A MACTIER PUBLICATION / OCTOBER 1968

BM/E

BROADCAST MANAGEMENT/ENGINEERING

how to ease into a deluxe color sync generator without straining your budget

In three easy steps, you can build your way economically to the same high quality deluxe color sync generator used by the major TV networks. Start out with Riker's basic EIA sync generator—four modules, rack frame and power supply—$2900. When your budget can afford the expansion, add two more modules for deluxe sync lock and you get the advantage of three selectable speeds for locking to an external composite video or sync signal. Cost: $790.

Now you're all set to step up to color. Add three more modules—$1985—and you have eased into Riker's widely used, field-proven Model 520-4CL Color Sync Generator with Deluxe Sync Lock. You now own the best sync generating system in the broadcast industry.

The Riker module at a time approach is the sensible way to build quality equipment into your facilities. Over the long term it's also the most inexpensive way. If you're interested in details on sync generators, write or call Riker—the one company in the TV broadcast industry offering a complete line of all solid-state instrumentation for video analysis, simulation and control.

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PRODUCTS FOR VIDEO ANALYSIS, SIMULATION & CONTROL

RIKER VIDEO INDUSTRIES, INC., 100 Parkway Drive South, Hauppauge, Long Island, N.Y. 11787 (516) 543-5200

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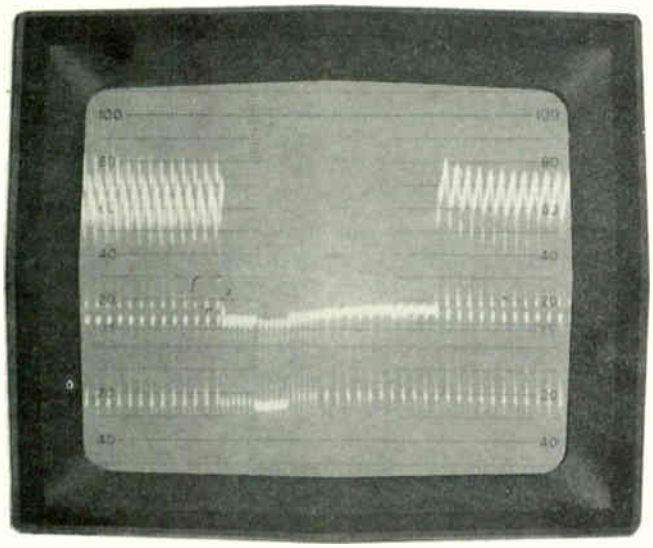
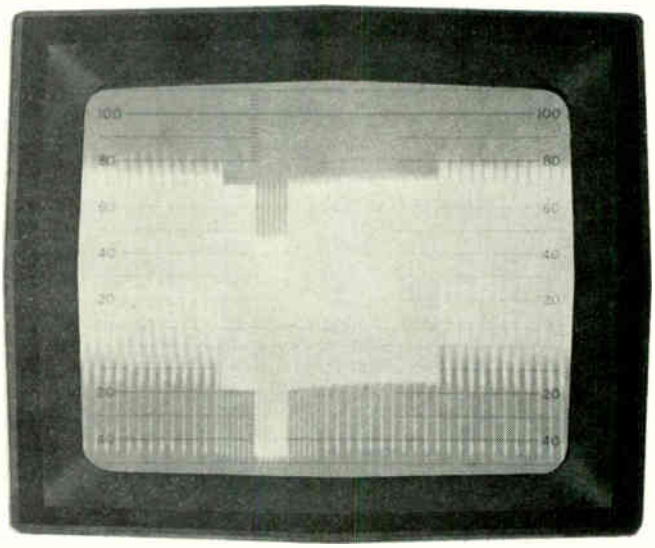
WHEN YOU NEED IT MOST!



Triggers on clean signals.



Triggers on noisy signals, too!

NEW All-Solid-State hp 191A TV Waveform Oscilloscope triggers faithfully and locks on video signals from network, studio, remote, or transmitter—*even when the signals are noisy!* With the 191A's digital field select, you can look at an individual line and know you're seeing what you want to see! Look at VITS by using the discrete LINE SELECT for lines 16 through 21. The 20 kV acceleration potential in the CRT gives you a bright, crisp trace—even when you're looking at fast-rise-time sine-squared T/2 pulses, at X25 magnification.

Use the 191A as your station standard. The all-solid-state 191A was designed in cooperation with broadcasters to meet broadcast requirements. It is the new standard in VITS measurements—with reliability proven by interstate TV transmission companies. Use it to calibrate your other monitoring equipment, and for color or black-and-white setup measurements. It requires only 70 watts for operation—and needs no fan for cooling. You can rack mount it, or stack it without providing extra ventilation!

Use the 191A to make your VITS measurements with 1% accuracy. High tolerance filter design, the constant phase delay amplifier and the parallax-free 8 x 10 cm internal graticule combine to give you this accuracy. Use it on remote telecast, too. It has a temperature operating range of −4°F to +149°F.

Use the 191A probe input on the front of the scope and the 10′ hp 10009A Probe for troubleshooting composite TV waveforms. Probe tip is WECO Type 477B connector for easy connection to patch boards. Troubleshoot your equipment without disconnecting feed-through broadcast signals.

You'll find the 191A is more expensive than other scopes, but when you compare all the advantages and features, you'll know it's worth every cent! It's the scope designed to meet today's requirements and tomorrow's demands! Contact your hp field engineer for full specifications. Or, write to Hewlett-Packard, Palo Alto, California 94304, Tel. (415) 326-7000; Europe: 54 Route des Acacias, Geneva. Price: hp Model 191A TV Waveform Oscilloscope, $1475.00; hp Model 193A (similar to KS19763 except for nomenclature) for interstate television signal relayers, $1550.00; hp Model 10009A Probe, $50.00.

087/21

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OCTOBER 1968/VOLUME 4/NUMBER 10

BM/E

BROADCAST MANAGEMENT/ ENGINEERING

This month's cover: Our Stop-Air-Pollution sign is aimed at the broadcast transmitter. It's designer Gus Sauter's way of pleading with broadcast engineers for cleaner a-m, fm and TV signals. Techniques for doing just that are found on pages 32 through 41. BM/E can't take credit for being the first to apply this slogan. Fm station WKJF, Pittsburgh, has used it to poke fun at their a-m brethren. Photo by Greco-White.

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A meter so sensitive
there's no such thing as silence

NOW YOU CAN HEAR A PIN DROP!

Our wide-range program monitor measures the drop of a pin as precisely as the beat of a drum.

Here's an instrument so sensitive it measures levels accurately across a 60 decibel range. And does it without range switching.

Mighty versatile, too. Uses? Many. *For broadcasting:* Checks signal-to-noise ratio. Monitors live programs or off-air signal. Continually monitors noise and cross-talk levels on stereo and SCA channels. *For remote network and studio transmitter links:* Measures hum, crosstalk and noise levels during program pauses. *For recording:* Monitors full program dynamic range and noise levels during tape, disc or optical recording. *For acoustical engineering:* Measures ambient noise and reverberation levels — checks out crossover and equalizer networks. And it also has an auxiliary output for chart recorders.

You'd expect this remarkable instrument to cost a fortune. But it doesn't. Portable model shown priced at only $305. ($345 with rack mounting enclosure).

Give it a trial run yourself. No obligation. Install it and put it to work. You'll find it the best analytical instrument in the business. We guarantee it. Unconditionally!

Write or call us collect. (203) 327-2000.

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Stamford, Connecticut. A Division of Columbia Broadcasting System, Inc.

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BROADCAST INDUSTRY NEWS

Philips to Build and Sell CBS Tote Camera

CBS Labs' hand-held wireless camera, used successfully at the 1968 Republican and Democratic conventions, will be manufactured for world-wide sale by Philips Broadcasting Equipment Corp.

CBS Labs' Minicam is an important development in several respects. All adjustments are made by digital remote-control techniques from a base station. Camera output is NTSC signal, so that it may be directly recorded either at source or in control room. Many of its principles could be used in standard studio cameras.

John S. Auld, vice president and general manager of Philips, stated that the selling price for the lightweight camera has not yet been established and the market potential is presently impossible for them to calculate.

Objection to Media Monopoly Rules Mounts

FCC has proposed revising the rules which govern multiownership of standard, fm and TV broadcast stations. At present, no individual may own more than seven a-m stations, seven fm stations and seven TV stations, no more than five of which may be vhf. The Commission is now planning to limit any owner to only one broadcast station per market, including newspaper-broadcasting combinations.

Meanwhile, objection from the broadcast industry is mounting. The FCC proposal has been attacked from several angles including: (1) FCC shouldn't discriminate against applicants solely because of other media ownership, (2) fm and uhf would both be hurt and (3) there's more multiownership now than ever despite statements to the contrary.

ACTS Tries for Improved Uhf Tuners

Dissatisfied with progress towards better uhf tuners, uhf broadcasters' All-Channel TV Society discussed means of obtaining a better product at its last board meeting. While continuing to work with the EIA, ACTS will also try to find other means of production and use of improved uhf tuners.

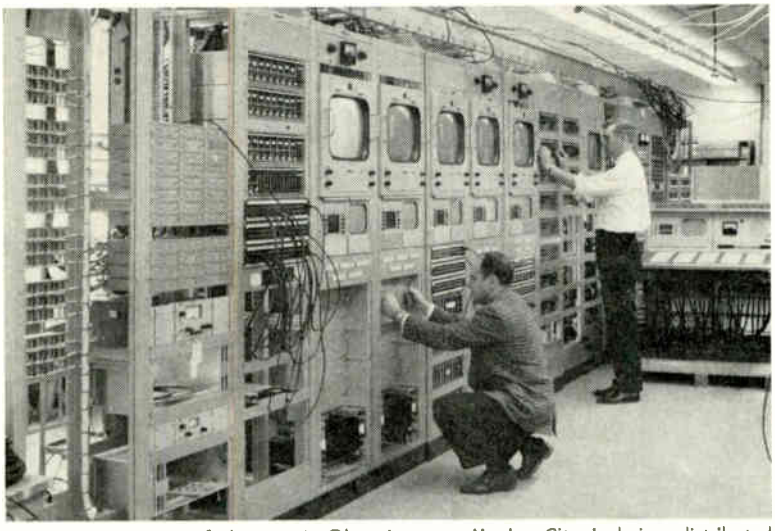
ACTS members stated that a major breakthough will be possible only when each manufacturer has the proper incentive to make better tuners in the maximum number of set lines without competition.

EIA Group will Investigate Standards

EIA has announced plans to form an ad hoc engineering committee to investigate the preparation of standards which may be required as a result of the FCC decision in the Caterfone case. In that decision, FCC opened the door for the manufacture of independently produced telephone accessories that could be used to interconnect with major telephone systems. Currently, such devices are manufactured and supplied by the major telephone companies.

Specifically, the ad hoc group's purpose will be to prepare standards for all possible combinations of interface between signal converters and communication facilities that may now arise.

Olympic Video Switching Complex



Television coverage of this year's Olympics near Mexico City is being distributed to worldwide broadcast networks and their viewers from this switching complex, manufactured at RCA's Camden, N.J. plant. The $750,000 system, one of the largest ever built, is capable of handling up to 24 incoming program signals simultaneously and distributing them on 12 outgoing lines.

Bundy to Keynote NAEB Convention

Ford Foundation President McGeorge Bundy will be keynote speaker at the 44th annual NAEB convention.

The meeting, to run from Nov. 19-22 at the Sheraton Park Hotel, Washington, D.C., is expected to draw over 4000 representatives of broadcasting and allied industries.

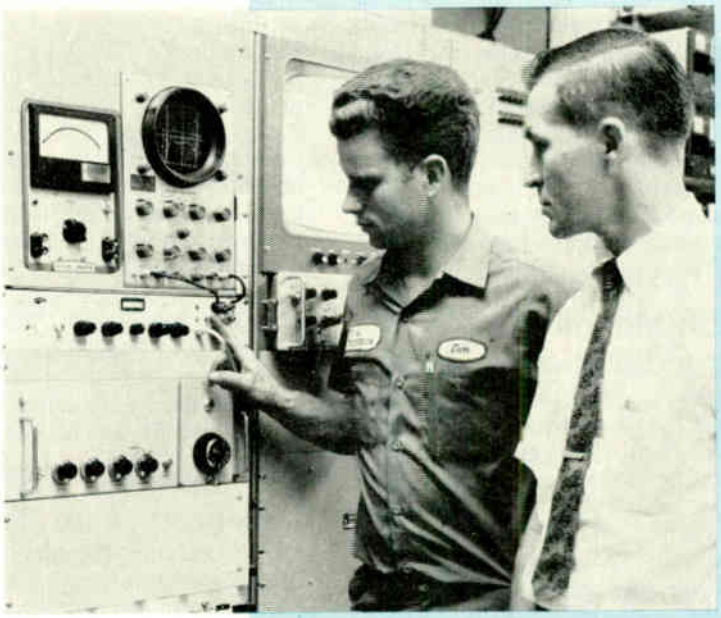
FCC Authorizes Air-Ground Communication

FCC has granted the Nixon-Agnew Campaign Committee emergency temporary authorization to use common carrier frequencies for communication between mobile units aboard aircraft and base stations in the business radio band.

Continued on page 8

"EVERY CABLE TV SYSTEM USING MODULATORS NEEDS A SIDEBAND ANALYZER,"

says Don Cantrell of TOTAL TV, Santa Rosa, California



Don Cantrell, Chief Technician, demonstrates operation of TS-100B Sideband Analyzer to Jim Monroe, Mgr. of TOTAL TV.

TOTAL TV of Santa Rosa, California has been using a DYNAIR TS-100B Sideband Analyzer for over a year. Here's the way they feel about it . . .

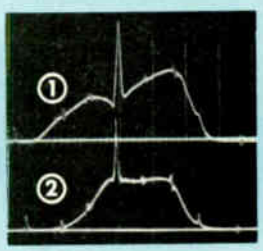
"The DYNAIR sideband analyzer allows us to check modulator operation at any time—precisely and in just a matter of minutes. It also greatly shortens the time required for modulator alignment."

Yes, cable TV operators everywhere have discovered what broadcasters have known for years . . . *the only practical way to check transmitter operation is with a sideband-response analyzer.*

The DYNAIR TS-100B Sideband Analyzer is designed especially for the needs of the CATV operator. It is completely solid state and has a self-contained regulated power supply. It is extremely compact. And it is priced at only $1250 . . . a small price to pay for the savings in time and the increased system performance that are immediately realized. (And an *especially* small price when compared with the $8500-odd worth of standard precision test equipment you would have to assemble to do a roughly equivalent—but many times slower—job!)

These units are available for immediate delivery. Give us a call and place your order today. If you're still not convinced, ask the man who has one.

Dynair also manufactures audio-video modulators, TV demodulators and heterodyne channel converters for CATV use, as well as a complete line of local-origination accessory equipment. Write for complete information.



Actual Sideband Analyzer waveforms indicating (1) poor modulator response and (2) Proper response.

The Dynair TS-100B generates a video sweep signal which is applied to the video input of the modulator under test. The RF output of the modulator is then directed back through the TS-100B, where the RF spectrum is analyzed and then applied to an oscilloscope for display. The display is a precise representation of the sideband response curve, showing both the visual and aural carriers. Markers for frequency measurement are provided at 0.2, 0.5, 1.5, 3.6 and 4.5 mHz to allow exact frequency determination.

DYNAIR

ELECTRONICS, INC.
SAN DIEGO, CALIFORNIA

DYNAIR ELECTRONICS, INC.
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CALIFORNIA 92114 (714) 582-9211

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The Commission approved operation, from Aug. 21-Nov. 15, 1968, of mobile station KH4514 to include two air-ground radiotelephone transmitters with 50 watts input power, for voice and teletypewriter, one on each of two leased jet transports. The mobile units may be used to communicate with developmental ground stations authorized in the Public Air-Ground Radio Service on specified frequencies with concurrence of the Bell System operating companies.

$2.6-Million Needed By Educational Radio

A survey conducted by the Educational Radio division of the NAEB shows that 19 of the 160 eligible member stations in the U.S. plan to request a total of $2,658,550 for the purpose of future construction and expansion.

Projecting the 19-station sample to the national figure of 160 stations indicates total projects are likely to exceed $23-million of which $15-million would be Public Broadcasting Act Funds and $6.6-million local money. Plans reported in the survey include new stations as well as new building and facilities, multiplex equipment, increased transmitter power and production centers for existing broadcast stations.

Study of Urban Crises At NAB Conferences

The National Association of Broadcasters has scheduled an in-depth study of the crises in the cities and the broadcaster's role in remedying these problems at its Fall conferences.

Other conference highlights will include a report on the state of the radio-TV industry, a radio roundtable on recorded music and an address by an FCC official. Also on the agenda are discussions on radio's role in contemporary life and the need for political action by broadcasters against the danger of government encroachment into their daily operations.

The six conferences are scheduled for New York City on Oct. 17-18, Los Angeles on Oct. 21-22; Denver on Oct. 24-25, Cincinnati on Nov. 11-12, Dallas on Nov. 14-15, and Atlanta on Nov. 18-19.

EIA Opposes Use of Low-Freq. Cue Tones

EIA Consumer Products Division has filed objection to the FCC proposal to permit a-m radio broadcasters to use low-frequency (20-36 Hz) tones for telemetry purposes, thereby eliminating the need for leased land lines and use of lines from studio to transmitter.

The EIA position is based on results of lab tests conducted in May, followed by two field tests made in June and July. Field tests consisted of a mixture of program material plus a series of special signals, in addition to the low-frequency telemetry tones.

The listening tests produced noticeable distortion and interference at modulation levels as low as one percent with certain program material, such as voice modulation and music passages with sustained pauses. Test participants concluded that the FCC proposal would lead to considerable listener dissatisfaction and complaints.

New TV Tuner Eases Uhf Channel Selection

Standard Components Division of Standard Kollsman Industries has developed a solid-state TV tuner that makes precise selection of uhf color and black-and-white programs as a simple as tuning vhf channels.

The new uhf tuner (for channels 14 through 83) is a companion to the solid-state vhf TV tuner. Both tuners use varactor diodes that eliminate the mechanical switching of the conventional vhf tuner, ganged capacitors and gear mechanisms of conventional uhf tuners. There are no moving parts inside the new tuners.

Pre-set tuning of uhf channels is rare in American TV sets because of the expense and complexity required to adapt conventional tuners. With the varactor tuner, however, pre-set selection is simply a matter of switching voltages.

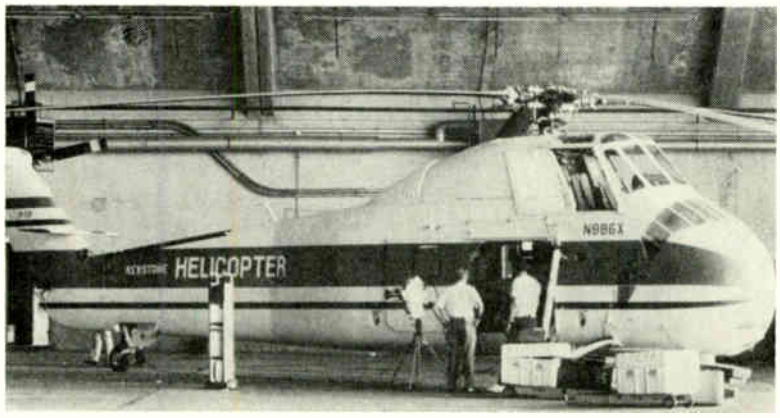
A pilot test of the varactor combination is scheduled to provide a quantity of samples for detailed engineering studies by television receiver manufacturers.

'Earth Stations Key to More Commo Birds Use'

In a study made recently by an ad hoc engineering group of the Electronic Industries Association, it was concluded that powerful, low-cost earth stations hold the key to future satellite telecommunications uses. The study was part of the EIA Satellite Telecommunication Subdivision's active push for a domestic telecommunications satellite system.

Reports, eventually forwarded to the President's Task Force on Communication Policy, concluded that satellites radiating relatively high output power, coupled with low-cost earth stations, will lead to a reduction in overall user costs. It was also stated that replacement of large steerable antennas by smaller nontracking antennas and uncooled noise receivers would result in the multiplex equipment becoming the major cost factor, rather than the large antennas. Furthermore, it was proven that there is an essentially linear reduction in maximum orbital channel capacity as antenna diameter is reduced and there is a large

Chopper Aids Convention Coverage



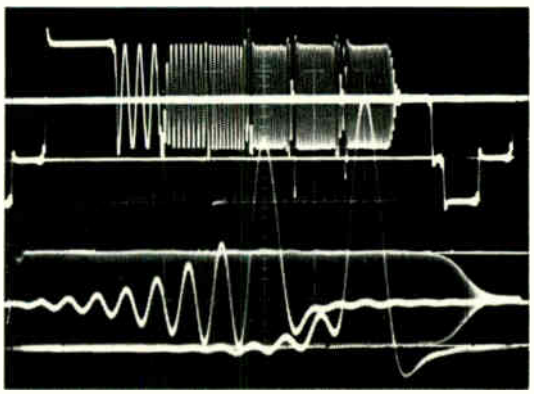
This year, for the first time, a helicopter was used for outdoor live, color convention coverage. The helicopter, used by NBC, was a Sikorsky S-58, one of the largest civilian helicopters in use on the East Coast. The helicopter was used both in Miami and Chicago for covering arrivals and departures of VIPs at the airport, following motorcades and covering special events. Pilot Mel Davis operated the machine while a team of four NBC engineers, including the director and a cameraman, remained in the rear of the ship. While the director guided the flight through an intercom connecting with the pilot, the cameraman sat close by with a safety strap around his waist and an 80-lb camera at his shoulder.

5 QUESTIONS

engineers ask before they buy our solid-state transmitter

COLOR Phase Equalizer & Low Pass Video Filter

NOW IN USE IN OVER 200 STATIONS



TYPICAL SYSTEM OUTPUT — SWEEP, MULTI-BURST, 2 T AND T PULSE

1. What is the overall Frequency Response of the Equalizer System including the Video Low Pass Filter?

   Ans. ± 0.5 db 10 cps to 4.0 Mc/s; -1.0 db max. at 4.2 Mc/s; -20.0 db min. at 4.75 Mc/s; more than 20.0 db down above 4.75 Mc/s.

2. Will it work with my transmitter? What type of variable delay does it have?

   Ans. This system has 50 delay positions in each of the LF, HF and Notch Equalizers, approaching continuously variable delay — adequate to meet any phase correction requirement of your transmitter.

3. How much rack space does it take?

   Ans. A Complete system for a transmitter occupies only half of a 5¼" rack frame.

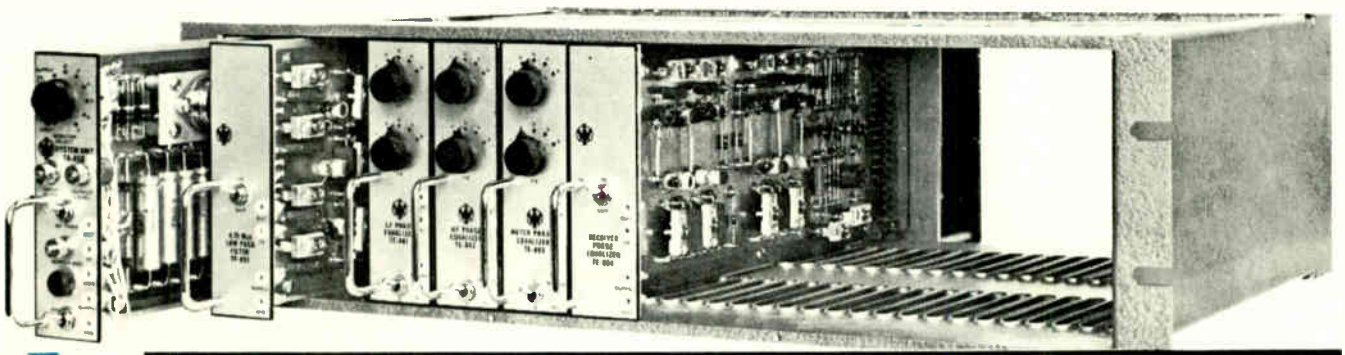
4. Does it have by-pass facilities?

   Ans. Yes, automatic by-pass for the entire system, and selectable by-pass for video low pass filter, receiver equalizer, and variable delay modules.

5. How much does it cost, and how long is delivery?

   Ans. The system is only $3,200 (or $3,875 with notch equalizer) F.O.B. Clark, and we are currently making delivery from stock.

NOTE: If Phase Equalizer does not meet with your satisfaction, it may be returned within 30 days for full credit.



WARD ELECTRONIC INDUSTRIES

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cost reduction in the earth station as the antenna diameter is reduced.

TVSI Management Seminar Scheduled

The third annual TV Stations, Inc. management seminar is scheduled for Oct. 14 and 15 at the New York Hilton Hotel. Six panel sessions will be held to explore this year's theme of "the challenges of change."

Leonard Goldenson, ABC president will be keynote speaker. Other luncheon speakers will be William Lawrence, ABC political correspondent and Frank Pace, Jr. CPB chairman. FCC Chairman Hyde will explain the government position in the conflict between airwave and wire TV transmission.

A panel made up of Thomas Murphy, chairman of Capital Cities Broadcasting Corp. and John T. Murphy, president of Avco Broadcasting will be among others discussing the topic "station image."

FCC Denies Waiver Requests

Requests for continued waiver of the 50-percent a-m/fm nonduplication rule by stations WJJD-FM and WNUS-FM, Chicago, WGEE-FM, Indianapolis and KBEY-FM, Kansas City, Missouri have been denied by the FCC. Though requests for exemption have been denied, the stations were granted temporary exemptions through Sept. 30, 1968, so that any changes necessary for compliance can be made.

On March 9, 1966 the FCC adopted an order stating that more than 50-percent program duplication of commonly owned a-m and fm companion stations wasn't consistent with sound frequency management. It also waived the nonduplication rule for fm stations duplicating programming of daytime-only, limited or shared-time a-m stations through the end of their normal license terms, or through Dec. 31, 1967, whichever was later.

Study Being Made Of Color Uniformity

The problem of color variations on home sets from station-to-station, camera-to-camera, scene-to-scene and program-to-program will be the subject of an exhaustive industry-wide engineering study.

The study is being conducted by a special ad hoc committee headed by CBS's K. Blair Benson, under the guidance of the Joint Committee on Inter-Society Coordination. The group is studying station equipment, film processing, measurement techniques, receiver design, receiving antennas, maintenance and standards and their relationship to color uniformity.

Texas Stations Have Licenses Renewed

Two hundred twenty one out of 446 Texas stations have been found to qualify, Aug. 1, 1968, for license renewals.

Two hundred seventy five a-m, 119 fm and 52 TV stations are involved in the staff action. Major reasons for deferrals included omissions or deficiencies in Section IV-A reporting and nonprograming problems. This section requires details on station programming.

SMPTE to Meet In November

The 104th Technical Conference of the Society of Motion Picture and Television Engineers will be held November 10-15, at the Washington Hilton Hotel in Washington, D.C.

Sessions on the conference program are: aerospace, audio and videotape; cinematography; education; instrumentation and high-speed photography; medicine; laboratory practices; oceanography; photographic and allied sciences; small format films and theatre presentation and projection.

An equipment exhibit is scheduled to run concurrently with the conference from November 11-14.

Quickie Video Station Used for Papal Visit

Comsat was granted authority by the FCC to operate the Andover, Maine, transportable earth station for television coverage of the August Eucharistic Congress at Bogota, Colombia.

The mobile earth station—an electronics-stuffed hut and a 16-foot antenna—is designed to send TV signals through the NASA-Hughes ATS-3 satellite. ATS will retransmit the TV coverage of the papal visit to viewers in the U.S. and Europe via receiving "dishes" at Andover, Maine and Raisting, Germany.

This quickie ground station can be flown anywhere in the world and set up within 24 hours. It is the only one of its kind in the world.

CBS Granted Extension For Vhf-TV Translator

Columbia Broadcasting System, Inc. has been granted extended emergency authorization to construct and operate a vhf-TV translator station at Valparaiso, Ind.

CBS had sought the authorization because of loss of WBBM-TV's signals in northeast Gary and Valparaiso, Ind. due to construction in Chicago blocking the station's transmitting antenna. CBS in its original request stated that the translator would be used only until WBBM-TV could move its translator to a better location.

Latest RCA Advances Featured at WESCON

More than 150 electronic components designed for the products and systems of tomorrow were displayed at the 1968 Western Electronics Show and Convention.

The RCA exhibit, which opened August 20 at Hollywood Park, Los Angeles, reflected the latest advances in electron tubes and solid-state devices for virtually every segment of the $23 billion electronics industry.

Of particular interest to broadcasters were improvements in camera pickup tubes.

Continuing demands for miniature electronic components were dramatically evidenced and prices of RCA components ranged from less than a dollar to several thousand dollars. Featured miniatures included the world's smallest scan-conversion tube for radar systems of military aircraft and the world's smallest photomultiplier tube designed for use in star tracking equipment.

In addition, the giant RCA exhibit included: color TV picture tubes, memory products and systems for electronic computers, test instruments and microphones.

An important advance in vhf/uhf transistor technology was also featured. This was the world's first hermetic strip-line overlay transistor in a metal-ceramic package for broadband military communications equipment in the 225-400 MHz range. For the consumer, RCA displayed an 8-ampere Triac in an economy-type plastic package made of plastic.

FOCUS ON
CATV

FCC Shaping CATV and Vice Versa

The first of what promises to be a series of FCC meetings was held the first week in August in an effort to arrive at a more firmly structured policy and internal organization to regulate the Commission's now officially recognized charge—CATV.

Two key proposals were advanced at the initial meeting: 1) a freeze on signal importation within the top-100 market, and 2) a possible change in the overall character or shape of cable television. Program originations and pay-TV on a per-program basis are areas slated for possible changes.

The Commission is considering the substitution of a 40-mile limit for the current Grade A contour, with absolutely no waivers. The ban on signal importation in top-100 areas would remain in effect for from 5 to 10 years while effects on uhf development are studied. (The current ruling prevents signal importation in top-100 markets from stations whose Grade B contour does not penetrate the area.)

Internally, the Commission is having problems deciding where to file the cable industry. Some at the FCC think it should have its own bureau, others feel that it should be made a component of the Broadcast Bureau and still others think it really should be under the wing of the Common Carrier Bureau.

Commission Sides with Vumore

On the grounds that insufficient evidence of economic injury and no importation of distant signals within top-100 markets is involved, the FCC recently denied KRDO-TV and KOOA-TV a hearing by requesting the U.S. Court of Appeals for the District of Columbia to deny the stations' request to remand the case to the Commission.

