

JANUARY 1975

BME

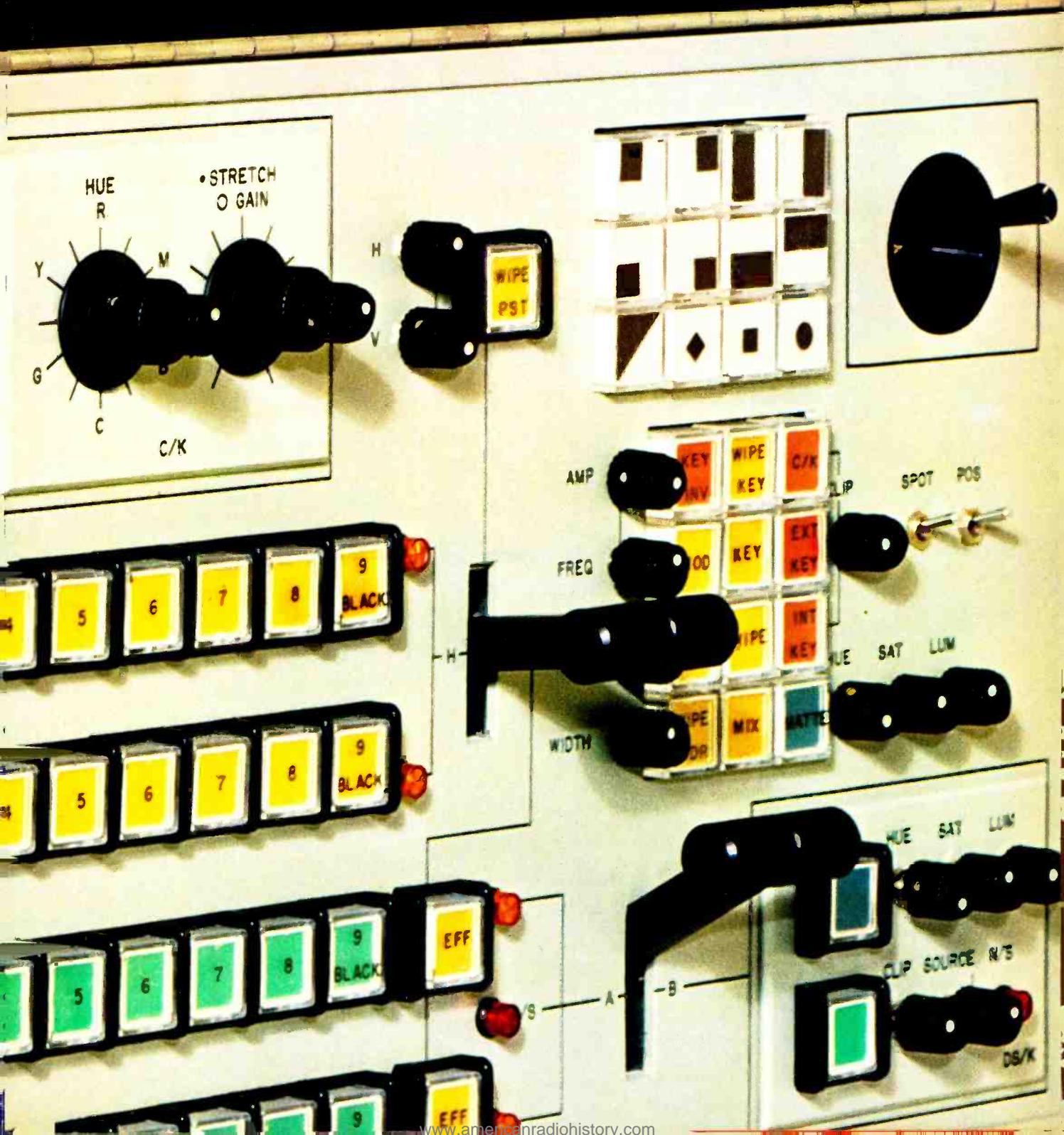
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If you don't have a copy of "Video Transmission Techniques", you would be wise to write for one. It's free from DYN AIR, and its 70 jam-packed pages will tell you a lot about how to handle long video runs and what DYN AIR equalizers can do for you.

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BM/E

BROADCAST MANAGEMENT/ENGINEERING

JANUARY 1975/VOLUME 11/NUMBER 1



We interrupt this issue to bring you a report on instant TV news . . . It's all possible because of advances in microwave, portable cameras and VTRs, TBCs, and editing equipment. Turn to page 34.

**BROADBAND
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274 Madison Ave.
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Editor

James A. Lippke

Associate Editor

Robin Lanier

Washington Editor

M.L. Hollowell

Contributing Editor

Robert Wollins

Assistant Editor

Djuna Zellmer

Art Director

Gus Sauter

Production Manager

Helen Horan

FCC Counsel

**Pittman Lovett Ford
and Hennessey**

Publisher

Charles C. Lenz Jr.

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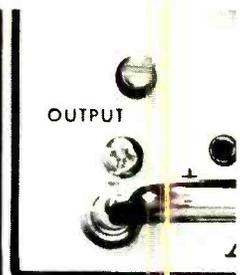
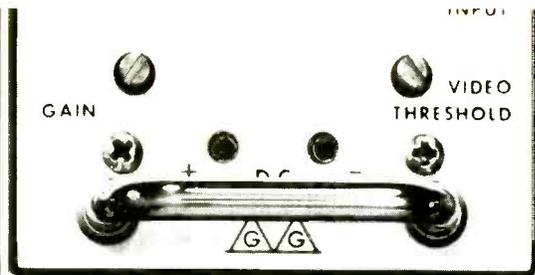
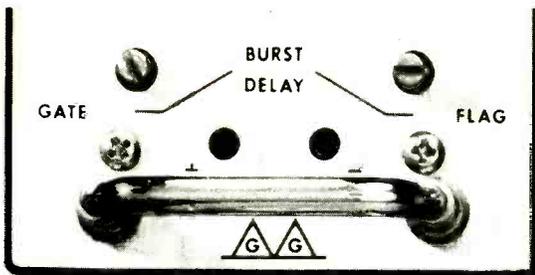
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New and significant products

