A MACFADDEN PUBLICATION JUNE 1971

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"...and the fairy computer said to the little telecine, from this day forward you are color correct."

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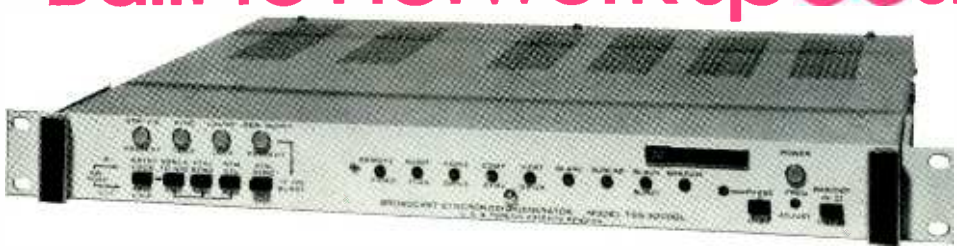

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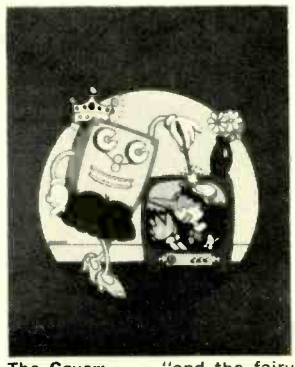
JUNE 1971/VOLUME 7/NUMBER 6

BM/E

BROADCAST MANAGEMENT/ENGINEERING



The Cover: . . . "and the fairy computer said to the telecine, from this day forward you are color correct." Question is, who runs the computer? See page 22 for possible answers.

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MANAGEMENT:

For a readable (not overly technical) update on the progress in magnetic tape, check this month's Audio File, **page 10.** Hopefully the flap over drug lyrics is over, but just to review programming and censorship obligations of broadcasters, this month's FCC column is devoted to responsibilities in programming, **page 14.** Have you faced up to your responsibilities regarding off-color TV? Engineers can solve the problem, but management will have to foot the bill. For an interesting proposal, take a look at **page 22.** If you buy something before the month is out, you can get a full year's depreciation. For an explanation of new rules on Asset Depreciation Ranges, don't miss the article on **page 29.** Read it before June 30! And, in case you're increasing your uhf power, there's a cost-saving idea on **page 18.**

ENGINEERING:

A recap on what's happening in magnetic tape: 3-M's High Energy tape; a new Cobaloy material from Graham Magnetics and the latest on chromium dioxide—**page 10.** Are you up-to date on gas-filled transmission lines? You can increase power now, without increasing size. See **page 18.** For a run-down of equipment to improve color TV broadcasting, be sure to read the survey beginning on **page 22.**

NEW 3600 SYSTEM SWITCHING SYSTEMS

THE 3600 SERIES SWITCHING MATRIX (ILLUSTRATED BELOW) IS THE BASIC ELEMENT IN A NEW LINE OF COMPACT, HIGH PERFORMANCE SWITCHING SYSTEMS.

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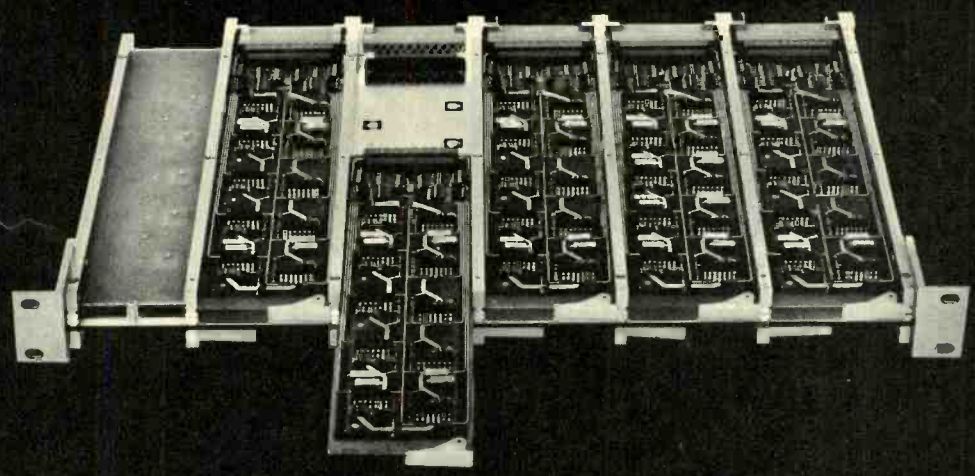
FOR ADDITIONAL INFORMATION ON THE 3600 SERIES EQUIPMENT, CONTACT GVG THROUGH ONE OF THE SALES OFFICES LISTED BELOW.



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BROADCAST INDUSTRY NEWS

Houser Speculates on Cable TV as "Uncommon Carrier"

The Cable TV industry got a chance to meet the FCC's newest commissioner, Thomas Houser, first at the NCTA Programming Conference in Chicago and then again at the Pennsylvania Community Antenna Television Association. In both instances, Commissioner Houser talked about cable as an "uncommon carrier." The Commissioner said his comments were speculative and did not "represent any Commissioner's views, including my own." Houser said cable is heading toward an intrinsic monopoly because of a tendency for high-saturation systems to merge into a multiple-system complex.

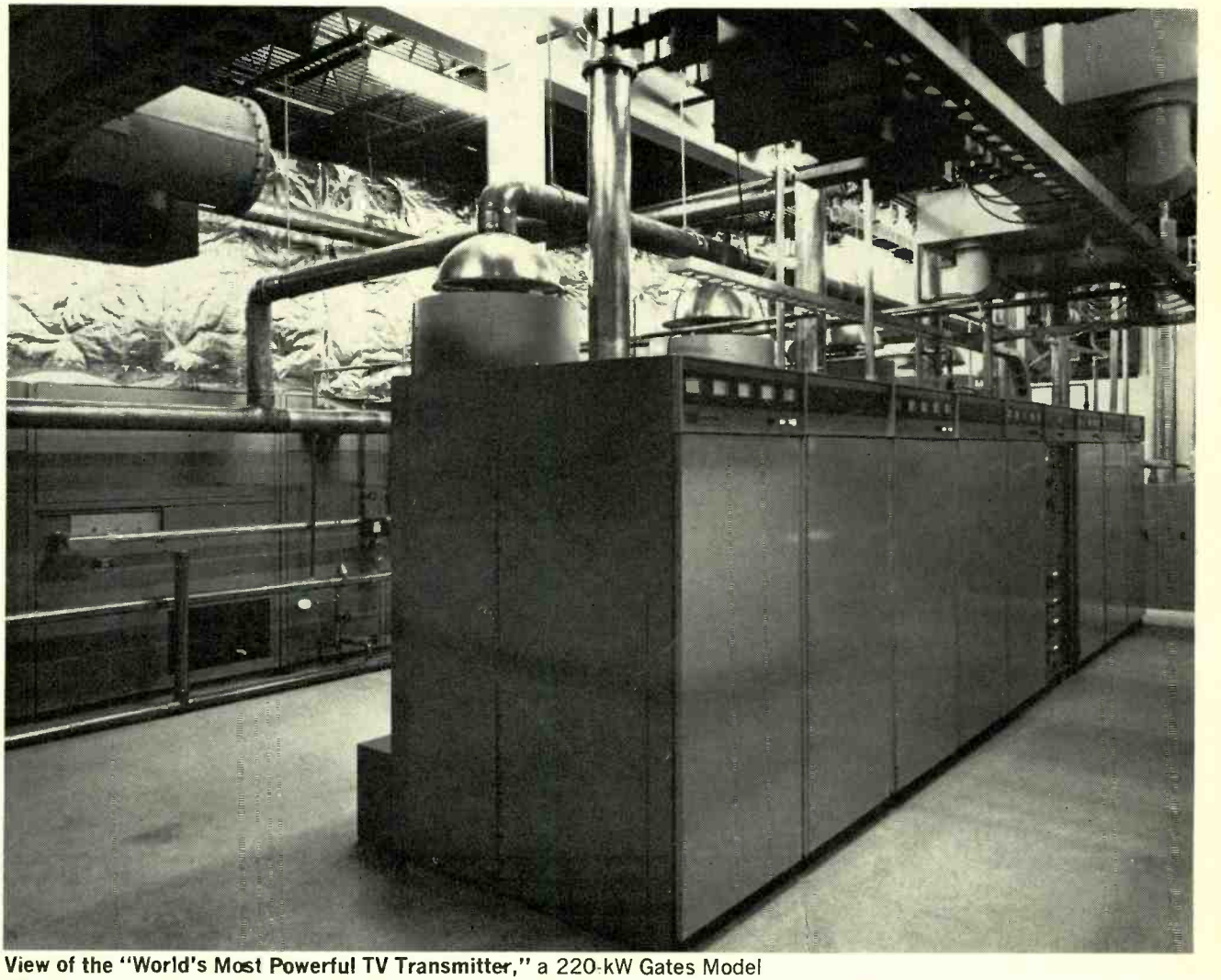
When this happens, the biggest fear is limited diversity and the result is close regulation. Houser asks, therefore, why a good alternative isn't complete separation of software and hardware functions and less meddlesome regulation.

Since 35 percent of cable operators forced into cablecasting by the FCC have asked for relief, Houser wondered if an alternative to forced programming might not be a simpler requirement that says the cable operator merely needs to lease a channel rather than to fill it.

The Commissioner cites a Brookings Institute study which showed that the cost to cablecast programs runs $50 to $100 per hour including equipment amortization. This might be the basis for a leasing fee, Houser opined, and was not out of line with lecture hall rental fees.

If leasing rates were low, Houser said he could envision, in addition

(Continued on page 8)



View of the "World's Most Powerful TV Transmitter," a 220-kW Gates Model BT-220U, installed at WDCA-TV (UHF Channel 20), Washington, D.C. Station signed on-the-air March 16, 1971. It may also be the world's longest—nine cabinets take up 25 feet. Unit draws one million watts.

No hangups. No sloppy focus. No accidental changes. No bull.

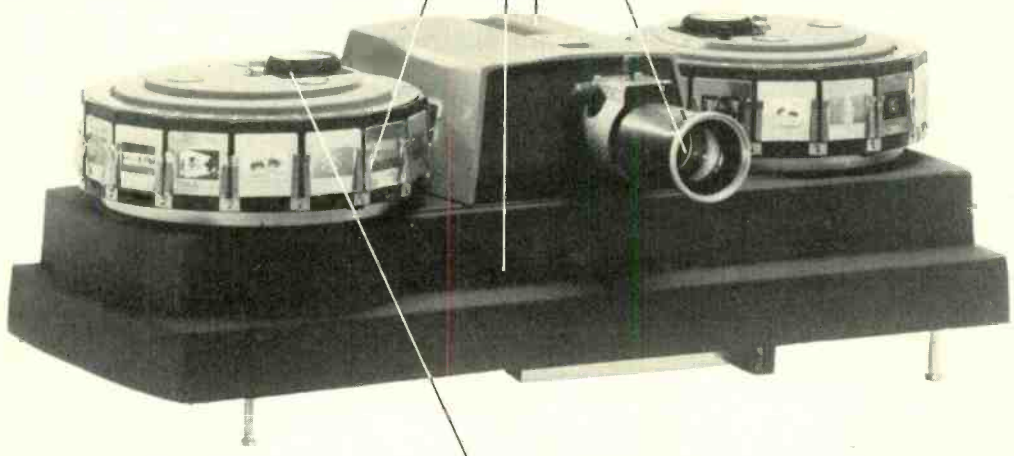
The thing you're looking at is the Spectrum 32 film chain slide projector. It's made for TV. Strictly.

1 The logic's all solid state. The optical, mechanical and electronic assemblies are modular. They can be unplugged and serviced without messing up the film chain alignment. All that makes your job a lot easier.

2 These things make it better. You have two channels. 16 slides each. The color, intensity and polarization of each is balanced perfectly. Automatically. There are soft preview lights so you can check all slides without spinning the magazine.

3 Each channel has only one mirror surface and it's set so it never needs adjustment. The magazines are so finely tuned there's no change in sharpness as you go from one slide to another. And if you need speed, they'll flip one to another in a second.

4 The lenses are all color corrected, coated and have a diaphragm and holder for neutral density or color correcting filters. You've got a choice of lenses including 7½" and 9" for multiplexing. Plus inverted 3" and 5" for direct projection onto a camera tube face.



5 Lamps have a low-glow Standby Mode. There's never a big surge current. You get longer lamp life. There's also a turbine blower for each lamp. And a blower system that cools every slide. And an air filter that keeps dust out of the works, slides and optics.

6 Warning: you have to pay a little bit less than you'd expect. You can't buy better. For all the specs ask your supplier, or contact Spindler & Sauppe, Inc., 13034 Saticoy Street, North Hollywood, California 91605. (213) 764-1800.

SPECTRUM 32 PROJECTOR Spindler & Sauppe

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to community associations, a private group establishing a CATV Programming Network that would take advantage of the channels available.

Houser assumes the operator would be indemnified against libel or other similar sanctions.

Hidden Danger In Common Carrier Concept?

Something of a response to Houser's rumination was presented by Fred Ford, former NCTA Chairman, who also addressed the Pennsylvania CATV group.

Ford pointed out that implicit in the common carrier concept is that while the carrier makes the facility available to the public for "communication or transmitting intelligence of their own design", as the FCC puts it, those who do employ these facilities must compensate the carrier.

Ford said he was worried that neither the Commission nor those who claim CATV should be a common carrier really mean that. "Actually," Ford said, "they are referring to a public access channel on a first-come, first-served basis, at no charge. They also are referring to other types of contract carriage, either without charge or with some form of rate surveillance. It may very well be that the official sanction now being given to the allocation of 50 percent of channels for public use will ultimately force higher charges to subscribers to finance these services. I doubt that a tax deduction for the contribution of these services, if allowed, would be sufficient compensation for this taking."

Ford declared that the CATV function, including its origination channels, should not, under any circumstances, be regarded as a common carrier. Normally, a common carrier is entitled to some degree of monopoly protection. CATV, Ford said, must compete with translators, satellites, high powered TV transmitters and even roof top antennas and, as such, is a private enterprise which provides an optional service. Unlike a common carrier, CATV is a high risk business which depends on venture capital. The Commission, the industries, and the public must begin to understand and accept CATV as it is and will become—a hybrid of many communications services, in Ford's view.

ITFS Relay Stations Permitted

New FCC rules permit low power relay stations (translators or boosters) to relay the signals of an Instructional Television Fixed Service (ITFS) station to receiving locations shielded from direct reception by intervening obstructions. The action (Docket 18940) amends Part 74, Subpart I of the Rules.

Under the new rules, ITFS licensees will be able to use either translators or boosters to meet their needs. Translators retransmit the originating station's signal on a different frequency; boosters are repeating devices that amplify and retransmit a signal on the originating station's channel.

Compulsory CATV Origination Declared Illegal

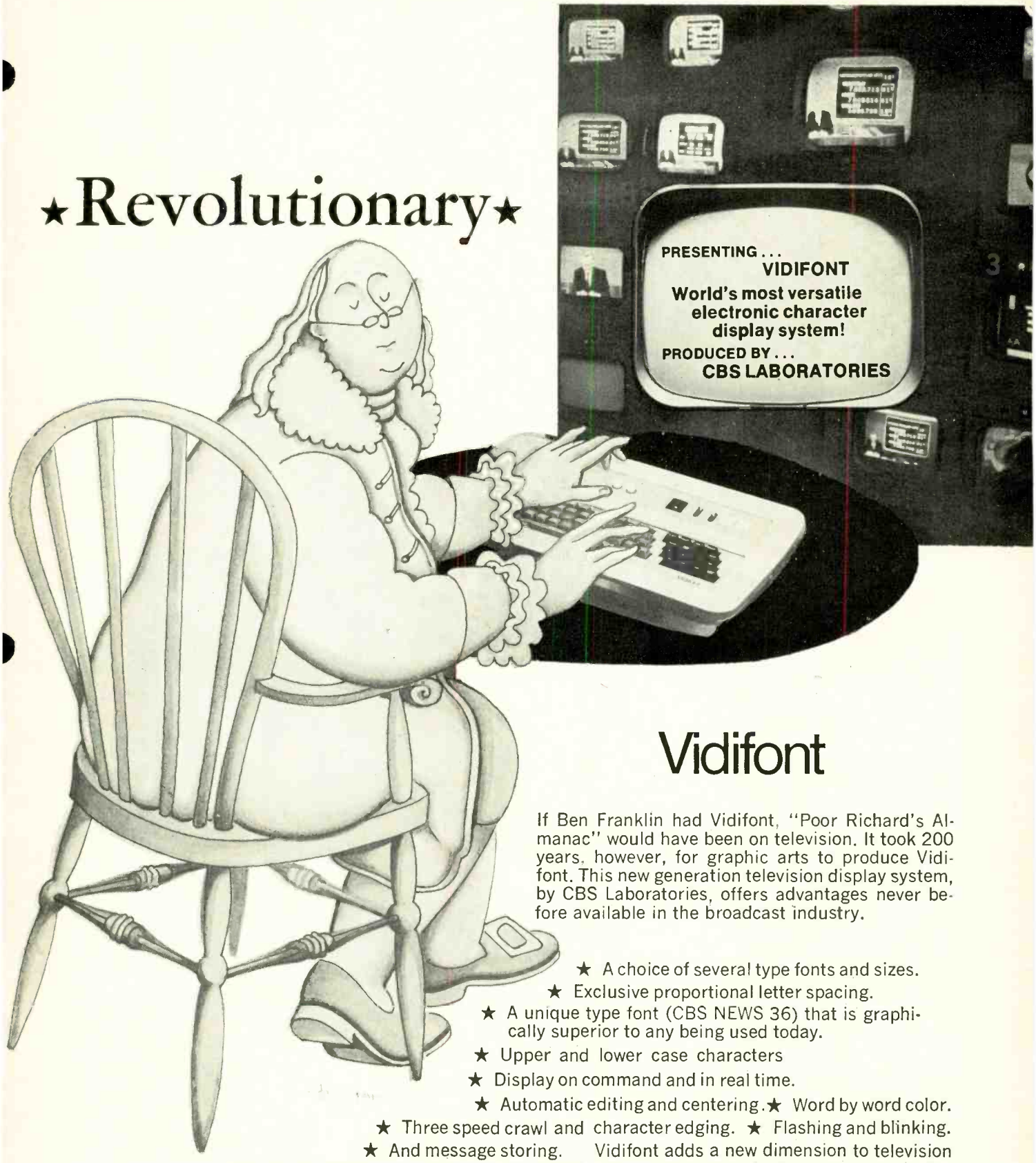
The Eighth Circuit Appeals Court has ruled that the FCC cannot compel CATV systems to originate programs. Congress never gave the FCC the authority, Chief Justice Martin Van Oosterhout wrote in the decision.