The case is of particular interest because an in-depth study showing economic effects on vhf and on the development of uhf TV was done by a team of communications specialists from Ohio University. The report indicated that Vumore Video Corp.'s operation would seriously financially injure TV stations in the area.

The Commission rejected the study, calling it "inadequately documented . . . marred by faulty logic and based in part on unreliable, incomplete or erroneous data."

The Commission did not, however, close the door for future hearings should the TV stations be able to show documentation indicating economic injury.

Interim Procedures for Sec. 214 Applications

Inquiries stemming from the Supreme Court's June ruling requiring telcos to prove convenience and necessity to proceed with construction on lease-back systems have been received at the Commission. As a result, the Commission has set up an interim seven-step procedure for handling applications. The procedure makes provision for a 30-day period for responsive pleadings and for emergency action where requested by an applicant. Action will in no case, however, be taken in less than one week. The Common Carrier Bureau's services are made available to potential applicants to determine appropriate portions of Part 63 to cite when filing for Section 214 certificates.

NCTA Proposes CATV Color Noise Standard

A technical standard approved by NCTA at the conclusion of the July convention in Boston has just been made available to interested individuals. The standard defines terms, specifies test methods and suggests techniques for determining noise level in cable systems. Standard 005-C is 8 pages in length (a 4-page appendix is attached).

Circle 300 on Reader Service Card

Eighth Circuit Court Backs FCC's Cable Jurisdiction

Early August saw the loss of the last case contesting the FCC's jurisdiction over CATV. The case was brought by Midwest Video, Inc. in 1965.

The decision was handed down by the U.S. Court of Appeals for the Eighth Circuit in a unanimous, three-judge opinion. The court countered the CATV argument, saying, "The Commission's efforts to preserve local television by regulating CATV has the same constitutional status as regulation of the originating station."

Joined in the Midwest litigation were Alice Cable TV Corp., Alice, Tex.; Buckeye Cabledivision, Inc., Toledo, Ohio and Mission Cable Tv, Inc., San Diego, Calif.

Subcommittee Weighing Copyright Proposals

All recommendations on copyright legislation have now been received by John L. McClellan, chairman of the Senate Subcommittee on Patents, Trademarks and Copyrights. The deadline had been extended a number of times in the past in view of impending decisions by the Supreme Court and the fact that CATV and broadcast interests were negotiating. The last deadline date was October 1.

The chief counsel of the McClellan sub committee is now reviewing recommendations submitted by the copyright parties.

MTS Shows Color Front Projection System

An electronic closed-circuit color presentation system was demonstrated recently in the ballroom of the New York Hilton by Management Television Systems.

The system—Model 360—consists of control and projection cabinets. The control cabinet houses monitoring, color alignment and focus controls, as well as power supplies, audio amplifiers, a color bar generator and a specialized chassis called a media mixer.

The projection cabinet contains a CRT for each of the red, green and blue channels plus a monochrome standby for emergency backup.

At the Hilton demonstration, a mix of live, videotaped and graphic material was projected onto a divided screen somewhat smaller than that of movie theater.

For the last word on CATV's legal position, see "CATV, the FCC and the Law" beginning on p. 22.

The Performance Picture Looks Great with BIALKON Orthicons

- New warranty—now extended to 1800 hours
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INTERPRETING THE FCC RULES & REGULATIONS

New Revisions To A-m, Fm & TV Ownership Rules–Part II

LAST MONTH'S ARTICLE (September/68 *BM/E*) discussed the manner in which investment entities (e.g. mutual funds, stockbrokers & trusts) operate, the problems imposed upon licensees by same, and the Commission's new, more relaxed approach to same. This month's article concentrates upon the one-percent rule and certain changes in the reporting requirements of 1.613 (filing of contracts) and 1.615 (Form 323, the Ownership Report).

The June 1968 amendments to the multiple ownership rules (73.35 for a-m, 73.240 for fm, and 73.636 for TV), which give rise to this two-part article, have the following, general effects: (1) they cause little change in the substantive provisions of the multiple ownership rules; (2) they relax the Commission's rules as to investment entities; (3) they serve to resolve serious questions by interpreting the multiple ownership rules as to investment entities; and (4) by interpreting the multiple ownership rules, they change somewhat, 1.613 (filing of contracts) and 1.615 (the reporting requirements of Form 323, the Ownership Report).

The One-Percent Rule Expanded

As a threshhold matter, the one-percent rule affects the Ownership Report; the latter provides that whenever a corporation has more than 50 stockholders, only the officers, directors, and shareholders holding 1 percent or more of the stock are required to report the details of their stock transactions. This remains the rule today—except as to mutual funds; the latter is discussed hereinafter.

The one-percent rule. ("Note 2" of the multiple ownership rules) constitutes an exception to the multiple ownership rules. That is, as to corporate licensees with more than 50 shareholders, the multiple ownership rules are not applied to stockholders with less than one percent. That exception, under the new rules, has been expanded.

As to the 1-percent rule and its application to mutual funds, the Commission faced a difficult decision, because some mutual funds (unlike brokerage houses) are permitted to vote stock concerning matters of importance. The Commission realized that the practical facts of life must be faced. Generally, funds are passive investors, and they are not interested in controlling licensees. Furthermore, the Commission relied heavily on a study which disclosed that adherence to the 1-percent standard for mutual funds would require divestiture of holdings by numerous funds—thereby depressing the market for broadcast stocks. Consequently, as to mutual funds, the Commission raised the standard from 1 to 3 percent. By doing so, only three funds would be required to divest some of their broadcast holdings, and this would not appreciably affect broadcast stock prices. Therefore, broadcast licensees (with 50 or more shareholders) need not report stockholdings of mutual funds in the Ownership Report, unless the fund holds 3 percent or more.

The Duopoly and Concentration of Control Rules Interpreted

As adopted initially in the 1940's, Sections 73.35(a), 73.240(a), and 73.636(a) of the Commission's Rules provided limitations on the common ownership or control of stations in the same service and/or serving substantially the same area. These duopoly (overlap) and concentration of control provisions of the Rules were intended to promote competition and maximize diversification of program viewpoints. The duopoly rule restricts common ownership of broadcast stations, in the same service, based upon the degree of overlap of the signal contour (1 μV/m for a-m or fm and Grade B for TV). The concentration of control rule prohibits common ownership in more abstract terms—i.e., the size, extent, and location of areas served, the number of people served, the classes of stations involved, etc. Significantly, "Note 2" of these rules provides that the duopoly and concentration of control rules will not be applied in cases where the licensee involved has 50 or more stockholders and the stockholder(s) violating the duopoly or concentration of control rules own less than one percent of the stock. In sum, the new rules have not changed the duopoly and concentration of control rules.

The one-percent rule—which is "Note 2" of the duopoly and concentration of control rules—is generally discussed in connection with Ownership Reports and the requirements thereon to

This section, providing broad interpretation of FCC rules and policies, does not substitute for competent legal counsel. Legal advice in 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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detail stock holdings. However, it also has great bearing upon the multiple ownership rules—duopoly and concentration of control in particular. Prior to the advent of the new rules discussed herein, the multiple ownership rules were not applied to a stockholder with less than one percent in licensee-corporations with 50 or more stockholders. That is still the case today, and the new rules ease these requirements somewhat—particularly as to mutual-fund stockholders, stockholders, stockbrokers, and trusts, etc., where such legal entities do not have the power to vote their stock holdings.

When the Commission adopted its June 1968 Report and Order in Docket 15627, the subject of this article, it reaffirmed the rules described above. While the new rules do not really alter the old duopoly and concentration of control rules, they serve to explain and interpret them. The exception relates to mutual funds. In summary, the interpretation of greatest significance may be recapped as follows:

(1) a mutual fund may hold up to 3 percent of the voting stock of each two television stations (with more than 50 voting stockholders) in the same city;

(2) a stockbroker may hold unlimited quantities of stock in those stations for the benefit of its customers; and,

(3) a trust may only hold up to 1 percent.

If any of the foregoing be violated, the duopoly and concentration of control rules will be applied.

Ownership Reporting

Section 1.613 and 1.615 of the Rules, and the Ownership Report (FCC Form 323) together with its instructions, require broadcast permittees, and broadcast licensee's to file with the Commission complete ownership information. As mentioned earlier, in the case of corporations with more than 50 stockholders, this information must be submitted with regard to all stockholders holding 1 percent or more of the voting or nonvoting stock of the corporation.* Among other things, the information required of corporate permittees or licensees includes identities of record owners, beneficial owners, and those having the power to vote the stock. Section 1.613 requires filing with the Commission any agreement, document, or instrument affecting directly or indirectly, the ownership or voting rights of the licensee's or permittee's stock. This includes trust agreements and proxies. Supplemental ownership reports must be filed within 30 days after any change occurs in the ownership information previously reported.

Publicly traded corporate permittees and li-

*Do not confuse the reporting requirements discussed herein with the modification of the duopoly and concentration of control percentages discussed above. Even though a nonvoting shareholder (such as a mutual fund or a brokerage house) may hold more than 1 percent of the stock and not contravene the duopoly and/or concentration of control rules, the licensee's responsibilities under the reporting rules have not changed.

censees with more than 50 voting stockholders do not generally submit the required information about beneficial ownership or, insofar as investment entities are concerned, the holders of one percent or more of the voting stock. In addition, proxies have often not been filed. Lack of information about these matters has weakened the Commission's administration of the multiple ownership rules. The U.S. Congress has publicly criticized the FCC for its laxity in these areas.

The Commission decided that permittees and licensees shall promptly submit to the Commission full and complete information in accordance with the provisions of Sections 1.613 and 1.615 of the Rules and the instructions on FCC Form 323 "Ownership Report." However, if a permittee or licensee is unable to obtain complete ownership information for reporting to the Commission, it shall file on the FCC Form 323 whatever information is available to it together with a detailed explanation of why the omitted material is not available.

Since information concerning trust instruments has often been lacking in the Commission's files, it amended Section 1.613 (b) (3) of the Rules to make compliance therewith easier. As opposed to the present requirements that trust instruments be filed, the Commission requires only the filing of an abstract of the instrument setting forth the following information: (1) the name of the trust; (2) the duration of the trust; (3) the name and number of shares of stock held by the trust.

The amendments adopted to Sections 1.613 (Filing of Contracts), 1.615 (Ownership Reports), and 73.35, 73.240, 73.636 (Multiple Ownership Rules) codify what the Commission's staff has followed as policy during the past few years.

Summary

In summary, the Commission has amended the rules as follows:

Duopoly, Concentration of Control and one-percent Rule. (1) Any amount of ownership will be interpreted as a violation of the duopoly (overlap) rules [73.35(a), 73.240(a), and 73.636(a)]. Thus, even where a stockholder would hold less than one percent, of two broadcast facilities with prohibited signal overlap, such could not be accomplished without filing and receiving a grant of a petition of waiver of the duopoly rule.

(2) For corporations with more than 50 voting stockholders, both the duopoly and concentration of control rules will be applied to (a) officers, (b) directors, and (c) stockholders owning 1 percent or more of the voting stock; however as to investment companies (e.g., mutual funds), the said rules will not be applied unless the funds own (directly or indirectly) 3 percent or more of the voting stock. Stock holdings by investment companies under common management shall be aggregated. Furthermore, if an investment com-

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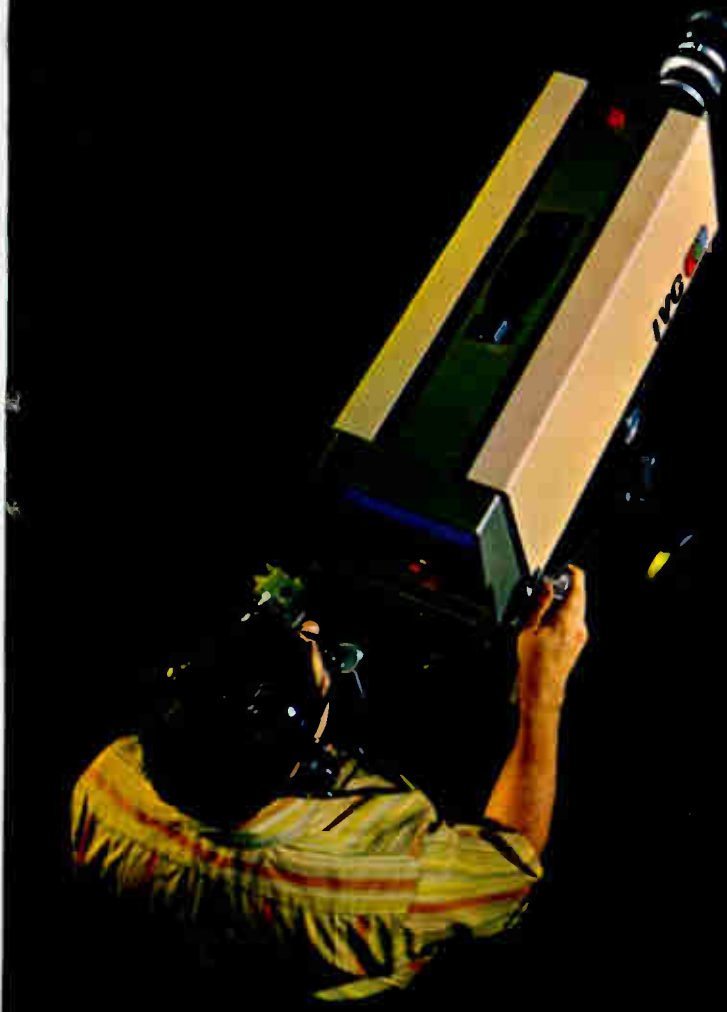

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A

B

C

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pany directly or indirectly owns 50 percent or more of the voting stock of a company which in turn owns directly or indirectly 50 percent of a corporate broadcast licensee, the investment company shall be considered to own the same percentage of outstanding shares of the broadcast corporation as it owns of the outstanding share of the corporation between it and the licensee corporation. If the intermediate company owns less than 50 percent of the licensee corporation's outstanding stock, the investment company's holdings need not be considered under the 3-percent rule; however, officers and/or directors of the licensee-corporation (who are representatives of the intermediate company) shall be considered to be representatives of the investment company.

(3) Further, in determining whether the duopoly and concentration of control rules have been contravened, where there are more than 50 voting stockholders and the record and beneficial ownership of voting stock are not identical, the party having the right to determine how the stock will be voted will be considered as the owner. Examples of the foregoing include bank nominees holding stock as record owners for the benefit of mutual funds, brokerage houses holding stock in street name for the benefit of customers, trusts holding stock as record owners for the benefit of designated parties, and so forth.

Ownership Reporting

(4) Corporations with 50 or more stockholders still are required to submit ownership information as to all stockholders holding 1 percent or more of the voting or nonvoting stock.

(5) If all the information required by Sections 1.613 (contracts) and 1.615 (ownership) cannot be ascertained, whatever information is available must be submitted with an explanation disclosing why omitted material is unavailable.

(6) Trust instruments need not be submitted; however, abstracts of same disclosing the trusts' name, duration, number and names of stock, name(s) of beneficiary, name(s) of record owner, name(s) of party exercising vote or control of stock, and, any conditions on power of voting stock as well as other unusual characteristics of the trust must be filed. (If the Commission deems it necessary, it can require the filing of the trust instrument.)

(7) Information as to brokerage houses need not be reported until their ownership of stock is at least 30 days old.

Thus, the June 1968 amendments to the multiple ownership rules have made no major changes but, rather, have relaxed the rules as to investment entities and have served to explain and interpret the application of those rules to investment entities. In so doing, minor changes have been made in the ownership reporting requirements of 1.613 (contracts) and 1.615 (ownership). ●

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CATV, the FCC and the Law

Industry interest in cable TV is at an all-time high. The NCTA's marathon legal seminar in Washington held in mid-September, brought together some of the most adroit minds in communications jurisprudence. Here are their views on government regulation, copyright and the future of cable television.

LEGAL PROBLEMS BEDEVILING THE CATV industry came into sharper focus at this year's NCTA legal seminar in Washington. The major interests attended in strength—many of them represented by top-echelon executives.

At the sessions, some revealing positions became clear:

- Antitrust violations are an ever-present possibility.
- A freeze on cable applications is shaping up.
- CATV should be formally regulated, with licensing.
- CATV operators will have to pay for copyrighted material.
- Exclusivity rights still have to be hammered out.
- The Second Report and Order will be revoked.
- The FCC is ready to take a fresh look at CATV.
- CATV must not be classed as a utility.

NCTA General Counsel Bruce Lovett pointed out that attendees included highly placed telco officials, many copyright interests, and many members of the communications bar who previously hadn't been that interested. "This means," Lovett said, "that cable's expanding, that concepts are expanding, and that we're more significant now. The panelists this time around have shown a high degree of sophistication. Some of the panelists have changed attitudes; they're different; they say different things (than in 1966). They talk about CATV differently."

Cable Industry is Optimistic

There was certainly no gloom in the legal sessions. Outside, it was dismal and raining interminably. An ominous omen? Hardly. Inside the Hotel America, after they dried out, the panelists presented their views vigorously and in hard-hitting terms that minced no words. The main questions were: How high would the industry ultimately go under current regulatory procedures? What could the industry reasonably expect in the realm of new FCC regulation? What were some of the major stumbling blocks along the way?

In commenting on the FCC regulation of CATV, Harry Plotkin indicated that non-duplication would solve the immediate constitutional problem, but time-zone differences would continue to create difficulties with viewer convenience. This typified many of the ideas at the seminar—how to stay within legal and FCC restrictions and at the same time provide the public service and user convenience that CATV is capable of.

Plotkin took a hard line toward unreasonable restrictions. "If something's constitutional," he said, "we'll fight; we'll even lose, but we'll fight for what's right."

Of major importance, and mentioned in practically every discussion and presention, was the question of possible antitrust considerations. Telcos —both Bell and the smaller independents—came under intense fire from the assemblage of legal experts. The feeling was that industry growth would rely largely on a push from American business interests. It's such growth's very nature that voluntary self-restraint won't work. Besides, this would be conspiratorial and in possible violation of antitrust laws. But antitrust was especially important in telco dealings which came out in later panels.

The consensus was that some kind of regulation is definitely needed—true regulation that spells out the dos and don'ts the way they are spelled out for the broadcast industry. The FCC came under fire for its many protracted hearings, which were labeled as a stalling action. Said Washington attorney Arthur Stambler, "These hearings are simply a device whereby the Commission sweeps something under the rug for a few years. These hearings don't help establish any ground rules. There are always lots of sideshows going on at the Commission which can sidetrack the main issues."

To Freeze or not to Freeze?

High on the list of imponderables has been the question of a possible FCC freeze on CATV development. Panelist Arthur Scheiner indicated that such a freeze was definitely shaping up. Scheiner said, "The TV allocation freeze was a natural step at the time it was taken. But it's a mistake to confuse the need for allocations with an imminent freeze. The net result would be to stifle CATV as a competitor to broadcasters, and the cable industry's growth would be stultified for a while."

Stambler indicated that a possible reason for the impending freeze might be to give uhf broadcasters their promised chance for survival. The FCC and some broadcasters still regard CATV with some suspicion and as competition for the TV stations. Yet, as Stambler pointed out, "CATV has sprung up to fill the holes in the FCC's planned program." The need for cable—the "holes"—exist because of the Commission, not in spite of it. This feeling was stated by one panelist after another.

The freeze—proposed to the Commission by some broadcasters—would be effective on all petitions, and the hearings would be stopped. Fortunately for the CATV industry, this freeze has been tabled for further consideration by the Commission. When it will actually come up again is anybody's guess.

What About Some Rules?

The exasperation of dealing with an unformulated policy—working in a vacuum as it were—was evident among the lawyers. "The Commission doesn't establish any ground rules at these hearings," said Stambler. "In San Diego," he pointed out, "the Commission was finally forced to lay down some ground rules. One examiner asked to be relieved of his duties at the hearings, since they were being used to establish policy contrary to the rules

previously laid down in the San Diego case. The examiner was told in no uncertain terms to continue the hearings."

Stambler's example may have been extreme, but it points out the Commission's capriciousness and insensitivity so vocally complained about by the industry and its legal counselors. Stambler, like so many others, wants to see some predetermined rules. "These would be fine," he stated, "provided they aren't absolute rules and could be bent a little."

But the freeze is the really dangerous possibility facing the industry now. Stambler indicated that there's a substantial body of opinion that the FCC could absolutely prohibit further CATV development, except for one or two cities. But, he warned, there's another type of freeze—the one in which the Commission simply takes no action at all. This has already happened in other areas of FCC jurisdiction. Because of the very heavy backlog of applications, there's currently an a-m broadcast freeze in effect. This freeze is so all-encompassing that existing stations can't even apply for changes or improvements in their existing facilities! "Ultimately," Stambler stated, "all the freeze does is avoid coming to grips with very tough questions."

NCTA General Counsel Bruce Lovett (left) and FCC's Schildhause during recent Washington seminar.

What About Copyrights?

The feeling among CATVers is one of immense progress on the copyright question. As Bruce Lovett said, "We've come a long way in copyright since our last legal session. We've even been negotiating with broadcasters on this." But there are still many unanswered questions, and Lovett voiced several of them:

"Has the Fortnightly case established some sort of mandate? Can the FCC contend that copyright payment is not in question, but exclusivity is? Where is the dividing line between exclusivity and diversity of dissemination?"

Speaking for the celluloid mills, panelist Gerald Phillips cited the financial value of television to the motion-picture industry. "Without TV," Phillips said, "producers would no longer show a profit." But exclusivity isn't that well defined. Philips stated, "Stations in a given market should have exclusivity for contractural series and first showings. If there's fractionalization in a market, payments to the distributor by the broadcaster will have to be reduced, and additional payments should be made by the cable operator or other fractionalizing element."

Speaking on the parallel with the non-duplication rule, Phillips said, "Syndication needs as much protection as the networks do. Copyright owners want CATVers to become customers for their protected material. A new law is needed—one which will protect the arts and is also fair to the user."

Phillips emphasized cooperative ventures. He cited one case he knew of in which a uhf broadcaster joined forces with a CATV operator in bidding for copyrighted material. Left to its own resources, the u wouldn't have been able to bid successfully against the much stronger vhf station in its market area. By cooperating with the cable company, the broadcaster was able to make an acceptable bid.

Panelist, E. Stratford Smith—who took a strong anti-FCC stance—stated, "The FCC has not served the public interest with its lack of CATV regulation. Instead, the Commission is trying to impose a freeze which will be a disservice to both the industry and the public." Turning to copyright, Smith said, "It may well turn out that exclusivity isn't all that important. Adamant exclusivity could well suppress further CATV development."

Caretaker of all these problems, Miss Barbara Ringer, the assistant register of copyrights, characterized the proposed new legislation as highly problematical. The suggested Kastenmeiner bill has these three main elements: It would establish a complex system of exemptions for full liability and partial liability; it would provide a series of "trigger" provisions—categories of copyright liability; instead of a compulsory licensing fee, it would establish criteria for a federal court which would set fees when cases were brought before it. Of these three sections, the "trigger provisions" section is by far the most controversial.

Miss Ringer indicated that if the NCTA sticks to its own specific copyright proposals, a great deal can be accomplished. She said that the copyright office is prepared to drop the trigger provisions section—including the prohibition against local origination. She feels that such regulations could best be left up to FCC jurisdiction.

Regarding exclusivity, Miss Ringer said, "The concept of exclusivity has been a major stumbling block. Fred Ford stated in his summary that exclusivity should be assured for programs that hadn't yet been aired in a given market. At least one broadcaster has defined exclusivity as how the government goes about cutting off the TV station's water. The time has come for copyright law revision. We'll need lots of cooperative effort."

So the copyright office's chief spokesman agrees to the need for a new law. But she sees stormy seas ahead:

"I think we're on the verge of something so complex that it will make Section III look like 'Mary Had a Little Lamb,'" she went on to say, "What we need is a general umbrella under which to operate and which will regulate contractual agreements."

ASCAP's general counsel, Herman Finkelstein, was less adamant than other segments of the copyright interests. His is a simple formula: "We don't

L'Heureux Finkelstein Ringer Smith Wilson

want exclusivity; we want you to use our music. We're not interested in exclusivity, only money. And if you feel our rate is too high, you can always go to federal court, since ASCAP is regulated by a consent decree."

Franchises Made Easy

In a major address before the seminar participants, John D. Matthews outlined some of the theory and expectations involved with obtaining cable television franchises. He indicated that the term "franchise" is really a misnomer, since it connotes a kind of public utility operation—the monopolistic kind of utility typified by the telephone and electric power companies.

But, he contended, there's a substantial body of precedence for municipal regulation and authorization in these cases. For one thing, municipalities have a well-established right to regulate the use of public ways and thoroughfares. Add to this traditional mandate the more recent right to regulate CATV systems—granted by state legislatures in most areas—and the municipality ends up with a very substantial amount of control at its disposal.

Matthews went on to describe the "ideal" situation in which the CATV franchise applicant knows precisely what is required by the municipality. In his application for franchise, the potential operator should: show evidence of very sound management practices; have solid engineering support within his organization; show a willingness to operate as an entirely local business.

NCTA Legal Panel Sessions

FCC Regulation: Prohibition or Temperence
Gary L. Christensen, Assistant General Counsel, NCTA (moderator)
Arthur Stambler, Attorney, Washington, D.C.
Harry M. Plotkin, Arent, Fox, Kintner, Plotkin & Kahn
Arthur Scheiner, Wilner, Scheiner & Greeley
Russell Eagan, Kirkland, Ellis, Hodson, Chaffetz & Masters

Section 214, CATV and Telephone Companies: Poles Apart
Harold Farrow (moderator)
J. Malcolm Lothschuetz, FCC Common Carrier Bureau
John P. Cole, Cole, Zylstra & Raywid
Lewis A. Rivlin, O'Connor, Green, Thomas, Walters & Kelly
James Greeley, Wilner, Scheiner & Greeley

CATV and Utility Concepts: A Collision
Bruce E. Lovett (moderator)
Lewis I. Cohen, Cohen & Berfield
George Barco, Barco & Barco
Robert D. L'Heureux, Smith, Pepper, Shack & L'Heureux
George McMillan, Cannon & Andreasen

Copyrights: The Courts and Congress
Bruce E. Lovett (moderator)
E. Stratford Smith, Smith, Pepper, Shack & L'Heureaux
Gerald Phillips, Phillips, Nizer, Benjamin, Krim & Ballon
Barbara Ringer, Assistant Register of Copyrights
Herman Finkelstein, General Counsel, ASCAP

CATV and Changing Communication Laws: Evolution or Revolution?
Jay E. Ricks, Hogan & Hartson (moderator)
Tom Wilson, Dow, Lohnes & Albertson
Tom Dowd, Pierson, Ball & Dowd
Sol Schildhause, Chief, FCC, CATV Task Force
Lee Lovett, Pittman, Lovett & Hennessey

Evolution vs. Revolution

In a stimulating panel session, the question of possible future directions for the CATV industry was foremost in consideration. Looking into the future, panelist Tom Wilson indicated that the industry would find many expanded entertainment and educational uses. A major dilemma facing the broadcast industry today, according to Wilson, is the FCC's insistence on minority programming during late afternoon and evening prime time. CATV has the unique and highly effective ability to provide such minority programming along with educational programming of various types.

Wilson said that he "sees unlimited possibilities for increasing communications uses of cable television. Such new, non-entertainment uses could include anti-burglary surveillance systems for the home." He went on to say that, "The cable TV industry must look for regulation to a degree that it hasn't yet had.

"Inevitably," Wilson said, "non-entertainment uses will involve CATV in problems very close to the public utility concept." He feels that cable TV "embraces many characteristics of broadcasting," and should therefore be subject to broadcast-industry type control. "The states," he said, "have no experience in regulating things of this kind. Therefore the regulation must be centered in the FCC. When this happens, regulations for the broadcast industry will likewise be imposed on CATV."

Taking a somewhat unpopular stance, panelist Tom Dowd said, "The public utility concept (for CATV) is not as bad as it would seem. The Commission is not going to let 20-odd channels of communication be controlled by a single individual. The utility status is the least onerous of several possible areas of government regulation."

Scheiner Plotkin Fred Ford Stambler Cole

Highlighting the afternoon discussions, Sol Schildhause, chief of the FCC's CATV Task Force, stated that "the number of new starts has been slowed by the Second Report and Order, but industry interest hasn't flagged at all. There's no location in the country," he said, "that doesn't have its CATV proponents."

Commenting on the relationship between CATV and the broadcast industry, Schildhause said, "Those parts of our communications system already in place have the edge over innovative developments such as CATV. The Second Report and Order bought some time (for the FCC) but has brought no insight." He was adamant in his belief that the Second Report is on the way out. "It's had it," he said. "The FCC," he continued, "is on the verge of taking a fresh look at CATV."

Schildhause went on to say that the Commission may be forced to abandon its hearings on new applications for CATV. "I don't know what will replace the hearings," he said. But he struck a hopeful note in saying that CATV, wisely guided, can fill in the holes that exists in the TV structure.

But there continue to be problems. Schildhause affirmed the belief that, "CATV is primitive by TV broadcast standards." In the meantime, the Commission is firmly committed to see all-channel legislation passed.

The Task Force's feeling, according to Schildhause, is that cable TV operators should pay for copyrighted material. Further, he indicated that the industry was approaching its next phase in the evolution of regulatory control. "We're likely to see," he said, "a series of painful convulsions, while some uneasy truces are declared. In the final analysis, both broadcast television and the CATV industry will hold their own."

Sympathetic to the FCC's problems, panelist Lee Lovett believes that cable operators have been subjected to an industry upheaval of "Gothic" proportions. He believes the FCC's seeming intransigence is due to myriad problems of being understaffed, trying to work around a frequently difficult Congress, and a Commission that is a house divided.

"The Commission," said Lovett, "has not been able to respond to the dynamic technological explosion." This is so, he believes, because of the Commission's many problems and seemingly unsolvable dilemma. Lovett firmly believes that a new Commission or regulatory body may be closer to reality than the industry expects.

Lovett went on to say, "CATV remains an inexorable natural force, and it will be up to cable operators to publicize their public service capacity." He firmly believes that "CATV must provide substantial local programming to show the Commission and the world that cable is the only medium for visual communications."

"Cable systems must become an indispensible contributor to society," he said, "and use the magic words 'public interest' against their adversaries."

