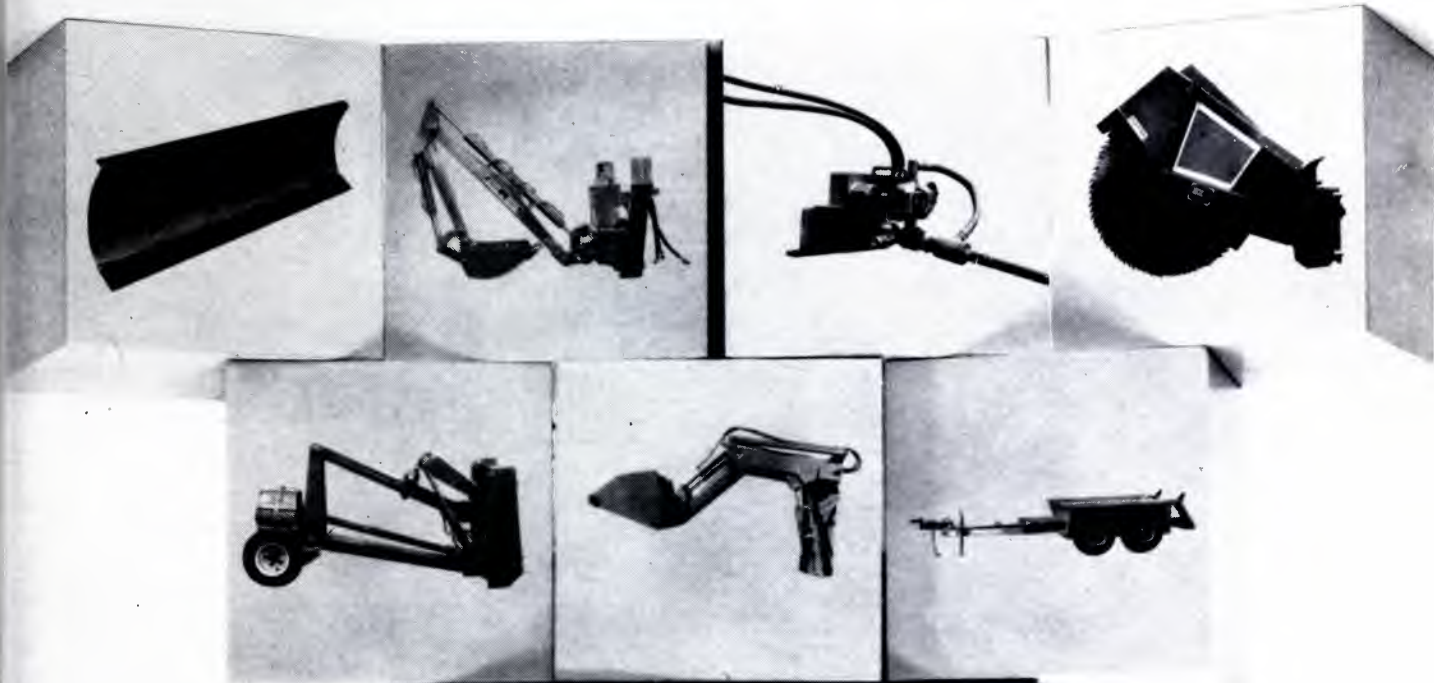
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