

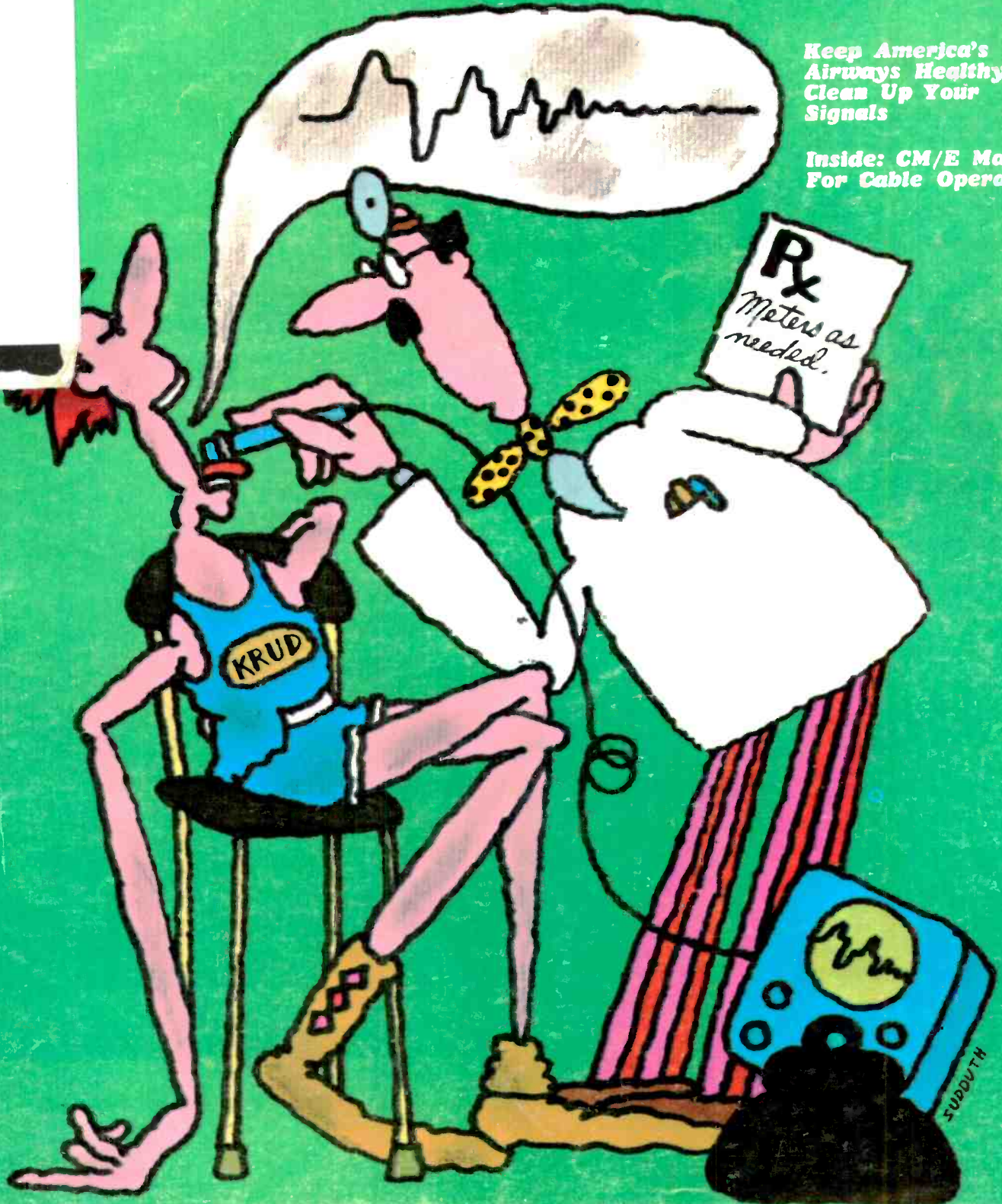
NOVEMBER 1971

BME

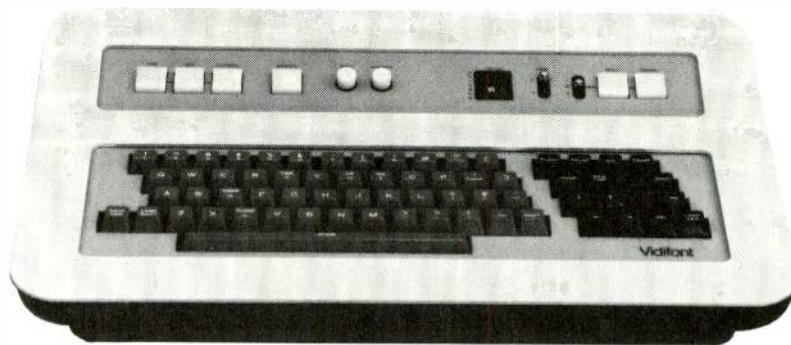
BROADCAST MANAGEMENT ENGINEERING

Keep America's
Airways Healthy—
Clean Up Your
Signals

Inside: CM/E Magazine
For Cable Operators



automated graphic arts department



Vidifont is the completely automated television display system that does all your titling instantaneously. One typist can compose news flashes and other messages in real time that are graphically superior. Because Vidifont features proportional letter spacing . . . a choice of type fonts and sizes . . . upper and lower case characters . . . word-by-word color . . . push-button centering . . . three-speed flashing . . . built-in edging . . . and roll and crawl. Vidifont can pay

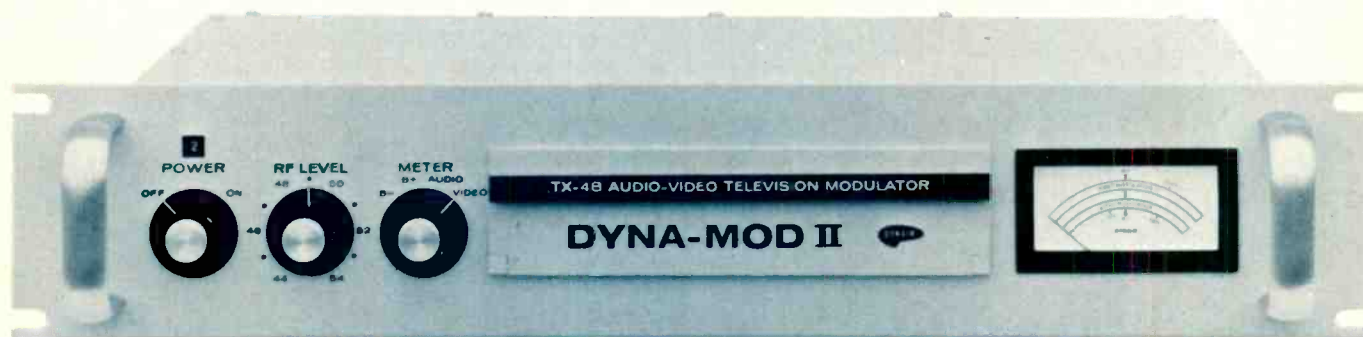
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DYNA-MOD II

... the first real improvement
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DYNA-MOD



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The basic **DYNA-MOD II** accepts separate audio and video inputs with which it generates a broadcast quality VHF television signal on any standard channel; other frequencies are available on special order. The new modulator is also available for use with inputs of video only, separate video and 4.5-MHz aural, or combined video and 4.5-MHz aural.

The **DYNA-MOD II** contains a sideband response filter and output amplifier which assure quality performance in adjacent-channel color systems without the addition of external filters. Maximum RF output is 500,000 microvolts with a second output providing a 10-DB reduction. A switch-selectable attenuator allows attenuation of either output in 1 DB increments over a 10 DB range. A third RF output, which is 30 DB below the line

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DYNAIR

BM/E

BROADCAST MANAGEMENT/ENGINEERING



Time for a check up: Project a clean healthy signal. For a diagnosis and prescription, consult our feature articles this month.

BROADBAND INFORMATION SERVICES, INC.

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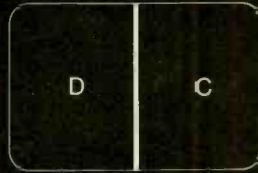
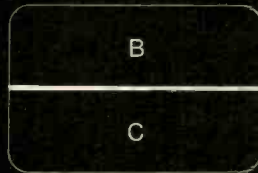
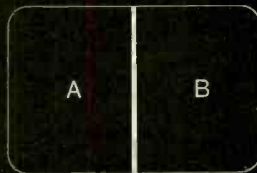
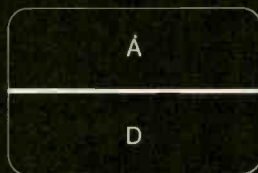
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BPA BM/E, BROADCAST MANAGEMENT/ENGINEERING, is published monthly by Broadband Information Services, Inc. All notices pertaining to undeliverable mail or subscriptions should be addressed to 200 Madison Ave., New York, N.Y. 10016. BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities. These facilities include AM, FM, and TV broadcast stations; CATV systems; ETV stations; networks and studios; audio and video recording studios; consultants, etc. Subscription prices to others: \$15.00 one year, \$25.00 two.
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MODEL 938 QUAD SPLIT GENERATOR



Model 938 is a complete special effects system. It permits up to four video signals to be displayed simultaneously. The separation of the four quadrants can be emphasized by the use of a variable width border which can be adjusted to any level from black to white. In addition, borders can be colored by use of a color background generator.

Complete remote control of the 938 is provided. The horizontal and vertical separation lines can be placed anywhere in the raster or, if desired, wiped completely off the screen to leave two signals separated either horizontally or vertically (see illustration).

The 938 system consists of two plug in modules, plus power supply and mounting frame. A remote control panel is supplied as standard equipment. GVG Model 909 Color Background Generator (optional) is suggested for those users requiring colored borders.

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BROADCAST INDUSTRY NEWS

Green Light for Pay TV on New York Cable

The FCC sent cable around an important turning point by authorizing Sterling Manhattan, one of the two major cable outfits operating in New York, to proceed with programming for pay. The franchises from the city under which Sterling and TelePrompTer are operating provide that the two firms may charge for programming if affirmatively authorized to do so by the FCC.

With that authorization in hand, the New York cable outfits can be expected to move vigorously ahead with fee TV. Sterling's victory (which obviously is a victory for TelePrompTer, too) comes after several years' struggle with motion picture exhibitors who fought hard to keep the city from authorizing pay TV in New York under any circumstances.

Hailing the FCC action, Charles F. Dolan, board chairman of Sterling, said: "[This] changes the economics of local television and creates an opportunity that will permit the medium to realize its full potential as an educational, cultural, informational and entertainment source in the home."

TV Profits Down in 1970 (If You Didn't Know)

Profits of the TV industry dropped 18 percent in 1970 below the 1969 figure, according to the FCC's summary of broadcast financial data for that year, recently released. The figures are \$553.6 million in 1969, \$453.8 million in 1970. Revenues were up a shade in 1970, from \$2,796 million to \$2,808.2 million, with a 7.7% rise in local advertising just offsetting drops of 1.2% in network advertising and 1.5% in national and regional spot advertising. The national networks suffered a reduction in profits far above that of the whole industry (46% against the 18% noted above). Among the very numerous tables of financial data supplied with the FCC's summary,

are breakdowns on TV expenses at various income levels, number of stations reporting profit and loss, and market data on each of the 160 or so major market areas.

Network TV Down in 1971

But 1970 (see above) was not the bottom for network TV. According to a report of the Television Bureau of Advertising, network revenue dropped a further 8.1% in the first eight months of 1971, from the corresponding months of 1970.

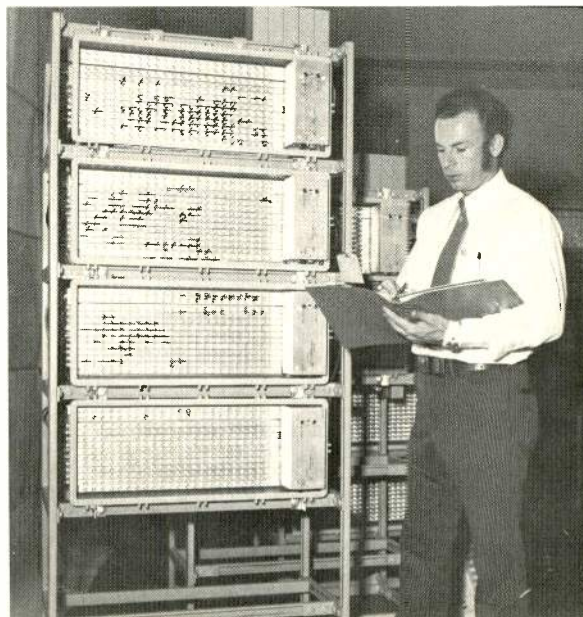
Copyright Agency Gives Clues to Pirated Records

The Harry Fox Agency of New York, which represents music publishers in the collection of royalties for recorded performances, reports a flood of calls from broadcasters following the NAB warning of last June that a station may be liable for damages if it carries sales promotion for pirated records. Apparently over-the-air selling of records with stolen programming is on the increase. Fox advises that a station get an agreement from any record advertiser indemnifying the station against liability for copyright dam-

ages. Fox lists four factors which should make a station operator sniff carefully for record bootlegging: a selling price that looks much lower than normal; no label name, or an unknown one; a mixture of artists known to be under contract to different companies; non-professional packaging.

Memorex Markets Chromium Dioxide Cassettes Nationwide

The substantially higher output at high frequencies of chromium dioxide tape, especially important in slow-speed applications, is now available in cassettes marketed across the country by Memorex, according to an announcement from that company. Memorex points out that at least six major equipment makers now market cassette recorders with the higher bias needed for chromium dioxide tape, usually selectable with a switch. Other tape sources, according to advance information, will soon join the chromium dioxide parade. For broadcasters, the message is that the cassette quality climb will continue. There will be a revolution if, and when, cassette convenience and high fidelity are truly joined.



New Disney World at Orlando, Florida, uses Ameco Discade to pipe TV into hotel rooms on a separate-channel-per-cable basis.

Whitehead Calls for Major Regulatory Changes

In an address before the International Radio and Television Society in October, OTP Director Tom Whitehead proposed some drastic changes for broadcast. He would favor legislation that eliminated the fairness doctrine and the new "judicially-contrived" requirement forcing access. Whitehead also suggested longer renewal periods and revocation of license for cause but no FCC control over programming. Complete de-regulation of radio was proposed for a few large markets on an experimental basis. It's Whitehead's view that for most purposes radio could be regarded as magazines.

Leasing Subsidiary for Laser Link

Users of Laser Link microwave systems will have the option to buy outright or to lease the equipment, with the formation of a subsidiary, Laser Link Leasing Corporation, to handle renting. Leases will be offered on various terms, but most, according to the announcement, will be of the full payout type with the lessee offered full title for a small additional payment. Executive director of leasing will be James Aita, controller of Laser Link Corporation.

FM Listeners Liked Dolby Demonstration

Dolby Laboratories has released a summary of listener reactions to the experimental broadcasts made last June in Chicago by station WFMT, which compared broadcasts using a Dolby "B" system to unDolbyized material. Listeners equipped with Dolby adaptors were nearly unanimous in reporting a noticeable reduction in noise. In addition, says the report, 75% of those not equipped with Dolby units preferred the Dolbyized broadcasts. Even 62% of those listening on "low-fi" equipment in cars and elsewhere, heard an improvement in the Dolbyized broadcasts, with 27% of this group uncommitted. At least 10 more FM stations, says the report, will soon use Dolby equipment, experimentally or regularly.

Polite Thief Puts WHAD-FM Off The Air; Gates Gets It Back

What may well be the only lesson to date in proper behavior while



The 5000th VTR manufactured by IVC (an 820 model) gets inspected by QC and company officials.

stealing broadcast transmitter equipment was provided by a still unknown Raffles who put WHAD-FM, Delafield, Wisconsin, off the air suddenly last August. He left the following entries in the station log: "Very early in the morning . . . removed exciter and driver amplifier . . . thank you."

Hearing about the educational station's loss in a news broadcast while on the road, Bob Gorjance, salesman for Gates Radio Company, arranged for emergency delivery of Gates equipment to get the station back on the air.

Canadian Commission Restates Program "Purity" Requirements

At least 50% of what private broadcasters put on the air in Canada, beginning October, 1971, must be guaranteed pure Canadian—"conceived, performed, and produced by and for Canadians"—says a policy statement of the Canadian Radio-Television Commission. This reaffirms earlier statements of the CRTC. Beginning October 1972, the programming must assay out 60% Canadian. Anybody with hot programming ideas who is having trouble getting a hearing south of the border should consider switching allegiance northward.

Zenith Demonstrates Acousto-Optic Printer

Extremely fast deflection of a laser beam by ultrasound (the Bragg reflection process) is the basis for a super-speed experimental wire service news printer demonstrated by Zenith Radio Corporation at the Electro-Optical Systems Design

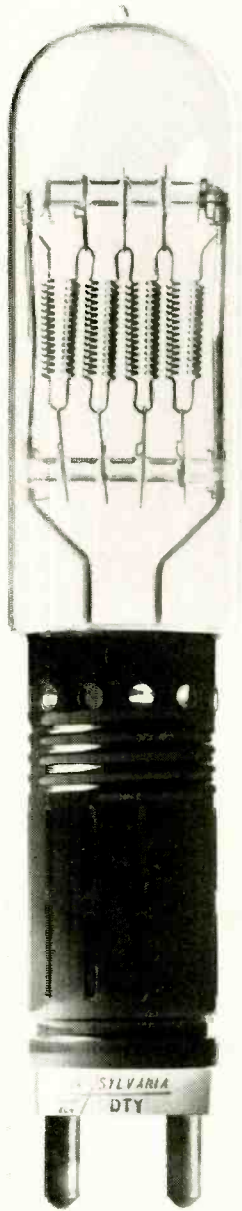
Conference in New York in September. Printing directly on photographic paper without any moving parts, the unit is capable of speeds above 100,000 characters per second. Other experimental devices coming out of Zenith's intensive work with laser-ultrasound interaction are television projection without a picture tube, super-speed computer print-out, character generators.

Business Briefs . . .

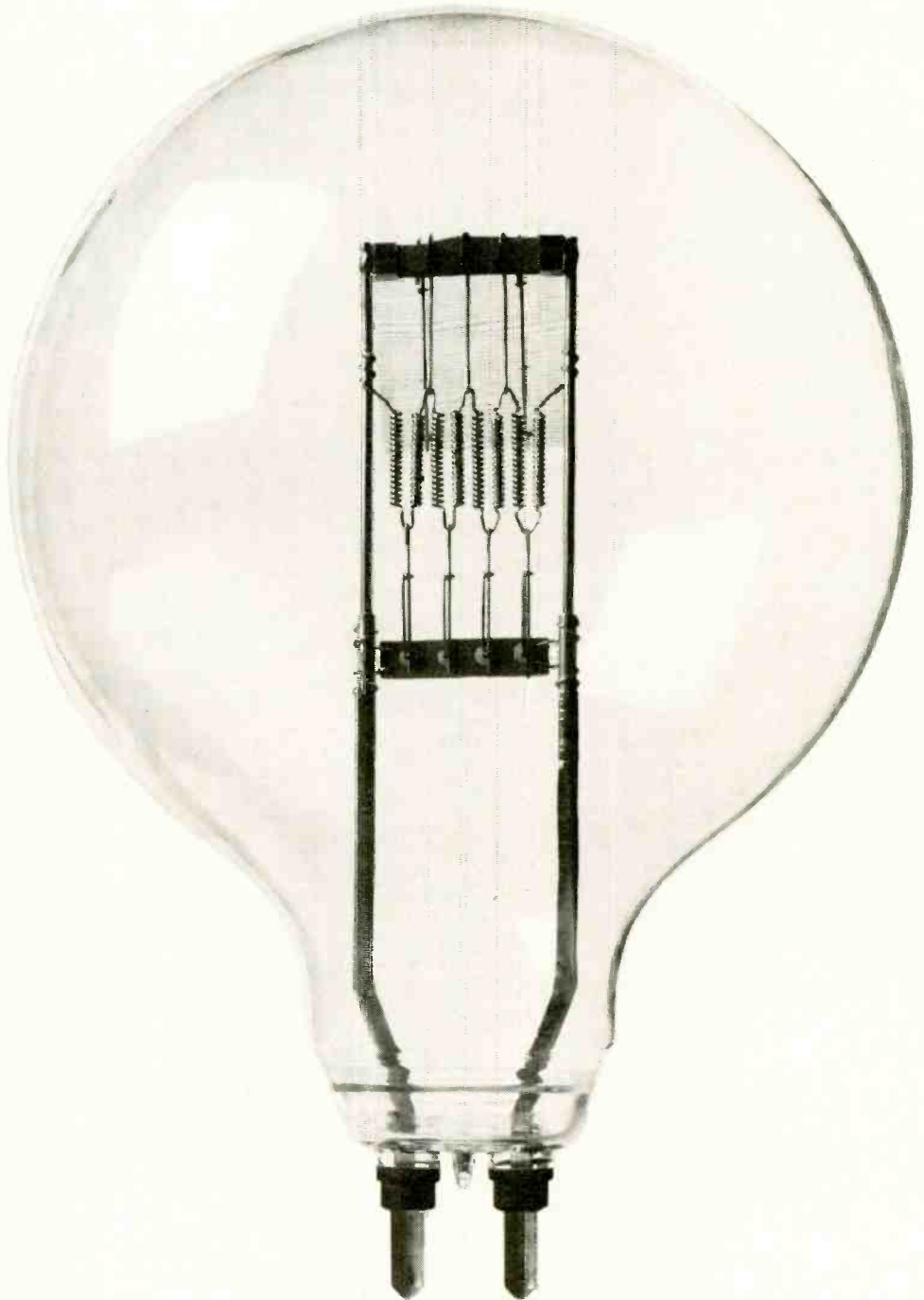
System Wire and Cable Inc., of Phoenix, announced addition of a manufacturing plant and distribution center in Rome, New York, to specialize in products for cable TV. The company also announced earnings of \$173,285 for the nine months ended June 30, 1971 . . .