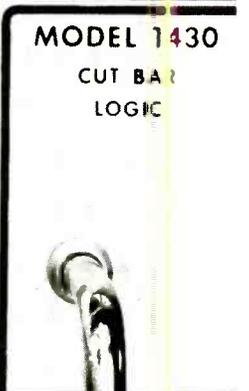
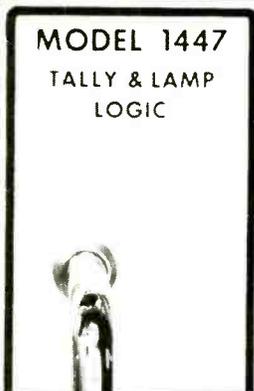
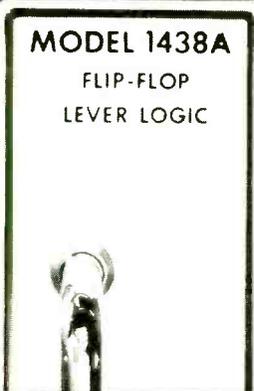
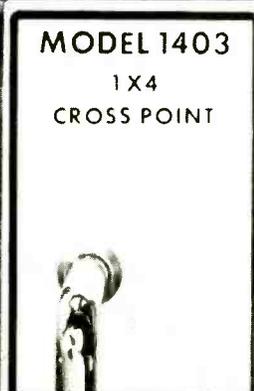
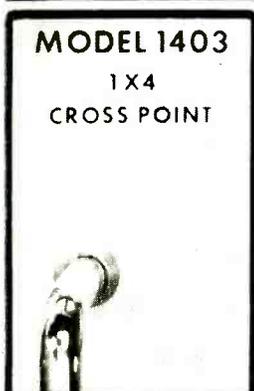
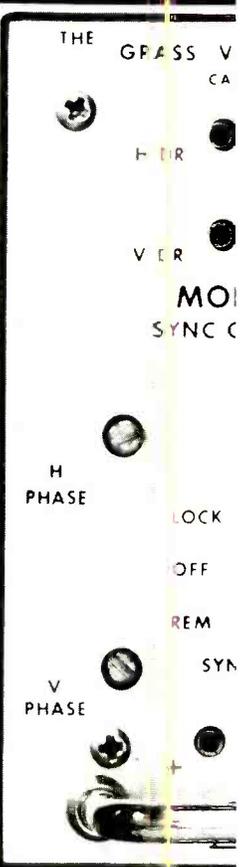
**CM/E Supplement for those with cable interests will appear in
February issue**



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BROADCAST INDUSTRY NEWS

U.S. Reinstates Antitrust Suits Against Networks

The U.S. Department of Justice has reopened its antitrust attack on the three national networks with separate suits filed in December, charging each with monopolizing programming during evening prime time, 6 to 11 p.m. Similar suits, filed in 1972, had been dismissed by a Federal district judge without prejudice about a month earlier. That means no decision on the merits of the cases had been reached. The networks had charged that the 1972 suits were motivated by the Nixon administration's dislike of network news handling. However, Thomas E. Kauper, Assistant Attorney General in charge of antitrust action, says the suits are based on actions going back to the 1950's. Network spokesmen, responding to news of the suits, said the charges were irrelevant to network practices at the present time, and predicted that the allegations would be rejected by the courts.

License of WPIX Renewed

A slam-bang license renewal battle that started more than five years ago reached the stage of FCC administrative law decision in mid-December when Judge James F. Tierney ruled for renewal of the license of WPIX, the Daily News television outlet in New York. The WPIX renewal had been challenged by Forum Communications, Inc., (a New York organization including various citizen groups), in 1969, on the grounds of distortion of the news, racial bias, inadequate attention to community needs, and other alleged failures to meet FCC standards.

The FCC Broadcast Bureau had ruled against WPIX in 1970; the WPIX management fought back in lengthy hearings before Judge Tierney that did not end until January, 1973. Judge Tierney said certain distortions in news programs, admitted by WPIX to have occurred between 1966 and 1969 and strictly forbidden

after that, were at worst lapses in judgement and taste. L. K. Grossman, president of Forum Communications, announced that the groups would appeal the decision to the full Commission and, if necessary, to the courts.

New Company Formed To Revolutionize News

Electronics News Systems, Inc., is a new Arkansas based company established to hasten the all-electronic television news revolution. Founder is Jimmie Mundell, who has a 26 year background in television news filming. The company will market a lightweight TV camera with a portable color video recorder. This enables the news reporter to shoot an event, and get the story on the air without the delay of film processing. The camera can be connected to microwave equipment to beam the picture live to the studio.

Although the same type of equipment is available from several sources, Mundell's claim to the market is the inclusion of an editing device enabling the cameraman to make immediate editing.

Motion picture film costs an average of \$4.50 per minute. The video approach cost less than \$0.02 per minute, according to Mundell, based on annual usage.

"AMP," Ampex Founder, Marks 30th Year There

The man whose initials are firmly inscribed into the first large-scale use of magnetic tape recording in this country, Alexander M. Poniatoff, recently celebrated his 30th year with the company he founded, the Ampex Corporation. Using his initials to name the company and its products, Poniatoff brought out the first professional-grade tape recorder in the 1940's, a machine that, with its successors, dominated the explosively-expanding field for a number of years.

Now 82, Poniatoff, having retired as Chairman of Ampex in 1970, is active as director of the Alexander



Richard Elkus, Ch. of Bd., and Arthur Hausman, Pres., congratulate founder Poniatoff on 30th anniversary.

M. Poniatoff Laboratory, a research organization within Ampex. He was born in Russia, educated in engineering in Germany. He was a pilot in the Russian Air Force in World War I, fought with the White Russian Army after the Revolution, escaped to China, came to this country in 1927. Poniatoff founded Ampex in 1944 to manufacture electric motors, and turned to magnetic recording shortly after World War II.

