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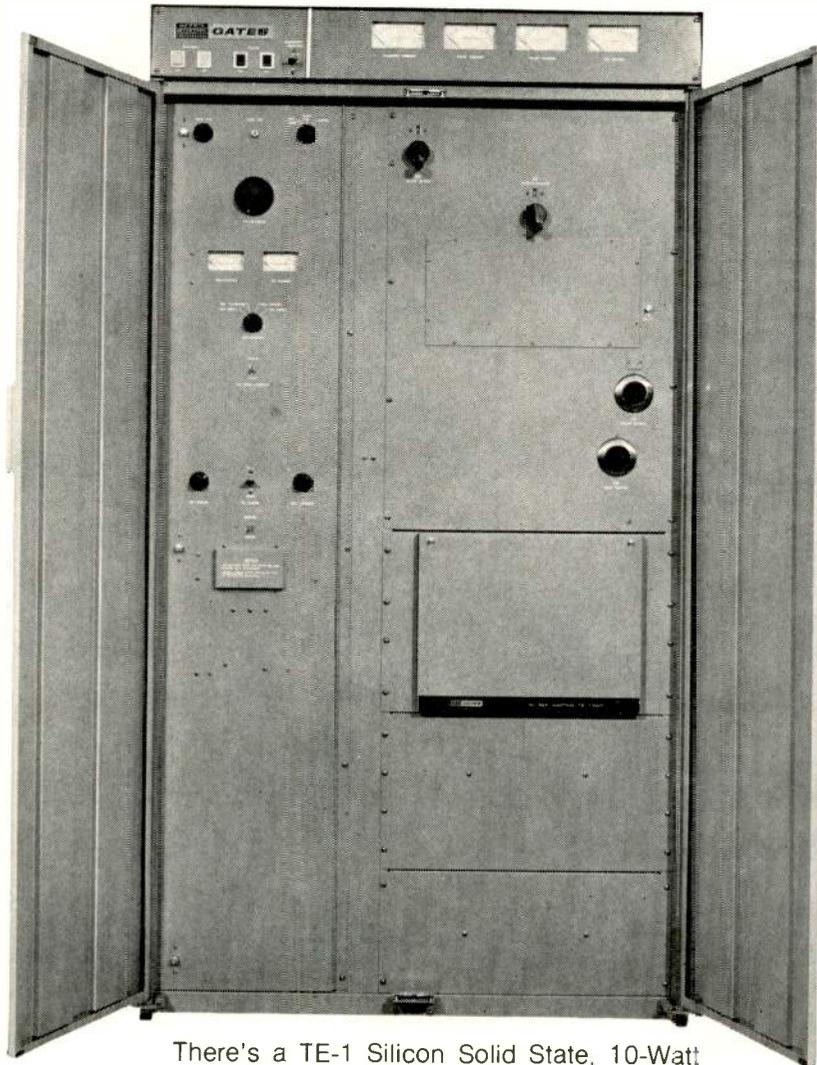
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**This month's cover:** Apollo modules have become TV studios these days, and the astronauts are so concerned about their appearance on the tube that they've taken to shaving during the mission. Next on the agenda, no doubt, will be a weightless cosmetic kit and dime-store makeup mirror (also good for shaving) as depicted in Art Sudduth's cover design. For more on the Apollo TV coverage, see pp. 35-37.

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# BROADCAST INDUSTRY NEWS

## NAB Board fails to okay NAB-NCTA proposal; establishes committee to meet with NCTA

The Board of Directors of the National Association of Broadcasters ended its four-day consideration of the NAB-National Cable Television Association compromise agreement on June 20, by unanimously adopting a resolution of its own.

Calling for "major revision and resolution of other issues" in the proposal, the NAB resolution endorsed a 12-man committee of broad representation to renew negotiations with the NCTA and copyright owners.

On June 26 NAB President Vincent T. Wasilewski appointed William Grant, president of KOAA-TV, Pueblo, Colorado, chairman of the negotiating group. Three members of the committee sit on NAB's Television Board; one member belongs to NAB's Radio Board. NAB's newly-elected Board chairman and vice chairmen are ex-officio members of the negotiating committee.

In separate meetings during the NAB Board meeting, the 15 members of the TV Board and the 29 members of the Radio Board went their separate ways.

The Television Board, which suggested the wording "major" revision, asked Wasilewski to include on the committee representatives from the Association of Maximum Service Telecasters, All-Channel Television Society, major program sources and the National Association of Educational Broadcasters—all critics of the joint plan.

The Radio Board, which wanted to delete the wording "major" revision, was said to have decided that naming organizations with a hard-line policy toward cable regulation would unnecessarily antagonize CATV negotiators.

When the two Boards compromised at the Board of Directors' meeting, the word "major" was put back into the resolution and specific mention of MST, ACTS and NAEB was deleted.

Exactly what was meant by "major revision" was not confirmed by

Wasilewski; but it is believed by many in the industry to refer in particular to provisions which proposed that systems carry three network affiliates and three independent stations. "Other issues" is thought to refer to items like radio carriage by CATV systems.

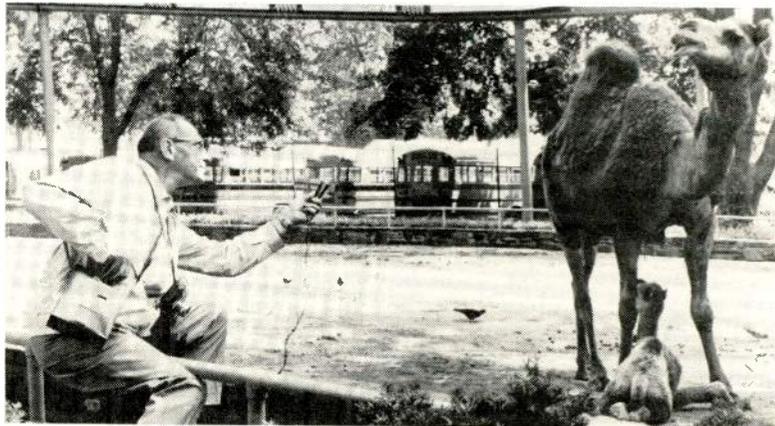
Board members seemed adamant on one point—that any new NAB proposal must include the stipulation that agreements would be subject to enabling legislation. In this way, if the NAB preserved its ban on CATV interconnection (deemed anticompetitive by the Justice Department), it would have specific legislation protecting it from antitrust charges.

Worked out over four months by legal staffs of the NAB and the NCTA, and accepted "in principle" by the NCTA Board in late

May, the plan proposed essentially that:

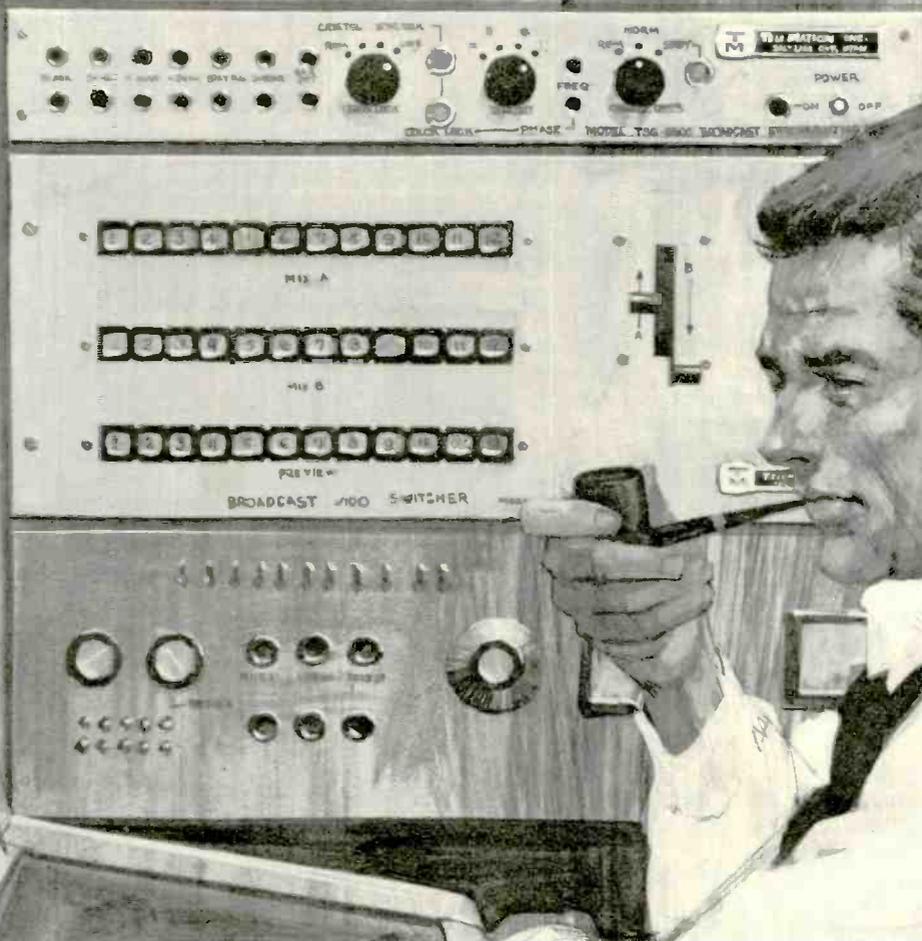
- CATV systems be made liable as determined by Congress for payment of copyright fees on television programs retransmitted to their subscribers.
- CATV systems be permitted to carry three network affiliated stations, plus three independent commercial stations, and be required to carry local stations.
- CATV systems be prohibited from interconnecting.
- All CATV systems serving subscribers as of the date of the passage of new copyright legislation continue to carry signals they carry presently without providing "exclusivity" protection.
- CATV systems be allowed to originate a single channel of entertainment and unlimited channels of automated programs with one originating channel carrying advertising.
- Existing CATV systems be

### 'Sure, we ALL want peace in the Middle East . . .'



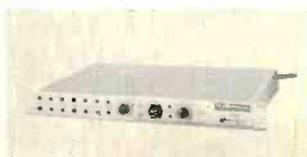
Commenting on current events is one of Philadelphia Zoo's own, who debuted recently on tape in the Zoo's new Safari Monorail (seen in background). Taping our friend's remarks for background during commentary as the train passes camels' headquarters, is Henry Gregg, president of Henry Gregg, Inc., Havertown, Pa. Gregg created the effect of a real safari by writing, timing, taping and selecting proper sound effects, music, scoring and mixing. Recorded Publications Laboratories, Camden, N.J., did the sound production and recording for the four completed tapes. Challenges were many, but the greatest were said to have been preventing spill-over towards the ground (the trains ride 15 feet above animal collections) and improvising animal sounds not available in the RPL extensive library; to achieve a realistic sound of a bear when the bears were speechless, Gregg and a producer-director took the sound of a baby crying and slowed the speed. Each of the three Monorail train controls carries two tape cartridges—one as a spare, with switching made possible from normal to reserve power if necessary.

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grandfathered to permit them to continue services supplied at the time of adopting new legislation.

To many cable and broadcasting leaders, passage by the NAB of the May 29th compromise agreement would have meant protection for the broadcaster against indiscriminate use of his programs by CATV and more room in which CATV could have expanded than seemed possible under proposed FCC rules.

If the plan had passed NAB, it would have been sent to Congress and to the FCC, which would have had to ratify it in the form of copyright legislation and rules before any final peace could have been declared.

Such peaceful coexistence between the broadcasting and cable communities appears remote at present, the general consensus in cable quarters being that NAB is "running scared" and "on the defensive."

"The . . . resolution . . . must be interpreted as a rejection of the NCTA-NAB staff proposals," said Fred Ford, NCTA president. "This action marks the second time in a four-year period in which representatives of the two associations have reached an accord approved by the NCTA Board of Directors, only to be rejected later by the NAB Board," added Ford, who would give no further comment pending NCTA action.

## Supreme Court upholds 'fairness doctrine'

Saying that it is the right of the viewers and listeners, not the right of the broadcasters, which is paramount, the Supreme Court unanimously upheld on June 9 the constitutionality of the Federal Communications Commission's "fairness doctrine," which requires broadcasters to air both sides of important issues.

In its 32-page opinion, the High Court said that the fairness rules "enhance rather than abridge the freedoms of speech and press protected by the First Amendment"; the Court also said, "it is idle" to assume an "unabridgeable First Amendment right to broadcast comparable to the right of every individual to speak, write or publish"—unlike print media, access to station ownership is limited.

Specifically at issue were two doctrine subrules adopted in 1967—the "personal attack" rule and the "political editorial" rule—which don't apply to bona fide

news coverage or interviews, commentary or analysis done in the course of news broadcast. The former requires stations to donate free time to any person or group whose honesty, character or integrity has been attacked over the station's facilities; the latter provides that stations endorsing a political candidate give the candidate's opponent a chance to reply.

The Court's decision is said to offer little hope of success to appeals filed by the National Association of Broadcasters, three major TV networks and tobacco industries to the FCC's order that stations carrying cigarette commercials have "the duty" to inform listeners of health hazards of smoking.

In one of the controversies decided the same day, the Supreme Court affirmed FCC action requiring Red Lion Broadcasting Co., licensee of WGB, Red Lion, Pa., to provide free reply time under the fairness doctrine for response to a personal attack. The Court thus reversed a decision of the U.S. Court of Appeals for the Seventh District that held the Commission's personal attack rules unconstitutional.

## Commission adopts anti discrimination rules

The FCC has adopted on a five-to-one vote rules to prohibit discrimination in employment practices by the broadcast licensees.

According to the new policies, each station must "establish, maintain and carry out a positive continuing program of specific practices designed to assure equal opportunity in every aspect of station employment policy and practice."

In an associated item, the Commission asked for comments on proposals which would require broadcasters with five or more full-time employees to submit, with applications for new licenses and transfers, equal opportunity programs they are adopting for employing Negroes, Orientals, American Indians and Americans with Spanish surnames. At renewal time, reports on the progress of the programs would be submitted and annual statistical reports would also be required.

The new rules originated in an order issued on July 5, 1968, when in response to a petition by the United Church of Christ, the FCC ruled that racial discrimination in broadcast employment wasn't con-

## Radio & surfing team up



Leroy Gloger, president of Houston C & W Radio Station KIKK, congratulates Judi Kunkel—overall winner of the girl's division in the Third Annual Pepsi State Surfing Championships sponsored by KIKK and held on Galveston Island, Texas, in May. The past three contests have been made into 60-minute TV specials; this year's color special, aired during prime evening time on ABC's Houston affiliate, KTRK-TV, is expected to be shown on a statewide network. Trading its boots and spurs for a surfboard has helped KIKK pull a greater share of the teenage listening audience in its market. For over \$2000 in prizes and \$900 in trophies and medals, why not?

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sistent with operation in the public interest. At that time, the Commission decided to carry out the policy on the basis of individual complaints.

The Commission indicated with the release of the new rules in early June, that it can't effectively implement equal employment opportunity policy by relying solely on individual complaints.

## Committee stalls cigarette debate

By renewing a Cigarette Labeling Act provision during the week of May 25, the House Commerce Committee delayed regulatory agency action to require warnings in cigarette advertising until 1975.

The Committee did, however, approve a stronger warning for cigarette package: "Warning: The surgeon general has determined that cigarette smoking is dangerous to your health and may cause lung cancer or other diseases."

Inclusion of the July 1, 1975 expiration date was the only gain made by antismoking forces on the committee. Before amendment, the bill did not specify any expiration date—an omission preferred by protobacco groups.

The question of who is to regulate cigarette advertising policy—the industry itself or government agencies—should be answered soon by the outcome of the meeting of NAB's radio and TV code boards.

## Five months later, White House releases Task Force Report

Unaccompanied by any Nixon administration endorsement, the Johnson administration's Task Force Report on Communications Policy (minus 3000 pages of staff reports) was released by the White House during the week of May 19, five months after its completion.

Months of Congressional pressure for official release of the document culminated on May 19 with Representative Torbert H. Macdonald (D-Mass.) requesting the Report before his panel's interview of Eugene V. Rostow, chairman of the Task Force. The Report was sent the following morning to Representative James R. Broyhill (R-N.C.).

Release of the report has not added new information to that already known through an early draft (see January, *BM/E*, pp. 6, 8).

Copies are available from the Government Printing Office @ \$4.50 each.

## The whole world was watching . . .

Those of us who missed Columbus' discovering America were able to make up for it on July 16, by witnessing another first—the landing of the first men on the moon via the Apollo 11.

The whole world watched—in color—as astronauts Armstrong and Aldrin stepped out on the Lunar surface for mankind's first touchdown on another heavenly body.

Backing up the epoch-making occasion was the ABC TV pool. The three networks have been rotating pool responsibility with each Apollo flight. As ABC's Julie Barnathan put it, "It was just our turn in the barrel."

## Black audio news service starts operating

BAN—Black Audio Network—signed contracts and went into operation in New York City on June 9.

Designed for the exclusive use of black-oriented broadcasters, BAN consists of reports from its correspondents around the world and actual sounds of the newsmakers.

Although BAN emphasizes news of particular interest to the black listener, it covers major general interest news as well.

BAN makes available two daily news feeds to subscribers—the first at 7 a.m. and the second at 3 p.m. Rates run from \$40 to \$150 per week; rates are exclusive for primary coverage area.

Because BAN signs up only one station in each market and since there are only a few hundred black markets in the U.S., about 75 stations thus far having signed up for the service is a good show, according to Bill Winchell of BAN.

## The New Left hasn't left out broadcasting

The New Left may soon take on the FCC and the broadcasting industry, if the formation by New Left figure Marcus Raskin of a task force to study the relationship between the two and the public interest is any indication.

One-time advisor to President Kennedy, Raskin is codirector of

the Institute for Policy Studies in Washington, D.C.; the project is part of his studies of major national institutions.

"One purpose of the study is to talk through the issues of what is the definition of public interest and of ownership . . . Broadcasting gives people their culture, their information and their values. Not to look at it is to not look at a central part of what America is about," said Raskin.

The study, which may provide material for a book scheduled for completion by next year, might be the basis for criticism of the Commission's licensing policies, said Raskin.

A six-year-old center for research, educational and social problems, the IPS is financed most by private foundations like the Edgar Stern Family Fund, the Fontaney Corp. through James P. Warburg and the Ford Foundation.

## 106th SMPTE Conference set for Los Angeles

The 106th Technical Conference and Equipment Exhibit of the Society of Motion Picture and Television Engineers is set for September 28-October 3 at the Century Plaza Hotel, Los Angeles, California. A special program is planned on super 8mm production techniques during the last two days of the Symposium. If interested in presenting a paper, write to: SMPTE Headquarters, 9 East 41st St., New York, N.Y. 10017, Att: 106th Conference Program.

## Hasselblad color shot used for space stamp

A photograph taken by Apollo 8 astronauts with an electric Hasselblad camera, served as the basis for a new stamp commemorating man's first flight to the moon.

Electric Hasselblads advance the film automatically and take photographs by remote control. Using this method, one of the cameras took stills of the surface of the moon.

Timed at 20-second intervals, for a 50-to-60 overlap on each exposure, the photographs were later stereographically projected for height and depth evaluation for accurate moon mapping from the 2¼ × 2¼-in. negative.

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## FOCUS ON **CATV**

**CATV industry  
now has a PACCT**

A Political Action Committee of Cable Television (PACCT) was formed early in June to educate legislators with CATV's legislative position and to generate financial support for law makers who share CATV industry views.

PACCT is a separate, independent, unincorporated organization by necessity, said Martin Malarkey, chairman, because federal law prohibits corporations such as the National Cable Television Association from making political contributions.

Individual operators and group CATV owners were asked in solicitation letters mailed in June to contribute \$99 for each system. Manufacturers and others were asked to give a minimum of \$250.

PACCT members met with a number of key Congressional leaders on June 23, during the NCTA Convention at the Fairmont Hotel in San Francisco.

**CRTC bars commercials,  
networks from CATV**

The Canadian Radio-Television Commission issued guidelines during the week of May 19 that bar commercials from CATV systems, block any formation of networks by cable operators, encourage local programming and permit the CRTC to examine and regulate CATV rates.

According to CRTC Chairman Pierre Juneau, the Commission banned advertising on CATV systems because it feels that the cost of local origination should be covered by subscriber revenue.

Although the new rules slow down formation of a network like a U.S. national TV hookup, they don't prohibit adjacent community CATV systems from combining to present local programming.

The guidelines establish priorities as to what programming may be carried by CATV systems—cable operators must first supply the Canadian Broadcasting Corporation to subscribers before they offer private Canadian networks. Another priority is that all available Canadian fm stations must be carried in both official languages by systems carrying fm signals.

The CRTC will use rates as a criterion for renewing licenses.

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# INTERPRETING THE FCC RULES & REGULATIONS

## FCC Regulation of 'Telco' CATV Systems —A Background

THERE ARE TWO KINDS of CATV systems: (1) those constructed, owned and operated by individuals or non-public utility companies, and (2) those constructed and leased, or owned, by telephone companies ("telcos"). The latter are popularly called "leaseback" CATV systems.

Of course, the FCC regulates all common carriers (including the telcos). Until June 1968, however, no attempt was made to regulate telephone company construction and/or ownership of CATV systems.

In the absence of regulation, many telcos (including those owned by AT&T) constructed CATV systems. Some telcos leased to third parties; they operated others for profit.

A problem arose. The telcos began building and leasing (or operating) CATV systems in communities *without* obtaining a CATV permit or franchise from the local municipal authorities. Sometimes these telco-CATV systems were built on top of existing systems, or built *immediately* before construction of a *privately* constructed and owned CATV system.

CATV operators complained to the FCC that such telco-constructed CATVs were unfair competition, in violation of the anti-trust laws, and that they circumvented local franchising authorities. The CATV operators alleged that the FCC should require telephone companies to get "certificates of public convenience and necessity" from the FCC—pursuant to Section 214 of the Communications Act—*before* building the CATV.

The FCC had repeatedly held that CATVs were not common carriers. Since telephone companies are common carriers, they argued, the FCC could not require telcos to obtain FCC authority to build CATV systems.

After lengthy hearings, *the FCC ruled*, in its famed "214 Decision"<sup>1</sup> *that telephone companies*

*could NOT construct, lease, own or operate CATV systems, until they obtained certificates of public convenience and necessity (214 certificates) from the FCC.*

In a landmark appellate decision,<sup>2</sup> the Court recently affirmed the FCC's holding that Section 214(a) of the Communications Act of 1934, 47 USC 214(a) (1962)<sup>3</sup> grants the Commission jurisdiction over common carrier facilities used to provide local distribution channel service to CATV operators transmitting broadcast signals

1. See *Decision In the Matter of General Telephone Co. of California et al.*, FCC 68-658, 13 FCC2d 448, as released June 26, 1968.

2. *General Telephone Co. of California, et al. v. FCC*, U.S. App. D.C. 16 RR 2d 2001 (April 30, 1969).

3. Section 214 (a), 47 USC §214 (a) (1962), provides:

"No carrier shall undertake the construction of a new line or an extension of any line, or shall acquire or operate any line, or extension thereof, or shall engage in transmission over or by means of such additional or extended line, unless and until there shall first have been obtained from the Commission a certificate that the present or future public convenience and necessity require or will require the construction, or operation, or construction and operation of such additional or extended line: provided, that no such certificate shall be required under this section for the construction, acquisition, or operation of (1) a line within a single State unless such line constitutes part of an interstate line, (2) local branch, or terminal lines not exceeding ten miles in length, (3) or any line acquired under section 221 or 222 of this title: provided further, that the Commission may, upon appropriate request being made, authorize temporary or emergency service, or the supplementing of existing facilities, without regard to the provisions of this section. No carrier shall discontinue, reduce, or impair service to a community, or part of a community, unless and until there shall first have been obtained from the Commission a certificate that neither the present nor future public convenience and necessity will be adversely affected thereby; except that the Commission may, upon appropriate request being made, authorize temporary or emergency discontinuance, reduction, or impairment of service, or partial discontinuance, reduction, or impairment of service, without regard to the provisions of this section. As used in this section, the term "line" means any channel of communication established by the interconnection of two or more existing channels: provided, however, that nothing in this section shall be construed to require a certificate or other authorization from the Commission for any installation, replacement, or other changes in plant, operation, or equipment, other than new construction, which will not impair the adequacy or quality of service provided."

# DUAL CHANNEL PERFORMANCE...

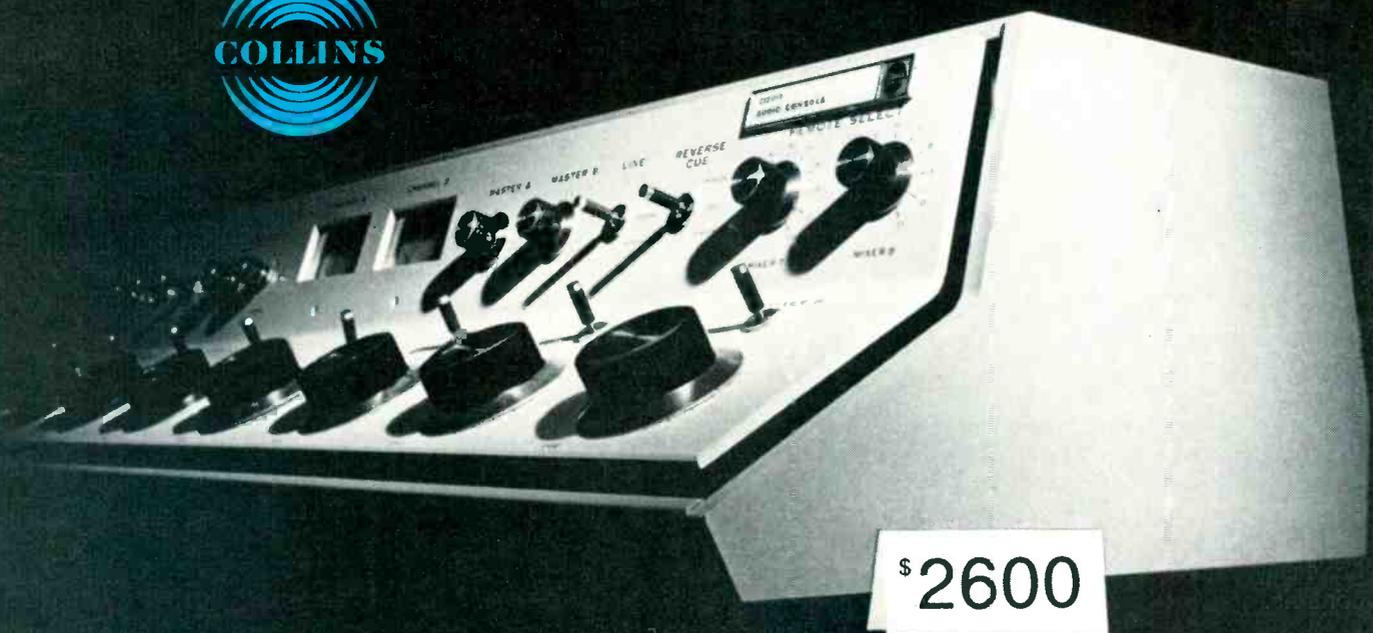
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Collins' new 212V-1 Audio Console, with its 8 mixers and 2 metered program channels, increases a station's capability for high fidelity AM and FM, TV broadcasting, and program control.