The appeal for relief was made by Midwest Video of Missouri. The ruling is considered a surprise to the FCC and the CATV industry. It is not known at press time whether the FCC will ask for a stay or appeal the decision to the Supreme Court. Informed sources believe the FCC will take no action at this time.

IN BRIEF . . .

Business: Kleigl Brothers got the largest single television lighting contract in their history from the Canadian Broadcasting Corporation. Seven new television studios will get lighting control systems worth one million . . . **Sennheiser Electronic** named sole U.S. importer of SEAS—Scandinavian speaker line . . . **CCTV,** a $90-million market in 1970, will grow at an annual rate of ten percent over the next decade, reaching $240 million by 1980, according to the New York based research firm, Frost & Sullivan, Inc., 106 Fulton Street. . . . **Ampex International Operations** has received a $450,000 order for its first "turnkey" VHF broadcast television station from Channel 3, LaPampa, Argentina.

★Revolutionary★



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If Ben Franklin had Vidifont, "Poor Richard's Almanac" would have been on television. It took 200 years, however, for graphic arts to produce Vidifont. This new generation television display system, by CBS Laboratories, offers advantages never before available in the broadcast industry.

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★ And message storing. Vidifont adds a new dimension to television display and opens up a whole new area of programming possibilities for your station.

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AUDIO FILE:
FOR BETTER IDEAS
FROM AUDIO ENGINEERS

Quieter Sound in the Seventies From High-Energy Tape

AT THE BEGINNING OF THE YEAR, one might have been excused for thinking that iron oxide magnetic tape was and would be the standard for some time to come. The much-heralded chromium dioxide had broken onto the scene, but nobody seemed to be making very much of it.

Then, in March, the 3M Company announced High Energy oxide, a cobalt-modified ferric oxide formulation which Daniel E. Denham, general manager of Magnetic Products, called a major technological breakthrough.

3-M said the new formulation was ready to go into mass production. The reproducibility aspect was significant for two reasons: 1) higher coercivity cobalt-doped ferric oxide tape had been developed years earlier in Germany, but no one had ever solved the production problem; 2) it was beginning to look like chromium dioxide couldn't be readily manufactured and furthermore the tape was incompatible with the standard oxide brands—bias and equalization would have to be different. 3-M's cobalt-doped High Energy tape, on the other hand, could be played on tape recorders with both a higher signal output and a better signal-to-noise ratio. At the same time, tape wear and head life was the same as that for iron oxide. This is important because chromium dioxide is considered a more abrasive product.

The new High Energy tape looks like it will prove most valuable in the video field (tape speed would be cut to 7½ ips with the same quality of recording normally obtained at 15 ips, for example), but audio cassettes can be better too.

Because of the greater output at all frequencies, 3-M said the dynamic range of audio tape could be improved from 2 dB at low frequencies to 6 dB at the high end.

"High Energy" is not to be confused with 3-M's "Extended Range" cassette—also recently announced. The Extended Range tapes use a low-noise oxide and binder system that provides, according to 3-M, better head-to-tape control, an extended frequency range and reduction of flutter and wow.

Both the High Energy and Extended Range cassettes, which will hit the market late this month or next, will have a micro-thin protective treatment on the back side which greatly reduces scattering of the wind, the primary cause of cassette jamming.

Material	Coercive Force in Oersteds	Saturation Magnetization EMU/cc	Relative Magnetic Energy
Gamma Iron Oxide	300	389	6,750
Cobalt-doped iron oxide	600	355	8,700
Chromium Dioxide	400	490	9,800
Cobaloy	1,000	980	31,600
Ideal Magnetic Particle	1,000	1,500	47,500

This new BM/E department belongs to audio engineers—only. Your ideas will make it, your interest will sustain it. Here's what we expect Audio File will contain:

- A forum for audio engineers to exchange problems and solutions.
- A growing compilation of the most effective audio practices in the industry.
- Tips for the man who wants the right equipment for the job; who won't accept the inadequate, won't be taken in by the superfluous.
- Forthright opinions—ours and yours—on controversial subjects in the industry. And your frank evaluations of equipment and practices affecting your work.

These are our goals—and we'll need your help. Write:

Audio File, BM/E Magazine
820 Second Avenue
New York, New York 10017

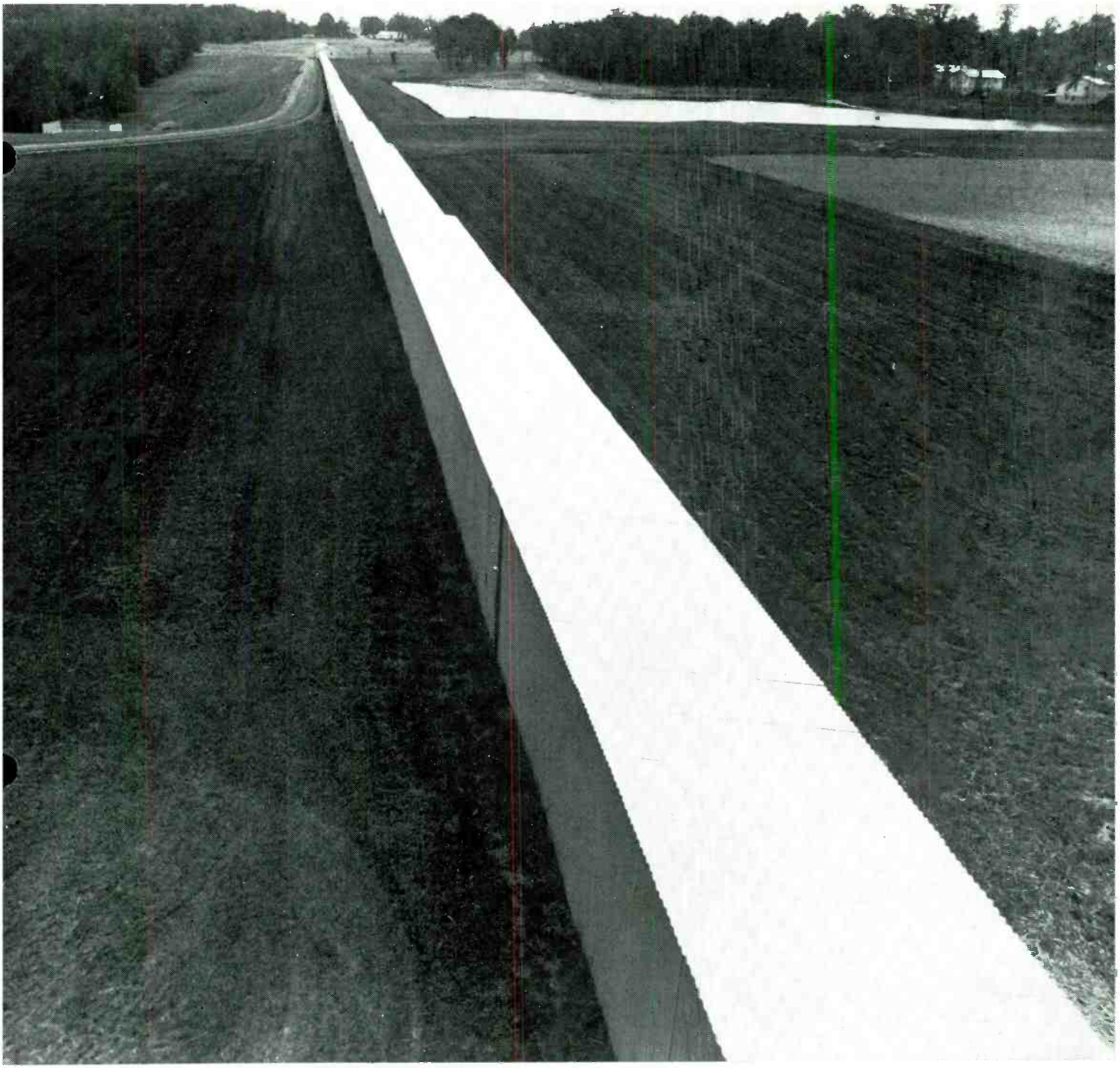
Enter Cobaloy—3X better

3-M gained important publicity for its modified cobalt material, but one month later, a young computer tape manufacturer, Graham Magnetics Inc., of Graham, Texas, came along and said cobalt-doped oxide tapes and chromium dioxide formulations were only minor improvements. Graham's Cobaloy has coercivity of 1000 oersteds compared to iron oxide's 300, chromium dioxide's 400 and cobalt-doped oxide, which has 600. The Cobaloy magnetic particle is a pure metal, not an oxide.

Cobaloy offers high magnetizing strength in smaller single particles. Thus the density of information can be increased in the case of computer tapes or the speed reduced in the case of audio tapes—meaning longer playing times. Graham says a one-hour length of tape made of Cobaloy can be played for four hours.

On the other hand, the size of the cassette could be reduced while still maintaining a full hour of playing time. (The slow speed also affects video—the standard one-hour tape reel can contained a four-hour show.)

(Continued on page 40)



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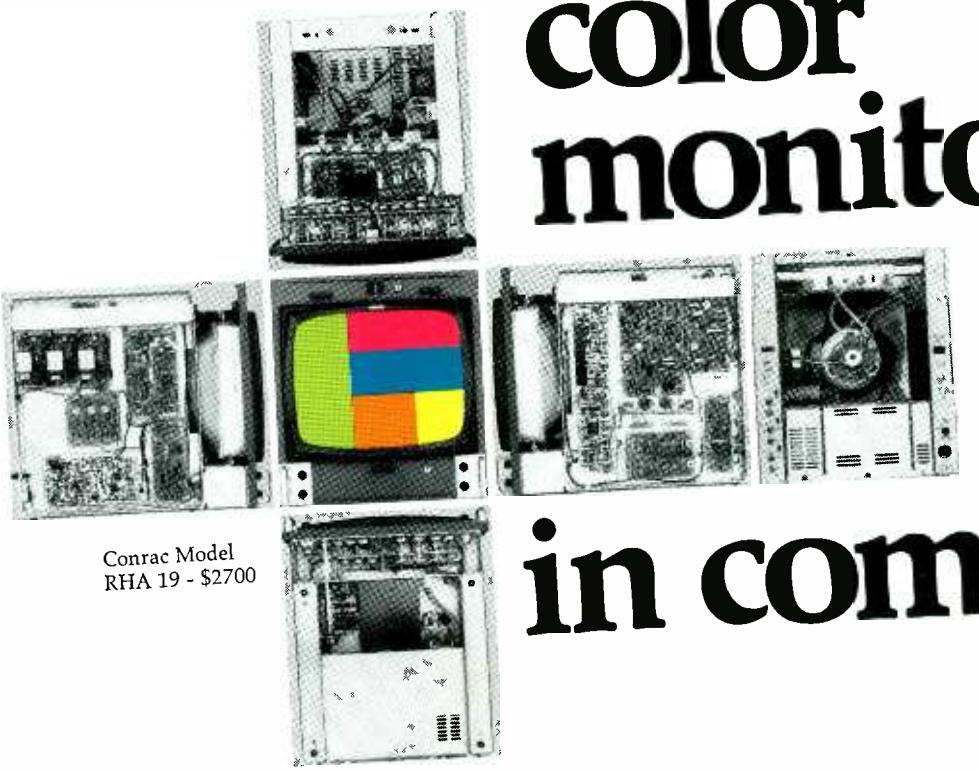
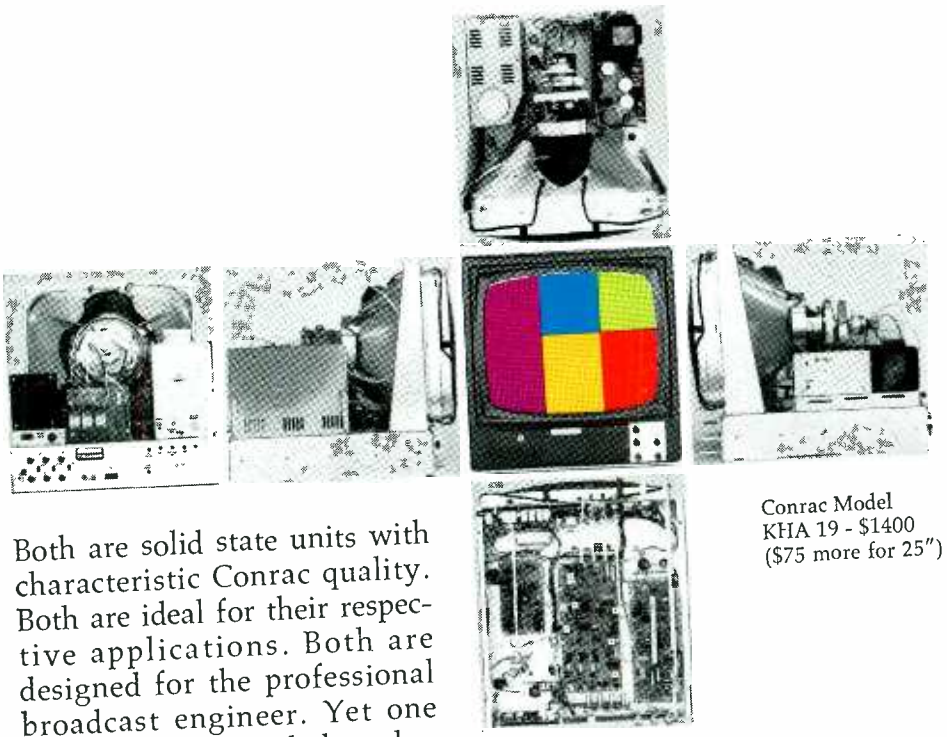
we've uncovered two conrac color monitors with a lot in common



Conrac Model
RHA 19 - $2700



Conrac Model
KHA 19 - $1400
($75 more for 25")

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 $1400 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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INTERPRETING THE FCC RULES & REGULATIONS

Responsibility in Programming

The recent brouhaha over the Commission's pronouncements concerning broadcast licensee responsibilities to review records before broadcast —especially as they relate to drugs—highlights a troublesome area for many broadcasters and the Commission. A look at programming, censorship, and the obligations of broadcasters and the Commission is appropriate.

Censorship and Programming

At the heart of the controversy is the pronouncement of the United States Congress embodied in the Communications Act. Specifically, in Section 326 of the Act, Congress has stated,

> Nothing in this chapter shall be understood or construed to give the Commission the power of censorship over the radio communications or signals transmitted by any radio station, and no regulation or condition shall be promulgated or fixed by the Commission which shall interfere with the right of free speech by means of radio communication.

While it is clear that the Commission may not censor material broadcast by stations, it is equally clear that licensees are responsible for program material broadcast over their facilities, except, of course, for statements made by political candidates.

In its 1960 *Programming Policy Statement*[1] the Commission noted that broadcasters are required to program their stations in the "public interest, convenience, and necessity." Therefore, despite the Congressional restrictions on censorship and First Amendment freedoms of speech, a broadcaster's freedom to program is not absolute. As the Commission has declared,

> The licensee is not a bookstore, but a public trustee of an inherently limited resource who is fully responsible for its operation in the public interest.
>
> * * *
>
> It is nonsense to assert that the licensee can be indifferent to [the responsibility of material broadcast over his facilities]. If a person approaches a station to buy time to attack his neighbor, or simply to let loose a torrent of vile language, he will not be presented.[2]

But Commission restraints on materials that may be broadcast must be carefully circumspect. The Commission's role as a practical matter, as well as a legal matter, cannot be one of program dictation or program supervision. As Supreme Court Justice Douglas noted,

> The music selected by one bureaucrat may be as offensive to some as it is soothing to others. The news commentator chosen to report on the events of the day may give overtones to the news that pleases the bureaucrat but which rile the . . . audience. The political philosophy which one radio sponsor exudes may be thought by the official who makes up the programs as the best for the welfare of the people. But the man who listens to it . . . may think it marks the destruction of the republic. . . . Today it is a business enterprise working out a radio program under the auspices of the government. Tomorrow it may be a dominant, political or religious group. . . . Once a man is forced to submit to one type of a program, he can be forced to submit to another. It may be but a short step from a cultural program to a political program. . . . The strength of our system is in the dignity, resourcefulness and the intelligence of our people. Our confidence is in their ability to make the wisest choice. That system cannot flourish if regimentation takes hold.[3]

Frederick W. Ford, then-Chairman of the Federal Communications Commission, noted in 1960 before a Senate Subcommittee that,

> When it comes to questions of taste, unless it is downright profanity or obscenity, I do not think that the Commission has any part in it. I don't see how we could possibly go out and say this program is good and that program is bad. That would be a direct violation of law.[4]

More recently, the Courts have provided further insight into the Commission's authority to dictate program fare. The famous *Red Lion* case makes it clear that the public has a right to listen and view without intervention or restraint by Congress or the Commission.

> It is the right of the public to receive suitable access to social, political, esthetic, moral and other ideas and experiences which are crucial here. That right may not constitutionally be abridged either by Congress or by the FCC.[5]

The Courts have also indicated that where speech is to be banned from the airwaves, it must be banned with precision so that the ban will not have a "chilling effect" beyond its scope. The Court of Appeals, in two separate cases, has warned the Commission accordingly:

> There is high risk that [public interest rulings relating to specific program content] will reflect the Commission's selection among tastes, opinions and value judgments, rather than a recognizable public interest. Especially with First Amendment issues lurking in the near background, the "public interest" is too vague a criterion for administrative action unless it is narrowed by definable standards.[6]
>
> * * *
>
> The Commission must be cautious in the manner in which it acts; regulations which are vague and overboard create a risk of chilling free speech . . .[7]

An examination of the foregoing reveals several salient aspects of the Commission's authority relating to programming, as well as to broadcast licensee's responsibilities. First, the Commission may not censor nor dictate program material under the strict provisions of the Communications Act and the First Amendment, unless generally recognized exceptions to censorship apply: for ex-

1. 20 RR 1901 (1960).
2. FCC 71-428 (released April 16, 1971).
3. **Public Utilities Commission v. Pollak,** 343 U. S. 451.
4. 20 RR 1901 at 1907.
5. **Red Lion Broadcasting Co. v. FCC,** 395 U. S. 367.
6. **Banzhaf v. FCC,** 405 F. 2d 1082, **cert. denied,** 396 U. S. 842.
7. **National Association of Theatre Owners v. FCC,** 420 F. 2d 194, **cert. denied,** 397 U. S. 922.