NCTA Cablecast Contest Entries Invited for 1975

Setting the final mailing date for entries at January 31, 1975, the National Cable Television Association has announced a new set of rules and invited entries for its annual Cablecasting Awards Contest. There will be three classes of contestants: systems with up to 5,000 subscribers; those with over 5,000 and up to 15,000; those with more than 15,000. In each classification, prizes will be awarded for six different series-style programs and one "one-shot" program. The types of series programs winning separate prizes are: News and public affairs; election coverage, 1974; sports; children; education; other. The one-time only category can be any type of program. No single contestant, however, can enter in more than three categories altogether. All entries must be on 3/4" video cassettes, and not more than 5 minutes long. They can be excerpts from a single show or from a series of shows. The shows must have

continued on page 8

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Now, all the ease and advantages of videocassette recording go portable.

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Unlike other broadcast limiters that are factory-set automatic, our Model BL-40 MODULIMITER offers front panel adjustments and separate meters for output level, peak limiting and RMS limiting. No matter what your format, hard rock to classical, MODULIMITER is readily adjustable to maximize transmitter efficiency and extend coverage. Our patented electro-optical attenuator provides unobtrusive, smooth, true RMS limiting. An ultra-fast F.E.T. peak limiting section prevents unwanted overmodulation with no peak clipping. Our "Phase Optimizer" maintains most favorable signal polarity permitting up to 125% positive modulation without negative undershoot. The BL-40 MODULIMITER offers all state-of-the-art automatic features plus complete adjustability not available in others. UREI quality, of course.



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NEWS

been produced after February 15, 1974. Further information is available from NCTA at 918-16th St. N.W. Washington 20006.

Citizen Groups Fighting Station Format Change Get Official Boost

Citizen groups fighting to save "their" station from the clutches of new ownership or programming may have gained support from an inadvertent source. The ten justices of the U.S. Ninth Circuit Court (Washington, D.C.) by an 8-2 vote, reversed lower court approval of the FCC's decision to permit the sale of classical music station WEFM-FM to rock-oriented GCC Corp. The sale had attracted considerable citizen protest over threatened loss of the station's format. But, the results are more far-ranging than that.

The decision may have significant bearing on the programming switch at ex-WNCN-FM, New York, N.Y. WNCN was New York's only full-time classical music station. Citizen power girding to save the NCN format say that the WEFM decision is directly applicable. Starr Broadcasting, owners of WNCN, however, don't see things that way. In support of the reversal, the Court said: "We think it axiomatic that preservation of a format that would otherwise disappear, although economically and technically viable and preferred by a significant number of listeners, is generally in the public interest. There may well be situations in which that is not the case for reasons within the discretion of the FCC to consider, but a policy of mechanistic deference to 'competition' in entertainment programming format will not focus the FCC's attention on the necessity to discern such reasons before allowing diversity, serving the public interest because it serves more of the public, to disappear from the airwaves."

Television The Number One Ad Medium, Says TvB

According to the Television Bureau of Advertising's Report on the Scope & Dimensions of Television Today (better known as 'TvBasics'), national advertisers in 1973 invested \$3.5 billion in spot and network television, \$1.5 billion in magazines, \$1.2 billion in newspapers and \$450 million in spot and network radio.

continued on page 10

**This Tube
Makes Our
Great Color Camera
Even Greater!**



It's the new $\frac{2}{3}$ " Plumbicon* tube that will be at the heart of our advanced Hitachi-Shibaden FPC 1000P 3-tube color camera.

The Plumbicon design is famous for producing remarkably faithful images comparable to broadcast quality. And combining the new Plumbicon tube with our superb FPC 1000B camera will result in what we honestly believe to be the finest color camera in its price class. This new instrument will become a proud addition to the precision line of Hitachi-Shibaden video equipment that also includes our popular FP 1212 1" Plumbicon camera.

You may have seen it at the NAEB Show. If not, send in the coupon and we'll send you the specs on the first and only $\frac{2}{3}$ " Plumbicon camera in the world.

FPC-1000P

- Please send literature only.
- Have representative call

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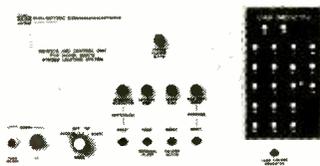


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A high intensity strobe warning system that eliminates the cost and maintenance of "Candy Stripe" painting. And provides effective obstruction warning during all ambient light levels, twenty-four hours a day, in all weather.

The system features...

- Automatic day/twilight/night switching of light levels
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- Lightweight luminaires
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Control and monitor—A solid-state unit containing individual luminaire monitoring. Indicates day, twilight and night modes of operation. Mode is automatically controlled through a dual photo cell system. Manual override, system alarm and reset switches are included.

For full details, write: Dielectric Communications, Division of Sola Basic Industries, Raymond, ME 04071.

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In this annual edition, TvBasics No. 17, are the bureau's annual compilation of facts and figures about television. To wit: More retailers than ever before made sizeable commitments to television... many major agencies set up subsidiaries to handle retail accounts... local television grew the most (12%) compared to newspapers (11%) and outdoor advertising (10%). Other facts culled from TvBasics No. 17: The top 100 national advertisers voted television their preferred marketing medium... television's summer audience has grown from 4 hours 36 minutes in '65 to 5 hours 31 minutes in 1973.

Copies of TvBasics No. 17 are available from TvB members or on request from the Television Bureau of Advertising, One Rockefeller Plaza, New York, N.Y. 10020.

HUD Awards Additional Funds to New Rural Society Project

The U.S. Department of Housing and Urban Development (HUD) has awarded an additional \$300,000 to Fairfield University in Connecticut for the continuation of the national pilot New Rural Society Project to help improve the quality of life in rural towns through telecommunications. The New Rural Society Project was funded initially by HUD in 1972 for \$361,000. The latest funding has been awarded for project activities during 1974-75.

"The new funds," said Sen. Abraham Ribicoff (D-Conn.) of the project, "will enable this important study team to continue its explorations of practical rural development programs in the nation's best interest and help relieve the inseparable urban, rural and energy problems confronting America's cities and small towns."