Though priced at only \$2600, the new unit carries Collins' reputation for quality, design, performance and styling. Also, the 212V-1 is easily maintained. A hinged front panel tilts forward, allowing easy visual inspection or removal of all components.

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COMMUNICATION / COMPUTATION / CONTROL



from another state—even though the particular distribution facilities are located within the boundaries of a single state.

### Comments on the 214 Decision

The basic issue in the *General Tel.* case was whether the Commission had jurisdiction over channel transmission service and facilities constructed by telephone companies to carry TV and FM radio signals by wire between a CATV antenna (or microwave receiver) and the subscribers—when the reception and transmission facilities are constructed entirely within one state to provide transmission service to CATV operators carrying signals which originate from TV and FM broadcasters in another state.

The telephone companies insisted that service wholly within a single state, when there is no common carriage across a state line, is “intrastate service”—even though the subject matter of that service, the interstate broadcast signal, may itself be regarded as interstate communication. The crucial fact to them was the character of the common carrier service and facilities involved. This, not the transmission itself, should determine whether a communication service is intrastate or interstate in character. The telephone companies maintained that the Commission was in error to consider interstate communication as the functional equivalent of interstate communication service. The Commission and Court held otherwise.

In evaluating the telco contention, the Com-

mission relied chiefly on what is considered to be an examination of the actual service which the carriers perform in relation to the total transmission process:

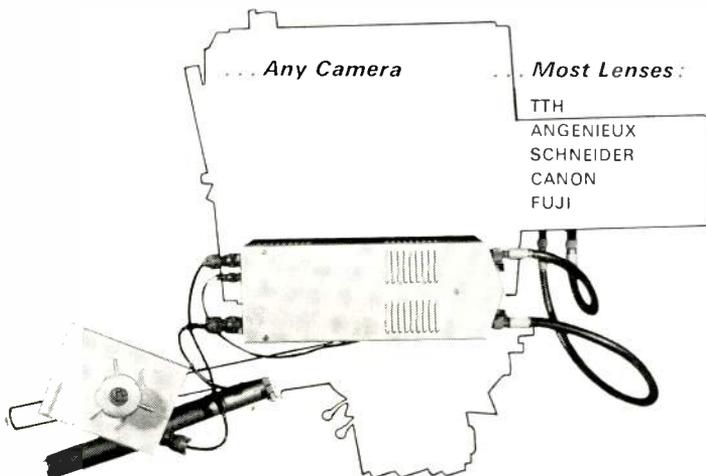
“The controlling facts here are that the cable facilities furnished by the telephone companies are links in the continuous transmission of the signals from the point of origin to the set of the viewer, as that transmitted by the broadcaster. Irrespective of the location of its physical facilities, the common carrier which thus participates as a link in the relay of television signals is performing an interstate communications service.”

In affirming, the Court referred to an early case involving FCC regulation of activities of common carrier microwave facilities serving CATV systems. In *Carter Mountain Transmission Corp. v. FCC*, 116 US App. D.C. 93, 321 F2d 359 [25 RR 2055], cert. denied, 375 U.S. 951 (1963), it reviewed a Commission decision denying a common carrier’s application to construct a microwave radio communication system to serve a CATV operator. The Commission had found that a grant would not serve the public interest because of its adverse impact on a local television station. In challenging the Commission’s determination, the carrier asserted that the Commission was in error to apply principles of “radio broadcast law” to a situation involving “common carrier licensing.” But the Commission’s decision was affirmed.

The *General Tel.*, or 214, Case raises problems of enormous magnitude and significance. At the time of the decision, six of General Telephone and Electronics Corporation’s 33 operating com-

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Servopak zoom and focus control drive unit is a complete package containing all power supplies, AC amplifiers, control circuitry and high powered AC Servo motor/generators with integral gear boxes and resetting potentiometers. Command signals are initiated by the operation of separate operator’s hand controls, either camera mounted or remote. The drive output is from splined gears which are coupled through specially silenced cables to the mechanical drive outlets of any standard zoom lens.

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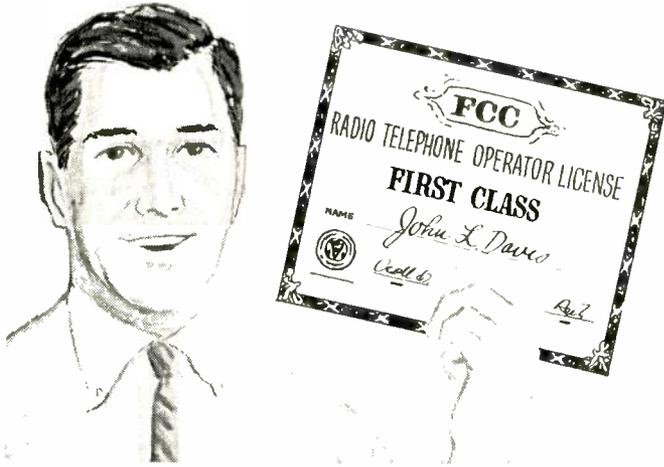
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panies were involved in eight-channel services. Other construction was contemplated. Other General operating companies were engaged directly in CATV operation. A wholly-owned General subsidiary engaged in CATV was a customer in 10 of the distribution systems of General carriers; this subsidiary owned 36 CATV systems and franchises.

Bell System Companies were supplying channel transmission services to 178 separate communities. United Utilities, parent of the United operating telephone companies, supplied channel service in 31 communities—in 30 of which the sole or major stockholder in the CATV systems was United Utilities.

General Tel. had invested over \$2,000,000 in channel service in ten communities, United—\$800,000 in six communities, and Bell—\$1,360,000 in four communities. *Bell's total investment cost in channel service systems was more than \$43,000,000.* Other telephone systems have also invested large sums. *The amounts involved for the number of communities being served show how large is the potential in CATV distribution by common carriers.*

Pursuant to these findings, the Commission directed the operating telephone companies of Bell, General, and United to file applications for certificates of public convenience and necessity pursuant to Section 214 with respect to all construction already undertaken to provide channel service to CATV systems. The Commission also directed these parties to cease and desist from constructing additional facilities until certificates were obtained, and to cease and desist from operating previously contemplated facilities until applications for certification had been filed and certain additional conditions had been met.

## Conclusion

There was widespread jubilation in the CATV industry after the June 1968 *Decision* and its subsequent affirmation by the appellate court. However, there have been no decisions made under this case, yet, and so it is impossible to tell how much the Commission will regulate the telcos' entry into and/or monopoly of the CATV field. Clearly the construction, maintenance, leasing, or operation and ownership of CATV systems by telcos raise substantial antitrust and other public-interest considerations. The Commission will have many opportunities within the year to hold hearings on requests for 214 certificates by various telcos and to indicate whether its policy will support or oppose telco construction and monopoly (direct or indirect) of CATV systems.

In any event, the June 1968 *214 Decision* constitutes a giant step forward for the CATV industry. It provides CATV entrepreneurs with an opportunity to file reasonable objections to telco requests for 214 certificates and—just as television stations have fought CATV systems under Section 74.1109—to delay interminably FCC action on such telco requests.

**BM/E**

This section, providing broad interpretation of FCC rules and policies, does not substitute for competent legal counsel. Legal advice on any given problem is predicated on the particular facts of each case. Therefore, when specific problems arise, you would be well advised to consult your own legal counsel.

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The  
General Electric  
guide to explaining  
your unfair advantages  
over competition



# Part 3: cameras

You're stuck. It's the kickoff dinner for the big local charity and you have to spend the evening sitting next to your biggest competitor. Of course he's going to bend your ear because he wants to know some things.

Like why your local color looks truer than his.

And how you get that crisp black and white.

And why you don't have lag and color problems under the new Lucalox® lamps at the municipal arena and the poor lights in the local college field house.

Chances are he knows you have General Electric PE-350 cameras. But since he's asking the questions, he apparently doesn't know how much the cameras mean. And you can keep your advantages with the right answers like this.

QUESTION: Boy, can't people be ugly when local news color is a little off?

ANSWER: "They sure are tough, but that's the public for you." You have to be pretty general here, because you probably don't even know the problem. The PE-350 has chroma enhancement on *all* color channels—not just red—to give you the most accurate, crisp color reproduction imaginable. And better yet, you're getting the best color at the least cost. With GE's "subtractive" registration, just one man can set up the camera. Maintenance is practically nonexistent and life on each of your four original tubes is averaging over 8,000 hours apiece. You know *you're* "money ahead" because he's been getting only 3-4000 hours on each of his three tubes. But why mention it.

QUESTION: You had much trouble with fuzzy black and white?

ANSWER: "Can't that really bug you?" Answer with a question and all he can

do is nod. Of course it bothers him. And what bothers him more is the fact he has the problem and you don't. But don't start talking about the many advantages of GE's separate luminance camera. You could rattle off facts about how a camera with separate luminance produces sharp black and white *even when the camera's slightly misregistered*. But you're at a dinner, not a seminar. Enjoy the creamed chicken and smile a lot.

QUESTION: Aren't models tough? They've been complaining about hot lights ever since we switched to color.

ANSWER: "Well, we try to soothe them." Actually, you soothe them by not using real hot lights. The PE-350 is the industry's leading low light level camera. It makes beautiful noise-free pictures even at *35 footcandles*.

You learned all this before you bought General Electric by visiting their Telecenter in Syracuse. And as a plus, your people were trained by GE not just to handle cameras but even to handle special telecasts such as remotes with combinations of incandescent, mercury, Multi-vapor® or Lucalox® lighting.

But don't volunteer that. And don't volunteer information about interchangeable circuit boards, interchangeable lenses, stability or the rest. He'll find out, someday.

One thing. If it's you that's knocking over water glasses to get close enough to ask the questions, get to someone who'll give you straight answers.

Your General Electric Broadcast Sales Representative might be able to give you an unfair advantage of your own. Call him. Or call us. General Electric Company, Visual Communication Products Department, Electronics Park, Syracuse, N.Y. 13201.

**GENERAL  ELECTRIC**



Single-vidicon PK-730 by RCA promises low-cost color for cable and closed-circuit use.

## New Cameras— Color them Plentiful

**New color cameras from old standbys as well as some companies just entering the field give today's broadcaster the widest equipment choice ever. Some are dirt cheap; others have an unseemingly high level of sophistication. No matter how you color the choice, it's bound to be a difficult decision to make.**



**BIG NEWS ON THE EQUIPMENT FRONT** is the new generation of color cameras—some from old hands in the business, others from new entries in the field. Ultra-sophistication in camera design, more compact heads, light weight, crisp, gorgeous colors and a bag of tricks as special options (or original equipment) make today's color TV camera a better buy than ever.

But there are new names in the field, plus



Light entering PK-730 lens (at left) passed through two overlapping filter grids to separate color information.

some new and unusual entries from the familiar camera sources. New gear is on the scene from RCA and Philips—both with deliveries slated for the beginning of 1970.

Rather new in the camera fields are companies like International Video, EMI and Visual. Oh sure, IVC's been around for a while with its \$14,500 and \$19,000 vidicon cameras, but now it's competing at the top with an all-Plumbicon camera. If you happen to be a moon-bound astronaut, you might want to look at the special Westinghouse field-sequential camera (see pages 35-37). It's a mini wonder that weighs in at 13 pounds—not counting the very substantial ground support and conversion equipment.

High on the scoreboard is the single-vidicon color camera from RCA. Not labeled as broadcast quality, the low-cost camera will probably be a winner in closed-circuit, educational and some CATV systems. The new EMI cameras offer the option of three- or four-tube design in an ultra-sophisticated studio package.

## One-Vidicon Color

RCA first showed its single-pickup-tube color camera (the PK-730) at last November's NAEB Convention. It has since been shown in improved versions at the NAB and most recently at the NCTA. The cameras on display are engineering prototypes; the mass-production model won't be ready for market until sometime late this fall. But this is the first filter-grid single-tube color camera to get any degree of public exposure in the U.S.

A forerunner of this system was Nippon Columbia's single-tube camera (see June 1968 *BM/E*, p. 42). But this camera hasn't gotten off the ground for what seem to be production problems. It's had some field testing by NHK,

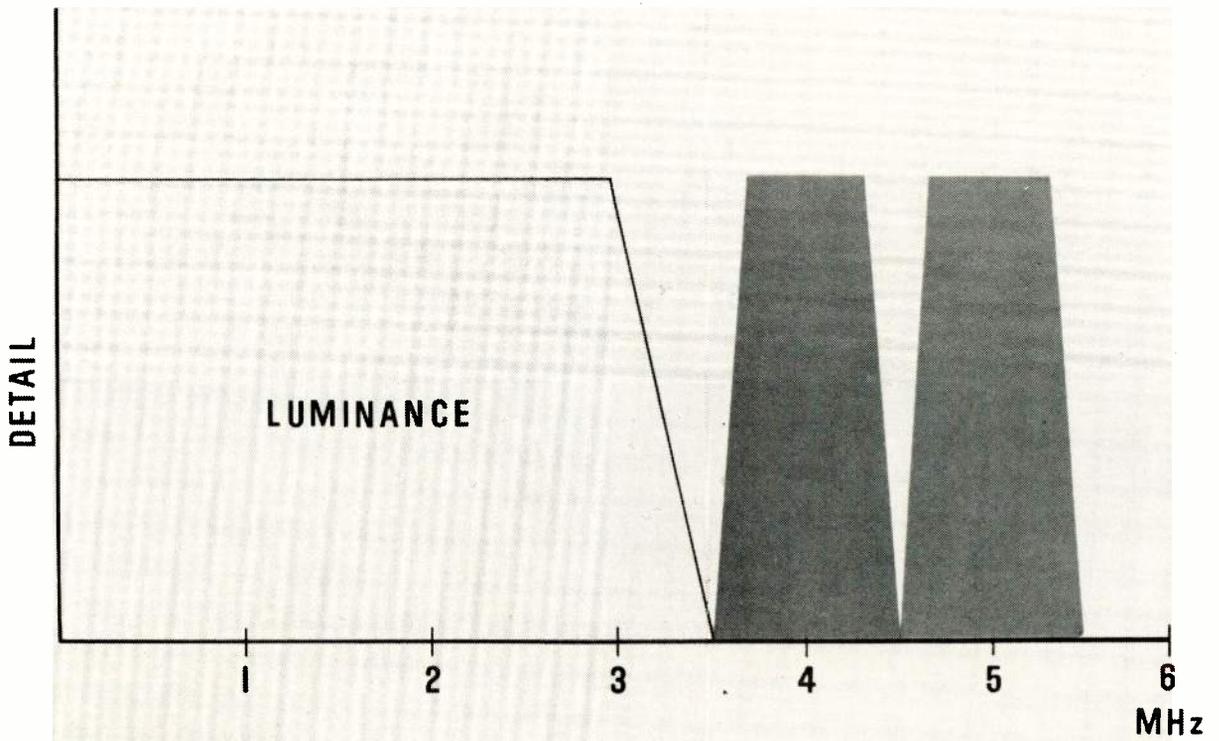
the Japanese national television network, but that's about as far as it has gone.

The most apparent quality of the PK-730 is its snappy color rendering. Early protos had some problems with green fringing, but this difficulty has been pretty much cleared up. The camera head is lightweight (45 pounds) and will be inexpensive—somewhere in the \$6000-\$10,000 range. Imaging isn't broadcast quality, since resolution is 250 lines, but this is more than adequate for educational, CCTV and some CATV work.

The key to the system is in the two-color stripe filters between the lens and the vidicon. The first filter is made up of cyan and white stripes; the second filter has yellow and white stripes. The tube target sees the cyan filter as a set of stripes; half of them (all pass) transmit light and the others (red stop) transmit cyan. When a bit of red information arrives, the cyan stripe will not pass this red; only the clear portion (white stripes) will allow red light to reach the tube target. This way, the red components of the original scene are chopped into stripes and a striped image appears on the target. The same kind of filtering action happens with the yellow image impinging on the filter with the blue-stop stripes.

The white (clear) stripes of the two filters overlap so there is a clear, straight-through white image which contains all colors and the needed luminance information. A specific area or stripe on the face of the vidicon is designated "white," "red" or "yellow" depending on its location. Any image scanned in that stripe is detected by the camera as color information. Similarly, the red-stop and blue-stop stripes overlap each other.

This technique, basically an "area sharing" system, relies on the single pickup tube to produce not only picture detail and brightness information, but also color information. The stripes let the



PK-730 electrical output provides Y channel to 3.5 MHz, red information centered at 4 MHz and blue centered at 5 MHz.

tube differentiate between red and blue since they reach the tube at different incremental brightness values. Also, the effective number of stripes is different for red and blue (because of the overlap) which makes the tube's recognition and separation of these two colors possible.

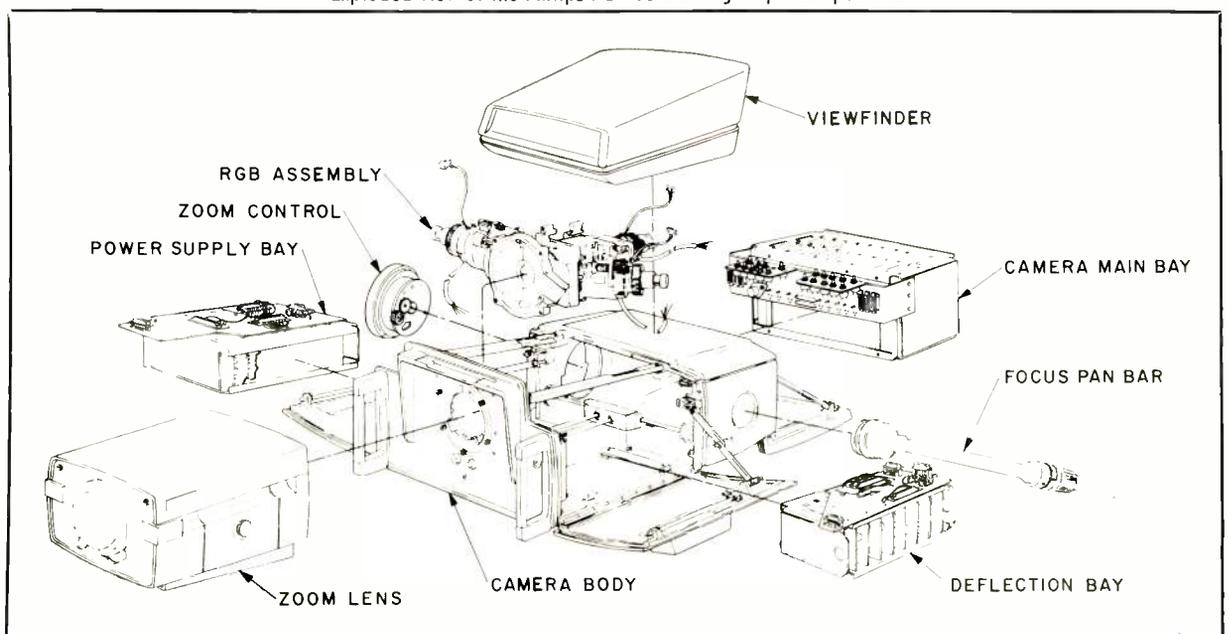
The scanning beam generates two carriers which contain the red and blue information. The number of stripes and the resulting carrier frequencies were selected so that they are within the useful resolution capability of typical color display. There is no green signal in the pickup

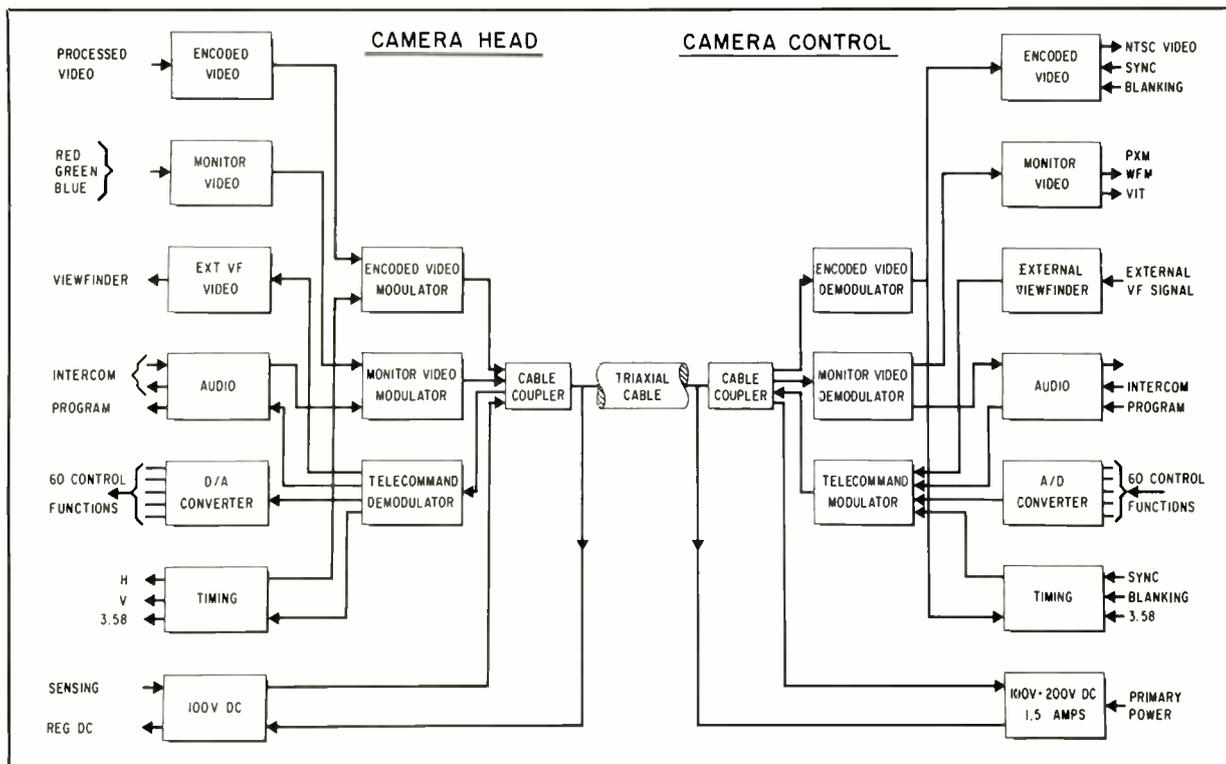
tube's output; this can be derived from the two known primaries, combined with the total picture (luminance) signal. Thus, if red and blue are subtracted from the full-color image, the result is the green signal.

#### Resolution is Limited

The horizontal resolution of this camera is limited to about 250 lines. This limitation is inherent in the system design. Yet the reconstructed color image is of high optical quality

Exploded view of the Philips PC-100 showing major components.





Simplified block diagram of the PC-100 system.

and eyeball tests are entirely satisfactory. Part of this is due to the fact that the signal is processed and reconstructed to meet NTSC specifications. The actual color information is every bit as accurate as color signals generated by other systems.

The signal customarily viewed on a typical color display is inherently limited to 275 lines of horizontal resolution. In actual practice, a typical color receiver will produce about 230 lines of resolution—less than the resolution of the PK-730.

RCA's design concept is unabashedly based on economy, producing what design engineers feel is subjectively pleasing color at a price that puts the camera within the financial reach of school and college TV systems, industrial, training research, business and other CCTV applications.

An offshoot of this basic design is a new film/slide chain, the PFS-710, which will be tagged at \$9850. This system includes camera, optical multiplexer for two inputs, a 16mm sound movie projector and a slide projector. This system is now in production and two units have already been shipped to cable operators in Ketchikan and Sitka, Alaska.

## Philips and Digital Control

Glamour camera of the future, slated for early-1970 availability, the Philips PC-100 is a start-from-scratch fourth-generation color system. Basic design concepts include small size (as studio cameras go), sophisticated controls, digital signal control from the control unit, multiplexing for lightweight cable use, and a brand-new, compact, one-inch Plumbicon as the imaging device in the three color channels.

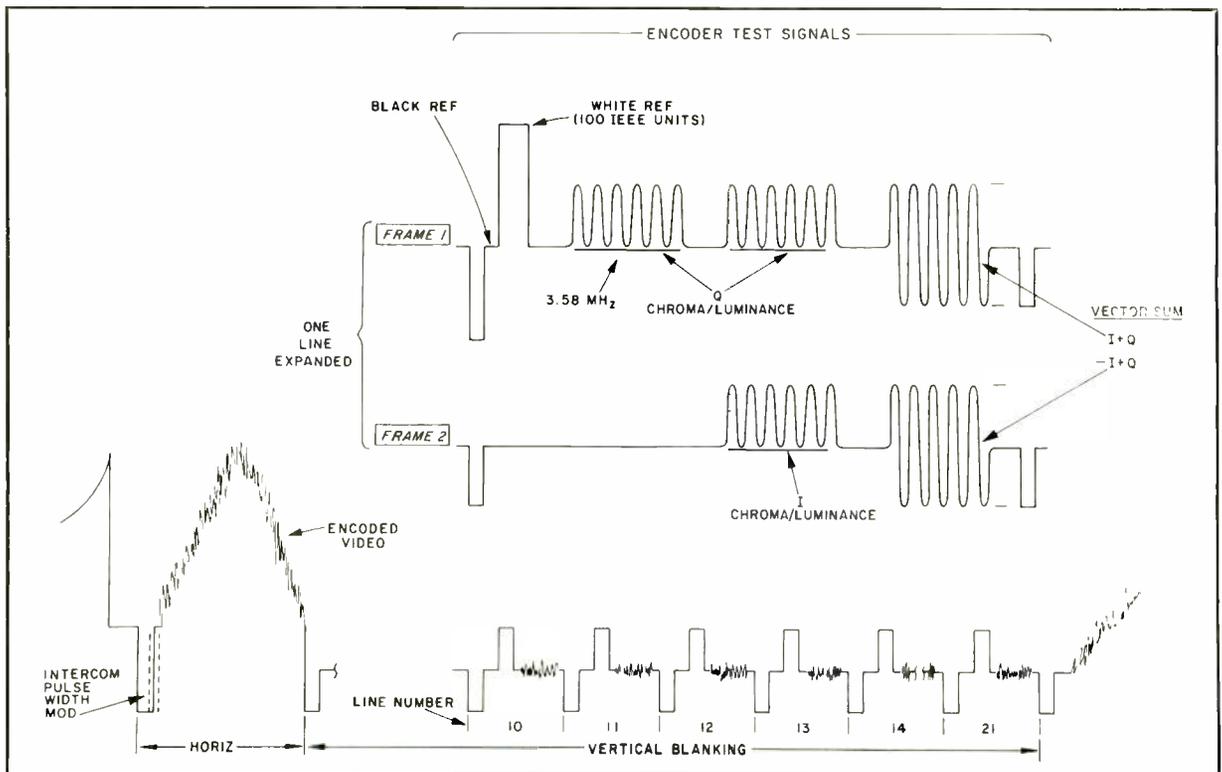
The manufacturer calls the basic design philosophy "radical," and well they may, for this camera is spanking new from the talley light to the cable connector. The camera body uses magnesium castings for weight-shaving. It has a removable lens and viewfinder, and it can use up to a mile of triaxial cable between camera head and the control unit. The cable carries dc power to the camera, along with three channels of complex multiplexed information. This multiplexed information includes encoded video, monitor video, external viewfinder video, intercom, program sound, tally and 120 channels of camera control data. The control console includes a picture monitor, waveform monitor, registration panel, operations panel and needed electronics.