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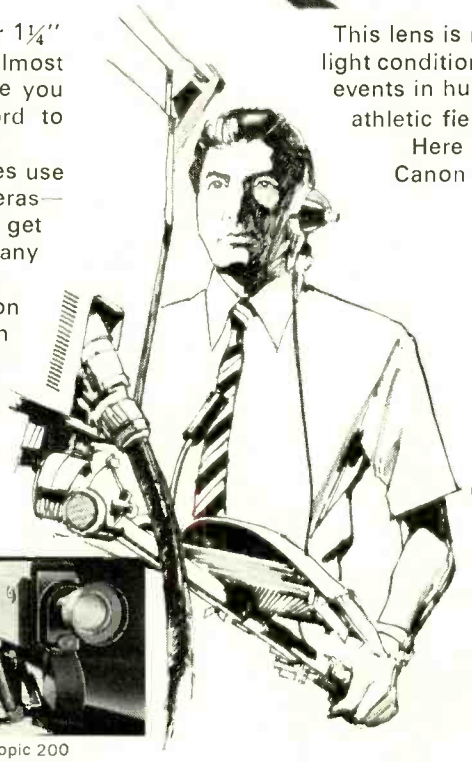
Broadcast or CCTV, manual or motor, 1" or 1¼" plumbicon or 1", ⅔" vidicon—Canon's almost sure to have just the size and performance you need, plus extra features you can't afford to pass up.

There are good reasons why the big names use Canon lenses when they build their cameras—and it's not just price or range. It's also to get the optimum in clear, sharp images for any TV need.

Check our new pride, for example: Canon TV Zoom Lens P17X30B2. Even with a zoom ratio of 17X, the relative aperture at maximum focal length is F2.5 (440-500mm). At 30-440mm it's an impressive F2.2.



V10X15R

Sound Scoopic 200

This lens is most suitable for telecasting in dim light conditions, providing ideal pictures for field events in huge open areas like race tracks and athletic fields.

Here are a few examples of the whole Canon line.

	Manual	Servorized/Motorized
1¼" plumbicon	**P17X30B2** **P10X20**	**P10X20B4**
1" plumbicon	**PV10X16** **PV10X15B**	
1" vidicon	**V10X15** **V6X16** **V5X20** **V4X25**	**V10X15R(DC)** **V6X16R(AC/DC)** **V4X25R (AC/DC, EE)**
⅔" vidicon	**J10X13** **J6X13** **J5X15** **J4X12**	

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ample, obscenity, profanity, indecency, programs inciting to riots, programs designed or inducing toward the commission of crime, lotteries, and the like. Second, it is the broadcast licensee's duty to furnish program material attuned to the "public interest, convenience, and necessity." Common sense guidelines generally apply; indeed, most licensees would not broadcast program material falling in the above-mentioned censorship exemption categories.

Yet, in spite of the supposedly clear guidelines set forth over the years, certain unique situations may arise where the ambiguity of Commission pronouncements are brought into disturbingly sharp focus. The most recent example of this concerns the Commission's policy statement regarding broadcast licensee responsibilities to review records before broadcast.

The Drug Records

On March 5, 1971, the Commission released its *Public Notice* concerning *Licensee Responsibility to Review Records Before Their Broadcast*.[8] The Commission noted that they had received a number of complaints concerning the lyrics of records played on various stations relating to the use of drugs. The avowed thrust of the *Notice* was to "simply" notify licensees that they must make a judgment whether some of the records played on their stations "tended to promote or glorify" the use of illegal drugs, and that stations could not follow a policy of playing such records without someone in a responsible position (i.e. a management level executive at the station) knowing the content of the lyrics. The Commission ominously declared that,

> Such a pattern of operation is clearly a violation of the basic principle of the licensee's responsibility for, and duty to exercise adequate control over, the broadcast material presented over his station.
>
> *It raises serious questions as to whether a continued operation of the station is in the public interest . . .* (Emphasis supplied.)

The reaction of the industry was quick in arriving. Like the proverbial scatological material caught in an implement for creating a current of air or a breeze, the Commission received a fallout of abuse. "Stations Told to Halt Drug-Oriented Music" and "FCC Bars Broadcasting of Drug-Linked Lyrics" were the newspaper headlines of the day. One of the more well-reasoned reactions was a Petition For Reconsideration filed by the Federal Communications Bar Association (an association of some 670 attorneys specializing in, or having an interest in, communications law).

The Association posed several pertinent questions to the Commission in its Petition, including the following:

> Does a song "tend to promote or glorify the use of illegal drugs": (1) only if it contains explicit advocacy of such use, or does a song fall into that category if it does no more than describe in a favorable way a person's sensations on using drugs?; (2) if it expressly advocates repeal of laws making the use of drugs illegal? (If so, would the Commission view adversely the broadcast of such a song but view differently an interview with a law enforcement official or doctor who favored the repeal of certain laws against the use of drugs?); (3) if it is viewed by a part of the audience as favorable to the use of drugs and by another part

8. FCC 71-205, March 5, 1971.

(Continued on page 48)

COST EFFECTIVE IDEA

Up Your Power Without Increasing Size Of Transmission Line

by Spencer Smith

Channel 61, Cleveland, is supplying power 100% without having to resort to waveguides. Station is simply replacing existing 6-inch coaxial cable with a gas-filled coax line using Freon HFE gas. Lower band U's, and all VHF and FM stations as well, can handle power without increasing diameter.

To increase power output from 60 kW to 120 kW, Channel 61, Cleveland, is replacing the 6-1/8–in. coaxial transmission line shown here with a new 6-1/8–in. line using "Freon" HFE coaxial cable gas. The HFE line means an increase in power output with no additional increase in size or weight and no effect on wind loading of the tower.

COAXIAL TRANSMISSION LINES filled with an appropriate dielectric gas are ideal for UHF applications. Gas-filled coaxial lines with outer conductor diameter of only 6-1/8 in. are carrying 120 kW of power on all UHF channels. A typical installation from transmitter to antenna consists of about 1000 feet of line made up of 20-foot sections.

The theory is you increase power transmitting capability by increasing the diameter of the coaxial line. In practice, however, you can increase line size only to a certain upper frequency limit. After that frequency is reached, a larger diameter conductor will no longer efficiently transmit power. For example an 8-in. coaxial line will not operate efficiently above 730 MHz due to moding.

Consequently the television station owner transmitting in the high UHF frequencies has but two courses of action open to him:

- Go to a waveguide system.
- Use a coaxial line filled with a dielectric gas.

The latter is the preferable approach because of power considerations and lower costs. Gas, such as Freon HFE, transfers heat away from the inner conductor at a greater rate than does air or nitrogen, allowing the cable to carry more power.

What's the problem with waveguides? They're bulky, fragile and difficult to work with. They also distort easily because expansion and contraction bring fluctuations in power transmitted. In addition the waveguide's configuration and size, affect the wind loading of the tower. This would preclude the use of certain towers and increase the cost of a new tower. This is also true, to a lesser degree, of a larger-size coaxial conductor.

Some operators have used parallel coaxial lines in conjunction with split feed antennas, but in addition to the tower wind loading problem,

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Spencer Smith is an engineer with Dielectric Communications, Portland, Maine. This article is adapted from a presentation made at an editorial conference sponsored by Du Pont.

you have the problem of keeping the electrical link of the two lines identical due to differential expansion. This detracts from the quality of the television picture.

Will any gas work? We have found Du Pont's HFE coaxial cable gas to be the ideal. This gas has the ability to transfer heat away from the inner conductor at a greater rate than other gases (it's 2.13 times more effective than nitrogen); thereby maintaining low inner conductor temperatures with increased power handling ability. If this heat is not transferred away, the power transmitting effectiveness of the line is impaired. In addition, HFE gas, because of a high dew point, prevents the oxidation of the surface. When oxidation occurs, a resistance to power flow is developed.

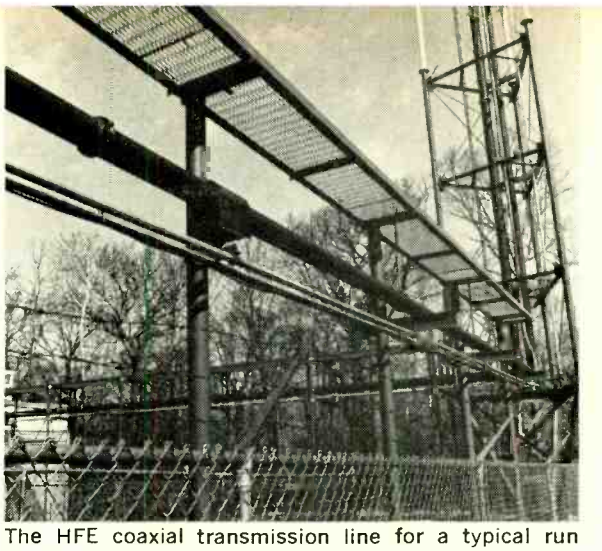
The HFE gas, which is very low in oxygen content, prevents oxidation of the outer surface of the inner conductor and makes it possible to transmit approximately 100% more power than would be possible with air. No other gas, including nitrogen, can do the same job. Consequently, using this gas as a dielectric, you can conduct the same amount of power in a 6-⅛-in. line as you can with an 8-in. line—except of course that the 8-in. line would not work efficiently above 730 MHz. Stations above Channel 56 would not be able to use greater than 6-⅛-in. line.

Power increase without equipment changes

If the owner of a television station wishes to increase the power output of his station and doesn't have the money to build a new tower or cannot increase cable size because of frequency limitations, he can do so by using HFE dielectric high power coaxial transmission line. If you remove the heat away from the surface of the inner conductor 50% faster, you can handle 50% more power on the line—that is what we are doing with HFE.

This benefit can be translated into dollars and cents. The approximate installed cost per 100 feet of 6-⅛-in. HFE coaxial line is $2625. A hundred feet of installed 8-in. line would be approximately $4080, while installed waveguide WR 1150 with dimensions of 11-½ by 5-¾ in. costs $3000 per 100 feet. The waveguide can handle more power, of course, but most present needs have not exceeded the average limit of the HFE system. (Operators are finding that 120 kW means an electric bill of $5000-6000 per month. To get only a 3 dB increase in gain requires doubling the power—an expensive proposition.) These savings can be quite significant when you're talking about 1000 feet, the average installation.

Given these savings then, along with the advantages I have outlined to you, you can see why one of the larger television stations, Channel 61, a Kaiser Broadcasting Station in Cleveland, has purchased from RCA, and is currently installing, the new HFE dielectric high power coaxial transmission line. The changeover will simply replace the 6-in. line now in place with our new 6-in. line, and the result, of course, is to double the power



The HFE coaxial transmission line for a typical run of about 1000 feet is less expensive than dry–type or waveguides.

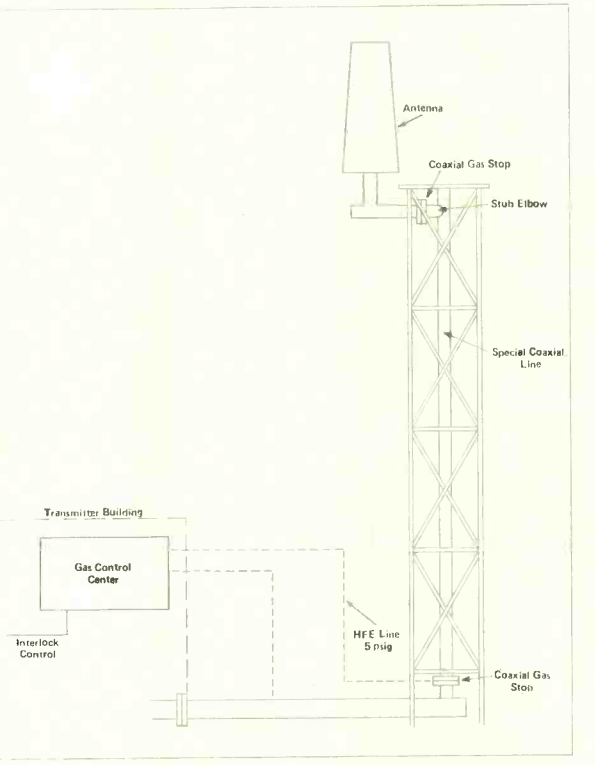
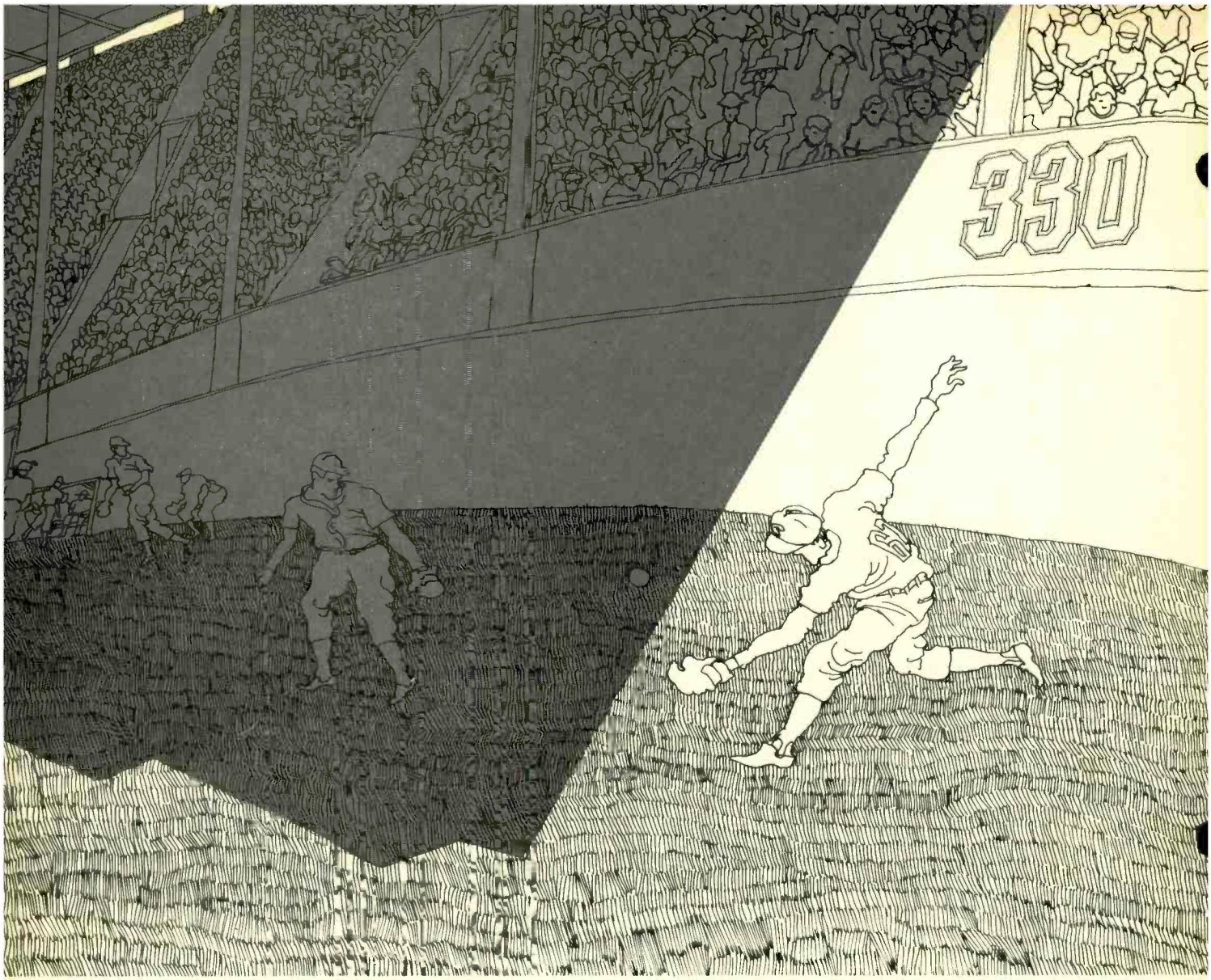


Diagram of a transmission line using dielectric gas.

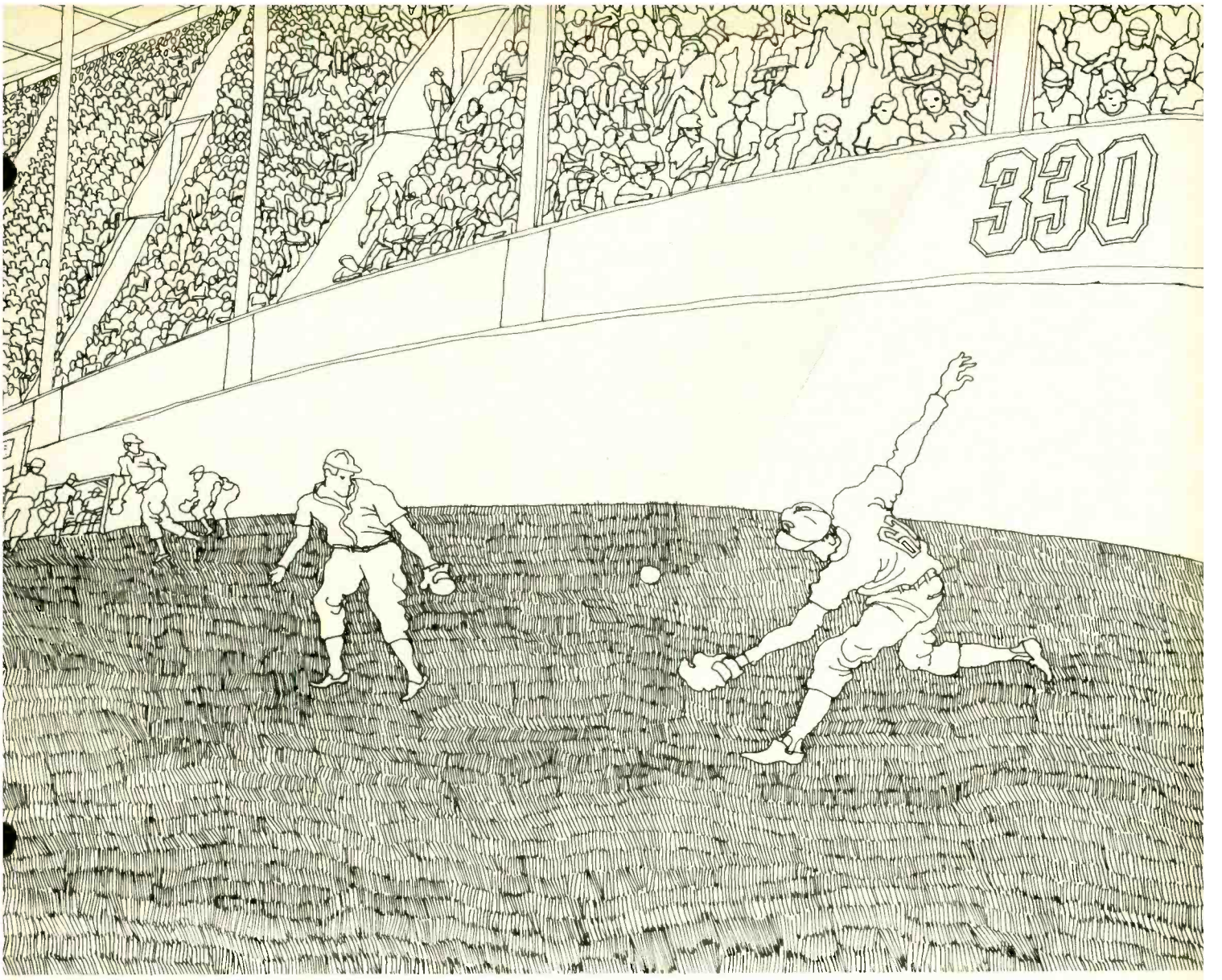
output with no additional increase in weight or size. Channel 61, which is paralleling a second 60 kW RCA transmitter to its present unit, will end up with a total output of 120 kW.