The project covers a 10-town area with a population of approximately 65,000 people and is being conducted in cooperation with the Windham Regional Planning Agency. Major areas of exploration during the Project's next phase include a series of "communications audits" of state agencies and industrial operations to develop new broadband communications techniques to facilitate the decentralization and relocation of such operations. The use of electronic telecommunications technology as a substitute for business travel to conserve energy is under study, as is the development of an optimum "quality

of life" growth plan for the 350-square-mile Windham region for the year 2000, which is being designed to get people of all communities to become actively involved in the planning process for the future. Factors under exploration include size, makeup and distribution of population, employment, service components, descriptions of government, transportation, housing, and external and internal communications needs, including health, education, culture and entertainment.

NAEB Staff is Reorganized

The National Association of Educational Broadcasters has revised its staff organization. Those named to serve as Directors of Member Services are: Mary Ann Buddington, director of Personnel and Employment Services; Eva Archer, director of Publications and Information Services; David Gillmore, director of Professional Training Services; Mary Lynn Moody, director of Conventions and Conferences; and H. Holt Riddleberger, director of Institutional Management Services.

In addition to these staff re-arrangements, James A. Fellows, who now serves as secretary to the Board of Directors, has been named Executive Director of the NAEB with the day-to-day responsibilities for staff administration, membership development, development of Professional Emphasis Groups, and planning. William G. Harley will continue as president of the NAEB, with special responsibilities in the area of fundraising. Continuing as treasurer is William Sickles.

NYC Convention Center Corporation Names Goldmark Consultant

Goldmark Communications Corp., a subsidiary of Warner Communications, has been named communications consultant to the New York City Convention & Exhibition Center Corporation for the design and development of telecommunications systems functions and services. The agreement includes an initial development phase for \$108,000 to design basic telecommunications systems for such services as management information, security and safety, teleconferencing, television broadcasting, and audio-video display systems. Goldmark engineers are designing the communications plan in cooperation with Exhibition Center representatives and architects Skidmore, Owings & Merrill to accom-

continued on page 12

IKEGAMI model HL-33: the mini professional broadcast color camera

Now used by all four nets and many
independents throughout the country.

According to BM/E the Ikegami mini-camera is
now one of the main forces in the Electronic News
Gathering movement.

The reason is obvious: it offers matching quality
to studio cameras.

Lightweight too — with the camera head weigh-
ing only 12 pounds and backpack 22 pounds.
Completely self-contained. It can feed a VTR or go
direct to air. Or a combination of the two modes.

The HL-33 is ideal for instant news gathering.
For instance, the meeting between President Ford
and President Valery Giscard d'Estaing in
Martinique where CBS used ENG for its coverage.

But most important, the Ikegami
HL-33 has the ruggedness and reliability
necessary for electronic journalism.

“CBS News intro-
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gathering and we
are now routinely
using nearly a
dozen covering
national and inter-
national news
events.”

Marshall Davidson, Vice-President
News Operations for CBS Network.

Marshall Davidson



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Our proven reliable units enhance every type system. So when you want the best image enhancement, do what the major networks do, specify Dynasciences Enhancers.

And, by the way, we've now added a new **LOW COST** Color Enhancer, the Model 888. Specially designed for those of you who could not afford a color enhancer — 'til now. For information, write us.

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NEWS

modate all communications services of the \$200-million Center.

Dr. Peter C Goldmark, president of Goldmark Communications, will direct an engineering team on the project. Among the potential Convention Center communications services being explored for present and future considerations are an integrated communications transmission network for electronic registration for visitors, information retrieval methods, automated parking control, teleclinic facilities, information processing, and television production and recording studios.

Triangle Broadcasting Changes Name to Summit Communications

The name of Triangle Broadcasting Corp. has been changed to Summit Communications, Inc. The company operates WSJS-AM, WTQR-FM and the cable television system in Winston-Salem, North Carolina. The company also has cable television franchises in Thomasville-Lexington, portions of Davidson County, N.C., Reidsville, Eden and Statesville. The system in Thomasville-Lexington is currently under construction.

The company has also changed the name of the cable division from Tele-Cable to Summit Cable Services. This name is applicable to all of the company's cable television franchises. Summit, in addition to its Winston-Salem radio interests, has purchased WCOA-AM, WJLQ-FM in Pensacola, Florida, and WREC-AM/FM in Memphis, Tenn.

Second Annual VIDSEC Announced

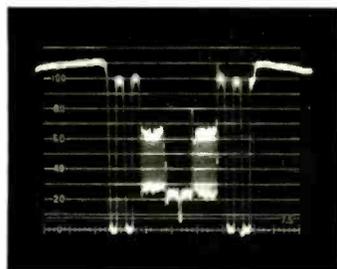
VIDSEC 75, the Video Systems Exposition & Conference, will be held June 1-3, 1975 at McCormick Place, Chicago, concurrent in time and place with the summer Consumer Electronics Show. VIDSEC 75 is sponsored and produced by the Video Division, Electronic Industries Association. A couple of features of last year's VIDSEC are being expanded for this summer's show: the video conferences, and the video library. The video lab, another feature, is being added for the first time. Admission to the exposition will be free, and the charge to trade attendees for the allied events including the video library, video labs,

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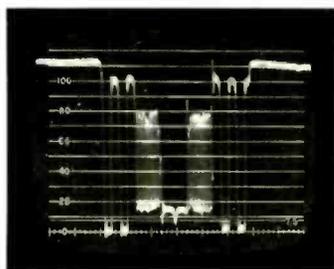
Amperex announces a new high resolution Plumbicon* tube that increases the modulation depth in your Green Channel by 50%†

In the ten years since we introduced the Plumbicon TV camera tube, we have worked continuously to "improve the breed." The first improvement was the development of the separate-mesh Plumbicon . . . then, the XQ1025R, an extended red response version that doubled red-channel sensitivity with color response paralleling that of the human eye.

Now we've made still another advance in Plumbicon technology: a green channel version of the XQ1025. With the new XQ1025G, you can expect an improvement in green channel performance that will be instantly apparent to your viewers . . . and to your advertisers.



Our standard XQ1020G offers 40% modulation depth in the green channel.