The lens is designed specifically for the one-inch Plumbicon format. Its *f*-stop is 1.8 and it zooms from 14mm to 140mm. Lens mount is simplified and range extenders can be inserted easily. Lens drive mechanism is internal, and a high-inertia flywheel provides fine control of the zoom operation.

The camera's electronics are packaged on three-by-five-inch circuit cards. These cards are multi-layer type and make extensive use of integrated circuits.

The three main channels of multiplexed information are:

- Telecommand channel for all operating, registration and setup signals from the control location to the camera.
- Video channel for sending encoded video from the camera to the control location.
- Monitor channel for sending monitor signals from various points in the video chain to the control location.



Control pulses and multiplexed video in the PC-100's video channel.

The control system consists of an analog-to-digital converter at the control unit, and separate converters in the camera. The information is transmitted in digital form, with each function sampled 240 times a second. System capacity is 60 eight-bit channels and 60 one-bit channels—which includes provision for future growth.

### Digital Portable

Licensed to manufacture the CBS Labs Mini-cam portable color system, Philips Broadcast Equipment Corp. has dubbed this unit the PCP-90. The system is available both in cabled and wireless (rf) form and uses a digital control system. This digital command system is not the same as that used in the PC-100.

Although the basic techniques of signal multiplexing are similar to those used in the PC-100, the amount of information transmitted and the method of generating the control signals are different.

The PCP-90 is a hand-held camera/viewfinder assembly, a backpack and a base station control unit. The camera can be connected to the CCU through a mile of triax cable or through a microwave link. It can also feed a tape recorder with or without CCU control. Options include picture and waveform monitors, image enhancer, video demodulator for RGB displays, and a stabilizing amplifier for video reprocessing and sync regeneration in the rf mode.

The digital control system uses an audio signal. A 5.4 kHz tone is phase-shifted 180° to indicate one information bit. The technique permits seven simultaneous and 30 individual camera control functions.

A special feature of the PCP-90 is its use of the new one-inch Plumbicons. Lens system is a 6-to-1  $f2.8$  zoom, and the camera has a three-position filter wheel.

The viewfinder uses a three-inch picture tube, along with a simple magnifying lens and a polarized filter for improved outdoor viewing. A waveform presentation at the left of the display lets the cameraman set the iris and pedestal.

The backpack is divided into three sections. The main section houses video processing, sync and command control circuits. The top section contains the uhf data receiver and microwave transmitter (in the wireless version). The bottom section is either battery equipment or the cable power converter.

The camera head weighs in at 18½ pounds, while the backpack weight is 12 pounds in cabled version, or 32 pounds in the rf configuration. The base station control equipment is designed to fit into a standard 19-inch rack. First delivery of this camera was made in June to Los Angeles station KTLA. The PCP-90 is being fitted to one of the station's two helicopters for airborne and ground-based mobile news coverage. Presumably the camera's aerie will let it zoom in on news, special events, traffic congestion and riots. It will supplement the PCP-70 in the station's other chopper.

### EMI Double-Header

Two new cameras from EMI, imported and distributed by IVC, come a little closer to resolving the four-tube vs. three-tube controversy. The company manufactures both types in almost identical packages, so the customer has total freedom of choice.

There are still two distinct schools of thought in the old four-tube vs. three-tube argument. The classical disadvantages that plagued three-tube cameras in the 1950's—color balance drift and registration drift—were partially solved by the addition of the luminance channel. But this four-tube design has also had its problems—notably the “Livingston” error—errors in luminance of saturated colors and the resulting sometimes-poor colorimetry.

The EMI 2001-B (four-tube) and 2001-C (three-tube) cameras offer the best of both worlds. The 2001-B uses an unusual four-tube-to-three-tube matrix process—said to reduce the Livingston error to a second-order effect. For the three-tube proponents, the 2001-C is available in the same package at a slightly lower price (\$72,000 vs. \$76,000 for the “B” model). IVC officials feel that the three-tube camera will likely predominate over the four-tube with a projected sales ratio of 3 to 1—just as other four-tube camera manufacturers eventually will concentrate on three-tube designs.

### Identical Boxes

Externally, the two EMI cameras look exactly the same, and this sameness of design is carried out to a large extent internally, as well. The same RGB optics are used in both systems and in exactly the same odd-angled positions. The three-tube camera has an empty space in the box, a space that's filled in its four-tube counterpart.

Optical paths are unusual—none of the pickup tubes are parallel to any particular reference axis. Instead, they're positioned for optical optimization. The resulting package is somewhat smaller and trimmer than comparable studio cameras now in use, and the entire unit is designed for easy servicing accessibility.

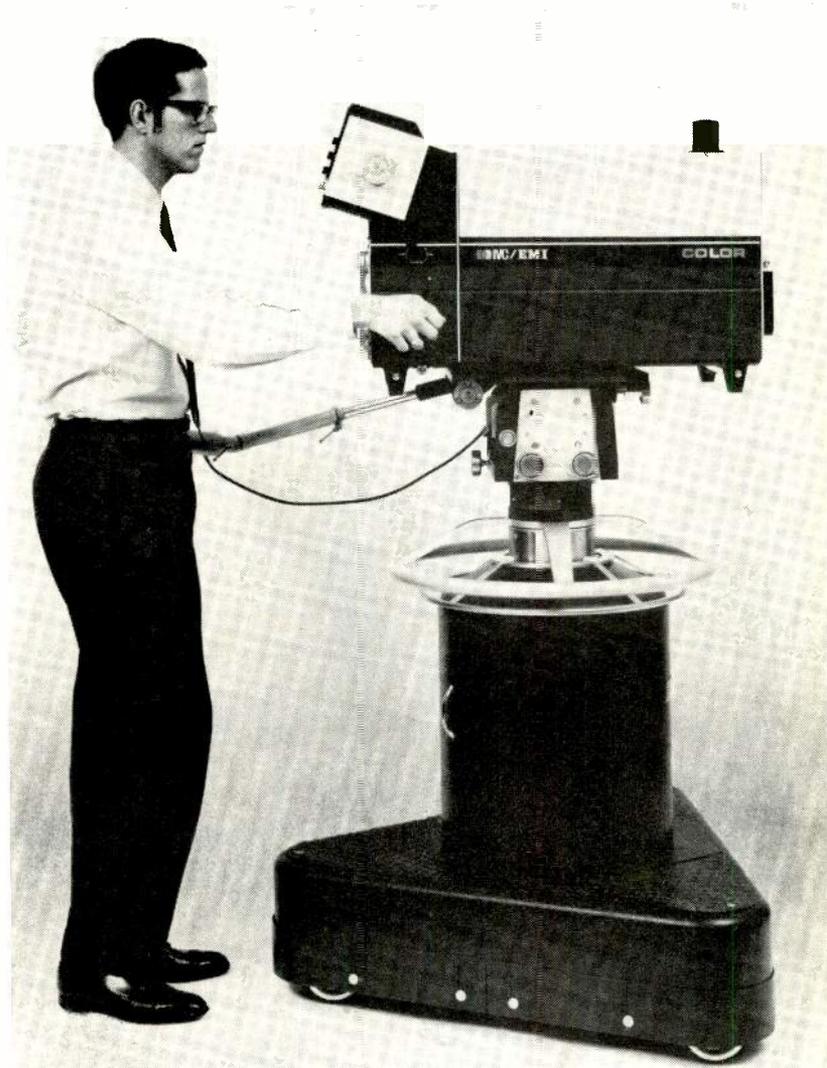
While new in the American market, the EMI cameras have been rigorously field-tested in Great Britain, with nearly 200 units in use by the BBC and the Independent network. Plumbicon tubes are used as image pickups, and all circuits are on plug-in modules.

A built-in lens shot box permits pre-programmed lens angles, and the zoom rate is continuously adjustable. Lenses can be changed quickly without optical realignment, and the lens system is completely contained within the camera's box.

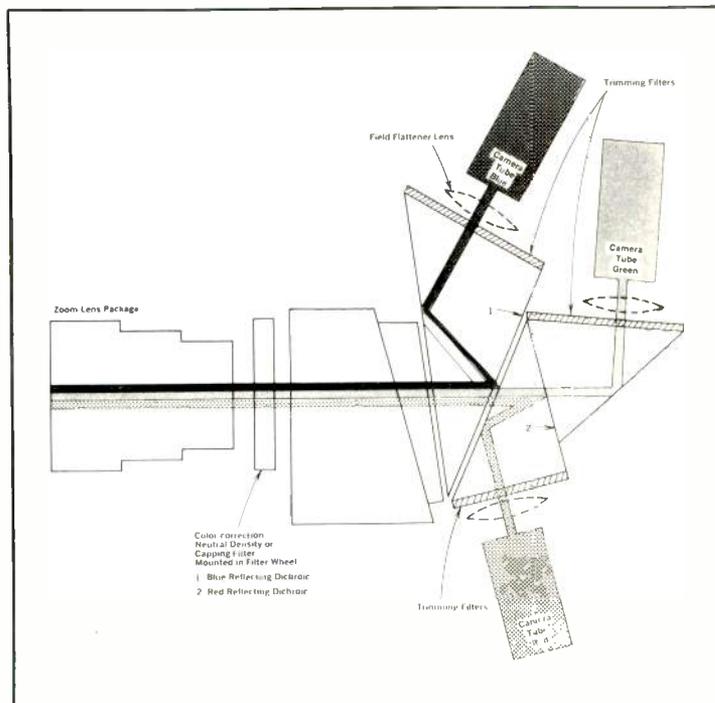
The electronic viewfinder tilts up and down and can be removed from the head for operation up to 30 feet away. It can display luminance signal, color channels for registration check, or a signal from a separate source for cueing and special effects.

Other features include aluminum alloy construction, retractable carrying handles, short-circuit-proof power supplies and printed wiring deflection yokes. Built-in airstep calibration signal allows precise camera setup.

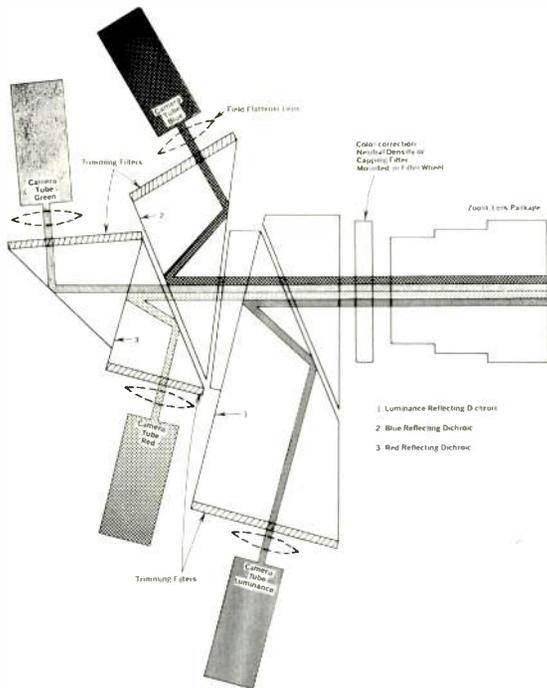
Overall, it's an impressive piece of video gear, has human-engineering high on the list of basic



Basic box for both three- and four-tube versions of the EMI camera is small and compact with full studio features.



Optical path for three-tube EMI camera places Plumbicon pickup tubes at crazy angles.



Four-tube version of EMI camera has RGB paths identical to three-tube model with addition of Y channel.

design concepts, and may lay to rest once and for all the old three-tube vs. four-tube controversy.

### Color on a Budget

The long-awaited Plumbicon version of IVC's low-cost color cameras finally bowed at this year's NAB. Dubbed the IVC-300, the new package is attractively priced at \$29,500, and should be instrumental in converting many low-budget stations and marginal u's to color.

The "Maverick," as some ingenious marketing man has nicknamed the camera, retains most of the economy-oriented features of its vidicon brethren—especially the sealed, mass-produced optical system and the lack of the many bells and whistles found on \$70,000 studio cameras. Certainly this lack of operating extras means that the camera will not do everything that the high-priced units can, but it'll handily handle such less-than-crucial situations as news broadcasts, remotes and production work. But the basic package produces color that was judged quite acceptable in editorial eyeballing, with very little discernible difference in colorimetry when A-B'd with more traditionally priced cameras.

The camera head is light—weighing in at 87 pounds with its Varotal XX lens with 10-to-1 zoom and local or remote servo-driven iris. Focal length of the Varotal is 15:150mm or 30:300mm with range extender.

The optical system uses a sealed system of dichroic mirrors (see Dec. 1968 *BM/E*, pp. 40-42) and an in-line Plumbicon array that eliminates any optical adjustments or setups. The electronic viewfinder has a nine-inch screen, and camera operator controls are extremely simple.

Setup adjustments are made on a swing-out

panel that provides instant accessibility. The camera has a built-in intercom with a split line for program or cue audio, in addition to party line. The camera is interfaced to the studio junction unit with a 50-conductor camera cable. One camera feeds each studio junction, and these are interconnected to the master sync generator.

## Visual VP-3

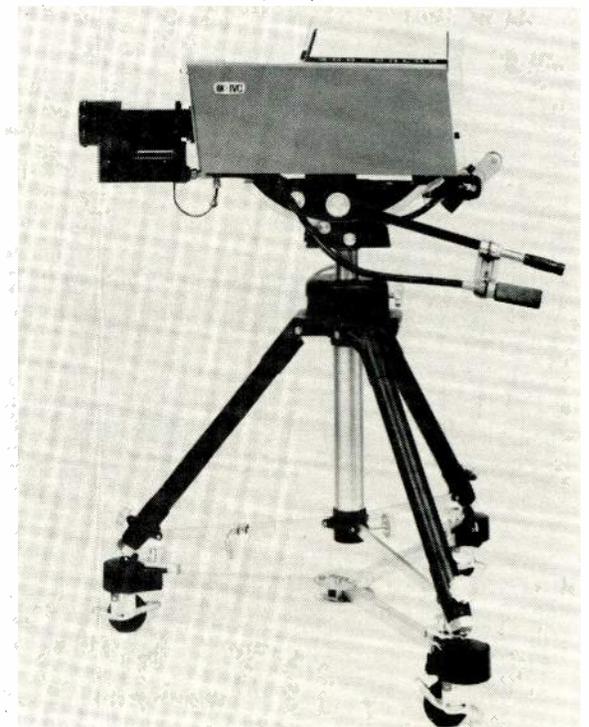
The head itself weighs in at 89 pounds without lens. The three Plumbicons are side-by-side—all placed horizontally. The VP-3 uses an enclosed dichroic assembly instead of conventional prisms to provide this feature. This design approach is cited by Visual's Frank Haber as giving the camera more reliable registration, since any stray magnetic field affects all three tubes identically. This also lets a technician remove the tubes from the rear without removing the yokes—not possible in a prism camera. Other state-of-the-art advances include the latest in silicon transistors and integrated circuits plus careful packaging.

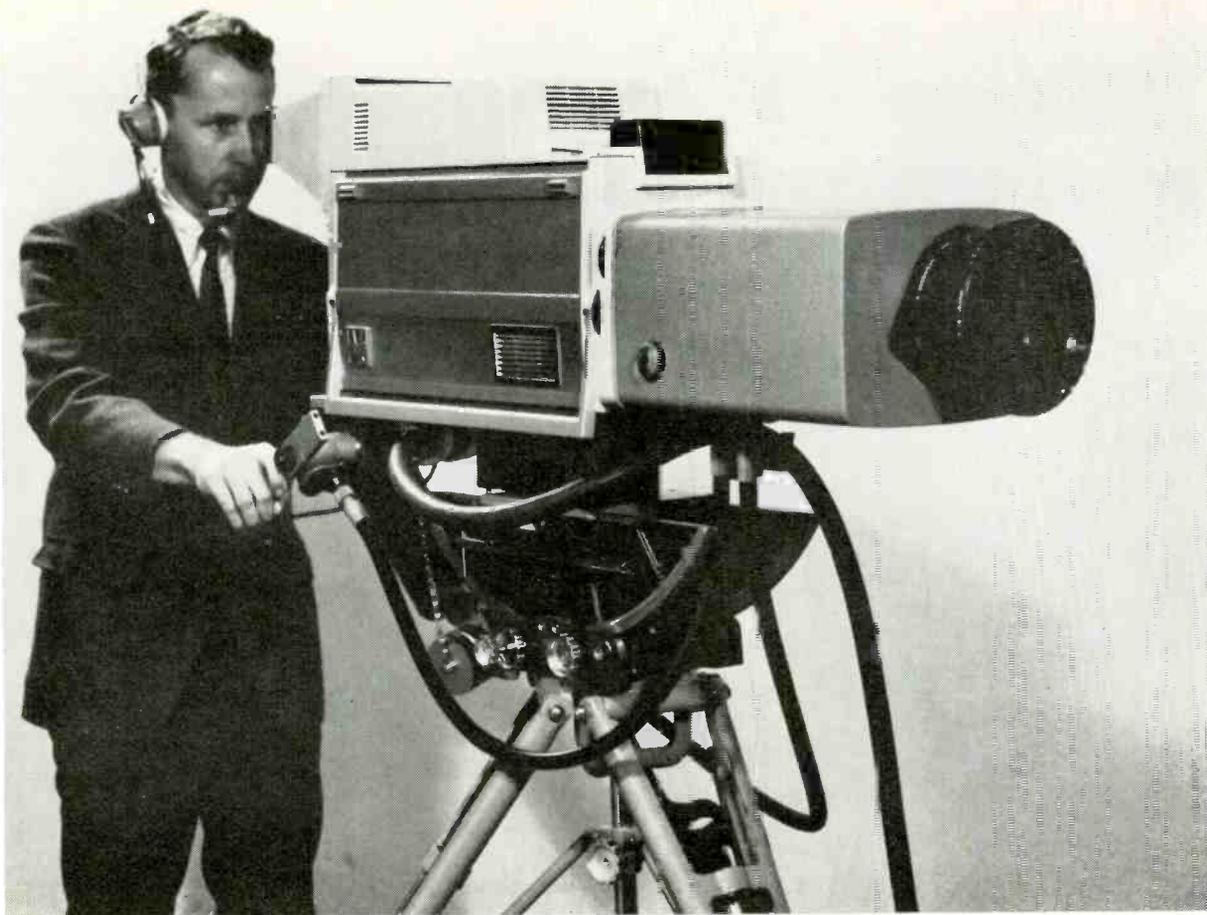
The FET (field-effect transistor) preamps are low-noise types and have test sawtooth signals at their inputs. Haber calls this the first camera to take full advantage of the new "XQ" separate-mesh tubes with their 300-ma filaments and high beam current. Yokes are printed-circuit type for exact repeatability and therefore provide good registration. Included is a space for test slide insertion, an aid during camera setup.

A special coax is built in to feed any preamp output directly to the viewfinder for troubleshooting. Viewfinder is a plug-in seven-inch type that can be quickly changed in emergencies.

The original version of this three-Plumbicon

Low-cost three-Plumbicon IVC-300 is missing some frills, but belts out excellent studio-quality color.





camera was exhibited by Shibaden at last year's NAB. The manufacturer quoted a price of \$50,000, no delivery date and didn't demonstrate the hardware; it just sat there in the booth. This year's NAB saw an improved and much-modified version of the camera, alive and quite well, at the Visual booth. Labeled the VP-3, the camera head is made by Shiba to Visual specs, then modified when it reaches the U.S. Priced at \$48,000 without lens (add \$11,000-12,000 for lens), the camera is called "evolutionary" in design. It contains no engineering surprises, but rather incorporates as much of today's state-of-the-art as is feasible in a piece of studio equipment.

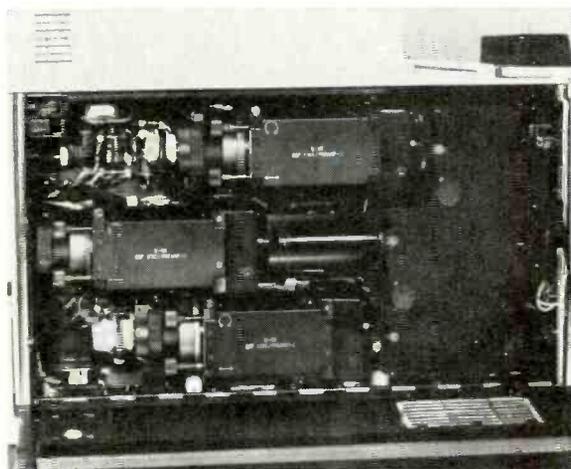
### Coloring the Shadows

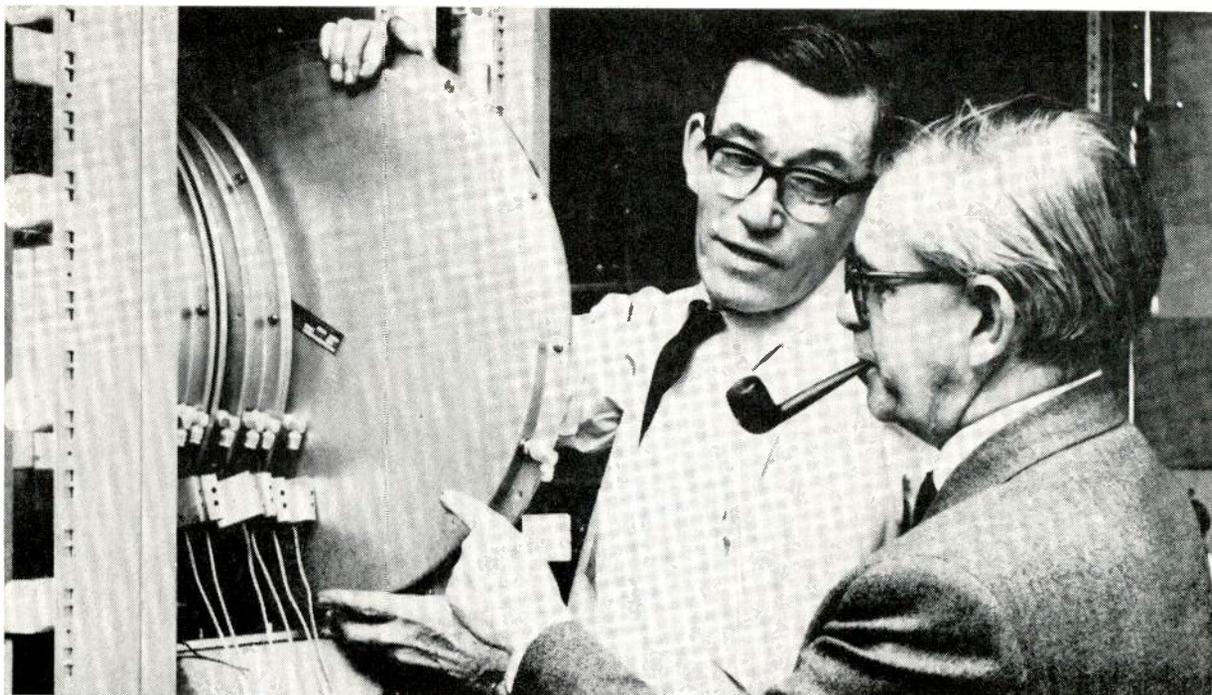
One standout performance feature is the readily apparent color detail in shadow areas. Reason for this, according to Haber, is the drastically reduced flare in black areas resulting from the parallel optical paths. During Visual's NAB demonstration, colors did indeed remain true in shadow areas.

The control system is designed to use standard 81-conductor cable, and the camera compensates for cable lengths up to 2000 feet. Camera back panel includes operating controls and switches, and below, under a fold-back cover are conveniently located setup and registration controls.

Lens options include three basic types: Angenieux  $f2.2$ , 10:1 zoom; Angenieux  $f2.2/3.2$  18:1 zoom; Schneider  $f2.1$ , 11:1 zoom. All three have servo iris, manual twist focus, manual crank zoom. Range extenders can be installed without removing the lens from the camera. **BM/E**

Visual VP-3 (above) is well engineered from top to bottom and is shown here with one of several lens options. A look under the hood (below) shows the three parallel Plumbicon pickups and the sealed optical system. This arrangement lets all three tubes respond identically to any stray magnetic fields that might ordinarily cause colors to wander. Electronic viewfinder (bottom) on VP-3 can be tilted or fully removed for variety of shooting situations.





George Hunt (right) of BBC and technician E. J. Briggs, discuss installation of Corning glass delay lines in system.

## Unscrambling those

**Plagued by three basic standards for color TV transmission, the international fraternity of broadcasters has had to resort to some fancy signal processing to make trans-Atlantic satellite telecasts possible. The converter systems are still rather rare, but full-scale production will be starting soon and there may well be a converter in your future.**



THE INTELSAT III series of communications satellites makes possible direct TV program interchange between many countries of the world. Historic events—such as President Nixon's recent European journey, or General Eisenhower's funeral—are relayed across oceans. Soon, many programs will be sent around the globe, as a matter of course. Major sports events—such as the Olympics—also hold keen interest for people

in many countries and will continue to be relayed by satellite.