A pressure of five to ten psig will be maintained on this line, and a flow meter will be used to monitor excessive leaks. To do this we will use three 95-lb cylinders—one and a half to fill the line and one and a half as spares to maintain the pressure. The cost of the gas is minimal. If serious leaks develop (say as a result of someone shooting the line full of holes with a .22 rifle), an air compressor is automatically started and power is reduced—you stay on the air.

We at Dielectric Communications can see potential applications with VHF and FM as well as UHF where a larger line would lead to the need for a new tower or excessive costs in other areas. [**Ed. note.** Dielectric Communications' products are available exclusively from RCA.] **BM/E**



The grass is greener...



on our side.

It's the most important play of the game. But it's in the stadium's shadow, where no color camera can capture all the color and action of the scene. The one that comes closest is RCA's TK-44A, the best color camera on the market.

Now the grass is still greener, and the action clearer, on our side.

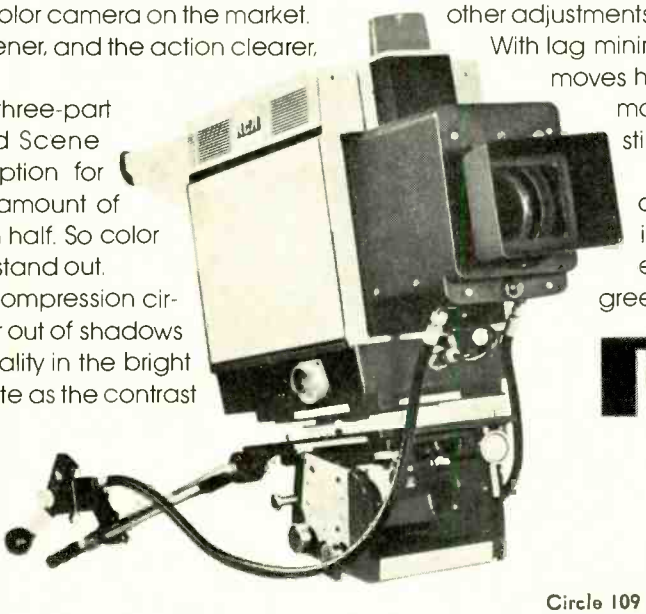
We've developed a three-part Extended Sensitivity and Scene Contrast Compression option for the TK-44A that cuts the amount of light the camera needs in half. So color and action in dark areas stand out.

Our Scene Contrast Compression circuit picks detail and color out of shadows without compromising quality in the bright areas. It's as easy to operate as the contrast control on a television receiver.

The option also includes bias lighting that drastically reduces lag. It can be turned on or off with one switch. No other adjustments are necessary.

With lag minimized, our RGB coring technique removes high-frequency noise, so you can use more video gain at low light levels and still get full video output.

We started by making the best color camera. The TK-44A. Now we're offering you a new option that makes it even better. We want the grass to be greener on your side, too.



RCA

Circle 109 on Reader Service Card

Promising New Approaches To Color Correction

A variety of equipment is popping up to make that on-air color picture of consistantly high quality, manually or automatically. But film variations can fluctuate so widely, automation of some sort must be used. Question is, who feeds the computer—the source or the broadcaster?

WHEN TV PROGRAM MATERIAL comes from a variety of sources, including both studio and on-location recording, color balance is a problem. This is largely because of varying ambient light conditions.

Films are especially troublesome. Films made up of different scenes often introduce abrupt color changes. Some films may be low in chroma, others are too dense, still others lack color fidelity. Color tracking problems resulting from the different color sensitivity of R, G and B pickups for light and dark scenes also lead to poor pictures.

The TV industry has lamented these film telecasting problems for years. Some gains have been made.

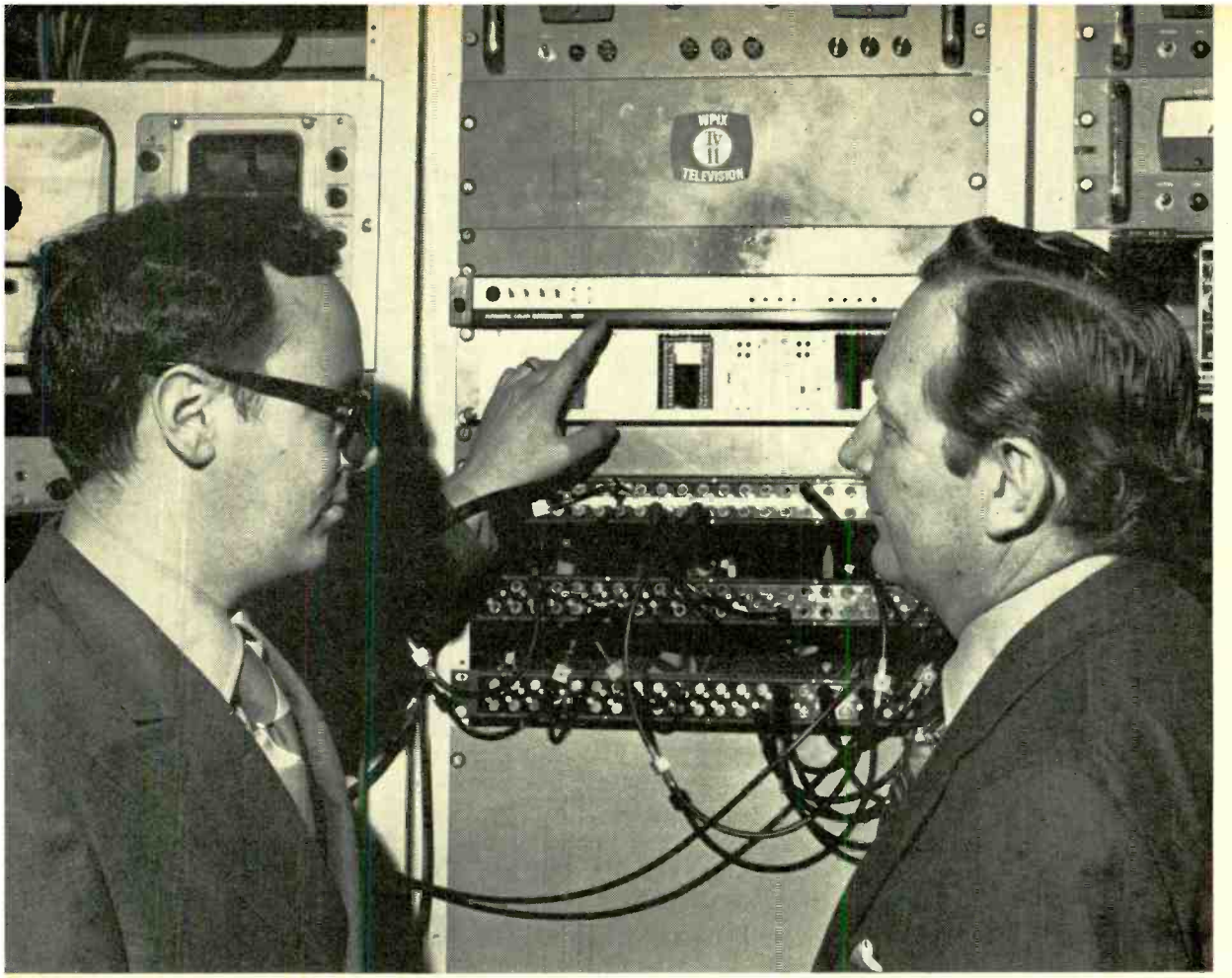
- Viewing condition standards have been set so that when a film is previewed it will be seen in ambient light conditions that are similar to TV viewing.
- Projection lamps with a color temperature of 5400 K have been set for 16mm film, and new print releases assume this is the standard temperature.
- Eastman Kodak has come up with a color reference slide made of Inconel that doesn't show color shift with age.
- Standard set up procedures have been established for telecines. Optics have been checked out to make sure variations aren't introduced by the telecine itself.
- Illumant D-6500 has been set as a color temperature standard for color monitors.
- Procedures for matching color monitors have been worked up.

Most of these gains have been recorded in *BM/E* (see July, 1970 issue). Cameramen and film processing labs have become aware of the limitations posed by TV and they now correct the product more carefully.

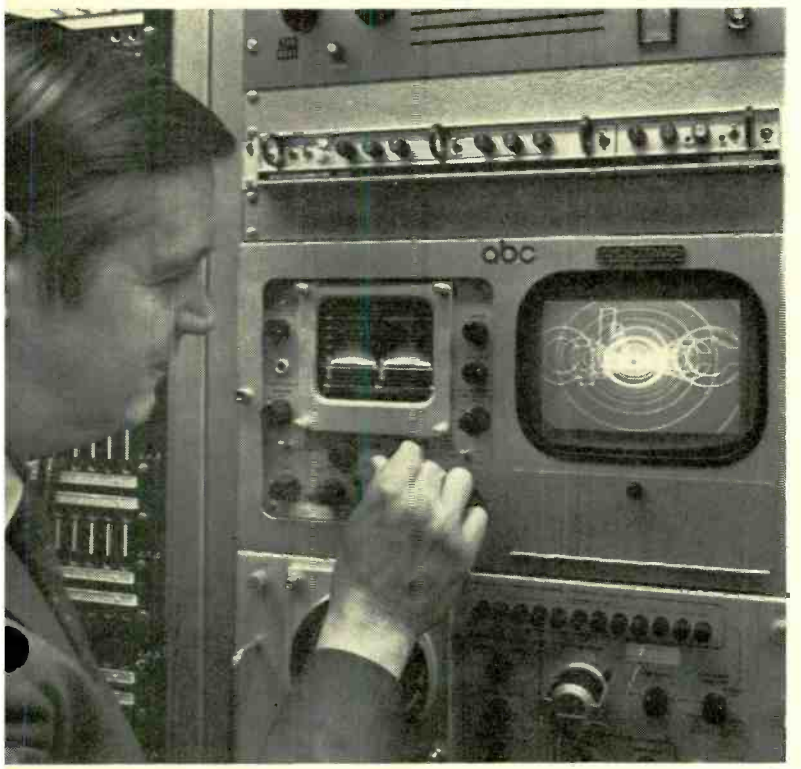
But additional correction factors are often needed. There are several equipments on the market to improve the film product. ABC-TV recently surveyed the field and in light of what was found came up with a new system approach as a solution.

Rather than every broadcaster previewing film and making up cue sheets for manual on-air painting—an expensive procedure rarely followed—why not, reasoned Mike Fisher and Ed Rheingold of ABC, have one central viewing source for all telecine film? An expert colorizer man could view the product and make corrections for telecine that could be stored on punched tape. Then this correction tape could be shipped with every film. If the correction tape was played simultaneously with the film, near-perfect television pictures would result every time.

The answer to the just-posed question "why not?" is another question. Who is going to pay for the expert and the correction code? Technically



Clyde Smith, CBS Labs engineer and co-inventor, with John Neeck, assistant chief engineer at WPIX-TV, New York, who was first to use new CBS automatic color corrector on-the-air.



Mike Fisher, ABC, looks at results of using CBS color corrector (located above monitors). ABC uses remote controls.

the system could work—in fact, most of the elements of the system are around, as ABC found. Before tackling the latter question of *who*, let's look at the equipment surveyed by ABC plus two others that didn't exist until recently: the CBS Automatic Color Corrector and the CMX Systems Company film tape editor.

The first solution to the problem discussed by Fisher* was "Chromaloc." Chromaloc is an elaborate film correction system devised by Teletronics International, a leading videotape production house in New York City. Film to be corrected is inspected and metal foil tabs are placed at every scene change. The film is then loaded in a telecine that has been modified to stop at every tab.

A video operator colorist using a master electronic control panel integrally wired to the film chain corrects each scene on the film. He has eight operating controls: channel gain and black level control for each of the three color channels and the luminance channel. There are nine groups of these eight-correction controls. He corrects the first scene to his satisfaction, or that of his client, using group one controls. He then runs the projector which stops at the next tabbed scene. If a different correction than that set for group num-

*Most of the material that follows is taken directly from a paper presented by Mr. Fisher at the SMPTE Winter Television Conference, San Francisco, January 1971.

ber one is necessary, he rotates his memory selector switch to correction group two, makes the necessary corrections and proceeds to the next tab where this procedure is again repeated.

A later scene may require the same corrections as an earlier one. By dialing the same correction group number into the memory several times, a preset memory of a large number of events can be accommodated while using only nine correction groups. Once the corrections are made, the film is rewound and the system put into the "run" mode for recording on video tape. The film goes

How The CBS Color Corrector Works

The CBS color balance corrector handles composite video signals and may be installed at any point in the signal distribution path. In essence, the Color Corrector puts back into the hands of the operator black level, gain and gamma controls for the three coloring channels equivalent in function to those he would use on a live or telecine channel.

The program signal is **not** encoded, but is sampled, correction signals are derived, and error correction signals are vectorially added to the original.

The Color Corrector modifies only the chroma components of the encoded program signal. No corrections or changes are made to luminance. This compromise between theoretical perfection and practical economic implementation results in negligibly small luminance and/or saturation errors. (Automatic inclusion of luminance corrections to accompany chroma adjustments can be theoretically incorrect in some cases.)

The incoming signal is split into two paths, Fig. 1. The main signal patch has separate output amplifiers for preview and program with each capable of having the correction signal switched in or out. In the second patch the signal is decoded and demodulated, the correction signal is generated and remodulated, and with appropriate blanking, is fed as a correction vector back into the two output amplifiers.

A block diagram of the signal processing channel for one color axis is shown in Fig. 2. The R-Y demodulator has a low frequency Y signal added to it to generate an R signal which is applied through a 2:1 voltage divider to one side of a difference amplifier while the other side is supplied from a potentiometer. With the potentiometer in mid-position, the difference amplifier is balanced and no correction signal is generated. Movement of the potentiometer causes either a positive or negative red correction signal output which is rematrixed with the inverted Y signal to form an R-Y input to a modulator fed in parallel with the same subcarrier used for the demodulator. Use of the same carrier phase for modulation and demodulation ensures that small drifts in phase will not cause serious errors in the correction signal. The blacking correction signal is generated similarly and added to one input of the difference amplifier.

In the actual device, the difference amplifier potentiometer combinations have been replaced by double-balanced variable-gain transistor stages. This circuit permits DC control of correction signals making remote or computer control installations easy. Another advantage of DC control is that it simplifies the cross-connection of gain and black level controls so that the addition of black level correction does not upset white balance in the signal.

The block diagram of the gamma correction circuit is shown in Fig. 3. A linear signal is applied to one side of the difference amplifier and a signal with the same peak-to-peak level but a slightly modified gamma of about 0.8 is applied to the other side of the difference amplifier. Thus a significant output from the difference amplifier is present only during mid-level signals. This difference signal, after passing through another double-balanced variable-gain stage, is applied to the correction modulator. Only blue and red gamma correction controls are provided; green gamma is retained as an operating reference.

The Color Corrector may be operated in a constant white or masking mode in which operation of the controls affects only color information and does not upset gray scale balance. This is done by removing the Y signal from both the demodulator and modulator matrixes and inserting a diode in the R-Y correction signal patch so that only red quadrant information is affected and not the cyan quadrant. The blue and green channels are similarly designed. The automatic color balancing attachment is designed to remedy color errors introduced by films made with low-light levels. (Apparently the practice in optical printing is to vary intensity of the printer light to produce scenes with low-light levels. This corresponds to a gain change in TV, thus upsetting otherwise optimized flesh tones.) The **remedial** circuit works on the principle of **pulling out chroma in the low light areas** of the picture. Note that this action is fundamentally different from simply removing chroma in the low light areas! The block diagram for doing this is shown in Fig. 4 for the R-Y channel. The incoming Y signal is put through a low pass filter and into a level detector set to produce an output signal with video below 7% of peak white. The level detector actuates a sample and hold gate which is fed from the R-Y decoder with the signal polarities so arranged that the output signal operates the Color Corrector black level control to generate a correction vector which cancels out the black level chroma.

The automatic film balance circuit also incorporates another Y level detector which operates when luminance is above 95% to null out chroma in the white levels (by means of another sample and hold circuit). In this manner, the signal can be automatically balanced for both white and black levels.

through the projector and at each tab the memory automatically inserts the rehearsed correction. Because of the memory provided in the unit, several video tape masters may be made having identical characteristics.