Modulation depth under same test conditions is 60% with the new XQ1025G, an improvement of 50%.

As the photographs show, the XQ1025G provides a 50% increase in green channel modulation depth as compared to the XQ1020G you're now using. This increase in modulation depth makes possible a significant improvement in resolution and also greatly reduces the need for electronic signal enhancement in the green channel. The resulting improvement in overall system signal-to-noise ratio now allows the camera to be operated at lower light levels.

The new XQ1025G is physically and electrically interchangeable with the standard XQ1020G. Since it is based on the same design and construction principles as the earlier Plumbicon tubes, it offers the equivalent reliability and long life as the standard versions.

We have prepared a short report on the characteristics of the new tube and on what it means insofar as improvements you can expect from it for your camera. For your free copy, contact: Amperex Electronic Corporation, Electro-Optical Devices Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800.

*Registered trademark N.V. Philips of the Netherlands.

†Typical measurement: 50%; Range: 40% to 70%



Amperex

TOMORROW'S THINKING IN TODAY'S PRODUCTS

Sold through
North American Philips Electronic Component Corporation

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TV Cooke Varotals are designed by Taylor-Hobson to meet operational requirements of directors and cameramen with minimum technical compromise. Varotals 17A and 30 operating side by side offer horizontal angular coverage from 56° wide to less than .075° narrow.

Large diameter front optical elements (135mm for Varotal 17 and 159mm for Varotal 30) combined with

unique wide band anti-reflection coatings provide maximum light grasp.

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conferences and lunches, breakfasts and receptions will be \$35. To receive further information on exhibit space, write to VIDSEC 75, Video Systems Exposition and Conference, 331 Madison Ave., New York, N.Y. 10017.

All Taft Broadcasting Stations to be Converted To BIAS System

All 16 of the Taft Broadcasting Company's radio and TV stations will be converted to the BIAS (Broadcast Industry Automation System) computerized communications system. The contract for automated information services was signed by John H. McClay, Executive Vice President of Taft Broadcasting and Norfleet Turner, President of Data Communications Corp., Memphis, Tenn., operator of the BIAS network. It includes all Taft broadcast properties; initial conversion was started in November with plans for all TV stations to be on the system by June 1975. BIAS systems for the radio properties will

be started on completion of the TV stations.

Children's TV Workshop To Be Hosted By NAB

A two-day workshop on children's television will be held in Washington, D.C. in May, this year, for station general managers, program directors and producers of children's television programs. The workshop will be designed to provide a forum for an exchange of information and techniques to help improve local children's television. Dr. Roger Fransecky of the University of Cincinnati, a specialist in children's programming, was selected by the committee to assist in formulating the agenda for the workshop.

NAB Radio Code Board Approves Promo Campaign

The Radio Code Board of the National Association of Broadcasters has approved a year-long promotion campaign designed to make radio listeners more aware of the objectives and achievements of industry self-regulation. At a recent meeting in New Orleans, the Board pre-

continued on page 16

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For the last 10 years, Super-8 film has been "silent". Without sound, your Super-8 movies were "incomplete".

Today, there is "Ektasound" film, a revolutionary film which provides the means to record sound (directly on the film) as you're filming. You, therefore, can shoot "complete" movies.

With the new Beaulieu movie camera, you will go even further in Super-8. The "5008S" benefits from the advanced technology provided by Beaulieu: an image with a professional touch, and now sound with a high quality level.

Professional Sound Quality

Pop in a new Super-8 sound ("Ektasound") film cartridge. Focus. Then, plug in the mike. That's all the preparation you need. With the Beaulieu "5008S", you're now ready to start filming professional quality Super-8 single system sound movies.

An amplifier is built into the camera which records the sound directly onto the magnetic stripe of your sound film. The camera records high fidelity sound, both in treble as well as bass (*frequency response*: 50-12,000 Hz \pm 1.5 dB; *distortion*: less than 0.75%; *signal-to-noise ratio*: 57 dB; *wow and flutter*, attenuated peak: less than 0.4%).

The "5008S" modulates the single system sound recording automatically. However, there is also a "manual" setting so that you can modulate the sound as you are filming (by using the VU meter).

"XL" (Existing Light) Filming Capability

The "5008S" has "XL" (Existing Light) filming capability which is provided by: a *super-fast* lens (f1.2, 6-80mm Angenieux zoom), a longer exposure time for the image (1/40 second), and a through-the-lens metering system that sends 100% of the available light to the film.

Since many of your sound movies will be filmed indoors, this feature will enable you to shoot films in the available light of your scene (whether that "light" is bright or not).

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For the lens, Beaulieu turned to the professional and technical "know how" of Angenieux (which supplies NASA for all their space missions).

Angenieux succeeded in creating a new zoom lens that covers all the focal lengths from 6-80mm (a 13.3 to 1 zoom ratio).

Imagine such a lens in 35mm still photography. It would go from a 35mm wide angle to a 500mm tele.

In addition, the lens opens to f1.2 (an *unprecedented feature* on a zoom lens with such a wide focal length range).

New Dolly Shot Style

The power zoom of the Beaulieu "5008S" is continuously variable. You can travel the full focal length range in 4 seconds, or 12 seconds (*or any speed in between*).

Macrocinematography — Without Touching the Subject

To film macrocinematography with the "5008S", just zoom to 80mm and focus. At the minimum focusing distance of 2 feet, 8 inches, you get all the light available since the lens doesn't actually touch the subject. For example, at this distance, a postage stamp

(1½" x 1-1/5" in size) completely fills the viewfinder (and consequently, the screen—when projecting).

Forget the Exposure

With the "5008S", you can concentrate totally on framing and sound recording. The diaphragm operates automatically and stops instantly at the right aperture. (This feature has "Manual Override".)