While television is worldwide in scope, TV standards (lines and fields per second) and color systems are not the same in every country. At least three modes are commonly used, and direct electronic program exchange isn't possible without a converter. The TV standards converter today is as rare as the whooping crane, but it's estimated that within a few years hundreds may be in use. Each network will probably have one or two, and then major independent stations may obtain them. They'll be able to have direct reception from Intelsat satellites, translating the foreign programs they receive into NTSC standards.

### TV Standards and Color Systems

After experimenting with several TV techniques, the various countries have settled down to two line/field standards and three color systems. The standards are based on the frequency of commercial a-c systems—60 Hz in North America, and 50 Hz in Europe and most of the rest of the world. Thus North America uses 525 lines and 60 fields in its TV picture, while Europe uses 625 lines and 50 fields. (Two other standards are still used in England and France, but are rapidly becoming obsolete.)

Similarly, three color systems are used. NTSC

is used in the US, Canada, Mexico and Japan. PAL is used in England, West Germany, Italy and Austria. SECAM is used in France and the USSR.

Thus three general systems are presently used: NTSC 525/60, PAL 625/50 and SECAM 625/50. It is, of course, impossible for an NTSC 525/60 receiver to make a picture from a PAL 625/50 signal, and vice versa. The same holds true between SECAM and the other systems. What is needed is a standards converter to interface any two of the systems.

#### Early Standards Converters

Various converters have been developed through the years. The BBC built the first, an optical version. It used an image orthicon pickup tube viewing a high-quality monitor kinescope. But its outgoing picture had poor quality due to the rescanned image. At present, optical converters have been superseded by all-electronic types, which are essential for color.

The BBC also built the first all-electronic converter. The older British TV service uses 405

lines, while the newer uses 625. The 1964 BBC converter is a line-store type, which expands or contracts individual scanning lines. This is possible because the two British TV services use the same 50-field rate.

#### Field-Store Converter

It isn't possible to use a simple line-store converter between 50- and 60-field standards. In the late 1960's the BBC therefore developed a more satisfactory model called a field-store converter. In Japan, NHK has also developed a similar converter.

The problem is to fit 60 American fields into the space of 50 European fields. This is done by delaying the U.S. fields and reading them out to coincide with European field timing. In a 0.1-second interval, for instance, there occur 6 American fields, but only 5 European fields. And of course, an American field occupies less time than a European field.

The actual conversion is made by delaying each American field slightly until it can be fitted

# European Colorcasts

## Domestic Satellite Receiver

Key to the growing satellite TV system may well be a new satellite receiver that's priced within the reach of many independent broadcasters. Such a receiver could be used to pick up domestic as well as trans-oceanic broadcasts for retransmission.

This key element is the KTR-10S, developed by Raytheon for use in the 3.7 - 4.2 GHz band. According to the manufacturer, the receiver meets all requirements for the proposed domestic satellite pilot system that is currently pending consideration by the FCC.

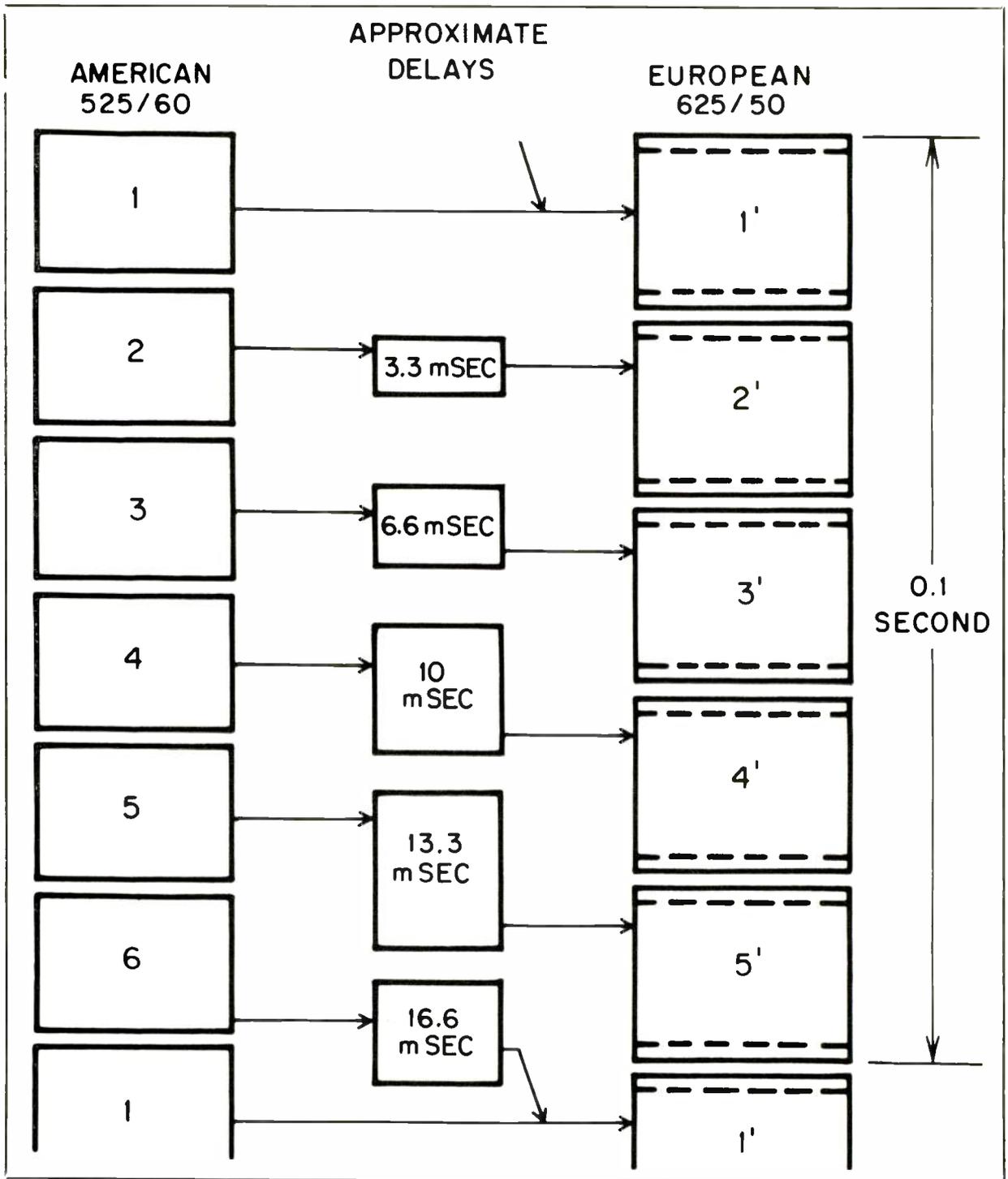
The receiver's frequency agility is called a key feature, since the unit requires no manual tuning or adjustment, and permits instant channel switching by remote control. The receiver will be offered on a turnkey basis, complete with antenna, parametric amplifier and other necessary hardware.

While Raytheon won't be pinned down on price right now, a company spokesman indicated that the package turnkey would be tagged somewhere between \$150-200,000. Part of the problem here is the FCC's slothlike speed in setting up standards for a domestic satellite system. The manufacturer obviously can't start production on a receiver for a system that has yet to have its standards set.

The KTR-10S isn't legal for use with present



COMSAT and INTELSAT satellites. But it will be in production just as soon as the Commission gives the industry the nod.



One hundred milliseconds' worth of U.S./European conversion.

into the space of a European field. American field No. 1 is transferred practically without delay, since the first European field (1') begins at the same time. American field No. 2, however, must be shifted in time by approximately 3.3 msec to fit into the next European field (2').

Likewise, American field No. 1 must be delayed by 6.6 msec, and the other fields are similarly delayed by increasingly longer times. Finally, American field No. 5 becomes European field 5'.

Since there are only 5 European fields, Amer-

ican field No. 6 is left over. If it were simply discarded, the omission would be unnoticed in many program scenes. But fast motion in the scene produces what the BBC calls *judder*, or jerky movement clearly revealing the omission of every sixth field.

To prevent judder, American field No. 6 is delayed by 16.6 msec to make it occur at the same time as American field No. 1. An interpolation circuit then compares the video content of both fields, averages them, and produces a com-

posite field for European field No. 1' which makes judder much less noticeable.

### Converted Picture Size

The number of lines per field is not altered by the field-store converter. Thus the American field occupies less vertical space than a full European raster, and there is a black border at the top and bottom of the converted signal. But the converted picture is full width, which means there is geometric distortion of the transmitted image.

To overcome this difficulty, a separate line-store converter compresses each horizontal line until the correct aspect ratio of 4 to 3 is restored. This prevents geometric distortion, but the final European picture contains a black border, about 1/12 picture height, around the edges.

In this early field-store converter, color information is dematrixed from the composite signal and processed separately. It is then used to encode a PAL signal for the European signal.

In the reverse of the above system, to convert European TV to American, 5 fields must be converted to 6, which requires additional interpolation. Since the European field occupies more space than the American, European picture edges are simply discarded and there is no black border.

These same principles also apply when converting between NTSC and SECAM; the only difference is in the color encoders. It is fairly simple to convert between PAL 625/50 and SECAM 625/50, as the line and frequency standards are identical and only the chrominance information must be recoded. As a matter of fact,

the French ORTF has such a PAL/SECAM converter.

### Improved BBC Converter

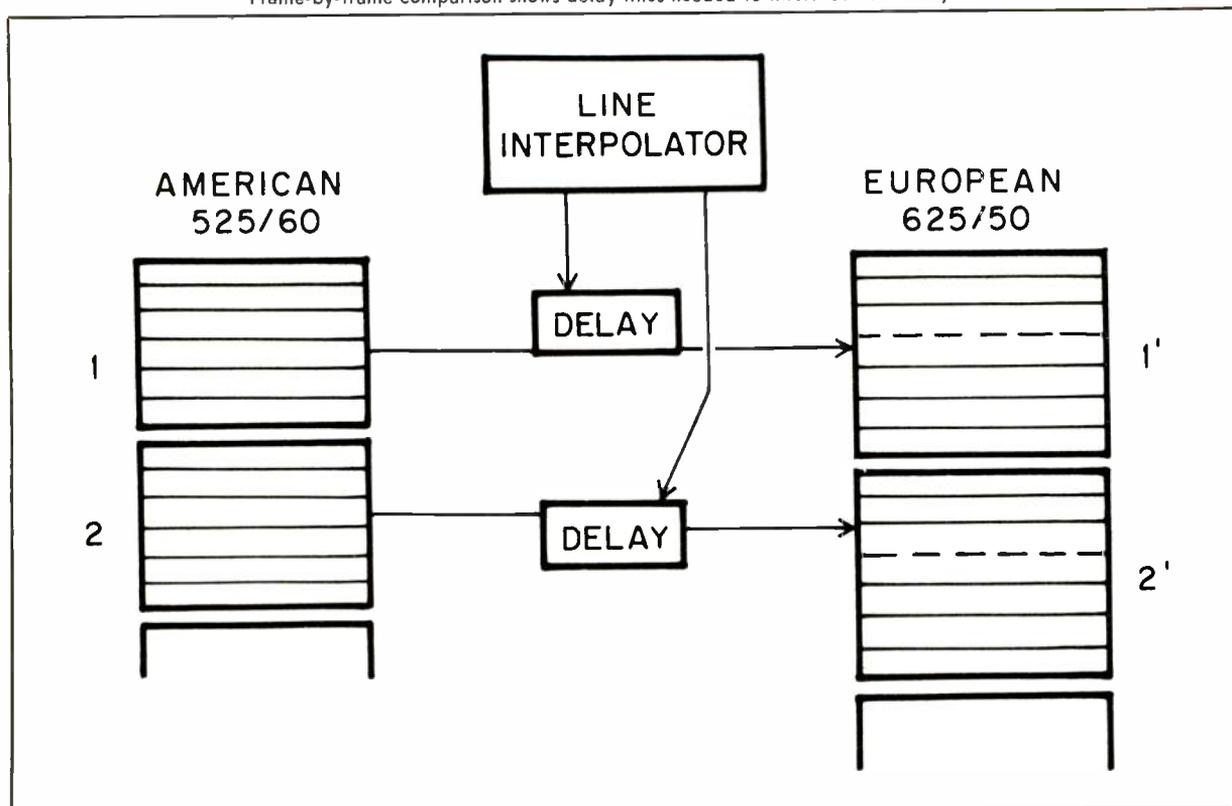
The conversion from American to European standards by the previous BBC device left an undesirable black border around the picture edge. BBC engineers have since devised a way around this problem. Recently the BBC licensed Rank Precision Industries, Ltd. to manufacture an improved version of this modern converter. North American distribution of this converter is handled by Andersen Laboratories, Inc.

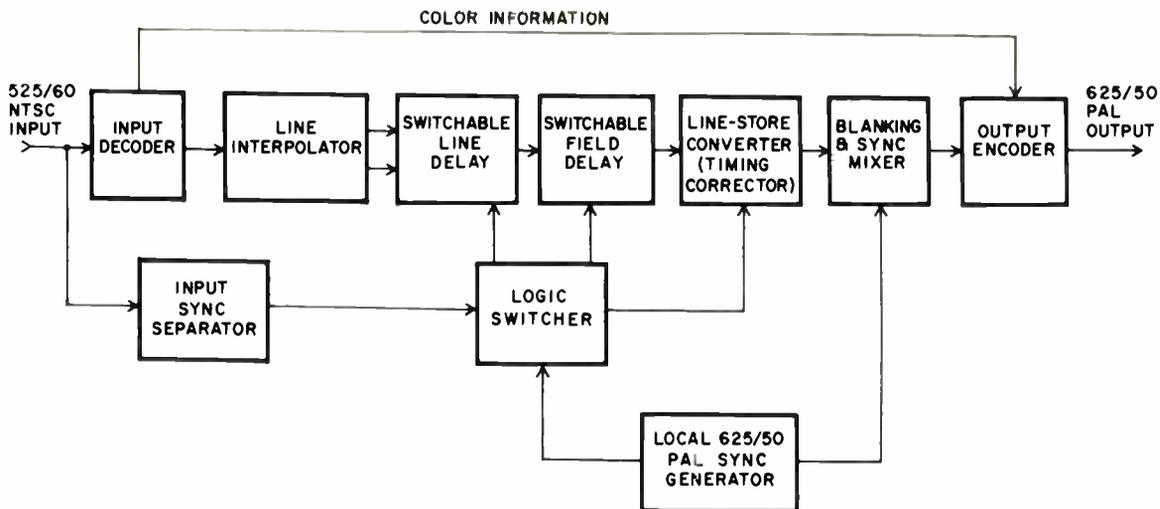
The solution devised by the BBC, instead of compressing the picture horizontally to restore geometric symmetry and eliminate the black border, expands the picture vertically. The American field is not only delayed, but a special line interpolator adds approximately one additional line for each five in the original picture. To the original American 525-line frame, 100 additional lines are added, making a total of 625, the European standard. (50 lines are added to each field; since 2 fields constitute a single frame, the total is 100 lines per frame.) The result is no black border and geometrically a near-perfect picture.

### Line Interpolator

It would be a simple matter to supply the additional 50 lines per field by repeating adjacent lines. But this would produce distortion by displacing video information throughout the entire length of two adjacent lines. A more sophisticated

Frame-by-frame comparison shows delay lines needed to interface the two systems.





Block diagram of entire system as used by the BBC.

method than this is used in the latest BBC converter. Two adjacent lines are sampled by a special network and an average taken from them. This weighted sample is then used to synthesize an artificial line in between. A line interpolator adds the 50 additional lines per field. At the same time, the interpolator keys in the field-store delay network, displacing the incoming American fields as required to fit the European field timing.

In the conversion from 525/60 to 625/50, delay is increased by one unit on 50 occasions during each field. The 50 increases in delay must extend the field period by 3.3 msec; thus each unit of delay is  $3333/50 \mu\text{sec}$ , or  $66.7 \mu\text{sec}$ , or just more than one horizontal scanning line period. Delay increase is done during horizontal blanking and thus no video information is lost. The correct number of lines occurs during each field period and so the mean line frequency is correct. But there are irregularities in the timing of successive lines of the video signal which must be removed later in the converter.

In this improved converter, the composite 525/60 NTSC signal is applied to an input decoder which removes the chrominance information. This input signal is also applied to a sync separator which feeds the logic switcher. The switcher performs all switching and actually causes the delay action of both lines and fields. The logic switcher compares the input 525/60 sync with local 625/50 sync from a generator.

Meanwhile, input luminance video is applied to the line interpolator, which delays one input video line (through an ultrasonic glass delay line) until another has caught up with it. Thus the interpolator can furnish two adjacent lines of input video at its output.

Since two input video lines are supplied to the switchable line delay circuit, signal averaging takes place and the additional video lines are synthesized. Both original and synthesized video lines are then interleaved and fed to the switchable field delay circuit. The logic switcher is meanwhile keying both line and field delay circuits. The result

is that 5 of 6 American fields are delayed and fitted into the 5 European fields. The sixth American field is omitted. At the same time, the line delay circuit is adding 50 synthesized lines to expand the converted picture vertically.

Since every sixth American field is thrown away, judder is apparent in fast-moving scenes. This is an unfortunate disadvantage of the present system which must be accepted in return for the full, converted picture. The BBC, however, is working on an additional interpolation circuit which will reduce judder in this advanced converter.

In the converter, the line-store converter corrects the timing of the video lines which have been distributed by the difference in the input video line duration and the duration of the delay circuits. Next, new 625/50 sync is added by the blanking and sync mixer. Following this, chrominance information is restored by the PAL output encoder.

#### Converter Usage

At the present time, converters are being used only by the English (BBC) and French (ORTF). It is quite likely that U.S. networks will acquire their own converters in the near future, as will government television services in other countries.

Intelsat III satellites can handle 525/60, 625/50, NTSC, PAL and SECAM. With the transmission network thus capable of handling all existing common systems, it seems clear that the standards converter will be used by the program receiver, unless a special fee is paid to the originator. If an event is telecast in Europe and fed to North America via satellite, unless it's converted in Europe—as it's done now—conversion equipment on this side of the Atlantic is a must. And as satellite use grows, more of these converters will be needed. Eventually, even the small, independent TV stations and CATV systems may be equipped to pick up satellite transmissions directly. It'll bring the world into your viewer's living room, but that converter—somewhere in the system—will always be a must. **BM/E**

# Color TV from the Moon

**Apollo 10's landmark TV coverage was the result of a marriage of old and new technologies. Technical problems were monumental—not only in converting color images from field-sequential to NTSC, but in compensating for Doppler color shift caused by the spacecraft's high velocity.**

By Laymon L. Stewart



THE APOLLO 10 color telecasts represented a curious combination of the old and the new. Some segments of the system were considered “old-hat” by some of us ex-broadcast engineers who were involved with field-sequential color during the early postwar years of television.

The specific Westinghouse camera on board Apollo 10 represented considerable progress in the state-of-the-art since the field sequential system first bowed two decades ago. First, the total weight was only 13 pounds—a vital requirement for space flight. Secondly, the camera was capable of operating in near darkness as well as in normal daylight levels because of the SEC vidicon camera tube (also a Westinghouse development). The camera was considered to be an excellent signal source, since it operated at the normal scan sequence of 30 frames per second compared to earlier space-cameras which used slow-scan video techniques.

## Problems Compounded at NASA

The decision to use the field-sequential color method created considerable head-scratching among NASA engineers because of its incompatibility with present-day industry standards. The fact that the field-sequential system had been dormant for several years didn't help either. These

**Laymon L. Stewart** is project manager, Taft Broadcasting Company, 914 Gemini Ave., NASA's Manned Spacecraft Center, Houston, Texas.

problems were further compounded by the spacecraft's rapid motion and the Doppler shift effects that would undoubtedly be felt.

Although it appeared at first that the time available for the entire task was entirely insufficient (see box, “Who Me?”), ideas began to jell and slowly the system began to take shape. NASA mechanical engineers were summoned to lend a hand and combine their efforts with ours in working out final hardware designs for the Doppler shift correction mechanism envisioned as being necessary for the operation.

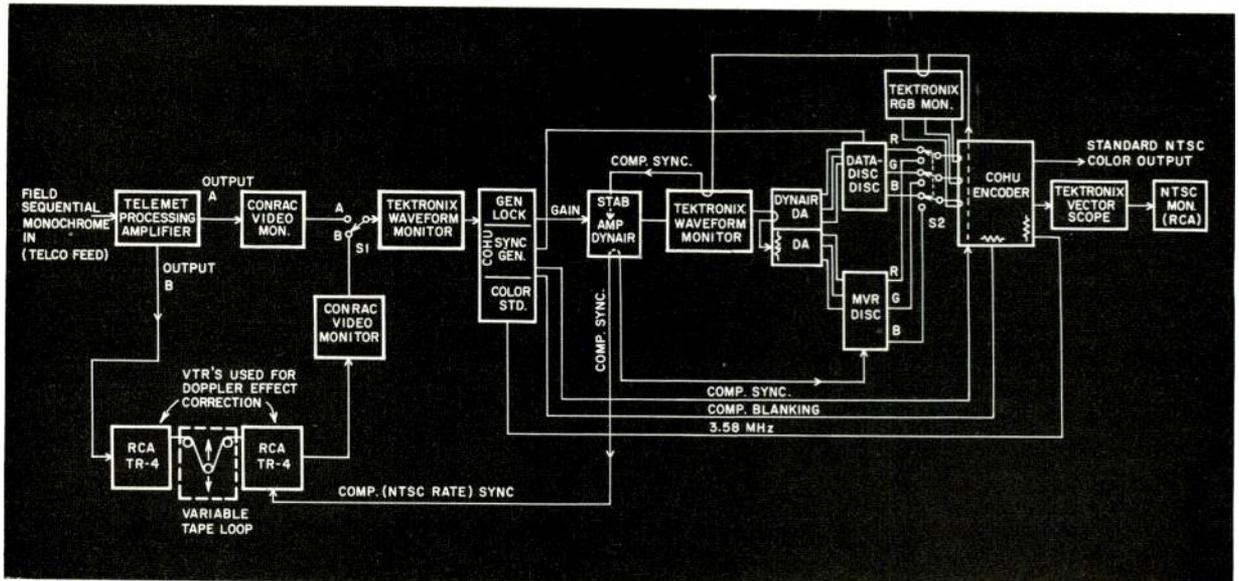
This close liaison of forces paid off quickly. Within a period of some four weeks, the group had produced a system which would:

- Provide automatic Doppler-shift compensation for induced phase-angle error.
- Shift the incoming field-sequential signal time-base from non-standard to standard color sweep rates.
- Derive the appropriate R-G-B signals for encoder processing.
- Produce a standard NTSC color signal for use by the networks.

The system had such built-in redundancy that we were able to predict ahead of time the exact alternatives in signal transmission to the networks,

## Acknowledgment

The author wishes to pay tribute to the many private contractors and government agencies who contributed to the success of the Apollo 10 color television experiment—a list that's so extensive that it would be impossible to include in this article. Especially to be thanked is NASA's worldwide tracking station network which delivered such a beautiful television signal to the Manned Spacecraft Center in Houston. It was truly a remarkable technical accomplishment.



Block diagram of system used by NASA to convert field-sequential color into usable NTSC signals. Note that incoming signal can be routed through tape loop for optional Doppler shift correction. System uses mixture of available equipment.

in case of various equipment failures. These were, in order of preference, the standard NTSC color signal, standard monochrome, non-standard color with uncorrected sync rates, and as a final alternative, the monochrome signal as received from the spacecraft, with the discernible flicker effect created by the camera scanning disc.

### Signal Processing

First, the incoming signal was recorded on an RCA TR-4 video tape recorder. The signal on the

### Who, Me?

Stewart reports that the initial reaction in Houston was simply one of academic interest. This changed when NASA officials issued orders indicating that the overall signal conversion would be done at the Manned Spacecraft Center. Then things began to pop. Top management at the Center quickly made responsibility assignments involving engineers at NASA's Space Electronics Systems Division and its support contractor Lockheed Electronics, the Photographic Technology Laboratory and its MSC Television section, as well as Taft Broadcasting Company, the MSC Television support contractor.

In view of the fact that only precious few weeks remained before the actual flight of Apollo 10, several urgent meetings were held involving William E. Perry of the Space Electronics Systems Division, Bernie Gordon of Lockheed, James C. Stamps of the MSC Television office at the Manned Spacecraft Center, John Brinkman, Chief of the Photographic Technology Lab., author Stewart and Taft Technical Manager Jim Graham, both representing Taft Broadcasting Co. The mutual goal was to get a "fix" on the definite problems involved, and to expedite fast solutions.

tape was then fed through a mechanical "tape loop" which displaced some 30 inches of tape at full extension. This first VTR was operated in the "video lock" mode. The tape loop was then fed into the second VTR, also an RCA TR-4, which was operated in the "playback" mode.

The playback machine was connected to a local Cohu color standard which supplied the correct drive pulses for the NTSC regulation at this point. Here, in the second machine, the servo-mechanisms adjusted the rate of playback, and the difference in speed between first and second recorders created a proportionate tape differential in the loop mechanism. This differential supplied the proper tensioning to either displace more tape or release additional tape depending on whether the Doppler shift was increasing or decreasing the phase of the incoming signal (*i.e.*, whether the spacecraft was moving toward the Earth, or away from the Earth).

The amount of tape stored in the loop was calculated to compensate for as much as one hour of continuous television transmission. Approximately eleven seconds of delays were encountered in this corrective requirement. The output of this second machine provided a monochrome picture with corrected time-base, which was then fed into a set of Dynair distribution amplifiers. The outputs of these amplifiers were identical in phase.

### Video Disc Delay

At this point, the latest technology was again used in channeling these outputs into an appropriate video disc recorder, either a Data-Disc or an MVR unit. These machines recorded and stored each of the serial R-G-B scan wheel frames and played them back simultaneously in parallel at a 30 frame-per-second rate. Each separated signal formed the R-G-B inputs for the Cohu color en-



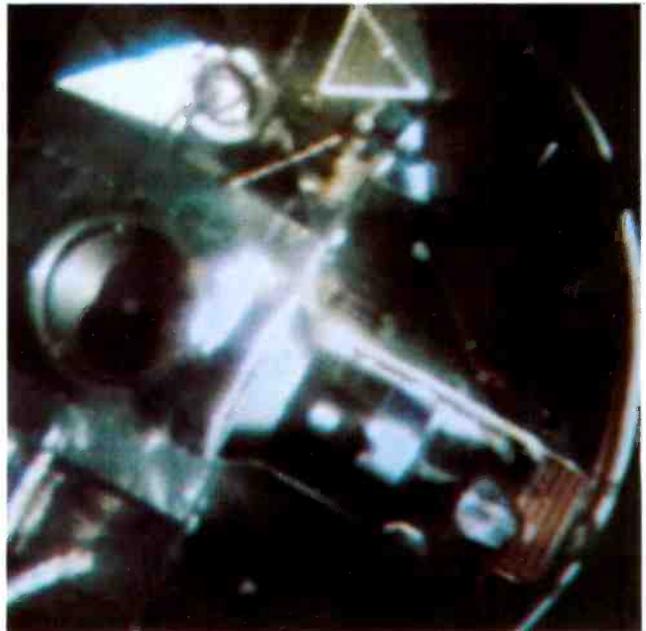
Cloud-covered earth from distance of about 15,000 miles is seen in this second TV transmission made by color TV camera aboard the Apollo 10 spacecraft. The United States and Mexico are located at right center in photo.