North American Rockwell Corp. invested \$35 million in **Collins Radio Company**, through purchase for cash of a new class of Collins convertible preferred stock . . . WGN, Chicago and KDUB-TV, Dubuque, have formed **Super 8 Research Service** to distribute information on professional uses of Super 8mm film. They will publish a monthly newsletter (\$3.00 a year from KDUB-TV, P.O. Box 1166, Dubuque, Iowa). **Channel 7, Inc.**, Tyler, Texas, has bought from **Bedford Cable TV, Inc.**, the latter's cable systems serving Bedford, Oolitic and Lawrence counties, with 2700 subscribers . . . **Good Communications, Inc.**, of Philadelphia has put on the market a computerized accounts receivable program for cable operators and broadcasters. The user needs only an NCR Opti-Printer, for input of primary information and output of a variety

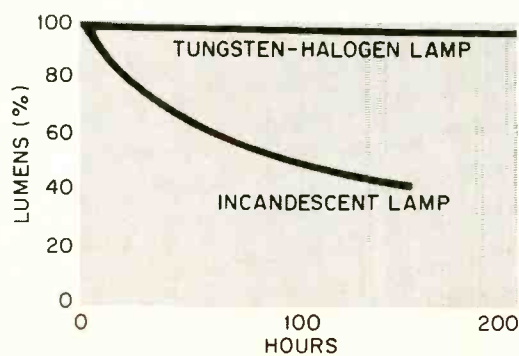
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10 KW TUNGSTEN-HALOGEN LAMP.



10 KW INCANDESCENT LAMP.



WE'VE CONQUERED THE DROOP.

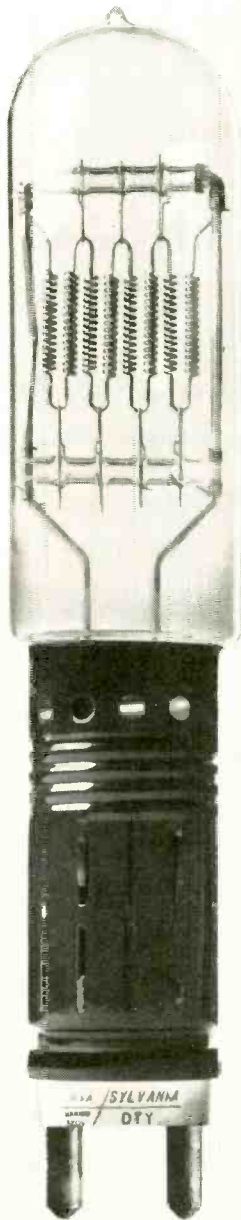
If you've ever watched those big, fat incandescents deteriorate, you know what a big, fat pain-in-the-neck that is. Their lumen output sinks and their color temperature drops, as the graph shows.

Now Sylvania tungsten-halogen lamps have come to the rescue.

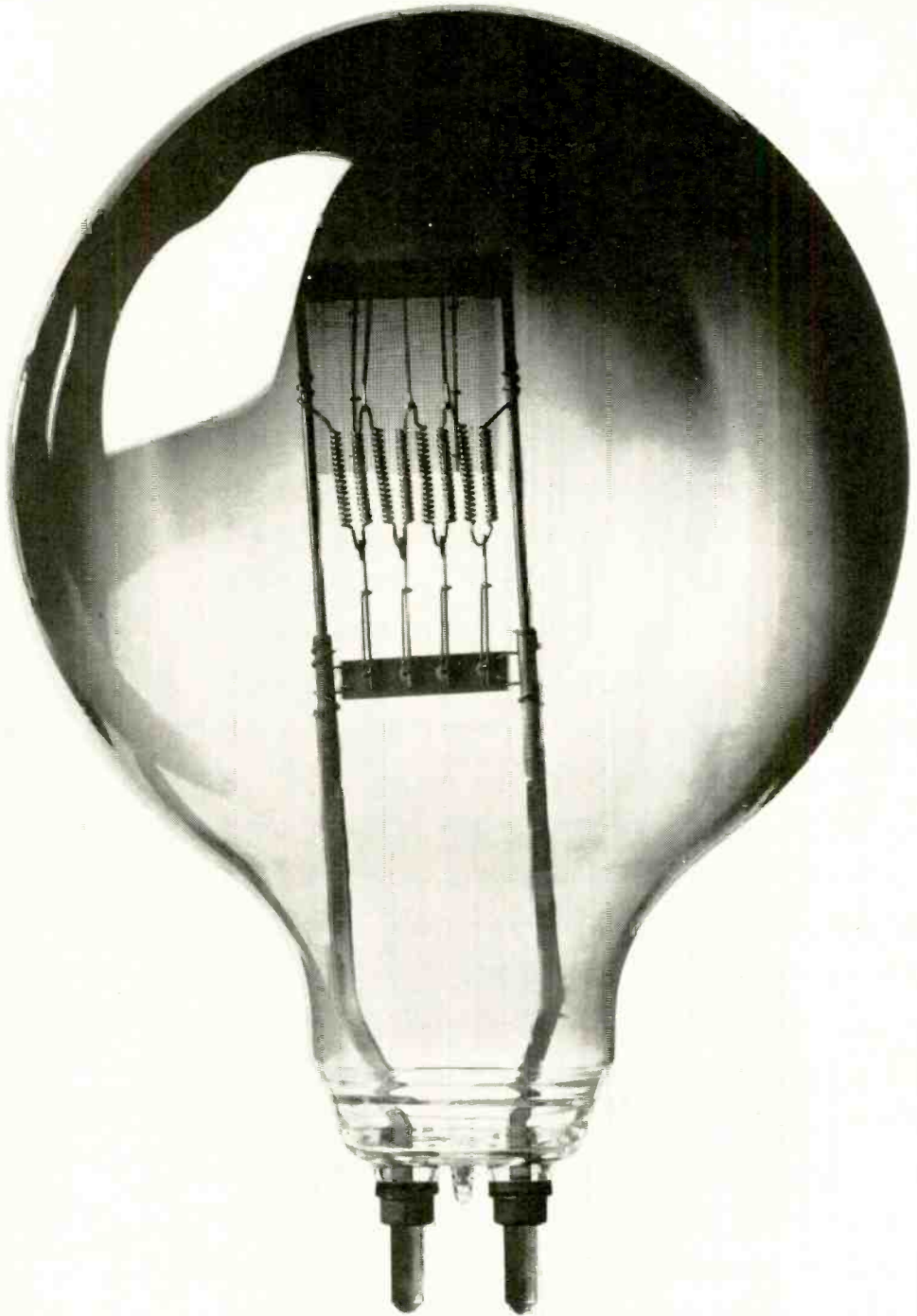
They don't blacken with age, so light output and color temperature don't go into a slump.

That means you don't have to keep

70 HOURS LATER.



10 KW TUNGSTEN-HALOGEN LAMP.



10 KW INCANDESCENT LAMP.

fiddling with the studio lights or camera settings. You get constant color rendition on color film and save money on print correction.

Tungsten-halogen lamps outlast the incandescents 2-to-1. (Or even 3-to-1, since you may have to throw away the blackened lamps before they conk out.)

Then there's size. Why should anyone want big, heavy glass balloons when he can have nice, slim little

lamps that are easy to handle and store?

We've developed two complete lines of Sylvania tungsten-halogen lamps.

The first is a line of direct replacements. These lamps fit into the big, old sockets vacated by the big, fat incandescents.

The second is a line of even smaller tungsten-halogen lamps that you can use to replace our replacements once

you've gotten rid of the old sockets and fixtures. They fit into entirely new, smaller, more efficient fixtures.

Ask us about both our lines. Right away.

Before another 70 hours go by.

We'll be glad to send you an illustrated brochure on each line. For your copies, write: Sylvania Lighting Center, Danvers, Mass. 01923.

GTE SYLVANIA

INTERPRETING THE **FCC** RULES & REGULATIONS

Personal Attack

Of concern to broadcasters are the Commission's Rules governing "fairness"—the licensee's broad obligation to air all sides of a controversial issue of public importance.

Generally, the "Fairness Doctrine" requires that the broadcast licensee: 1) encourage, implement and foster the carriage of programming designed to expose public issues; and 2) afford a reasonable opportunity for all sides of important, controversial issues to be aired by the licensee's station.

The Rule

Specifically, the Commission's Rules (Section 73.123 for AM; 73.300 for FM, and 73.679 for TV) relating to the personal attack provisions of the Fairness Doctrine require that:

(a) When, during the presentation of views on a controversial issue of public importance, an attack is made upon the honesty, character, integrity or like personal qualities of an identified person or group, the licensee shall, within a reasonable time and in no event later than one week after the attack, transmit to the person or group attacked (1) notification of the date, time and identification of the broadcast; (2) a script or tape (or an accurate summary if a script or tape is not available) of the attack; and (3) an offer of a reasonable opportunity to respond over the licensee's facilities.

(b) The provisions of paragraph (a) of this section shall not be applicable (1) to attacks on foreign groups or foreign public figures; (2) to personal attacks which are made by legally qualified candidates, their authorized spokesmen, or those associated with them in the campaign, on other such candidates, their authorized spokesmen, or persons associated with the candidates in the campaign; and (3) to bona fide newscasts, bona fide news interviews, and on-the-spot coverage of a bona fide news event (including commentary or analysis contained in the foregoing programs, but the provisions of paragraph (a) of this section shall be applicable to editorials of the licensee).

(c) Where a licensee, in an editorial, (1) endorses or (2) opposes a legally qualified candidate or candidates, the licensee shall, within 24 hours after the editorial, transmit to respectively (i) the other qualified candidate or candidates for the same office or (ii) the candidate opposed in the editorial (a) notification of the date and the time of the editorial; (b) a script or tape of the editorial; and (c) an offer of a reasonable opportunity for a candidate or a spokesman of the candidate to respond over the licensee's facilities: Provided, however, that where such editorials are broadcast within 72 hours prior to the day of the election, the licensee shall comply with the provisions of this paragraph sufficiently far in advance of the broadcast to enable the candidate or candidates to have a reasonable opportunity to prepare a response and to present it in a timely fashion.

The Commission believes licensees must act affirmatively to achieve compliance with the "Fairness

Doctrine." However, the licensee has considerable discretion in choosing the particular form of affirmative action to be used. It is not a matter of choosing one method and rigidly adhering to it; the licensee's analysis of a particular situation and selection of the means to achieve "fairness" is what counts. Specifically, the Commission has stated (in a letter to *Mid-Florida Television Corporation*) that,

The mechanics of achieving fairness will necessarily vary with the circumstances and it is within the discretion of each licensee, acting in good faith, to choose an appropriate method of implementing the policy to aid and encourage expression of contrasting viewpoints. Our experience indicates that licensees have chosen a variety of methods, and often a combination of various methods. Thus, some licensees, where they know or have reason to believe that a responsible individual or group within the community holds a contrasting viewpoint with respect to a controversial issue presented or to be presented, communicate to the individual or group a specific offer of the use of their facilities for the expression of contrasting opinion, and send a copy or summary of material broadcast on the issue . . . As stated, it is within the discretion of the licensee, acting reasonably and in good faith to choose the precise means of achieving fairness.

In practice, however, what do the various provisions of the rule mean?

Specific Rule Provisions

The personal attack provisions of the rule state that when, during the presentation of views on a controversial issue of public importance, an attack is made upon the honesty, character, integrity or like personal qualities of an identified person or group, the licensee must, among other things, offer a reasonable opportunity to respond over his facilities.

The most significant problem with the rules is the *interpretation* of its provisions; that is, what is meant by "views of a controversial issue of public importance?" Additionally, it may be asked what is the definition of "an attack upon the honesty, character, or integrity of a person or group?"

In adopting personal attack provisions for "Fairness Doctrine" rules (Docket No. 16574, July 1967), the Commission stated that "we stress that the personal attack principle is applicable only in the discussion of a controversial issue of public importance." However, the Commission pointed out that some comments had been received which,

[I]ndicate the mistaken impression that an attack on a specific person or group constitutes, itself, a controversial issue of public importance requiring the invocation of the

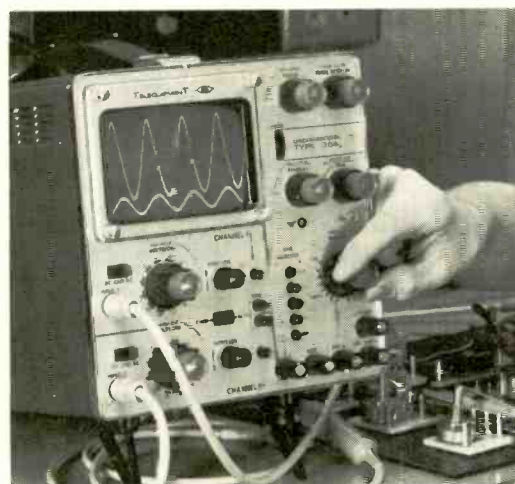
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Single Trace—Type S54A—\$450

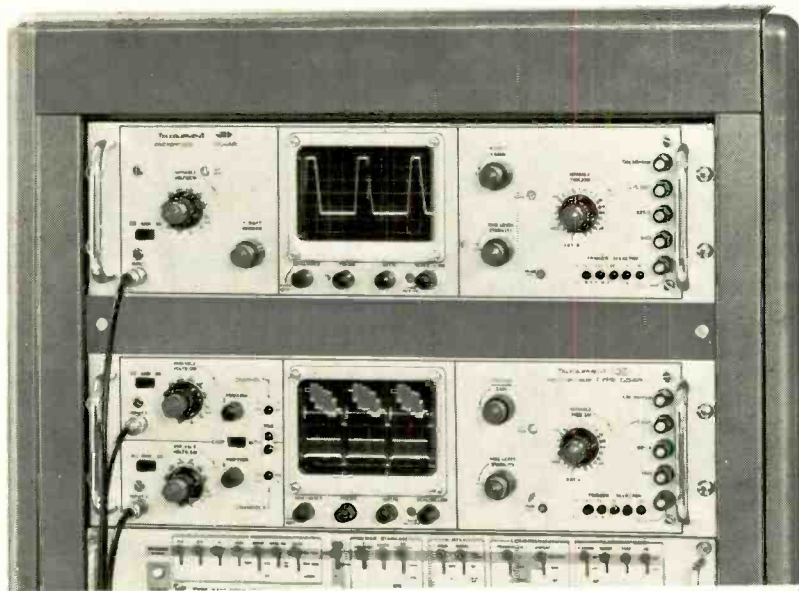


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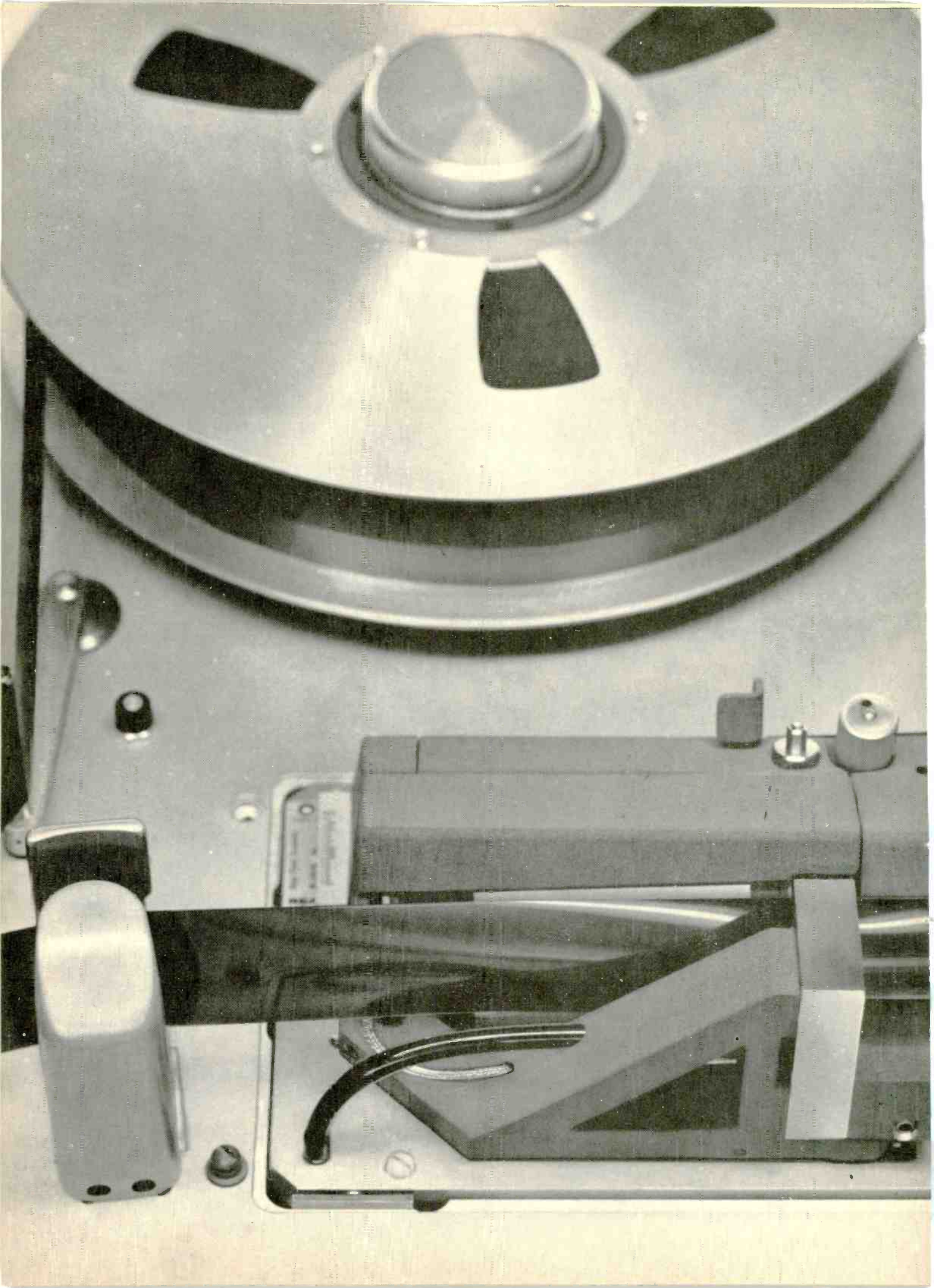
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**OK.
3001 hours on our
headwheel at KENI-TV is a
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Long headwheel life is just one feature of RCAVTRs.

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RCA

Shopping for lenses? Compare Canon!

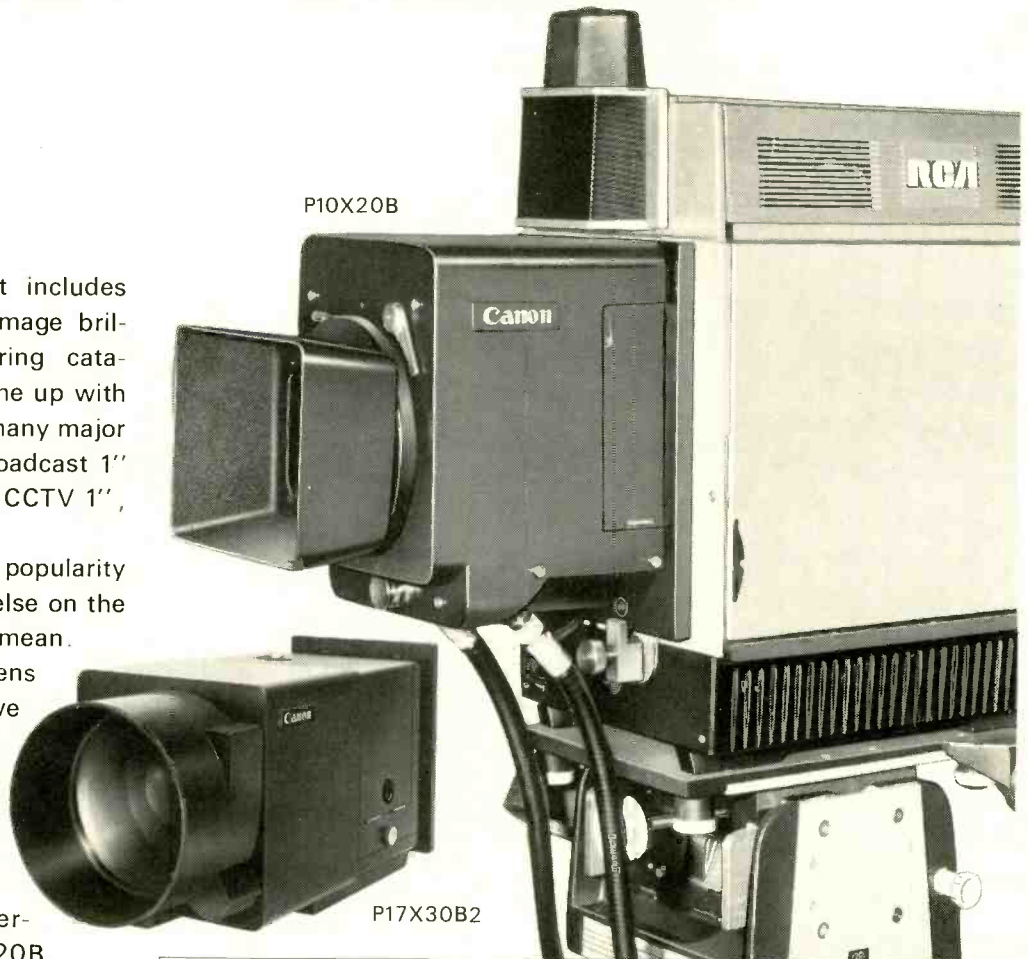
Draw up a checklist that includes price, specifications and image brilliance, then start comparing catalogues. You'll probably come up with the Canon answer, like so many major camera producers—for broadcast 1" or 1 1/4" PLUMBICON® or CCTV 1", 2/3" vidicon.

Stack these two Canon popularity favorites against anything else on the market and see what we mean.

The Canon TV Zoom Lens P17X30B2 has an impressive 1:2.5 relative aperture at focal length range (440-500mm), in spite of its 17X zoom ratio. At 30—440mm it's a remarkable 1:2.2, offering the same performance as our P10X20B, specially designed for maximum versatility with three different range extenders.

Both are ideal for a variety of situation, including dim lighting and open areas like field events.