The second innovation discussed by Fisher was Rank Precision Industries' Auto-Colorgrade system shown at the International Broadcasting Convention in London last September and at NAB in Chicago this past March (*BM/E*, May, page 40). This equipment is installed between the television camera and the encoder. The correction system

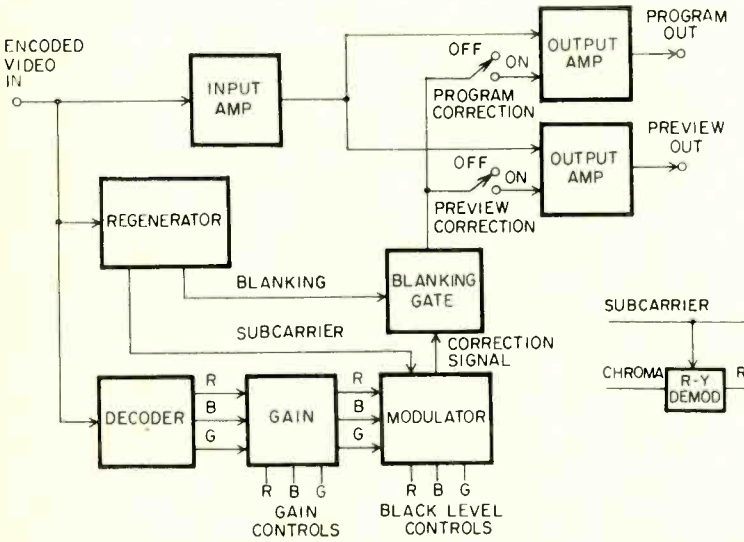


Fig. 1. Encoded signal color corrector

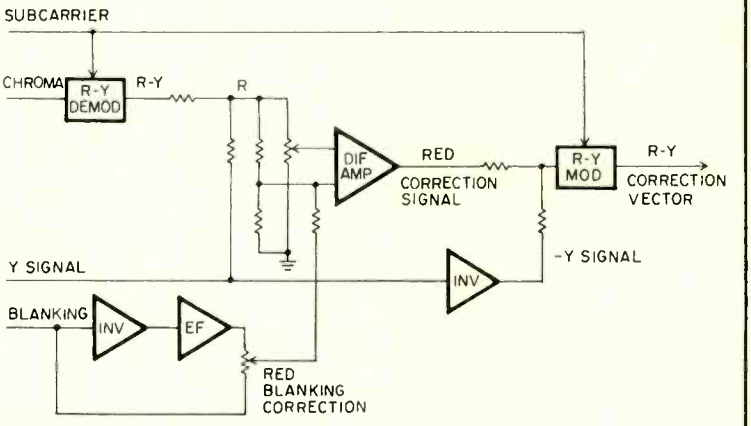


Fig. 2. Red correction channel

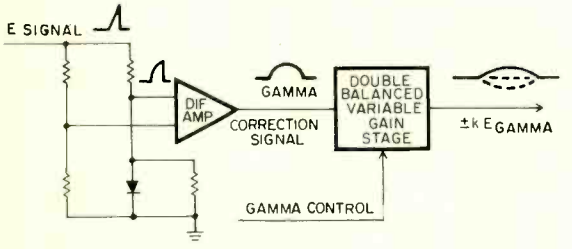


Fig. 3. Gamma error correction signal

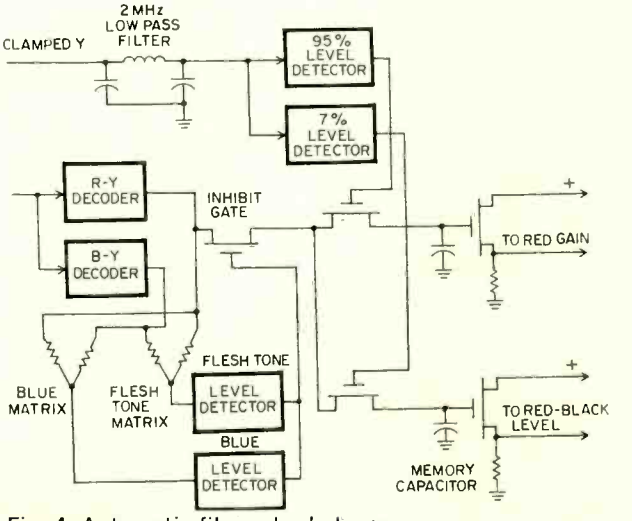


Fig. 4. Automatic film color balance

(Adapted from a presentation by W. G. Connolly, R. H. McMann and C. W. Smith)

employs a remote control panel, which has either three joysticks or nine calibrated controls. The film projector is fitted with a shaft encoder or frame counter.

The correction for a sequence is made on the control panel. This is stored when the "Record" button is pressed. The film is run to the end of the sequence requiring that correction. The correction is then entered into punched tape, together with the film frame number. This process is repeated through the whole film, and all the corrections recorded on punched tape. The tape and film are then rewound and restarted. The correction information automatically controls the unit. Because of the use of frame counting, the projector may be run backwards. Fisher noted that the unit needs no preparation of the film before use and that corrections are unlimited due to the use of a punched tape memory.

ABC observed that a compact cassette tape memory, such as that made by The Davco Manufacturing Company of Morristown, New Jersey, could be used in place of punched tape. The features of the Davco system are a unique tape time code, which allows the encoding or decoding of corrections in either forward or reverse, and an unlimited memory.

Fisher's rundown then discussed the CBS Labs *manual* color converter, the NTSC Color Corrector. The corrector takes a single-wire NTSC encoded video input, and provides a corrected NTSC video output. The corrector works on the chrominance or color information in the picture by adding or subtracting color subcarrier information. This color information is applied through appropriate circuits to give the effect of normal color television camera controls. The controls provided are: color gain for the red, green and blue channels, black level control for the three color channels, gamma corrections for red and blue channels, and saturation (chroma) gain. *(See Box,* How the Color Corrector Works.)

Tests at ABC, Fisher reported, demonstrate that the range of correction provided and the parameters that can be corrected are quite suitable for film operation. This unit may be easily switched from one film chain to another. It is simply added in series with the video output.

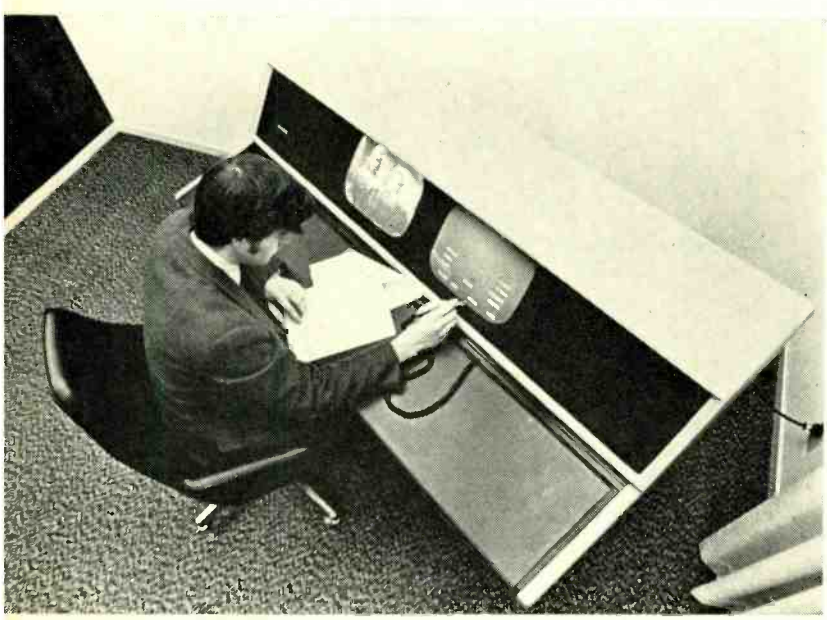
At the time ABC made its survey, Ampex had just introduced a unit with an electronic memory for performing a limited number of pre-programmed corrections. The unit is called the ACC-1 and incorporates the CBS Labs NTSC Color Corrector. As such it permits any user to avail themselves of a system capability similar to that developed by Teletronics. Cost is approximately $25,000.

In March of this year, subsequent to Fisher's survey, CBS Labs announced the *Automatic* NTSC Color Corrector, Model 6000, which seemingly would obviate the three-step need for preview, storing a correction and then a subsequent replay with correction factor added. The automatic color corrector does indeed take a wide variety of inputs—camera, tapes and film—and can process them in sequence without the viewer ever noticing color balance shifts. The corrector maintains balance by maintaining a white level at 95 IRE units, and black at 5 IRE units. In other words, it will take care of shifts. What it will not do automatically is put in color corrections that did not exist in the original material (though that can be done with the manual corrector mode).

Another solution to color correction that appeared on the scene this March is the CMX Systems Company's CMX-600 system editor. Although this unit (*BM/E*, May page 46) was designed as a cost-cutting editing assembly tool, its storage features will permit color corrections to be entered frame by frame. The final program assembled is on disc packs. In one more pass, color corrections and balance can be entered.

These post corrective approaches are not entirely dissimilar to color optimization steps that could be taken by film laboratories to prepare material for broadcast.

Fisher points out that the first step used by labs is to analyze the preprint film. Most labs use the Hazeltine Color Film Analyzer for this purpose. These units use flying spot television scanners to produce a kinescope picture. The operator is provided with correction controls which are calibrated in printer values. At a scene change, or where a printing correction is required, he punches an index or timing notch in the film near the sprocket holes. He then adjusts his analyzer correction controls, matching his color television monitor to a projected subjective reference slide. The settings of the controls are translated into a punched paper tape. He repeats this process of



CMX 600 permits easy editing and assembly of film. After assembly correction factor can be entered before recording on tape.

notching the film and recording the corrections until the film has been corrected.

The film is then run together with the punched tape through a printer. The tape controls the position of color filters in the printer, which corrects the preprint material for the manufacture of the first trial print. The trial print is then screened and, if necessary, several trial prints will be made until the client is satisfied. At this point, a release print is delivered to TV broadcaster.

Fisher says the shortcomings of lab timing may be outlined as follows: The process is limited to overall density and color corrections. There is no practical method to correct gamma or color

Progress Report: JCIC Ad Hoc Color Television Study Committee

(Extracted from a presentation by K. B. Benson at the NAB Convention)

Since its formation a little over two years ago, the Ad Hoc Color Television Study Committee has conducted investigations of the causes of variations in color television reproduction over a broad front covering every link in the television system chain from picture generation to the home reproduction. What follows are highlights of some investigations which have been completed and progress in some of the other more significant studies currently underway.

Over-the-air transmission. Data gathered by the Transmission Subcommittee (under the chairmanship of W. C. Morrison of RCA) from test signal transmissions in Chicago (over three transmitters to eight antennas and tuners, two of each of four different locations), revealed significant deviations in hue and saturation despite the fact that the television system was operational within applicable FCC specs. (Details were reported in *BM/E*, December 1970.)

The principle cause of the excessive channel-to-channel hue variation measured was one transmitter wherein the reference burst was shifted to phase (although within FCC specifications) with respect to color information in the picture. The need to tighten the burst-to-chrominance phase tolerance is clear, and is recommended. This task has been taken up by EIA BTS.

That saturation (chrominance-to-luminance ratio) errors were excessive is not surprising. The specification on frequency response, by itself, permits excessive station-to-station variations. In addition to this, evidence was found that the prescribed method for measuring frequency response does not give an accurate indication of chrominance-luminance ratio. This shortcoming is ascribed to the failure to detect significant changes in the luminance signal. Luminance changes result from differential gain errors and from quadrature distortion in RF amplitude detectors as well as from frequency response errors. The differential gain characteristic, as usually stated, cannot be combined with the frequency response characteristic to yield an actual chrominance-luminance ratio. It appears that the saturation characteristic is not only loosely specified but that saturation variations are concealed by the fact that the actual saturation characteristic is seldom measured.

The saturation situation is further complicated by receivers which use the burst to sense saturation errors. Objectionable variations were found in the burst-to-chrominance ratio in switching from station to station. As was the case with hue, this was principally due to one transmitter with an error in burst amplitude.

It is clear that the specification on characteristics affecting saturation—linearity (differential gain) and frequency response—need to be unified to prevent tolerance build-up. This is recommended. Furthermore, if color burst is to continue as a chrominance amplitude reference for receivers, it is evident that a joint effort with receiver designers is needed to determine the additional tolerances that may be required. This too is recommended.

Compliance with specifications would be more easily ascertained and maintained if the blanking interval specification utilized a burst with the finite rise time which must in fact be present.

The findings of the Transmission Committee have been turned over to EIA and IEEE for determination of specifically what is required in the way of tighter tolerances and improved testing procedures.

Cable television transmission. As a fall-out from the Transmission Subcommittee field tests, an examination of CATV systems was conducted by another subcommittee under Norman Penwell, former engineering director of NCTA. Highlights of this investigation show that the wide-band portion of a properly designed, installed and operated cable system apparently is not a significant contributor to color non-uniformity. However, if for example cut-off filters of the system introduce phase or amplitude errors, color errors can occur on channels at the band-pass limits. Investigation also indicated many receivers are misaligned and the AFT circuits do not perform properly. Another major problem is the inadequacy of the r-f baseband conversion equipment. This subject along with the questions of quadrature distortion and chrominance/luminance distortion is being taken up by a subcommittee chaired by Mr. Rhodes of Tektronix.

Video signal processing. R. L. Pointer's committee of the NAB studying video signal processing amplifiers, has found that improper adjustment can introduce significant variations in color, and more importantly, improper operation of video tape equipment. Equipment manufacturers have been given a guide for direction in design improvements.

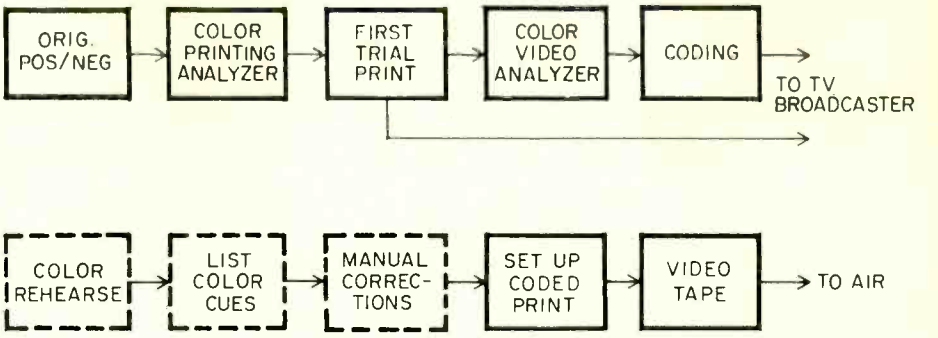
Colorimetry study. First, the Colorimetry Subcommittee, under the chairmanship of E. P. Bertero of NBC, has studied reproduction fidelity under varying conditions of scene lighting color temperature, camera signal matrixing, receiver phosphors, and receiver adjustment. (See April 1970, *SMPTE Journal*.) The subcommittee is now working on a single procedure for operating personnel to assure the day-to-day uniformity of color rendition.

Recommendations of the EBU Ad Hoc Committee on Color Television Primaries for standardizing phosphor is under study by the subcommittee.

Color monitor set-up. A subcommittee of the SMPTE Television Committee on Color Monitor Set-up, chaired by Grayson Jones, is developing standard procedures for uniform adjustment of this very important part of the video system.

Optimum receiver balance. D. Zwick of Eastman Kodak is conducting an investigation of the effect on viewer satisfaction of different values of white balance for the home receiver. The present practice of the home receiver being balanced to 9000K or higher is not compatible with studio practice and may be a significant factor in accentuating variations in color.

Conclusion. Concerted efforts of the Ad Hoc and others promise to bring about a significant improvement in color quality for the home viewer.



Top diagram shows what could be done at film lab. Rather than send a print without corrections to the broadcaster, NTSC encoding could be put on a separate tape. If this happened, the three functions that a broadcaster performs (dashed-line boxes, bottom diagram) could be eliminated.

tracking. The process depends upon the judgment of the operator without reference to actual broadcasting conditions. The broadcaster screens and accepts the release print. Ideally, the process should stop there, but many corrections necessary for the television system cannot be made by simple film lab correction of color balance. Mid-range color errors, such as green faces, cannot be corrected on a printer without introducing new color errors elsewhere. Mid-range values (color channel gain), and background values (color channel black level) are all available for adjustment on a telecine camera chain. To make these adjustments, the broadcasters must preview the film and must expend a large amount of costly effort to optimize it for television which is costly both in studio time and equipment required for rehearsal. What Fisher and Rheingold see as a solution to avoid rehearsals and previews is a scheme whereby the film lab produces a NTSC encoded signal at the time they produce the color coding for the master print.

Right now the signal producing the picture viewed on monitors are non-standard. This could be converted to NTSC. Thus the Color Video Analyzer concept could be applied to an NTSC color corrector. If the film lab colorist was provided with a few additional controls, he could correct for broadcast any errors noted in the trial print. If the film lab then encoded these corrections into a recording (either punched tape or audio cassette), the recording together with the first trial print could be delivered to broadcasters. The film could be played directly on the air by simultaneously playing the recorded correction information. The film could be marked by a notch or tab or a frame counter could be used.

Hazeltine has shown the feasibility of the system by interfacing their analyzer out with an NTSC encoder.

If the ABC proposed system would be endorsed by the film labs, the other networks, the O&O's and the group broadcasters, it could come into being. The labs would buy the encoders and correction recorders; the broadcasters would modify their telecines and buy tape players.

Better quality news documentaries and feature films originated by the networks was ABC's original interest. Obviously, the system, once operative, could be applied to program material coming from independent sources. It could apply to commercials.

What are the prospects?

ABC has described and demonstrated the system fairly widely. What is the reaction? Fisher says the film labs are cautious. Their reaction is, how many encoded-correction productions will you buy from us—can we recoup our investment in encoders, recorders and in personnel to make the correction decisions.

John Kowalik of MovieLabs does not favor his company making the investment. He recommends an alternative: Let the networks set up an independent lab to screen all films, make judgments or corrections and encode the correction tapes. Kowalik reasons if the improvement is worth it, the networks can capitalize the scheme.

NBC has reviewed the proposal technically and Ed Betero says he has sent a report to his management. Betero could not elaborate on his reactions except to say all parties involved will be very cost conscious. Somebody has to pay the man to do the color correcting—the further upstream this is, the better. "We shouldn't have to invent rubber gloves to handle contaminated products," Betero said, philosophically. Films could be produced that need little or no corrective action. Betero says NBC will send a product back to the lab if the quality isn't as good as it should be. This is okay for documentaries because time would generally permit it. It wouldn't work for daily news, but then such correction is pretty much the broadcaster's internal problem. The broadcaster would have to preview and encode—a luxury procedure that is not normally followed.

CBS is rather reluctant to commit itself. For one reason, it was a joint sponsor with Memorex of the CMX-600 system. The first unit has been installed in the CBS Television Studio Center in Los Angeles.

Although the unit was designed as an editing tool, it can be used to process color corrections. A large built-in memory (computer disc packs) is part of the system and an operator has direct access to any frame or scene. Rehearsal is extremely easy. The final product has to be tape—unless one were to additionally use the $120,000 3-M electron beam recorder-printer, Chromabeam, to convert from tape to 16mm film. **BM/E**

ADR=Tax Savings For You

By Mark E. Battersby

Painless belt-tightening in the tax field can help management hold the financial line in these lean and hungry times. New tax rules can save your station money—if you know how to use them to best advantage.