Closeup view of astronaut John W. Young aboard the Apollo 10—the command module pilot. This shot was from third TV transmission when spacecraft was already some 41,500 miles from the earth.



Astronaut Young holds up picture of comic-strip character Snoopy—one of several heroes of the Apollo team. Hat being worn by Young is called "Snoopy cap," named after this scourge of the Red Baron.



Early in this flight, this transmission showed the Lunar Module, still attached to the Saturn IVB stage. This picture was transmitted before the LM extraction from the booster rocket. Circular object is the docking drogue assembly.

NASA Photos

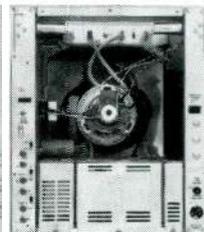
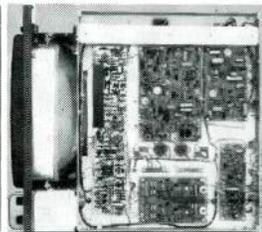
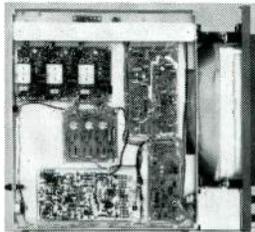
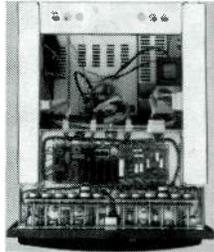
coder which followed this unit.

The Cohu encoder derived the 3.58 MHz modulation index from the applied R-G-B signals from the disc unit, related the color phasing to the color burst inserted at this point, and reformed the composite signal in standard NTSC color.

This standard NTSC color product, although perhaps deficient by comparison with local studio

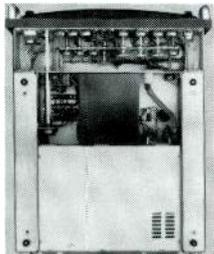
conditions, was generally described as "beautiful" by the networks, and others who fully realized the monumental technical problems involved. Further, there had been no method of simulation and pre-testing which would have guaranteed an operable system under actual space conditions. This shortcoming, if indeed it can be classed as such, was offset by the enormous spontaneous ingenuity that helped make the program a success. **BM/E**

**we've uncovered  
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color  
monitors**

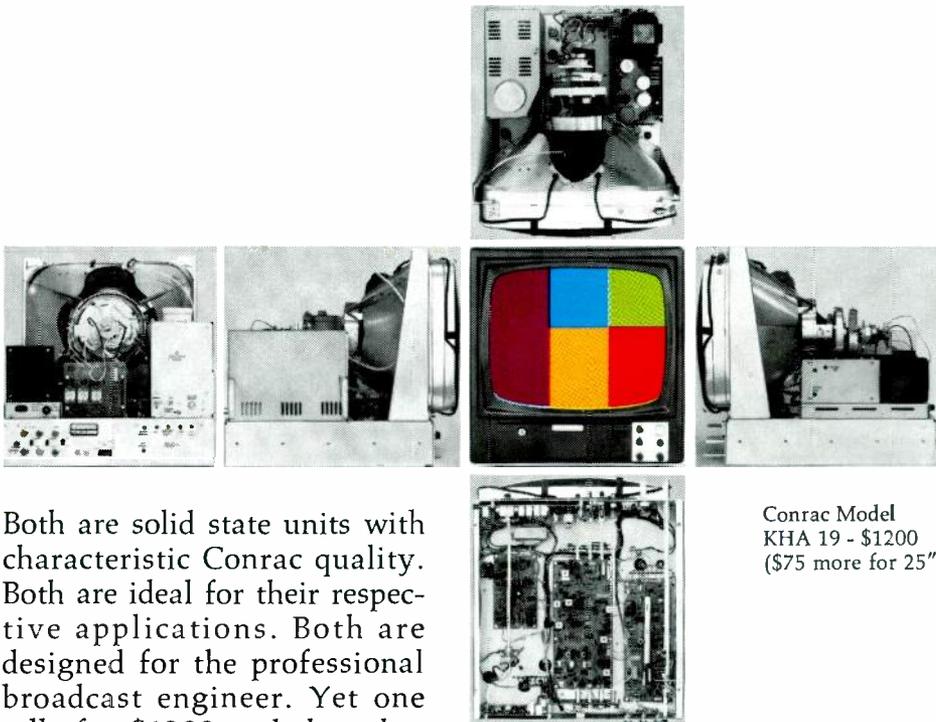


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Conrac Model  
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Both are solid state units with characteristic Conrac quality. Both are ideal for their respective applications. Both are designed for the professional broadcast engineer. Yet one sells for \$1200 and the other \$2700. With their covers off you can see why at a glance. Inside, where it counts, there is a difference between them of 25 diodes, 113 transistors and 10 circuit boards. That difference is design refinement which makes one a high-quality professional unit well suited for rigid broadcast-studio requirements, and the other an excellent utility monitor for less stringent audience or client-room use. The two complement each other. It all depends upon what you want to do. Compare the photos above. You'll see what we mean.

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Special effects can add pazzazz and eye-grabbing colors (top photo) to an otherwise ho-hum tape. Keying in (second from top) via tape takes a lot of the chanciness out of production. Variation on chroma key (third from top) adds to the effect. Nancy Sinatra (bottom) is chroma-keyed against Ice Capades backdrop in MPC Corp. show.

Ingenious use of solarization (top), combined with matting and color synthesis—all done electronically—(top to bottom) provide high-key color interest in this commercial produced for Schrafft's by Andy Warhol, Technique takes relatively unglamorous ice cream Sundae and adds attention-getting excitement.

(Top to bottom) Dance sequence, "Coney Island," for Kraft Music Hall (Yorkshire Productions, Div. of Filmways) makes extensive use of such props as funny mirrors and far-out videodisc techniques. Dancers were stopped, speeded, slowed and reversed by disc, even sliding up fire house poles in one sequence.



BM/E Photo  
 Advertel's Karl Genus using one-inch Ampex for his editing. Frame number is usually apparent on screen.

# How's Your Videomagination (Electography)?

**Most TV stations have all the ingredients for truly imaginative production work. Sadly, too few producers are willing to go off the deep end for spectacular color and electronic effects. For the producer who's willing to take the plunge, the results can be not only artistically gratifying, but can generate total involvement and excitement with the "new" medium.**



THE OBVIOUS VIRTUE OF VIDEO is that the director can always see what he's doing. There should be absolutely no reason to have to reshoot a scene at another time—something film producers do too frequently.

But there are other reasons for using the electronic medium in

1969. Lucien Lessard, director of Tele-Tape Productions, put the subject in focus this way: "Videotape people used to say, 'we can do everything film can do.' But video tape is now out of the me-tooism stage. Video people can do easily things

The name of the game depends on who you're talking to. To most of us, it's simply videotape production; to WGN, it's "videomagination," and to 3M, it's the almost unpronounceable "electography." Take your pick.



BM/E Photo

Highly vocal and animated about tape as a medium is Tele-Tape's director Lucien Lessard.

that just aren't feasible with film."

Lessard cites two examples—use of computer techniques for frame-by-frame editing and the slow-motion, stop-motion disc recorder. The new Ampex disc is a practical tool that can really challenge the creative man's imagination, says Lessard. The HS-200 teleproduction system combines the disc recorder with a computer.

The computer-controlled system records and plays back frame-by-frame color pictures and permits an operator precise and almost immediate access to any recorded frame from a pushbutton editing console. Like the original high-band color disc recorder, the Ampex HS-100, the system plays back recorded material at normal, fast and slow speeds, down to stop-action, in both forward and reverse modes.

The first commercial HS-200 was delivered to Reeves Telecom Corp. in New York in May. Because of its capabilities, Grey Hodges of Reeves predicts a further acceleration of the trend toward placing commercials and other programs on tape.

#### Electronic Editing Refined

It is the refinement of electronic editing techniques that gives, or will give, tape producers a big plus. The RA-4000 random-access tape con-

troller unveiled by Ampex at NAB (*BM/E*, May 1969, p. 42) is a good example of the latest generation of editing devices. But the RA-4000 won't be commercially available until next year.

The need for less time-consuming editing equipment has spurred one pioneer production company, Advertel of Toronto (with offices in Chicago and New York), to develop its own computer-controlled machine.

Because of this computer-editor, Advertel's president, Peter Hollidge, boasts that a very creative commercial for Chevrolet aired last December had only a 2½-hour lapse between the end of shooting and production of the first continuity cut. What's more, the shooting and editing were done in Detroit, even though the computer was located in Toronto, an hour away by plane.

Actually, Advertel can edit anywhere, and only one man is needed—the director. In the Chevy example, the director was the noted creative director, Karl Genus. Genus sometimes feels like editing lying on his stomach, something he can do with the Advertel approach.

All takes are recorded on a 2-in. quad-head machine. During the taping session, every frame gets tagged with a seven-segment digital code (identifying minutes, seconds and frame). Immediately after the shooting is finished, the 2-in. recording is dubbed onto a 1-in. tape on an Ampex 7800. Since each frame is identified visually with the frame code, all the editor does is use his 7800 like a film moviola machine, zeroing in on the frame he wants by rocking the reels back and forth by hand. When the desired frame is in view on the monitor, the editor jots down the frame code identifier and the desired action—cut, dissolve, fade, etc.—also in code. This edit list can be electrically entered into the computer by using a touch-tone telephone keyboard as the input device.

In making the Chevrolet commercial, Genus put the 2-in. tape on a plane to Toronto and stayed on location to do his editing. Two and one-half hours later he picked up the phone, got his Toronto office on the wire, and keyboarded in his editing code. Thus programmed, the Toronto computer then played back the original 2-in. tape following the editing instructions. The edited version was then flown to the client for a review.

Herb Horton, of Advertel, isn't certain the electronic computer editor always saves that much time. He quips, "It's faster, yes, but now we don't quit so soon." Hollidge counts the system as an asset, however. "We sell our services on the basis of creativity," he says, "but technology makes creativity easier."

#### Computer-Controlled Editor

Reeves also has a computer-controlled program editor. Made by CDL, the Reeves device provides random access to any frame. With the CDL system, editing information can be programmed sequentially on a separate ¼-inch tape for later automatic editing, perhaps during night-

time hours with their usually lower overhead costs. This also make possible the production of identical tape masters without the expense of reprogramming the computer. The programming device can set timed optical effects (dissolves, fades, etc.) ranging from one frame to 399. It can also edit audio alone, or offset from the video. This gives the editor double-system capabilities on a single machine.

Videotape user discovered early that special effects such as wipes and double or triple and even quadruple images on electronically-generated color backgrounds can be useful, reports William Madden of 3M. In fact, there are so many tempting effects available, directors have to be on guard to avoid gimmicking.

Madden singled out NBC's "H. Andrew Williams' Magic Lantern Show" as an example of a visually exciting program. At the opening, Andy Williams introduced a quartet made up of images of himself all singing in sync. Such a composite picture typically involves a combination of production, editing and equipment sophistication all of which add up to highly creative visuals.

A graphic example of the effects now possible on video tape is an Electography demonstration reel produced by Reeves Video and shown by 3M at the NAB convention in Washington. A film chain was used to produce many of the exciting effects. Patterns and colors were generated electronically within the film chain and fed to the special effects generator, which was also mixed images from several studio cameras.

The result was a marriage of bright, rapidly

changing colors; patterns of dots, circles, squares and various other shapes combined with live action.

"Ironically," says Madden, "many of the broadcasters who marvelled at the tape actually already own the equipment—special effects generators, video switchers, cameras, film chains and video tape recorders—capable of producing most of the same effects. The only limitation, really, is imagination."

Some money-saving tips on electronic editing that 3M has gathered from various production houses:

- Place 60 seconds of color bars at the head of each roll of tape to simplify machine preparation.
- Omit music or sound effects from the original track if audio correction is to come later. Editing moves faster when working with dialogue alone.
- If planning to audio-correct after editing, do not over-equalize during recording.
- Record at a constant volume and leave necessary variations to the post-production phase.
- Prepare a storyboard, even a rough one, to help the editor visualize the effect desired.

#### Advancing the Audio Art

The advancing art of electrography also relates to the sound it communicates. The double-system editing techniques that have been used so successfully in film production are now being used by some videotape producers—though not all. Advertel, for instance, says it isn't necessary.

In double-system sound, the audio signal is

Electronic editing room at Reeves Video's 44th Street studios in New York is equipped with Central Dynamics computer.



## Tool for the Creative Director

Add this editor to your Ampex HS-100 disc recorder system and you can do frame by frame editing effortlessly. By taking advantage of the disc recorder's fast and slow speeds, down to stop action in both forward and reverse modes, you can make unusual animation and special effects possible.

Individual frames can be selected and stored and later combined automatically by a computer program. For example, computer-edited choreography is a new art form made possible and visible only through the medium of video disc recording. How else could you have a dancer do an abrupt reverse pirouette in slow motion, no less? Adding the editor to the HS-100 costs \$40,000. You can buy a complete system for \$120,000. Circle 301 on reader service card for more information.



fed to a 16mm or 35mm magnetic film recorder in addition to the audio track of the video tape. The incoming video signal controls the 16mm or 35mm film recorder so that the two machines are synchronous.

Using this approach, a producer can edit the video picture with little possibility of clipping words or sounds from the audio track. Picture editing goes quickly and the audio can be blended, altered or mixed as desired.

Different audio sections of a program now can be electronically corrected to make their "presence" match after editing. The final sound track of the program or commercial is re-recorded with the edited version of the video tape.

### Economics of videotape

Generally, videotape techniques can save time. And if you can get it right with the first shooting, which you can with video, you save the high cost of talent for retakes. But don't lose sight of the fact that your video equipment investment is a whale of a lot higher than it is for film. TV color cameras cost \$70,000, a videotape recorder costs \$100,000 and you need two video operators in addition to a camera man. A film camera, on the other hand, costs only \$30,000 and can be rented for \$45 a day. Film is cheaper than tape. In many

animation situations it's cheaper to have a film camera operating two days, than a TV system two hours. But not always; it depends on the specific sequence and specific requirements.

Although the diehard film man would snort that TV will never approach the simplicity of a 16-pound Arriflex (which can be rented on the spot), electronic hardware is getting smaller and smaller. Miniaturized, compartmentalized production equipment can be trucked or flown to almost any location within hours.

For those who see merits in both tape and film, both can be used simultaneously. Actron's Syncrovision concept of placing a TV and film camera on the same pedestal (a concept also promoted by Reeves) offers the best of both possible worlds.

Tape by no means replaces film, but for many situations it's more flexible and more economical. Only in the ability to handle blow-ups is film equipment more practical. But a video producer would retort, "Who needs post blow-ups?"

Happily for those primarily film-oriented, one can make tape-to-film transfers. On the other hand, film can be transferred to tape for editing, or edited A & B rolls of film can be taken to a videotape service and mixed on tape with all of the desired optical effects produced electronically.

**BM/E**

# Color TV That's Not

Got a mono operation that's not quite ready for color? Zap your viewers with this eye-popping color that they can see on their black-and-white TV screen. It may stir things up in your market, but lots of viewers will never admit that they saw it.



AN OPTICAL ILLUSION? A bit of nonsense? Fooling the public? All of these might be reactions to a system available from Color-Tel Corp. for adding color to mono systems. Feature of the system is that it provides some measure of color impact with mono cameras and mono receivers. It's not

true color, and the necessary flicker rate makes it an eye popper that could produce headaches or refrigerator raids during commercials.

It's in the mono commercial that this idea can be a standout performer. The TV viewer is sud-

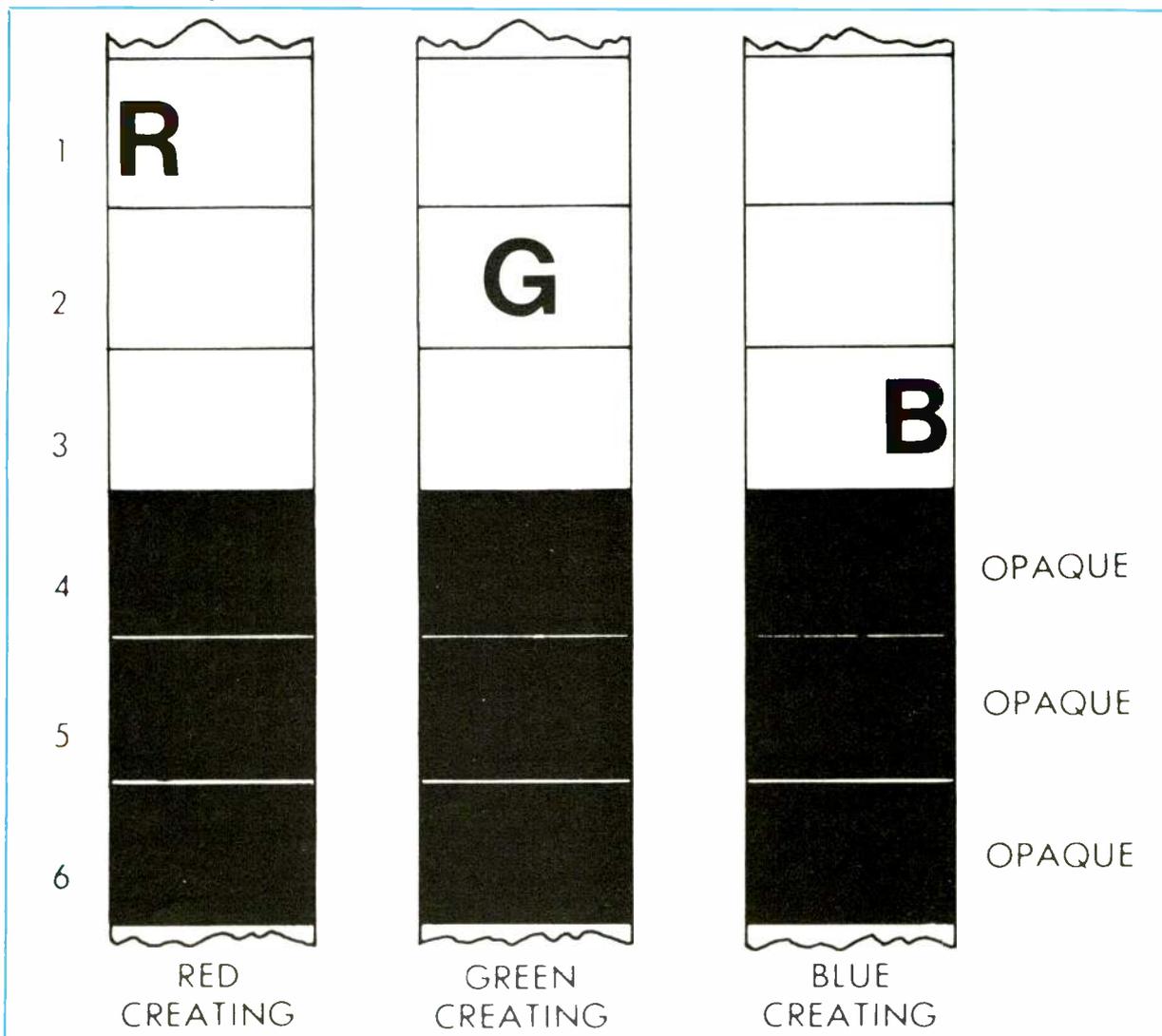
denly surprised by a spot in which the flickering company or brand name is red, the product name is blue and the container is green. First reaction is that people in the viewing audience don't believe it. Some think they've taken leave of their senses. No one admits he's seeing color on a black-and-white TV set. After all, it's just not possible—or is it?

## PCM Is the Key

How does this bit of video legerdemain come about? The human eye takes color frequencies and translates them into a form of pulse-code modulation (PCM). These PCM signals are then transmitted to the brain on the optic nerve. The brain has learned to interpret these pulses as colors.

Theoretically, it's possible to feed such PCM

Location of color-creating blink with respect to three opaque frames is crucial in film version of color-Tel.



signals directly to the eye without any intervening color. The pulses get through to the optic nerve and the *brain* sees color. Thus, if an image on a black-and-white TV screen can be made to flicker at a particular rate—along with black frames—it will appear to be red. If it flickers in a different way, it will appear to be blue. The flickers are necessary to feed the brain the kind of PCM signal needed. Also, full-color pictures aren't possible at this point.

### Guinea Pigs in Providence

Not long ago, station WTEV (New Bedford, Mass.) serving the Providence area, decided to try the Color-Tel system in a station promo. The station call letters in a "slide" were carried in "color" on the mono station, and received as "color" on mono receivers. The station made no announcement of its experiment for the first week. And not one person in the audience would admit to anyone that he had seen color on his monochrome TV set.

### Want More Information?

Write on your station letterhead to: Mr. Haylett B. Shaw, Color-Tel Corp., 13720 Riverside Drive, Sherman Oaks, Calif. 91403.

Finally, one person rather abashedly admitted that he thought he saw WTEV's logo in color one night—and he said this on an interview radio program. Suddenly other people started admitting that they had seen some color. Then WTEV announced some "experiments" and if you saw anything strange in the station breaks, like maybe a little color, please telephone the station. The switchboard almost immediately lit up. Many people did, indeed, see color on their mono sets. Others couldn't believe it. Still others said the station was full of baloney and there wasn't any color.

In any event, the station says it suddenly rocketed in ratings as its viewing public sat up, noticed and watched. The color-that-wasn't turned out to be an excellent station promo—one that provided an instant audience increase at almost no cost at all.

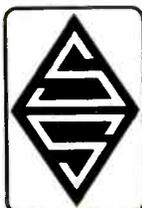
The color can be produced either on film or on videotape relatively easily. Special camera attachments aren't needed, although Color-Tel does provide special accessories for closed-circuit camera applications. If you're not quite ready for color yet, you can zap your audience with red (or green or blue) call letters in your breaks for a while. The system also works on color transmissions received on mono sets. It's sure to be an attention-getter, and may help beef up business for the local headshrinkers.

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# The switch- hitters

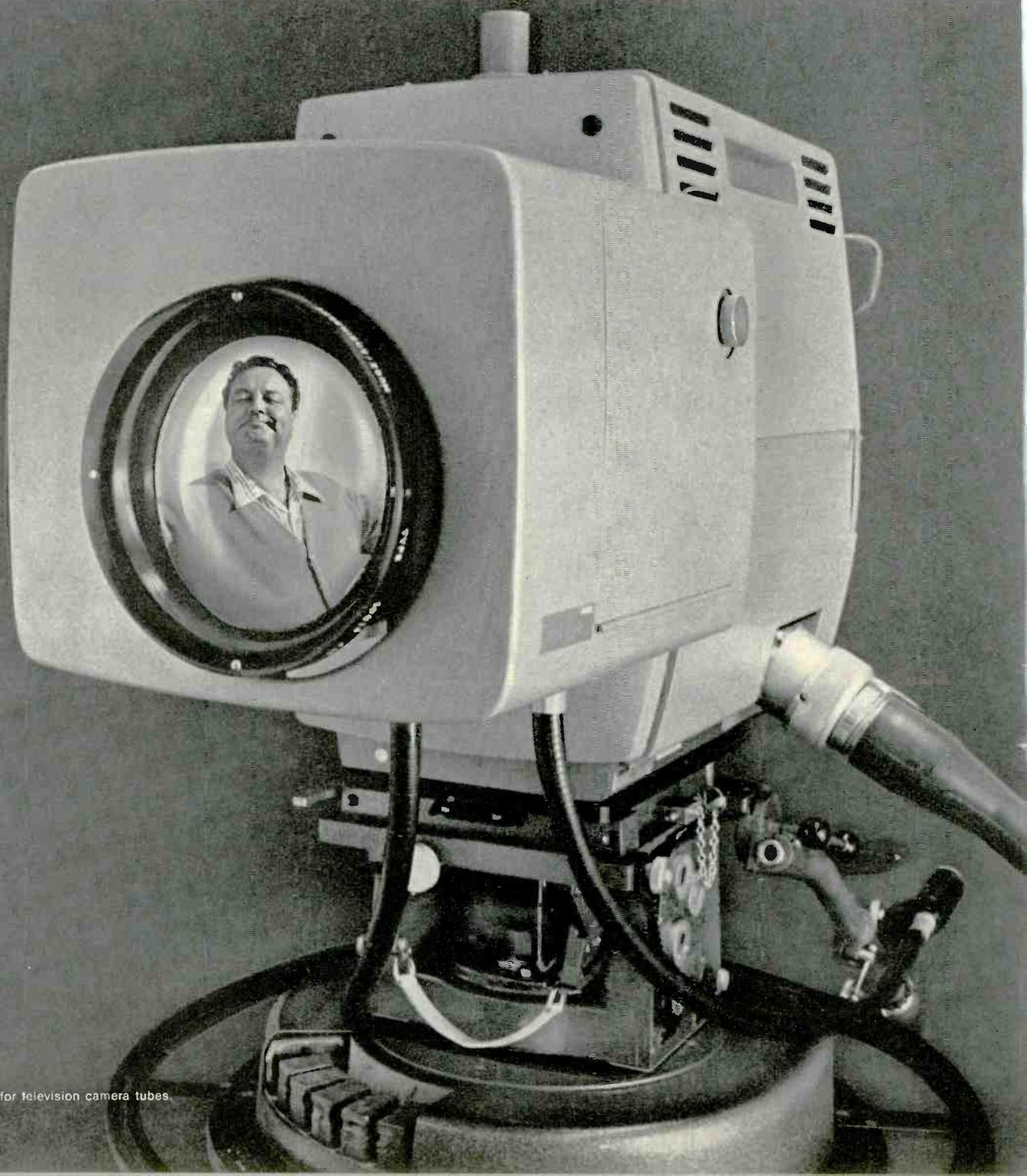
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\*The Philips PC-100, announced at NAB '69, will be available early in 1970.