Here are some other examples of the wide Canon line:



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	Name	Range of Focal Length	Zoom Ratio	Maximum Relative Aperture
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	P10 x 20	20—200mm	1 : 10	F 2.2
1" PLUMBICON	PV17 x 24B	24—400mm	1 : 17	F 1.8
	PV10 x 16	16—160mm	1 : 10	F 1.6
	PV10 x 15B	15—150mm	1 : 10	F 2.0
1" Vidicon	V10 x 15	15—150mm	1 : 10	F 2.8
	V6 x 16	16.9—95mm	1 : 6	F 2.0
	V5 x 20	20—100mm	1 : 5	F 2.5
	V4 x 25	25—100mm	1 : 4	F 1.8
2/3" Vidicon	J10 x 13	13—130mm	1 : 10	F 2.8
	J 6 x 13	13—76mm	1 : 6	F 1.9
	J 5 x 15	15—75mm	1 : 5	F 2.1
	J 4 x 12	12.5—50mm	1 : 4	F 1.8
Servorized/Motorized				
	Name	Range of Focal Length	Zoom Ratio	Maximum Relative Aperture
1 1/4" PLUMBICON	P10 x 20B4	20—200mm	1 : 10	F 2.2
1" Vidicon	V10 x 15R (DC)	15—150mm	1 : 10	F 2.8
	V6 x 16R (AC/DC)	16.9—95mm	1 : 6	F 2.0
	V4 x 25R (AC/DC.EE)	25—100mm	1 : 4	F 2.5

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Ideas for Improving Signal Quality

Correcting waveform errors in TV transmissions, the case for the 12.5T pulse for predicting chrominance and luminance non-linearities and delivering audio over 1000-mile lines were discussed at the IEEE Broadcast Meeting. A new solid-state field strength meter was also described.

Among the many papers at the IEEE Fall Broadcast Meeting were several that zeroed in on the problem of transmitting healthy, clean signals. Frederick C. Everett, former NBC engineer and now consultant in Fort Lauderdale, Florida, says a time domain equalizer can enhance correction and cancel out antenna reflections and other anomalies. More about his time domain equalizer later.

Everett also uses stabilizing amps to reconstitute pulse portions. Stab amps can be used to control noise, distortion, ringing and smearing, says Everett. Square waves are useful in determining the real nature of dislocations such as phase lead, phase lag, low frequency response, low-end cutoffs or phase compensation. Everett declared, "Equipment with a flat frequency response will often have a good transient response, but frequency response errors at low frequencies produce waveform errors which persist over a longer time and are more distracting to the viewer. A broad dip of about 2 dB at 50 kHz, for instance, will cause far more waveform distortion than a very sharp hole of 5 or 10 dB at 500 kHz."

Exponential overshoot and undershoot are often found on incoming video circuits from telephone lines. Adjustments preventing this can be made by observing the square wave provided by the window, or white flag, in multiburst.

Often a low frequency error causes smearing which may or may not be related to the VIT signal. Sometimes the VIT signal gets applied so late in the chain that it does not reflect the condition of the video signal. In such cases it is better to eliminate smear by adjusting the low frequency equalizer while observing the picture.

Everett urged the use of differential phase and differential gain correctors for that form of distortion. He said that dif gain is the biggest problem since excessive dif gain can effect color saturation, color brightness and large-area color.

Stabilizing amplifiers are not the best to use for dif gain because they are not arranged for easy adjustment, and sometimes produce a spike similar to envelope delay ringing.

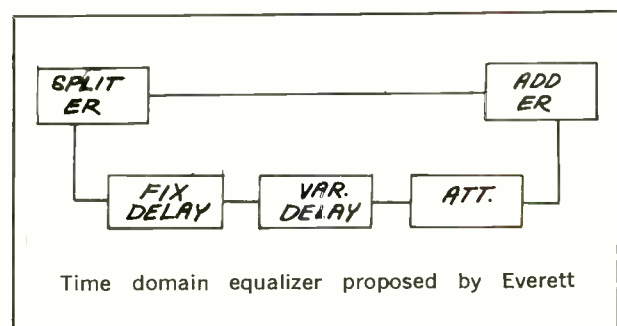
Envelope delay ringing, which is caused by finite frequency cut-off of circuits (and may be appreciable from telephone terminals because of local loops or cumulative build-up along long distance circuits), should be compensated for by all pass phase corrective networks.

Everett urged that more consideration be given to time delaying methods as a means of correcting envelope delay ringing. Citing H. A. Wheeler's work, Everett said amplitude and phase distortion could be described as a pulse and its echo, provided the amount of distortion is small. Conversely the error in amplitude and phase can be cancelled by a pulse which may be generated from the original. A time domain equalizer, as illustrated by the block diagram, can be constructed to do this. Some of the signal is divided, passed through a suitable delay, and recombined with the original signal and the phase and amplitude controlled so that it just cancels out the distortion. The length of the delay may be quite long, say a couple of μ seconds, so that the echo is noticeably separated from the original pulse, particularly in the case of the reflection from an antenna.

The availability today of tapped delays in increments of five nanoseconds and continuously variable delays for lesser values make it possible to precisely produce a cancellation pulse.

Time domain equalizers also improve signal-to-noise ratio, according to Everett.

STL's often produce envelope delay distortion



because of their finite bandwidth, particularly when sound is multiplexed. Everett said the STL should be phase equalized or phase equalizing filters should be used in the STL itself. He said reflections should be fixed or corrected by time domain methods.

Time domain methods can be applied to the transmitter. Everett said that the predistortion introduced to reduce quadrature distortion should have overshoots at the top corners of the square wave in order to get the desired overall response. Application of time domain equalization procedures can restore the proper overshoot of the back of the square wave for idealized response.

Among the other problems which plague broadcasters that can be remedied by time domain reflection techniques are: elimination of reflection off strongly lighted objects (thus increasing acuity greatly); correction of idiosyncratic echoes created in transmitters (such as RF getting into the modulator and rectified, a power supply with too long a time constant); correction of antenna mismatches which may create a reflection near the carrier or color subcarrier); and correction of envelope delay ringing errors introduced at CATV head end (demodulate-modulate signal processors can create all kinds of errors, heterodyne processors often limit bandwidth producing envelope delay ringing).

From this host of ills that can be remedied by time domain equalizers, it would appear that Everett is on to something. His address is 462 NW 45th Street, Fort Lauderdale, Florida, 33313. The phone number is (305) 731-0612.

Although the 20T modulated sine-squared pulse

has been considered a significant signal test to measure color television circuit capabilities, it has not been quite optimum for NTSC standards. The 20T has been more useful abroad where it was first developed (by Peter Wolf of I.R.T.). It measures relative chrominance gain and delay indicating color misregistry.

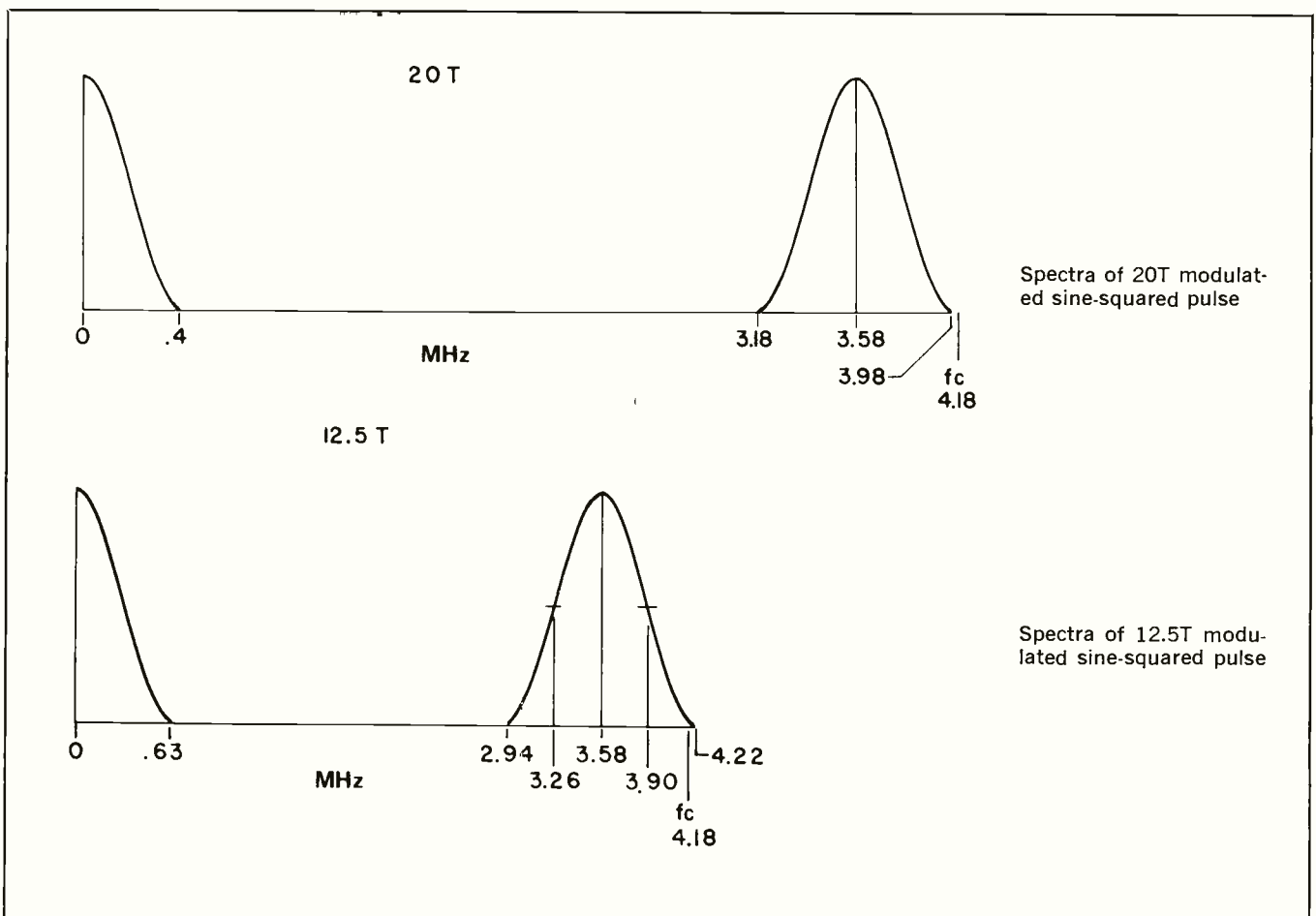
Charles W. Rhodes of Tektronix thinks a properly-scaled test signal for NTSC would be a 12.5 modulated sine-squared pulse. He reported at the IEEE Fall Broadcast Meeting that 12.5T compared to 20T offers 1) an increased sensitivity to relative chroma delay, and 2) a simple scale factor:

- a) for 12.5T = 10d
- b) for 20T = 15.9d

The calculation of delay is easier (nomographs are provided) and there is a reduced pulse interval on the test line which is of value when several test signals are combined onto one line of the vertical blanking interval.

The spectra of the 20T modulated sine-squared pulse and the 12.5T for NTSC are shown in the illustration. Note that at 4.22 MHz the test signal has reached complete cutoff, while the NTSC transmitter should not be more than 4 dB down at 4.18 MHz from 3.58 MHz. The proposed test signal is a closer match to the bandwidth of the chrominance signals than is the case with the 20T test signal.

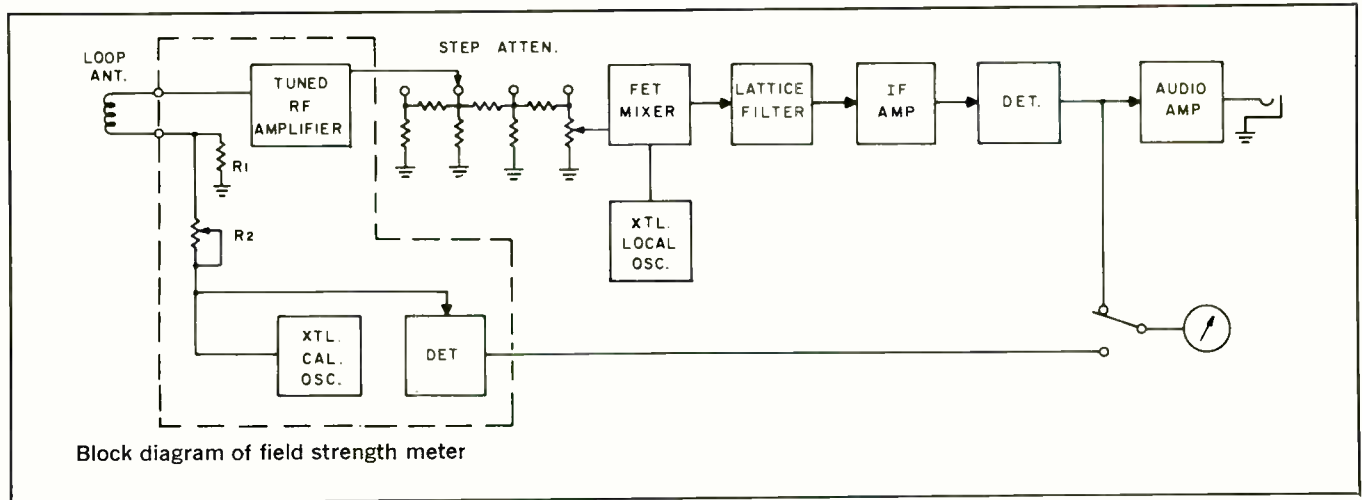
Both 20T and 12.5T test signals have been tested through several transmitters and demodulators to compare measured values of delay and gain distor-



Audio Performance Over 1000-Mile Paths

	Short Transmission Path	Standard Frequency Div. Using Multiplex	FD Multiplexing Modem Plus Radio Trans.	Diplex FM Channel	PCM 8-voice circuits*	Audio on Cable	Audio on DDD Broadband
Frequency Spectrum	20 Hz to 20kHz	100-8000 Hz	100-8000 Hz	50-15000 Hz	less than 5000 Hz	50 Hz-15 kHz	300-3400 Hz
Frequency Response	Spread 0.5 dB	Spread <0.3 dB	.5 dB	1 dB	poor	3 dB 500 miles	3-6 dB
Harmonic Distortion	0.25%	Less than .2%	.5%	1%	high	<1%	—
Signal-to-Noise	65 dB Flat	67 dB weighted	40 dB requires weighting	50-53 dB	<40 dB	>55 dB	30-40 dB
Phase Distortion	← Can be problem at low and high frequencies →				—	high	—

* 12- or 16-voice circuits equivalents needed



tions: results are summarized below:

	12.5T	20T
Measured gain distortion	3.5 dB	3.2 dB
Measured delay distortion	220 ns	250 ns

An interesting analysis of what happened to an audio signal during a 1000-mile-transmission was given by E. Norden of the British Columbia Telephone Company.

Norden considered quality, subjective vs. standard performance tests, and reliability for six different transmission systems: common, multiplex, diplex, pcm, cable, and DDD broadband.

Most long distance audio transmission is done on standard FD multiplex and it provides a satisfactory overall performance as the summary chart shows. Companders have to be used to get a suitable S/N ratio. Objective tests are for the most part satisfactory, but there are some side effects such as a trailing noise and modulation noise, Norden said. These will be reduced in the future by new ideas now in the development stages such as multi-band audio transmission and the use of modulated MOS-FETs and log-amplifiers in feedback circuits. These new techniques make it possible to reduce the attack and recovery time to a minimum. A multi-band compander divides the audio spectrum into sub-spectrums and each section is compandered under the control of its own signal. It will consequently not affect the level of frequency outside its own band, thus maintaining optimum S/N. Use of multi-band companders will increase system loading.

The use of a diplex system is limited because of channel space costs, although reliability is okay. Pcm facilities may be used in the future, but a 12- or 16-level system is needed for good quality and

costs are high, Norden reported. Audio on cable for 1000 miles is not generally used although cable extensions of FD multiplex are common. Cable presents no problem except phase distortion is much greater. The DDD broadband system can be used for extremely long distances, but only for temporary situations since quality is not tolerable for regular broadcast purposes.

New concept FSM

A new solid-state field strength meter was described by Charles Wright of Delta Electronics. Wright said the new instrument was conceptually different from meters now in existence. "It is intended for a single frequency use, primarily by broadcast station engineers making their weekly monitor point readings or coverage measurements of their broadcast station. Both the local oscillator and the calibration oscillator are crystal-controlled (operating on the station's assigned frequency), and no frequency tuning is required in operation."

In other respects, the meter is not unlike previous FSMs. The single frequency design is more economical and easier to use. Improved accuracy is expected because there is no confusion over getting the correct center frequency response since tuning is eliminated. Wright said large ac and dc feedback is used which makes the circuits relatively immune to temperature and supply voltage changes. The design goal for the instrument was operation between -50° and $+50^{\circ}$ C. Considerable environmental testing was done during the development to accomplish the result and Wright said, "We believe the operator will fail from environmental conditions before the instrument will."

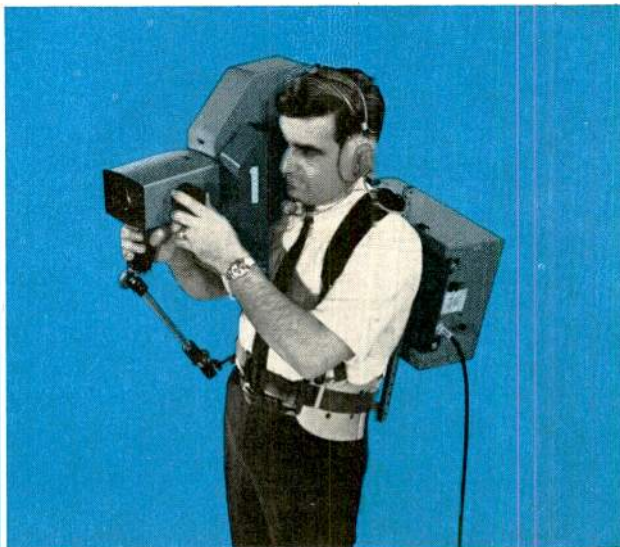
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color camera that uses
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Norelco PC-100A...the only camera with A.C.T. Plumbicon* tubes ... solve high-contrast problems at the source.

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A new gun design gives the A.C.T. Plumbicon tube an unprecedented dynamic range (inherent overbeaming capability equivalent to five or more f-stops overexposure) with no washout or loss of detail even in action scenes with brilliant highlights and deep shadows. It's standard in the PC-100A, and the contrast problem is defeated at the source . . . not partially offset through complicated, costly, extra-option hardware. As a bonus, the A.C.T. tube handles low-light situations with matchless fidelity.

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Whatever Happened to VITS?

By Forest H. Belt

It seemed like such a good idea, and everyone agreed to use it. But no standard ever evolved.

BACK IN 1964 the first Network Transmission Committee of network and telco engineers got together on what a test signal for color programs should include. Till then the only way to find out where a network color picture was being degraded was by a series of time-consuming tests along the video feeds. That could involve hundreds of miles of cable or microwave and a whole string of amplifiers and repeater equipment. It could only be done when no programs were being transmitted.

By 1968, when NTC Engineering Report No. 5 was issued, the three networks and AT&T agreed the way to do it was with continuous test signals in the vertical interval. The Federal Communications Commission had already approved using the last 12 microseconds of line 17, and any of lines 18, 19, or 20, in either field. With such a signal, cause of any signal degradation could be isolated by scope tests at cable and repeater terminals. A troubled section could be patched around till it was repaired.

Even today no one disagrees that VITS ("the VIT" as it is familiarly called) is a good idea. But if you keep an ear open around some affiliate stations, you get the notion the VIT isn't everything it's cracked up to be. Watch the little line-selecting A-scopes with any regularity and you may begin to wonder yourself. The VIT has changed.

The way it was

Following 1968 all three networks put in the standard VITS recommended in ER-5. Its makeup is shown in Fig. 1. The VIT involves four signal groups, two of which are alike.

Field 1 has two lines of VITS. Line 18 begins right after horizontal and color sync (burst is the dashed-line rectangle in Fig. 1).

First part of the VIT is a brightness flag. It begins with an abrupt voltage rise from zero to 100 IRE units. Duration is 0.075 of the horizontal period (0.075H) or about 4.75 microseconds. Purpose is identification; it tells where the VIT originates.

After the ID flag comes a *multiburst*. That is six bursts of video-frequency sine waves, each burst at a different frequency. Amplitude is exactly 90 IRE units, from 10 to 100. Their object is analysis of frequency response. Any tilt in response of a cable section or repeater amp shortens one or more bursts.

The multiburst photo in Fig. 2 is taken from a station's monitor A-scope. Line 18 of field 1 has

been expanded 5X to show multiburst detail. The bursts are, from left to right, 500 kHz, 2.0 MHz, 3.0 MHz, 3.6 MHz, and 4.2 MHz. Faint tilt has shortened the 3.6 and 4.2 bursts, but there's not enough rolloff to degrade a picture seriously.

Back to the original VITS in Fig. 1. Following the multiburst in line 18 of field 1 are program-black and program-white references at 7.5 and 100 IRE units respectively. They establish bounds for program video or Y levels.

Line 19 of field 1 carries a *sine-squared* pulse and bar. The pulse is very sharp, having a half-amplitude duration of only 0.125 microsecond. The bar has the same rise-time characteristic but duration is almost 16 microseconds. It sometimes is called a *window*. Pulse and window both ride at a base level of 10 and rise exactly to 100.

Poor high-frequency response along the transmission route can reduce amplitude of the sine-squared pulse. Phase delay causes overshoot and ringing at the base line. Fig. 3 shows how A-scope displays of a sine-squared pulse look spread out 25X for close observation.

The final portion of line 19 in field 1 is a repetition of the program-black and -white references.

In this original VITS, line 18 of field 2 is a repeat of flag and multiburst, followed by program-level references. It was mentioned the position of the flag in the multiburst indicates where the VITS is inserted. Preceding 0.5 MHz, as in Fig. 1, the flag denotes New York. Between 0.5 and 1.5 MHz, the flag means Hollywood is supplying the VIT. A flag between the 1.5 and 2.0 bursts represents Chicago.