In the session on Section 214, FCC's J. Malcolm Lothschuetz stated that the Commission is not required to hold hearings under the 214 ruling. "But," he commented, "Part 63's purpose is to bring before the FCC all pertinent data concerning a system proposal." Do these data come before the Commission in the form of a legal brief or as part of a hearing? The hearings are forever being requested by interested parties, so whether the FCC wants them or not, hearings there will probably be.

Panelist James Greeley strongly urged new legislation to regulate telco's relationship with CATV. And once again there's that problem: no real regulation for the cable industry.

On the same panel, John P. Cole said that the tactical significance of the 214 decision hasn't been too clear. "The 214 decision," said Cole, "is the first major skirmish in the war that's beginning to take shape between telco and the small, independent CATV companies. The decision hasn't been finalized, and it certainly hasn't put a crimp in telephone company operations."

Cole cautioned against telco's old, pre-214 tactic of installing coax on its poles for potential leaseback which non-Bell Telcos are still doing. "The name of the game," Cole stated, "is 'plant and facilities.'" Whoever cables the community first faces the Commission with a *fait accompli*. But the 214 ruling requires prior FCC approval of any telco cabling that might look attractive. Before the 214 decision, there was nothing to stop telco from doing pretty much as it pleased with cables.

"The Commission's present attitude," Cole continued, "is to process cable applications with no impediments. The 214 rule is designed to slow down development temporarily so the Commission can take an overall look at the industry's development." There's little indication, according to Cole, of just how much time will elapse before the FCC enters what he called the second phase of the telco-vs.-CATV battle. "This battle," he said, "must be fought. The 214 will be a very hollow victory if we don't win the really big case still before the agency."

Strongly antitrust-oriented attorney Lewis A. Rivlin pointed out that any interested party can stir things up by going into federal district court and asking for an injunction against unauthorized installations. Aggravating these installations is the fact that telco has a virtual monopoly on street poles. If telco doesn't own the pole (it may belong to the electric power company), it at least has a contract for the "communications area" of the pole—at some height below the power company wires. Telco thus has the nay-saying power over outside coax on poles, even if it stands to make a tidy sum on the rentals. Many telephone companies—especially the smaller

(Continued on page 70)

Vision on the move

The new Minicam VI marks another innovation in the realm of the "impossible" from CBS Laboratories.

The Minicam VI is a television camera that can go anywhere: land, sea or air. And a single cameraman can carry it easily on his shoulder.

It opens up a whole new world in television broadcasting. It is the only portable camera to give an NTSC signal from a backpack. It will cover fast-action sports events and fast-breaking news stories live from the scene of action —with studio-quality color pictures.

Minicam is just one more significant innovation in Professional Products from CBS Laboratories—creators of the Image Enhancer, Digital Display Unit, Loudness Controller, Audimax, Volumax, and others.

CBS Laboratories has researched, developed, produced and marketed many of the most remarkable advances in the science of sight and sound.

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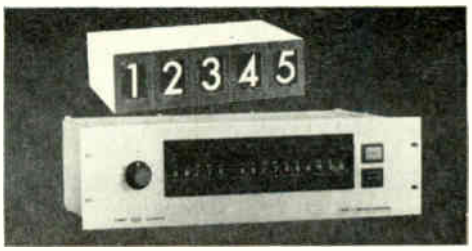
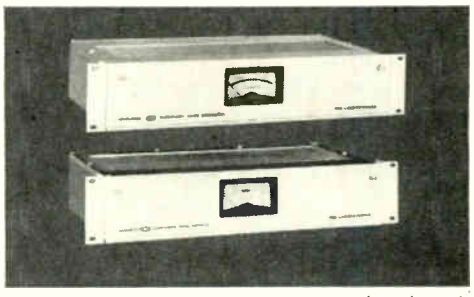


Digital Display Units. Modular compact units for any size TV studio. Give optimum clarity up to 70 feet—from any camera angle up to 145 degrees. All operated by one controller which is able to handle 192 units!



Audimax and Volumax. A level control and peak limiter years ahead of any of their kind. Combination automatically *guarantees* maximum increase in audience coverage without over modulation.

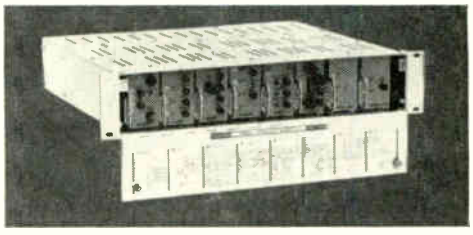
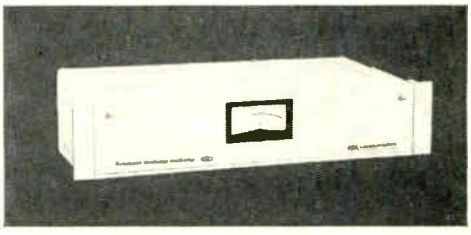


Image Enhancer "rides through' weaknesses and defects in home television receivers. Delivers amazing picture clarity in both black-and-white and color. Remarkable process called "crispening" sharpens detail without noise or crosstalk.



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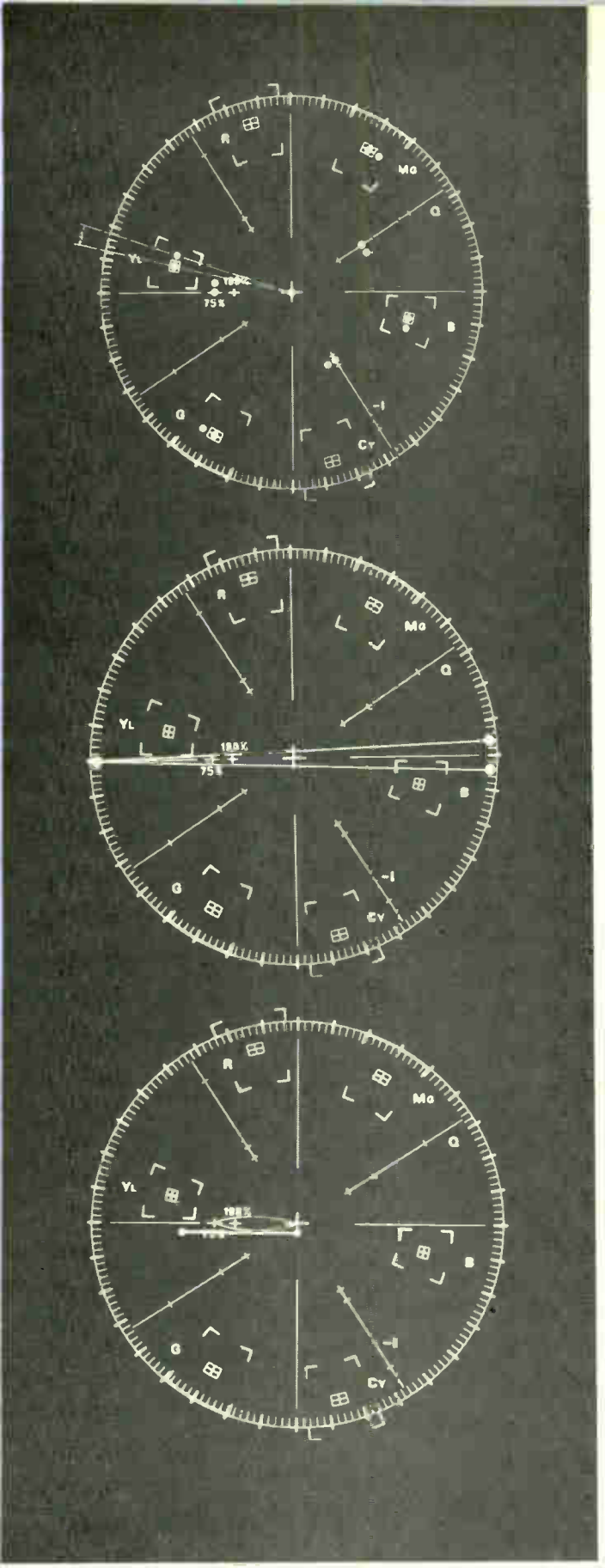
Circle 13 on Reader Service Card



(Top) Vectorscope screen showing two signals when operating in the time-sharing mode. One of these signals is about 4° clockwise from the other. (Middle photo) By doubling vector amplitude and repositioning the display, physical displacement of signals will be doubled, increasing accuracy by factor of 2. (Bottom) Properly timed incoming system subcarrier displayed on the Vectorscope as a reference signal.

Painless Steps

By B. van Benthem

Want to transmit better color? Who doesn't? It's not all that hard to do. First, get rid of those "calibrated eyeballs" and start using your monitoring equipment the way it was intended. Your viewers will bless you, and your advertisers are sure to sit up and take notice.

TOO MANY BROADCASTERS rely on "calibrated eyeballs" to make color adjustments—level settings, color phase and so on—in the control room. This is done in spite of the ultra-sophisticated measuring and test equipment already on hand and readily available for engineering personnel's use. The viewer doesn't know about the manufacturers' claims for that expensive equipment, but he is aware of the green, red and blue faces he sees when a program source changes.

There are many alignment procedures which will help keep your station operating satisfactorily. Unfortunately, some excellent procedures are impractical—they eat up too much time and equipment. But there are some simple, consistently repeatable test and alignment methods for putting a more reliable color signal on the air. Each of these methods uses existing standard studio monitoring equipment for these tests. The procedures themselves are quite basic and may need no explanation. But this explanation is very

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to Better Color Transmission

necessary for those stations that still use the "calibrated eyeball" as the main piece of test equipment.

Additive Oscilloscope

An oscilloscope that can algebraically add two vertical input signals is best since it's so simple to operate. Typical of this kind of scope is the Tektronix RM529 waveform monitor. Equivalent oscilloscopes can be used the same way with only slight modification.

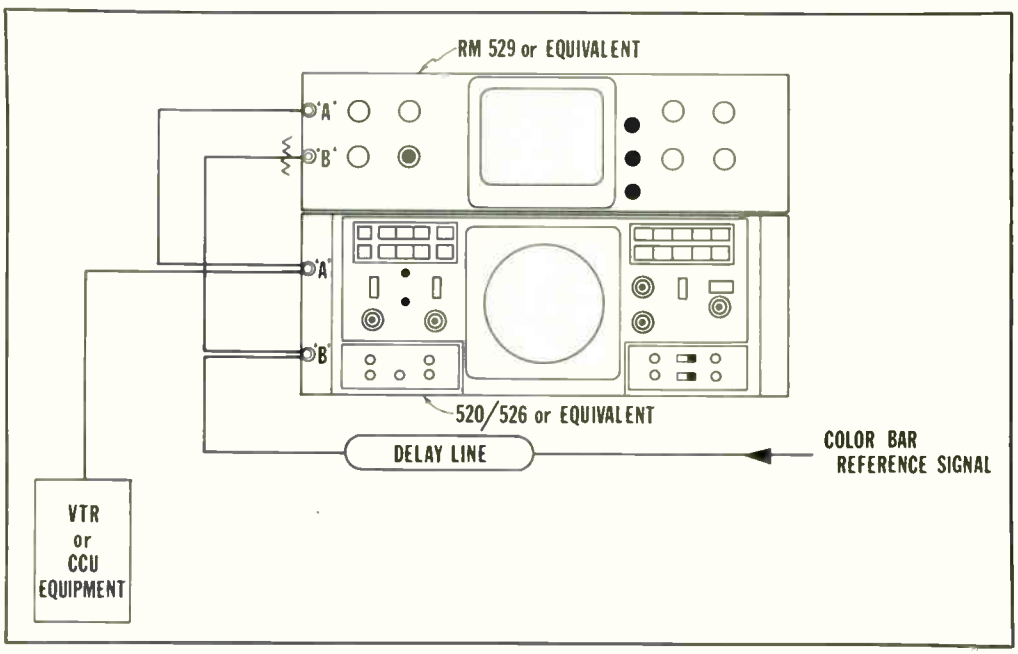
In a basic test setup, the waveform monitor will show the amplitude difference between the input and output signals of the system under test, when the vertical mode selector of the waveform monitor is set to A-B. If the system has a unity gain, the display will contain spikes due to the time differences between the two signals (path length through the system) and possible waveform modification. The polarity of this display indicates whether system gain is greater or less than unity. If the system being tested is designed to have a gain greater than unity, a fixed precision attenuator with a value (in dB) equal to the system gain should be inserted in the line. This technique permits system level control adjustments for an optimum waveform. By increasing the vertical sensitivity of the oscilloscope (MAG on the waveform monitor) the system levels can be set very accurately.

As an example of the accuracy that's possible, assume that a 1-volt peak-to-peak staircase signal has been applied to the input. Set the vertical mode selector of the waveform monitor to A, and set the vertical channel gain at 50 IEEE units per step. Setting vertical channel gain at 50 IEEE units per step is possible by setting the other dial of the vertical MAG switch to the most sensitive position ($\times 5$) and rotating the inner FINE knob.

In a 10-step waveform, each step represents 10 percent of the video portion or about 7 percent of the composite 1-volt peak-to-peak waveform. Since 50 IEEE units on the graticule represent only 10 percent of the video signal, it is easy to detect system gain discrepancies of only 1 or 2 percent in either direction.

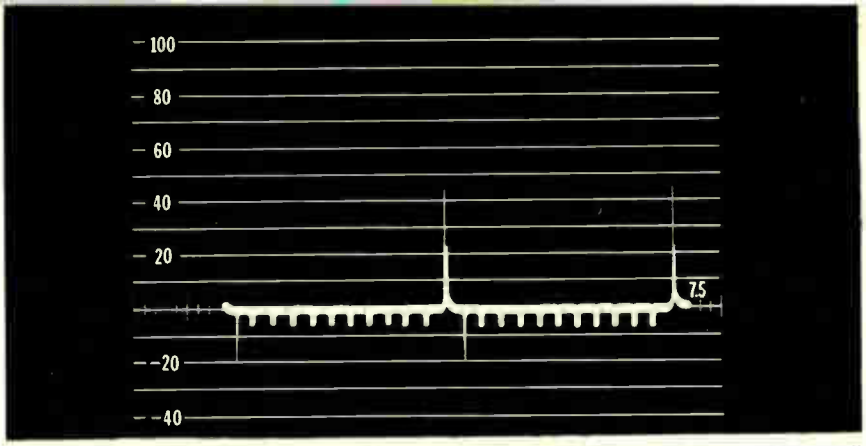
The goal in level setting is *uniformity* of signal amplitude throughout the station rather than precise level control. An encoded color bar generator's output is normally available throughout the station and this output is usually rather stable due to the generator's relative simplicity. If desired, this output could be used as a reference signal. In such a case, the waveform monitor should be set for IEEE rolloff. When using this signal to measure actual system gain discrepancies, remember that the peak-to-peak amplitude now displayed is only 76 IEEE units. If VIT signals are being injected into the system (see June 1968 *BM/E*, p. 46), some of these tests can be performed while regular programming is going on.

A slight modification of this test setup permits pulse timing. In this case, the reference input is the output of the "longest" camera chain. Instead of looking only for vertical displacement of the

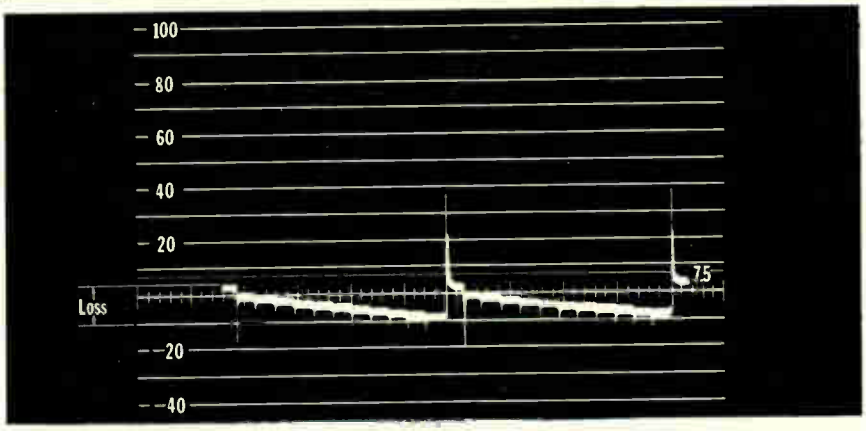


Most economical with time, this test equipment setup can be used for all three basic tests.

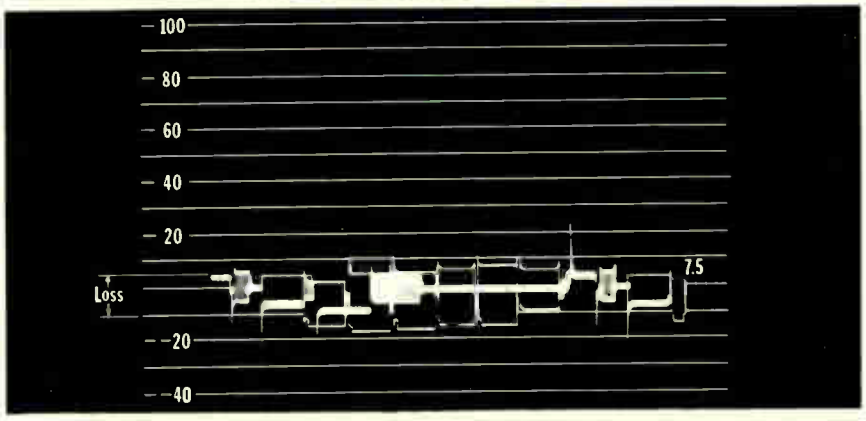
System with unity gain displays spikes of this kind.



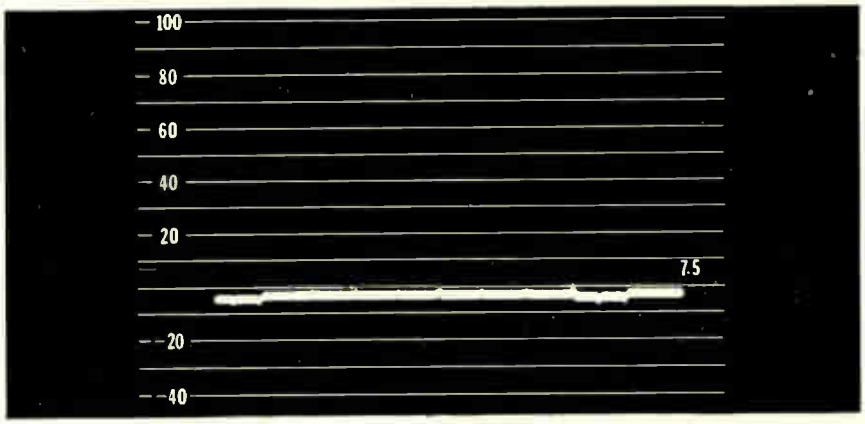
Spikes are due to time differences between two signals (path length through the system) and possible waveform modification.



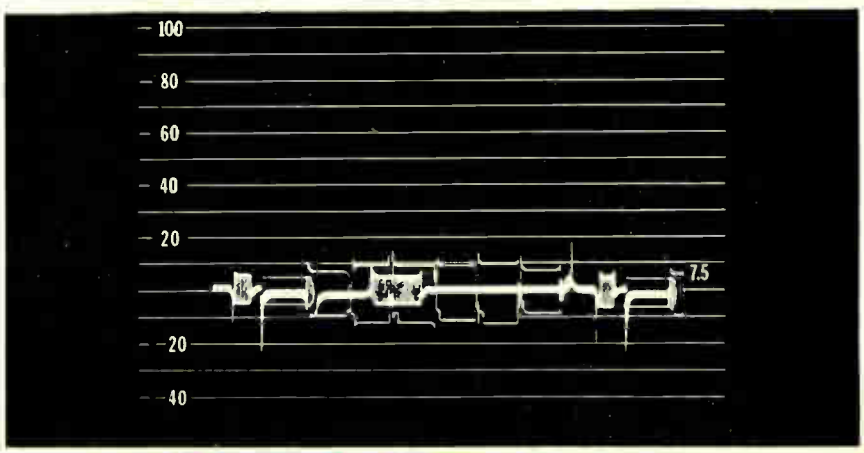
In 10-step waveform, each step represents 10 percent of the video portion or about 7 percent of composite.



Using reference input of longest camera chain, time delay between signals will show on scope. Here, there's no delay.



A time delay between the two compared signals shows up this way on the scope.



display on the waveform monitor, the trace is monitored for time delay between two signals as well. When both input signals arrive at the waveform monitor with no delay time difference between them, the waveform monitor will display a straight line when the vertical mode selector set for A-B.

How Accurate?

The precision of this type measurement depends on the instrument's horizontal sensitivity or sweep magnification. The ×25 position of the waveform monitor is more than adequate. In its fastest sweep position (.125 H/cm, ×25) the waveform monitor displays 0.318 μs/cm or 0.005 H/cm.

These measurements let you see that camera delay lines are set properly, and that sync adders are correctly timed. In cases where videotape is used, it's possible to provide the operator with a reference line back into the waveform monitor so he can be phased-in with the rest of the station without assistance from a master control operator.

Color Timing

For proper color timing, every source routed through the system must arrive at the output with identical delay. Identical means ±1.5 ns (approximately 1° at 3.85 MHz). The only equipment available at most stations which is capable of this accuracy is a Vectorscope such as the Tektronix type-520 or 526 NTSC models.

With two signal inputs and with the Vectorscope operating in the time-sharing mode, two signals are displayed. One of these two signals is about 4° clockwise from the other; this is the A input signal. Thus, the amount of delay injected by the 2-foot section of cable has been measured with ease. Even smaller delays can be detected by reducing trace intensity (spot size). By doubling vector amplitude and repositioning the display, physical displacement of the two signals will be doubled, increasing accuracy by a factor of 2. This way it's possible to detect signal path differences of less than 6 inches (1° at 3.58 MHz).

Remember, this method permits measurement of delay *differences* with great accuracy. It will not measure absolute delay values this way with the same kind of accuracy.

The fastest way to check delays would be to apply the output of the longest camera chain to input B of the Vectorscope, and then connect a signal arriving via a different path to input A, and measure the difference. But this is *not* the best way! All video paths include active elements such as amplifiers, and a misalignment or malfunction in one of these units in the reference path can disrupt all subsequent measurements.

The most precise method involves the use of a reference cable with a delay identical to that of the system. When working with systems that have long delays, the A and B signals should also be applied to a waveform monitor. This will prevent your timing the two signals with a full cycle (about 180 feet at 3.58 MHz) of delay between them without knowing it.

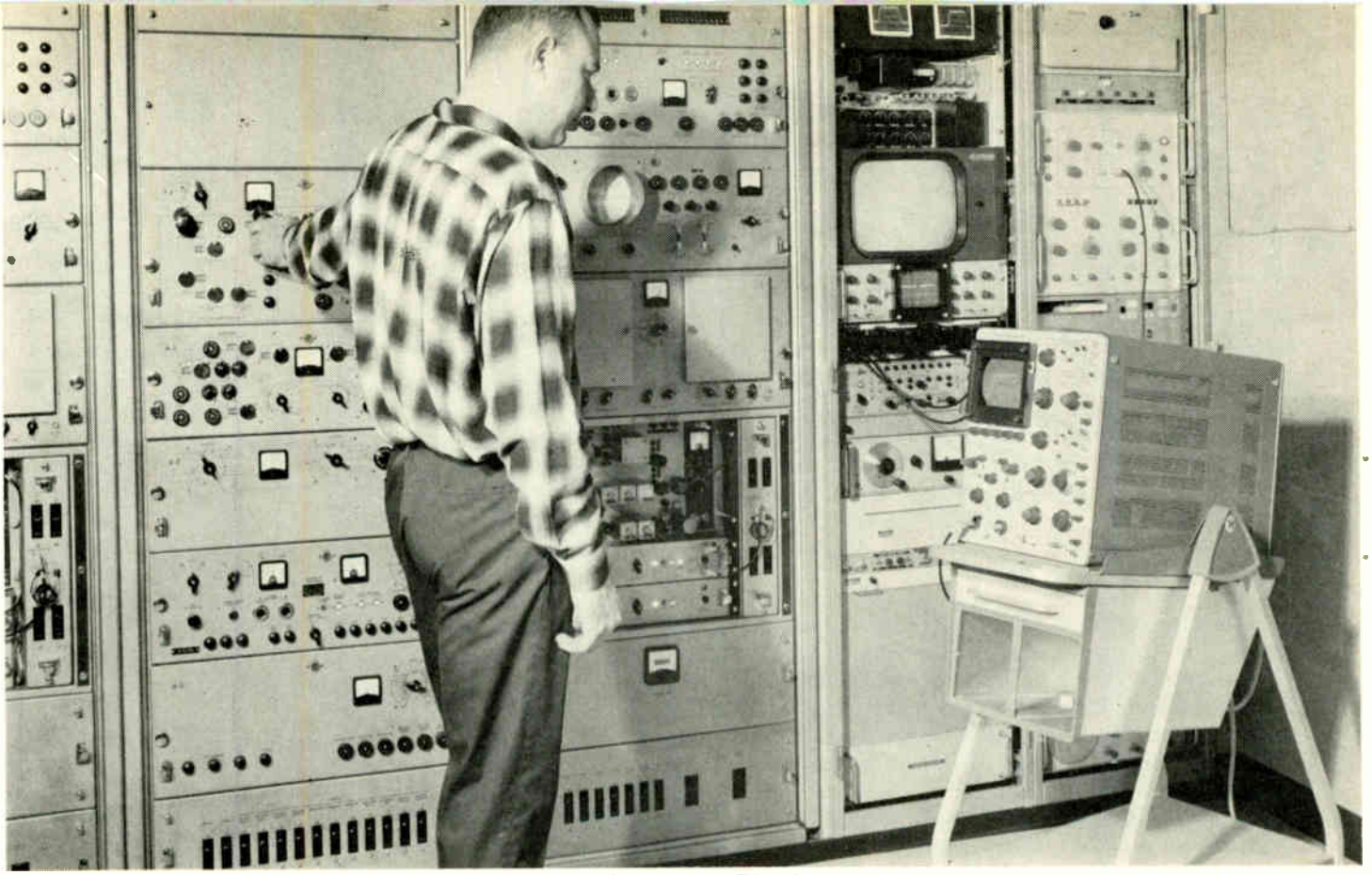
Once the system is completely timed, the same principles can be applied to phase-up sources into the switch system to permit mixing and wiping without color deterioration. With a Vectorscope in the VTR area, displaying a properly-timed incoming subcarrier on the Vectorscope as a reference signal is a help. Then, during playback, the VTR or film chain output is displayed on the Vectorscope and compared (via time sharing) with the reference. By adjusting the system source phase control while watching the Vectorscope, the operator can see the results of his adjustments.

Each test set-up and procedure has been described in its simplest form. To save time, you may want to set up the test equipment in a combined configuration (waveform monitor and Vectorscope) that will work for all three tests. The reference in this case is the standard color bar signal, normally available throughout the station. This way, pulse timing is possible by observing pulse position in the horizontal and vertical blanking intervals and at the same time monitor the color timing. This method has the added advantage of using only one reference signal for all measurements, which enhances repeatability.

Financial Considerations

Finances may not permit the use of a waveform monitor and Vectorscope at every source. In such cases, his kind of test setup can be placed at the master control location only. In small stations where the VTR and CCU equipment are within the master control area, this setup can work out very well. Here, timing of routing of these different signals to the monitoring station is crucial.

Use of these procedures will insure repeatability. Tests will depend only on the stability and accuracy of the test or reference signal. An operational check of the encoded color bar generator supplying these reference signals should be on the daily maintenance checklist. And you can wastebasket those "calibrated eyeballs" once and for all. ●



Engineer checks terminal equipment in TV station.

Network Loops: Color them Clean

By Don Wick

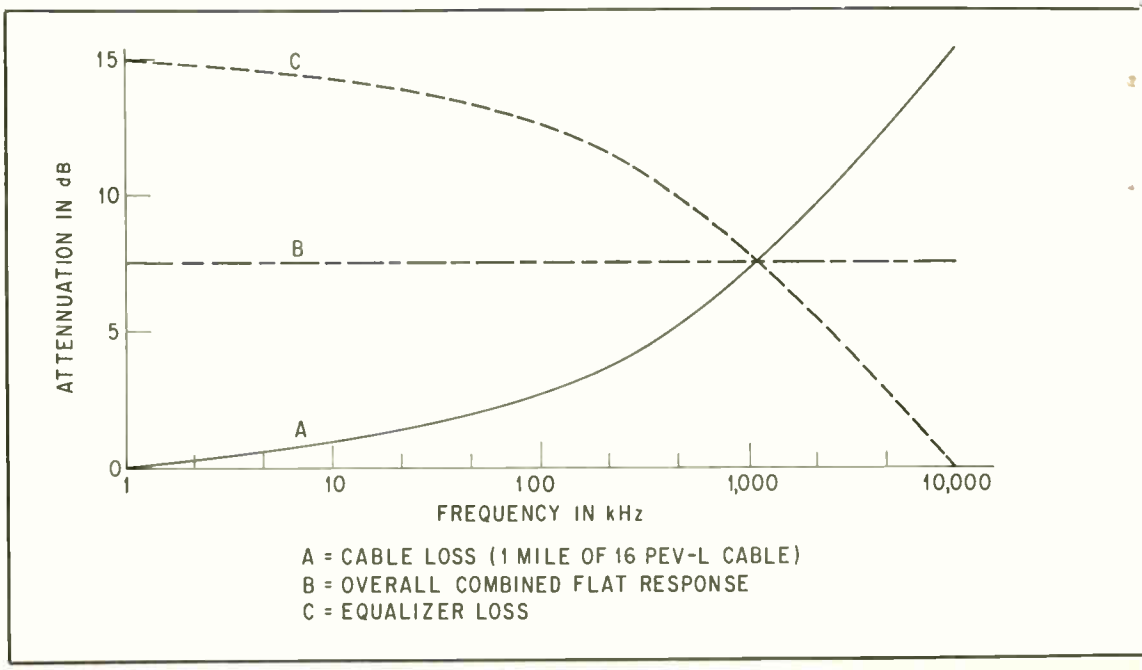


Fig. 1. Cable and equalizer loss.

Coaxial transmission lines used in telco loops don't have flat frequency response. Getting a flat output takes some fancy legerdemain to boost high frequencies at the sending end, which must then be attenuated at the output. The result is a better color program, but oh that test equipment setup!

LOCAL VIDEO LOOPS are characterized by several miles of coaxial cable transmission of a frequency band that extends from zero to above 5 MHz. Getting a flat response over this wide frequency range is hampered by coaxial transmission losses, which vary approximately as the square root of frequency. To overcome this frequency-dependent loss, equalizers are inserted into the system. Equalizer loss is the reciprocal of cable loss, resulting in an overall flat frequency response.