THERE'S A NEW TAX REGULATION to keep in mind from now on. But unlike most tax rules, this one can mean a tax savings for you. Unlike the 1969 Tax Reform Act and the repeal of the 7% investment credit, these new rules announced by President Nixon can save you money, not to mention increasing your cash flow, freeing capital and providing incentives to modernize your operations.

The new rules are called the Asset Depreciation Range (ADR) System. Remember the name. You're going to be hearing a lot about it.

Very simply, the ADR System provides assets, repeals the "reserve ratio test," and, finally, adds an optional method for computing the amount of depreciation which can be taken in the first year.

Sounds basic enough! In actual practice these new rules are expected to reduce business taxes by $2.6 billion this year and by an estimated $4 billion by 1976. Imagine the results of increasing your firm's annual depreciation deduction by 20%—plus increasing first-year depreciation write-offs from an average of one-half of one year's depreciation, to an average of three-fourths of a year's depreciation!

Unfortunately, these new rules may be unlike most tax regulations in that they save you money, but still contain the familiar limitations and restrictions. The biggest of these is that the new Asset Depreciation Ranges cannot be used for real estate. But, you still have equipment and assets which may be depreciated using the ADR System.

Optional asset lives

The heart of the new ADR System is the creation of new, but still optional, lives for your assets. Rather than being rigid guidelines such as the ones still in existence, these new lives are in the form of ranges. Based on the existing Guideline lives the new Asset Depreciation Ranges are not more than 20% shorter nor 20% longer than the Guideline lives.

To illustrate, transmitter equipment presently has a Guideline life of 10 years. Under the new optional ADR System you could select a life for your particular equipment anywhere between 8 to 12 years. And once selected, that life will be accepted without question by the Internal Revenue Service.

As mentioned, election of the ADR is optional. You are still permitted to determine the life of your assets based on your own experience, or to use the Guideline life. Also optional, regardless of the method you use to determine the life, is the method you choose to depreciate your asset: Straight-line, double-declining balance, sum-of-the-year's digits, or any recognized method of depreciation is acceptable.

If you do elect to use the ADR System for *some* assets purchased during a year, you must use it for *all* assets placed in service during that year. Of course, you may elect a different basis for determining asset lives in subsequent years, but with ADR it's all or none for an entire year. For this purpose, all assets subject to this election will be required to be accounted for in item accounts or in multiple-asset accounts by year placed in service (vintage accounts).

If you choose the ADR System for assets placed in service, it will apply to both new and used assets. The depreciation period of the used assets, as well as of the new assets, must be within the Asset Depreciation Range for such assets or classes of assets, but need not be the same if the new and used assets are placed in separate depreciation accounts.

An exception will be made where the basis of used assets exceeds 10% of the total basis of all assets placed in service in the year; in such cases lives for used assets may, at your election, be determined without regard to the Asset Depreciation Ranges.

Similarly, the cost of rebuilding, rehabilitating or repairing an asset, to the extent that such cost must be capitalized, must be accounted for in a separate vintage account for the year in which the rebuilding, rehabilitation, or repair is com-

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Mark E. Battersby is a tax consultant in Ardmore, Pennsylvania.

pleted and cannot be added to the original vintage account for the asset. This type of account is treated in the same manner as used assets.

If a 20% increase in your annual depreciation write-off isn't enough for you—there is also the new "modified first-year convention."

Modified first-year convention

In the past, taxpayers were offered a special "half-year convention" under which they were permitted to deduct one-half of one year's depreciation for any asset purchased during the course of the year.

With the modified first-year convention you will now be permitted to deduct a full year's depreciation for any asset purchased in the first half of the year, and one-half a year's depreciation for all assets purchased in the second half of the year.

In other words, assuming that new assets were put in service in equal amounts at various times of the year, the most anyone could deduct before was ½ of one year depreciation. Under the new rules the maximum, again assuming equal purchases in both halves, is three-fourths of a year's depreciation.

But remember, this option is only available to you if you elect to use the Asset Depreciation Ranges. And again even though the former half year conventions and the new modified first-year convention are available once you elect the ADR method you can only elect one for a given year. The next year you may elect to use another method of computing your first year's depreciation; but like the ADR's, once you elect to do it one way for *some* assets, *all* assets purchased in the year must be treated in the same manner.

Reserve ratio test

In the past, depreciation was generally complicated by an involved test for proving that the depreciation reserve for assets in a guideline class bore a reasonable relationship to the basis of those assets.

This test has been eliminated for taxable years after December 31, 1970. Thus if you have elected to be examined under the test and satisfied the requirements for all taxable years ending before January 1, 1971, you may continue to use the prescribed Guideline lives for all subsequent years without application of the reserve ratio test.

So the test has now been eliminated from almost all consideration.

Effects of ADR

In general, depreciation of an asset is computed from the date you acquire it. However, under existing rules a "half-year convention" is applied in many cases, whereby all assets acquired during the year are considered as acquired at the mid-point of the year. Under the new ADR System, you will be given the option of selecting a new modified first-year convention under which all assets acquired in the first-half of a year are treated as being acquired on the first day of the year, and all assets acquired during the second-half of the year are treated as acquired at the mid-point of the year. The following example illustrates the impact of this change.

Assume that on May 1, 1971, Smith Communications, a calendar-year corporation, which is in the habit of purchasing equipment at various times throughout the year, acquires new microphone equipment costing $1,000. Under the Guidelines, microphones have a depreciable life of 5 years.

a At present, under the double declining balance method of depreciation, Smith's deduction for a full year would be 40% (2 × 20%) of the cost of the equipment, or $400, but under the existing half-year convention used by Smith Communications, it's first year deduction would be only $200. The tax savings in the first year would be $96 (48% tax rate × $200).

b Under the ADR System the depreciable period would be shortened from five years to four years. Thus, Smith's double declining balance depreciation would increase to 50% (2 × 25%) for a full year or $500. Under the half-year convention its deduction would be only $250 (½ of $500). The tax savings in the first year would be $120 (48% × $250).

c In addition to shortening the depreciable period, the ADR System also modifies the first year convention. Since Smith Communications bought the equipment before July 1, 1971, it is treated as having acquired the microphone equipment on the first day of the year. Therefore, the first-year deduction under the ADR System will be increased to $500. The 1971 tax savings would be $240.

The 1971 tax savings under the ADR System, as illustrated in *c*, is approximately 2½ times the saving a taxpayer can obtain under existing rules, and twice the saving it would have obtained if only the depreciable period had been shortened without changing the first year convention. In terms of net cash flow in the first year, the purchase of the microphone equipment under the ADR System illustrated in *c* requires a net first-year cash expenditure of only $760, while under *b* it requires $800, and under existing rules—illustrated in *a*—it requires $904. The same results would follow for any asset purchased between January 1 and June 30. **BM/E**

Composite over-all life of broadcast equipment

Transmitter equipment	8	to 12	yrs.
Studio control equipment	8	to 12	yrs.
Speech input equipment	8	to 12	yrs.
Antenna equipment	9½	to 11½	yrs.
Towers	8	to 12	yrs.
Studio furniture & fixtures	5½	to 8½	yrs.
Office furniture & fixtures	12	to 18	yrs.
Pipe organs, pianos, etc.	8	to 12	yrs.
Television equipment	3	to 5	yrs.
Facsimile equipment	4	to 6	yrs.

These figures are based on the preliminary Asset Depreciation Ranges released by the U.S. Treasury Department, applied to the general categories of assets applicable to the broadcast industry.

BROADCAST EQUIPMENT

Audio equipment

Dynamic noise filter reduces noise in tape, disc, FM by varying bandwidth in response to music. At low levels attenuation is 25 dB at 30 Hz and 22 dB at 10 kHz. At high levels freq resp is flat within 0.2 dB from 20 Hz to 20 kHz. THD typically .01% at +18 dBm. Chassis accommodates up to 4 channels. BURWEN LABS. **280**

Quadraphonic encoder converts four channels into two. Model 7445 Stereo-4 Encoder processes quad material into compatible two-channel material for FM, tape or disc. Listeners using companion decoders receive four channels; others get two. Requires no changes in bandwidth or standards for FM broadcast; currently in use by 26 U.S. stations. $795. ELECTRO-VOICE. **281**

Phone-line equalizer is compact, producing response comparable to broadcast quality at receiving end. Phone-Tatch II can be used with any standard telephone, for voice or music, in studio or field. CADDCO. **282**

Video equipment

Zoom lens for CCTV, CATV cameras has 15-150 mm range, *f*/2.5 rating, motor drive for remote-control operation. Mark XB-1 has color-corrected optical system, uses low-voltage dc motors. Control box uses four D cells, with three switches for zoom, irising, and focus. ZOOMAR. **287**

Studio/portable lighting, Feather-Lite Soft Lite, is rated at 4000 W, weighs 30 lb. Compact construction includes flat back for easy stacking. Accessories include Booster Barndoor which increases intensity up to 40%, and C-clamp pipe mount. $259.95. BERKEY-COLORTRAN. **288**

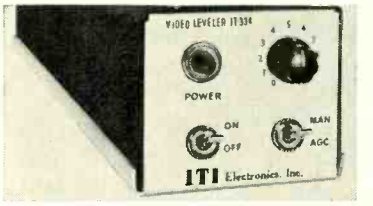
Color picture monitors have 300-line horizontal resolution, 2% V and H linearity, 2% HV regulation. Automatic dc restoration by keyed clamp, instant-on picture through standby power-ready circuit. Setchell-Carlson 25-in. Model 5MC914, $1195; 19-in. Model 9MC914, $1095. SC ELECTRONICS. **283**

New and significant

Audio delay system has no moving parts, employs analog/digital circuits to store program material. Up to five separately controllable outputs from single input; adjustable in 5 ms steps to 320 ms max. S/N ratio is 60 dB,

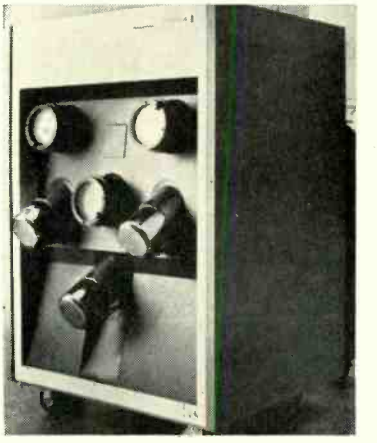
freq resp ±2 dB 20 Hz to 12 kHz, THD and IM below 1% for line-level outputs. Delta-T Model 101 system has balanced in and out, 20 dB extra gain. $3192 for basic unit. GOTHAM AUDIO. **275**

Video AGC amplifier accepts composite video from 75-ohm or high-Z source in range 0.4-4.0 V pk-pk, delivers constant 1.5 V pk-pk output to 75-ohm load. Freq resp ±0.5 dB to 20 MHz; 60-Hz squarewave has less than 5% tilt. Model IT-334 Video Leveler designed for CCTV or



CATV programming use. AGC action may be disabled, unit used as line amplifier with 26 dB gain. $145. ITI ELECTRONICS. **276**

Color TV projector, Eidophor Model EP-7, provides screen brightness of 4000 lumens, brighter than 35-mm motion picture projectors. Pictures up to 73 × 54 ft, viewable by up to 35,000 persons. New color Eidophor has automatic color registration, is all solid-state, has 800-line center resolution. Contrast ratio at least 100:1, video bandwidth 15 MHz ±3 dB. Useful for large audiences, or as rear-screen for studio production. Electronic keystone correction allows projection angle of +10°



to −20°. $129,300. Manufactured by Gretag Ltd. (Switzerland), distributed by TNT COMMUNICATIONS. **277**

Film camera is 16-mm self-blimped model with magnetic sound-stripe system. Sound Scoopic 200 has automatic through-lens metering, 12.5-75 mm *f*/2.5 zoom lens, over-shoulder recording amplifier with AGC and rechargeable nickel-cadmium battery which handles up to 2000 ft of film on charge. Package includes headphones and microphone, battery charger, gelatin filter holders. CANON. **284**

Video switcher is compact (19 × 10½ × 5¼ in.) has eight inputs from either composite or non-composite sources. Has program and preview busses, A/B mix/effects busses, key, mat, and mix, wipe, and split-screen. Rack or console mount. BALL BROTHERS. **285**

Color picture monitor uses Sony Trinitron CRT for easy setup with only four front-panel adjustments. Has different screen phosphors than home-receiver Trinitrons. Chromaticity closely matches CCIR/PAL and Canadian practice, with reference white at 6500 K. Has detented, variable controls for chroma gain, chroma phase, contrast, brightness, to permit displaying NTSC specified picture. Has three modes: automatic color in presence of burst; forced color with or without burst; monochrome (no chroma, increased luminance bandwidth). TEKTRONIX. **286**

Tape gear

Cassette recorder kit includes hand-held parabolic microphone for long-distance pickup in field or studio. Astro-Mike kit includes Model 2393B cassette player/recorder, microphone, reflector, blank cassette, batteries. BELL & HOWELL. **293**

Studio console helical VTR has conveniences usually found only with quad machines: pix and waveform monitors, audio monitor amplifier and speaker, video display switcher. Model 4190 console includes Model 900 VTR, with Model 4102 time base corrector available as accessory to meet FCC color standards. Second head is playback monitor during recording. $14,000 basic price. IVC. **294**

Audio cartridge playback machines are multiple deck, have provision for remote control, automatic sequencing are available in mono or stereo versions. INSTA-TAPE DIV. AMPRO. **295**

Portable reel-reel audio recorder has three speeds: 7½, 3¾, 1⅞ in./s. Model 11 is available in full- and half-track versions, takes 5-in. reels with cover closed, 7-in. reels with cover open. Has three heads for erase, record, playback; speaker or headphone monitoring. Uses batteries, has ac adaptor. TANDBERG. **296**

VTR accessories speed duplication of spots and short program segments. Model VBL-1 Bin Loop Adaptor eliminates rewind time. Used on master recorder in place of supply and takeup reels, consists of four-minute loop that plays continuously, while dubs are made on second machine. $6950. Duplicated tape is placed on ATD-1 Tailoring Device, which winds each program segment onto takeup reel or cassette hub, cuts and codes tape for beginning and end of tape sensing. $14,050. AMPEX. **297**

Multicart audio tape playback systems are available in mono, stereo versions. Model RT-16 contains six playback decks; RT-26 is 12-deck unit. Both use solid-state logic circuits, no relays, have self-sequencing, random sequence, status-lighted pushbutton control. Heavy-duty synchronous motor; redundant solid-state plug-in circuit boards. RCA. **298**

Wireless-controlled **cassette recorder** includes AM/FM receiver. Model 2613 features wireless control of tape

Free loan-for-trial.
Free repairs for the first two years, no matter what happens.
Plus a lifetime guarantee.

We're very confident. But then we've been offering all this for years!

A careful study of guarantees can tell you quite a bit about a company. And that's why we're so proud of ours. For instance, every E-V Professional-line microphone has a 2-year UNCONDITIONAL warranty against malfunction; regardless of cause. Even accidental damage is covered, no questions asked. All absolutely free—except one-way postage. And for a modest charge we'll even hide the scars!

But that's just part of the story. Every Electro-Voice microphone is also guaranteed for the life of the unit to be free from factory defects in workmanship and materials. To show you we're really serious, we've printed the entire guarantee below. There's no finer in the industry.

How can we afford such liberal guarantees? By making products that have served for decades as the yardstick of reliability in studios throughout the world. And by creating designs that really solve your sound problems, day after day. Which brings us to our other unusual offer.

Did you know that most Electro-Voice distributors will loan any E-V Professional product to responsible firms for trial without cost or obligation? You can make every test you want under actual working conditions. And in the rare event that you aren't satisfied, just return the unit. Your distributor then exchanges it for fresh stock from us. No cost to either him or you. We've found this simple system helps you choose the products that really solve your problems. And we're happy to help.

A great guarantee and a time-tested loan-for-trial program. Plus a broad line of professional products that fit almost every studio need. We wouldn't want to do business any other way.

WARRANTY

Electro-Voice Professional Broadcast and Recording Microphones are guaranteed unconditionally against malfunction for two years from date of purchase. Within this period Electro-Voice will, at its option, repair or replace any E-V Professional microphone exhibiting any malfunction regardless of cause, including accidental abuse. This warranty does not cover finish or appearance. Also, every Electro-Voice microphone is guaranteed for the life of the microphone to be free of factory defects in materials and workmanship, and will be repaired or replaced (at our option) at no charge if exhibiting malfunction from this cause. Microphones for warranty repair must be shipped prepaid to Electro-Voice, Inc. or its authorized service agency, and will be returned prepaid.

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Electro-Voice®

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Circle 111 on Reader Service Card

motion from microphone which may be some 30 ft from recorder. Also has audible end-of-tape alarm, battery or inbuilt ac power with automatic recharging, AFC on FM, tape counter. $139.95. CRAIG. **299**

Transmitters and accessories

Linear amplifier is rated at 100 W peak visual power in UHF service. Model TOA-100A uses long-life ceramic planar triode type TH-328. Front-panel metering includes plate current, plate voltage, filament voltage, bias voltage, peak visual power, aural power, reverse power. May be supplied as amplifier, or with exciter as 100-W translator. EMCEE. **300**

Ice-detection device senses ice formation on antennas, rather than simply triggering at 32°F. Detector may be located up to 2000 ft from control unit, which will operate antenna heater circuits. Model 871-CB is unaffected by coatings of water, oil, grease, or dirt. CYBRIX. **301**

AM frequency/modulation monitor, type BW-50, has 100% negative peak indicator independent of calibration procedures. Companion BW-60 RF amplifier permits use at remote-control point. RCA. **302**

Microwave TV link is available for fixed broadcast TV relay in 12.7-13.2 GHz band, also as portable for remote TV broadcast and CATV live program origination in CARS band. System includes 4-ft antennas, radomes, 100-ft control cable, RF heads and control boxes ready for 4-in. pipe mounting. Typical useful range with substantial fade margin is 10 miles. MA-12C is one-way simplex system; two-way duplex available. MA-12C price, $5400. MICROWAVE ASSOCIATES. **303**

Vacuum capacitor is suitable for medium- and high-power transmitter use. Type VC1500 ratings are 1500 pF, 130 A, 15, 20, or 25 kV. Overall length 9⅜ in; copper-to-glass seals are 4½ in. DOLINKO & WILKENS. **304**

Dummy loads for VHF or UHF handle 20 or 10 kW. Moduload load resistor modules take up five cubic feet, terminate 50-ohm systems with VSWR of 1.1 from dc to 1300 MHz. Available with 3⅛ in. EIA flanged or unflanged input. $3300 for 20-kW model, $2300-$2350 for 10-kW model. BIRD. **305**

KDAL-TV moved out to move up to full color. "The timing was perfect," says Ron Lund, Director of Photography for the Duluth station. "Management had already decided to move the entire station to a new building, and this fits our plans for a whole new photo department—complete with color processor.