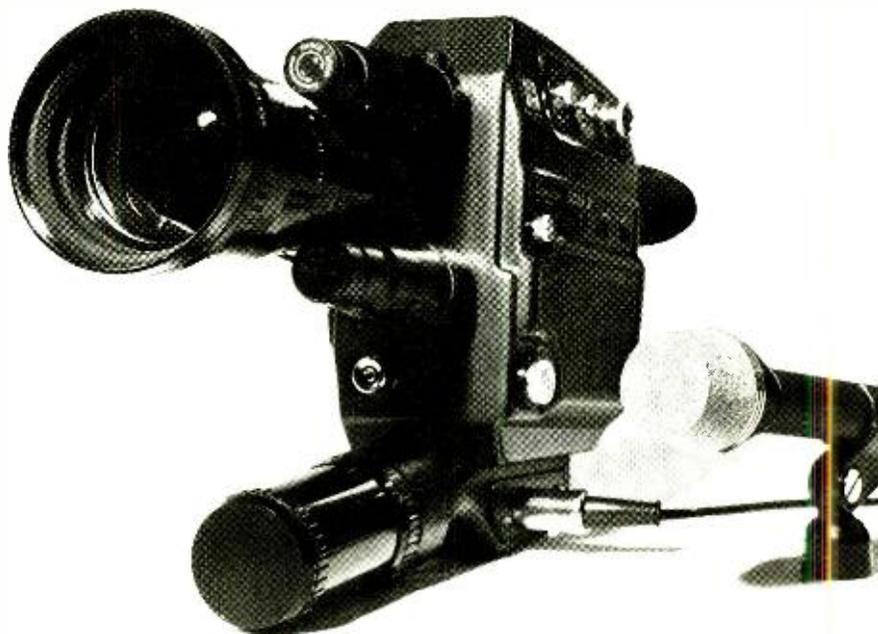
Lens Interchangeability

The "5008S" is the only single system sound camera with an interchangeable lens. It accepts 35mm still photography lenses (by means of an adapter), as well as all 16mm "C" mount lenses.

The choice is yours. You can interchange an unlimited amount of different lenses in order to create a certain "feeling" or effect in your films.

For full information on the new Beaulieu "5008S" Super-8 Single System Sound Camera, please write to:

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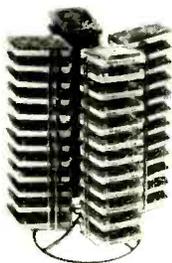
Each WR-25 Modular Rack holds 25 Type A Cartridges . . . eight can be mounted on our Mobile Carousel Base to make up the MR-200.

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NEWS

viewed a series of 26 spot announcements from 10 to 30 seconds in length that promote the code with words and music. The disc will be mailed to subscribing stations shortly and are cleared for on-air from Jan. 1, 1975 to Jan. 1, 1976.

Restrict Reruns? FCC Taking Careful Look

Whether or not there should be any restrictions on reruns in prime-time television is the question the Federal Communications Commission hopes to answer in an inquiry opened in October. The FCC was responding to a petition filed by Bernard A. Balmuth, a Hollywood film editor, who said that prime time television is filled with far too much repeat material, making for dull programming that, if allowed to continue, will destroy television's vitality. The petition has been opposed by ABC, CBS, NBC, and by two groups of TV station licensees, who said that any restrictions on reruns would force them to use less expensive types of programming, such as game or quiz shows. The FCC, in announcing the inquiry, said that it hoped the rerun

question could be settled by private action, and was not sure there was a valid regulatory issue involved. However, the FCC said it hoped to answer that question in the inquiry, as well as what, if any, restrictions would be desirable. Comments are due by January 10, 1975 and reply comments by February 7, 1975 (Docket # 20203).

BRIEFS

The National Association of Broadcasters, in comments filed with the Federal Communications Commission, has opposed any relaxation of non-duplication rules as an unwarranted subsidy for cable television that would damage broadcasters to the public detriment. The 147-page filing opposes suggestions for a "moratorium" on the non-duplication rules during a market test by various rating services. **Cohu** has introduced a 28-ft. custom display van to begin nation-wide tours demonstrating the firm's array of television equipment for broadcast, ETV, ITV, CATV, and CCTV users

RCA has received a NASA contract valued at \$15.2 million to sup-

continued on page 30



Jack Hansen, WFMD, Frederick, Md.

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With the Model AM-19D (210) Digital Antenna Monitor, accuracy is assured and operating cost savings are realized. Now antenna phase angle and loop current ratio readings can be taken by lesser grade operators. The easy-to-read numeric readout provides exact readings and eliminates interpretation errors common with conventional meters. Resolution is 0.1° for phase angle and 0.1% for current ratio.