Since the cable loss varies with the cable length, type and temperature, the equalizers must be adjustable to account for these variations. Cable loss is not uniform; it has fine-grain variations due to manufacturing variations, splices, imperfect terminations and other discontinuities. Each of these discontinuities causes changes in the cable's impedance characteristics, resulting in a loss change at particular frequencies. Compensating equalizers must be adjustable at these frequencies to offset this variable loss. The loss varies periodically with temperature, and routine adjustments must be made regularly to maintain the extremely flat response needed for high-quality television transmission.

Don Wick is a communications engineer for Hewlett-Packard's Loveland Division, Loveland, Colorado.

Low Frequencies a Problem

The low-frequency component of a TV signal is due to the slowly changing brightness level, usually called APL, or average picture level. It results when the camera pans between scenes of varying brightness. Transmission of this low-frequency component is important, as it controls the average brightness of the received picture on the viewer's set. Without this transmission, the brightness would change as the energy component in the video signal varied.

Low-frequency transmission is difficult for several reasons. For one thing, invariably there's a lack of dc-coupling somewhere in the system. TV transmission over microwave links for example, precludes direct coupling. Transmission of low frequencies over long distances with loss requires stable dc gain, which is difficult to obtain.

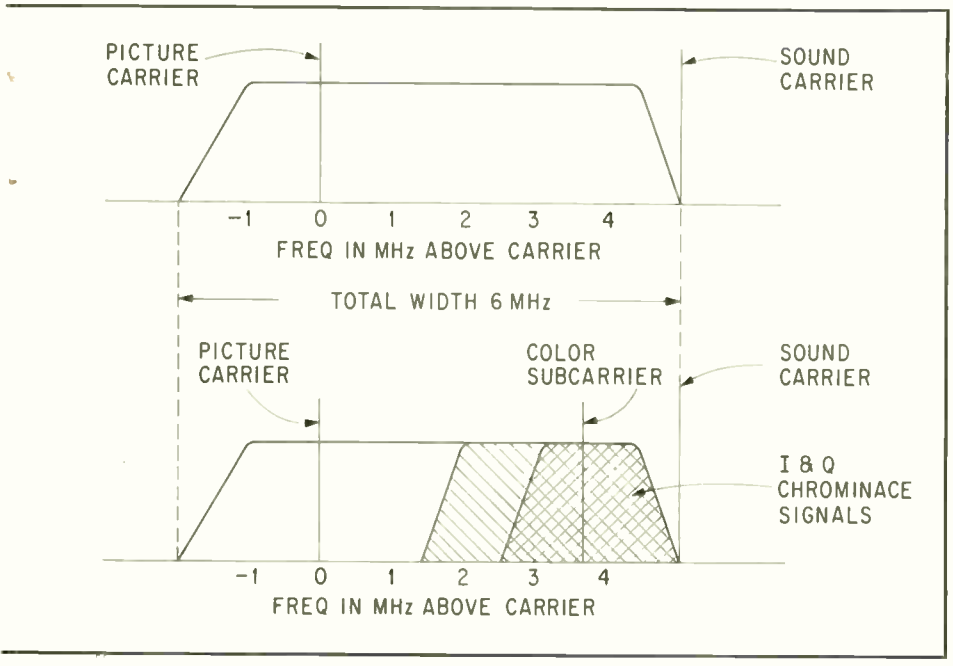


Fig. 2. Frequency spectrum of transmitted TV signals.

problems by periodically sampling the low-frequency level. Since the samples are essentially an ac waveform, they can easily be transmitted. In practice, the sampling is done conveniently by using the horizontal sync pulses. Sample amplitude is clamped to a fixed level which then serves as the reference. Clamping also reduces low-frequency distortion and 60-Hz hum.

TV's High-Frequency Component

The high-frequency component of a TV signal is needed for the large number of scanning elements that reproduce fine detail. This component signal extends beyond 4.5 MHz for both mono and color. Phase and amplitude variations are very important in color transmission, since the colors are determined by the chrominance signal's relation to the 3.58-MHz color carrier.

Local video loops connect telco's intercity

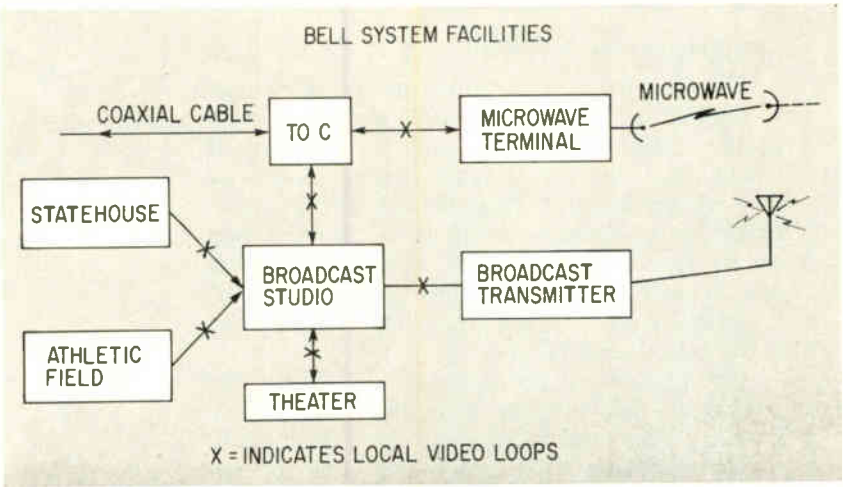


Fig. 3 Typical video transmission system.

network at the television operating center (TOC) to the broadcaster's studio. The loops also connect various public buildings, such as statehouse, stadium or sport arena to the studio for remotes.

The transmission system typically uses balanced coaxial cable with a nominal impedance of 124 ohms. Balanced cable is used to minimize extraneous signal pickup from other sources. Since the cable is often near power distribution circuits and other video, data or voice transmission facilities, complete freedom from pickup is essential. Ac hum from power systems, for example, can cause such interference as vertical lines moving through the picture.

The balanced system uses a differential amplifier at the receiving end that responds only to the differential signal appearing between the cable pairs. If the cable is well-balanced and has equal exposure of both conductors to interference sources, the resulting signal pickup will be equal in magnitude and phase. This longitudinal interference will be rejected by the differential amplifier.

Once in the studio, the signal is usually connected to an unbalanced 75-ohm system for easier switching and distribution.

Cable Losses

The cable's loss varies as the square root of frequency. A low-frequency loss is specified along with a 4.5-MHz high-frequency loss. These two numbers characterize the particular section of cable involved. Typical 16 PEV-L cable loss is 18 dB/mile—the low-frequency loss is 0 dB/mile and the 4.5-MHz loss is 18 dB/mile. The equalizers at the receiving end must have a loss that is the inverse of this to result in an overall flat response. This level is then amplified to the 1VP-P or 0 dBV—0 dB standard referred to 1VP-P.

Peak-to-peak voltage levels are used, since the video signal is nonsinusoidal and has positive and negative peaks. In practice, the sending end signals are pre-equalized by boosting the high frequency levels 15 dB. Since the high frequencies must then be attenuated at the receiving end to compensate for this pre-equalization, the noise will also be attenuated, improving the signal-to-noise ratio. Transmission systems of this type are the classic Western Electric A2A system and its new transistorized counterpart, the A2AT. General Electric, Telemet, Dynair, Jerrold and others manufacture equivalent systems. These systems are also used as microwave entrance links.

Setting Up the System

The equalizers are adjusted with sine-wave frequency runs. First, a reference frequency of 300 kHz at a standard level of 0 dBV is applied to the sending terminal and its level monitored at the receiving end. The gain is adjusted for a 0-dBV output at the receiving terminal. Next, a 4.5-MHz test frequency is applied with its level maintained at 0 dBV. The "A" equalizer knob at the receiving terminal is then adjusted until the receive output is again 0 dBV. This compensates for cable characteristics making the system loss the same at low and high frequencies.

The other knobs are set the same way. This technique of comparing different frequency losses minimizes the test equipment's accuracy requirements.

To adjust the equalizer, the reference and test frequencies are alternately switched while the technician watches the receive terminal output. System gain adjustment affects all frequencies while, the equalizers affect only specific frequencies. This permits independent loss adjustment at all frequencies. Since the test equipment is switched between the two frequencies, it merely needs a flat frequency response.

Test Equipment Lineup

Test equipment at the sending end consists of a Western Electric 61C signal generator, which supplies test frequencies from 300 kHz to 10 MHz, and a Hewlett-Packard 200 CD oscillator for supplying the 300-kHz reference. For test frequencies below 300 kHz, the 200 CD is used

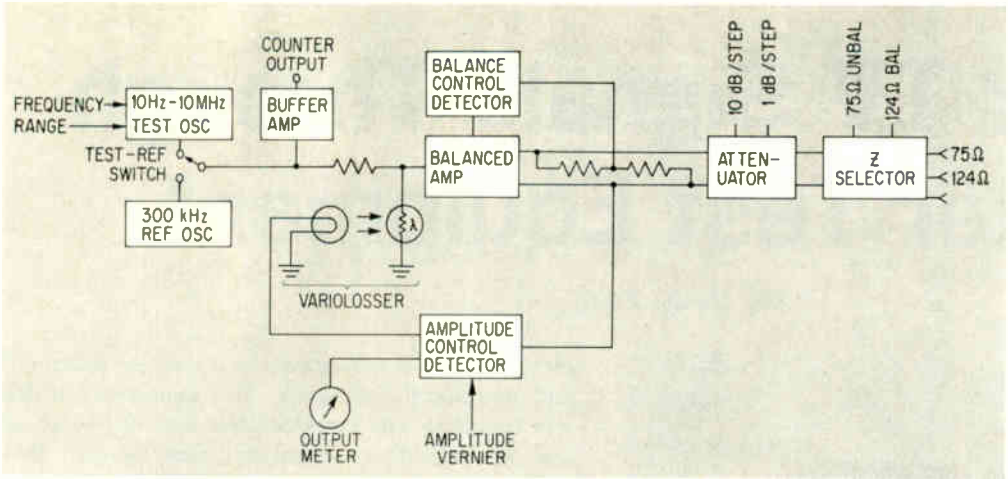


Fig. 4. Block diagram of the type 653A oscillator.

as the test frequency generator, and the 61C supplies the reference. Since neither generator can supply accurate amplitude signals with a flat frequency response over the wide range required, a Western Electric 70B power meter is used to monitor the generator outputs.

The 70B is a highly accurate thermocouple-type meter. Overloads can therefore cause burn-out or reading errors. Its time constant is slow, making rapid amplitude adjustments difficult. A Western Electric 1AP comparing set is used to switch between the test and reference frequencies, and contains a power splitter which permits simultaneous monitoring while transmitting. The receiving level indicator is also a 70B power meter.

There are several possible sources of error here. Since the power meter responds to the oscillator's total power, any oscillator distortion will also be measured. If the distortion is not constant, total indicated power will vary. In some installations, the 1AP comparing set and 70B power meter are replaced with a Western Electric 38A transmission measuring set, which automatically performs the switching and comparing function.

All-in-One System

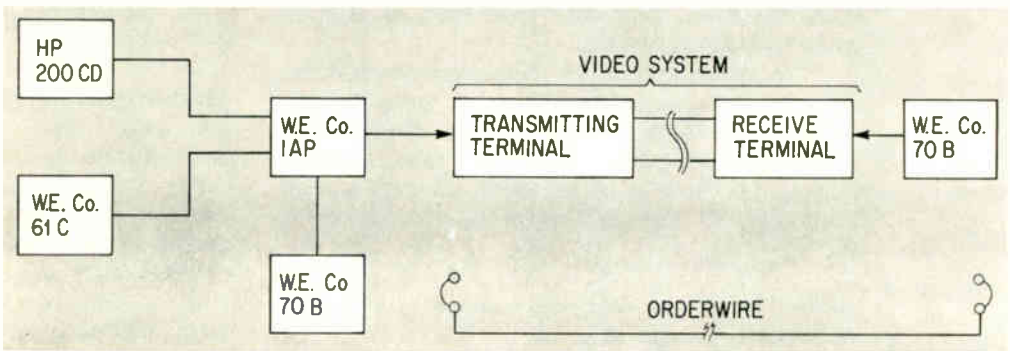
A recently introduced system by Hewlett-Packard, the model 653A test oscillator, combines the 4 test-set functions into one 21-lb package. The oscillator covers a frequency range of 10 Hz to 10 MHz and has a built-in 300-kHz reference oscillator. The output can be switched between the test and reference frequency at any time. The output circuit supplies a balanced 124 ohms or unbalanced 75 ohms output that's flat within ±0.05 dB over the entire 10-Hz to 10-MHz frequency range. An accurate 1- & 10-dB step attenuator together with a high resolution meter (0.02)-dB resolution) allow output levels from +10 dBV to –99 dBV to be set accurately.

The test system consists of a free-running LC oscillator operating at 300 kHz and a Wien bridge oscillator. The selected signal, either the test or reference frequency, is fed to a variolosser amplifier which maintains a fixed output level regardless of oscillator amplitude. The output, either balanced or unbalanced, is monitored and its level compared to a precision reference zener diode. Any difference between the output and zener voltage creates an error signal which, through a photoresistor coupling, adjusts amplifier gain to correct the output voltage.

A special feedback circuit maintains balance over the entire frequency range. This feedback circuit sums the output of the two sides of the balanced amplifier. If they are equal and 180° out of phase, the necessary condition for balance, the feedback signal will be zero. If not, an error signal is generated which adjusts the amplifier gain, restoring the condition of balance.

This system may well be the most painless problem-solver for harried telco and broadcast engineers. Its use will certainly help in maintaining crisp outgoing color programs. ●

Fig. 5. Test equipment setup in video loop.



Better TV Signals Through Better Test Equipment

By Rudy Feldt

Mere compliance with FCC minimum test equipment standards and striving for quality TV signals are poles apart. An engineer long engaged in the field of manufacturing TV test equipment here sets forth his minimum standards for maintaining quality color TV signals.

THE FCC REQUIRES TV transmitters to be equipped with a specified minimum of test equipment. This requirement is being complied with. There are, however, other obligatory measurements which have to be carried out from time to time by station personnel or outside consultants, using more sophisticated measuring equipment. The most basic group of station equipment relates to fundamental operations of a TV transmitter, namely the control of assigned channel frequency, output power, coverage of assigned territory, modulation control, etc. These types of measurements and equipment are well known and shall not be discussed here, since they have little or nothing to do with signal quality.

The second group of measurements pertains directly to signal quality. To this group belong all the measurements dealing with distortion of amplitude and phase, noise and transistor behavior. The quality of television pictures and in particular of color TV pictures depends on a large number of variables which must be measured and monitored frequently. The accuracies which are required are considerable and the cost of this equipment is substantial. No wonder then that in many quarters there is reluctance to spend money for sophisticated test gear, particularly when in the good old black-and-white days one could get along with very little.

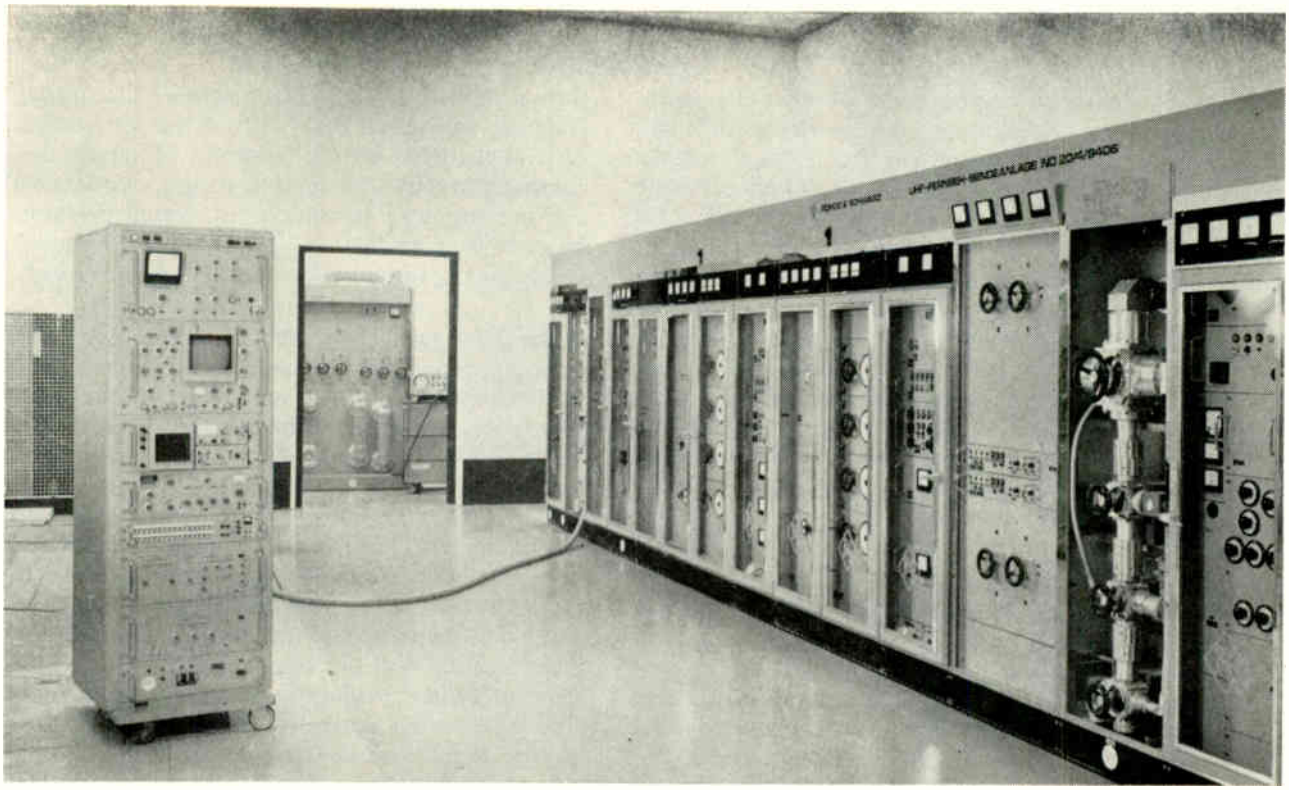
But what about the viewers? They're becoming quite aware of how good a color TV picture can or should be and they aren't willing anymore to accept inferior quality. The human eye sees defects in a color picture much more readily than in a black-and-white picture. In our experience with the highly competitive color-TV market, those stations will be on top which adhere to a "Hi-fi TV" policy. Competition from CATV is now working in the same direction.

The equipment required will prove a good investment on condition that all parts of it form an harmonious system without duplication or overlapping and with compatible accuracies. It seems far better to equip a station step by step with first-rate equipment than by doing it all at once with cheap but poor instruments. Choosing the cheap route may be disastrous since the technical requirements will certainly become even more stringent as time goes by, and the "cheap" instruments will become expensive, because they will have become useless by that time.

Demodulator. This is perhaps the most important device for checking overall performance of the transmitter. It represents the ideal receiver and if followed by a picture monitor, permits visual observation of picture quality. The prime function of the demodulator is measurement of both visual and aural characteristics of the transmitter. A demodulator will give satisfactory results however, only if its filter response accurately compensates for transmitter response. This requires a Nyquist slope demodulator, not just the all too frequently used simple diode.

Measurement of video noise. Noise is one important factor which degrades a picture. Accurate measurement of video noise permits not only locating and reducing noise sources, but can save considerable money by checking and comparing quality of expensive studio equipment and components such video pickup tubes, videotape recorders, videotape, etc. In this connection it is frequently necessary to measure very small noise

Author Feldt is an electrical engineer with Rohde & Schwarz, Passaic, N.J.



Measurement test rack type UMVF is at left, ready for crucial checks in modern uhf transmitter plant. Transmitters are 20-kW video and 2-kW audio.

levels on the order of –60 to –70 dB in the presence of the very large sync and blanking pulses. This rules out the use of the oscilloscope as a measuring device. Only equipment which blanks out those pulses is suitable for this purpose, and such equipment is presently available.

Video signal generator. A good signal generator for video has to fulfill a number of important requirements. It must generate all the basic signals which are needed for checking performance. These signals must have accurate waveforms, levels and frequencies. The generator must have a precision mixer for the combination of these signals with video, sync, or other signal coming from other sources. For instance, if the generator produces a sawtooth voltage which is to be used for the measurement of differential gain on the order of 0.5 percent, the linearity of this sawtooth must obviously be much better than 0.5 percent. Similarly, square waves used for checking the transient behavior of the transmitter must have accurately known and identical rise and fall times in accordance with the transmission bandwidth of the system. Such precision generators cost money, but here again false economy will prove more costly.

Measurement of frequency response. Transmitter frequency response measurement is of extreme importance. This is done preferably by sweep methods either from video to video using the demodulator, or from video to rf, with a sideband adapter. Because of the time constants of the filter circuits in the transmitter, accurate frequency response curves will be obtained only if the sweep operates at slow repetition rates, generally below 1 Hz. Sweepers operating at line frequency are known to give completely erroneous information. If the vestigial sideband characteristic is to be obtained at rf by using a so-called sideband adapter, these very important points must be considered: much of the important information lies in the low frequency part close to the carrier; a good sideband adapter will be capable of measuring within 50 kHz from the carrier; this requires tuning accuracies and stabilities which can be provided only by frequency synthesizers. Again, this costs money.

Group (envelope) delay. If the frequency response characteristic tells whether or not all frequencies

References

1. H. Mangold, "Modern Equipment for Measuring Television Transmissions Systems," presented to the NAB Conference, March 1966.
2. R. Feldt, "The Video-Noisemeter," presented to the NAB Conference, March 1967.
3. H. Mangold, "New Developments in Television Measuring Techniques," presented to the NAB Conference, March 1968.
4. R. Feldt, "Simultaneous Video and Phase and Gain Display," BM/E, Vol. 4 No. 3, March 1968.
5. W. Stroessenreuther, "A New TV Demodulator," R/S Mitt. No. 16.

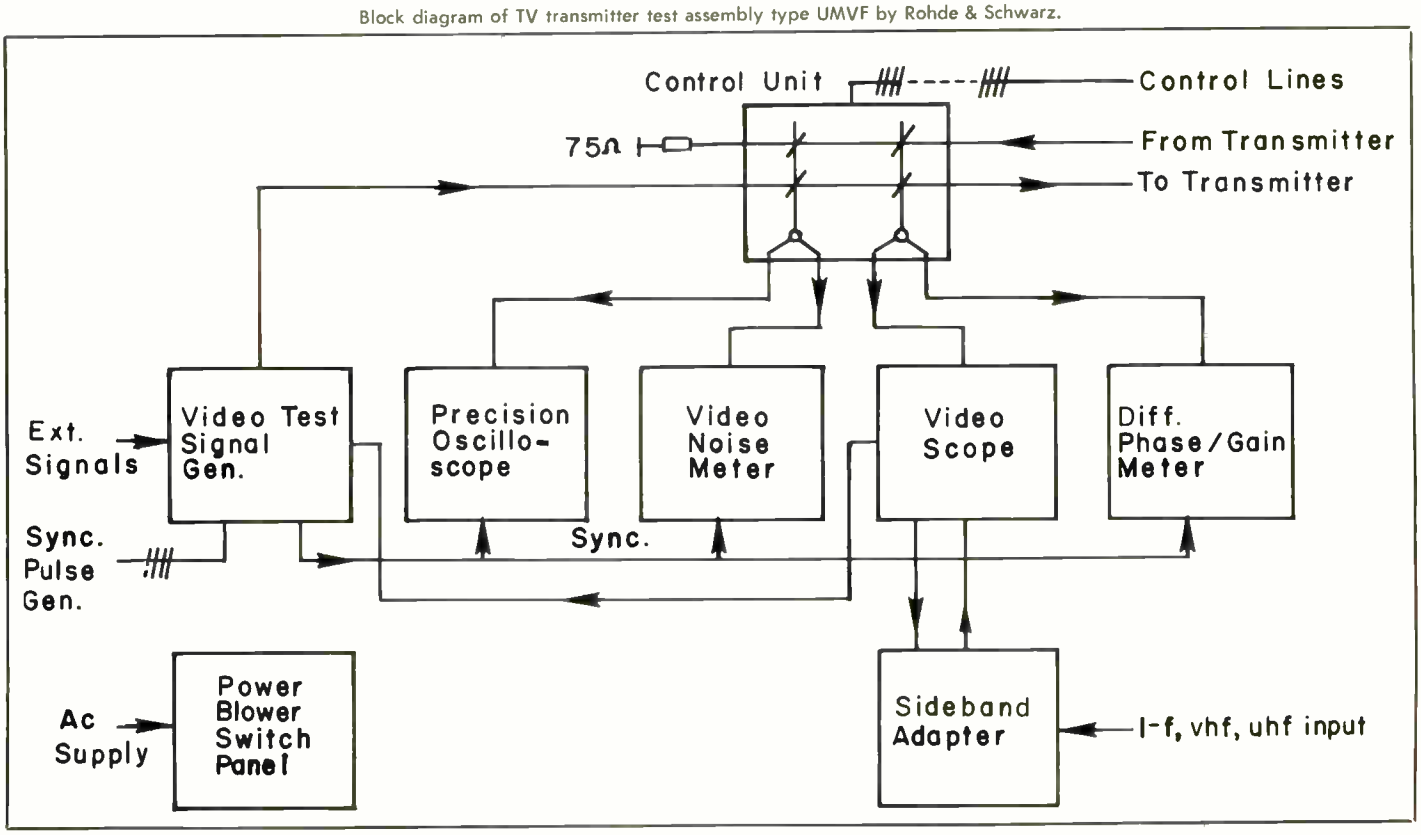
Note: Most of the above-listed papers can be obtained as reprints by writing to Rohde & Schwarz Sales Co. (USA), Inc., P.O. Box 148, Passaic, N.J. 07055.

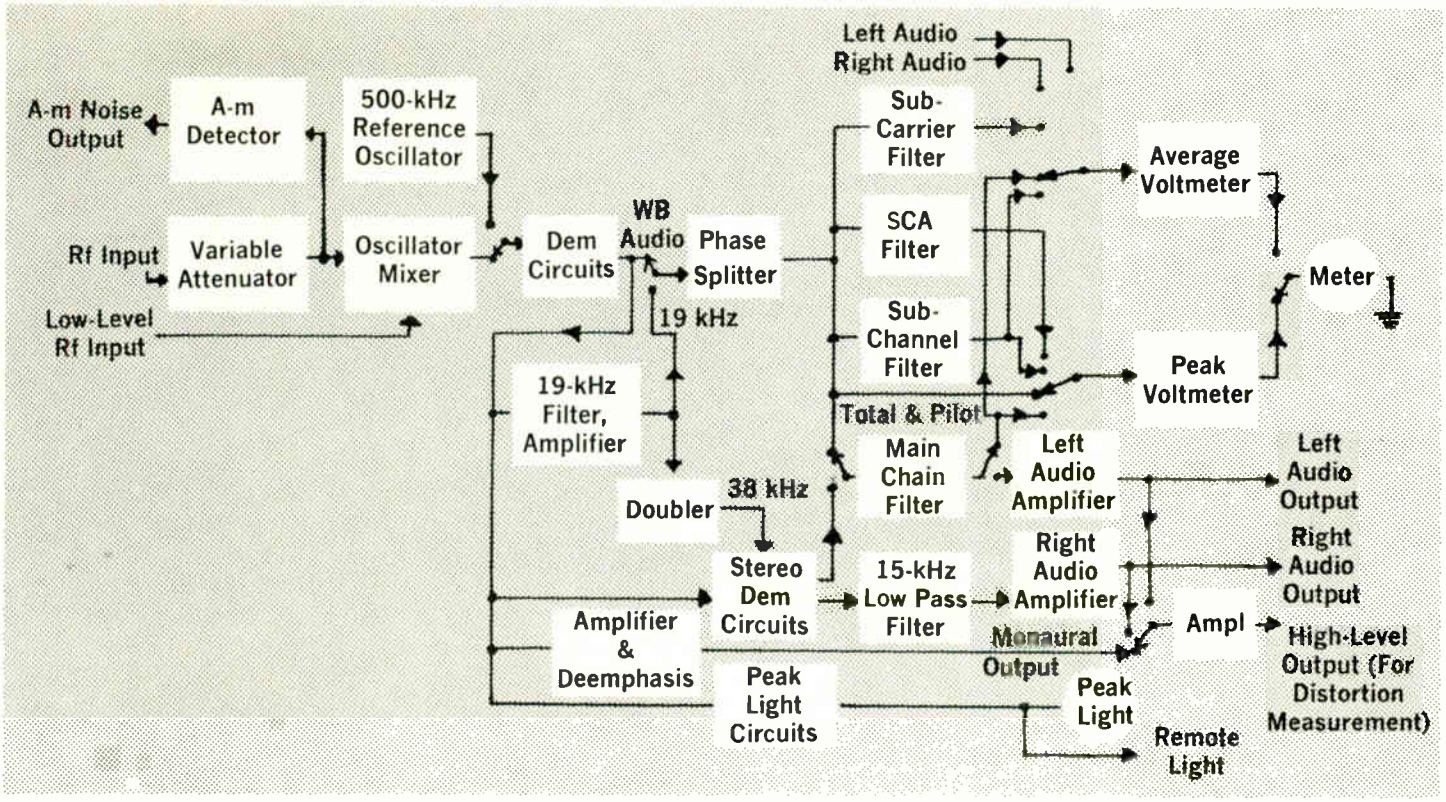
within the transmission band are properly transmitted, measurement of group delay indicates whether or not a pulse traveling through such a band will maintain its original shape. Accordingly, constant group delay is of decisive importance for the quality of the TV picture. Measurement of this characteristic can be done by a sweep method similar to the plotting of the frequency response. It is strongly recommended that such equipment be on hand for detailed checking of all the components of the transmitting system. There is, however, a new method available which is admirably sulted to the instantaneous and simultaneous checking of frequency response and group delay, the 2T/20T technique.

2T/20T method. To use this, three well-defined signals are used to obtain immediate display of the behavior of a TV system with respect to frequency response and group delay. The test signal consists of a 2T pulse (duration for half amplitude) of 250 ns, a white bar whose rise and fall times are carefully adjusted for t = 2T and a 20T pulse (2.5 μs duration) which modulates a color subcarrier of 3.58 MHz. A detailed description of this method cannot be given here. Suffice it to say that distortion of the 2T pulse at the output of the transmission system is a direct and immediate indication of the distortion present in a black and white system, while distortion of the 20T pulse is a measure of frequency response and group delay in a color TV system. This method has all the earmarks of rapidly becoming popular because it is simple, economical and permits rapid monitoring of overall performance. It does not replace, however, the more accurate and quantitative sweep methods mentioned.