"The Kodak ME-4 process gave us the flexibility we needed to stay on top of color news and sports. Now we can do more, and do it faster. We've had film come in at 9:15 P.M., and had it on the air for the 10 o'clock evening news. And we've had tremendous community response to our documentaries. We've shot everything from an anniversary of a forest fire to local sports fishing.

"And it's paid off in other ways. We process quite a lot of commercials and industrial films. And we've installed the Kodak Silver Recovery System to add a little more to the profits.

"Color quality? Just great! And we've had excellent results with Kodak's packaged chemicals. In short, we're just glad we moved when we did."

Want to know more about the advantages of ME-4 or mini ME-4 processing? You don't have far to go. Just call your nearest Kodak Representative at one of the numbers below. And make *your* move.

EASTMAN KODAK COMPANY ATLANTA: Bob Baker 404/351-6510/CHICAGO: Dick Potter 312/654-5300/DALLAS: Frank Reinking 214/351-3221/HOLLYWOOD: John Waner 213/464-6131/NEW YORK: Bill Reddick 212/262-7100/SAN FRANCISCO: Joe Semmelmayer 415/776-6055

CATV gear

Equalized splitters are available in three models. ESM-2 has two equalized outputs; ESM-3 has three; ESM-D is directional coupler with one flat and one equalized output. Split trunk and feeder cables with inbuilt equalization, and has attenuation characteristic similar to cable. C-COR. **306**

Trencher is compact, has simple hydrostatic drive control. Model M-147H digs 3-5 in. wide, down to 30 in. deep, at speeds up to 20 ft/min. A 16 × 42 in dozer blade attachment permits backfilling. Blade angles 30° left or right. Has 14-hp engine, two-wheel disc-type brakes. VERMEER. **307**

Demodulator covers VHF channels 2-13 with 75-ohm input (5-50 mV) and 50-ohm input (50-500 mV). Outputs include two separate 75-ohm video outputs, one high-Z envelope detector output, audio. Alarm indicates video output loss. Freq stability of local oscillator ±.002% from 5°-50°C. TELEMET. **308**

All-channel inline taps are designed for indoor or outdoor use. F-1412 has 12 dB isolation; F-1416 has 16 dB isolation; F-1426 has 26 dB isolation; F-1436 has 36 dB isolation. All housed in aluminum die castings, designed for surface mounting. JERROLD. **309**

ETV modulator for local origination, furnishes visual and aural carriers on any VHF or sub-band channel. Crystal controlled. Model ETM-171, $575. FUNG ENGINEERING. **310**

Test gear

Cable fault locator locates high- or low-resistance faults in power and communication cables with accuracy of ±0.5% of cable loop length; indicates faults up to 200 megohms. Small, portable, battery-operated, with high-Z solid-state null detector, 10-turn calibrated balance control, zero-center meter. JAMES G. BIDDLE. **311**

Six-digit counter displays 5 Hz to 32 MHz in six time bases. Model 2726 makes single and multiple period measurements plus frequency ratio referenced to 1, 10, 100 or 1000 cycles of base frequency. Internal crystal clock insures accuracy of .001% over range of 15°-55°C. $575. SIMPSON. **312**

Interference locator covers 540 kHz

It's no song and dance.

If you're processing video signals, you've got enough to do without worrying about the equipment. So at 3M we've reached into our repertoire and come up with a handful of reliable video products that work like magic.

The first trick out of the bag is the **helical VTR dropout compensator.** A combination dropout compensator, ultra-stable processing amplifier, AGC and automatic chroma level control, it corrects, cleans up and stabilizes helical VTR signals.

Next on the bill is the only **dropout compensator** made that provides proper color and luminance replacement for quadruplex VTR's. The 3M system eliminates white and color flashes, color mismatches and grey-out values, while maintaining full video stability and color interlace even through multi-generation dubs. An interface kit for your VTR and a test tape are free with your order.

The perfect partner for either of the above units is the 3M **dropout profile recorder.** Operating on-line, it records an hour of playback on a 5" chart for evaluation at a glance. Tapes too degraded to use for new program material can be stored along with a permanent record of their performance. The recorder includes a built-in calibrator and remote control.

Our **color video encoder** works its magic by supplying a standard NTSC color signal from any 3- or 4-channel camera, low-priced or high-priced. Its unique all-digital color bar generator is exceptionally accurate yet never needs adjustment, while its just-as-unique video input clamping eliminates low frequency hum and noise. Other circuits provide sharper, crisper pictures, improved color fidelity and automatic green channel luminance in monochrome.

And as our last act (for now), there's our **10-channel bridging video switcher** with audio-follow. Frequency response is ± 0.25 dB to 10 MHz, low frequency tilt is under 1% and isolation is 52 dB at 3.58 MHz. Both the center conductor and video ground are switched, so connections are easily made and one switching has no effect on other switchers looped to the same input. Routing switchers up to 10 x 20 are readily assembled.

That's the 3M Video Magic Show. We've had to be brief, so why not contact us for the details? In the meantime, you might like to know that in spite of the high performance, we're more than competitively priced.

And if that's not magic, what is?

Mincom Division, 3M Company, 300 South Lewis Road, Camarillo, California 93010. Telephone (805) 482-1911.

VIDEO PRODUCTS

Mincom Division 3M COMPANY

Circle 116 on Reader Service Card

to 220 MHz in six bands, has sensitivity of 2 μV or better for 5% meter deflection over range. Portable, battery-operated Model 600A has combination rod and VHF dipole, directional loop antenna. Has output (RF level) meter, speaker, headphone jack, external meter jack. SPRAGUE. **313**

Transmission simulator combines FM/AM signal generator with sweep generator. Covers 10 kHz to 510 MHz in 11 ranges. Each range may be swept over entire span and full modulation facilities retained in swept mode. MARCONI. **314**

Digital impedance meter makes up to four measurements per second with 1% basic accuracy, displays four digits of R, L, C and dissipation factor. Measurements cover, in seven ranges each, 0.1 pF to 200 μF parallel C, 0.1 μH to 200 H series L, and 1 milliohm to 2 megohm of R. $1050 (bench) $1080 (rack). GENERAL RADIO. **315**

Waveform generator produces normal sine, square, triangle, plus/minus sine, plus/minus square, plus/minus pulse, haversine, and other waveforms. Model 125 Lin-Log Multigenerator has dual output amplifiers, each with individual function selection, 80 dB attenuation, two generators, 1000:1 internal or external voltage-controlled frequency, frequency ranges of 0.1 Hz to 5 MHz and .01 Hz to 1 MHz. $795. EXACT ELECTRONICS. **316**

Test-oscillator card covers 20 Hz to 15 kHz in one sweep, or five selected frequencies from 20 Hz to 15 kHz. Frequency may be remotely controlled. Model 692-OSC is one of INTEGRA II card series for Fairchild consoles. Output level is +10 dBm, distortion 0.2% max. FAIRCHILD SOUND. **317**

SCA receiver has been redesigned to 5% lower price. TR-66B crystal-controlled FM/SCA receiver incorporates combined RF/IF/SCA printed-circuit board which is interchangeable between TR-66B and previous TR-55 FM-SCA tuner. Sensitivity is 1.5 μV for 30 dB quieting, 3.0 μV for complete limiting. MCMARTIN. **318**

Lettering/marking device die-cuts letters in sequence from continuous pressure-sensitive tape. Leteron Tapesigner enables lettering most surfaces with type sizes from 5/16 to 1 ¼ in. high. LETERON DIV. REYNOLDS PRINTASIGN. **319**

Miscellaneous

Programmer/switchers for CCTV, CATV are solid-state and compact. Model 8V4FER color switcher provides mix, wipe, fade, cut, super, take, insert, title, key and matted title control plus six adjustable and reversible split screen patterns. Has six sync, two non-sync inputs. $4995. Model 7V3FER is low-cost switcher with five sync, two non-sync inputs, six wipe patterns, internal/external keying, mix/effects preview. $1995. Made by Viscount Video (Vancouver, B.C., Canada), distributed by AMPEX. **289**

TV prompting system consists of dual-camera multitransport readout, modified video monitors, and through-lens viewing. VideoPromp-Ter system will transmit information type on conventional or multilingual typewriters to one or more monitors placed directly on or off camera. Q-TV. **290**

Spotlight is rated at 1000 W, has 18° field angle, throw distance of 60 ft. Model 1357/6 is designed to be used with tungsten halogen lamps. $145. KLIEGL. **291**

Daylight filters for film news cameras are said to give better results with Ektachrome EF film 7242 (tungsten) exposed under daylight conditions and reproduced on TV. New Kodak Wratten gelatin filters are No. 85BN6 (equivalent to No. 85B + 0.60 neutral density) and No. 85BN3 (equivalent to No. 85B + 0.30 neutral density). EASTMAN KODAK. **292**

Monitor amplifier is rated at 50 W rms into 4, 8, 16 ohms or 70-V line, with or without optional transformer, has TDH of less than 0.5% from 20 Hz to 20 kHz. Solid-state and plug-in. BA-48A has protection against opens, shorts, overloads. RCA. **278**

Condenser microphone is variable-directivity type with low-noise FET preamplifier having 130 dB dynamic range. Model C-37P has 24 dB SPL equivalent noise level, and 154 dB SPL overload level. Utilizes phantom powering, may be used with any 48-V supply with 2.5 mA capability. Has inbuilt shock mount. $259 (mike), $99.95 (power supply). SONY. **279**

AUDIO FILE: (Continued from page 4)

Graham says the most important property of its new magnetic particle is a three-fold improvement in saturation magnetization—the basic measurement of how strong a magnetic field the material produces. This property is measured in electromagnetic units per cubic centimeter of powder, or EMI/cc. The stronger the magnetic field that the particle produces, the stronger will be the signal picked up by the recorder head when the tape is played. A rough rule of thumb for calculating the energy of a recording tape is to multiply the saturation magnetization by the square root of the coercive force. Although this formula is but approximate, it does serve for a rough comparison basis between high-energy particles, according to Graham.

The metal alloy, Cobaloy, is softer than iron oxide, hence head wear should be low. Because of the quite different properties, a recorder could require different biases and equalizations. New Cobaloy tapes should be available in production within a year. If equipment manufacturers respond by building recorders and players that will handle Cobaloy, users can realize the benefits.

But chromium dioxide also becomes available

The cobalts—3-M's cobalt-modified ferric oxide and Graham's Cobaloy—promising as they may sound, will not necessarily keep chromium dioxide from flourishing even though the Du Pont material had not yet caught on in the audio sector.

We can make such a statement on the strength of Henry Kloss' commitment. Kloss, the strong-minded president of Advent, is determined to see Crolyn (the Du Pont trademark) benefit music lovers. Advent Corp. will produce an audio cassette "in significant commercial quantities" according to Kloss, under the name of Advocate "Crolyn."

Saturation levels and sensitivity for Crolyn are 6-9 dB higher than iron oxide tapes at 10 kilohertz. That is, 4- to 8-times the energy at high frequencies can be stored on the tape surface. Since the smallest signal that Crolyn tape can record is about the same as iron oxide tapes, as determined by the basic tape noise, the overall dynamic range which Crolyn will accommodate is much greater than conventional tapes. By changing recorder circuitry, recordings can be made which are noticeably freer from tape noise than conventional tapes. Program material which could cause an ordinary tape to saturate can be recorded on Crolyn. A number of cassette tape decks specifically designed to handle Crolyn are available at present and more will be available shortly according to Kloss.

Present tape decks not specifically designed to record with Crolyn tape can still take advantage of some of its superior qualities. By recording with Crolyn as one would normally, the resulting recording will have noticeably more high frequencies than if made with conventional tape. Turning back the treble control of a music system on playback so that the tonal balance approximates that of the material recorded, will result in an appreciable reduction in tape "hiss." **BM/E**

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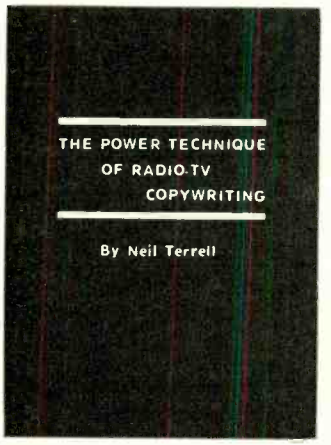

A practical handbook for active copywriters, broadcast salesmen, and students who are aiming for a career in broadcasting.

Here's a brand-new fast-paced guide on how to write copy that moves and inspires consumers—copy that Sells. Written by one of broadcasting's most successful salesmen and instructors, the content covers basic advertising principles as they apply to broadcasting. You learn to recognize each client's prospects, then how to create copy that motivates those prospects, copy designed to move them to buy.

CONTENTS

The author begins with an analysis of the copywriter's potential power to motivate people, whether the station serves a community of a few thousand or a metropolis. You learn how to understand the viewpoint and attitudes of people, why they buy a particular item or a specific brand. You'll understand the emotions that motivate masses to act in a certain predictable way.

By capitalizing on the author's six proven "Power Appeals", you'll soon be turning out copy that will excite the imagination—copy that will motivate your station's listeners or viewers into decisive action! The author explains how to recognize the correct motivating appeals for each product or advertiser category —how to create such an insatiable desire within the client's prospects that inaction would be unthinkable.

The importance of language in effective copy creation is thoroughly explained. The choice of appropriate words and phrases, as the author illustrates, enables you to aim your copy directly at the most likely prospects. Whether you need a 60-second or a shorter spot, you'll learn how to select the most effective words and combine them into a motivating sales message.

For almost every client there are several possible types of copy which can produce results. What you need, of course, is the one that will produce the **best** results. By analyzing the advertiser's business and his aims, you'll learn how to select the most effective type of copy. Using numerous practical examples, the author presents hypothetical clients' needs and, step-by-step, shows how to convert these needs into the needs of his prospects. You'll learn how to develop leads that will capture the attention of the advertiser's prospects, compel them to listen. Then, with the techniques recommended in this book, you'll build a desire—in fact, an overwhelming need—for your clients' products. In a relatively short time you'll become a real pro, capable of producing compelling sales copy, whether it be institutional or "bargain-day" style, straightforward promotions or hard-hitting sales messages.

Production copy—announcements using two or more voices and sound effects—receives appropriate attention. The basic approaches are illustrated by numerous examples, drawn from the files of some of the nation's most prolific innovative creators, including material developed by the author. There's a Copy Basics section covering major advertiser categories, listing the dominant prospect appeals, the key ideas in each case, and helpful words and phrases designed to aid you in producing copy with that "hypnotic" power to persuade. Also, the sample copy scattered throughout the text and in Chapter 13 shows "how it's done." The samples may be adapted, at least in part, to some of your clients' needs. There's no doubt, whether you're a beginner or a practiced copywriter, this book will help you to improve the convincing power of your copy. It's also an excellent reference manual for management. 224 pps. 13 Chapters plus Index. Hardbound.

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A GUIDE TO RADIO & TV BROADCAST ENGINEERING PRACTICE By E. L. Safford, Jr.

THE FIRST NEW BROADCAST ENGINEERING BOOK IN YEARS! A modern, up-to-date, comprehensive handbook on all phases of broadcast operation, maintenance and troubleshooting.

Here's a book long needed by the radio and TV engineering profession—in fact by anyone with an interest in radio and TV broadcasting, since it covers all aspects of the subject from personnel qualifications to proof-of-performance measurements. This invaluable volume is divided into two parts—Radio and Television—and begins with a discussion of personnel qualifications. Here you'll find useful suggestions on how to classify various levels of technical competence and how to encourage improvement at each level. Preventive maintenance is given thorough treatment, including how to set up a schedule based on analysis of failure rate and probability, and how to determine tube replacement and spare parts requirements. Also, a number of actual case histories provide answers to tough or unusual problems. Extensive attention is given to AM antenna systems; how to measure antenna reactance, impedance, and resistance; the use of shunt-fed towers; the design and operation of directional phasing and matching networks; and multi-station towers. The television section also includes a complete description of a model station, plus practical engineering suggestions supplied by stations all over the country. You'll be fascinated by a "tour" of what is considered to be one of the finest TV operations anywhere. You'll see their layout, equipment setup, and gain valuable insight from reading the philosophy behind the design and construction of this facility.

And, this engineering manual is as valuable to management as it is to technical personnel. It not only involves the daily nuts-and-bolts aspects, but also covers those phases of vital interest to administrative personnel (including those who hope to move into administrative positions). For those perplexed by the "operator" situation, the author offers poignant suggestions for solving present problems and working toward more equitable arrangements within the organization. In fact, some of the ideas could well be the basis for revolutionizing the entire field of broadcast engineering.

While an in-depth consideration of equipment was not intended to be a part of this work, there is enough information, both descriptive and pictorial, to acquaint any uninitiated reader with typical equipment used in radio and TV stations. Also suggested is a maintenance philosophy based on proven calculated probabilities of failure. You'll see how a preventive maintenance program can practically eliminate lost air time and cut overall maintenance costs to the bone. The most prevalent (and some not so prevalent) technical problems are described, along with suggested solutions and appropriate comments. There's a good chance that the solutions to some of your persistent problems are included. An entire Chapter is devoted to directional antenna systems—how to use vector diagrams in designing the necessary phasing, power-dividing, and matching circuits. You'll also read about common-tower systems and the problems encountered when several AM stations use the same tower. Covered also is the design of shunt-fed antennas which are becoming increasingly popular with many stations.

An analysis of existing radio and TV maintenance procedures indicate what is being done and what should be done in broadcasting operations. By comparison, you'll see why some methods fail and why preventive maintenance is so important. For those who are continually "hung up" on tests—both routine and special—the author tells how to avoid the common pitfalls. You'll be amazed at the attitude some have regarding response tests, and you'll see why radio and TV proof-of-performance checks are so important (aside from meeting FCC requirements).