Line 19 of field 2 contains, besides program-level references, a modulated staircase. There are ten steps, plus zero of course, each one modulated by 3.579545 MHz. The steps are in increments of 10 IRE units, and modulation on each is 20 units high. A study of this pattern can reveal video nonlinearity, differential phase and differential gain that would affect color, and envelope delay.

The way it is now

I just described the VIT as the NTC planned it. The VITS today is quite another thing.

In the first place, no two networks use the same pattern anymore. Each has its own VITS. But more than that—you can't be sure what any network is going to send down from one day to the next. The

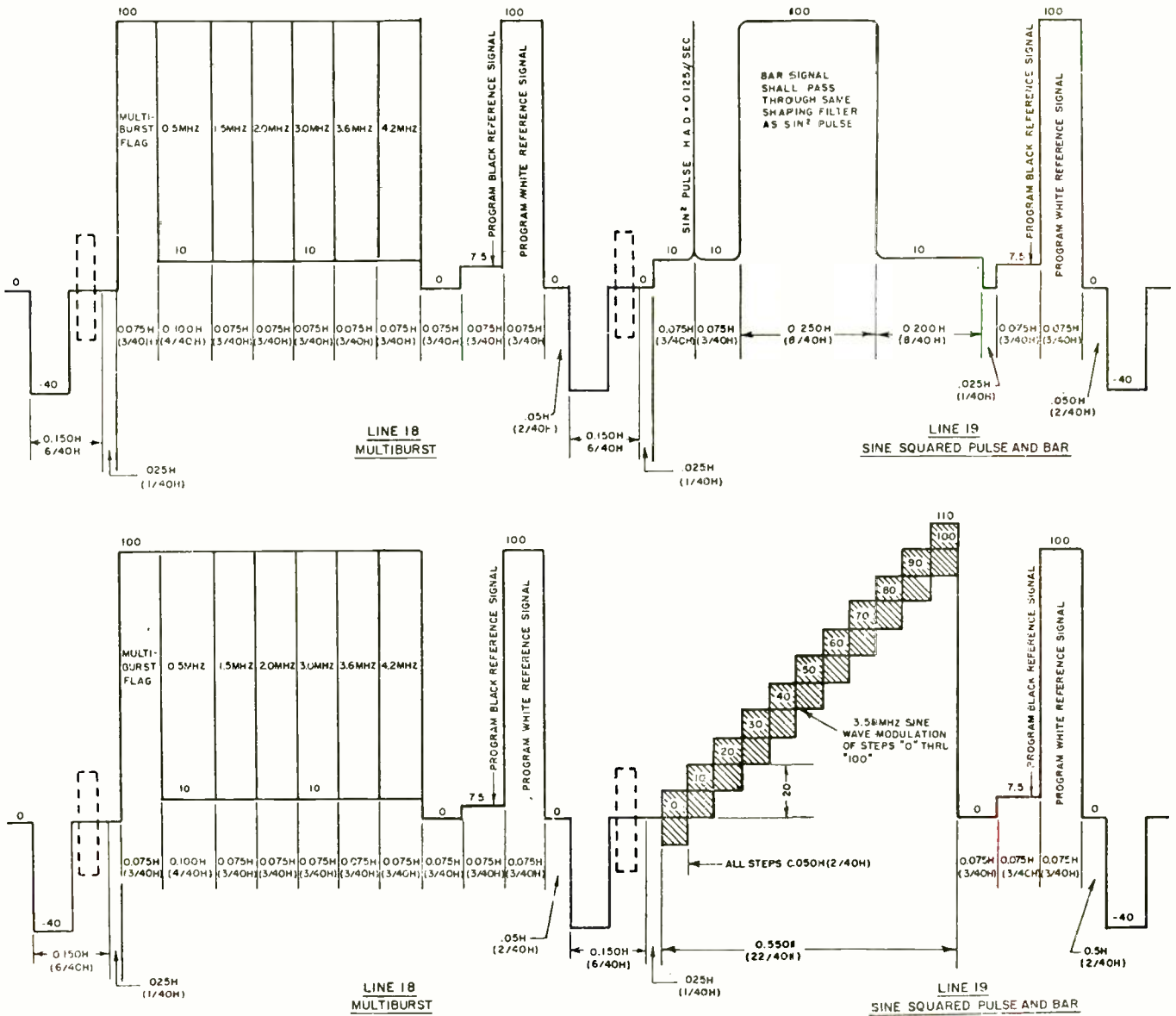


Fig. 1. Vertical-interval test signal (VITS) as originally conceived by Network Transmission Committee some years ago.

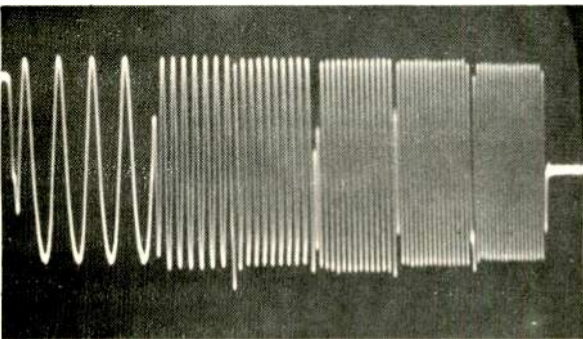


Fig. 2. Multiburst spread out for detailed viewing on A-scope.

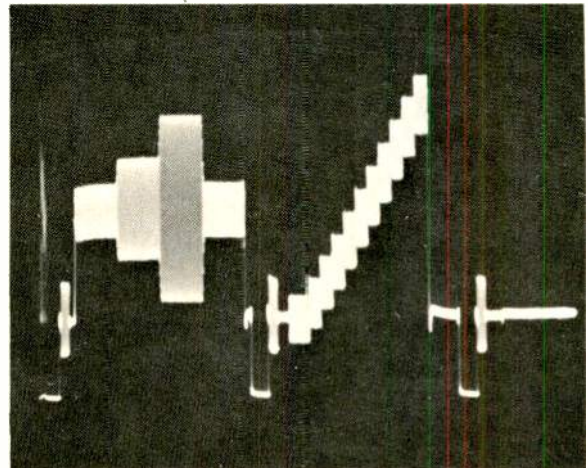


Fig. 3. Sine-squared pulse spread out 25X reveals distortion in transmission path, shown by ringing along the baseline.

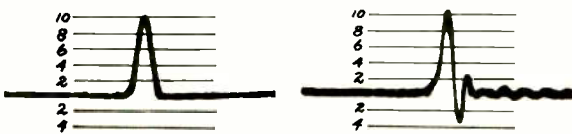


Fig. 4. Pattern on line 18 (at left) wasn't identified by network or telco, but was one of new VITS being tried out.

nets seem to be trying out new VITS patterns. Most versions contain rearrangements of the original patterns, plus some new shapes. The station engineer is inconvenienced by not knowing what's coming down the line nor what he should do with it.

Network and telco officials have an answer. This is an era of rapid change. Demand for increased color transmission quality by the FCC, by station affiliates, and even by viewers, dictates a search for better ways to assure that quality. New equipment and methods deserve improved evaluation—the job of a VITS.

Too often, though, no one seems to know what is being tried or why. One week awhile back the pattern in Fig. 4 popped up in field 1 on the A-scope at NBC affiliates. The modulated stairstep on line

19 was familiar but the line-18 signal was something new.

No one at the station knew what it was for. A call to the local telco terminal generated interest, but queries up the line all the way to New York found no one who could identify the new signal. Telco asked NBC New York and still got no information.

The signal, inspected by vectorscope, was four bursts of 3.579545-MHz signal. But phase was rotated about 90° from the reference burst. What for? Some test no doubt, but of no use to baffled station and telco engineers.

Another day the A-scope at an ABC affiliate showed the patterns in Fig. 5 coming down from New York. At left, field 1 shows a modified stair-

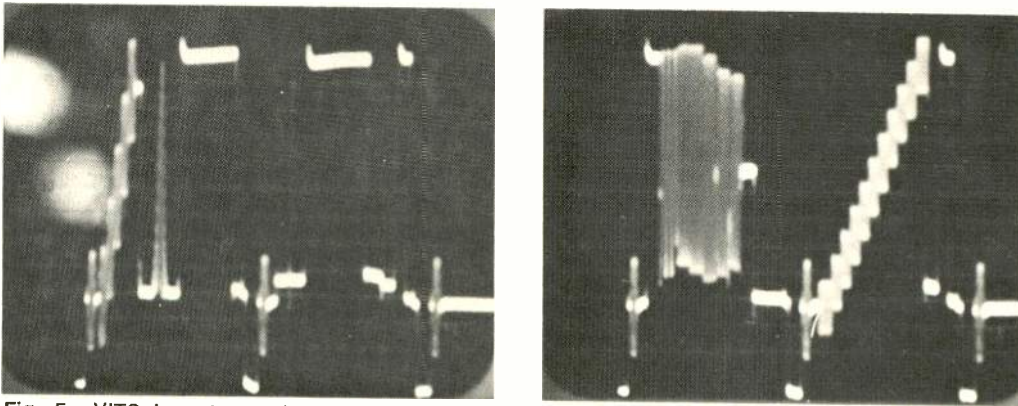


Fig. 5. VITS is not standard anymore on any of the networks. Both lines of field 1 are at left, both of field 2 at right.

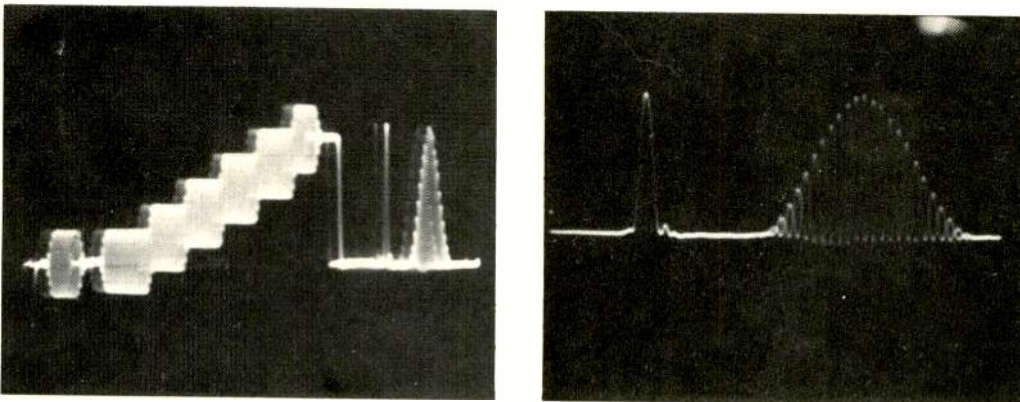
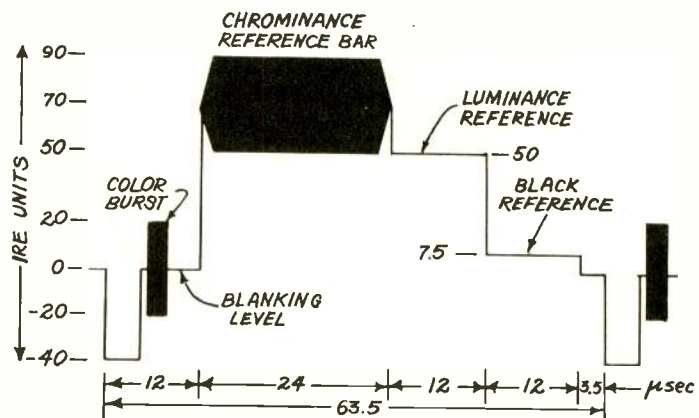


Fig. 6. Left photo is 5X view of line 18 of field 2 on one network recently. At right are 2T and 14T displays, at 25X.

Fig. 7. Vertical-interval reference (VIR) goes on line 20. Experiment is over, but some networks still try it briefly.



step, a new display called a 20T bar (explained later), and a window—all on line 18. Line 19 of the same field carries a sine-squared pulse, another window, and program-level reference blocks.

The 20T at ABC has an extra function. It is modulated by 3.579545-MHz energy. The phase is a clue to where the ABC VITS is inserted. New York is 347° , or blue; Chicago is 103° , or red; Washington is 241° , or green.

Field 2 of that recent ABC VIT carried a multi-burst on line 18 and a standard modulated staircase and program-level bar on line 19. This is much like the original VITS, although rearranged.

Still another day found that modified staircase on line 18 of field 2 over at CBS. It's a five-step stair (Fig. 6) with each step modulated by a 3.579545-MHz signal. Accompanying the stair was the new display that Telemet, the company pushing its use, calls a 2T and 20T.

The CBS version this particular day actually had a 14T bar following the 2T pulse. A few days earlier it had been 20T. The photo at right in Fig. 6 shows the two bars spread out 25X on an A-scope.

These patterns let station and telco engineers detect envelope delay and differential phase or gain. Station operators can use the patterns for STL testing too. The expanded versions in Fig. 6 show that the system has some distortion: overshoot at the base of the 2T pulse is one clue, and the wavy baseline of the modulated 14T bar is another. Both signify need for corrections in the color/video transmission or repeater or reception equipment.

Experimental color reference

During the final months of 1970 all three networks participated in a series of new-signal tests. The signal was a vertical-interval reference (VIR) for color.

Ever since its introduction in the U.S. color TV has been plagued by certain viewing aggravations. Color hues are not stable; facial tones range from green to blue in what seems a haphazard manner to the viewer. Color saturation varies too, from station to station and from program to program, even on the same network.

A Broadcast Television Systems (BTS) committee of the Electronic Industries Association worked out some of the causes. From what they learned, members of the BTS committee devised a reference signal station operators can use to evaluate the color signal they're getting.

This reference signal was to accompany each color program. Phase or amplitude defects in the chroma distort the reference signal too. Corrections that restore the reference signal to its standard shape and phase also fix up the chroma signal.

The VIR as conceived and tested is shown in Fig. 7. It goes on line 20 of the vertical interval, usually in both fields. Horizontal sync and blanking fill their usual 12 microseconds of the line interval, with regular color-sync burst on the back porch.

● The first reference signal is a 24-microsecond bar of 3.579545 MHz. Its phase is at zero degrees—precisely the same as the color-sync burst should be.

Amplitude of this chrominance bar is exactly 40 IRE units, peak to peak.

Transmission and repeater equipment may inadvertently shift the color-sync burst from the phase it has at point of origin. Or, the phase of color sidebands may be altered somewhere along the line. The reference-signal chroma bar is treated the same as program chroma. Any phase shift that develops between chroma and color sync is detectable at the pickup point by comparing burst phase with VIR chroma-bar phase. Any discrepancy can be adjusted out.

● Next comes a 12-microsecond program Y-level (luminance) reference. It sits precisely 50 IRE units above zero or blanking level. The relationship between it and the chroma bar is important. Distortion that displaces the chroma bar above or below the 50 level of the luminance bar destroys the relationship between Y and chroma in the program signal. Detected, the distortion can be corrected, or the station or repeater operator can readjust to compensate for it.

● A program-black reference bar occupies the next 12 microseconds of the VIR. Its level is the standard 7.5 IRE units. The Y level is normal when this bar is at 7.5 and the luminance bar at 50.

● A station operator at the pickup point can follow this procedure of verifying the color signal he receives: 1) Set the A-scope to display line 20 of field 1; 2) Establish blanking level at zero with positioning knob; 3) With black level at 7.5, adjust video to put luminance bar at 50; 4) Adjust chrominance bar for 40 IRE units peak-to-peak amplitude; 5) Balance luminance and chrominance so bottom of chrominance bar rests at 50 level; 6) On vector-scope set to view line 20, compare phase and amplitude of chrominance bar and color burst; correct burst if necessary.

The vertical-interval reference doesn't cure all NTSC color ills. The human factor still exists at the point of program origin. Camera and film-chain setups remain a weak point because they require subjective artistic judgment. Film processing is a serious variable; colors may not be true when they're introduced to the television system, and a VIR can't help that.

Some station engineers virtually ignore the VIR tests. They say, "Get the VITS right before you start adding more stuff to it." Some of them feel a dependable VITS, perhaps slightly redesigned and put together with precision, could do just as well as the VIR.

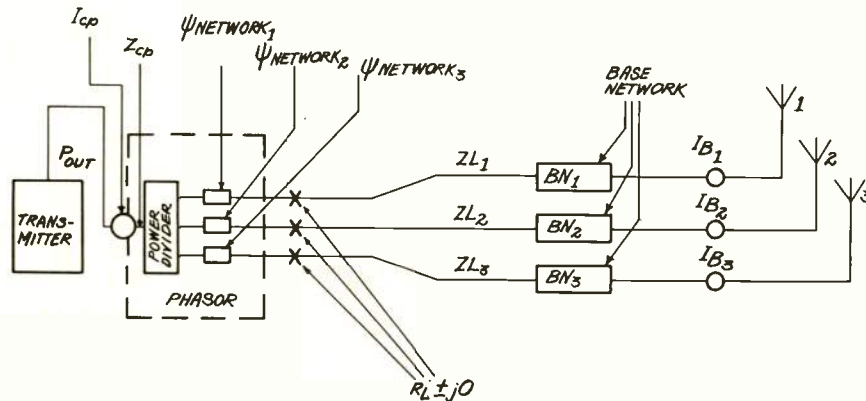
The networks have not yet reported their evaluation of the VIR experiment. Neither has the BTS committee. An occasional VIR still comes down the line from network New York. The official experiment ended, but the VIR hasn't been discarded.

VITS or VIR—both are tools aimed at improving color for the viewing public. They aren't the end-all, and no one has settled yet exactly what they should be. But they should be standard. And they'd be more useful if a single source supplied all three networks. Whatever they may become, they're still around in one form or another and will likely continue to be.

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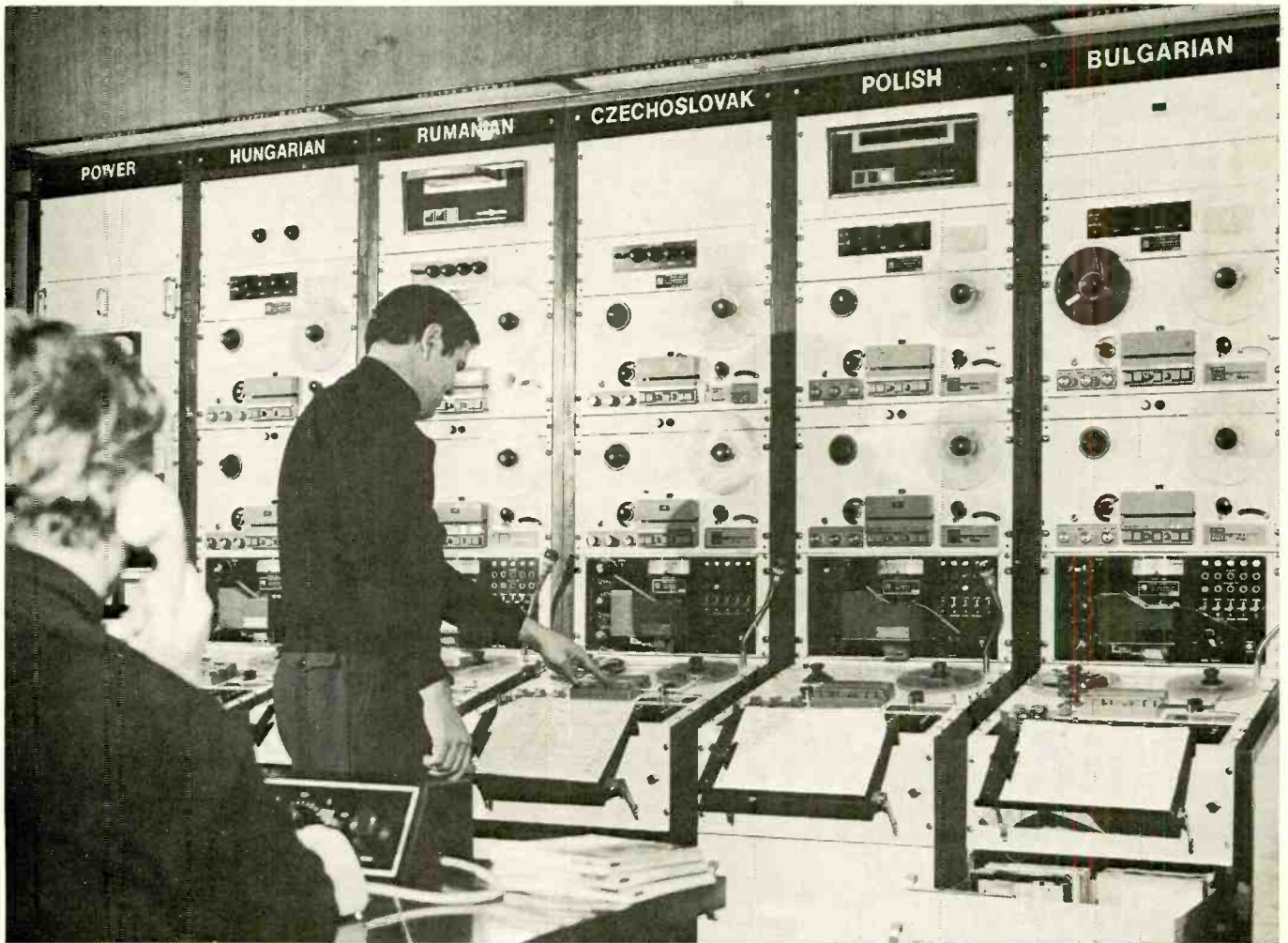
Trouble Shooting Tower Arrays

by John Battison
Consulting Engineer



SYMPTOMS	CAUSE	CHECK	ACTION
Common Point Current Abnormal I_{cp} High I_{cp} Low	Transmitter output changed Z_{cp} low Z_{cp} high Phasor misadjustment Phasing or matching networks Antenna(s) and/or connections damaged	Transmitter output power (P_{out}) Common point impedance Z_{cp} Ground system and connections Phasor settings Settings of ψN_{1-2-3} Antenna(s) and base circuitry meters I_{B1-2-3}	Adjust transmitter output to correct level, check E_p/I_p . Use in-line, or RF bridge to check Z_{cp} . If necessary readjust to correct for $R \pm jO$. Ensure ground system not damaged and all grounds OK. Reset as necessary. Use in-line bridge, or RF bridge, correct as necessary—if necessary. Check FM, TV, etc., line isolations at towers, RF circuits, sampling loops, and isocouplers, tower lighting circuits.
Antenna Base Currents Abnormal	I_b meter(s) damaged	Base and common point meter calibrations	Calibrate meters, or replace with known good ones. Insert in-line bridge and readjust Z_{cp} .
Transmitter Efficiency Too High, or Too Low	Z_{cp} changed, or I_{cp} meter damaged	Z_{cp} , and I_{cp} meter Also E_p/I_p	Calibrate and/or replace faulty meters(s). Measure Z_{cp} .
Magnitude and/or Phase(s) Out on One Tower	Phasor misadjusted. Phase monitor and/or sampling lines damaged. Base matching network BN_{1-2-3} misadjusted (less likely)	Phasor settings Sampling lines, phase monitor operation. Base network	Make correct adjustment. Disconnect sampling line, measure Z and R with RF bridge and ohmmeter. Ratio tower against self. Check for sufficient RF drive to phase monitor. Use in-line bridge to correct.
Unstable Phase Monitor Readings	Intermittent connections in phase monitor system, or line voltage fluctuations.	Loops, lines, phase monitor, power supply line voltage.	Clean and tighten all connections. Check and clean loop mounting. Check primary power supply for heating/air cooling load effects on phase monitor supply
Unstable Base Currents I_b and/or Remote Readings	Dirty insulators at base, water in insulators, poor connections in RF system, sampling system faulty.	Insulators and drain holes, tighten all connections and relay contacts, sampling transformer, lines, base meter.	Clean all insulators, open drain holes, clean and tighten all connections, clean and repair ground connections, check sampling meter calibration.
Monitor Points Some Out	Local conditions. Measuring equipment faulty, Phasor settings moved and/or wrong.	Power output, new construction around MP's, power lines, etc., FS meter. Phase monitor settings	Readjust as necessary. Select new alternate MP's if FSM shows good nulls are not obtained at old MP's. Test FSM against known good FS meter. Readjust phasor.
All Out	Power output too high. Conductivity increased. FSM faulty. Phasor misadjusted. (Check all above causes)	Radial measurements. Phasor settings. (Check all above causes)	Make partial proof along radials involved, analyze and/or ratio to previous proof values. Inform FCC if necessary, and request new MP values—may be seasonal. Check FSM operation, and phasor adjustment first.