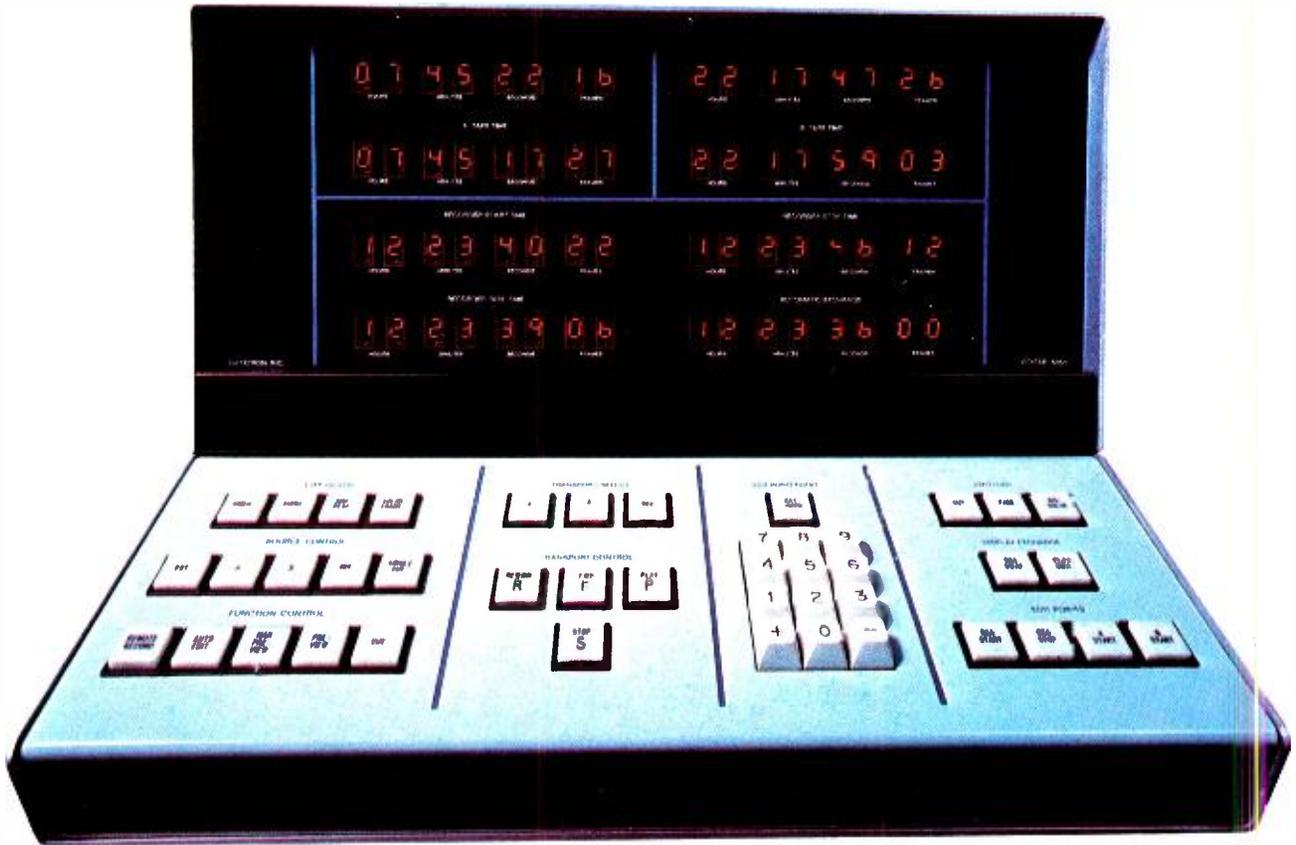
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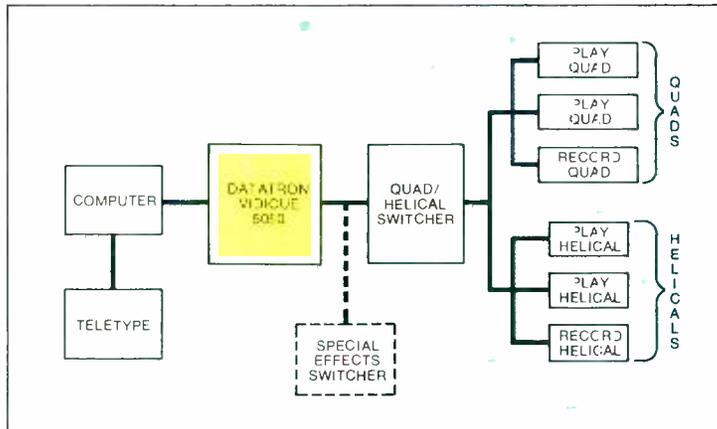
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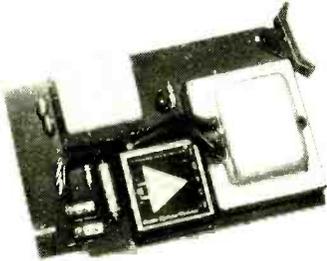
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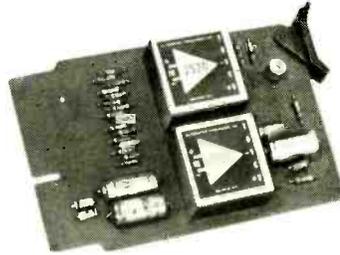
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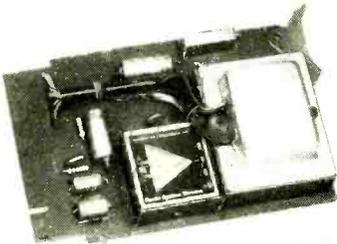
Transformer coupled input and output. Exceptionally low noise (equivalent input -129 dBm) and high output capability with low distortion. Adjustable gain. Input to 0 dBm and output capability +30 dBm. Utilizes Model 2520 operational amplifier.

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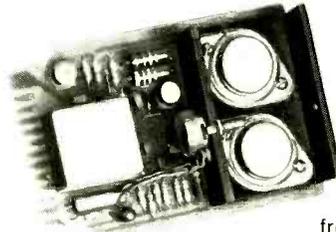
SPECIAL PURPOSE AMPLIFIERS Models 330P, 330T, 330F, 330G



Models available for RIAA Phono, NAB Tape, and Magnetic Film. Low noise, adjustable gain, high output capability. Equalization adjustable. 330F provides both 16 and 35 mm. curves, externally selectable.

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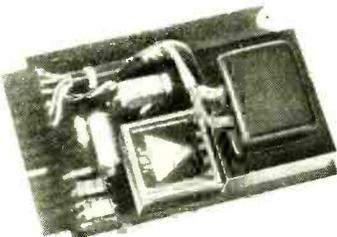
10 WATT POWER AMPLIFIER Model 701



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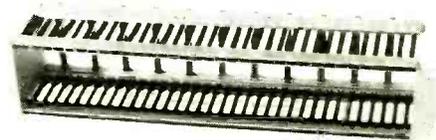
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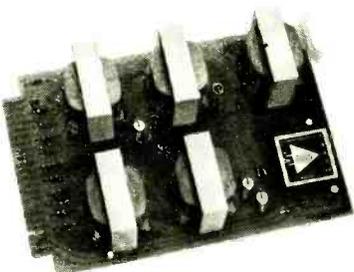
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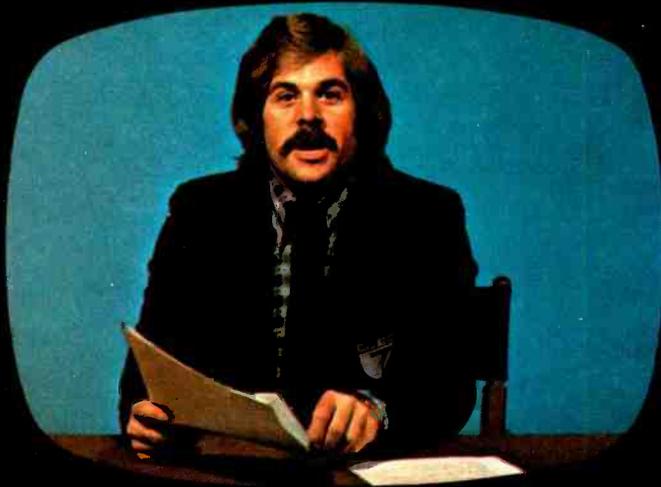