Differential pulse and gain. Last but not least, these important parameters tell the nonlinear distortion of the amplitude and phase of the color subcarrier, i.e. of the chrominance signal. The Vectorscope is the instrument most widely used for this purpose, particularly when the overall behavior of the transmitter is to be measured. With this equipment, the two parameters are measured independently. When transmitter circuits are to be optimized for minimum differential phase and gain, it becomes apparent that in general the best compensation for the two values is not at the same point, so a compromise is necessary. Also, when measuring individual portions of a transmitting system, it may become necessary to measure very small fractions of one percent or one degree. For this type of measurement a new instrument, the differential phase and gain meter, permits simultaneous display of both parameters on the screen of a low-frequency oscilloscope. Alternatingly one line shows differential phase, the other differential gain. •

Block diagram of TV transmitter test assembly type UMVF by Rohde & Schwarz.





Block diagram of Collins 900C-3 stereo modulation monitor—a basic building block for add-on SCA modulation monitor plug-in.

Controlling Fm Subchannel Air Pollution

Off-the-air checkout of fm subchannels is a tricky operation at best—so tricky that some transmitters get only a once-a-year once-over. In clamping down on makeshift and often slipshod test procedures, the FCC has helped spawn a new breed of test equipment that's simple to use, and doesn't require transmitter downtime for testing. With this gear, you can spot a dirty, air-polluting signal with one test prod tied behind your back. Finding the cause of this pollution can be a bit touchier.

THE FM BROADCASTER is becoming uncomfortably aware of the need for sophisticated instrumentation. This is especially true of stations carrying one or more subchannels. FCC requirements call for stringent modulation monitoring for both stereo and SCA channels. Last year, the onus was on fm stereocasters. Now the SCA fm'er is under the gun. The appropriate note in the revised rules, paragraph 73.253, reads in part:

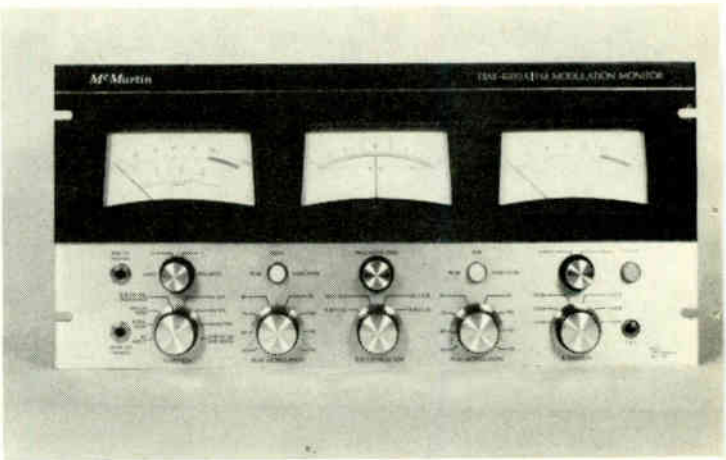
> The provisions of this subpart shall become effective September 1, 1967, for stereophonic modulation monitors and March 1, 1968, for SCA modulation monitors . . .

The March 1 deadline has since been extended to January 1, 1969, and some industry spokesmen believe that a further extension may be in the offing. The reason: type-approved monitors just won't be coming off the production lines in large

enough quantities soon enough for total industry-wide compliance.

But what sparked these new FCC restrictions? Clearly, some fm broadcasters haven't been living up to their obligation to provide crisp, undistorted subchannel signals. They've been polluting the airwaves with signals from equipment that would get a cursory test and alignment a couple of times a year, if that often. Yet, the fault hasn't been entirely the broadcasters'. Test procedures have been cumbersome, difficult and time-consuming—often possible only during the wee hours when the transmitter's off the air. The new direct-reading modulation monitors combine the functions of several different pieces of test equipment, are intrinsically easy to operate, can monitor off-the-air signals continuously, and don't require the presence of an engineer for operation.

Probably the most ticklish kind of operation to instrument successfully is the fm station that transmits two subcarriers—stereo and SCA. Two such New York stations polled—WPIX-FM and WRFM—each offer their own formula for fm instrumentation.



Newest in McMartin's instrument lineup, the TBM 4500A SCA modulation monitor is FCC type-approved and is being produced to meet the FCC's January 1 cutoff date. Monitor has direct-reading meter scales, and provides continous metering.

Main-channel modulation monitor is typical of McMartin instrumentation gear that can make signal cleanup relatively painless. With equipment of this type available, there's little need to pollute airwaves with dirty fm.

New Monitors on Order

In compliance with the updated FCC rules, WRFM has ordered an SCA modulation monitor from Belar. Right now, according to Chief Engineer Joe Losgar, the station broadcasts background music on its SCA channel continuously.

Ultimately, says Losgar, the Belar monitor will perform a frequency check in addition to its modulation monitoring function. It'll do this on a direct-reading meter. Currently, WRFM uses a Hickok digital frequency counter along with a standard subscriber-type SCA receiver. Modulation checks are currently made daily when inspecting the transmitter. Since the station's on the air on a 24-hour-a-day basis, this limits adjustments to the once-a-week downtime—from 12 midnight Sunday to 6 A.M. Monday. Use of the new monitor will change all this, and will let the station instrument its signal continuously.

Duplicate Equipment Lineup

One station that has it made from an instrumentation standpoint is New York's WPIX-FM. As the baby brother to TV station WPIX, the station uses sophisticated (and expensive) instrumentation that most fm'ers simply can't afford. This utility is made even more effective by the transmitter location—close to the TV transmitter in the Empire State Building. This proximity adds still another plus—there's always a TV engineer available for emergencies that might crop up in the fm transmitting plant.

WPIX-FM's test equipment lineup is impressive. At the transmitter site, station engineers have available: RCA (Belar) BW-85 stereo frequency and modulation monitor; RCA BW-75A fm and frequency monitor; McMartin 4000 SCA frequency (67 kHz) and modulation monitor; Hewlett-Packard 524L general-purpose frequency counter; Nems Clark SDT 501 spectrum analyzer. According to Transmission Engineer Sherman Egan, the station simply wouldn't have a frequency counter or spectrum analyzer if the parent TV station didn't require these instruments.

The studio lineup includes: McMartin 4500A stereo modulation monitor; McMartin TBM 3000 frequency monitor; McMartin TBM 3019 (19 kHz) frequency monitor; McMartin TBM 2000A modulation and frequency monitor. Some of this gear is brand new.

Broadcasting two simultaneous subcarriers can be a problem. As Egan says, "The whole trick is to keep the two subcarriers from interfering with

each other—by keeping subcarrier modulation where it belongs. We have Volumax in all channels, including SCA. One extra that Volumax has—besides its gain-riding function—is its limiting action on instantaneous overmodulation peaks. It rolls off the high frequency spikes, and lets us keep our average modulation level up."

Egan goes on to say, "Monitoring SCA modulation is a must. Now that special monitoring equipment is becoming available, it's high time for the broadcaster to start stringent modulation monitoring. Until recently, there weren't enough SCA channels in the country to create a market for this specialized test equipment. With more and more stations using SCA, now there's an incentive for manufacturers to produce specialized SCA monitoring equipment."

In its new test equipment lineup, WPIX-FM doesn't need a local oscillator or generator in the studio monitoring gear—the 19-kHz pilot is picked up from the McMartin monitor. The new gear's monitoring meters aren't heavily damped, so the engineer can read actual peak modulation. This capability is cited as a great advantage in preventing interchannel distortion and crosstalk.

Test-Equipment Musts

Bare compliance with the amended FCC rules isn't enough for good, clean transmission. There are certain "basic" pieces of instrumentation gear that are a must for decent fm operation. The first on the list of musts is a good-quality oscilloscope. Good-quality here means an instrument with good calibration—not the garden-variety kit-type scope used in a TV service shop. TV stations use very high-quality scopes out of necessity. These scopes are expensive initially, but station performance improvement is well worth the investment. Also bear in mind the all-important low-capacity probe—another must, and a cheap one at that—for proper scope operation.

Most fm engineers will concur in the need for a frequency counter. No station can tolerate an off-frequency transmitter or subcarrier. An off-the-air monitor simply is not an accurate way to check frequency. This point is emphasized by Al Jarratt, a member of RCA's fm transmitter product management team.

Jarratt states that he has actually seen stations shut down because their monitors were off frequency—all the time thinking it was the transmitter's fault. Use of the frequency counter in periodic maintenance can prevent this kind of cataclysmic error.

An all-around and inexpensive instrument—the VTVM—is another important item. Most ordinary VTVM's will do the job. Many of the new breed of transistorized volt-ohmmeters will also work well in the fm plant, as long as they have a minimum input impedance of 11 megohms.

Dummy Loads to the Rescue

It often happens—the engineer finds an excessive amount of crosstalk, distortion or a-m noise in the monitored signal, but can't pinpoint the source of the problem immediately. It could be a transmitter problem, or it could be trouble with the exciter. This is where a special kind of dummy load comes into play—a dummy load for the *exciter*. Use this and you can tell in a hurry if your exciter is acting up, since you can run it and test it separately.

Audio generators used in testing exciters have to be a whole lot better than average for fm work. RCA's Jarratt points out that audio generators with ½ of 1-percent distortion have been acceptable in the past—especially since the FCC required a generator accuracy of only 2½ percent. The picture's changed now that exciters are capable of distortion figures much better than ½ of 1 percent. Unless the generator is considerably better than this figure, the station engineer can't tell how much distortion is coming from the exciter and how much from the sig gen. Jarratt emphasizes the importance of a generator with 1/10 of 1-percent distortion or better—especially for minimizing crosstalk between stereo and SCA subcarriers.

Another must, according to Jarratt, is a distortion analyzer. After all, you should have some way of actually measuring this intrusive distortion. Another item that should be self-evident is a grid-dip meter. Here, even an inexpensive kit-type meter will do the trick, provided you know its calibration is accurate.

Other desirable instruments include a wattmeter to check transmitter efficiency. A wattmeter such as Bird's "Thru-line" can help locate defects in the transmission line or antenna and can check reflected power.

An a-m noise measuring set is also helpful, as is a wideband fm detector. This latter instrument can be a boon if there's any question about the monitor's accuracy. It's very possible for measured distortion to be caused by the monitor and not by the transmitter. The wideband detector can help pinpoint the trouble.

The new breed of sophisticated, all-in-one test and monitoring equipment that's making its appearance now will go a long way toward satisfying a long-standing fm ill—the lack of concurrent monitoring/metering capabilities. But this new gear will only tell you that a problem exists. Finding the malfunctions and debugging the fm system still depend on well-known and long-used standard test gear. It's not enough to know your signal's dirty—you owe it to yourself and your public to do something about it! ●

Cottonseed Clark at the KZEL control board puts his extensive experience to work in selecting Country and Western tune for his afternoon show. A portion of KZEL's ample C&W library is available for ready access from the control board positoin.

C&W Format Puts KZEL in the Black

By Maurie M. Green

Take one ailing, almost-bankrupt radio station, inject a totally new format to fill a gap in the audience coverage, mix in a well-known personality, promote the new format like crazy and voila: instant success.

IN THE SPRING OF 1967, after five years of broadcasting, KWFS, Eugene, Oregon, had accumulated nothing more than the booby prizes awarded them for being the eighth station in an eight station market for five consecutive years.

Naturally, if listeners were hard to find, advertisers were even scarcer. The station's sales staff had dreams that someday they would see a profit month; but that's all they did: dream. Unfortunately KWFS's creditors wanted something more substantial in payment of the station's increasingly mounting debt. As the money ran out so did the building contractor of the yet unfinished KWFS studio. When KWFS's debit balance crossed the $30,000 mark Associated Press came and took away the station's teletype machine.

With such a sorry showing in the polls and account books it was obvious that KWFS's management was doing something wrong. At the heart of the whole problem was the station's incredible approach to programming. At least ten hours of every day's broadcasts were devoted to speakers predicting an impending Red takeover of the country. The rest of the broadcast day was devoted to fulfilling their contract as a CBS affiliate by sandwiching in Arthur Godfrey and Derwood Kerby. In short, KWFS was out of touch with what a radio audience wants to hear. When the only female vocalist on a station is Phyllis Shaftly singing off key about the Secretary of Defense, "Can you build an F-111 Bobby boy,

Maurie Green is associated with KORE radio, Eugene, Oregon, as an advertising salesman. In the past he has acted as advisor to station owners interested in programming their stations with C&W music.

The KZEL studio in Eugene also serves as base for the station's four-hundred-foot tower. Studio and transmitter are to the right of the central entrance hall. Sales and management offices are on the left.

Bobby boy?," listenership is bound to fall off.

KWFS was sinking fast when the owner, making the smartest move of his radio career, quit the broadcasting business by selling the station to a Eugene lumberman, George Zellner. Zellner paid enough of the station's back debts to keep the radio afloat, changed the call letters to KZEL, and sent out a call for help to Cottonseed Clark. Cottonseed was then the top Country-Western disc jockey at KEEN, San Francisco, thereby indicating what KZEL's format would be as soon as the political broadcasts could be dropped, a task which is still in progress at KZEL.

When it came to Country-Western music old Cottonseed was one of the best, being a former producer-writer for Gene Autry and the Andrews Sisters, along with claiming two golden records of his own and experience as emcee of the *Hollywood Barn Dance* and the *Hoffman Hayride*. Zellner felt it would be well worth the part ownership that was given him to relocate in Eugene and take over management of KZEL.

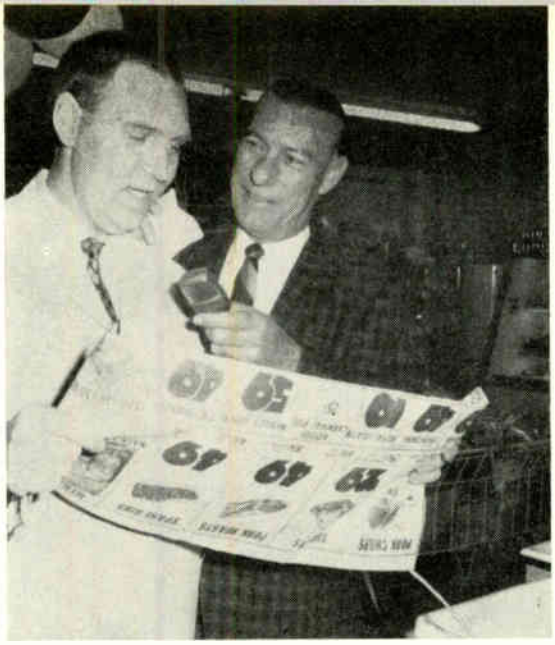
Country-Western music was chosen as KZEL's new format for one basic reason. As Cotton himself puts it ". . . now, money is a powerful motivation." And C&W was where the greatest profit potential was in the Eugene market. This 100,000 market area had seven a-m stations sharing the advertising dollar with KZEL. Two of these stations were all talk, two were hard rock, two were music and news, and one was C&W. The latter station, KATR, C&W since 1963, had proved that Country music could attract a respectable audience by having become the number one station during the morning hours. Adding things up on his fingers, Zellner figured C&W would be the road of least direct competition with a proven format that had already gotten the local advertisers interested.

The long range possibilities didn't escape KZEL's new owner. The station was starting at the bottom with the fastest growing radio format in the country, catering to a predominantly adult audience. Zellner realized that C&W provided the greatest profit potential for both present and future operation.

Having been given a format idea, Cottonseed set about making the C&W idea into eighteen hours of enjoyable programming by placing the Cottonseed Clark show between the salable travel hours of 3:10 and 5:30 P.M. weekdays.

In his show, Cotton makes maximum use of his fourteen years experience as a C&W disc jockey. Rarely is a record played that Cotton can't tell the listener about in great detail. Personal anecdotes about the recording artist, the history of his career, and the success of his recordings are all familiar to Cotton and add color and interest to the program.

The Cottonseed Clark show is designed with a personal appeal in mind. The dominant theme is nostalgia. Maudlin songs and old time favorites are the sole features. Cotton himself is a soft-spoken man with a Texas drawl. Realizing that radio is an intimate media, Cotton does not speak



Cottonseed Clark discusses grocery bargains with the manager of a Springfield food market. Personal style of broadcast advertising has been the keystone of KZEL's success.

to the unseen masses beyond his microphone, but talks with his audience on a company-come-to-home level.

Although the show does have this dominant theme of nostalgia it is a remarkably well-balanced program. Humorous and serious songs, the latest hits, and dusty discs are evenly distributed in an interesting and pleasant manner. Cotton also features the only regularly scheduled sponsored poetry recitation in the United States. These rural rhymes are actually written by Cotton himself and appear at a fixed time within the show.

Though Cotton's knowledge of C&W is enormous it never becomes so apparent that it puts him above his listeners. Cotton's golden rule has been never to talk down to the audience.

With Cotton's own program in the center of the station's broadcast day KZEL has built its programming around this show. The other KZEL disc jockies are not billed as personalities but concentrate on offering good C&W music. To balance Cottonseed's appeal to nostalgia the other KZEL shows are based on a formula leaning toward the newer hits.

When KZEL first went C&W their record repertoire was almost nonexistent. However some slick dealing by the program director got them 200 records at a reasonable price from four local distributors. Other C&W records were obtained by trading with other stations. The going rate of exchange was four Phillis Schaftlys for one Buck Owens. The program director still spends an hour a day writing for records. When Cottonseed joined the station his large record library was added to that of the station. Cotton's name is also used to solicit mailouts from distributors in the C&W field who realize the value of having their music played by Cottonseed Clark.

The transformation of KZEL from the sorry sight it had been to a respectable C&W station was almost entirely completed within three months. KZEL is still waiting, however, for the network contract to expire so that their morning hours will be free to program C&W music.

Now that Cotton had put things right at KZEL he still had a big job ahead of him: advertising the new format of the station. This he did in the most direct station promotion fashion, hitting every civic club to read his Brushwood poetry and publicize the good things at KZEL.

Cotton shook so many hands and kissed so many babies while broadcasting his show live from the KZEL booth at the county fair that the station was afraid he had taken up politics. These remote broadcasts at the fairground were so successful that Cotton decided to continue a weekly remote broadcast so that even more people could see what was happening at KZEL. The *Cottonseed Clark Show* is now broadcast from a local shopping center every Friday afternoon. Not only does Cotton get to tell the people about KZEL but the retail stores in the shopping center are delighted to have the program and sponsor the entire show.

Desiring to augment Eugene's social life by way of promoting KZEL, Cotton decided to sponsor *Cottonseed Clark Pancake Feed and Poetry Recital* in cooperation with the owner of a local pancake restaurant. With all the pancakes they could eat and all the Brushwood poetry they could stand the people of Eugene packed the house. By the time they left they were completely sold on both the products of the restaurant and KZEL radio.

Promotion Helps

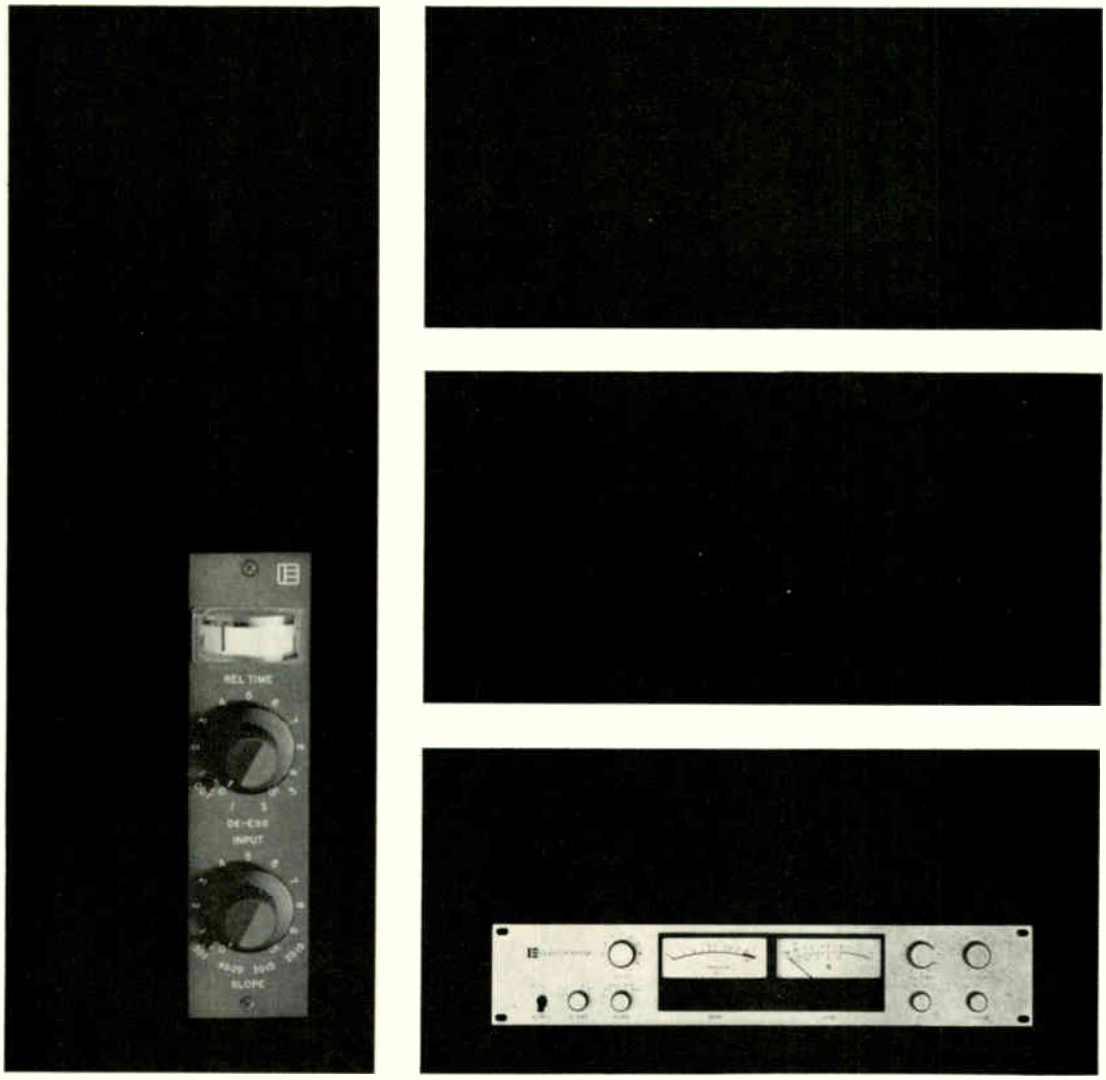
Cotton also got together with another sponsor in a station promotion that involved a mystery melody contest. A local dairy gave away milk delivery and chances to win a free trip to Las Vegas to listeners who could identify the tune of the day. The dairy's products were advertised on the station in connection with the contest and printed station material publicizing the contest was included in the dairy's regular delivery of milk. Also promotional cards about KZEL were placed in stores where the dairy products were sold.

More conventional means of station promotion were not ignored by Cottonseed. KZEL for many months had a permanent ad in the local daily paper with a picture of Cotton and an invitation to the reader to tune to KZEL. Billboards around Eugene also urged motorists to tune in KZEL on their car radios.

Six months of intensive advertising of KZEL and much hand shaking and public speaking by Cottonseed had been quite effective in changing KZEL's ratings and revenue.

Today the station is number five in percentage of the total audience and KZEL's income statement is beginning to look healthier. The man whom Tex Ritter had said "had done more than anyone to make people western minded" has successfully transformed a down-and-out radio station into a bright-eyed, bushy-tailed C&W enterprise with a prosperous future. ●

Does the world really need two new compressor-limiters?



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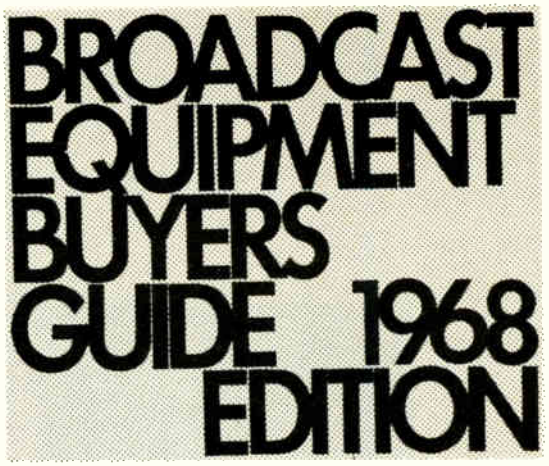
Attention:

1968 BROADCAST EQUIPMENT BUYERS GUIDE OWNERS

This is an important addenda page. It should be clipped along the perforation and pasted on page 118 of the 1968 BROADCAST EQUIPMENT BUYERS GUIDE. This will bring your guide up-to-date with the very latest changes, additions and corrections to company listings.



The transmitter buildings category on page 36 should read as follows:

Transmitter Buildings

Advance Industries
Command Communications
Fort Worth Tower
Rohn Mfg.

The Directory of Manufacturers' Local Sales Offices and Representatives section should incorporate the following changes, additions and corrections:

BIRD ELECTRONIC CORP., 30303 Aurora Rd., Cleveland (Solon), Ohio 44139. (216) 248-1200

transmitter access; rf loads; transmission line switches (coax); catv transmission lines & access.; rf test eqpt.

Cal. Allgood Associates, Inc., 3388 W. 8th St., Los Angeles 90005. (213) 321 8867
O.H. Brown Co., P.O. Box 128, Palo Alto 84302. (415) 321 8867
Mass. Bird Electronic Corp., 235 Bear Hill Rd., Waltham 02154. (617) 899 4162
Va. Bird Electronic Corp., 201 Lincolnia Rd., Alexandria (703) 751-2077

DISAN ENGINEERING CORP., Box 589, Nowata, Okla. 74048. (918) 273-1636

amplifiers: audio, remote, video processing; audio consoles; automation systems & eqpt; magnetic tape cartridge eqpt; power supplies, regulators & generators; sca eqpt; fm transmitters

HEWLETT-PACKARD, 1501 Page Mill Rd., Palo Alto, Cal. 94304. (415) 326-7000

tape bulk erase eqpt; power supplies (audio); audio distortion analyzers; video: pulse & distrib. amps., sync & test generators, monitors, waveform monitors; am, fm & tv monitors; rf loads; transmission line couplers; rf, video, audio & general-purpose test eqpt.

Ala. Hewlett-Packard, Inc., 2003 Byrd Spring Rd., S.W., Huntsville 35802. (205) 881 4591
Ariz. Hewlett-Packard, Inc., 3009 No. Scottsdale Rd., Scottsdale 85251. (602) 945 7601
Hewlett-Packard, Inc., 5737 E. Broadway, Tucson 85711. (602) 298 2313
Cal. Hewlett-Packard, Inc., 3939 Lankershim Blvd., North Hollywood 91604. (213) 877 1282
Hewlett-Packard, Inc., 1101 Embarcadero Rd., Palo Alto 94303. (415) 327 6500
Hewlett-Packard, Inc., 2591 Carlsbad Ave., Sacramento 95821. (916) 482 1463
Hewlett-Packard, Inc., 1055 Shafter Street, San Diego 92106. (714) 223 8103
Col. Hewlett-Packard, Inc., 7965 E. Prentice, Englewood 80110 (303) 771 3455
Conn. Hewlett-Packard, Inc., 508 Tolland St., East Hartford 06108. (203) 289 9394
Hewlett-Packard, Inc., 111 East Ave., Norwalk 06851. (203) 853 1251
Del. Hewlett-Packard, Inc., 3941 Kennett Pike, Wilmington 19807. (302) 655 6161
Fla. Hewlett-Packard, Inc., 621 Commonwealth Ave., Orlando 32814. (305) 841 3970
Hewlett-Packard, Inc., 9999 Northeast 2nd Ave., Miami Shores. 33153. (305) 758 3626
Hewlett-Packard, Inc., 410 150th Ave., St. Petersburg 33708. (813) 391 0211
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Hewlett-Packard, Inc., 4242 Richmond Ave., Houston 77027. (713) 667 2407
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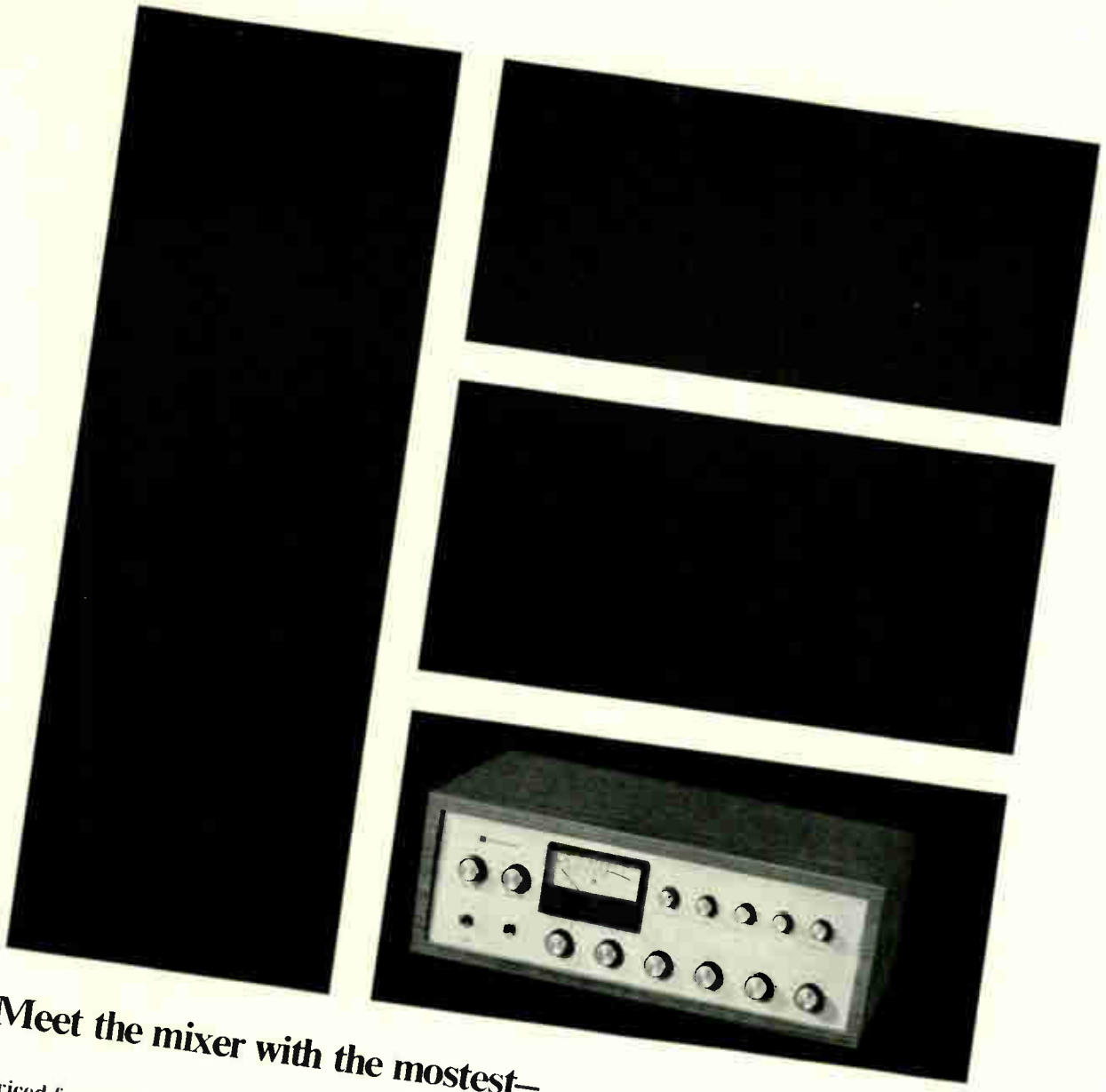
LOW POWER BROADCAST CO., 248 Swedesford Rd., Malvern, Pa. 19355. (215) 644-4096

am transmitters

W.R.S. ELECTRONICS LTD. 14 Willow Park Center, Route 110, E. Farmingdale, N.Y. 11735. (516) 249-1884

audio amplifiers; consoles



Meet the mixer with the mostest—

priced from only $300 with 6 inputs and 3 controllable outputs—that's E-600 by Electrodyne.