The above assumes that the array has been properly maintained and that the symptoms are not the result of sudden deterioration, such as lightning strikes or physical damage, and that basic operating checks have been made.



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Videoplayer Status Report

—Still very much a horse race

The SMPTE program committee for last month's 110th Technical Conference made a valiant effort to report on what's happening in the videoplayer field by scheduling two days of speakers from around the world—Canada, USA, Europe and Japan. The situation was best summed up by one panelist who said it was still very much a horse race. However, CBS's EVR and Sony are in the lead at the moment in the view of several panelists who are prospective users.

The finish line is by no means in sight though, and new entries can still leave the gate with confidence that they might finish in the money. Eastman-Kodak paraded in front of the grandstand a working super 8 mm film videoplayer for TV and sidled up to the starting post but didn't exactly leave it. Its entry was announced as a feasibility model—not a production prototype. A key feature of the Kodak system is its ability to use the same software for either a conventional optical-display or a TV-display system. The super 8 cartridge is the identical cartridge that now plays on the company's super 8 front-viewing projector. Demonstrated at the convention were two new players—a brief-case-sized rear screen projection unit for direct viewing and a flying spot scanner videoplayer for connection to a TV set. The latter unit used a continuous film transport system (which permits usage of thinner base film material for longer programs and less wear on the mechanism and film).

But mild skepticism over the videoplayer's future was the order of the day judging from questions asked by the audience and, indeed, this was the conclusion of the keynoter on the first day, Wilton R. Holm, SMPTE president, who said there were too many unknowns to be optimistic.

Buy now, play later?

The audience kept asking for some standardization so that they might buy now with some

confidence that they could play later any software designed for any videoplayer. But the technically-oriented panelists, who some day will likely sit on a voluntary standards committee, said it was simply too early for that to happen. Keynoter Holms said a few manufacturers have to get some systems out into the market so that the buying public can decide on the usual terms of the marketplace: price, quality and service.

Price of videoplayers today is high, but a player for \$250-\$300 is still envisioned once production lines roll. Quality is a factor that may be more important than most suspect. Magnetic tape videoplayers will offer poorer quality than broadcast standards; super 8 hasn't yet proved itself (the quality of the Kodak demo was unimpressive); only high-quality source material can be converted to EVR. Although, video disc demos (Teldec) have looked promising, holographic tests (RCA) show that approach has a long way to go. The kind of service (means of distribution, etc.) that will be needed is unknown. The eventual price of software is highly speculative. Mass-produced programs for delivery via video discs or pressed vinyl (for holographic projection) can be inexpensive but if a subject is general enough for mass consumption, free broadcast with its higher quality may be the better system for this material.

The concept of marginal utility of videoplayer material was raised by Gordon Thompson. He said the phonograph cannot be used as a model because music is background ("ground" in Gestalt theory) which can be played repeatedly because it does not require undivided attention. Video, on the other hand, if watched, precludes the viewer doing other things (its "field" in Gestalt theory). Thus, customers are unlikely to use "field-like" video materials as repeatedly as they do audio materials—and what they will pay for something viewed only once, twice, or at the most three times, is a big unknown, Gordon said. Possibly a market big enough to really lower costs can't be developed.

Holms arrived at his skeptical view of the future in part out of the fact that hardware manufacturers were not investing their own money in software. "It's like producing razors but no blades," he said.

The assessment only increased the pleas of the potential users for standardization of the hardware so that they could safely invest in the new form. The mess in super 8 in the educational market was repeatedly cited as the reason this format never took off.

Inability to see a way of solving the age-old chicken-or-the-egg riddle as it applies to hardware or software led to the pessimism on the part of many but certainly not all.



Feasibility model of Eastman Kodak's proposed cartridge-loading super 8 film videoplayer.

"Produce the chicken," said Caravatt

Obviously impatient with the whining about lack of standards, second-day panelist Paul Caravatt said, "If you really believe there is a need for better communications to individuals on an individual basis, get busy and start producing some software. The hardware will follow." Caravatt, from an advertising agency (Interpublic Group), said he was convinced that 95 percent of all current motion picture and television production is absolutely worthless for home video cassette use. He said he was not alone in this view and he outlined some ten efforts going on now to test market what the individual will accept. (These efforts included "edutainment" type programs, product and personal type information, and public service-type programs, many of which will likely be sponsored and therefore free to viewers.)

Numerous authorities reviewed the various design approaches to videoplayers, and their respec-

tive advantages and disadvantages. No one was prepared to write off any of the approaches suggested to date (which total about 20), although it was the opinion of many that those magnetic cassette systems that revealed some standardization of interchangeability capability would move into the lead. Sony avers that other Japanese companies will follow its lead. At NAEB, Panasonic did indeed show a $\frac{3}{4}$ -in. model using the Sony format. The Philips magnetic tape approach appears to have gained acceptance from several European manufacturers and is considered as serious contender as a future standard. Ampex's design, despite the fact its cartridge is compatible with EIAJ- $\frac{1}{2}$ -in. and will be sold in Japan by Toshiba, gets talked about less these days because of delivery schedule slippage and no news of software. SMPTE speakers believed differentiated usage may assure a future roll for all designs: magnetic tape, optical film and pressed disc or embossed film formats.

Sony Begins Videocassette Production

WHILE PROTOTYPES of a dozen encapsulated video systems have been demonstrated during the past two years, hardly any production models are around (except for CBS/Motorola EVR). At a recent day-long applications seminar, Sony showed production models of its videocassette player, and introduced a new cassette duplicating system. Trying hard for the business and educational video markets, the company made an impressive showing of hardware which worked well, and was more interesting than the predictions and speculations which followed.

Software is the key to expansion of the videocassette market. That's what one speaker said in New York recently at Sony's videocassette seminar. Aiming at producers and users, the company demonstrated production models of a new cassette player and showed a prototype duplicating system. Heart of the system is a new open-reel helical VTR using two-inch tape. It's used to assemble and edit the master tape, and then to play it back while making copies.

Cassette player

Slightly different (and more costly) than the 1969 prototype, the production model player is simple to operate, even by laymen. With automatic tape threading, all you do is insert the cassette and press the play button; the picture appears in a few seconds. That automatic threading (see diagram) is particularly ingenious.

The tape itself is $\frac{3}{4}$ -in. wide, with chromium dioxide coating. Each cassette has 60 minutes playing time (3.75 in./s tape speed). The color TV picture *BM/E* saw was excellent, as was

stereo from the twin audio tracks. (The two tracks may also be used separately.)

Rewind and fast forward take three minutes, and backtracking is possible at any point. Besides the usual controls (play, stop, etc.) there are knobs for audio track selection, tape skew and tracking, and color lock. Tape format is helical scan, full field, with two video heads. Horizontal resolution (color) is specified at 250 lines, with video S/N at greater than 40 dB. Time-base stability is about 1 μ s. Output from the player is +20 dBmV in 300 ohms, for feeding the antenna terminals of any TV receiver. Several receivers may be driven simultaneously, and more through RF distribution equipment.

According to Sony VP Richard O'Brien, who spoke first, the videocassette itself will retail for \$30, compared with about \$40 for a $\frac{1}{2}$ -in. cassette and \$60 for one using 1-in. tape. He said the videocassette player will sell for about \$80, and that Sony will build approximately 1000 units per month for the first few months, later adjusting plant output to match market needs. He noted the present Sony VTR market breakdown: 48% educational, 33% business, 10% government, 7% medical, and 2% miscellaneous.

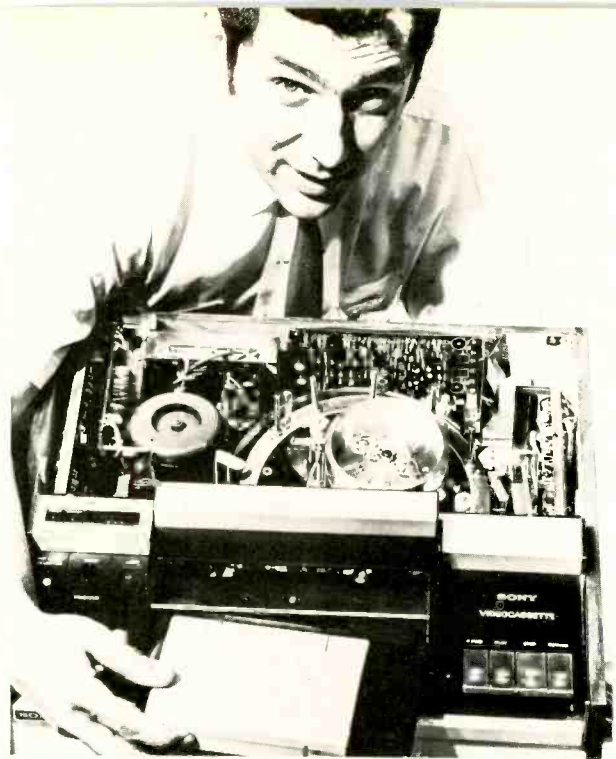
Duplicating facility

For mass production of cassettes, Sony has developed the D-100 master and slave system which includes the facility of checking out recorded copies. There are three components: MV-10000 master VTR, DMC-100 main control, and the slave recorders.

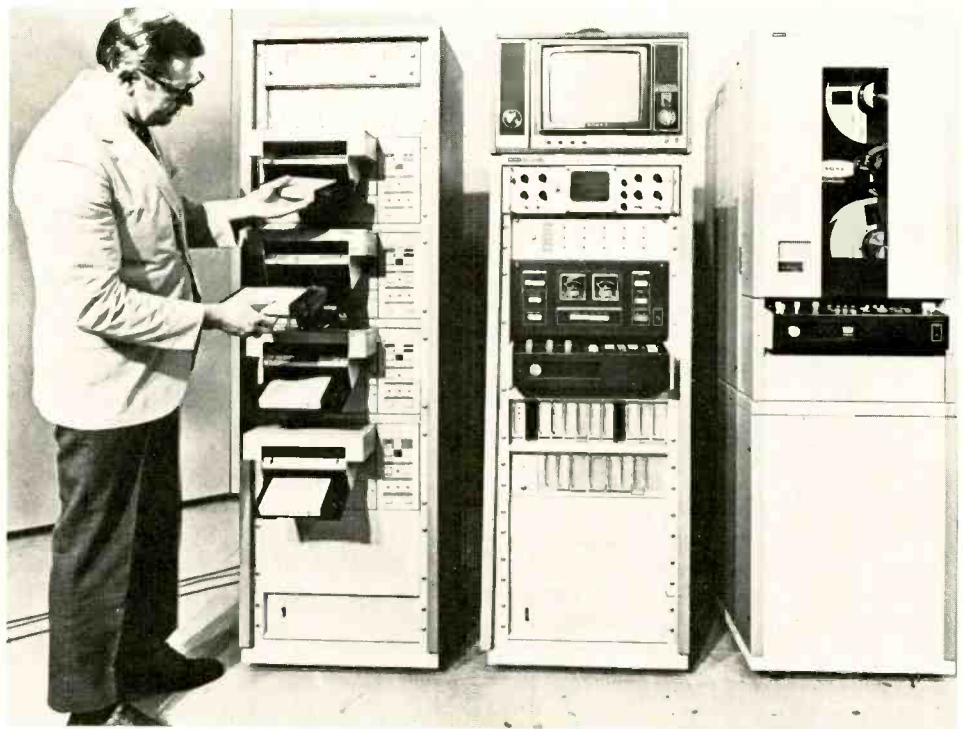
Second seminar speaker was William Amos,



Videocassette gets inserted into Sony player simply by pushing. Threading is automatic.



Full 60-minute programs in color or black-and-white can be recorded, erased and reused.



Duplication system to produce many prints relies on a real-time system. Extra racks can be added to dub 500 copies from one master simultaneously.

manager of market development at Sony. He said duplication cost of a 1-hour videotape is about \$35 on a quad VTR, \$15 on an open-reel helical, compared with \$5 or so for a Sony videocassette run of 500 copies. He said the D-100 system is now being manufactured, will be ready for delivery in Fall 1971. Cost will be \$150,000 plus installation, for a system including 20 slaves. Initially, Sony will install three systems to be located on the east and west coasts and in the mid-west.

While any video source (live or telecine

camera, quad or other VTR) can input the duplicating system, Sony has devised the MV-10000 master recorder/reproducer as a high-quality assembling/editing facility for that purpose. The machine is somewhat of a hybrid, using 2-in. tape with a two-head helical format. Tape is chromium dioxide, with 93 minutes of recording time available on a 10½-in. EIA reel. Tape speed is 8.58 in./s, and there are two audio tracks in addition to one cue and one control track.

Quality is apparently high in the MV-10000; it uses high-band NTSC-type direct color re-

covery, a reference sync servo, and a double heterodyne system. Color video response is claimed as less than 3 dB down at 4.5 MHz, S/N is 49 dB pk-pk signal to RMS noise. Other specifications: differential gain, less than 3%; differential phase, less than 3°; tilt, less than 2%; K factor less than 2% at 2T pulse; time-base error less than 0.5 μ s.

Also included are an inbuilt dropout compensator and color processing amplifier.

Running the duplicating show is the DMC-100 Main Control, which processes incoming video and audio signals and distributes modulated RF to the slaves. Other functions performed are demodulation and quality checking. The facility includes a Sony Trinitron color picture monitor, and a Tektronix waveform monitor.

Each slave rack contains four cassette recording decks; as many racks as desired may be added to a system, depending on volume of copying desired. In each deck, when recording is finished the cassette may be ejected by pressing a button, and another blank loaded for the next run. This makes it easy for an operator to collect all recorded copies quickly without interrupting the next copying cycle.

Short-run recording

Although the D-100 duplicating system is ideally suited to high-volume copying, some users will undoubtedly prefer a smaller investment for short-run recording. Assistant product manager Fred Samuel said that a future version of the videocassette player will have that recording capability. Presumably a small user could purchase one cassette recorder/player, and several player-only models. Samuel also commented that using $\frac{3}{4}$ -in. tape permits better color fidelity, twin audio tracks, and a compact cassette ($8\frac{3}{4} \times 1\frac{1}{4}$ in.).

During a Q&A session, several other points came out. Sony hasn't found that chromium dioxide tape causes greater head wear; besides, during rewind and fast forward the tape doesn't contact the heads. The present cassette player doesn't have stop motion (freeze frame), but a future model will. Each cassette is good for about 1000 plays. Panasonic (Matsushita) and Nippon Victor are said to be working on hardware using the same format as the Sony videocassette.

Applications

Audio-video consultants Les Waddington and Ken Winslow spoke at the seminar on the future of videocassettes. Waddington outlined the many business and industrial uses: executive video memos on company policy, new product information from advertising and sales promotion, personnel-department instructions to employees on time sheets, expense accounts, etc.; and a how-to series for salesmen. Winslow stressed the advantage of cassette over open-reel tape: you don't need a technician to operate the cassette player—anyone can do it. He felt there is a

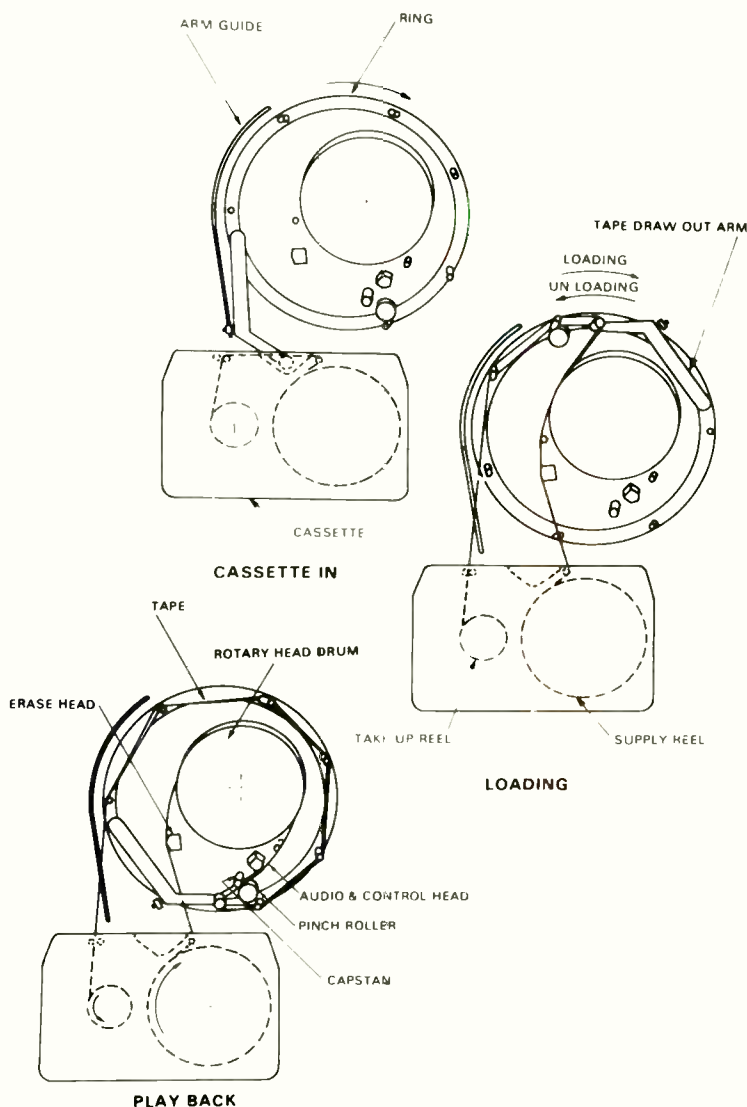
large market for playback-only machines.

Later, Dr. Richard Evans of the University of Houston said that cosmopolitan educators accept technological innovation, while the more provincial teachers resist it. He thought that videotaped lectures were often dull, while creative use of video could supplement and enhance live teaching. But he warned that few colleges would accept a taped series by a world-famous authority (Einstein on math, for instance); this might be construed as a threat to local professors, who'd reject this infringement on their domain.

Eva June of Ability Search related her firm's use of videotape in recruiting executive personnel on an international basis. She emphasized that chemistry is very important in a job where the ability to communicate is essential. A printed resumé doesn't come across to the prospective employer, while a videotaped screen test is valuable in demonstrating a job applicant's ability.

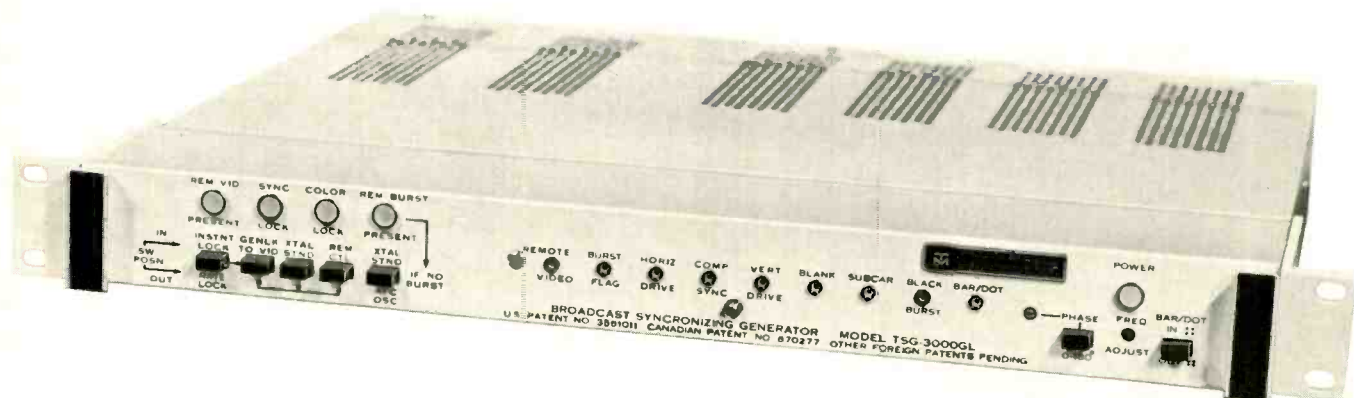
Charles Trafford of Macmillan Educational Service rounded out the seminar with some words on the role of video communications in education.