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# Radio Formatting in

New York City has more radio stations than any metro area in the country, and making a profit means aggressive programming. Here's how some of these 47 stations slice up the pie. Part 2, in next month's BM/E, will cover the balance of the New York formats.

By Thomas R. Haskett

WHEN TELEVISION TOOK DRAMATIC and variety programs away from radio in the early 1950's, the ear medium found specialized programming the only way to survive. Then, in 1965, the FCC cut much a-m/fm simulcasting in half. Since January 1967, no fm station in cities over 100,000 population has been allowed to duplicate its sister a-m station more than 50% of the time. The result has been further format specialization.

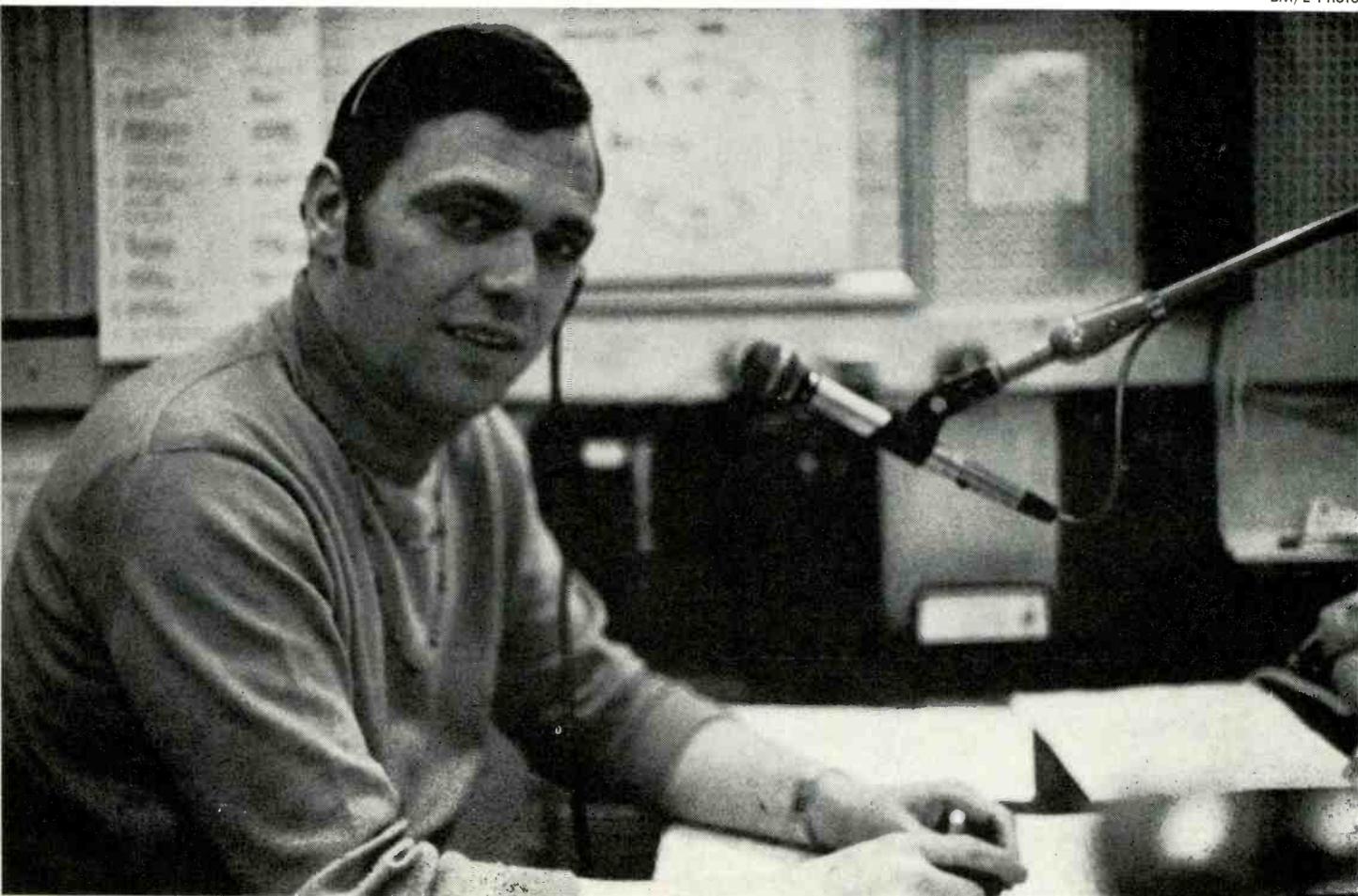
The best example of today's radio specialization is New York City, number one market in the USA.

The 47 New York stations are grouped on the chart according to their program formats. The two major divisions are music and talk, but there

**Thomas Haskett** is a New York-based electronics writer and consultant.

Hosting top-40 WMCA is ace deejay Chuck Browning.

BM/E Photo



# New York—Part 1

are some crossovers. There are interrelationships between groups, and not all stations stick to their formats all the time. Every station carries some news, but news programming is beyond the scope of this article.

## Contemporary Music

Most people simply say "rock" to describe music played by and for anyone under 30. "Contemporary" seems a more appropriate and inclusive term. For one thing, rock seems inappropriate to describe a category which includes borrowed classical stuff like Paul Mauriat's "Love is Blue" (Prokofiev) and Procol Harum's "Whiter Shade of Pale" (Bach), not to mention the down-home apathy of Bobbie Gentry's "Ode to Billy Joe."

## Top 40

Two stations—WABC and WMCA—do Top 40 in New York. The fleetingly popular music is by such artists as Bobby Goldsboro, the Fifth Dimension, Dionne Warwick, the 1910 Fruit Gum Company and the Foundations. The two stations play 45 singles, seldom album cuts. Both stations operate 24 hours, with listener contests, live disc jockeys, editorials and station and personality jingles. Between-records talk is fast and uptempo, with overrides, uptakes and a generally tight format. The stations air lots of up-tempo commercials pitching such things as diet supplements, skin creams, shampoos, and tight jeans.

"Music Power" WABC uses reverb and picks up featurettes like the "Surprises" jokes from the ABC Contemporary Network. The most popular DJ is Cousin Bruce, who's over 30 but sounds under 15. Favorites at WMCA include Jack Spector, Lee Gray and Frankie Crockett. WMCA does an ombudsman service known as "Call for Action." The Top-40 audience seems composed chiefly of nine- through 15-year-olds.

WMCA isn't completely music. A holdover from the previous format is Barry Gray, who does a controversial interview show nightly from 11 to 1.

## Psychedelic Rock

Three stations—WABC-FM, WFMU-FM (East Orange, N.J.), and WNEW-FM—program "psychedelic" or "progressive rock," which includes "folk" and "protest" music. This musical style includes groups like Blood, Sweat & Tears, Jimi Hendrix, the Rolling Stones, Arlo Guthrie, the Bee Gees and Bob Dylan, as well as some Top-40 stuff. Nearly all this music is from album cuts, with few 45 singles being used.

The progressive-rock audience is largely 16 through 23 and is reached by hip-styled commercials for mod clothes, avante-garde clubs and coffeehouses, and psych-rock albums. The music is usually played in blocks of two or three cuts, intro'd and outro'd as a group. There is a moderate amount of DJ comment. All three stations are on the air 24 hours a day.

WABC-FM simulcasts its teenybopper kid-sister a-m from 1 to 6 am. Between 7 and 11 pm it carries a local jock named Bobaloo live. The station also carries New York Mets baseball. During the rest of its broadcast day, WABC-FM carries "Love," the new ABC automated/syndicated program service. "Love" music is psych-rock; talk is by Bobaloo, Brother John and Howard Smith (of the *Village Voice*). Except for baseball, WABC-FM is all stereo. The station does editorials and uses jingles.

WFMU is a college-owned, noncommercial operation which plays some classical and jazz along with progressive rock. Jocks are live and talk is moderate. The station does interviews and some live music.

"New Groove" WNEW-FM is all stereo, with live DJ's and moderate amounts of talk. Main attractions are Scott Muni and Rosko; the all-night shift is done by Allison Steele, who calls herself "Nightbird."

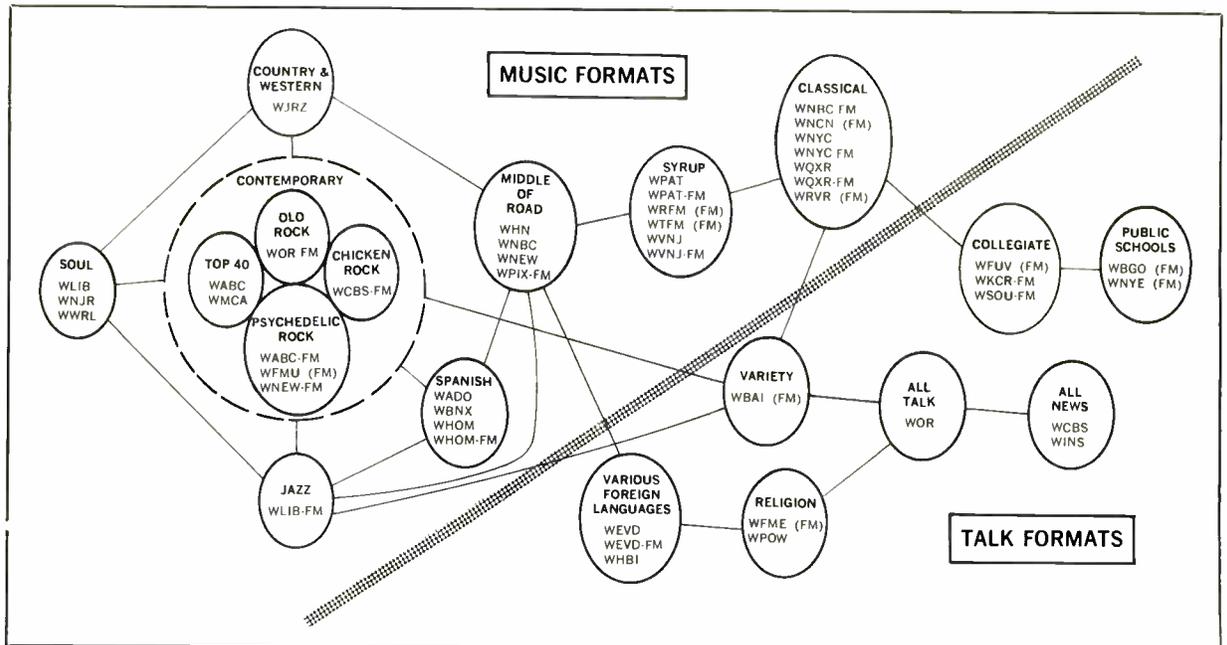
## Old Rock

WOR-FM—"The Big-Town Sound"—uses a format of 1950's rock-and-roll (45 singles) including such artists as Little Richard and Bo Diddley. They also program up-to-date Top-40 stuff by Spanky and Our Gang, Aretha Franklin, and Richard Harris, as well as a few progressive-rock album cuts. A recent impressive special was a 48-hour continuous documentary entitled "The History of Rock and Roll," which included interviews with '50's artists and original cuts from the period.

WOR-FM is stereo 24 hours a day with live DJ's who all sound pretty much alike (they're computer-programmed by radio doctor Bill Drake). The station uses jingles, contests and somewhat hip-styled commercials. The format is like Top-40, very fast and tight, with no dead air but minimal DJ comment. Listeners are probably from 24 to 33.

## Chicken Rock

This hybrid music is played by WCBS-FM, and the style is heavy with album cuts of the saccharine Hollyridge Strings and Johnny Mann



New York broadcasters grouped according to basic categories and showing the interrelationships that necessarily cause some blurring of boundaries. Even those classified within a single group often reach outside their circle for program diversification.

Singers, playing their versions of stuff that was on the Top-40 charts six months earlier. Other artists include Trini Lopez, Jack Jones, the Tijuana Brass and the Cowsills. The key to chicken rock is that you never hear a rock tune done by the group which made it a hit, but only a watered-down copy.

WCBS-FM uses a live DJ named Wally King from 6 to 10 a.m., and is automated the rest of the day until 2 a.m. signoff. The station is stereo. There is some DJ comment on the morning show, but the automated programming (a CBS syndication called "The Young Sound") is different. Music is played in 10- or 12-minute blocks, intro'd and outro'd as a group, with commercials blocked in between. There aren't many commercials and they don't seem aimed at any special audience.

### Soul Music

The main ingredient is rhythm and blues, by artists like Pigmeat Markhams, the Rascals, Stevie Wonder and Nina Simone. Other elements: gospel (Mahalia Jackson), country (John Lee Hooker, Muddy Waters), jazz (Ray Charles, Aretha Franklin) and even Top-40 (Dionne Warwick, Procol Harum). The keynote is that, with few exceptions, the music is played by and for blacks. Sometimes a record makes the top of the playlist on both soul and Top-40 stations (e.g., "Tighten Up," by Archie Bell and the Drells, or "Cowboys and Girls," by the Intruders).

Three stations in the metro area play soul music—WLIB, WNJR (Newark) and WWRL. All are programmed to blacks, but owned by whites. All three stations use live DJ's who talk a fair amount. There are jingles, and lots of commercials which seem aimed at a lower-middle audience. Many recorded spots use black talent for ethnic

appeal; suprisingly, some don't.

WLIB operates limited hours (signing off shortly after sunset), uses reverb, has contests and has featurettes such as "Job Opportunities." WNJR—"The Big N"—is a 24-hour operation with inserts like "Spotlight on Black History." WWRL—"The Big RL"—is also 24 hours, uses reverb and contests, airs editorials and has a negro-history feature called "Profile in Black." WLIB and WNJR do a few jazz shows in addition to their regular soul format.

### Country and Western

Only one station in the metro area follows a C & W format—WJRZ (Hackensack, N.J.). "Hillbilly music" is a passé term today, for it means stuff played 20 years ago by Ernest Tubb and Roy Acuff, appealing to puritanical Bible-belt mountaineers and illiterate dirt farmers. Today's C & W music is slick, polished and high-pressure marketed to urban and suburban dwellers who grew up on midwestern and southern farms but later moved to the big city for good-money jobs. As the chart shows, C & W is interrelated with soul, contemporary and middle-of-road music. Ever since Elvis Presley hit all four markets with "Heartbreak Hotel" in the 1950's, some artists have continued to cross format lines. Thus, Glen Campbell's "Galveston" is played on WJRZ as well as Top 40 and MOR stations.

WJRZ—"The Nashville Sound"—is a 24-hour operation using reverb, jingles and live jocks with moderate amounts of conversation. Format is up-tempo and tight. The station carries New York Mets baseball, and has inserts such as "Job Opportunities." Commercials sell such things as home-improvement loans, country music concerts and beer.

WLIB-FM does jazz during its broadcast day

from noon to 12:30 midnight. Content is chiefly current: Horace Silver, Gabor Szabo, Morgana King, Duke Ellington, Chico Hamilton and Elvin Jones. Not all artists are black (e.g., Don Ellis, Stan Getz). There's little from the Dixieland, Swing and Bop eras. Interrelationships are manifold, with links to soul (Ray Charles, Miriam Makeba), Top 40 (Ramsey Lewis, Ahmad Jamal), psychedelic rock (Gary Burton), MOR (Nancy Wilson, Ella Fitzgerald) and Spanish-language music (Mongo Santamaria, Bola Sete).

WLIB-FM DJ's are live and do considerable talking. Favorites include Del Shields and jazz pianist Billy Taylor. The format is loose and relaxed. Commercials are mostly general, leaning toward entertainment and luxuries (concerts, cigarettes, beer). Audience is largely black, but a sizeable percentage of whites listen. The station breaks format to carry a listener phone-in show nightly from 11:30 to 12:30 hosted by Del Shields.

There are other New York area jazz shows. WTFM carries one from 2- to 5:45 a.m. with Rhett Evers. Oldtimer Symphony Sid plays some jazz and mostly Spanish music from 11 p.m. to 3 a.m. on WEVD (A-M/FM). WRVR's Ed Beach does a daily two-hour show. WBAI, WFUV and WKCR-FM also do occasional jazz show. And as mentioned, WLIB and WNJR do some jazz.

#### Middle-of-Road Music

This used to be called "pop music," but the

term connotes music which is popular with the majority. Today, the people who listen to WHN, WNBC, WNEW and WPIX-FM are no longer the majority.

The hard core of MOR music consists of artists like Frank Sinatra, Tony Bennett, Henry Mancini, Barbara Streisand, Nelson Riddle, Eydie Gorme and Jerry Vale. MOR music has links with chicken rock (Trini Lopez, the Johnny Mann Singers), jazz, (Stan Kenton, Count Basie), C & W (Glen Campbell), syrup (Robert Farnon) and Spanish-language music (Laurindo Almeida).

Each of New York's four MOR stations differ slightly in their musical content. WHN is antiseptic and family oriented (which means housewife, since the kids are digging contemporary music) and serve a diet including Dinah Shore, Stanley Black, Patti Page and Hugo Winterhalter. Its listeners are from about 35 to 50 and live in the suburbs. WHN disinters such things as Buddy Clark's original 1947 hit, "Linda." Top jocks are Jack Sterling and Jim Ameche—known as "the world's most famous radio announcer."

WNBC used to be an all-talk station and recently switched to about  $\frac{2}{3}$  music and  $\frac{1}{3}$  talk, hiring Joe O'Brian away from Top-40 WMCA to do the morning show. Making a pitch to younger listeners, WNBC spices its Dean Martin with the Peppermint Rainbow, its Margaret Whitting with the Mamas and the Papas. It plays some of the milder Top-40 rock by Petula Clark, Gary Puckett and the Union Gap. Other popular DJ's include Big Wilson and Charlie Brown. WNBC is making

Veteran announcer Jim Ameche presides over WHN's MOR format.

BM/E Photo



an effort to capture the younger market, but it's too early to say if it has succeeded.

WNEW is a swinger station, using up-tempo formula stuff by Al Hirt, Richard Maltby, Peggy Lee, Sergio Mendes and Brasil 66. Gene Clavan does what is probably the funniest morning show in radio, and William B. Williams has a large housewife following. WNEW listeners are about 30 to 45 and like to think they're not stodgy, but not teenyboppers, either.

WPIX-FM has a Broadway image, and does show tunes by the Melachrino Strings, Jerry Vale and Enoch Light. Tom Mercein does a relaxed but lively morning show.

All four MOR stations operate 24 hours with live DJ's and a relaxed, talky format (although WPIX-FM jocks talk less). WHN uses jingles, a contest, and featurettes such as "Information from A to Z." The station also carries New York Yankees baseball.

WNBC—"Radio 660"—has a contest and picks up informative features like "The Now Program" (with Rosko, a WNEW-FM progressive-rock DJ) from NBC radio, from which it also gets "Monitor" on weekends.

WNBC has some talk programming.

WNEW uses jingles and a contest, with featurettes like "Ski Reports," and Community Bulletin Board."

WPIX-FM—"The Pix Penthouse"—is stereo, with jingles and a quiet sound.

Commercials on MOR stations are general in nature and aimed at the mature audiences these stations attract.

One significant difference between swinger WNEW and family WHN—WNEW carried the "Give a Damn" public-service announcements verbatim, while WHN rewrote them, eliminating the naughty word.

Father Time is catching up with the MOR stations. As contemporary-music listeners grow up and begin to make money, rock stations' profits grow. Meanwhile, the MOR audience dwindles with age and death. A movement is discernible—a slight shift in music played on MOR station. Where five or ten years ago it would have been unthinkable to play a Top-40 tune on an MOR outlet, today that's not so.

At first, syrupy groups like the Hollyridge Strings and the Johnny Mann Singers came out with things like a non-Richard-Harris "McArthur Park," and a non-Dionne-Warwick "Say a Little Prayer," months after they were on the Top-40 charts. But this lo-fi version of chicken rock seems only a holding action. Already, top sellers are breaking through on MOR stations at the time they're hot on rock playlists. Examples: Bobby Goldsboro's "Honey," Dionne Warwick's "San Jose," and "This Girl's in Love with You." You can even hear Harper's Bizarre, the Fifth Dimension, the Association and occasionally Blood-Sweat-and-Tears.

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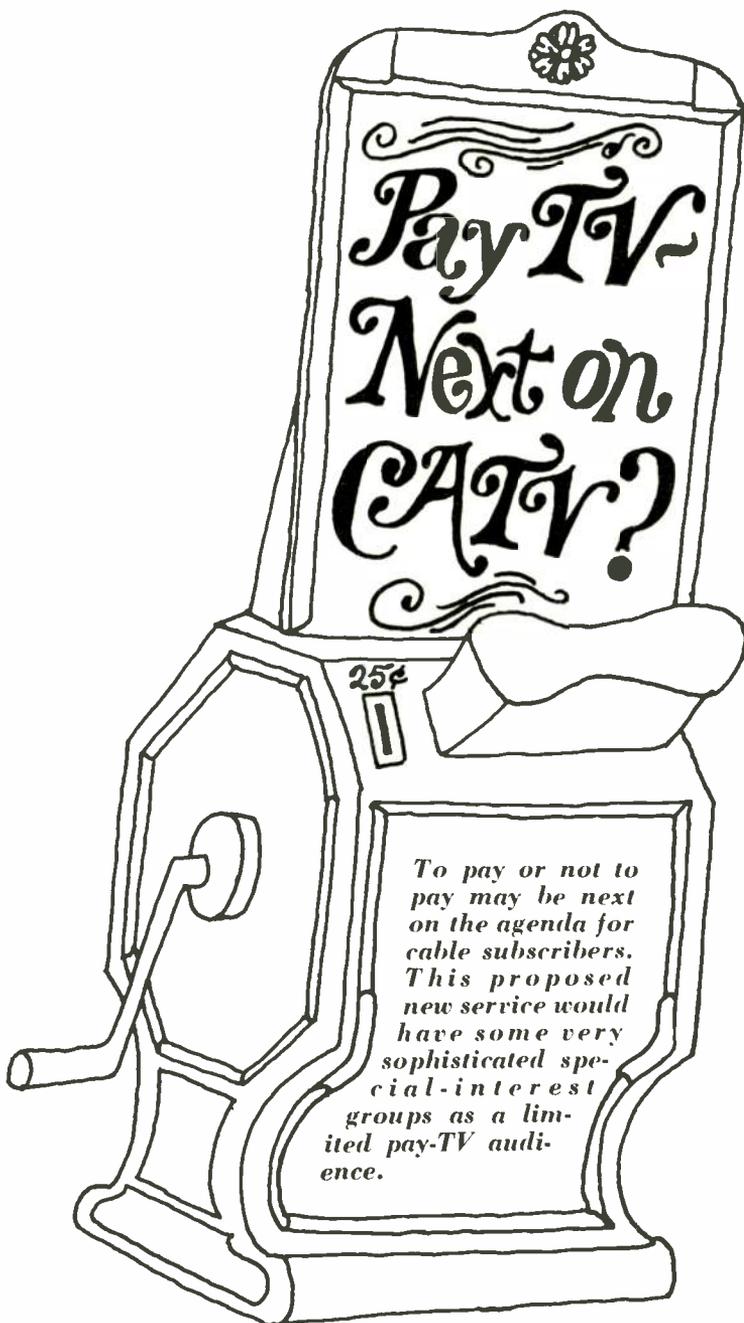


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For starters, the Tapecaster Model 700RP has 30 sealed silicon transistors and 15 silicon diodes of the best quality money can buy... and now it has the SUPER-TORQUE hysteresis synchronous motor. No wonder Tapecaster is the leader in professional tape cartridge equipment.

Circle 117 on Reader Service Card



SPECIALIZED PROGRAMS for fragmented audiences have been predicted how many times?—a hundred, a thousand? Alfred R. Stern, CATV pioneer and president of TeleVision Communication Corp. (TVC), hopes to make this promise part of the present—part of the here and now. To do so he set-up TVC subsidiary, Gridtronics, with Frank Cooper at its head.

Four channels are for hire in the Gridtronics diversity concept: a professional channel at \$2 per month, an instructional channel at \$3, an information channel at \$2, and a contemporary film channel at \$5. Only customers who have a converter-decoder can receive the additional channels.

What is fundamentally different about the new Gridtronics service is that the primary aim is not to win new cable subscribers or to increase market penetration. Rather, it's a new dimension of service that calls for additional capitalization and return on investment. Frank Cooper says he can show that the diversity concept can earn extra profit from existing customers alone.

A sizable capital investment is needed. First the cable and amplifier systems must be first class and capable of full-channel transmission without distortion or interference. Gridtronics expects to use the mid band for some, if not all, of its transmissions. Only modern, transistorized low-distortion amplifiers can operate midband. Systems not having this capability will have to modernize before they can avail themselves of the Gridtronics concept.

Secondly, the cable operation will have to be able to feed into the cable color video-tape or 16mm film programs. Therefore, a full-color local origination capability is needed. This alone can cost \$50-75,000. Cooper expects the cable operators to go all out; *i.e.*, to buy not only the color video tape recorders and film chains but the color cameras as well. TeleMation, Inc. has been picked by Gridtronics to provide the equipment needed.

#### Programs of High Caliber

The material to be offered on the pay channels is not just a collection of available material.

The first professional channel is intended for physicians. A new videotape production company, Preferred TV, Inc., has been formed to develop special material. Heading up Preferred is Ira Wolf who comes from the NBC TV network. Wolf says the productions will be of network quality. To help underwrite the required investment, sponsorship will be obtained from ethical drug companies.

Wolf recognizes that even if every doctor now on regular cable were to become a professional channel subscriber as well, revenue would be light. He and his parent company, Computer Programmed Markets, specialists in medical marketing, are prepared for the long haul. This means first class productions regardless of initial income. After the program for medical doctors in under-way, Gridtronics will consider lawyers, accountants, architects, etc.

#### Cable ITV

The instructional channel will offer back-to-school courses all day long. This will include basic courses in English, physics, math and biology and enrichment courses such as French, Spanish, art and so on. These courses will be available on an exclusive basis to cable operators only through Gridtronics.

The informational channel will not be like usual travelogues or free-film "documentaries" but will feature outstanding productions covering cultural and social topics. Cooper says these programs will range from plays by Ibsen and Shakespeare, to current discussions dealing with Red

China, air pollution and oceanography, for example.

What will be on the movie channel is at this time not certain. Hollywood producers are playing hard to get but Cooper expects they will come his way after a few independents sign up. "Hollywood won't be able to resist," Cooper maintains.