It's ready to go in any application from high-quality recording through CATV to sound reinforcement. Rack-mounted or completely self-contained in its own handsome Teak cabinet. E-600 comes with 6 mike or line inputs, each with speech/music select switch. All three outputs—Line, Headphone, and Auxiliary—have their own independent level controls.

Thanks to integrated-circuit, plug-in electronics and Electrodyne design, frequency response is 20 Hz to 20 kHz ±1 db. Maximum output is +30 dbm; distortion less than 0.5%.

There's an illuminated VU meter with multiplier, along with a built-in oscillator for level set. The fully-regulated power supply can be paralleled for fail-safe battery supply, and the headphone jack can be paralleled for an additional output.

ELECTRODYNE CORPORATION
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If you've been waiting for the mixer with the mostest, wait no more. Call and tell us just how you'd like yours packaged, and what time you'd like it delivered.

Mix with E-600 and other new Electrodyne goodies at AES Booths 11 & 12.

Circle 15 on Reader Service Card

BROADCAST EQUIPMENT

Wireless Broadcast Mike System

The Broadcast Radio Microphone system developed for NBC and ABC by Airborne Instruments Laboratory, Deer Park, N.Y. 11729, provides voice communications at 950 MHz, even in unfavorable electromagnetic

environments. System makes use of duplex operation, crystal-controlled transmission and reception, narrow-band preselection, high-fidelity phase modulation transmission and a self-contained rechargeable battery supply. Lightweight mike uses solid-state circuitry and has free-space range of over three miles.

Circle 100 on Reader Service Card

High-Resolution CCTV Camera

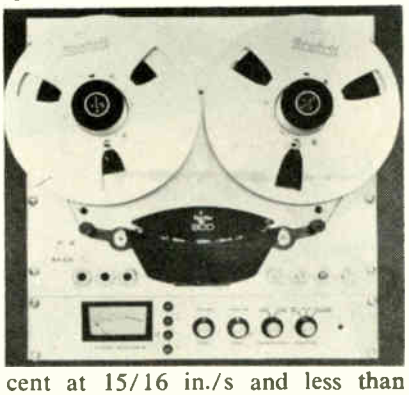
Fairchild Space and Defense Systems division of Fairchild Camera and Instrument Corporation, 300 Robbins Lane, Syosset, N.Y. 11791, has introduced a high-resolution CCTV camera. Known as Model TC-550B, the self-contained unit is suitable for data transmission, medical and CATV applications. Operating at scan rates up to 1323 lines/

frame with full deflection, camera furnishes over 1200 lines of horizontal resolution at scan rates to 1029 lines/frame. It produces signals conforming to EIA RS-170 and RS-343 standards and is capable of continuous and stable operation over a wide variation of light levels, temperature and humidity. It also provides fully automatic electronic compensation for light levels greater than 10,000:1. Camera is available with either vidicon or Oxycon tubes. All essential controls are located on camera's rear panel, including a switch to activate remotely located duplicate operating controls. Features such as gamma correction, video polarity reversal and white peak clipper are provided in standard camera.

Circle 101 on Reader Service Card

Logger Has Self-Seeking Playback

Model 900 radio station tape logger, made by TapeAthon Corp., 523 S. Hindry, Inglewood, Calif. 90307, uses dual capstans. Wow and flutter specifications are less than 0.3 per-



cent at 15/16 in./s and less than 0.5 percent at 15/32 in./s. Logger is equipped with automatic reversing feature at each of reels to assure continuous recording. Self-seeking system automatically plays correct track in correct direction when TRACK button is depressed. Model 900 logger is available in 2-, 4-, and 8-track configurations, with 1, 2 or more channels per track. Overall frequency response at 15/32 in./s is ±3 dB from 200 to 3000 Hz, and signal-to-noise ratio is 38 dB, unweighted at same speed. Using triple play ¼-in. tape, 900 will log over 400 hr on single 10½-in. reel. Rewind time is less than 1 min for 2400 ft of tape.

Circle 103 on Reader Service Card

Infrared Vidicon Camera

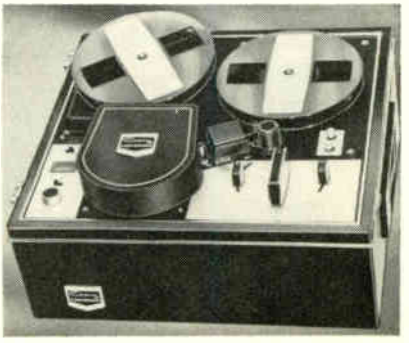
Infrared sensitive vidicon camera series capable of producing pictures of scenes emitting or illuminated by infrared now is available from Maryland Telecommunications, Inc., York and Video Roads, Cockeysville, Md. VC-40 Series also operates in visible light spectrum, for a total

light range of 0.4 to 1.6 microns. Series features single unit construction and is available with scanning rates of 525 (EIA), 875 or 945. Solid-state modular circuitry and Nuvistor low-noise preamplifier are used. Price, complete with MTI-Type V-330 infrared-sensitive pickup tube, is $3495.

Circle 104 on Reader Service Card

CCTV VTR

Model 6402 helical-scan videotape recorder from Craig Products Division, Craig Corporation, 2302 E. 15th St., Los Angeles, Calif. 90021, has field slant-track two-head frequency modulated recording system, and features all-electronic rotary transformer head assembly. VTR uses ½-in. magnetic tape at 9½ in./s tape speed for maximum 50- or 60-minute recording or playback time on either 7- or 8¼-in. reels. Audio re-record capability makes it possible to re-record sound track without disturbing video portion. Other features include automatic audio and video level controls; built-in 2:1 sync generator, providing electronic editing techniques; slow motion fixed at 1/12 normal speed, and stop motion for reproduction of



HOW DOES A HOT STATION GET HOTTER?

KOOL-TV DID IT BY ADDING COLOR FILM.

"The idea is to be way out in front in every way possible," says Jack Murphy, the Phoenix station's Vice President and Director of News and Special Events. "So we added Kodak Ektachrome color film and the Kodak ME-4 Process for local news, documentaries, and commercials. Our ratings went up. Our advertiser interest went up. Our advertising revenue went up."

The station's Director of Promotion and Publicity, Marge Injasoulian, enlarges on that. "Color film has given us a new realistic dimension for news and investigative documentaries. When a man took LSD and allowed us to film his trip for our documentary 'LSD—Madness or Miracle?', only color could dramatically record the images he drew. We got a 47% share of audience with that one against popular network evening shows."

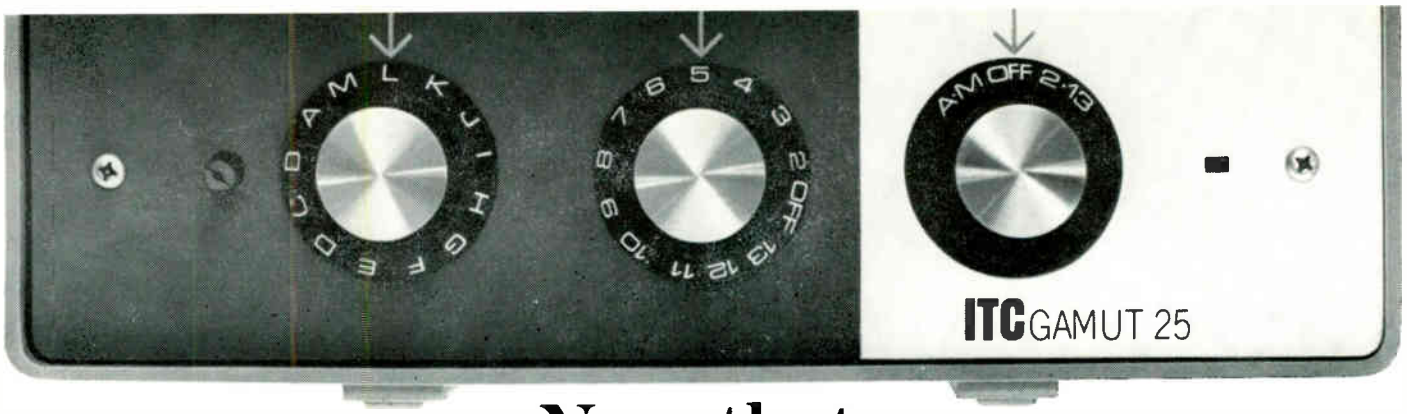
Murphy tells about other color advantages. "We had been doing color spots for local advertisers in the studio with color cameras. Color film meant we could shoot 'on location' at the advertiser's place of business for more impact and immediacy. It definitely increased advertising income. The use of color film in news moved us to a strong, dominant position in news audience. We are regular color contributors to the CBS Network News with coverage of the Southwest. We shoot color film exclusively—no black-and-white at all. Kodak experts spent two days helping us set up the Kodak ME-4 Process, and it's gone smoothly since. In fact, we're even reducing the costs of processing by using Kodak silver recovery equipment."

Everyone in TV will go full color sooner or later. Better contact Kodak soon—the sooner the better.

Kodak

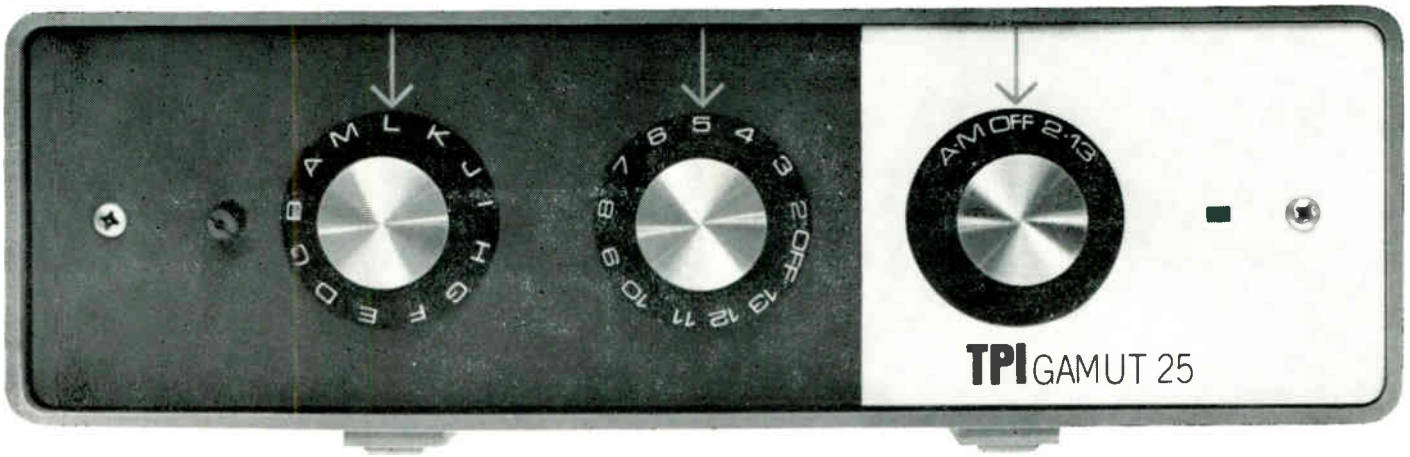
EASTMAN KODAK COMPANY

ATLANTA: 5315 Peachtree Industrial Blvd., Chamblee, 30005, 404—GL 7-5211; CHICAGO: 1901 West 22nd St., Oak Brook, 60523, 312—654-0200; DALLAS: 6300 Cedar Springs Rd., 75235, 214—FL 1-3221; HOLLYWOOD: 6706 Santa Monica Blvd., 90038, 213—464-6131; NEW YORK: 200 Park Ave., 10017, 212—MU 7-7080; SAN FRANCISCO: 3250 Van Ness Ave., 94119, 415—776-6055



Now that we've made a name for ourselves,

we've gone and changed it.



A lot of CATV city slickers (operators in multi-channel urban locations) have come to know International Telemeter Corporation converters as the best in the burgeoning extra-channel CATV business.

From our Gamut 25 to our Focus 12, you get everything you need to clean up cliff-dwelling ghosts. And deliver 25 channels of interference-free reception.

Now, we're putting our all (Gamut 25, Plus 13 and Focus 12) into a new name for us—and a very good name in CATV. TPI. Now—we're part of a growing corporate family, along with ALPHAMATIC NEWS the all-electronic, automated CATV cablecasting service that pays for itself with locally originated news, UPI 24-hour international/national coverage as well as New York Stock Exchange Reports.

So, when you're looking for ITC Converters, look under our new name because...

Starting now, ITC converters will be called TPI converters

tpi **For information, write or call collect (212) 421-9665**

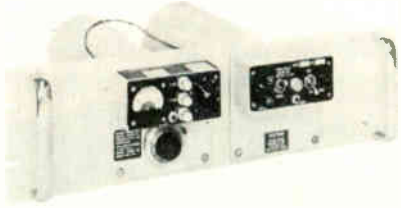
Television Presentations, Inc., A Subsidiary of Sterling Communications, Inc. 375 Park Avenue, New York, N.Y. 10022

Circle 16 on Reader Service Card

any single field of video information. Slanted tape deck for supply reel eliminates idler assembles and inclined tape guides. Dimensions are 18½ × 10¼ × 17½ in.; weight, 59 lb. Price is $1200.
Circle 106 on Reader Service Card

Frequency Standard

Model 5C precision frequency standard from Sulzer Laboratories Division of Tracor Inc., 6500 Tracor Lane, Austin, Texas 78721, uses a processed AT-cut quartz crystal, providing an aging rate of less than 10 parts in 10^{10} after 12-hour warm-up period. Outputs are 100 kHz, 1 and



5 MHz at 1 volt into a 50-ohm load. After 30 days of operation, 5C shows a typical aging rate of 1 part in 10^{10}, with typical power consumption of less than 6 watts. Both crystal oscillator and temperature control circuits are located inside a double-proportional oven. A front-panel meter provides a monitoring point for various operating levels within the instrument. Front panel control of the 5 MHz output frequency is provided by a fine frequency vernier having a range of 100×10^{-9}.
Circle 105 on Reader Service Card

Test Sets Measure Harmonic Distortion

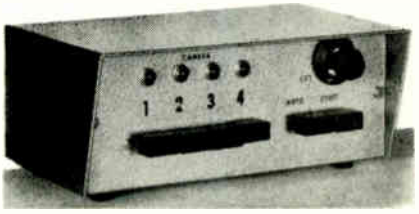
A pair of special purpose sets designed to measure harmonic distortion on program circuits, studio amplifiers, and other types of audio equipment has been announced by Northeast Electronics Corp., 3 North State St., Concord, N.H. 03301. Model TTS 146A signal generator is a multitone audio signal generator which supplies very-stable, low distortion tones at frequencies of 167, 1000 and 1500 Hz. Any tone is available singly or the upper and lower frequencies may be sent simultaneously. Output levels of 0 dBm and −30 dBm are provided. Model TTS 147A distortion detector is an audio level measuring set which contains filters to obtain measurements of frequencies of 333 and 4500 Hz.

These frequencies represent the second and third harmonics of the 167- and 1500-Hz test tones generated by the TTS 146A signal generator. Each unit is enclosed in an 8- × 11- × 7⅜-in. portable metal carrying case and weighs 13 lb.

Circle 107 on Reader Service Card

Sequential CCTV Switcher

A sequential video switcher has been announced by Orth-O-Vision, Inc., 18-10 26th Road, Long Island City, N.Y. Completely solid-state, switcher is suitable for use with industrial CCTV and TV studio applications. Standard Model SW-4 provides four switching positions. In automatic operation, SW-4 can be set to scan



each of four input cameras. Speed of sequencing is variable from two seconds to two minutes per position. Unused camera inputs can be eliminated from sequence by a setting of the front panel button. Bandwidth of SW-4 is 40 MHz; picture distortion is negligible. Automatic switching can be interrupted at any time, and cameras may be selected automatically by front-panel pushbuttons. Pilot lights indicate which input is being to output. Price $395.

Circle 108 on Reader Service Card

IC Stereo Generator

Model SCG-3T solid-state stereo generator with ICs is available now from Moseley Associates, Inc., 111 Castilian Dr., Goleta, Calif. 93017. Although generator is compatible with most direct fm exciters, it has been

designed primarily for use with the Moseley Model PCL-303/C single link stereo STL. Requiring 3½ in. of standard rack space, SCG-3T has peak reading modulation meter, self-contained power supply.

Circle 109 on Reader Service Card

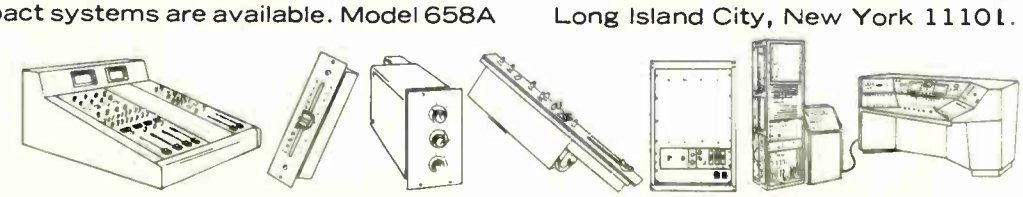
Playback & Playback-Record VTRs

Model VP-4900 playback and Model VR-5100 playback-record units have been designed by Ampex Corp., 401 Broadway, Redwood City, Calif. 94063, for use as instructional aids

Circle 19 on Reader Service Card→

THE FAIRCHILD REVERBERTRON

MODELS 658A, 658B. Fairchild reverberated sound is the sound of life; a real, natural, alive sound. Exclusive Fairchild systems offer a sound capability that supersedes all other artificial reverberation devices within equivalent price categories. Fairchild literally captures the superb quality of the world's finest acoustic chambers, without the expense of the chamber. Two compact systems are available. Model 658A utilizes 6 delay lines, each differently tuned, each carefully isolated. Its 28 pounds is completely portable; offers 3 basic reverberation periods and total unit flexibility. Model 658B, shown above in the lower corner, is only 3" wide, 5¼" high, 11" deep. It has fewer control features, yet embodies much of the Fairchild excellence. Contact your Fairchild Recording Distributor or write Fairchild for more data. **FAIRCHILD RECORDING EQUIPMENT CORPORATION.** Dept. BE10, 10-40 45th Avenue, Long Island City, New York 11101.



DESKTOP MODULE CONSOLE / LUMITEN / REVERBERTRON 658B / INTEGRATED CONTROL MODULE / REVERBERTRON 658A / REMOTE AUDIO CONSOLE

in education, industry, government, medicine and other areas. Both models feature a video response of 3 MHz and a horizontal resolution of 300 lines. Video to noise ratio is 42 dB. A rotary transformer in drum assembly provides increased reliability of signal transmission from the head. Rewind and fast-forward on both models takes 4 min. Both units share 1-in.-wide tape format, 9.6 in./s operating speed, 1000 in./s writing speed and 1-hr playing time. VP-4900 playback unit sells for $995; VR-5100 VTR, $1600.

Circle 110 on Reader Service Card

Vidicon Zoom Lens

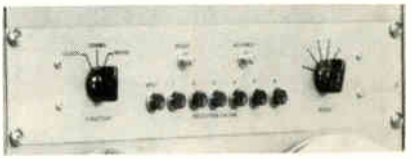
Type V5X20 vidicon zoom lens, from Video Center, Inc., 200 West 57 St., New York, N.Y. 10019, has

a focal length from 20 to 100mm and a speed of *f*2.5. Lens is suitable for CCTV and CATV applications. Price is $250.

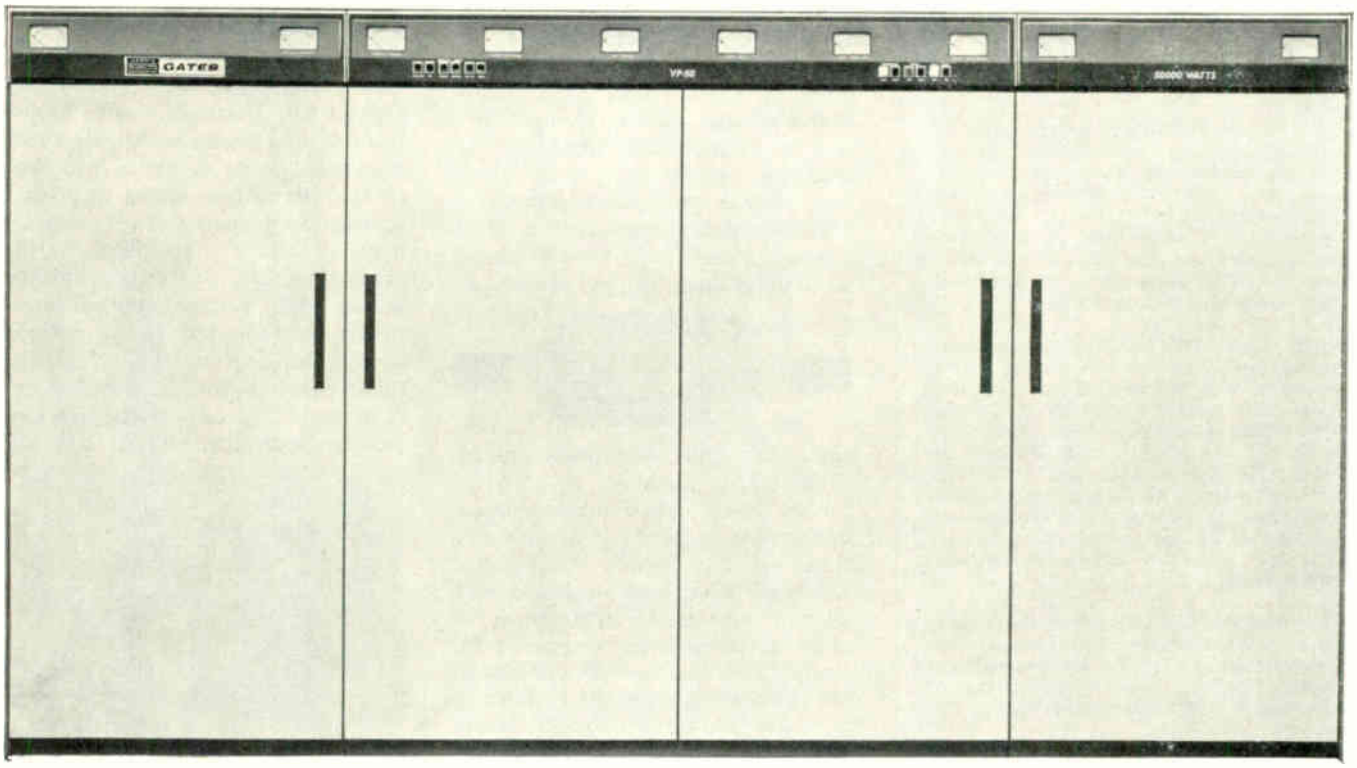
Circle 111 on Reader Service Card

Ratio Selector for TapeAthon

Availability of a music-announcement ratio control has been announced by TapeAthon Corp., 523 S. Hindry, Inglewood, Calif. 90307, as an optional accessory to their Model 5000 Automatic Broadcasting System. Ratio switch permits setting of selections to announcements ratio from 1:1 to 6:1. Other panel controls include FUNCTION selector, PRESET control and ADVANCE control. FUNCTION selector has setting for system clock that places operation on timed basis and eliminates ratio



First in its class...
a vapor-cooled, high-efficiency 50,000-watt AM transmitter by Gates



Inside and out – the VP-50 is the first really new 50,000-watt transmitter in years . . . a breakthrough in engineering design utilizing vapor cooling.

Superb fidelity is combined with operating economy in the VP-50 transmitter.
Lowest power consumption with only 80 kW at 0% modulation.
Lowest tube cost of any 50 kW model.

Newest solid-state design with all-transistor circuits up to RF driver.
Quietest operating transmitter in its class with no large blowers.

FCC-type accepted.

Want more information and complete specifications? Write or call (217) 222-8200 for complete information.

GATES HARRIS INTERTYPE CORPORATION

GATES RADIO COMPANY
QUINCY, ILLINOIS 62301, U.S.A.
A subsidiary of Harris-Intertype Corporation

Circle 23 on Reader Service Card

function. A second setting, COMBO, combines clock and ratio control for station i-d's every 30 min, at which time clock overrides ration control. Reset control is pushbutton that may be used to restart music cycle from first selection. ADVANCE control advances cycle so spot announcement will play immediately selection on air. A series of 7 pilot lights indicates which musical or spot is being aired. RATIO switcher unit is mounted in one of 5000 System's racks, occupying 3½ × 19 in. Unit may be added to existing 5000 Systems in the field. Price is $200.

Circle 112 on Reader Service Card

Tapoff Pretaps During Construction

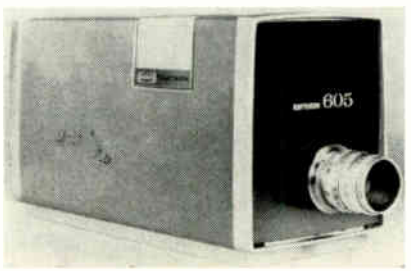
SMT Universal tapoff, manufactured by Entron, Inc., 2141 Industrial Parkway, Silver Spring, Md., can be economically pretapped by installing truline units with blank base plate as construction progresses. Thruline signal is not disturbed. Dual truline openings permit use overhead or underground. Unused outlets are

equipped with waterproof plugs. SMT tapoff measures 2 9/16 × 5 1/16 × 2⅜, and features interchangeable snap-in tap module fastened at four points with slotted hex-head bolts, weather sealed with silicone gaskets. Other features include a seized center conductor for strand mounting or 90° connection for installation in pedestals down to 6 in. ID. SMT has balanced output with greater than 20-dB isolation between tapoff terminals. Optional 4-dB loss base plate eliminates readjustment of line extenders.

Circle 113 on Reader Service Card

Automatic Vidicon Camera

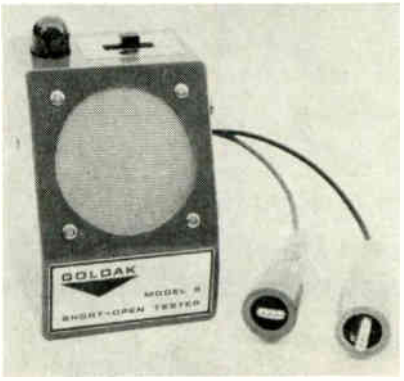
Designed for continuous operation, the Model 605 camera, made by Raytheon Learning Systems Co., Englewood, N.J., is well suited for educational, industrial, military and security applications. The single case design camera employs a 525-line random interlace and has a resolution of 650 TV lines (9MHz bandwidth) and contrast range of 10 full shades of gray. The transistorized camera measures 4½ × 5⅝ × 10½ in., and requires use of only ON/OFF switch for operation. Transistorized circuitry reduces power requirements to 20 W from a nominal 120 V ac household current. The camera can tolerate voltage fluctuations from 108 to 132 V and ambient temperature variations from 4° to 122° F without picture degradation. Camera is priced at $600.