BM/E



A tape draw-out arm pulls tape from cassette, and wraps it around rotary head drum.

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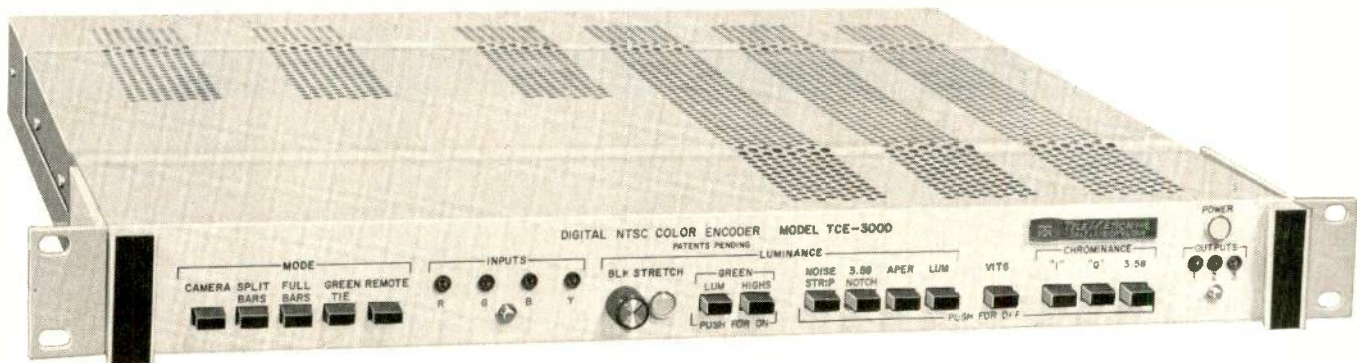
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Why & How I Took a Flyer in Four-Channel Broadcasting

By Lawrence Gahagan

The first of three articles in which an FM station operator tells why he went into four-channel, what equipment he used, how he expanded monitoring, control etc., from two channels to four.

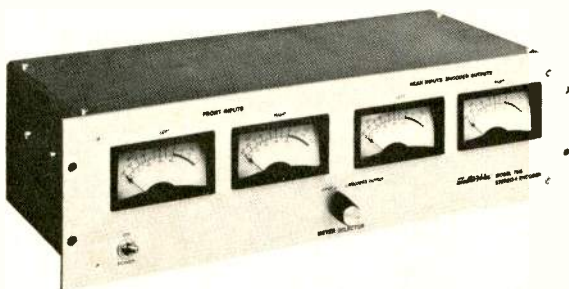
I WALKED INTO the AR listening room in Grand Central Station, New York, sometime over a year ago and heard four-channel stereo for the first time. It hit me a lot harder than I had expected. Four seemed more of an advance over two than two had over one. The depth you get with four channels is a big step beyond the simple width of two channels—four makes it literally 3-D, with an effect like a 3-D movie.

You can, in fact, create depth in sound perfectly well with three channels, but the listening area in which the effect occurs is very small. Four channels seem to make a satisfactory listening area that is about ten percent larger than the area bounded by the four speakers. That is a much bigger area than the "good" one with two-channel stereo, which is apt to be confined to a small triangle between the speakers.

What it is

Four channels ("quadraphonic," "quadrasonic," etc.) with four speakers, usually in or near the four corners of the room, lets you recreate "live" acoustics beautifully. In live, public performances the "surround" effect is generally produced by the reverberation. Naturally a home listening room has reverberation too, but most such rooms are so small

Lawrence Gahagan is co-general manager of station KPEN (FM) Mountain View, California



The Electro-Voice Stereo-4 Encoder is a professional matrix for use by radio stations and recording studios.

compared to a concert hall, theatre or auditorium that the reverb delay time is too short for a full-power reverb effect. Four channels lets you reproduce the timing and directions of the original, large-hall reverb, and that gets us very close to "live," three-dimensional acoustics.

Don't think, however, that four-channel is limited to recreating live concert-hall performances. Rock groups that have never played for a live audience use "mixes" that create spectacular four-channel effects.

The four speakers of four-channel are usually called left front, left rear, right front and right rear. It takes four amplifiers (two stereo amplifiers) to drive them. How a broadcaster can feed those four channels is the principal subject of this article.

Sources of music

Four-channel will be coming through for the home listener in all standard formats—tape, disc, and broadcast. As a broadcaster, I am most eager to have the listener who sets up for four-channel be listening to *me*, rather than to a tape or disc he bought from someone else. Right now I can be pretty sure he will be listening to me because of the scarcity and high cost of other four-channel program material. (Editor's note: Broadcasters will be getting more competition in this field with the arrival this winter of the Q8 four-channel cartridges, and of many four-channel discs encoded by the Electro-Voice and CBS methods.)

Like practically all electronic programming, four-channel starts with tape. Usually, for consumers as well as broadcasters, this is ¼-in. tape with four discrete channels recorded all in one direction, usually at 7½ ips and with the following track assignments: track 1 (top), left front; track 2, left rear; track 3, right front; track 4 (bottom), right rear. That has compatibility with existing tape configurations in the sense that if you play the four-channel tape on a standard stereo machine, the left front and right front will be reproduced as the left and right of two-channel stereo.

Four-channel is also coming on the market in the "Q8" cartridges, an adaptation of the 8-track two-channel cartridges we have had for some time. The Q8 four-channel cartridges seem to have the main problems of the 8-track cartridges they sprang from: poor high-frequency response, high hiss, wow and flutter, variation in phase relations between channels, difficult cueing. Those faults probably explain why you are not using 8-track cartridges in

your station right now, and also why there are probably only a few of your listeners who have bought 8-track cartridges for their home stereo systems. (**Editor's note:** Other reports on the early Q8 cartridges have been more favorable. A longer period of trial will be needed.)

Getting four-channel on the air

As in the early days of two-channel stereo, various techniques are being promoted for putting the new configuration on the air. We can assume that the first four-channel broadcasters will be FM stations both for technical and historical reasons. A basic fact is that FM broadcasters must continue to give satisfactory service to two-channel and mono listeners, who will make up the majority of their audience for a long time to come. Compatibility is more difficult with four channels than with two: for the latter case, the mono listener can simply hear the two channels summed together. But take, for example, a four-channel broadcast of a concert performance: it seems unwise to mix the four channels at equal amplitude; in other words, to give the mono listener the reverberant sound at the same level as the rest of the program. The same thing is true, to a lesser degree, for the two-channel listener. Not only must a four-channel broadcast be compatible (give satisfactory service to two-channel and mono listeners), but it must also use the spectrum in a way that the FCC will accept.

The two-station method

Over the past year pairs of stereo stations in several large cities have teamed up to put four channels on the air. One station would handle the right channels and the other the left, or one would put out the front and the other the rear. With the first of these arrangements, there was poor compatibility for the two-channel listener. With the second arrangement, the station with the rear channels often found itself broadcasting background noises and muffled music, especially to its mono listeners, because the rear channel material is mostly of random phase.

No room for subcarriers

There are several proposed systems that use one or more additional subcarriers. If such a system is to provide four 15-kHz channels, the total deviation will exceed the 75 kHz currently allowed by the FCC, which makes the system legal only if the FCC institutes new rule making—an uncertain and long-drawn-out process, depending as it does on establishment of a four-channel standard. That, I assume, means a delay of several years at least.

McMartin Industries has suggested a system that they claim will fit in the SCA band (*BM/E*, February 1970.) We ran a rigorous mathematical analysis on this proposal and concluded that it would interfere with the existing main channel, sub-channel and pilot.

Four fits into two with matrixing

But we did find a system that the FCC will not object to, that is compatible, and that has full frequency response on all four channels. The method

4-Channels . . . No Waiting

This article is based on 4-channel technology available to broadcasters as of late Spring, 1971. Since then Gately Electronics has introduced an encoder for the Dynaquad system, which itself has been modified to allow the listener's speakers to be arranged in the conventional two-front, two-rear pattern, which coincides with the set-up anticipated when 4-channel recordings are miked and mixed. The Gately/Dynaquad system appears to offer all of the current advantages of Electro-Voice's Stereo-4 at considerably less cost: the encoder can be purchased for \$300 or less and the decoder ("Quadaptor") for \$29.95 or less. (The Dynaco-type decoder is also available in a package from Lafayette Radio while the Electro-Voice decoder is now available in Radio Shack stores.) The Gately encoder can be switched to provide a signal complimentary to the Electro-Voice Stereo-4 decoder; however, it would appear that this use of the equipment would not be legal once Electro-Voice obtains a patent (currently applied for) on its system.

Meanwhile CBS has introduced a quadrasonic disc based on a unique matrixing system that optimizes left and right separation (both front and rear) at the expense of front-to-rear separation. No equipment for broadcasters is available however. CBS has instituted the idea of muting unused channels to maximize separation by use of gain riding logic circuitry. Presumably such a feature could be added to the Electro-Voice system as well (though not to the Dynaco Quadaptor, since it is a passive device).

In short, the past six months have brought about such a barrage of new ideas and equipment that the Electro-Voice system is no longer the obvious approach to broadcasting 4-channel sound. However Stereo-4 is the system being used most widely right now by both broadcasters and record manufacturers, and this initial acceptance speaks well for its ultimate success.

is the matrixing of four 15-kHz channels together in such a way that they will fit into the space normally taken by two, and in such a way that the resulting two channels produce satisfactory two-channel stereo on multiplex receivers and satisfactory mono on mono receivers. Such matrix systems are being marketed by Electro-Voice and Sansui.

The system uses a mixing matrix that combines the four channels into two by altering amplitude and phase relationships. (**Editor's note:** See *BM/E*, May 1970, for additional details on the Electro-Voice matrixing system.) These relationships have been chosen so that the final result will simulate the natural acoustics of surround sound.

The two channels that come out of the matrix, or "encoder," are handled exactly like any two stereo channels. You can mix them on your stereo console, record them on two-channel tape or tape cartridges (record companies put them on stereo discs, playable on regular stereo playback equipment), send them from the console down the audio chain to your stereo generator for transmission over the air. Not even your SCA will know that the signal is different from a standard two-channel one.

To hear the four channels, you and your listeners start with a regular stereo tuner or stereo monitor, and feed the two encoded channels to another matrix, the "decoder," which reestablishes the four-channel information. Now you have four channels back, and can feed them to four amplifiers and four speakers.

Separation—less but enough

If that were the whole story, nobody would question the matrix system for a moment. There is a

catch: a reduction of separation. In two-channel stereo, we have come to accept separation figures of 20-30 dB between channels. (The FCC requires FM stations to measure 29.7 dB of separation from microphone input to antenna output. But if we had to measure this through our disc-playing system, we would find out that 29.7 dB separation cannot be achieved by a broadcast station with today's technology.) In the output of a matrix system, separation will be limited to 10-20 dB, instead of the 20-30 dB we have been accustomed to.

I believe that this reduction of separation is not a cause for alarm, for two reasons. Separation is not like distortion, of which less is always better. If you have enough separation to get the desired effect, you don't need any more. Now, if you were broadcasting two entirely different programs, or the same program in two different languages, 11dB of separation—the worst-case figure, according to Electro-Voice—would not be enough. It might not be enough if you were broadcasting sound effects, such as a railroad train moving across the living room.

But my listening to stereo stations across the country indicates that most of them broadcast music most of the time. I believe that a matrix system is entirely satisfactory for music.

To find out if listeners would agree with this, we set up demonstrations of both the Electro-Voice and the Sansui systems at the four-day Bay Area High Fidelity Show in April 1971. We put 39 hours of four-channel stereo on the air, using the Electro-Voice system. Some 20,000 hi-fi buffs heard the broadcasts at the show; not a single listener complained of inadequate separation.

The second reason why I believe four-channel stereo needs less separation than present standards specify is inherent in "surround" projection of music. There are simply more sources of sound in a given area; hence it is less important that they be separated from each other to create the "surround" effect. Furthermore, if you turn down the separation control on a two-channel system, I think you will find that you have to turn it down pretty far before the lack of separation becomes apparent. One music lover with a lot of listening experience has told me that 6 dB of separation is enough to make two-channel stereo work perfectly for him. (**Editor's note:** See "Two Other Broadcasters' Views.")

Cost—very low

A lasting advantage of the matrix system is its low cost compared to that of other four-channel techniques available to the broadcaster. Electro-Voice sells the professional encoder, for converting four channels to two, for \$795. The decoders, used by listeners and in the broadcaster's control and monitoring set-up, cost \$59.95. The machines for playing the original four-channel programs on 1/4-in. tape are made by a number of firms, including Sony, Teac, Wollensak, etc. A Teac unit for playback only costs \$395. For less than \$1200 you can put four-channel stereo on the air today!

Next month: How I set up four-channel capability—control, monitoring, etc.

Two Other Broadcasters' Views

Here are excerpts from two letters received at BM/E on experience with the Electro-Voice matrixing system.

From Darryl E. Parker, chief engineer, KFJZ, Fort Worth, Texas:

"Radio Station KWXI-FM . . . began broadcasting in quadrasonic via the Electro-Voice Stereo 4 System on April 12, 1971. . . . We first discovered one interesting and necessary fact: for use of the E-V system all compressor/limiters must have ganged control voltage with respect to each channel. We also anticipated complaints about lack of separation, but were surprised when there were none. . . . Since April 12, KWXI has presented one hour each evening in "quad," a task not easily accomplished when one considers the limited amount of material available either on encoded disc or four-track tapes. . . . Since that time, however, many encoded discs have been made available to us. . . . We conducted some tests on the E-V method . . . we observed that the E-V system is essentially flat from 20-30,000 Hz with distortion less than 0.6% at any frequency in that range. The Electro-Voice 7445 is a well-constructed, professional piece of gear. . . . Although the E-V system leaves a lot to be desired in terms of separation, it does work, it does recover four different (but not entirely different) channels, and it is available today. It will inevitably be replaced by a better system, but no one can deny that it is creating a lot of interest in audio and broadcast circles. . . . For a very small investment, as more and more quad discs are made available, it is a great sales tool. This is one instance where engineering excellence means money in the bank, not out of it. We . . . have committed ourselves to the E-V method; it may not be the ultimate answer to the broadcasting of four-channel, but it deserves merit because of its compatibility and availability."

From Gary Lerude, quadrasonic coordinator, KSRN, Reno, Nevada:

"KSRN has taken an active interest in quad since its inception. In our final analysis, KSRN must favor the discrete approach to quadrasonic stereo for broadcasting and the audio industry.

"We tested the E-V system of matrixing and found it to be totally unacceptable from the standpoint of channel separation, when compared to discrete four-channel stereo. . . . I realize that for those stations that are taking advantage of the matrixing systems to build ratings and sales, or where market situations are such that simulcast four-channel is impractical, if not altogether impossible, the matrixing systems offer immediate means to achieve a particular end: sales, ratings, promotions. However, I would hope that the matrix systems would be only a temporary stepping stone to discrete methods of four channel."

WITN-TV eclipsed local news programming with a mini ME-4 color processor.

"We were the first in our market to go full color," says Dick Paul, Vice President—Operations, for WITN-TV in Washington, North Carolina. "And the amazing thing was that we made the switch overnight.

"We hooked it up in one day. A representative from Kodak showed us how to use Kodak's packaged chemicals and run test strips through our mini processor. And the following day we were on the air with color film.

"Sooner or later you have to go full color. The viewers demand it, and they're right. They want to see things as they are—not in black-and-white. When we covered the total eclipse last year, it was the first time our viewers were able to see it on television as it really was.

"We've had tremendous response from viewers and advertisers for our color eyeWITness news programs. And part of the success is due to the fact that we now have much more flexibility in the area of local news and documentaries. And, of course, with a processor we have fewer problems with deadlines. In short, it's been just as big a success with us as it has been with our viewers."

If you're considering the move to full color, mini ME-4 processing may be just what you're looking for. And you can get all the help you need from your nearest Kodak Representative. All it takes is a phone call. And before you know it, things will be looking up.

EASTMAN KODAK COMPANY ATLANTA: Bob Baker 404/351-6510/CHICAGO: Dick Potter 312/654-0200/CALLAS: Frank Reinring 214/351-3221/HOLLYWOOD: John Warner 213/464-6131/NEW YORK: Bill Reddick 212/262-7100/SAN FRANCISCO: Joe Sammelmayr 415/776-505E



AUDIO FILE:

FOR BETTER IDEAS
FROM AUDIO ENGINEERS

Four-Channel Stereo, Classy Consoles, Noise Reduction Make News at AES

The New York Convention of the Audio Engineering Society came to an end on Friday, October 8, completing four days that constituted a comprehensive showcase for all the ferment brewing in audio—and there is plenty of it. About 3000 people registered. The Exhibit of Professional Equipment was also the biggest for the Society, with more than 60 firms showing their products.

For broadcasters, the most important themes were probably the sharpening competition in four-channel methods and in noise reduction systems, and the steady advance in quality of audio consoles, of signal processing equipment, of magnetic tape and magnetic tape machines for audio.

The all-day tape recorder workshop, held on Wednesday, October 6, at a special fee of \$5, was heavily oversubscribed. Every session of the workshop played to a full house. Topics covered were: techniques for assuring stable tape speed; measurement methods; motor and drive characteristics; head adjustment; tape-machine relations; set-up and maintenance. An assembly of background material on these topics, from a number of sources, was so popular that the AES announced the availability of the package via mail from the Society's editorial office, 124 East 40th Street, New York 10016 (the nominal fee will be announced later).

On the four-channel front, broadcasters are naturally eager to see any signs of standardization of matrixing methods. The main contenders at present, Electro-Voice, Sansui, and CBS, were all strongly in evidence. CBS's paper on the SQ system drew a huge crowd. Electro-Voice and Sansui demonstrated their systems in exhibit booths. Perhaps most significant were the papers, by Duane Cooper, Peter Scheiber, and R. Itoh of Sansui,

discussing matrixing methods in the most general terms and looking toward a universal solution of the matrixing problem.

Noise reduction is another audio function for which competing systems are very much on the scene. David Robinson of Dolby described listener reactions to the experimental Dolbyized FM broadcasts (see separate story in "Broadcast News," this issue). R. S. Burwen demonstrated his quite different system which, he claims, produces a signal-to-noise ratio of 110 dB in a tape machine (the demo did show a dramatic drop in noise; thorough evaluation will require more listening). Hanson, of North American Philips, demonstrated his company's system, the third one in the field and again one could hear noise drop off sharply. Philips claims a 5 dB gain in s/n at 6 kHz and more than 20 dB above 10 kHz.

The conclusion the broadcaster can safely draw is that there is a many-sided attack on noise in tape (and in FM broadcasts), which will almost certainly change all the rules on noise dramatically. The Dolby system is, of course, very widely used already, but will not be able to rest on its laurels: broadcasters can only benefit from this competition.

A joint technical session with the IEEE Audio and Electroacoustics Group covered another state-of-the-art area, digital techniques in audio. A very useful paper was that of T. J. Stockham of the University of Utah on how to avoid certain distortions in D/A and A/D converters. An important practical application of digital audio, a delay system, was covered in a paper by Barry Blesser of MIT and also turned up in a ready device in Melcor's exhibit (see below).

Prominent among the exhibited items were fancy consoles, continuing the trend toward more elaborate control systems. Many were aimed

at 16-input-4-output recording and mixing. For most small broadcasters, these consoles are significant chiefly for the flexibility and automation of control that were in evidence, and that can be incorporated in consoles more directly aimed for broadcast use. Advanced units were shown by Neve, Spectrasonics, Langevin, Olive, Audio Designs, CCA, Fairchild, Gately, Philips Broadcast, ADRL, and RCA. Signal processors included Melcor's delay unit, a four-channel pan pot by Quad Eight, a phase shifter with capability to 1200 degrees by Eventide Clock Works, CBS compressors and limiters, DBX range expander, Allison's Kepex and limiters, equalizers by Automatic Processes and Systron Donner.

Tape machines came from Philips, Otari, Revox, Nagra (the new vest-pocket Nagra stirred interest), Teac, Studer, Scully and Sony. Preamplifiers, line amplifiers, power amplifiers were shown by Automated Processes, Bozak, Crown, Dukane, Langevin (MCA).

Prominent among the microphone exhibitors were Shure, Sennheiser, Sony/Superscope, Scientific Electronic, Electro-Voice. Test equipment of advanced design came from Elpha, Crown, DBX. Capps showed a new computer control unit for disc mastering, Gately showed the new Ortofon cutting system, Stanton showed magnetic disc pickups, and AKG, Koss and Revox-Beyer showed headphones.

—Robin Lanier

Adds Mike Compression to All-Talk Radio System

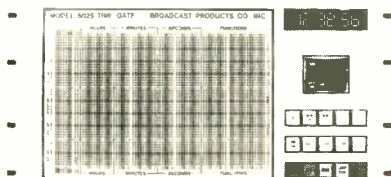
Some feedback on the "All-Talk Audio Processing" article which appeared in "Audio File," *BM/E* October 1971, just arrived from Mark Durenberger, chief engineer,
(Continued on page 43)

BROADCAST EQUIPMENT

New and significant

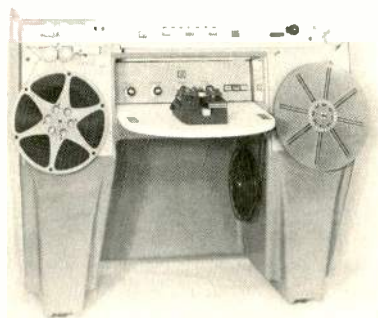
For more information, circle boldfaced numbers on Reader Service Card.