Also of vital concern is a list of most frequent FCC violations. Most broadcasters should find a perusal of the list most revealing and helpful in looking at their operations. To those who have not had personal dealings with the "professional," the discussion of the consulting engineering profession should be helpful, particularly in cases where it's necessary to rely heavily on outside assistance and for those in the lower engineering rank who aspire toward professional advancement. You'll find this one of the most interesting and informative books ever printed. 288 pages, over 140 illus. Hardbound.

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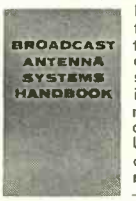

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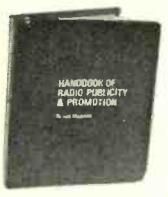

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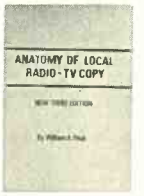

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Circle 118 on Reader Service Card

SALE
OF THE MONTH

Formatting for audience attracts specialized ads

Hal Chesnut
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WBAP-AM
Fort Worth, Texas

The Challenge: We were suddenly a new station. After sharing two frequencies with WFAA for 48 years (570 and 880 kHz), WBAP split off to become a 50-kW, clear-channel station operating 24 hours and with a new format: country and western music. For the first time we needed to attract long-distance advertisers on a 24-hour basis to our Fort Worth-based C&W station. But this required considerable changes in our selling techniques.

The Solution: We decided to go after a specialized audience, suited to our location and format, attractive to a broad range of advertisers. Our programming and large 24-hour-a-day coverage had begun building WBAP a sizeable following of truck drivers. So we simply began to focus on this audience. We avoided the slick approach many other C&W stations found fell flat. One of our biggest draws for truckers was disc jockey Bill Mack, on from midnight to six AM. He was recently named C&W Deejay of the Year in Nashville—and since he started with WBAP, he's devoted his time and programming to the transcontinental trucker: He's played the style of music they like, offered the humor they enjoy and the information they need, especially during the long, tiring early morning hours. We think this following among long-haul truckers is without precedent in the annals of radio deejays.

This simple combination of programming with the station's natural advantages of coverage and location has resulted in spectacular advertiser response. A typical case is the Tuscon Truck Terminal. Tuscon may be a long way from Fort Worth, but, as Triple T vp Dave Galligan puts it, it's not far for transcontinental truckers. Triple T wants to reach men headed from Texas to the West Coast by way of Tuscon, who need "a place to stay that can give all the advantages of a top-notch motel but is designed for the biggest truck transports on the road."

Reactions from other advertisers has been just as enthusiastic. Old advertisers have increased their budgets. Auto dealers and any businesses even remotely connected to truck driving are knocking at our salesmen's doors. Local and regional sales for 1970 were up 25% over '69 sales before we focussed on the trucker audience. WBAP has become one of the few seller's markets in radio.

Two tips from BM/E

A documented success story on film or videotape might be just what television ad salesmen need—and TvB has announced it will help (with $500 toward production) underwrite the cost of member-station produced success stories. If you can compress your station's story to fifteen minutes, try TvB. And if you can get your best sales idea down in writing, try us. We'll print it—and pay you ten dollars for your help.

Expensive?

That's one thing Jamieson's new Compac 16/8 color film processor isn't.

Jamieson's new Compac 16/8 is priced at just $6,980. And that's complete, even to the crate it's shipped in.

Study the picture of our new Compac 16/8. What you see is a completely operable machine. And what you see is what you get for the low, $6,980 price.

Jamieson's Compac 16/8 conducts the standard ME-4 process at 20 feet per minute. With the advanced EH-101* you can run it at 30 feet per minute.

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That's quite a bit for $6,980.
But there's more.

Jamieson's Compac 16/8 has a 2000 ft. magazine that's standard and a feed elevator. It has our patented tube tanks with features of high picture quality and economical cost, which are well known in Jamieson's larger models.

This new, low-cost color film processor has a new, quiet buffer squeegee. It has the automatic controls featured in larger machines and a complete set of flow meters.

We'd like to tell you more about our new Compac 16/8 and what it can do for your station. So write or call us.

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If you use many color slides, take a look at Jamieson's Compac 35/16. It processes 35mm slides as well as 16mm news film and commercials and at the same low price as the Compac 16/8.

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Professional antenna users are offered Technical Bulletins dealing mainly with antenna applications. Scala Radio. **201**

Two-piece production switcher providing high-quality vertical interval switching for monochrome or color production described in two-page brochure. Visual Educom. **202**

Rigid transmission line and related products shown in 24-page catalog. Includes performance data, curves and nomagraphs plus info on rigid line installation. Phelps Dodge. **203**

600 types of tubes and devices in 96-page "1971 Abridged Valve Data Book." Four sections cover power valves, microwave tubes, light conversion devices, vacuum capacitors, lasers and flash tubes. English Electric Valve. **204**

Electronic Wire and Cable Catalog No. 871 features 134 new products. Includes performance characteristics, line drawings showing physical configurations of cable types, cable-finder and color-coding charts. Belden. **205**

Ampex AC-125 portable television center described fully in six-page illustrated brochure. Ampex. **206**

Monochrome video switcher/special effects generator, Cletron Model 610, for CATV, ETV and ITV, shown in two-page technical data sheet. Cleveland Electronics. **207**

Radio facilities layout book for planning equipment placement contains two-dimensional scaled cut-outs for audio and AM-FM transmitting equipment, hints on arrangement of rack-mounted equipment. Grid-lined floor plan areas provided for mounting cut-outs. RCA. **208**

NEW

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(914) 358-4450	(312) 297-7020	(213) 685-8580	(416) 630-4514

Circle 126 on Reader Service Card

(Continued from page 17)

> as unfavorable?; (4) if the reference to illegal drugs is concealed and is in what amounts to code, so that the average person, including the average devotee of popular songs, is not aware of the reference? (5) if when it originally was published it had no such connotations but later came to be understood in some quarters as making favorable reference to the use of illegal drugs? If, for example, "How High The Moon" became popular with drug users because of its title, and came to mean to them a favorable view of drug use, would it then come to be a song which tend[s] to promote or glorify the use of illegal drugs?

Other organizations and licensees filed timely comments with the Commission. The FCC quickly responded with its *Memorandum Opinion and Order* adopted and released on April 16, 1971.[9] In its *Order,* the Commission said its initial *Notice* "simply reflected the well-established concept of licensee responsibility" and was erroneously otherwise depicted by the media. The Commission also specifically noted that whether or not to play a particular record relating to drugs does not raise an issue as to which the Government may intervene. However, the FCC did make clear, again, that broadcasters *could jeopardize their licenses by failing to exercise "licensee responsibility" in this area.*

> A licensee should know whether his facilities are being used to present again and again a record which urges youth to take heroin or cocaine. . . . The point is that such records are not withdrawn from the area of license responsibility.

The Commission's *Order* did not directly address itself to many of the questions posed in various comments filed in response to its *Notice.* However, a somewhat clearer picture of the Commission's attitude in this area emerged. In sum, broadcasters who willfully and repeatedly broadcast records which obviously and blatantly tend to glorify or encourage the use of drugs will have their licenses placed in jeopardy. Responsible broadcasters, who mistakenly broadcast blatant records in the above-mentioned category, or who broadcast records with obviously ambiguous or questionable lyrics on an irregular basis as a part of their normal program format, will not be encouraging Commission disfavor. Again, common sense in programming should prevail.

9. FCC 71-428, April 16, 1971.

Conclusion

The Commission is theoretically proscribed from censoring program material except in carefully designated areas. However, incidents like the statement concerning "drug records" highlight the pervasive Commission influence on its licensees. Purists may rightly argue that the Commission has taken it upon itself to legislate morals in contravention of Congressional and Constitutional mandates. Nonetheless, the "marginal" station operator, the operator who scoffs at many of the rules and regulations, will probably be the only licensee subjected to searching Commission inquiry concerning his stewardship. Nevertheless, if you have questions concerning this troublesome area, your counsel should be consulted. **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 predicted 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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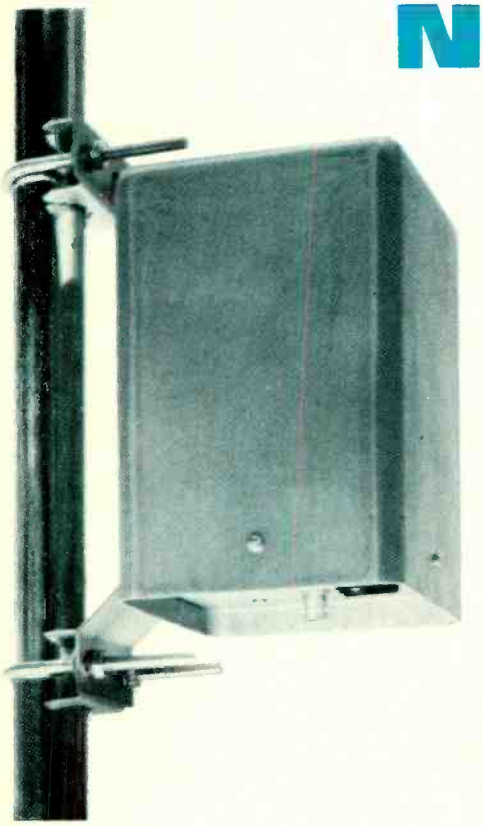

Because of the higher frequencies utilized in UHF television transmission, quality reception becomes difficult when the receiver is located a considerable distance from the antenna. High frequencies are greatly attenuated by coaxial cable necessitating amplification at the receiver end to restore the signal to a usable RF level. The signal will often be attenuated to the degree that the low-level noise inherent in the input amplifier stage has a significant amplitude as related to the attenuated television signal. Consequently, when the television signal is amplified, the noise is also amplified, with the end result being a noisy signal.

This problem can be solved, to a degree, by placing a broadband UHF amplifier directly adjacent to the antenna with which the signal is amplified prior to transmitting it down the cable to the receiver. This assures a strong signal at the receiver end of the cable.

A much more desirable solution, however, is to place the tuner, converter and IF amplifier sections of the receiver at the antenna location, with the resultant 45-MHz IF signal then transmitted down the cable to the receiver location. Since this IF signal is significantly lower in frequency than the received UHF channel, less loss is incurred in the lead-in line and a strong signal is applied to the receiver.

The DYNAIR FT-4BU Fixed Tuner is housed in two separate packages. A formed aluminum housing which has a universal pole-mounting bracket contains the tuner, converter and IF amplifier sections. It has a terminal strip for the 300-ohm antenna input and a BNC connector for the IF output to the lead-in cable. The second package consists of a plug-in module which replaces the standard tuner of a DYNAIR RX-4B "DYNA-TUNE" Television Demodulator. The plug-in module contains automatic frequency control circuitry which assures a stable signal. A switch is provided on its front panel for selection of either automatic or manual frequency control. An AFC tuning adjustment is also mounted on the front panel. The antenna lead-in from the pole-mounted tuner is applied to the SO-239 connector on the rear panel of the DYNA-TUNE which is normally used for the VHF antenna connectors.

The pole-mount tuner receives d-c power and AFC voltage from the demodulator via the coaxial lead-in cable. No other cables need be routed to the pole-mount unit.

SPECIFICATIONS

Input Level	200 uV to 31,620 uV (-14 to +30 dBmV)
Noise Figure	12 dB
Maximum Cable Length (RG-59)	1000-uV input: 500 ft 10,000-uV input: 1000 ft 20,000-uV input: 2000 ft
Price	FT-4BU: $335.00
DYNA-TUNE with FT-4BU	$1685.00

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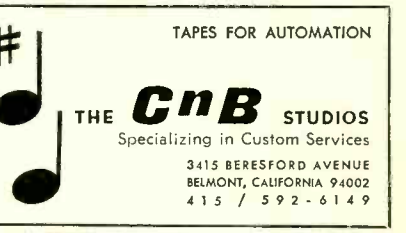

Gary Owens sez "Of All joke sheets I get, Weenie is funniest. All great lines. Use some on Laff In." 2435 SW 128th Avenue, Miami, Florida 33165, for samples.

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INSTRUCTIONS (Cont'd)

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Advance beyond the FCC License level. Be a real engineer. Earn your degree (mostly by correspondence), accredited by the Accrediting Commission of the National Home Study Council. Be a real engineer with higher income, prestige, and security. Free catalog. Grantham School of Engineering, 1503 N. Western, Hollywood, California 90027.

American Institute of Radio, by encouraging students to attend both day & night classes can guarantee you a First Class License in 2½ to 3½ weeks. New classes start every Monday. Housing can be arranged for $12-15 per week. Total tuition $330, 2622 Old Lebanon Rd., Nashville, Tenn. 37214, 615-889-0469 or 889-2480.

"1971 Tests-Answers" for FCC First Class License. Plus Command's "Self-Study Ability Test." Proven! $9.95. Command Productions, Box 26348-A, San Francisco 94126.

ADVERTISERS' INDEX

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Advertising Director

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Central Tokyo, Japan
535-6614

Yoshi Yamamoto

FROM THE EDITOR

Sustaining Free Electronic Journalism

From where we sit, we thought the industry had responded vigorously in support of the First Amendment and against intimidation and coercion, direct and indirect, from the Administration and from certain quarters in Congress.

We've been impressed with the tremendous job Vincent Wasilewski has done in urging NAB members to in no way compromise and to, in fact, become more assertive of broadcasters' rights and responsibilities.

But ABC President Elton Rule last month told his network's affiliates that the industry has not made enough noise on the side of freedom for electronic journalism. He sees, along with NBC, the House subpoena of CBS material as a direct attempt at the worst kind of censorship. Rule said one cannot help but suspect an attempt, conscious or unconscious, to drive a credibility gap between TV and its audience.

And then Walter Cronkite laid it on the line before the International Society of Radio and Television when he charged that President Nixon must bear the responsibility for his Administration's actions to discredit the free press and journalist.

Commentary on national news reporting is beyond the normal cognizance of this magazine, but when such a fundamental issue is at stake, we cannot sit quietly. We have two observations.

The charge against CBS's documentary, "The Selling of the Pentagon," is that the rearrangement of time sequences and deletion of some material, a standard practice in film editing, was unfair. We suppose there is something that sounds like subterfuge, or even dishonesty, about putting a sequence together that appears to convey a representation about a person that the person in question would not like nor approve. Whether this tactic is unfair or not depends on the intent of the editor. In publishing a trade magazine, we continuously alter the sequence of bylined articles and news releases, etc., in an attempt to clearly convey what we determine to be the central message of interest to our readers. We never set out to misrepresent a person or position, but we may edit to remove self-serving statements. This brings us to our next observation which is to agree with Tom Wicker, an associate editor of *The New York Times*, writing in the May/June issue of *Columbia Journalism Review*.

Wicker says the recent renewed effort of the editors and publishers to achieve a new sense of objectivity—which in effect means agreeing with Vice President Agnew because of his criticism that the news media have not been objective enough—is to fall into a trap. What the Vice President measures as objectivity, says Wicker, is more reliance on official sources of news. Wicker says, "To the extent that you are reliant upon institutional sources for news, you are reliant upon a self-serving source which in every case will attempt to put the focus on the news, to interpret information for you in the light of its own interest."

Lack of intellectualism in presentation of news led this country in the Vietnam war, and caused most journalists to dismiss Eugene McCarthy's candidacy for president as a joke or conspiracy. Journalists have missed other historical moments of great importance, according to Wicker, and his article cites many.

There's more at stake than defending the freedom of the press, its rights and privileges. We must *sustain* it and that means getting intelligent people into the business who are more than "objective" reporters of two sides of a question.

James A. Lippke, Editor

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A quick reference to products mentioned editorially or in advertisements. Page number is listed first (light face type) followed by reader service number (bold face.)

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Now There's a Difference

RCA VISTACON

The RCA Vistacon is a direct replacement for the lead-oxide target camera tube you may now be using. It has direct interchangeability, with exactly the same physical dimensions, the same performance characteristics.

TUBE FOR TUBE REPLACEMENT

RCA	REPLACE
4592/R, 4592/G 4592/B, 4592/L	XQ1020R, XQ1020G, XQ1020B, XQ1020L
4591/R, 4591/G 4591/B, 4591/L	55875R, 55875G 55875B, 55875L

And equally important, it's fully compatible with any mix of tubes. For example, you can put a Vistacon 4592/G in a camera with XQ1020L, R and B tubes.

The difference? Vistacon is made by RCA and serviced by RCA. That means a top quality tube backed by the same RCA Field Engineers you have come to depend upon for consultation or help whenever you want them.

Next time you need a replacement, try an RCA Vistacon. Then maybe you won't think about interchangeability any more – you'll go RCA all the way.

For complete specifications and delivery information, call your RCA distributor.
RCA | Electronic Components, | Harrison, N.J. 07029.

RCA

Circle 132 on Reader Service Card

Teledyne announces the introduction of their new Color Telefilm Recorder that transfers color tape to color film with remarkable quality.

Teledyne Camera Systems' CTR-2 Color Telefilm Recorder.

Extraordinary quality and practical economy from the outset.

Teledyne has developed the first broadcast quality Color Telefilm Recorder. They knew that excellence was mandatory. A piece of equipment that wouldn't deliver sharp, clear, color-balanced 16mm film transfers would not stand up to your criteria. So, the system was perfected and then it was introduced.

Engineering bottom line.

Primary heart of the system is the camera (DBM-64B) which uses compressed air to pull down and stabilize the film in less time than the television vertical blanking period. Result is full frame recording without mid-field splice or shutter bar.

System works for operator not the other way around.

Human engineering, ease of operation, and maintenance maximizes productivity. All components are immediately accessable. Test points on the printed circuit cards used with the built-in waveform monitor allow operation, adjustment, and trouble shooting without a separate oscilloscope. Slanted camera optical path is very convenient for magazine loading.

It almost had to be Teledyne.

You expect innovation from pioneers. Because the camera came first, from Teledyne, the system's development was only an extension. That camera revolutionized tape to film transfer and is clearly the industry's standard.

Partial list of nomenclature that makes the point.

DBM-64B Camera. Conrac RHM-19 Display. Tektronic 528 Waveform Monitor. Modified Tektronic 602 "X-Y" Display. CBS Labs Mark II Image Enhancer. Rank Decoder. Maurer "F" Prime or Auricon "Modulite" Variable Area Recording Galvanometers. Teledyne CK-120 Magnetic Recording System. And so on.

Giant step for the state of the art.

Video tape production and 16mm broadcast and dupe transmission are now a quality reality. To learn more about this capability and making it available to your operation, contact Teledyne Camera Systems at 131 North Fifth Avenue in Arcadia, California 91006. Telephone (213) 359-6691. They'll send you a reel sample.

TELEDYNE CAMERA SYSTEMS

Circle 133 on Reader Service Card