Circle 114 on Reader Service Card

Short/Open Tester

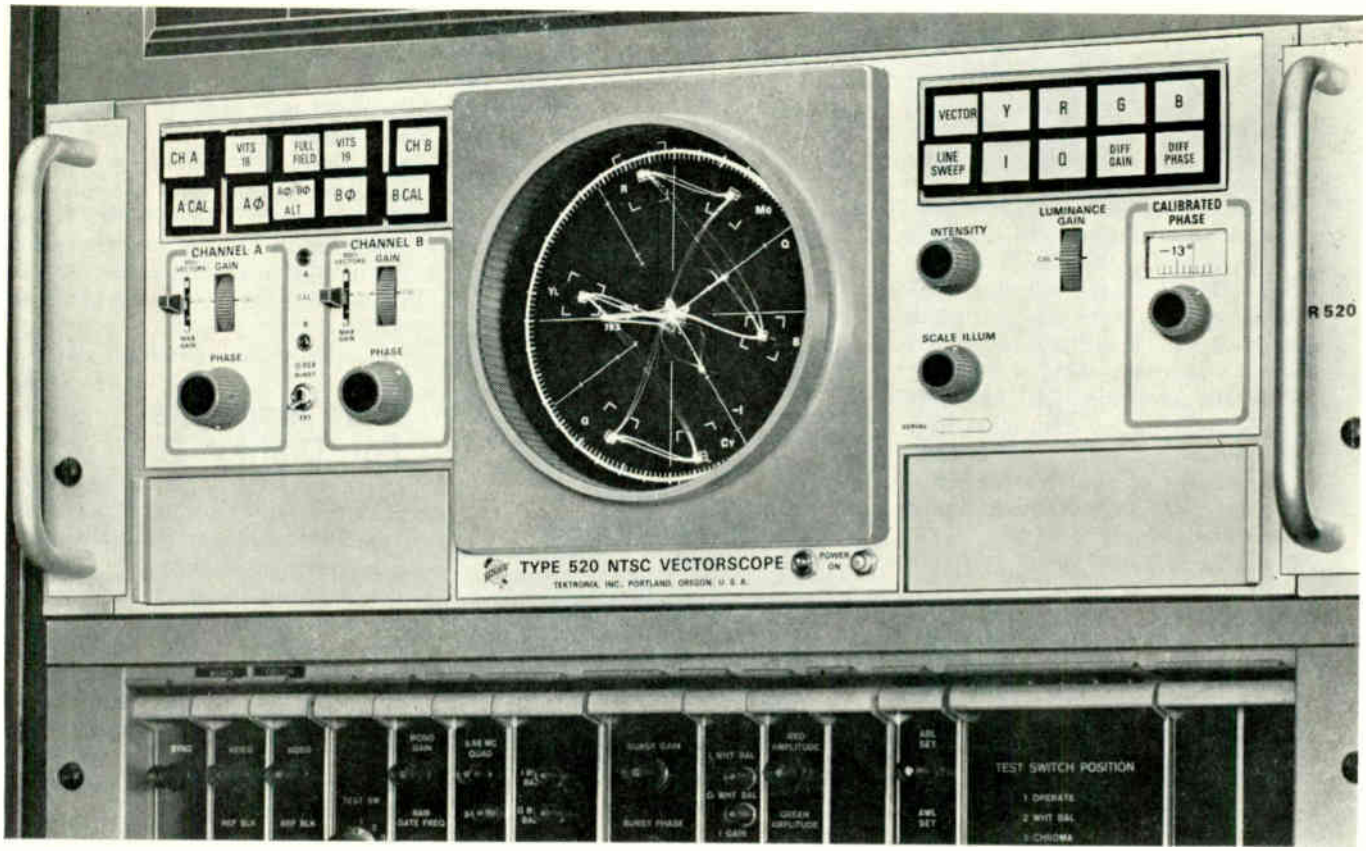
Designed for testing continuity and short conditions in circuitry by Goldak Co., Glendale, Calif., Model 8 short/open tester incorporates two high-speed fuses in series with test leads. This feature serves as protection against possible damage to equipment or injury to operator in the event leads are inadvertently placed across high voltage source. Continuity is indicated by a 600-Hz tone from built-in speaker, in addition to a light for visual indication. A separate "tel-tone" signal provides positive individual circuit indentification in conjunction wth speaker or headphones. Power is suppled by two standard, 1½-V D cells. Weight is 18 oz.



Circle 115 on Reader Service Card

Recorder-Reproducer

A compact 10- and 20-track magnetic recorder reproducer has been announced by the Stancil-Hoffman Corp., 921 North Hollywood Ave., Calif. 90038. Measuring 8¾ in. high × 19-in. wide, Model CRM-10 records 10 tracks continously for 25 hr on a 7-in. reel. Frequency response, equalized for communication networks, is basically flat from 300 to 3000 Hz and down not more than 6 dB at 250 Hz and 3500 Hz. Dy-



A New Vectorscope from Tektronix

- **New measurement capabilities**
- **Push-button operating convenience**
- **Accurate measurements of chrominance and luminance amplitude**
- **All silicon solid-state reliability. Cool, quiet operation**

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

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

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

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

Type 520 NTSC Vectorscope $1850
Rack Mount Type R520 ..... $1850

U. S. Sales Prices, FOB Beaverton, Oregon

TEKTRONIX

Research and development

... part of the Tektronix commitment to progress in the measurement sciences

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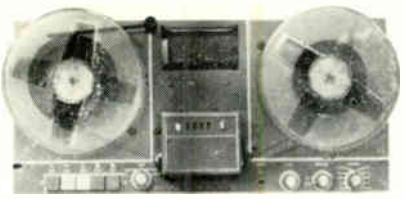
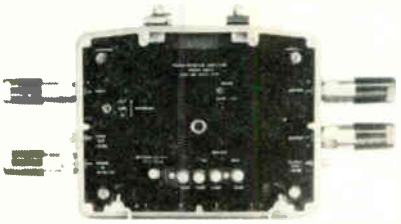


namic range and channel crosstalk are in excess of 30 dB. Continuous monitoring detects recording malfunctions, indicating which track is deficient. In case of failure, transfer of all operations to a standby recorder is automatic. All modes of operation are relay controlled from momentary contact pushbuttons. Any number of remote stations may operate CRM with complete indication of modes.

Circle 116 on Reader Service Card

CATV Line Amplifier

Series 8800 CATV line amplifier, from Anaconda Electronics Co., 1430 South Anaheim Blvd., Anaheim, Calif. 92803, provides 12- to 20-channel capability. Series 8800 amplifiers have frequency response of 40 to 250 MHz, low-noise figure, stable operation from −40 to 140° F and agc optional pilots at 220 MHz (12-channel operation) or 245 MHz (20-channel operation).



Circle 117 on Reader Service Card

Helical-Scan VTR Has Electronic Editing

Concord Electronics Corp., 1935 Armacost Ave., Los Angeles, Calif. 90025, has introduced a videotape recorder with electronic editing. Editing is accomplished automatically and electronically by a pushbutton control on Model VTR-620 1) when recorder is stopped and started between scenes during live recording; 2) when dubbing inserts from previously recorded tapes, films, off-the-air recordings, etc., onto single tape; and, 3) when mixing live and prerecorded tape segments onto single videotape. A sync controlled gate is used so that all additions to tape are in phase with any previous information on tape. VTR-620 uses ferrite video heads, yielding expected head life of 1000 hr and increase of signal-to-noise ratio. VTR-620 is priced at $1050.

Circle 118 on Reader Service Card

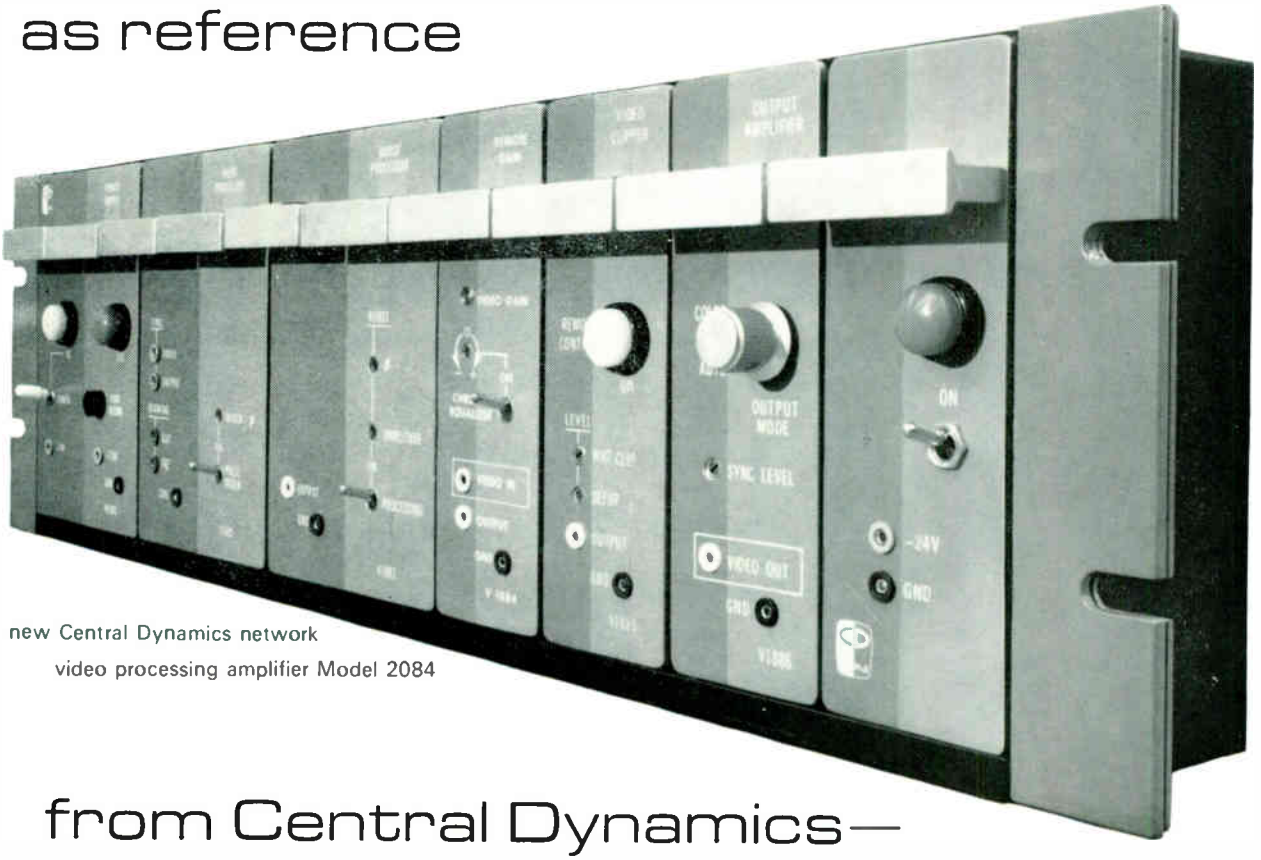
New Magazine For Doiflex 16

Intercinema Corp. New York, N.Y., exclusive distributor for the Doiflex 16mm reflex motion picture camera, announces availability of a 400-ft magazine for the camera. Magazine features coaxial design, with raw film stock feed directly opposite the exposed takeup chamber. Each chamber has its own screw type cover, permitting the operator to thread the takeup roll in daylight. A detachable torque motor drives the magazine, utilizing the same 8-V battery that supplies power the camera motor. A footage indicator window is located on the rear of the magazine.

Circle 119 on Reader Service Card

AN INDUSTRY FIRST!

Automatic Luminance/Chrominance control using standard VITS as reference



The new Central Dynamics network video processing amplifier Model 2084

from Central Dynamics— leaders in proc. amp. technology

The new 2084, latest member of Central Dynamic's full range of video processing amplifiers, offers complete processing of all essential signal components combined with the Automatic Luminance/Chrominance control feature. Other proc. amps. you will want to investigate:

2085: Provides the same facilities as the new 2084, but with manual control. White stretch unit optional.

2083: Designed on the same concepts as the 2085, but with facilities making it suitable for studio output video signal processing.

2080D: For transmitter input operation.

No other company has had more experience in the development of proc. amp. technology over the past five years than Central Dynamics. Write for your copy of the most helpful booklet a TV station engineer could have: "Processing Amplifier Technology". No charge or obligation.

CENTRAL DYNAMICS CORPORATION

Cherry Hill Industrial Park, Cherry Hill, New Jersey 08034. Phone (609) 424-3900

Circle 27 on Reader Service Card

Circle 28 on Reader Service Card →

ELECTOGRAPHY

A new dimension in videotaping made possible by "Scotch" Brand Color Tape Plus

Electography is videotaping at its finest. Colors are brighter, clearer, livelier. Black and whites are stronger with amazing presence. Copies are perfect... matching the original picture and sound.

Electography is immediate. Lets you complete complex programming in hours. You see your work as you go. You're free to experiment... be more daring. You can use slow motion, fast motion, stop motion and reverse action. You can go out on location. Combine all types of existing footage (stills, film) with new footage. Edit instantly... electronically with 30 frame per second precision.

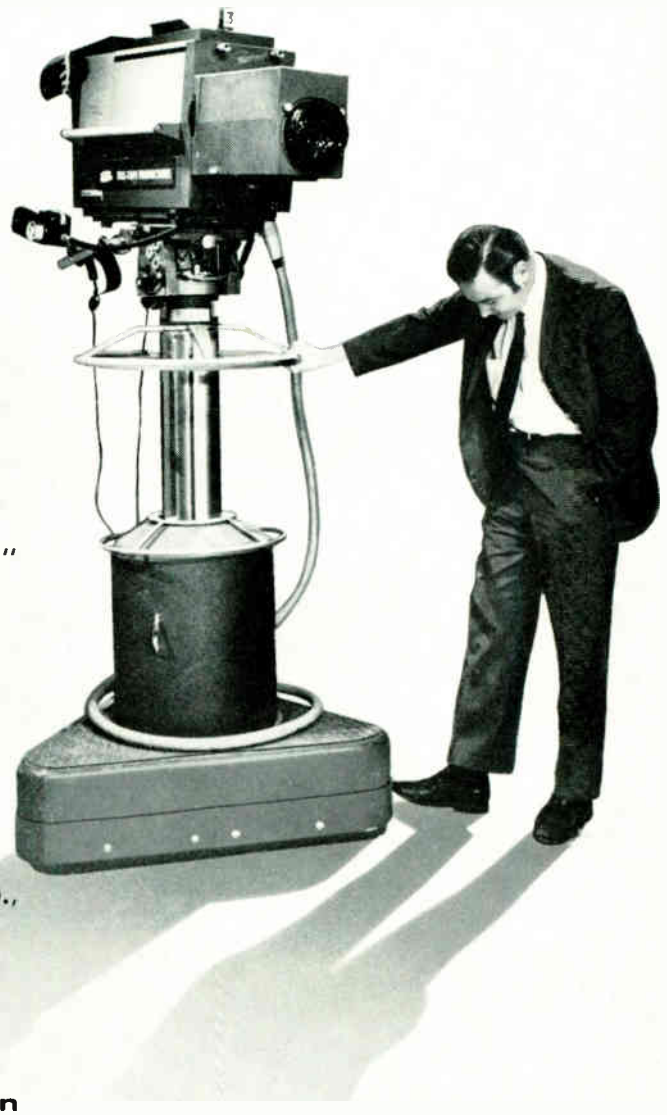
"Scotch" Brand Video Tape No. 399, Color Tape Plus, delivers the ultimate in electography. Gives you the response and full compatibility you need to make it all possible. Lets you use the most subtle lighting techniques. Gives you true colors... more dynamic black and whites... multiple generation copies undistinguishable from the master tape.

Want more information on electography and how you can take full advantage of this complete creative medium? Write: 3M Company, Magnetic Products Division, 3M Center, St. Paul, Minn. 55101.

3M COMPANY

What if you had to buy your TV camera like you buy your car?

In both cases you've got quite a choice of makes, models and options. But a manufacturer of broadcast TV cameras gives you one more choice: the freedom to specify certain critical major components, the most critical of which is the lens system. You can specify and get immediate delivery of Rank Taylor Hobson Varotal V and XX series zoom lenses for use on Vidicon, Plumbicon and Image Orthicon format cameras. If you already own an RTH Varotal lens and want a newer model camera, good news. Keep your old friend, the Varotal. Rank Taylor Hobson now has a Lens-Pak which permits you to adapt your present RTH lens to fit almost any new camera. (It will work better too — the Lens-Pak has a "ride the rails" device that allows close-up focusing to less than one inch). We've also got the famous RTH zoom pre-set servo unit — the "shot box" with its 7-position, 11-speed fingertip control range. Tell us what camera you have in mind and the situations in which you'll use it. We'll send you detailed recommendations to help you select the right lens system. All it will cost you is a stamp — a small price for a choice that even Detroit won't give you. Write Albion Optical Co., Inc., 260 N. Rt.303, West Nyack, N.Y. 10994.



albion rank taylor hobson

Circle 29 on Reader Service Card

← Circle 28 on Reader Service Card

BROADCASTERS SPEAK

Sirs:
I covet each issue of *BM/E*. It is a great boon to WCBG. Each issue gets better and better. Please see to it that we don't miss a single copy. We need it very much and would miss it if we were dropped. Thank you, and please keep up the good work.

Harvey E. Cunningham
Chief Engineer
WCBG Radio
Chambersburg, Pa.

Sirs:
Next week I'm to become chairman of the department of broadcasting at Central Wyoming College in Riverton. We'll have special courses in engineering for those students who want to become broadcast engineers, and all our students will be required to take enough engineering to get first class tickets. In addition, we will be operating a television station feeding into the local cable system and will do instructional TV.

We're trying to make arrangements to stay up to date, and our engineers here rate your magazine the best in its field. Do you have any program which would permit the college to obtain a gratis or reduced-rate subscription so we can keep within our budget and also take advantage of your magazine?

Dwight Jensen
Assistant Director
KBOI News
Boise, Idaho

We offer a 40-percent discount for schools and institutions, D.J.

Sirs:
If possible, could you send me another copy of *BM/E* from May/67. This issue contained an article on program logs which we found quite useful. However, in passing around from deejay to copywriter and everyone else, the magazine got lost or thrown away. Please send another copy to us.

Richard Dowdell
Continuity Director
WVAM Radio
Altoona, Pa.

May/67 BM/E *on its way, R.D.*

Sirs:
I have read *BM/E* at the station where I have worked, and would like to know if we can get a subscription for the national office of the Intercollegiate Broadcasting System, Inc.

We are the trade association and network of over 340 college radio stations in the United States, and often specify the purchases of capital equipment to our members as well as buying services (production) for our use.

A brochure is enclosed to explain our services, and we hope to receive *BM/E*.

J.R. Lebowitz
Director of Member Services
Intercollegiate Broadcasting System, Inc.
Middleton, Conn.

Qualification card on the way, J.L.

Sirs:
We're very interested in a subject that appeared in the May, 1965 issue of *BM/E*. The article, "Modifying a CB-Type Two-Way Radio for Use in the 26-MHz Remote Pickup Band," covers a subject that we'd like to pursue further here at KAKE.

Is there any further information available on this subject from any source?

Dan G. Peluso
KAKE Radio
Wichita, Kansas

We're planning an updated version of this conversion in a future issue of BM/E. *In the meantime, you might want to contact some of the larger CB manufacturers for their ideas on the subject. Any readers like to write the story?*

NAMES
IN THE NEWS

Alexander Autote

Siegfried Handler

Alexander J. Autote has been appointed vice president of Professional Products for the Shibaden Corp. of America.

The naming of **Siegfried Handel** as director of engineering for the Broadcast Equipment Division of Sarkes Tarzian, Inc. has been announced by Biagio Presti, division general manager.

Joseph A. Crispino, director of electronic sales for Superior Continental Corp. has announced the appointments of **O.B. Willingham** and **Richard P. Kohlhaas** as sales engineers, electronics group. **Joseph A. Crispino** has been appointed director of electronic sales.

TeleMation, Inc. has appointed **Floyd Moon** as its new comptroller.

Bill Dotey has been named program director of WASH-FM radio, Washington. **Sidney A. Abel** has been named sales manager of the Washington station.

Richard F. Carr, vice president of WIP radio named **Steve Ross** to the news staff of the station. **Robert Russo** was appointed as traffic director.

John W. Steed has joined WBTV, Charlotte in the capacity of motion picture cameraman.

WFGA-TV's vice president Jesse H. Cripe announced the addition of **Mack Freeman, Jr.** to the channel 12 news staff.

Thomas F. Bird has been appointed assistant station manager of radio station WNCN, New York, a division of the National Science Network, Inc.

Gulf and Western Industries has named **Abram E. Patlove** as executive vice president of International Telemeter Corp., a CATV subsidiary of Gulf & Western.

Martin E. Firestone has been elected general counsel and secretary for the All-Channel Television Society. **Patricia Anderson** has been appointed membership-corresponding secretary.

Gay C. Kleykamp has been named director of marketing-engineering for Ameco, Inc.

American Television and Communications Corp. has named **Monroe M. Rifkin** as president and director of the firm.

Joseph P. Duschene

G. Norman Penwell

Election of two Allied Radio Corp. vice presidents: **W.J. Forbes** and **Joseph P. Duschene,** was announced by W.E. Cowan, president.

G. Norman Penwell has been named as engineering director of the National Cable Television Association.

Further proof... sound has never been in better shape!

RE55 *OMNIDIRECTIONAL DYNAMIC MICROPHONE*

There are plenty of good, functional reasons behind the new look of Electro-Voice professional microphones. Reasons dramatically proved by the rapid success of the Model 635A and the RE15. Now we've added the RE55 to this handsome group.

The RE55, like its predecessor the 655C, is an extremely wide-range omnidirectional dynamic. And in most electrical particulars it is not greatly different. RE55 frequency response is a bit wider, and perhaps a trifle flatter. An impressive achievement when you consider that the 655C has been extensively used as a secondary frequency response standard. Output level is 2 db hotter, and the exclusive E-V Acoustalloy® diaphragm of the RE55 can provide undistorted output in sound fields so intense as to cause ear damage.

The biggest changes in the RE55 are mechanical. For this microphone is even more rugged than the 655... long known as one of the toughest in the business. There's a solid steel case and new, improved internal shock mounting for the RE55. Plus a satin nickel finish that looks great on TV long after most microphones have been scarred and scratched almost beyond recognition.

For convenience we've made the barrel of the RE55 just 3/4" in diameter. It fits modern 3/4" accessories. It also fits the hand (and its length makes the RE55 perfect for hand-held interviews). We also provide XLR-3 Cannon-type connectors to help you standardize your audio wiring. Detail refinements that make the RE55 more dependable, easier to use.

Finally, the RE55 has the exclusive Electro-Voice 2-year *unconditional* guarantee. No matter what happens, if an RE55 fails to perform during the first two years — for any reason — we'll repair it at no charge.

Try the Electro-Voice RE55 today. The more you listen, the better it looks!

ELECTRO-VOICE, INC., Dept. 1081EM, 614 Cecil Street, Buchanan, Michigan 49091

• high fidelity speakers and systems • tuners, amplifiers, receivers • public address loudspeakers
• microphones • phonograph needles and cartridges • organs • space and defense electronics

Electro-Voice®

A SUBSIDIARY OF GULTON INDUSTRIES, INC.

Circle 32 on Reader Service Card

Frederick B. Bundesman

Frank E. Bullard

Philips Broadcast Equipment Corp. has named **Frederick B. Bundesmann** as broadcast systems sales manager and **Frank E. Bullard** as sales engineer in the Midwest region.

Jay K. Hubbell has been promoted to the position of central regional sales manager of Anaconda Electronics.

Holley Dickinson, president of Canoga Electronics Corp., announced the appointment of **Robert E. Honer** as vice president.

Donald N. Bowdish has been raised to the position of senior applications engineer of Dynair Electronics, Inc.

Stuart E. Yeaton has been named manager of communications sales of General Cable Corporation.

E. Grant Masland has joined the National Association of Educational Broadcasters as special assistant to the president. **Robert W. Maull** has joined the association as director of instructional and professional services.

W. Barrett Mayer has been promoted to the position of manager of west coast operations of Pepper and Tanner, Inc. Within the same company **Alan Cameron** was made district representative for northern California.

James K. Branch has been appointed vice president of Photo Research Corp., it was announced recently.

The Public Broadcast Library recently made known the appointment of **John Wicklein** as chief of the Washington bureau of the PBL.

A recently appointed Rohn Communication Facilities sales manager is **H.E. Blakesley.**

Edmund W. Littlefield has been elected to Hewlett-Packard Company's board of directors, Chairman David Packard announced.

The post of executive director of the Institute of High Fidelity has recently been filled by **George Duhe.**

Robert L. Natwick has been named central district sales manager for International Video Corp., according to Ronald H. Fried, vice president of marketing.

Appointments to the engineering staff of National Teleproductions were the following: to the post of director of engineering **Dallas Clark** and to the post of video engineer **Ronald J. Stutzman.** Supervisor of videotape engineering at National Teleproductions is **Charles O. Ingram.**

Jack Drees

Curt Gowdy

Sportscasters **Jack Drees** and **Curt Gowdy** have been appointed to the directing faculty of Career Academy's Division of Famous Broadcasters.

That's a fact of life. If you want to go anywhere in the TV world, your future is in the grip of your connections.

Take Superior Continental Connectors, for instance.

They really snuggle up to you. Keep out the weather. Prevent conductor pull-out. And if you're concerned about your outer conductor, they'll maintain its integrity.

Like I say, fellows . . . if you're gonna go anywhere, go first class. Insist on quality. Things like silver-plated contacts. Teflon* insert. Iridited body. Anodized grip nut. And a heavy-duty weather seal that protects your backside.

That's what you get when you pick the right connections. But, then, who would know more about coaxial connectors than the leading producer of coaxial cables? And that's Superior Continental.

Get the connection?

*DuPont Trademark

For information and prices, write or call:
Superior Sales and Service Division
P. O. Box 2327 Hickory, North Carolina 28601
Phone 704/328-2171

SUPERIOR CONTINENTAL CORPORATION

Circle 34 on Reader Service Card

LITERATURE of INTEREST

For additional data, circle number shown on Reader Service Card.

Aluminum carrying cases—three different types and 24 sizes—are presented in Catalog F-68 from Zero Manufacturing. **150**

Program level control is the topic of six-page reprint from RCA. **151**

Dc power supplies are discussed in GE's publication GEA-73533 including ratings and information, circuit diagram, dimensional drawing and performance data. **152**

"1001 Ways To Use CCTV" is the title of a Fairchild brochure. Under main headings dealing with communication, safety control and production and process observation, folder describes specific applications in each of these areas. **153**

Portable professional audio recorder, Model AG-500, is described in Bulletin A287 from Ampex Corp. Also described are AA-620 speaker/amplifier and AM-10 stereo/mono mixer. **154**

Terminal blocks, connectors, crimping tools are topic of Catalog G-106 from Buchanan Electrical Products Corporation. **155**

Portable injection molding, encapsulating and welding unit is discussed with the aid of charts and pictures in Oneida Bulletin PF-68. **156**

"Craig Communivision—TV For Business" is a four-page illustrated brochure from the Craig Corp. **157**

Technical books catalog published by Hayden and Ruder lists books on audio and high fidelity, computers and test equipment. **158**

Wire cable and tubing reference guide is available from Alpha Wire Mfg. and is designed for wall or desk use. **159**

"High Stability Oscillators," a four-page brochure, contains information on three Motorola precision oscillators. Graphs are included showing spectral purity, aging, warm-up characteristics and frequency offset vs physical orientation. **160**

Recommended standard for color coding semiconductor devices by EIA in Bulletin RS-236-B. **161**

EIA Standards for electron tubes are offered in Booklet RS-209-A-2. **162**

Dual-purpose adaptor for use in conjunction with subminiature screw-on connectors is subject of product Bulletin CX-135 by Sealectro. **163**

Teflon-insulated wire and cable are described in brochure from Belden Corp. Charts and tables provide basic specifications and accessory information. **164**

Recommended microelectronic terms are compiled by Electronic Industries Assoc. in Bulletin No. 1A. **165**

Alphanumeric Grid System for designating terminal lead positions is outlined in Bulletin No. 8 from EIA. **166**

Silicon and selenium rectifiers are described in product review catalog from Electronic Devices, Inc. Included are appropriate forward currents, peak inverse voltages, recovery times and outline drawings. **167**

Bidirectional counters and decimal accumulators are topic of eight-page bulletin published by Burroughs Corp. Brochure is complete with charts showing mechanical characteristics, power requirements, block diagrams and specifications of both units and support modules used in the complete accumulator system. **168**

TvB of Canada makes available a brochure featuring tabulated consumer opinions indicating reliance on TV as a source of information. Conclusion is that not only does the average Canadian consumer look to television more than to any other medium for news, but TV is widely chosen to be the most believable, even to those people who use another news source. **169**

Self-contained TV camera series that may be used for closed-circuit, educational or broadcasting is the topic of technical data sheet No. 3200 published by Cohu Electronics. Data sheet contains specifications, environmental, electrical, mechanical plus options and accessories including a solid-state viewfinder. **170**

Sealectro-card 51×12 Tab Reader is the subject of technical data sheet made available by Programming Devices Division of Sealectro. **171**

Master TV Antenna Equipment catalog from JFD Electronics Co. covers such items as broadband and single channel antennas, broadband and single channel head end amplifiers, active and passive accessories, and filters and traps. **172**

Rapcor Hard Copy Generator System for computer or video outputs is the topic of detailed brochure published by OPTOmechanisms Inc. Brochure describes the system's capability for recording information displayed on a video monitor. **173**

Circle 36 on Reader Service Card →

ACCESSIBILITY

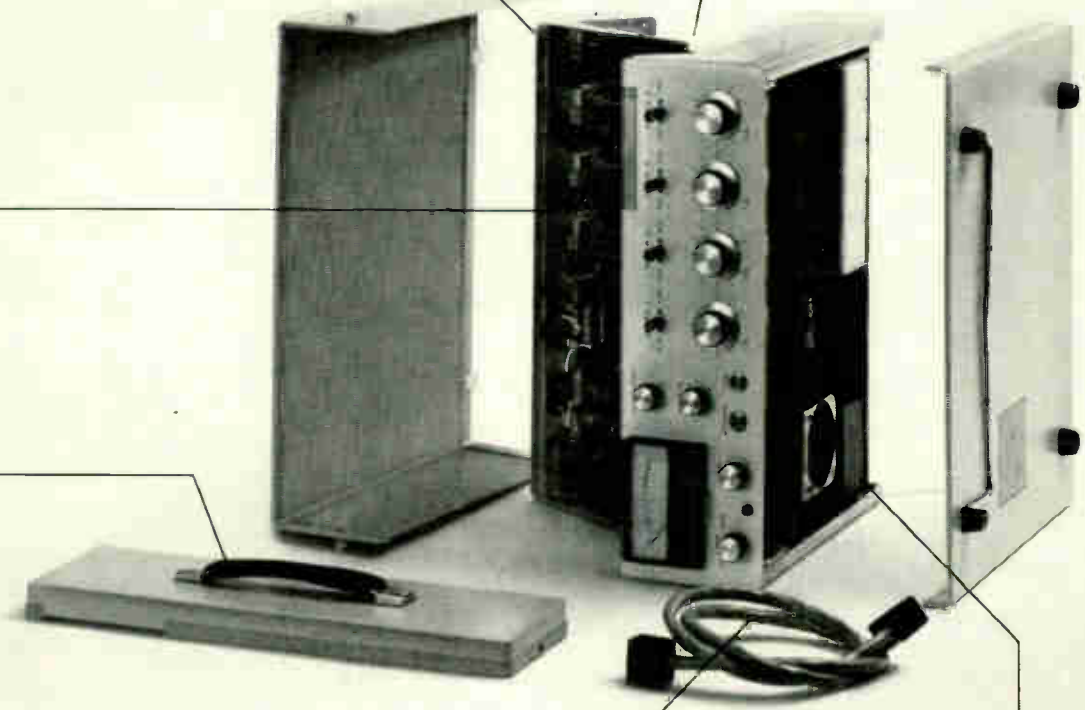
Top and bottom covers removed individually to expose all components. Circuit board hinged for easy access to reverse side and cables.

FLEXIBILITY

- 4 switch-selectable inputs: hi-level/mike/equal phone cannon XL connector/barrier strip input.
- External studio and local speaker.
- P. A. output (public address).
- Muting relay contacts on barrier strip.