Real time programmer allows station to completely program 25 real-time functions for up to one week in advance. Model 5025



Time Gate can simultaneously control AM, FM, and TV operations. It will control any station function by the day, hour, minute and second with an accuracy of ± 2 seconds per year. Programming is carried out by inserting program pins in the function/time holes in panel matrix. BROADCAST PRODUCTS. **276**

Automated film maintenance center has a self-checking detection

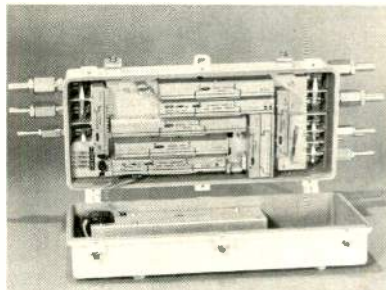


Low-light-level TV cameras ten times as sensitive as standard vidicon cameras for CCTV can be aimed directly at sun without damage to the silicon diode-array screen. The 4250/4350 series presents a usable picture with only 0.003 foot-candles of illumination (less than the light from a quarter

system that verifies accurate defect sensing before every inspection cycle. Model 9000 T/L has inspection speed control with range from normal viewing speed to 1000 ft/min. Wet tape cleaning with pre-packaged saturated tapes is standard. Automatic hot splicer can be included. PAUL-MAR, INC. **277**

High-band color video tape is designed for low head wear on all transverse-scan broadcast VTR's. The 175 Series of video tapes have smaller oxide particles than previous tapes and new tape coating process that results in head wear of less than 2 micro-inches per hour. Noise and dropout characteristics equal or superior to other tapes on market. AMPEX. **281**

Dual cable bi-directional amplifiers have bandwidth of 50-270 MHz forward and of 6-90 MHz in re-



verse. Challenger Mark III Model CVT-6AB trunk amplifier also has two-pilot slope and gain control with complete temperature compensation on forward trunk and stable automatic gain on the reverse. AEL COMMUNICATIONS CORP. **280**

Parabolic reflector has 15-foot diameter with focal length of 8 feet. "Miniscat" is available for coverage of bands 7 to 13, 14 to 70, or both.

moon). Horizontal center resolution is 650 lines, vertical center is 350 lines. Video output is composite video or modulated RF. COHU. **278**

Electronic image enhancer automatically increases the sharpness and detail of color images on home sets, when

Gain at channel 13 is 17.5 dB with a beam width of 22 degrees. Gain at channel 70 is 29 dB, with beam of 6 degrees. \$1200-\$1500. RF SYSTEMS. **283**

Automated control center programs music, random-selects cartridges for



commercials, inserts IDs. Sparta-Mation Control Center can be used with any broadcast-quality equipment. \$6000-\$8500. SPARTA. **282**

Lightweight headsets weigh 1 to 2 ounces, can be worn just off the ear



to avoid irritation. Minilite headsets come in several configurations, with and without mikes, with frequency range 100-3500 Hz. TELEVISION EQUIPMENT ASSOCIATES. **284**

used at broadcast transmitter. Mark III Automatic Image Enhancer increases contrast in "soft" pictures, particularly effective in fast-moving sports scenes. It can take the place of the manual enhancer now widely used, is less than half the size of the manual

(Continued on page 38)

all systems go!

The cumbersome four or more piece FM monitoring systems are going. Belar Monitors do a more accurate job, as totally integrated one, two or three-piece systems. The FM Frequency and Modulation Monitor measures both frequency deviation and modulation functions—the only unit to do both. The Stereo Frequency and Modulation Monitor has everything built in—phase discriminator, exclusive 19 kHz frequency meter, and test functions. The SCA Frequency and Modulation Monitor is the only one that monitors four separate subcarriers.

All systems go!
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Circle 110 on Reader Service Card

system, and examines coded color signals as they are broadcast to automatically adjust vertical and horizontal detail, as needed, to eliminate "softness." CBS LABORATORIES. 279

Time domain reflectometer system can be battery or ac operated, weighs eight pounds for easy portable use. The 1501 has a plug-in recorder that makes high-resolution charts, 4 × 25 cm., at the touch of a button. The signal can also be fed to an oscilloscope screen. Step pulse rise time is 1.3 nanoseconds, amplitude 1 volt. Unit can be used out to 10,000 feet. \$1900. TEKTRONIX. 275

Taped music service for broadcast automation systems is based on *Billboard's* "Easy Listening" charts. "Bright Now" series also has selections from the "Hot 100's," spiced with yesterday's golden award winners, and is aimed at the 18-49 age group. Form I puts major emphasis on big-beat instrumentals, Form II on vocals. Subscribers get a basic 66- to 77-hour library, with 6 to 7 hours of current music added monthly. \$750 to \$1025 for basic library; \$225 to \$325 per month for new reels. SCHAFFER. 285

Low-cost TV modulator makes it easy to add closed-circuit TV to master antenna TV systems. Uni-Mod has crystal-controlled video carrier; can be used with ETV, hotel, motel, or apartment house systems, and in security systems, to give tenants view of front door. Unit is available with output on any channel, 2 through 13. JERROLD. 286

Heavy-duty plow buries cable at speeds up to 47 fpm, to depths up to 30 inches. The P-20 plow is built specifically for the M-450 and M-460 tractor units, is mounted on a 3-point lift assembly with swivels for a very short turning radius. VERMEER. 287

Intensifier vidicon camera tube is said to be 50 times as sensitive as standard vidicon tubes. RCA Intensifier Vidicon C23165, is aimed at industrial surveillance in such locations as parking lots, warehouses, docks, freight storage areas, where light is low. RCA. 288

Pre-printed time and weather cards are printed with image on both sides in different sizes, so card can be trimmed to fit any time and weather machine. Large variety of images include Thanksgiving Greetings, Driver Safety, Christmas, Don't Lit-

(Continued on page 40)

"Scoopic 16 shoots the news faster than any other camera available."...Says Henk de Wit, Director of Photography at KDFW-TV Dallas.



Staff at KDFW-TV Dallas ready to film the news when it happens, where it happens with their Canon Scoopic 16s.

Canon's Scoopic 16. Made for fast-breaking news events. Because it shoots them faster than any hand camera around. That's a large claim for an under 7-pounder.

Uniquely designed hand-grip. Fully automatic exposure control with manual override. A built-in zoom lens. Motor drive and auto threading. All adding up to a perfect shot. Everytime.

Close-ups, medium and long shots, zooms, telephotos, wide angles. Even "follow" shots. Instantly focused. Indoors and out. Filming... not fumbling. Because your eye never leaves the view finder. You're always in focus for that great newsmaking moment.

But don't take our word for it. Try the Canon Scoopic 16 for yourself. Give it a good workout for two weeks. Free of charge and without obligation. That's how sure we are you'll find Scoopic 16 is all it claims. The best professional camera around. At only \$1250.

To qualify for our offer, you need only be a bonafide TV station in the U.S.A. If this is you, why not send in our coupon today.

- I'd like more information on Canon Scoopic 16.
- I'm interested in your offer. Please send my application for two weeks* trial use of Canon Scoopic 16. Free of cost and without obligation on my part.

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Station _____

Position _____

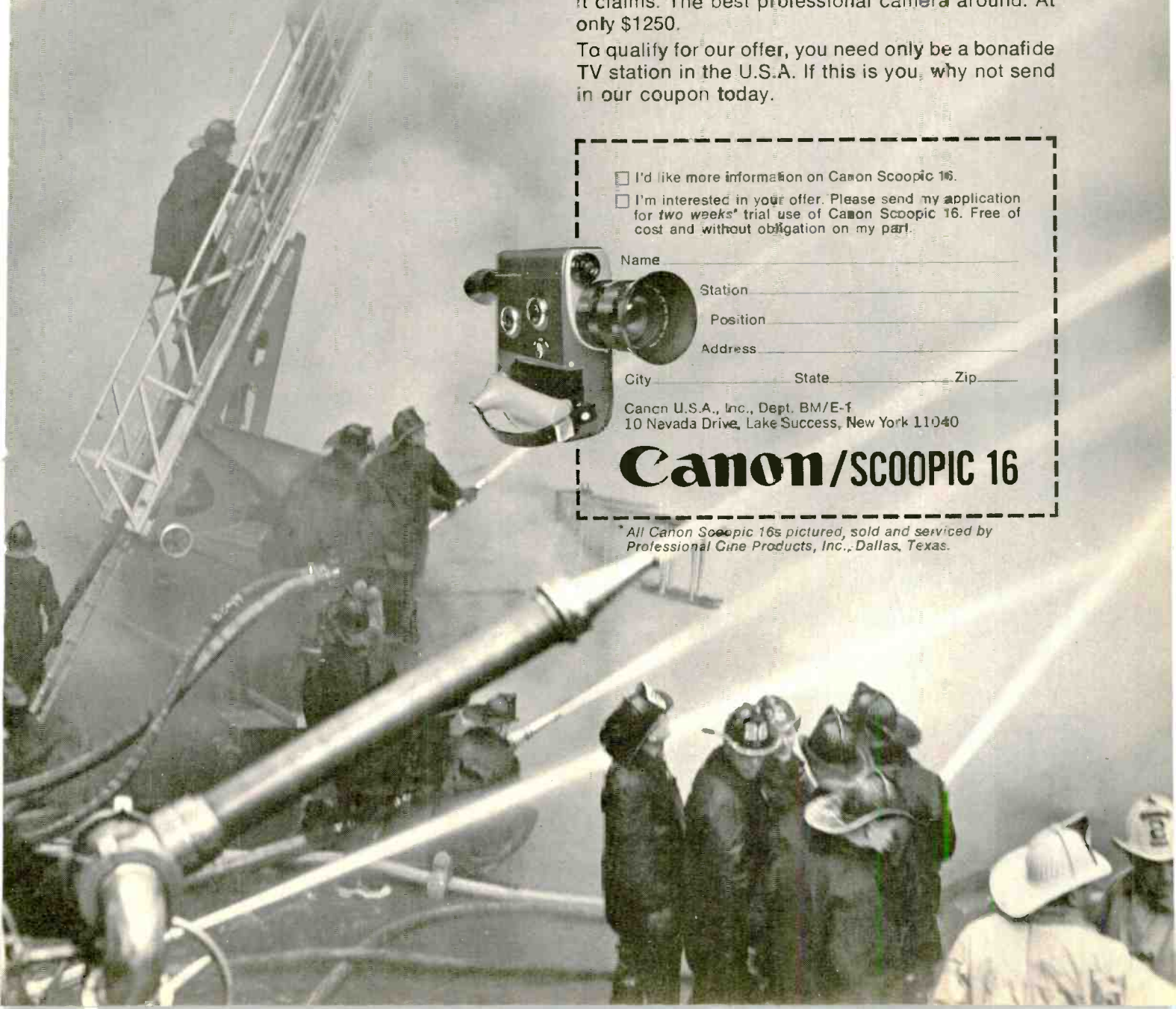
Address _____

City _____ State _____ Zip _____

Canon U.S.A., Inc., Dept. BM/E-1
10 Nevada Drive, Lake Success, New York 11040

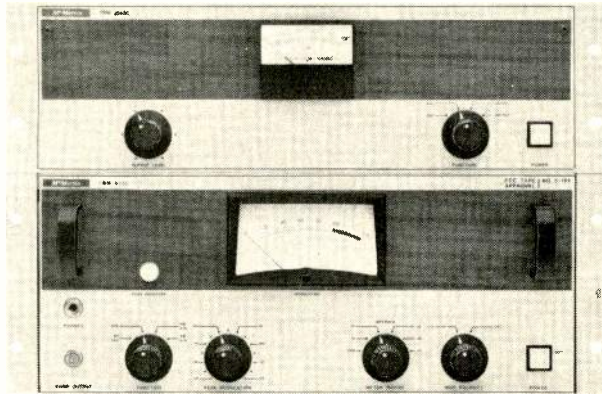
Canon/SCOOPIC 16

*All Canon Scoopic 16s pictured, sold and serviced by Professional Cine Products, Inc., Dallas, Texas.



remote VHF-TV

aural modulation monitoring



TBM-2500-CL\$510.00 | TBM-5500.....\$1,300.00
 TBM-2500-CH.....\$535.00

At a very practical price, McMartin's TBM-5500 satisfies new FCC rules for "a type approved aural modulation monitor, equipped where necessary, with a properly designed signal frequency amplifier..." Sec. 73.676(a)(5). ■ Driven by the TBM-2500-CL (Channels 2-6) or TBM-2500-CH (Channels 7-13) RF Amplifier, the TBM-5500 has a composite output signal termination to permit measurement of 39 kHz subcarrier injection level. Equipped with the TBM-2100 SCA Demodulator (optional at \$125.00), it also provides recovery of subcarrier telemetry tone information. ■ Long the leader in FM monitoring and professional receiving equipment, McMartin now provides the realistic answer to remote control VHF-TV aural monitoring. Coming soon—the TBM-5000 VHF-TV Digital Frequency Monitor—for visual, aural and intercarrier deviations.

For details, contact: Broadcast Product Manager (402) 342-2753

McMartin

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Circle 112 on Reader Service Card

ter, Home Safety, and many others.
 PENNSYLVANIA CATV ASSOC. 289

Rack cabinet has additional depth to hold television equipment. RAK-80 is 72 in. high, 25½ in. deep, with rear door. GATES. 291

New plumbicon TV camera in Dage series has white clip, delay line aperture correction, gamma correction and AGC. Dage 800 has full processing camera control, phase compensation, sync advance, other advanced features. DAGE. 292

VTR adaptor extends play time of Sony Videorecorder II from one half-hour to one hour. VP60-A fits onto



Sony machine, provides still frame, fast forward and rewind capabilities. VIDEO CIRCUITS. 293

New ultra-fast zoom lenses are rated at f/1.8. Ultrafast includes 10:1 and 6:1 versions, both manual and motorized. WOLLENSAK. 294

Real-time audio spectrum analyzer can stand alone or operate as part of an automatic or semi-automatic data system. Model 8064A has filters that divide spectrum into 24 third-octave channels in the range from 2 Hz to 40 kHz. Measured sound or vibration levels are displayed on oscilloscope screen, can be read with a resolution of 0.1 dB. Dynamic display range is 60 dB. Built-in analog memory will "freeze" the display, or record maximum level in a series. \$9900 for 24 channels, other models less. HEWLETT-PACKARD. 295

Cartridges aimed at providing reel-to-reel quality have two guide posts to minimize wow and flutter. "Aristocarts" have tapered hub and well to stabilize tension; frequency range virtually flat from 50 Hz to 15 kHz in stereo, low-pressure pads. INTERNATIONAL GOOD MUSIC. 296

Editor-programmer is for tape-to-tape (Continued on page 42)

WHEN THE CABLES GO UNDERGROUND

Go with HANDLEY Cable Closure for your buried plant



Lightweight / Non-Corroding / Inexpensive

Handley's durable CATV cable closure is made of non-corroding resin-rubber compound (A.B.S. Polymer) that will never rust nor rot. Long life is assured because it's non-shattering and withstands all soil conditions.

The lightweight closure is easy to handle, install and use. For easy cable and service drop entry, the bottom of the lower section features an open arch "through way."

The removable hood has a chemically-bonded green color (with white lettering) that provides a permanent finish and eliminates painting maintenance.

And the price? Phone or write for a pleasant surprise.



- A — Hood height 12" or 23" option
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Expensive?

That's
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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.

Our new Compac 16/8 runs 16mm and 8mm completely interchangeably. It warms up and is ready to go in 10 minutes flat. It can force two stops without slowing down.

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.

How about 35mm Slides?

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.

*The EH-101 procedure uses standard ME-4 chemistry at slightly higher temperatures.

EQUIPMENT DIVISION

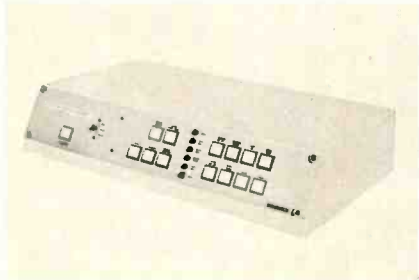
JAMIESON FILM COMPANY



1971 KING ARTHUR DRIVE, DALLAS, TEXAS 75247

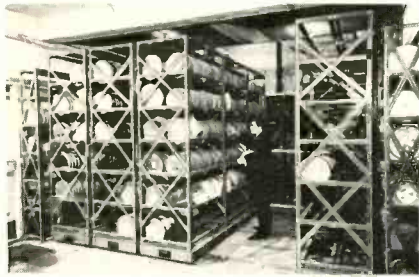
(214) 638-2660

assembly and insertion editing on most 1 in. and ½ in. VTRs, as well as 2 in. quad machines. Dynasciences Editor-Programmer has data storage capability to program "Start Insert," "End Insert;" preview record



and playback tape edit points independently or in combination; and perform many other editing functions on videotape. DYNASCIENCES. 297

Mobile storage racks increase storage capacity 75% or reduce space needed by 40%. "Live Aisle" mobile stor-



age uses racks on a sidewise roller system that allows an aisle to appear where wanted. Other racks are side by side. DEXION. 298

Cardioid dynamic microphone comes in personal carrying case for professional musician's use. Model 2250 has a highly directional pattern for pickup in noisy locations. Front-back discrimination is 16-18 dB over the operating range of 70-13,000 Hz. \$65. TURNER DIVISION OF CON-RAC. 299

Diesel electric system is rated at 125 kw standby and 100 kw continuous duty. DES-125 is for industrial plants, telephone offices, radio stations, hospitals. Brushless generator delivers voltage without sparking. Static voltage regulator has an accuracy of ±1%. ALLIS-CHALMERS. 300

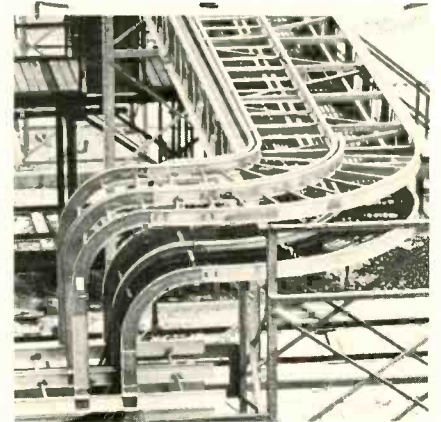
Shrinkable connector protector is waterproof, withstands weather and ultra-violet radiation. Templock Connector Protector requires 1- or 2-second application of 200°F heat to form impermeable cover. TEMPLOCK DIVISION OF ZIPPERTUBING. 301

Aerial bucket lift mounts on ½-ton or larger pickup truck. DF-30 Dura-Lift is completely insulated with

fiberglass boom and bucket, has effective working height of 30 ft, full 360° rotation. DURNELL. 302

Communication tower can reach height of 700 feet with guys, 100 feet without guys. Model T48 is for microwave and heavy-duty communications. It comes in bolt-together sections, 10 ft or 20 ft long. TRI-EX TOWER. 303

Cable trays have straight sections of many widths and depths, bends of various radii, crosses, tees, etc. Chal-



fant Trays can be assembled for a wide variety of support configurations for power, control, and communications cables. CHALFANT. 304

radio project manager

The leading producer of Radio Broadcast Equipment has an immediate opening for a project oriented individual. Although experience in Radio Broadcast Industry would be helpful the main requisite is experience in the management of projects. College degree required.

Responsibilities in AM and FM product line includes selection and definition of new products and responsibility for new product programs from development phase through market introduction.

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NEW LIT

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

Brochure on new keyboard electronics utilizing a scanning technique describes the "gold crosspoint" key system and includes block diagrams of a system using the method. Cherry Electrical. **200**

Capsule catalog of location lighting equipment for film making, still photography and television shows; quartz lights, soft lights, demountable link systems including grips and supports, barndoor lights, etc. Lowell. **201**

Catalog of B & K test units shows 21 instruments for electronic servicing, laboratory, school, and industry, ranging from a 100% mutual conductance tube tester to a dc to 10 MHz oscilloscope. Dynascan. **202**

Booklet on latest CATV equipment is titled "Tomorrow's Capabilities Now," shows single and dual cable bidirectional trunk amplifiers and related units. AEL Communications Corp. **203**

1972 Electronic Parts and Accessories Catalog No. 215 lists thousands of items often needed to keep equipment working, as well as radio, hi-fi and TV accessories. Allied Radio. **204**

Engineered sound systems catalog shows units and systems available through over 250 franchised sound contractors across the U.S. McMartin. **205**

Brochure on FET V-O-M's shows four new battery-operated portables for use in the laboratory or in the field, all with 10-11 megohm input resistance. Triplett. **206**

Catalog of knobs lists hand-crafted machined aluminum knobs and also five families of plastic knobs, comprising hundreds of models. Alcocknob. **207**

Technical data sheet on low-light cameras describes two units that present a usable picture with 0.003 footcandles, can be aimed at sun without damage. Cohu. **208**

Rental instruments catalog lists hundreds of items—amplifiers, test equipment, power supplies, generators, counters, oscilloscopes, etc., of leading makes, most available to the customer within 24 hours. Rental Electronics. **209**

AUDIO FILE continued from page 36

WLOL AM-FM, Minneapolis, Minnesota. Durenberger writes:

"At WLOL we use exactly the same audio chain for 24-hour talk . . . with a couple of additions. We have added some compression to the mike channels only before they mix with the telephone system and go on to the console. If abused, of course, this compressor ends up fighting the Audimax. But it has proved its worth in the many heated shouting matches that occur.

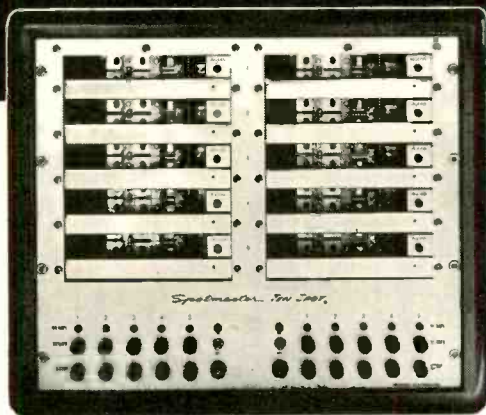
We also perform some rolloff to the entire system. A high-pass filter is down 1.5 dB at 100 Hz, then out of sight by 60 Hz.

And we operate our RE-15 mikes on the bass-tilt position. It's interesting to note that shortly after we rolled the mikes down we received comments on what listeners thought was an improvement in the telephone sound . . . and which was simply a lessening of the disparity between mike and 'phone.