What's in it for the program suppliers? About forty percent of the take. The cable operation will keep half. The other half will be split 40-10 between the producer and Gridtronics. Gridtronics of course, will handle distribution and collection.

#### The Next Generation

The diversity program concept sounds good but are cable operators ready to make the additional investment? Yes, says Alfred Stern, if cable operators recognize this move as the next era in cable operations. Many cable systems are nearing saturation in terms of subscribers, but costs keep going up. It's not always the smart thing to go to the local municipality that granted the franchise and ask for fee hike. Such tactics always leave a bad taste. But it's quite another thing to ask for a rate increase when it's sought on the basis of increased investment and additional service.

Stern is counting on significant additional programming to be paid for by subscribers rather than by local advertisers. If he's right, Gridtronics will have to face competing program packages in a few years. But that's all the lead time Gridtronics wants—a couple of years. **BM/E**

BM/E Photo

Frank Cooper, who makes Gridtronics go, is ready to answer any questions on new diversity concept.



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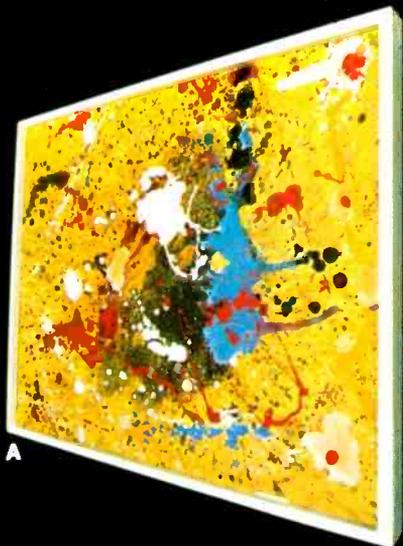
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It outperforms any other color camera in the world today. Once you see and try the TK-44A, you'll agree. You'll discover features found in no other camera. Features that mean better color and faster set-up. Features that mean more time for your engineers and camera-men to spend in program production instead of tinkering, to assure less tension and greater efficiency—indoors and out!

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**C** The TK-44A can give you the highest degree of color-match with any color camera you own. No other camera can offer you this important operating advantage. Reason: the unique "Chromacomp" Color Masker.

**D** The TK-44A can increase picture sharpness without causing a corresponding increase in noise. Reason: the unique comb filter Contour Enhancer.

**E** The TK-44A can produce life-like color at all light levels. Even at 15 foot candles, it can still deliver full video levels. Reason: optics 30% more efficient than the No. 2 camera.

In the months ahead, we will tell you why the new TK-44A offers you more for your money in operating flexibility. But if you want complete details now, call your RCA Broadcast Representative or write: RCA Broadcast Equipment, Bldg. 15-5, Camden, N. J. 08102.

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# BROADCAST EQUIPMENT

## Spot and flood lamps

Sealed beam 1000-W Quartzline spot and flood lamps feature dichroic coating outside eight-in. diameter lenses, which filters out red and transmits cool color with temperature from 5000 to 5500 degrees



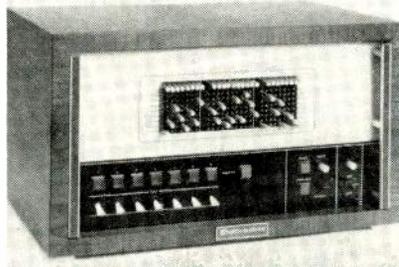
Kelvin, which blends with daylight. Three types of lamps include: Narrow spot, producing 220,000 center beam candlepower and covering an area of  $2 \times 4\frac{1}{2}$  ft at distance of 20 ft; medium flood whose beam of 62,000 candlepower covers area of

$4 \times 9\frac{1}{2}$  ft and wide flood with a beam of 25,000 candlepower covering area of  $8 \times 17\frac{1}{2}$  ft at 20 ft. Light source in lamps is tungsten-halogen filament tube. All lamps have rated average life of 60 hours at 120 V and can be mounted in existing 1000-W PAR-64 fixtures. General Electric Co.

Circle 278 on Reader Service Card

## Program controller

Model 726 automatic program controller can control any combination of broadcast quality audio sources without using electronics. It can be



used with existing time announcers, network joining systems, random selecting spot players. Both cartridge and reel-to-reel equipment can be intermixed; it isn't necessary to use only one manufacturer's transports. Price is under \$2000.00. Sparta Electronics Corp.

Circle 283 on Reader Service Card

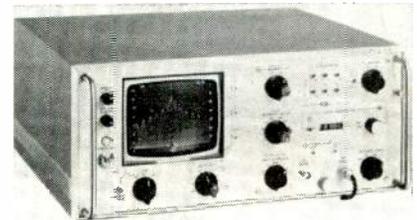
## Slide projectors

Models SLR-1200A and SLD-1200A are slide projectors which use 1200-W tungsten-halogen lamps, rated at 20 hours lamp life without yellowing. SLR-1200A with its 48-slide capacity and the dual-drum SLD-1200A with its 96-slide capacity are available either with or without the S&S Model 756 Ultrabright 3000-Lumen High Light System. Spindler & Sauppe.

Circle 282 on Reader Service Card

## Audio spectrum analyzer

Model 710 display unit and Model 800 analyzer module comprise portable, calibrated spectrum analyzer for frequency range of 10 Hz to 50



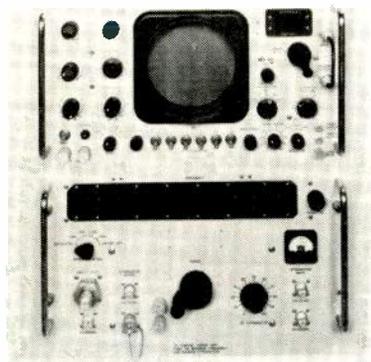
kHz. Optional internal rechargeable battery allows eight continuous hours of field use. Weight including battery is 30 lb. Applications besides spectrum analysis include use as selective nanovoltmeter, emi/rfi receiver or as a log VSWR indicator. Power dissipation is less than 15 W. Self-contained battery will power unit for more than eight hours. \$2495.00. Systron Donner Corp.

Circle 275 on Reader Service Card

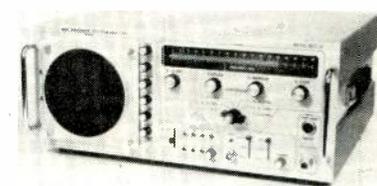
## Microwave spectrum analyzers

attenuator makes precision measurement possible. AUL Instruments, Inc.

Circle 276 on Reader Service Card



Model MSA-84 WA spectrum analyzer covers the 10 MHz-to-63 GHz frequency range. Mounted in louvered aluminum dust cabinet, the analyzer displays the detected output as a linear or logarithmic plot, or rf signal strength versus frequency on a cathode ray tube. This model features variable resolution of from one to 80 kHz and the 0.013 crystal markers provide means for precision measurement. A .1 dB/dB IF at-



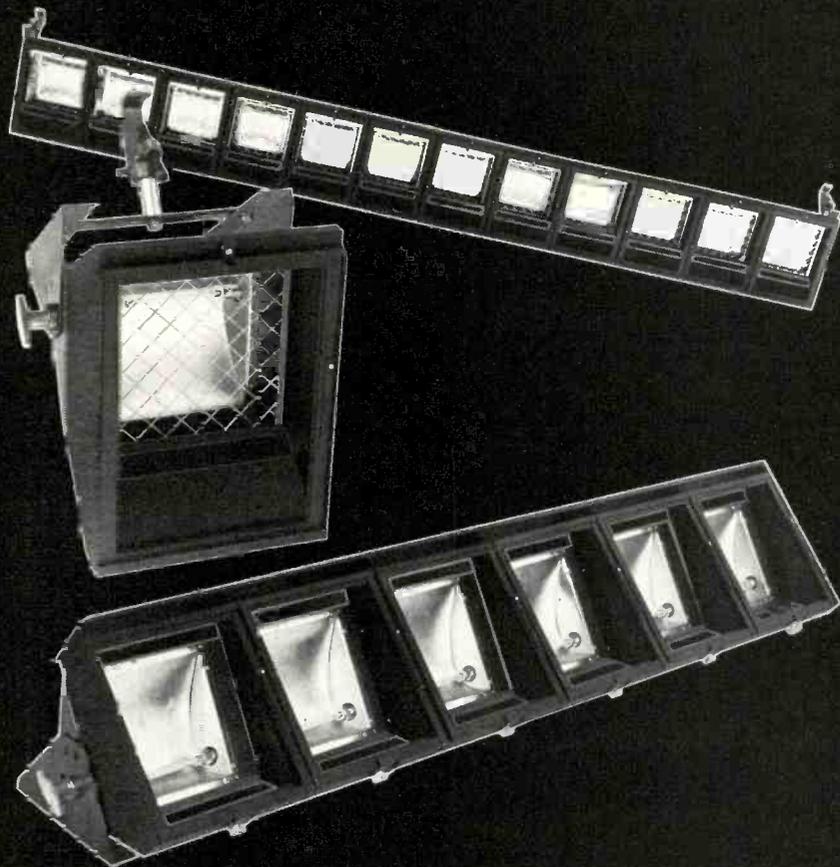
Model 8011B is a YIG-tuned electronically swept analyzer covering frequency range of 0.7 to 18.0 GHz. Flat response across the band is  $\pm 2$  dB, with a 60 dB dynamic range from -45 dBm to +15 dBm. This model doesn't produce harmonics, cross modulation products or images which are confusing for wide band presentation. Recommended for making power vs frequency measurements on microwave devices generating widely dispersed spectrum. \$4800 NYTEK Electronics.

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## Base station mike

Model Plus Three base station microphone has transistorized preamplifier plus compression amplifier circuit which prevents overmodulation. Frequency response has range of 300 to 3000 Hz. Pre-amplifier provides

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DIRECTION



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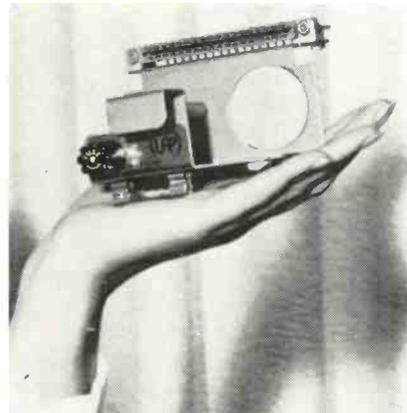


voltage gain from 0 to 35 dB. Replaceable nine-volt power pack is built in. List price of Plus Three is \$75.00. The Turner Co.

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## Voltage detector

CB-440 over-voltage detector protects Ampex AG-440 from amplifier damage caused by unnoticed power supply runaway. Detector is install-



able in any one- to-four track recorder in the series without rewiring, tools or technical skill. \$53.50 from Ultra Audio Products.

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## Video monitor

Model MV-5 solid-state five-in. video monitor features high horizontal resolution (550 lines) and is designed for optimum performance with all CCTV cameras. Weighing nine lb, it is compact; three MV-5's can be mounted on a standard 19-in. mon-



## WANT TO TAKE THE GAMBLE OUT OF VIDEO TAPE DROPOUTS?



## LET 3M's DROPOUT PROFILE RECORDER KEEP YOUR BEST TAPES IN THE RACE



Now for the first time it is possible with the 3M Brand Dropout Profile Recorder to evaluate dropout rate and annoyance factor during normal on-line playback, and to obtain a permanent strip-chart record for future reference. This enables you to decide when quality degradation has reached the point where the tape should be retired.

There's no fooling the Dropout Profile Recorder. It displays the true condition of a tape electronically even while the same tape is being dropout-compensated during broadcast to achieve acceptable visual quality.

As you can imagine, the logical companion to the DPR is the 3M Brand Dropout Compensator. The DOC electronically supplies full-color replacement

of lost video information. But dropout compensation can go only so far. When tape damage exceeds acceptable levels, the Dropout Profile Recorder is the only reliable way to decide on future usability.

The entire record for a one-hour video tape occupies only five inches of strip chart on the DPR. This chart can be evaluated at a glance. It can then be torn off and stored with the tape.

There are several additional features of the DPR which are described in our DPR brochure. (We'll send you a brochure on the DOC also, in case you are interested.) Drop us a line. Better still, call our DPR Information Phone at (805) 482-1911 ext. 216 and request the brochures.

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itor mount. All circuits are solid-state and mounted on plug-in boards for easy, rapid maintenance. The MV-5 carries the GBC one-year guarantee. GBC Closed Circuit TV Corp.

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### Audio console

The Yard II solid-state audio console measures just over a yard wide, features 12 inputs into eight mixing



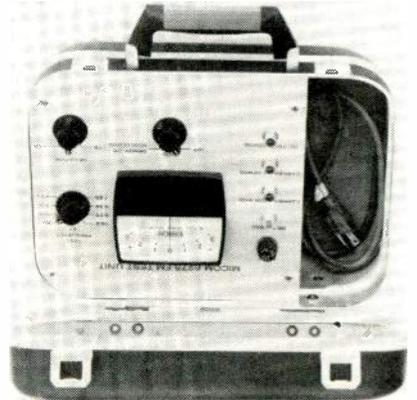
channels and is a full control facility for any size a-m and fm monophonic station. Any of the eight input channels may be switched to either the program or audition position to permit monitoring or recording of incoming sources without disturbing programming. Except for the externally mounted power transformer, the console is self-contained. Fre-

quency response is uniform  $\pm 1$  dB from 30 to 15,000 Hz; noise is better than 73 dB below normal output with cross talk below noise at normal levels and control settings. Distortion is less than .75 percent from 30 to 15,000 Hz at  $\pm 18$  dB output. Gates Radio Co.

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### Fm calibrator

Model 6275 fm portable calibrator calibrates IRIG Group 1 (40 percent deviation) narrow and intermediate



band fm electronics with center frequency carriers up to 432 kHz. Independent three-point calibration of modulators and demodulators can be performed as well as overall fm channel calibration. Zero center meter provides plus and minus three percent full-scale maximum error readings. \$550. Micom, Inc.

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### Coaxial cable

InterFoil is marketing name for 75-ohm all-85 channel coaxial cable with attenuation of 2.8 dB per 100 ft on channel 13 (216 MHz). Cable shields an 18 gauge copper conductor and low loss foam dielectric in aluminum mylar to assure maximum signal strength on all uhf, vhf, monochrome, color TV, CATV applications. 100 percent shielded design has an O.D. of .242 for space saving conduit installations. Cable is available in 2000 ft reels, 1000 ft reels, 500 ft spools and 100, 75 and 50 ft coils. International Wire & Cable Co.

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### New cleaner

New version of Mask-N-Glas cleaner is said to have superior cleaning power on picture tubes and picture tube masks, recorder and phono cases. The surface that has been cleaned retains antistatic coating which uses static electricity to repel dust. Chemtronics, Inc.

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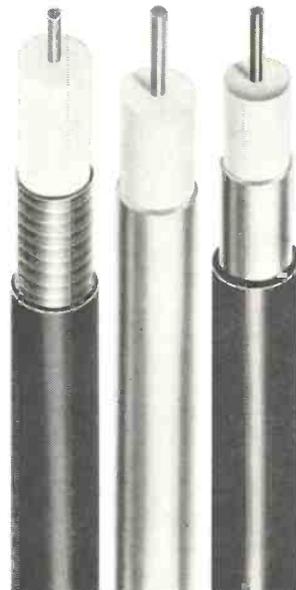
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# NAMES IN THE NEWS

Eastman Kodak Co. received an "Emmy" on June 8 from the National Academy of Television Arts and Sciences, in recognition of its development of the ME-4 color film process; CBS Inc. received the first "citation Emmy" for engineering development, for its Minicam digitally

controlled portable color camera, developed by CBS Labs and manufactured by Philips Broadcast.

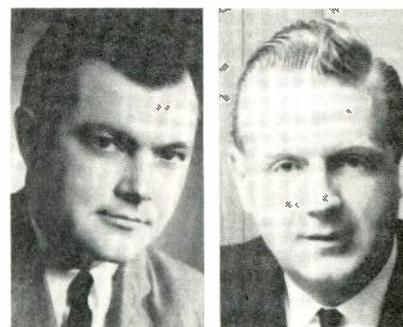
The Council on International Non-theatrical Events (CINE) has re-elected **Reid H. Ray**, midwest film producer, to his second term as president.

Director of the Hawaii Educational Television Network **Robert M. Reed** has been named director of the Educational Television Stations Program Service in Bloomington, Ind.



**Theodore Tsevdos**      **Walter S. Rekuc**

The new general manager of the Communications Systems Division and corporate controller and assistant treasurer for Philips Broadcast Equipment Corp., are, respectively, **Theodore J. Tsevdos** and **Walter S. Rekuc**.



**Robert Hueffed**      **James Harford**

**Robert G. Hueffed** has been appointed vice-president and general manager of Central Dynamics Corporation.

**James W. Harford** has been appointed president of Schafer Electronics, Chatsworth, Calif.

**Wayne Van Dine**, member of the staff at WSTV-TV, Steubenville, Ohio, for the past 11 years, has joined WHC-TV News.



**Michael F. Jeffers**      **Donald W. Hocks**

**Michael F. Jeffers** has been promoted to vice president, engineering, The Jerrold Corporation.

**Donald W. Hocks** has been named business manager of WTCN-TV, channel 11 in the Twin Cities.



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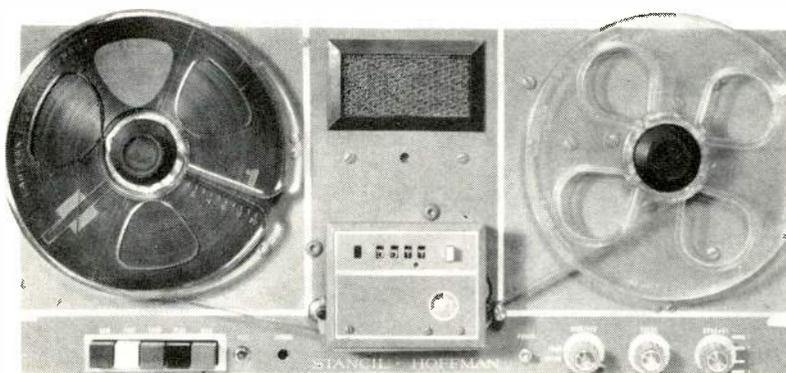
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# MODERN RADIO BROADCASTING

Management & Operation in Small to Medium Markets

BY R. H. CODDINGTON

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- 138 Subject Headings
- 18 BIG Chapters
- Complete & Up-to-Date

### PARTIAL LIST OF CONTENTS

**THE UNIQUE REQUIREMENTS OF THE SMALL MARKET:** The Growth of Broadcasting; How Small is a Small Market; The Prevalence of the Short-Term View Among Broadcasters; The Long-Range View is Essential to the Small Market; Programming Must be in the Public Interest—**AUDIENCES, DOLLARS AND PROFITS IN THE SMALL MARKET:** How Listeners are Measured in the Small Market; Personnel in the Small Market; Sales in the Small Market; Rates; New Station, or Established One; Investments and Profits in the Small Market—**CHOOSING A MARKET AND SELECTING A FACILITY:** Evaluating Market Potential; AM Channel Types and Classes; The AM Frequency Search; How About FM; FM Channel Selection—**FROM FORM 301 TO THE LICENSE:** The Official Application; Section I; Section II; Section III; Section IV-A; Section V; Immediate Post-Application Procedures; Hearings; The Construction Permit and Ownership Report; Equipment Tests; Program Tests and the License Application—**THE FCC—SOME GENERAL REQUIREMENTS:** Compliance; The Annual Financial Report; Ownership Changes and Reports; Modification of License; License Renewal; Logs; Operators; The Public Inspection File; Political Broadcasts; Editorials and the Fairness Doctrine; Sponsorship Identification; Official Inspections; The Emergency Broadcast System; Operating Hours—**LAND AND BUILDING REQUIREMENTS:** The Long-Range View Again; The Site; Remote Control; The Building(s); The Studios; Automation and the SCA; Other Plant Requirements—**EQUIPMENT IN GENERAL AND THE TRANSMITTER IN PARTICULAR:** Acquisition; The Tower and Antenna; The Transmitter; Special FM Transmitters; The Monitors; Limiters and AGC Amplifiers—Speech Processors—**CONTROL ROOM AND STUDIO EQUIPMENT:** Audio Control Consoles; Turntables; Cartridge Tape Equipment; Reel-to-Reel Tape Equipment; Microphones; Speakers; Remote Broadcast Equipment; Other Technical Equipment; Non-Technical Equipment—**THE STAFF:** Active Ownership; Management; Sales; National Representatives; Engineers; Announcers and Combination Men; Continuity and Traffic Requirements; Bookkeeping; Receptionists and Secretaries; Janitorial Services; Professional vs Local People; Employees are People—**PROGRAMMING IN GENERAL—MUSIC IN PARTICULAR:** Radio's Product; Music; Performance Licensing; Music Indexing—**OTHER PROGRAM TYPES AND PROGRAM LOGS:** Networks; Syndication; Talk Programs; News; Special Events; Religious Programs; Public Service; Surveys; Program Logs—**SALES AND PROMOTION—GETTING OFF THE GROUND:** A Good Product; Competition; Sales Methods; Internal Communications; Initial Promotion; Future Promotion; Conclusion—**THE ENGINEER—PART OF THE MANAGEMENT TEAM:** The Traditional Schism; The Engineer as an Idealist; The Engineer as a Salesman; High Equipment Reliability is Good Management; Far-Sighted Technical Planning

*Continued in next column*

## MODERN RADIO BROADCASTING: Management & Operation in Small to Medium Markets, By R. H. Coddington

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Here are the real "nuts-and-bolts" of modern radio operation, based on two decades of experience in all size markets—from the metropolitan goliaths to the "peanut whistle" variety. No matter what your interest in broadcasting—management, production, engineering, etc.—you'll refer to this encyclopedic volume time and again.

Written for those who are, or who aspire to be, owners and managers, **Modern Radio Broadcasting** provides an in-depth view of the largest single category of broadcasting station operation—the so-called "small" market. Regardless of your present status in broadcasting—experienced or inexperienced, veteran or student—you can't help but move up the ladder armed with the straight-forward information presented in this book. A glance at the Chapter titles and contents will give you an idea of scope covered in this practical, all-encompassing guide.

Chapter 1 describes the small market, its unique aspects, its peculiarities, what a station must do to ingrain itself in a community. The cold, hard facts of economy come under scrutiny in Chapter 2. Chapter 3 spotlights the often intricate ramifications of market and facility selection, while Chapter 4 follows up with the official FCC requirements and Chapter 5 explains compliance with FCC rules and regulations in general.

The pitfalls lurking behind land acquisition and building requirements are exposed in Chapter 6, and Chapter 7 explains transmitter and antenna equipment requirements. Chapter 8 is devoted to its entirety to studio equipment. Chapter 9 gets down to the "brass tacks" of staffing a station—from manager to janitor. Due to the scope of the subject, three chapters are devoted to program-

ming, sales, and promotion, and the many ramifications and complications of these operations.

The last six Chapters are devoted exclusively to engineering, with special emphasis on microphones and studio equipment. Especially for those not acquainted with construction, Chapter 17 divulges many practical and successful techniques essential to good engineering practice. The final Chapter is devoted entirely to the all-important subject of maintenance, the maintenance log, and the transmitter or operating log. For anyone in broadcasting, or those studying the subject, this book is an absolute *must!*

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news, editorializing, law and the news, etc. 176 pps; 8 Chapters; Heavily illus. Hardbound. Order No. 216 ..... only **\$7.95**

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# NEW LIT

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

Random access television programmer is described in bulletin V233 (200) and two case histories of complete TV production facilities are delineated in bulletin G323 (201) from Ampex.

"Statistical Trends in Broadcasting" is the title of 27-page booklet from Blair Television. **202**

Data Shield precision tape reels made of Chemcor strengthened glass are described in brochure by Corning Glass Works. **203**

"Coaxial Line and Components," a 72-page application manual, is available from Dielectric Communications Division of Sola Basic Industries. **204**

Monochrome and color video projectors for large screen, off-air and closed-circuit TV are covered in six-

page, four-color brochure from General Electric. **205**

VHFA-20 Communications Amplifier is described in data sheet from American Electronic Laboratories, Inc. **206**

Alignment of A2A local television video loop equalizers and equipment necessary for doing the job are discussed in three-page application note from Hewlett-Packard. **207**

Integrated systems from TV to remote lesson retrieval are presented in 32-page brochure from RCA. **208**

"A Mobile Electroacoustic Laboratory," the title of bulletin 6.1215.0, details specifications of the Audio Applications Laboratory of the Naval Training Device Center at Orlando, Fla., where a 40-ft semi-trailer was converted into the mobile lab. Industrial Acoustics Co. **209**

How a metropolitan area school system is increasing capability of its educational plant by means of instructional television is the subject of two reprinted articles available. Write to Joe Einsidler, manager, Educational and Communication Systems Division, Jerrold Electronics Corp.

"Audio Signal Processing by Means of AM/FM Limiters and agc Amplifiers" (210) and "Susceptibility of the Open-Delta Connection to Third Harmonic and Transient Disturbances" (211) are titles of technical papers available from Gates Radio Co.

Audio systems—the 212S-1 speech console, the 212M-1 monaural speech console and the 212T-1 TV audio control console—from Collins Radio are presented in 12-page book. **212**

Editing, Film Handling Equipment and Accessories is the title of 38-page catalog from SOS Photo-Cine-Optics, Inc. Recipients will also receive the complete 300-page catalog when it becomes available. **213**

Mini-Series—audio and video amplifiers, synchronizing generators, audio-video modulators, video switchers and faders, video cable equalizers and special effects generators—is detailed in 24-page book from Dynair Electronics. **214**

Two control computers—the PCC-8000 for a-m and fm station needs and the PCS-1000 System Computer for more complex situations—are presented by Schafer Electronics in a brochure. **215**

NTSC system instruments, including test signal generator, vectorscope, waveform monitor, are discussed in 41 pages by Tektronix, Inc. **216**

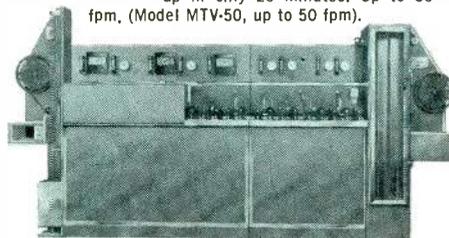


MTV-30. Compact, self-contained unit can be operated in 17' x 9' area. Warms up in only 20 minutes. Up to 30 fpm. (Model MTV-50, up to 50 fpm).