ELECTRONICS

- Etched-epoxy circuit board.
- Plug-in silicon transistors.
- 4 preamplifiers (each normal on equal RIAA phono).
- 1 program amplifier.
- 1 monitor amplifier.
- Speaker muting relays for local and studio speakers.
- May be strapped to operate from any mixer.
- Two-speaker muting.



PORTABILITY

Weight: 28 pounds.
Height: 5".
Width: 14".
Length: 17".

PARALLEL OPERATION

Optional plug-in cable allows parallel operation of two 212J-1's. Arrangement provides 8 input channels (hi-level/mike/phono), two metered program output channels, and two switchable input monitor channels.

OPTIONAL POWER SOURCE

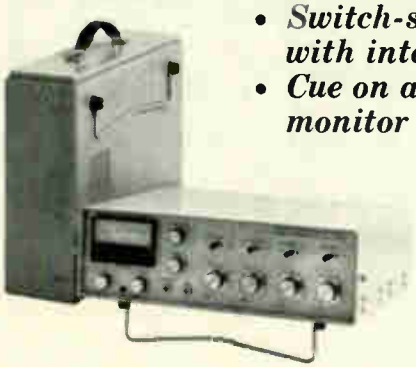
Self-contained power supply that operates the unit on AC also serves as charger for optional internal nickel-cadmium 12-volt battery. Unit switches automatically to battery in the event of an AC power loss. Unit also operates on external 12-volt battery.

a studio production console and remote pickup amplifier in one unit

That's the combination you get in Collins' new 212J-1 Console. Produce spots, conduct remote pickups, or operate the control room in emergency situations.

Completely solid-state, the 212J-1 offers:

- ***Four input channels, each with selectable switches for hi-level, microphone, or phone (RIAA equalization).***
- ***One program output channel.***
- ***Switch-selectable monitor amplifier with internal speaker.***
- ***Cue on all mixers overriding into monitor channel.***
- ***Local and studio speaker muting.***
- ***Public address system feed with level control.***



COMMUNICATION / COMPUTATION / CONTROL

COLLINS

CATV, the FCC and the Law

(Continued from page 25)

non-Bell companies—have been stringing their own coax, or have every intention of doing so. This fosters charges of attempted monopolistic practices. "In actual fact," Rivlin stated, "the telephone companies have no right to any status as a favored competitor. Refusals for pole attachments or leaseback arrangements can sometimes be used to get city councilmen to get cable franchises for telephone companies. Such refusals by Telco violate antitrust laws."

Is CATV a Utility?

Many local municipal governments and some state legislatures have tried or would like to give CATV public utility status. This would put cable under their wings, and supposedly remove it from FCC jurisdiction. But the Supreme Court has already decided that cable TV falls within the Commission's province, so many of these local government debates are exercises in futility. True, they must ultimately grant the franchise, but many of them are angry over being deprived of regulatory control.

Then there are those officials who'd like nothing better than to use CATV as a political football. And they can do it still. After all, it's perfectly reasonable and logical for a municipality to tell a cable company what minimum heights would be required for cable on poles, and other such purely operative regulations.

Probably one of the most outspoken critics of artificial problems created by the Commission and legislators was panelist Robert D. L'Heureux. Formerly general counsel for the NCTA, L'Heureux was adamant about the monopolistic telephone company practice of trying to restrict pole space to their own or leaseback cables. "They've gotten around FCC regulations in the past by applying to state regulatory bodies for a tarrif. This way, they'd circumvent FCC regulation, even though the traffic involved was interstate.

"They claim to be able to do this on the basis that CATV is normally all within one state," L'Heureux said. "Bruce Lovett and I filed a plea which was fought by the telephone company, and they lost the decision."

L'Heureux pointed out that, "Most communities grant franchises and require that reasonable regulations be followed: cable height; public served at reasonable rates; rate increases effected with prior application to the local governing body. This works out very well. It's not the same as PUC regulation.

"This kind of regulation has been approved by CATV operators; they have not objected to it. This is about as far as the cities should go. But when they try to make cable a public utility, they're really trying to take over a function that's been permitted only to the FCC. Any communications utility that's in interstate commerce comes under federal jurisdiction, not the state's."

As the last panel ended, the clouds outside parted, and the sun broke through, shining brightly on glistening pavement. Anyone believing in omens would say this portends well for the future of CATV. ●

Circle 39 on Reader Service Card

RELIABILITY AND PERFORMANCE ...THE ONLY STANDARDS

In today's rapidly changing video tape recording industry only one set of standards exists — reliability and performance.

Sony's pacesetting PV-120U Videocorder® leads in both categories. This helical-scan 2-inch machine has established the standards for professional VTRs throughout the world. Compact, rugged and fully transistorized, the PV-120U enables you to record video and audio signals off-the-air, off-cable or from locally-generated programs with original "live" fidelity and resolution. Standard features include stop-motion and exclusive variable slow-motion in both forward and reverse, and pushbutton controls. Add to this the options of NTSC color capability, remote control and electronic editing, and you have the most versatile VTR available today.

So if you're tired of foggy statements about the standardization of VTRs and want to bridge the gap between claims and proven performance, cross over to Sony today.

A SIMPLIFIED LEASING PROGRAM IS AVAILABLE ON ALL SONY VIDEOCORDERS

SONY®

RESEARCH MAKES THE DIFFERENCE

SONY CORPORATION OF AMERICA
VTR DIVISION
47-47 Van Dam St., Long Island City, New York 11101
IN CANADA: 1105 W. 8th Ave., Vancouver 9, B.C.

BM/E CLASSIFIED MARKETPLACE

CLASSIFIED ADVERTISING RATES

DISPLAY CLASSIFIED ADVERTISING: $22.50 per inch 1x; $22.00 per inch 3x; $21.00 per inch 6x; $20.00 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 25¢ per word; minimum $3.00. BLIND BOX NUMBER: No extra charge. Replies sent to address below will be forwarded to you. PAYABLE IN ADVANCE; send check with order. CLOSING DATE: 5th of 2nd month preceding issue date.

BM/E, Monterey and Pinola Avenues, Blue Ridge Summit, Pa. 17214 Phone 717/794-2191

BUSINESS OPPORTUNITIES

FRANCHISE DISTRIBUTORSHIPS FOR SEEBURG BACKGROUND MUSIC

We are expanding our distributor territories, and offer to those who qualify franchises for background music, with phone lines, FM Multiplex, or on-premise systems.

Complete details forwarded on request: Address:

Joseph F. Hards, Vice Pres.
SEEBURG MUSIC LIBRARY, INC.
1500 North Dayton Street
Chicago, Illinois 60622

STATION MANAGERS: Why not turn your idle time to money making time simply and easily. Reputable old established company seeks to promote sales of their exclusive patent medicines on a per-inquiry basis. Here is a good deal and good money maker. Write for further information to: Box 1068-13, c/o BM/E, Blue Ridge Summit, Pa. 17214.

SALES REPS WANTED

Seeking sales representatives in Western, Mountain and Central regions for hot new and growing line of video switchers and amplifiers and other video and audio terminal equipment. To sell direct to broadcasters and through distributors to closed circuit and CATV markets. A very attractive proposition is available to the right individuals. Write or call President, Alma Engineering, 7990 Dagget Street, San Diego, Calif. 92111 (714) 278-9330.

HELP WANTED

ASSISTANT DEVELOPMENT AND SALES ENGINEER

Will perform specific professional Sales Engineering tasks in the field of Sound—CATV—2500MH$_z$—CCTV and other Communication Media. The field of work encompasses Electronics Systems Design and writing of Specifications. Should have minimum of 6 years experience. Send resume to:

Squires of Ohio
474 S. Yearling Rd.
Columbus, Ohio 43213

CATV ANTENNA ENGINEER

We are looking for a professionally qualified engineer with a thorough knowledge of antenna and receiving technology. Salary commensurate with ability, experience and training. All replies held in strictest confidence. Please send detailed resume to:

Malarkey, Taylor and Associates
1225 Connecticut Avenue, N.W.
Washington, D.C. 20036

← Circle 40 on Reader Service Card

HELP WANTED (continued)

Metropolitan Edmonton Educational Television Association seeks EXECUTIVE DIRECTOR

University graduate; experienced in ETV or TV production and administration. Salary $15,000-$18,000.

Inquiries and resume to:
Chairman of the Board
MEETA House
11034-87th Avenue
Edmonton, Alberta, Canada

SALESMAN

Immediate opening for ambitious and aggressive salesman. M.O.R. good music station with top local and regional news coverage plans to expand in market of about two million. Applicant must be familiar with national as well as local sales and be able to plan and make successful presentations to advertising agencies. Applicant should have a past sales record and stand a thorough investigation of references. Person selected will become sales manager as soon as he can prove his worth.

WINU RADIO
P.O. BOX 303, HIGHLAND, ILLINOIS 62249

Broadcast Personnel
New ETV Station

Ground-floor key position openings now available for West Virginia's first public/educational TV station—WWVU-TV. Affiliated with NET, EEN. New physical plant including million-dollar color facility. Highband color video tape (4) and color film (2). Transmitter 30 kw. Openings for Master Control Switcher, Video Tape/Film, Maintenance, and Transmitter Operators. Competitive salaries and excellent fringe benefits. Apply by resume to: Employment Manager, Personnel Office, West Virginia University, Morgantown, West Virginia. 26506. An equal opportunity employer.

Opening for studio and field supervisors and staff technicians. Supervisory positions carry five figure salaries, require licenses. Technician positions, salary dependent on license, experience, etc. Network serves 5600 classrooms statewide with 4-channels. Visual Cameras, Ampex, VTR's, 5 day week. Write Technical Services Director, Delaware ETV Network, Box 898, Dover, Delaware.

Choice positions for two outstanding men. New midwestern major market UHF grantee needs chief engineer particularly strong on planning and installation supervision. Permanent position with well financed multiple-owner. Large west coast parochial school system needs chief engineer for planned area-wide instructional TV system. Requires knowledge of mono and color studio equipment installation and operation plus ability to learn essentials of ITFS and in-school distribution systems. Permanent position in excellent locale. For either position send resume and salary requirements to Box 1068-1, c/o BM/E, Blue Ridge Summit, Pa. 17214.

To work with VTR's, studio equipment and install color equipment. Experience desired. Send resume and salary requirements to Mr. Ronald Lask, Chief Broadcasting Engineer, University of Illinois Medical Center, P.O. Box 6998, Room 314, 907 Building, Chicago, Illinois 60680.

Need experienced announcer with ability to "sell" on the air, on and off camera. Good news and/or weather background preferable. Write or call James Tighe, General Manager WJHG-TV, Panama City, Florida. Box 2349. 904-763-7651.

Radio/Chief Engineer-announcer. Emphasis engineering. $525 and up monthly starting. Stable operation. College community of 25,000 Midwest. Write Box 1068-2, c/o BM/E, Blue Ridge Summit, Pa. 17214.

North Carolina single market needs announcer-salesman. $100 weekly plus commission. Opportunity for excellent earnings if willing to work. Write Box 1068-3, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Expanding group operation. News and production openings. Salary commensurate with experience. Fringe benefits. Personal interview required. WEOL-WBEA, E.S.T. Building, Elyria, Ohio 44035.

Soul Jock needed at once. Must be young, ambitous, alert, have third with endorsement. Send photo, tape, background soonest. Radio Station WNOO, Box 166, Chattanooga, Tennessee 37402.

Engineering position available to work with PC-70's, VR-2000's and TK-27's in outstanding metropolitan VHF operation. First Class license required. Write Box 1068-14, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wanted: Engineer-Salesman for Metropolitan Station in Jackson, Miss. 5000 Watt AM and 100,000 FM. Send resume to P.O. Box 9801, Jackson, Miss. 39206.

POSITIONS WANTED

Sales manager—specialized in local and regional sales. Eleven years experience in TV. Wish to relocate. Eastern seaboard preferred. Address reply to Box 1068-4, c/o BM/E, Blue Ridge Summit. Pa. 17214.

Experienced electronic engineer looking for position utilizing design/maintenance and sales experience, preferably in northern California or N.W.—no announcing. Box 1068-5, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Beginner . . . female dj/announcer, broadcast graduate, Negro, third. Seeking work as contemporary jazz or MOR disc jockey—willing to learn. Box 1068-6, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Wanted position as announcer/dj. Am beginner but is also necessary that I get started as soon as possible. I am very reliable and willing to take any position anywhere. Box 1068-7, c/o BM/E. Blue Ridge Summit, Pa. 17214.

Recent NYC broadcast school grad., 3rd endorsed, 31 yrs. old. Desire opportunity to learn sales, hard worker. Box 1068-15, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Female—40—December grad of Broadcast school. Desire work in copywriting, commercials or production commercials. Relocate. 3rd. Box 1068-8, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Soul jock—3rd endorsed, tight board. Draft exempted. College training, relocate. Box 1068-16 c/o BM/E, Blue Ridge Summit, Pa. 17214.

Video Switcher—T.D. 2 years Armed Forces Network experience, married. Available October 15. Box 919, Fort Clayton, Canal Zone.

POSITIONS WANTED (cont'd.)

News-DJ-MOR. Third. Recent Chicago Broadcasting graduate. H. Taylor, 2135 South Michigan, Chicago. 312-CA 5-6420.

Swinging personality for large market MOR. Creative, responsible, versatile. Can do talk. Box 1068-9, c/o BM/E, Blue Ridge Summit, Pa. 17214.

DJ-announcer-broadcast grad—draft exempt—work hard for experience. Box 1068-10, c/o BM/E, Blue Ridge Summit, Pa. 17214.

EQUIPMENT FOR SALE

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

ANTENNA FOR SALE

1 RCA TFU-24BLS Antenna (Ch. 27) with ½ degree electrical beam tilt. Good condition (VSWR 1.1 to 1 or less).
28 sections RCA MI 19089 UHF Trans. line. 3⅛ inch—20 ft. sections.

Contact: R. J. Wickham,
Dir. of Eng. WKOW-TV
Madison, Wisconsin 53701

Scully tape recorders, finance and trade. Two Spotmasters Playback, and one record/playback, all three, $38.25 monthly. New equipment. QRK or Russco deluxe turntables, $10.80 monthly. Write for list. New cartridges shipped freight prepaid. Audiovox, Box 7067-55, Miami, Florida 33155.

For Sale: Tower 140 ft. self supporting extra heavy duty construction, galvanized steel, recently painted, complete with lights and insulators, disassembled and ready to ship. SNOW SHOE T.V. CABLE CO., SNOW SHOE, PA. 16874. Phone 387-6871 or 387-4961. Area Code 814.

RECONDITIONED VIDEO TAPE RECORDERS AND CAMERAS. Color and Monochrome, Quadruplex and Helical, Ampex and RCA, Current and Late Models in All Configurations. Available Immediately to Buy or Lease. Reply to Box 1068-11, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Brand new remote amplifiers, 2 channel remote microphone amplifiers, 2½ inch VU, battery operated, 7 transistors $95.00 FOB Kokomo. **GREDCO, INC.**, 1830 S. Webster, Kokomo, Ind. 46901. Area 317-883-5688.

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AMPEX 307-2 transport, heads, VU-meters, etc. General Radio 605-B Signal Generator. Sacrifice, make offer. S. Allen, 1007 South Trenton Avenue, Pittsburgh, Pa. 15221.

Berlant Concertone Broadcast Recorder-single track, 4-channel input. Asking $1000. Write Dave Larson, 3015 Margaret Lane, Santa Monica, Calif. 90405.

Complete kit audio proof forms $3.50 postpaid. Specify AM/FM. Box 2605, Corpus Christi, Texas 78403.

MAZE offers some of America's greatest buys in new and used broadcast and recording equipment. Write Box 6636, Birmingham, Ala. 35210.

Whatever your equipment needs . . . check first with Broadcast Equipment and Supply Co., Box 3141, Bristol, Tennessee 37620.

6 element circular vertical and horizontal antenna. Price $2,400.00. Box 1068-17, c/o BM/E, Blue Ridge Summit, Pa. 17214.

Towers, broadcast, microwave, CATV, TV, new and used. Phone 224-9922, Tower Maintenance, Inc., 2408 Old St. Rd., Tallahassee, Fla.

Collins 26U-1 limiting amplifier. Used ten months. Make an offer. KMAQ, Maquoketa, Iowa.

BARGAINS: CCTV Cameras, monitors, send for free list. Box 1068-12, c/o BM/E Blue Ridge Summit, Pa. 17214.

Protect your records. Send for our free Lp supply lists. Record Supplies, Hillburn, N.Y. 10931.

GEL FM exciter working condition any channel. WKLS, Atlanta, Ga. 30309.

EQUIPMENT WANTED

Used FM Antenna, needed for 98.5 Mhz. Specify make and model. Write to Pedro O. Rodriguez, P.O. Box 268, Del Rio, Texas 78840.

MISCELLANEOUS FOR SALE

Japanese Electronics. New products monthly! $1.00. Money-back guarantee. DEE 10639 BM Riverside, North Hollywood, Calif. 91602.

Professional Electronics Projects — $1 up. Catalog 25¢. PARKS, Box 25665-B, Seattle, Wash. 98115.

SIGNS, NAMEPLATES, LABELS, Decals, Badges, Trophies, Plaques. Seton Corp., Dept. BM/E, New Haven, Conn. 06505.

TECHNICAL SERVICES

VIDEO TAPE RECORDER
AUDIO HEAD ASSEMBLY SERVICE

Precision relapping of all heads and supporting posts, includes cleaning and testing. AMPEX VTR audio assembly . . . $75.00 complete. Brand new shelf stock replacement heads of our manufacture available when relapping not advisable. LIPPS, Inc., 1630 Euclid St., Santa Monica, Calif. 90404 (213) EX 3-0449.

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for CATV SYSTEM: ENGINEERING — PLANNING — CONSTRUCTION — TECHNICAL SERVICES — MAINTENANCE

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Promotions like car antenna balls, five foot Santas, election ideas, magnetic car signs, wrist radios. John Kenworthy Enterprizes, Box 4544, Charlotte, N.C. 28207.

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16mm CATV
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Agencies beg broadcasters for depth information about both market and station. Our in-depth marketsheets tell the total story . . . and you get them at a fair price . . . 1,500 units printed 2 colors on best quality 70# white stock for $135 . . . bonus is 550-name ad agency list. Write for free presentation. ALLIED, Drawer 1991, Prescott, Arizona 86301. (Serving Broadcasters since 1952).

"DEEJAY MANUAL" is a folio of Gags, Ideas, Breaks, Gimmix, Fun for the working deejay. Special $3.00 with this ad. Write for free "Broadcast Comedy" catalog. Show-Biz Comedy Service (Dept. E) 1735 E 26 St., Brooklyn, New York 11229.

Radio Unlimited has just served its 1,100th radio station with budget datamaps . . . sales aids that build revenue. Write for our American Flag Parade of Stations brochure. It's FREE. Radio Unlimited, Box 2313, Prescott, Arizona 86301.

DEEJAYS! 6000 classified gag lines for radio, $5.00! COMEDY CATALOG FREE! E. Orrin, Boyer Rd., Mariposa, Calif. 95338.

Add six voices to your station. D. J. PRODUCTIONS, P.O. Box 281, Auburn, Washington 98002 for complete details and sample.

INSTRUCTION

R.E.I.'s famous (5) week course for the First Class Radio Telephone License is the shortest, most effective course in the nation. Over 98% of R.E.I. graduates pass F.C.C. exams for 1st class license. Total tuition $350.00. Job placement free. Write for brochure Radio Engineering Incorporated Schools, 1336 Main Street, Sarasota, Florida—or 3123 Gillham Road, Kansas City, Missouri—or 809 Caroline Street, Fredericksburg, Virginia.

First phone in six to twelve weeks through tape recorded lessons at home. Sixteen years FCC license teaching experience. Proven results. Bob Johnson Broadcast License Training, 1060D Duncan, Manhattan Beach, Calif. 90266.

FCC License in six weeks from the nation's largest license school. Compare reputations and success rates before you invest. Professional announcing training on the nation's only fully school-operated commercial station used solely for training. School locations in Dallas, Atlanta, Chicago, New Orleans and Minneapolis. Write Elkins Institute, 2603 Inwood Road, Dallas, Texas 75235.

FCC License preparation by correspondence. Also, associate degree in electronics by three semesters in correspondence and two semesters in resident classes. Free details on either course. Write: Grantham Desk 7-B, 1505 N. Western Avenue, Hollywood, Calif. 90027.

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in a space of ..... inches..... words under the Classification of:

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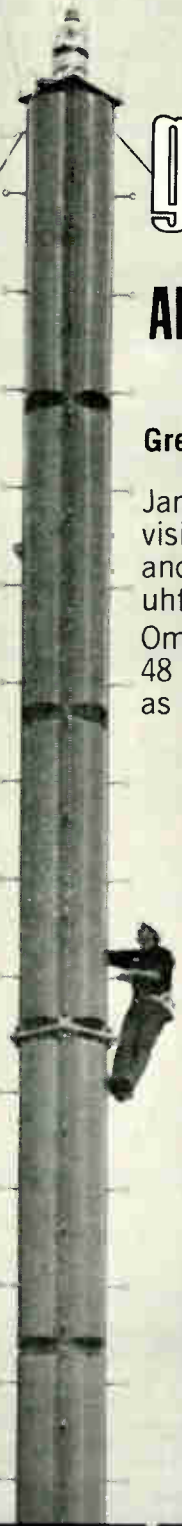
BM/E Classified Advertising Department, Monterey Ave., Blue Ridge Summit, Pa. 17214. 717/794-2191.

WHEN YOU go uhf go zig zag with a JAMPRO ANTENNA



Greater Flexibility - Lower Cost

Jampro's new ZIG ZAG uhf television antenna offers more pattern and gain per dollar than any other uhf antenna on the market.

Omnidirectionals with gains up to 48 and directional gains as high as 215! Input power to 120 KW!

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The highest power UHF station in Kentucky

FIBER GLASS RADOMES are available with each Zig Zag antenna. Eliminates expensive electrical de-icing power bills.

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Write for complete technical data and specifications.

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A DIVISION OF COMPUTER EQUIPMENT CORPORATION

Circle 41 on Reader Service Card

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*Also in Broadcast Equipment Buyers' Guide

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Manager, Advertising Sales

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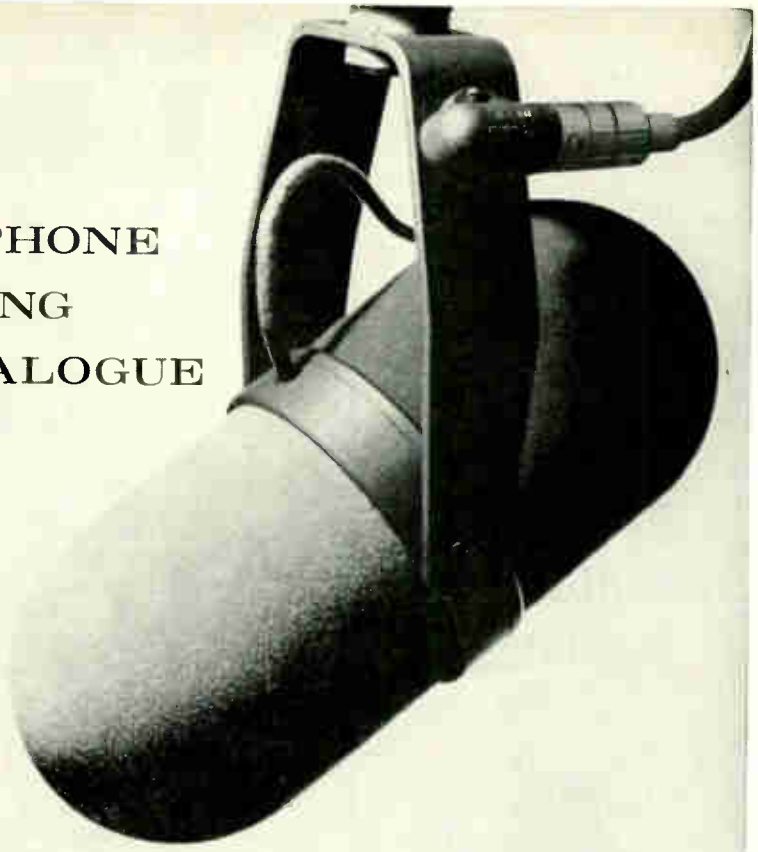
THIS BOOM MICROPHONE IGNORES EVERYTHING ...EXCEPT THE DIALOGUE



Consistency of sound track quality on an endless variety of locations and sets can be dramatically improved with the remarkable Shure SM5 Boom Microphone. It "hears" the dialogue rather than the ever-changing character of the surroundings.

Because its cardioid directional pattern is uniquely uniform with frequency and symmetrical about its axis, the SM5 is singularly independent of the effects of environment. Even in extreme shooting situations (such as with tight sets, low ceilings, hard walls, low microphone angles, traffic or air conditioner noise and rumble, and changing distance) the SM5 minimizes sound coloration and ambient noise pickup. Equalization changes — on the set or in transfer — are seldom, if ever, necessary.

The highly effective attached windscreen completely encloses the two-stage mechanical filter, so that there are no external "rubber bands" for the wind to "strum." The absence of response-correcting inductors or impedance transformers assures freedom from hum.

Call on the Shure SM5 to solve your most annoying boom problems!

For additional information, write directly to Mr. Robert Carr, Manager of Professional Products Division, Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Illinois.

SHURE SM5

UNIDIRECTIONAL DYNAMIC BOOM MICROPHONE

SHURE PROFESSIONAL MICROPHONES . . . FOR BETTER AUDIO

MODEL SM56
CARDIOID
DYNAMIC

Extremely versatile in studio, control room, and remote use. Also widely acclaimed for rhythm recording. Bright, clean sound. Exceptionally uniform cardioid pattern gives optimum control of environment.

MODEL SM33
UNIDIRECTIONAL
RIBBON

Warm, smooth sound for studio, control room, and scoring stage. Super-cardioid directional pattern. Compact, yet rugged.

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Ideal for interviews and audience participation, yet unusually smooth wide range response (40-20 KC) for critical music reproduction. Instantly detachable from stand. Steel case with Cannon connector.

MODEL SM50
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DYNAMIC

Self-windscreened and pop-free for news, sports, remotes, and interviews. Also ideal for many studio and control room applications. Comfortably balanced for hand or stand use. Natural response.

Circle 44 on Reader Service Card

FROM THE EDITOR

Stop Air Pollution

Broadcast air pollution is an unhappy fact. Bad signals leave transmitting towers with such regularity that fuzzy stereo and green faces are often the rule, rather than the exception. A clean signal is a quality signal. It must have minimum distortion, broad bandwidth and low noise. The ultimate goal is high fidelity audio and high fidelity color. The FCC has set certain minimum standards. Part of the problem is that too many chief engineers have been willing to let these minimums become their station's maximums.

In the past, biggest offenders have been a-m broadcasters. Fortunately, competitive pressures from fm'ers have been forcing many a-m stations to clean up their signals. But frequency modulation in itself isn't the entire answer either. Many fm stations are guilty of abominable quality. A favorite station may sound great on a tiny portable, but pipe it in through the good rig in the living room with those big speakers, and yecechhh!

TV stations have a more complicated quality control problem. "Fuzzy" would be a good word to describe what many of them are transmitting. Picture detail is often lost in cameras, camera chains, film chains and transmitting equipment. Some color pollution is so bad, it boggles the viewer's credulity.

Improvement must come from within the industry. Stations do have appropriate test equipment and techniques at their disposal. For some of them—especially the low-budget fm'ers, cost may be a crucial problem. For some, engineering expertise may be lacking. This latter problem can again be boiled down to a question of finances.

But money isn't the ultimate answer either. New developments in instrumentation technology—largely spurred by the FCC's modified monitoring requirements—will make it possible for technically unsophisticated station personnel to do complex checks as routinely as they prepare the station log. This is fast becoming the case for fm (see pages 39-41) and certainly can be possible in TV stations as well.

Or the other side of the coin, a station that earns a reputation for having the cleanest signal in its market can garner a larger proportion of the audience, and ultimately a larger advertising dollar. Clean signals benefit everyone. For openers, why not set a station goal of improving critical proof-of-performance measurements by 10 percent? You may be surprised at the results.

James A. Lippke

TDA2D VIDEO/PULSE DISTRIBUTION AMPLIFIER

The now-famous TDA2 Distribution Amplifier, in use at most television stations and networks, has a recently added feature. The "D" stands for Differential Input, which we added to the TDA2. And not only did we add a differential input, we subtracted $30.00 from the price. Instead of $325.00, we're selling the new, improved TDA2D for $295.00 F O B Nashville. The compact TDA2D fits neatly into 1¾" of panel space and produces virtually no heat.

For complete information, write to:

INTERNATIONAL NUCLEAR CORPORATION

608 Norris Ave. • Nashville, Tenn. 37204 • Ph.: (615) 254-3365

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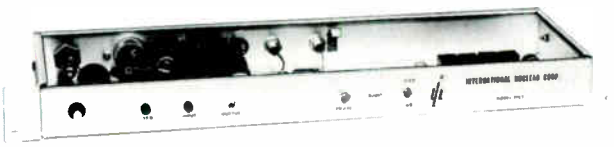
MODEL TPC2 TRANSISTORIZED BURST PHASE CORRECTOR

The TPC2 permits rotation of the color burst phase signal driving a TV transmitter, without the necessity for extensive transmitter investigation and possible modification. It permits advancement or retardation of the color burst by 20 degrees, without affecting the amplitude or other characteristics of transmission. This completely transistorized unit has its own internal regulated power supply, and is constructed on a 1¾" by 19" panel. $795.00 F O B Nashville.



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TC1 CLAMPING AMPLIFIER

The TC1 Clamping Amplifier employs tip clamping to remove low frequency signal deficiencies without disturbing burst and other chrominance information in or about back porch levels. The clamped stage utilizes a field effect transistor driven by a balanced bridge circuit. This advanced design technique produces highly effective and stable clamping. The TC1 Clamping Amplifier sells for $325.00 F O B Nashville.

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TBG2 BLACK BURST GENERATOR

The brand new TBG2 Black Burst Generator allows you to go black and back with perfection. The TBG2 has two outputs available for added versatility, and each has burst phase and burst amplitude adjustments so the two feeds can be matched under any condition. The TBG2 has the industry's only continuously rotatable phase control, and is accurate to within one degree. All the controls are on the front panel and can be locked. The unit is small, compact and lightweight. So is the price . . . $475.00 F O B Nashville.

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The world's most precise broadcast sync generator!

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The EIA Sync Generators in Tele-Mation's TSG-2000 Series are more accurate —more stable—than any available. Here are some of the reasons why:

- **All-digital design**
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