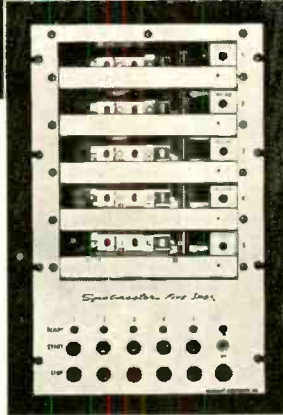
Thanks again for a great magazine!" **BM/E**

Spotmaster

Multiple Cartridge Playback Units



Ten • Spot Model 610B



Five • Spot Model 605B


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Spotmaster Ten • Spot (holding 10 cartridges) and Five • Spot (holding five) will reproduce any NAB Type A or B cartridge instantly at the push of a button . . . at random or in sequence. They may be operated manually or incorporated into programmed automation systems, using one, two or three NAB standard electronic cueing tones.

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"Fairness Doctrine." This misconceives the principle, based on the right of the public to be informed as to the vital issues of the day, which requires that an attack must occur within the context of a discussion of a controversial issue of public importance in order to invoke the personal attack principle. The use of broadcast facilities for the airing of mere private disputes and attacks would raise serious public interest issues, but such issues are not the focus of the "Fairness Doctrine."

In establishing these personal attack provisions, the Commission additionally noted that the purpose of establishing the rules was to clarify and make more precise the procedures which licensees are required to follow in personal attack situations:

The long-applied standard of what constitutes a personal attack remains unaffected . . . [T]he personal attack principle is applicable where there are statements, in connection with a controversial issue of public importance, attacking an individual's or group's integrity, character, or honesty or like personal qualities, and not when an individual or group is simply named or referred to . . . Thus, no matter how strong the disagreement as to views may be, the personal attack principle is not applicable; it becomes applicable only where in the context of the discussion of a controversial issue of public importance, there is an attack on an individual's or group's integrity, etc., as noted above.

The Commission, however, also recognized that in some circumstances there may be uncertainty or legitimate dispute concerning some aspects of the personal attack principle, such as whether a personal attack has occurred in the context of a discussion of a controversial issue of public importance, or whether the group or person attacked is "identified" sufficiently in the context to come within the rule.

Succinctly, however, the Commission declared that,

The rules are not designed to answer such questions. When they arise, licensees will have to continue making good faith judgments based on all of the relevant facts and the applicable Commission interpretations. In appropriate cases, licensees can and should promptly consult the Commission for interpretation of our rules and policies. This would be the appropriate procedure should there arise a question of the applicability of the principle of a factual situation.

Therefore, in answer to the questions raised above concerning interpretation of the rule, the best course of action, in doubtful personal attack situations, is to *consult the Commission (either through your counsel or directly) for interpretation of its rules and policies.*

Specific Examples

Consider the following hypothetical cases to help your understanding of "Fairness Doctrine" and personal attack rule applicability: First, suppose your station *sells* time to an individual who uses your station to discuss a controversial issue of public importance. During his broadcast, he attacks a group opposing his point of view. May you restrict a reply to *purchased* time on your facility? **No.** Even if the first individual purchased time, you would be required to 1) notify the group attacked, within one week, of the date, time, and identification of the broadcast; 2) provide a script or tape of the broadcast attack; and 3) offer a reasonable opportunity to respond over your facilities.

Second, consider the following situations involving
(Continued on page 46)

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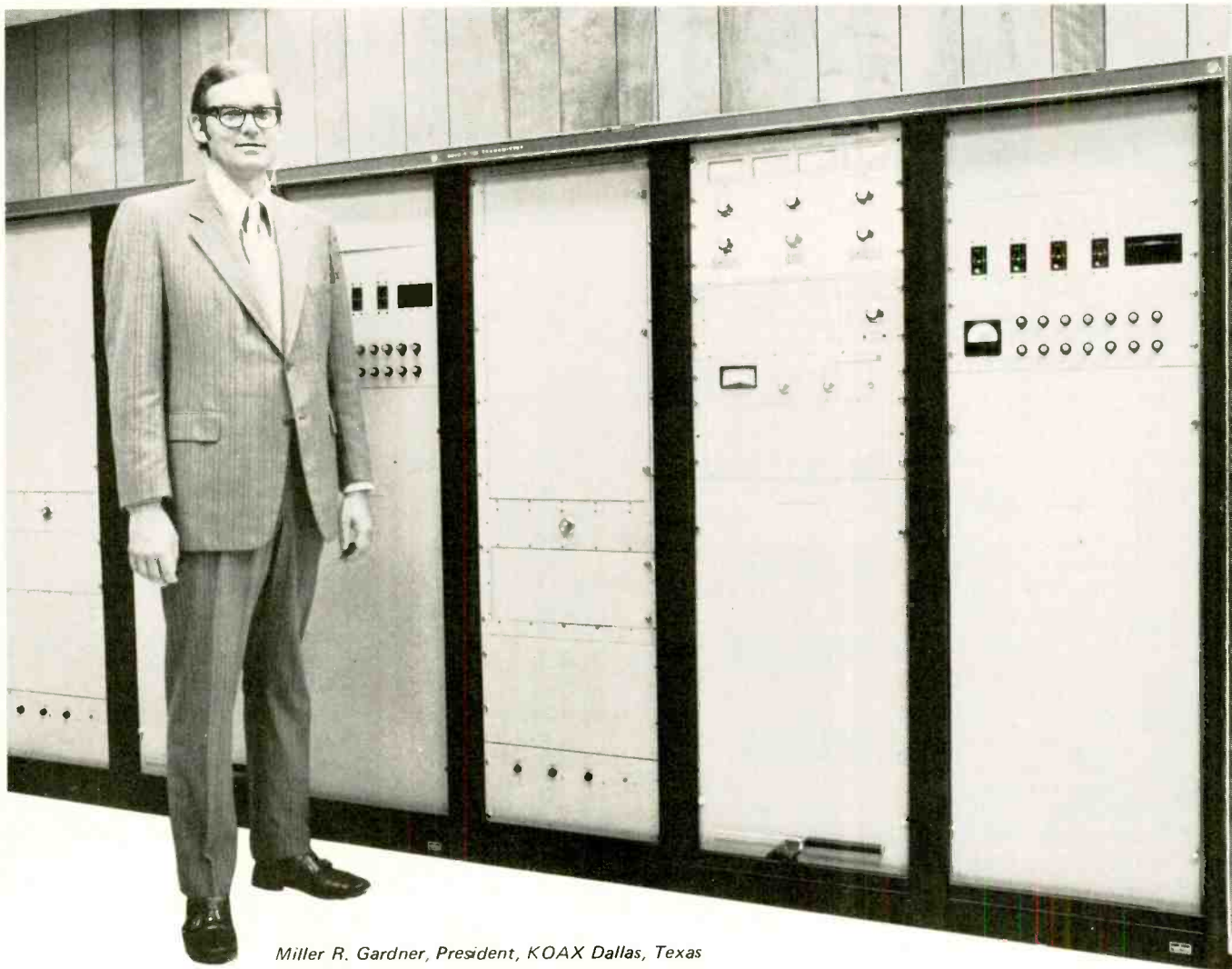
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FCC Continued

ing specific candidates or public-office holders: Suppose your station sells time to Candidate A, his authorized spokesman, an individual, a group, or an organization supporting Candidate A to urge his election. Candidate A does not appear personally on any of these broadcasts; however, issues in the campaign and/or the candidate are discussed. Then an authorized spokesman, an individual, a group, or an organization supporting Candidate B requests "fairness" time under the FCC's existing policies. Does the "Fairness Doctrine" apply? **Yes.** The Commission has held that the "Fairness Doctrine" is applicable and, in answering this question, the Commission reiterated "Fairness Doctrine" requirements: When a licensee presents one side of a controversial issue of public importance, he must afford a reasonable opportunity for the presentation of contrasting views.

Would free time have to be provided to Candidate B's spokesmen or supporters? The Commission has held that the public's "right to know" cannot be defeated by the licensee's inability to obtain paid sponsorship for presentation of a contrasting viewpoint *even where the initial presentation was made under paid sponsorship.* However, when spokesmen or supporters of Candidate A have purchased time, the Commission feels *it would be inappropriate to require licensees to, in effect, subsidize the campaign of an opposing candidate by providing Candidate B's spokesmen with free time.*

Suppose your station sells time to an individual, a group, or an organization supporting Candidate A and the time is used to criticize Candidate B or his position on the issues of the campaign. Authorized spokesmen, an individual, a group, or an organization supporting Candidate B request fairness time under the FCC's policies. Must you furnish time on your station? The Commission says the "Fairness Doctrine" is applicable here; however, you would not be obligated to provide *free time* to authorized spokesmen for Candidate B, or to those associated with him in the campaign, *if authorized spokesmen for Candidate A, or those associated with him in the campaign, had used paid time on your station to criticize Candidate B or his position on the campaign issues.*

In other words this latest statement of Commission policy means if your station *sells time* to Candidate A, or to an individual, a group, or organization supporting Candidate A, and, 1) Candidate A does not appear personally on the program, but issues in the campaign and/or the candidate are discussed, or 2) the broadcast time is used to criticize Candidate B or his position on the issues of the campaign, *then the "Fairness Doctrine" does apply and time must be made available; however, you would not be obligated to provide free time.*

Conclusion

Obviously, the problems presented by the "Fairness Doctrine" and its rules relating specifically to personal attack are many. When specific factual situations arise which may cause potential trouble for your station, you should contact your counsel at once. **BM/E**

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

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of weekly and monthly reports . . . **Opinion Research Corporation** reports that radio is the first source of news in the morning for 58% of the country's leading executives (it's 69% for those under 40 years old). Newspapers get 33% in the morning, television a mere 7%. But TV comes into its own at night, with a 63% rating. Newspapers are second again, at 22%, radio last at 15% . . . **Greenville Cablevision, Inc.**, has sold its cable system in Greenville, Texas, with 4,000 subscribers, to **Cablevision Properties, Inc.**, of Denver . . . **TeleMation, Inc.**, reports sale of 110 of its TSG-3000 broadcast synchronizing generators to NBC, for use in the NBC New York facilities . . . The **New Jersey Public Broadcasting Authority** has received its construction permit for a channel 58 station in Warren Township, one of four stations to be operated by NJPBA . . . **RCA's** directors declared a dividend of 25 cents per share on common stock, payable November 1st to holders of record September 13th . . . **Cypress Communications** reported record

revenues and earnings for the year ended June 30, 1971, with \$8,698,890 in revenues and \$206,848 in net income. Cypress has systems in more than 100 communities . . . **Television Communications Corp.** will buy substantially all the cable properties of **Continental Telephone Company** including systems with about 70,000 subscribers, and passing 130,000 homes. Alfred R. Stern, Chairman of TVC, reports that the acquisition will bring TVC's total to more than 170,000 subscribers . . . **Jamieson Film Company**, of Dallas, will build a new motion picture production complex, the largest in the southwest, to produce films for theatres, television broadcasting, cable TV, and ultimately for video cassettes. The company is also forming a new film producing company, **Masters Film Company**, in association with motion picture executive Martin Jurow.

Association News

NAB—A series of six conferences on the tough problems broadcasters face today in reporting the news has been organized by NAB, to take

place in six cities during October and November. Kick-off was in Atlanta on October 14, and the show will move on to Chicago, Boston, Las Vegas, Denver, and Dallas, the final stand being in the last city November 18. At each conference, discussion will be led by a panel of experts from network news departments and nearby stations . . . The **NAB Radio Code Board** approved an all-out drive to persuade more stations to subscribe to the Code. A task force of regional directors will carry out the program, headed by Ray Johnson, General Manager, KMED, Medford, Oregon, who is chairman of the Radio Code Board . . . NAB attacked a proposal for **public disclosure of the annual financial reports** of networks and broadcast stations. The proposal which includes a restructuring of Form 324 and routine availability of the information to the public, was said by the NAB to be wrong on both legal and practical grounds. The Commission now receives Forms 324 in strict confidence, since " . . . such data would certainly not be made public by the licensees themselves, just as no other business would offer such data for possible viewing by competitors."

NCTA—Responding to the Office of Telecommunications Policy's request for "concise written statements" on broad issues of cable regulation, NCTA made a number of recommendations, among them the following:

Industry structure: Cable should not be treated as a total common carrier; there should be limits on the number of systems in common ownership.

Access: All responsible groups and persons should have access to public cable channels.

Copyright: There should be a new law establishing a compulsory licensing plan.

Impact: Cable will have little, if any, adverse effect on existing networks or affiliates.

Regulation: There should be Federal pre-emption, with local franchising, but no state control.

NAEB—A survey of student members identified as major concerns the acceptance of minority lifestyles, the Vietnam conflict, social and political involvement economic problems, and the environment. The students also asked for, among other things, honest programming and truthful documentaries in public broadcasting, educational re-



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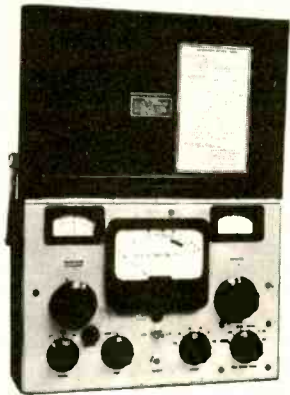
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NEWS continued

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FCC Briefs . . .

A Greenville, Ohio, station got only a short term renewal last time around for failure to supply FCC information as requested. The Commission said it would give WORK-FM another chance since it is the only facility in the area . . . Former Representative Charlotte T. Reid (R., Ill.) was officially sworn in as FCC Commissioner on October 8, succeeding Thomas J. Houser . . . Houser, prior to his leaving, issued a report calling for a new solution to the use of UHF spectrum. The present television-assignment computer program is called "antiquated." Fewer channels covering UHF-TV needs are envisioned . . . Prime time access rules were upheld when six individual stations requested permission to use network material in excess of 21 hours a week . . . Prime time was waived, however, to permit network affiliates to carry on-spot news stories, but FCC denied request for a regular new series . . . TV stations in the mountain time zone were permitted to redesignate prime time hours . . . Also the FCC waived football as part of prime time if the game starts before the magical hour, but other requests for waivers for sporting events such as basketball (all within prime-time slots) were denied . . . so was the Miss America contest.

Ascertainment of community needs continues to cause problems. At Lebanon, Mo., the application by Risner Broadcasting for a license was held in abeyance because programs proposed did not constitute "even a minimum adequate response to community problems and needs" . . . And perhaps to underscore what the FCC is looking for, the announcement approving the application for a new FM station for Salem, Ill., (channel 261A) spelled out in detail the steps taken by the applications at Salem to determine community needs . . . In the CATV sector, the FCC announced that new reporting forms were adopted (FCC Form 325, general information, and Form 325, financial information). First reports are due in March and April of 1972 . . . In New York the telco was denied cable expansion in several areas (under 214 applications) because of unjust treatment toward cable operators,

(Continued on page 50)

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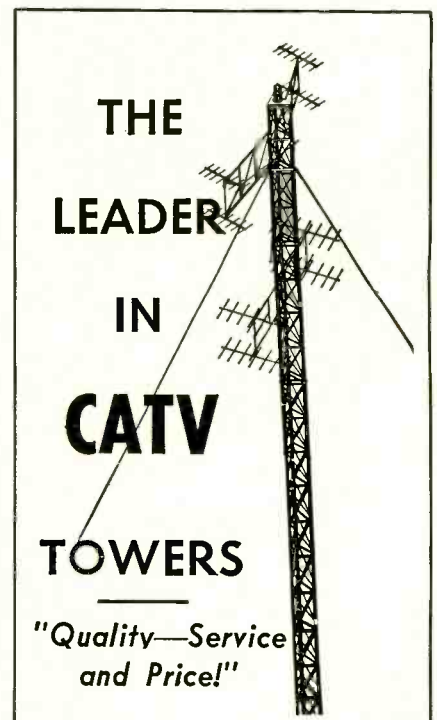
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NEWS continued

although some existing service and expansion were permitted to continue . . . The FCC informed Time-Life Broadcast and Sterling Manhattan Cable, in response to a clarification, that pay TV on cable does not require further authorization . . . On the contested renewals front, Scripps-Howard's WMC-TV, Memphis, Tenn. was granted license renewal. Better broadcasting coalition and citizens' council oppositions were denied for lack of substantial evidence and because Scripps-Howard had more than adequately complied with FCC requirements . . . The FCC said there was no evidence of monopolistic forces at work even though S-H owned a lot of media in the area. In a similar vein, the FCC permitted Newhouse Broadcasting to gain 100% control of KOIN-AM-FM-TV in Portland, Oregon, even though the Newhouse family owns two daily newspapers in Portland. Commissioners H. Rex Lee and Johnson dissented vigorously. (Johnson also dissented to some blanket renewals of six western-state stations because of their substandard programming proposals) . . . Some hefty forfeitures are being levied against errant licensees: W and W Broadcasting, Durham, N. C., for logging violations and engagement in a form of payola (an announcer was promoting an effort in which he had a stake); WBJA-TV Inc., \$3000 for not maintaining center frequencies and carrier frequencies within tolerance; WRKL, New City, N. Y., for failing to maintain the authorized ratio of antenna base currents; WTBY, Waterbury, Conn., \$1000 for falsifying operating logs; KIST, Santa Barbara, Calif., \$1000 for allowing an improperly licensed operator on duty . . . Rules changes have been made (Docket 19182) making it possible for blind persons to become eligible for all classes of radio-television licenses . . . Stiffer radiation limits from Class I TV devices (video cassettes, VTRs, cameras) have been proposed. New proposed limit is 15 microvolts per meter at a distance in feet of 157 divided by the frequency in megahertz, or a distance of one meter, whichever is greater . . . Temporary standards governing program identification patterns have been set pending action on rule amendments. More lines can contain the coding than before . . . Rules have been amended to authorize 1000-watt UHF translators on assigned but unused channels.

Presstime CATV News . . .

Kinney Services, Inc. expects to acquire TeleVision Communications Corp. (3 systems, 105,000 subscribers) and the CATV properties of Continental Telephone Corp. (20 systems, 70,000 subscribers). Kinney which is engaged in motion pictures (Warner Bros.), records, magazine publishing and distributing will acquire TVC for 1,264,000 shares of its common stock and Continental for approximately 550,000 shares. Kinney stock in mid-October was priced at 33-¾. . . Youthful (30 yrs.) Dr. John C. Malone has been elected president of Jerrold Corp.



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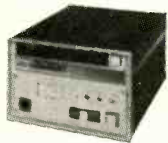
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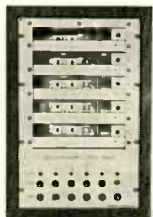


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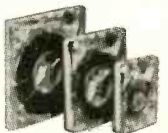
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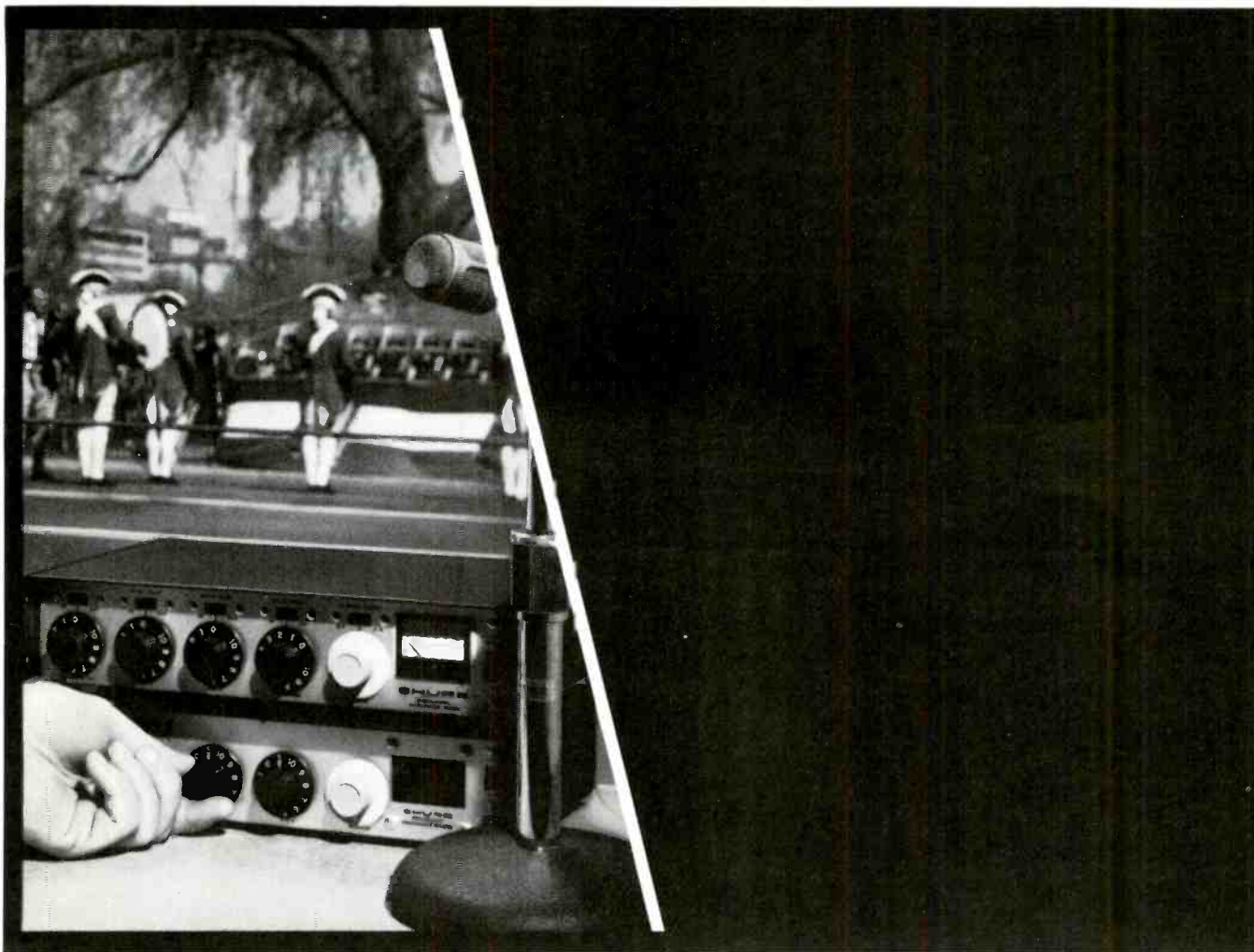
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