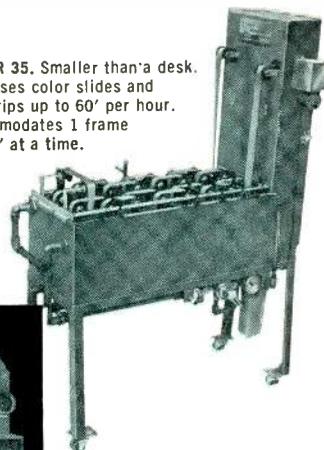
## Treise offers color processors in any size...any speed...any type to meet your TV Station needs!

When you film your local news in color, you gain added interest from your community... enhance your value to advertisers... and brighten your profit picture. Treise makes it possible by offering you a complete line of professional quality color processors that will have your local news "on the air" in color minutes after it happens.

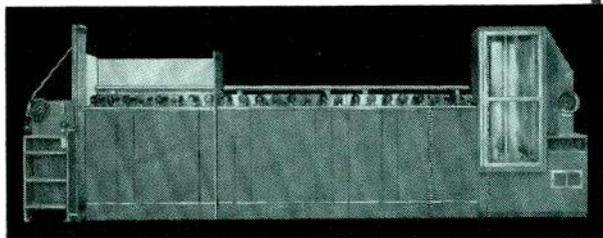
We provide color processors in any size, speed, or type—from small "desk-size" models to giant high-speed 150 fpm processors. Moreover, we will custom design or build units to meet your individual needs. If you have special requirements, our technical staff will be happy to study them and offer the best solution.



JUNIOR 35. Smaller than a desk. Processes color slides and filmstrips up to 60' per hour. Accommodates 1 frame to 100' at a time.



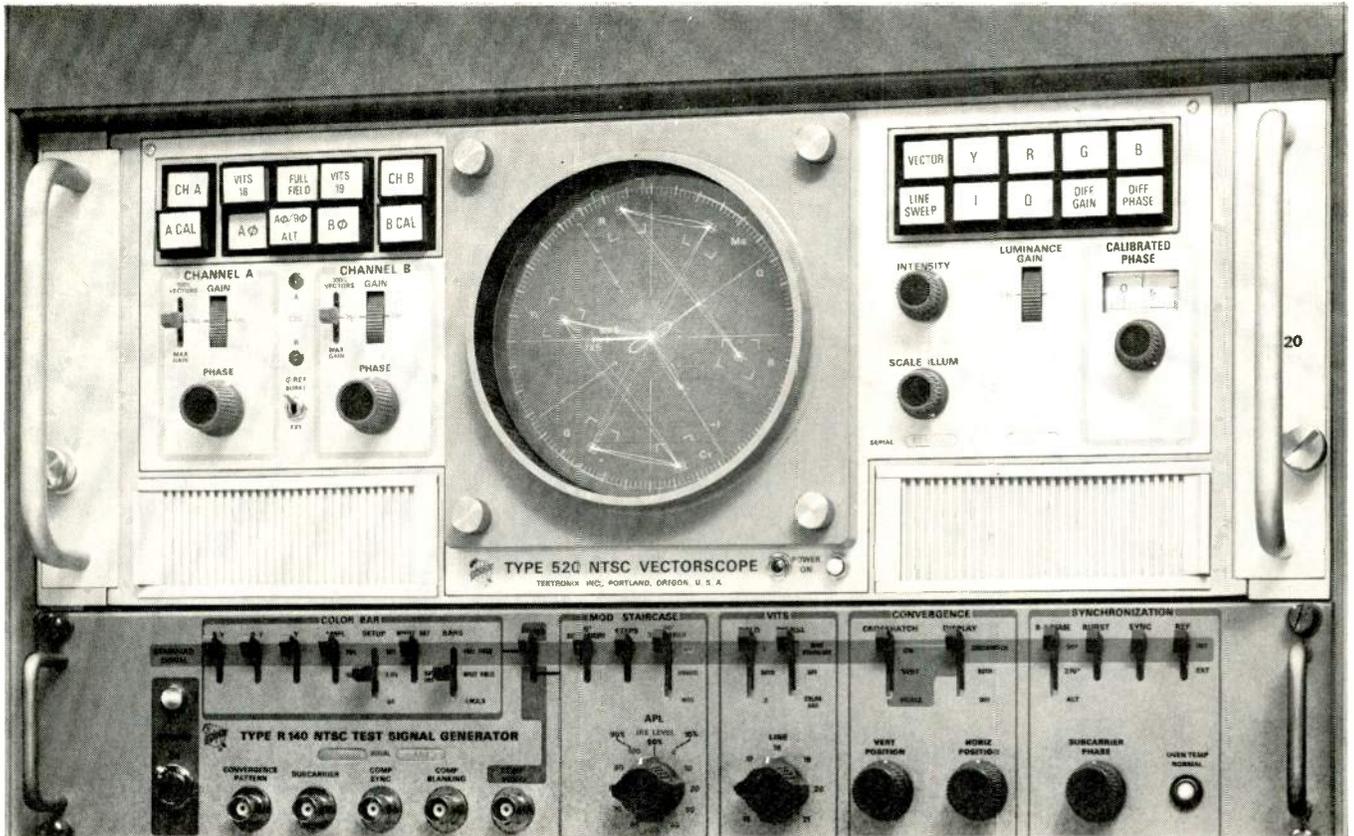
MT-20. Finest color processor ever created. Up to 70 fpm. Designed for TV stations requiring high volume in a short period of time.



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The Tektronix Type 520 NTSC Vectorscope provides new operator convenience, advanced measurement capability and silicon solid-state reliability. Push-button operating controls permit rapid selection of displays for quick analysis of color signal characteristics. A luminance channel separates the luminance (Y) component of composite color signals for display at a line rate. Combining the Y component with the chrominance demodulator outputs provides displays of the Red (R), Green (G), and Blue (B) values, revealing luminance to chrominance amplitude and delay errors if present. Line Rate displays of chrominance demodulated along the I or Q axis are provided for checking encoder performance.

Phase and amplitude accuracy of the vector presentation is verified by internally generated test signals. Errors in color encoding, video tape recording or transmission processes are readily apparent and are easily measured. Separate 0° to 360° phase shifters provide independent phase control of channel A and B displays. Excellent resolution for measuring small phase-angles is provided by a 30° precision calibrated phase shifter where 1 inch of dial movement represents approximately 1° of phase shift. Differential gain and differential phase measurements are made with accuracies within 1% for gain and 0.2° for phase. A unique graticule switching arrangement provides automatic selection of an IRE graticule or an illuminated parallax-free vector graticule. The selection occurs at the same time the operating mode is established.

The Type 520 Vectorscope provides the ability to check equipment performance during regular programming times through the utilization of Vertical Interval Test Signals. A digital line selector permits positive selection of Vertical Interval Test Signals from lines 7 through 21 of either field 1 or field 2.

For a demonstration contact your nearby Tektronix field engineer or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.

Type 520 NTSC Vectorscope ..... \$1875  
 Rackmount Type R520 Vectorscope ..... \$1900  
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# CROSS-TALK

Dear BM/E:

In your April 1969 issue, you carried an article entitled, "Translator is Key to ETV in Northern Virginia."

We enjoyed reading the article and feel that the installation project at Signal Knob was well worth the attention which you have given to it. However, we would like to point out the writer has made an error in giving credit to our good friends and supporters at the local commercial television station WSA-TV, channel 3, in Harrisonburg. Channel 51, which is educational television Station WVPT, undertook the particular project in order to extend its coverage as related by the article.

Thank you for your interest in our activities.

Arthur Hamilton  
Shenandoah Valley  
Educational TV Corp.  
Harrisonburg, Va.

Dear BM/E:

The ETV Translator article as published, as a matter of fact, con-

tained errors such as the weight of the antenna being three times actual weight, and the cost of the station being considerably higher than the real figure, which could be detrimental to our reputation.

I certainly feel that articles of this type are valuable to the broadcaster and appreciate the BM/E effort, however, may I suggest that in the future you submit the article to the source before you go into printing.

Steve Koppelman  
Sales Engineering Manager  
EMCEE  
White Haven, Pa.

*We make it a practice to submit articles for an accuracy check. In this case, somehow it didn't happen. Thanks to both Messrs. Hamilton and Koppelman for keeping us on our toes.*

Dear BM/E:

Regarding your story in the April issue of BM/E concerning the use of the Code-a-Phone 700 in the news operation of a station—some managers may find the rental cost too high to fit into their budgets.

Here at WHUT we have found that the recorder can pay for itself and still be used by the news department. We use the answering portion of the machine to provide a 24-hour

weather service. This is sold to a local business and the rental cost of the machine is paid by the advertiser.

The message-taking portion, which is a completely separate recorder, is used by the news department. When a newsman calls in with a story, he waits until he hears the tone following the forecast, then records his report. When the weather is recorded, we hold the record button down about 15 seconds after the message is finished. This gives the person who calls for the weather time to hang up without activating the recorder.

If anyone wants to see how it works, call 317-644-1227.

Dick Lange  
Operation Mgr.  
WHUT  
Anderson, Indiana

Dear BM/E:

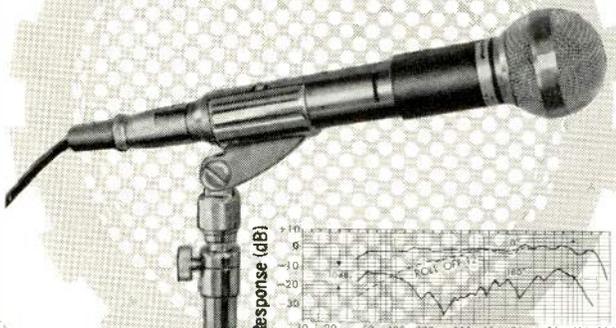
On page 36 in your May issue, right column, photo no. 3 was tagged, "New TV Transmitter from AEL." The Reader Service Number is, "348—AEL TV Transmitter."

If you strike out "TV" and replace it with "FM" you'll have a true picture.

Correction, please.

A. Rosset  
American Electronic  
Laboratories, Inc.  
Colmar, Pa.

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RCA invented the Vidicon. So it's only natural that more TV cameras use RCA Vidicons than any other kind. More broadcast cameras. More CCTV units. Now they take off in NASA and ESSA project satellites where there's no margin for error.

Think of that when you replace Vidicons next time. Ask your RCA Industrial Tube Distributor how you can step up with RCA. Step up resolution with separately-connected mesh electrode types. Step up sensitivity by selecting Type II photoconductor types. And step up over-all performance with RCA Vidicons—made in the same plant, with the techniques, controls, and quality assurance checks used to make the Vidicons that gave us our first close-up look at the moon.

RCA Electronic Components | Harrison, N. J. | 07029

# RCA

#### Use This Short Form Step-Up Selector

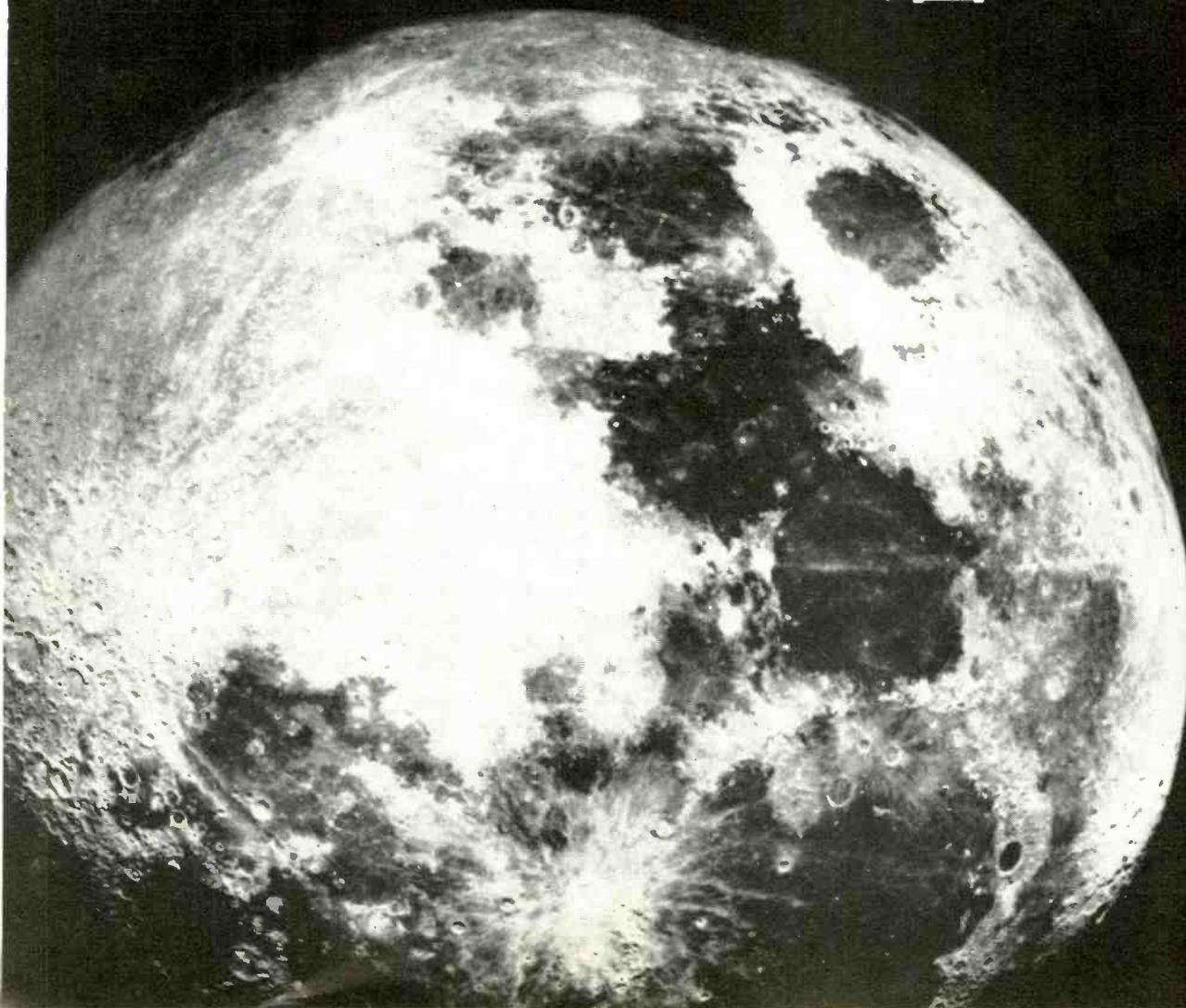
For Color Film Pick-up	For B&W Film Pick-up	For Live Color in RCA TK42 Cameras
RCA-7038 RCA-7735B* RCA-3134/VI*†   in RCA RCA-3480/VI†   TK27 RCA-3507A*† RCA-3572A†	RCA-7038 RCA-7735B* RCA-3480† RCA-3507A*† RCA-3572A†	RCA-4493*† RCA-4494*† RCA-4495*†

NOTES: \*types feature separate mesh electrode construction  
† indicates Type II photoconductor

And, RCA has many other types for industrial, commercial, and educational closed circuit TV—such as 4478, 7262A, 7735, 7735A, 8134, and 8573A.



Join the Big Phone-In. Call your RCA Industrial Tube Distributor. He supplies dependable RCA Vidicons—plus technical data in the newly revised catalog CAM-700A.



# FCC ACTIONS

**Acquisition of four a-m's** has been made by Starr Broadcasting Group Inc., which is controlled by columnist William Buckley Jr. A-m's include: WBOK, New Orleans, for \$700,000; WLOK, Memphis, for \$900,000; KYOK, Houston, for \$1,390,000; and KXLR, North Little Rock, for \$450,000. After Starr sells 73.3 percent of its stock to the public, as planned, Buckley will own 16.9 percent of the Group.

**Transfer of control** of WIBF Broadcasting Co., permittee of WIBF-TV, Philadelphia, Pa., to Taft Broadcasting Co. has been authorized. Selling price of \$1,400,000 is subject to adjustments and assumption of debt that may bring the total to \$4,500,000. Taft already owns five stations in top 50 TV markets.

**Assigning licenses** of WAAB-AM-FM, Worcester, Mass., from Waterman Broadcasting Corp. to WAAB,

Inc., and denying an opposing petition by WORC, Inc., licensee of WORC, Worcester, has been affirmed.

**Application by Midwest Television, Inc.** for renewal of license for station KFMB-TV, San Diego, Calif., has been granted, and a petition by Mission Cable TV, Inc. to deny the renewal has been dismissed on grounds that it "lacked standing as a party in interest." The cable system had alleged that granting the renewal application would have injured it economically.

**Request by WHDH, Inc.,** licensee of channel 5, Boston, Mass., for rehearing of the decision of January 23 denying the station's application for renewal and granting the license to Boston Broadcasters, Inc., has been denied. The Commission said that no new criteria were adopted which would have called for new evidence.

**Seaboard Broadcasting, Inc.,** has been directed to show cause why the license for its a-m station, WLAS, Jacksonville, North Carolina, should not be revoked for willful or repeated failure to ob-

serve prohibition against fraudulent billing practices. If proven guilty the licensee should be issued \$10,000 forfeiture or less.

**Belvedere Broadcasting Corp.,** licensee of wWIN, Baltimore, Md., has been notified of apparent liability forfeiture of \$3500 for violation of Section 1304, Title 18, U.S. Code by broadcasting lottery information and Section 73.93 of the Rules by failing to have a properly licensed operator on duty."

**Petition** for reconsideration by United Broadcasting Co. and an application for review by Paul F. Cory (secured creditor of licensee) of an action by the Chief, Broadcast Bureau, dismissing application by United for renewal of license for KOLR and deletion of the call letters have been denied.

**Supplemental** renewal applications of Progress Broadcasting Corp. and United Broadcasting Co. of N.Y., Inc., licensees of Stations WHOM and WBNX, New York, N.Y., have been deferred pending criminal proceedings against employees of the stations for alleged perjury and "payola."

## Get a \$295 tape timer

**Free**

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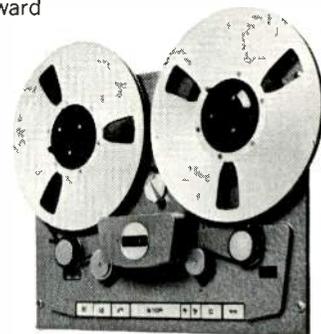
It's got every feature you've ever looked for in a professional tape recorder — plus others you'll find only in ours. Like the tape timer. It's *not* the famous Lyrec TIM-4 you know so well. This one's built in to the deck.

To get a direct reading in minutes and seconds, just run the recorder, even at fast speed. (The Timer's accurate to within 3 seconds in a ½ hour tape.) In the time it takes to rewind, your program will be timed.

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Wanted Engineers with FCC First Class License. Only experienced need reply. Fully colorized station operation. AMPEX, GE and NORELCO color equipment. Excellent pay and benefits. Please send Resume to C. Iannucci, C.E., WNHC, 135 College St., New Haven, Conn.—06510.

#1 engineer for Pennsylvania CATV. Get in on ground floor of expanding operation. Box 769-6, c/o BM/E, Blue Ridge Summit, Pa. 17214.

TV Account Executive wanted at WXEX-TV, Richmond, Virginia. Good salary—and commission arrangement—pension—life insurance—hospitalization and disability plans, plus working for a company which offers you a future. WXEX-TV is a nation-wide communications station. Contact—Edward J. Ruppe, Local Sales Director, P.O. Box 8765.

First phone announcer, preferably experienced for Wisconsin AM-FM fulltime operation. Send air-check and resume. Robert Bodden, General Manager, WSWW, Box 1, Platteville.

Announcer—first ticket engineer. Excellent salary for right man. Permanent position in good community. Contact Ron Clark, WHLT, Huntington, Indiana 219/356-1640.

WTOC-AM-FM-TV needs technicians with first class F.C.C. license. Reply by letter to Chief Engineer, WTOC, P.O. Box 8086, Savannah, Ga. 31402.

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INTERNATIONAL BROADCASTER seeks U.S. position. 4 years experience in civil broadcasting, Britain (BBC) New Zealand, South Africa, New Guinea, Australia. Radio and TV News-casting, creative writing and journalism. Valuable international contacts. Spoken-word ser. es recently broadcast KPFA Berkeley. Resume, tape, photo, credentials from Huw Evans, ABC, Port Moresby, Papua New Guinea.

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Will finish RCA Television Studio training course August 5. Looking for position in TV East of Mississippi River. Have first phone license and one year's previous experience in TV with network station. Contact H. M. Smith, P.O. Box 1828, Chicago, Illinois, 60690.

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Disc jockey newscaster. Dependable, versatile, tight board, creative, third endorsed, re-locate. Resume tape upon request. Box 769-7, c/o BM/E, Blue Ridge Summit, Pa. 17214.

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400 to 500 foot self-supporting tower. Give details & price. Mr. Lee, WSBC, 2400 W. Madison Street, Chicago, Ill. 60612.

We need good used 5 Kw AM transmitter. 1 Kw FM transmitter. XEU, Independencia 1656, —Veracruz, Ver. Mexico.

POOR BOY wants to lease equipment for low power UHF. (919) 462-2292 or Box 769-3, c/o BM/E, Blue Ridge Summit, Pa. 17214.

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New Collins TT 400/200 turntables. Due to the acquisition of QRK by CCA Electronics, it has been mutually agreed, QRK will no longer manufacture these turntables for Collins. QRK has available a limited number of these turntables at 10% discount, with full warranty. QRK will maintain a complete inventory of parts for Collins TT 400/200 turntables. Contact QRK (209) 251-4213 or your CCA area representative: CCA Electronics Corporation, 716 Jersey Avenue, Gloucester City, New Jersey (609) 456-1716.

TRANSLATOR POWER Now put your translator where antenna should be for best coverage not where power line happens to be. Use a TELAN thermoelectric generator. No moving parts, simple to operate, leave unattended 6-12 months. General Instrument Corp., Thermoelectric Division, Dept. BM, 65 Gouverneur St., Newark, N.J. 07104, 201-485-2100 ext. 481.

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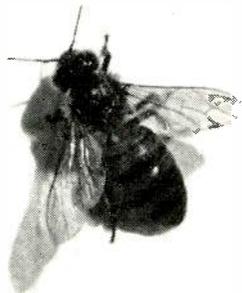
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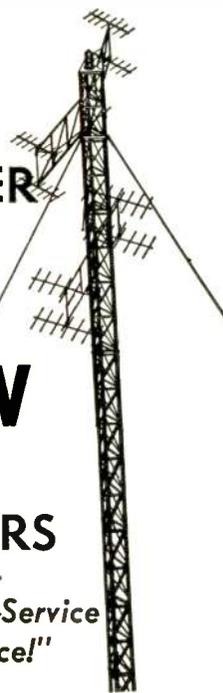
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## FROM THE EDITOR

### A Little Competition

Implicit in a station's license is a franchise to provide a service for the public—not only a franchise, but a moral commitment. Unhappily, too many stations today simply don't feel the urgency of this commitment until license renewal time rolls around. Certainly a station has every right to try to be a commercial success, but success and community service need not be mutually exclusive.

Now a new spectre is rising on the skyline. It's called "pay TV," and broadcasters were being urged by the NAB to color it ugly. The movie industry is also up in arms over the possible spectre of pay TV. This has produced the rather ludicrous spectacle of the movie industry and the NAB linked arm-in-arm in common cause. Marquees of both busy and long-abandoned movie theaters carry the suggestively chilling slogan, "Save Free TV." This slogan, by the way, is carried on marquees of theaters that may have been actually boarded up because of free TV.

How far will the anti-pay-TV outcry be carried? CATV has been treated as such an insidious menace in the past, that CATV has come to equal pay TV, no matter what. And there's some justification behind this. At least one company (see pages 55-56) is now offering extra subscription channels to cable customers—a technique designed to reach small, special-interest groups. The idea is bound to make some people very unhappy.

Free public broadcasting is a cornerstone of the very fabric of American society. Nobody is going to kill free TV. If it's more convenient to have the free TV come in on a cable, this is an option that's well within the decision-making capabilities of the homeowner. The ultimate decision of receiving three or 30 channels must be left up to him; the question shouldn't be decided by special-interest groups or by a wave of hysterical propaganda. And if some of the channels are going to be a form of pay-TV (color it dirty), again this choice should be left to the viewer.

And what of the public commitment of the broadcaster? The most potent weapon against pay-TV is simply *better programming*. If all the viewer can find on his free TV are reruns of last summer's reruns, then at whose doorstep do we lay the blame for the emergence of pay TV?

And what of the viewer's ability to choose? Thomas Jefferson characterized freedom as the ability to exercise free choice. Choice is also a prime characteristic of a free enterprise system. Let's not rob America of its legacy in the name of protectionism.

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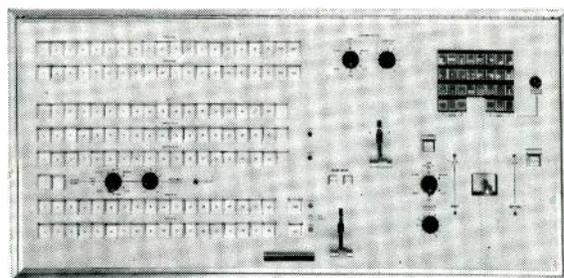


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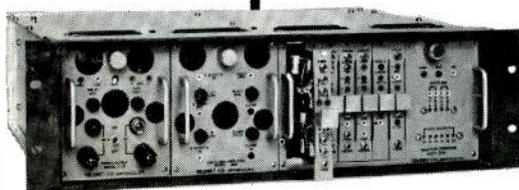
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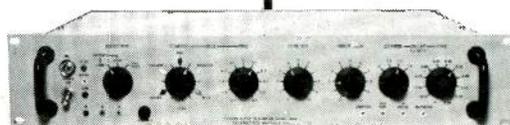
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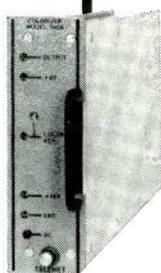
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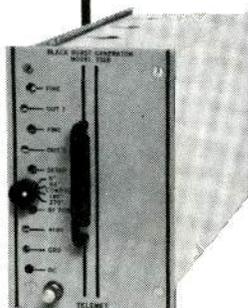
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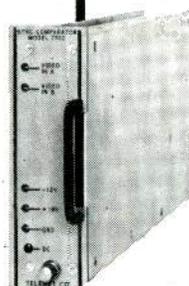
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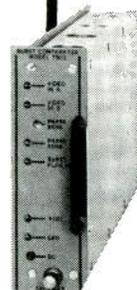
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