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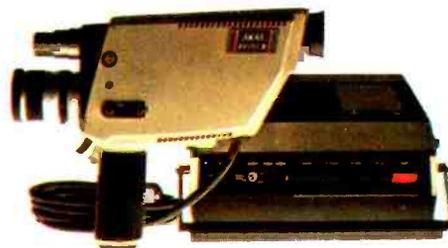
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Children's Television Programming

By Frederick W. Ford and Lee G. Lovett
Pittman, Lovett, Ford and Hennessey, Washington, D.C.

Nearly three years ago, the Commission launched its wide-ranging study into children's television programming and advertising practices. The Commission adopted no formal rules in its recently released *Children's Television Report And Policy Statement*. Yet, the *Report* unmistakably "clarified" broadcasters' responsibilities in children's programming.

Background

The *Report* began by discussing the Commission's duty to balance its "obligation to assure programming service in the public interest" with the danger of "excessive governmental interference with specific program decisions." To meet this obligation, the Commission has traditionally imposed only "general affirmative duties" leaving the licensee "broad discretion in giving specific content to these duties."

As early as 1929, the Federal Radio Commission [predecessor to the present FCC] stated that "the tastes, needs and desires of all substantial groups among the listening public should be met . . . matters of interest to all members of the family find a place." The Commission explicitly recognized children's programs as an element of a "well-balanced program structure." The *Red Lion* case¹ provided further support for the principle that the Commission "could properly interest itself in program categories." Indeed, the Commission has interpreted *Red Lion* as pointing to a "wide range of programming responsibilities on the part of the broadcaster."

Broadcasters' Responsibilities

The Commission believes that broadcasters have a "special obligation" to serve children and must develop and present programs which will serve the "unique needs of the child audience." Most children lack the sophistication to benefit from programming designed for the general public. Thus, broadcasters must make special efforts to produce educational and/or informational programming for children.

The Commission declined to promulgate by rule any particular number of hours per week to be dedicated to children's programming. This hesitancy was prompted by the proximity of "detailed government supervision" of programming to First Amendment/freedom of speech rights. Certainly, a *reasonable part* of children's programming must be educational. In all other respects, the Commission will determine whether or not a licensee has broadcast an adequate amount of children's programming on an *ad hoc* basis.² Yet, broadcasters should understand that the Commission expects stations to make a meaningful effort in programming child-oriented material. On the low end of the spectrum, a total lack of children's programming is unacceptable for commercial television stations.

The lack of commitment to educational and informational children's programming (until the recent past) was scored by the Commission. The *Report* rather ominously states that "stations' license renewal applications should reflect a *reasonable amount*" of non-entertainment children's programming to enrich their appreciation of history, science, literature, the environment, drama, music, fine arts, human relations, other cultures and languages, and basic skills such as reading and mathematics which are crucial to a child's development. Programming to meet this goal need not, of course, consist of classroom-type instruction. Programs such as *Sesame Street*, etc., have convincingly demonstrated that programs can be imaginative and interesting while maintaining a primarily educational goal. Nor must the station broadcast programs which cover every field of interest to a child. It would be far more meaningful, in the Commission's

continued on page 24

¹ 395 US 367 (1969).

² Broadcasters should be aware that FCC Form 303, Section 4-B, Question 6 relates to stations' children's programming performance. Upon compilation of a significant data base over a period of time, the Commission might see fit to prescribe rules delineating minimum amounts of children's programming.



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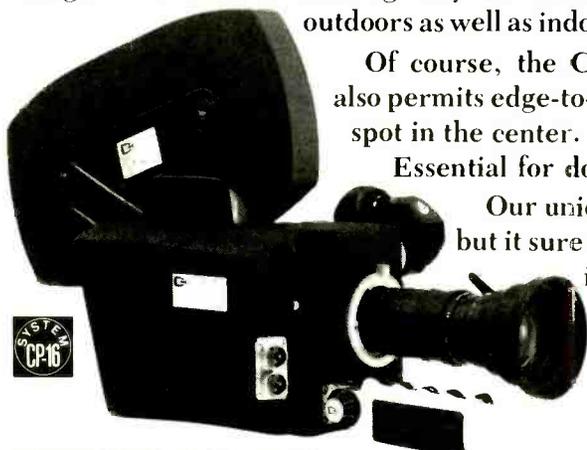
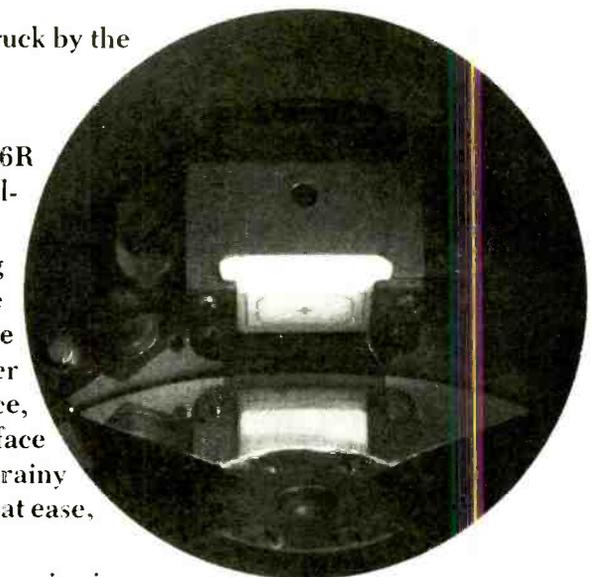
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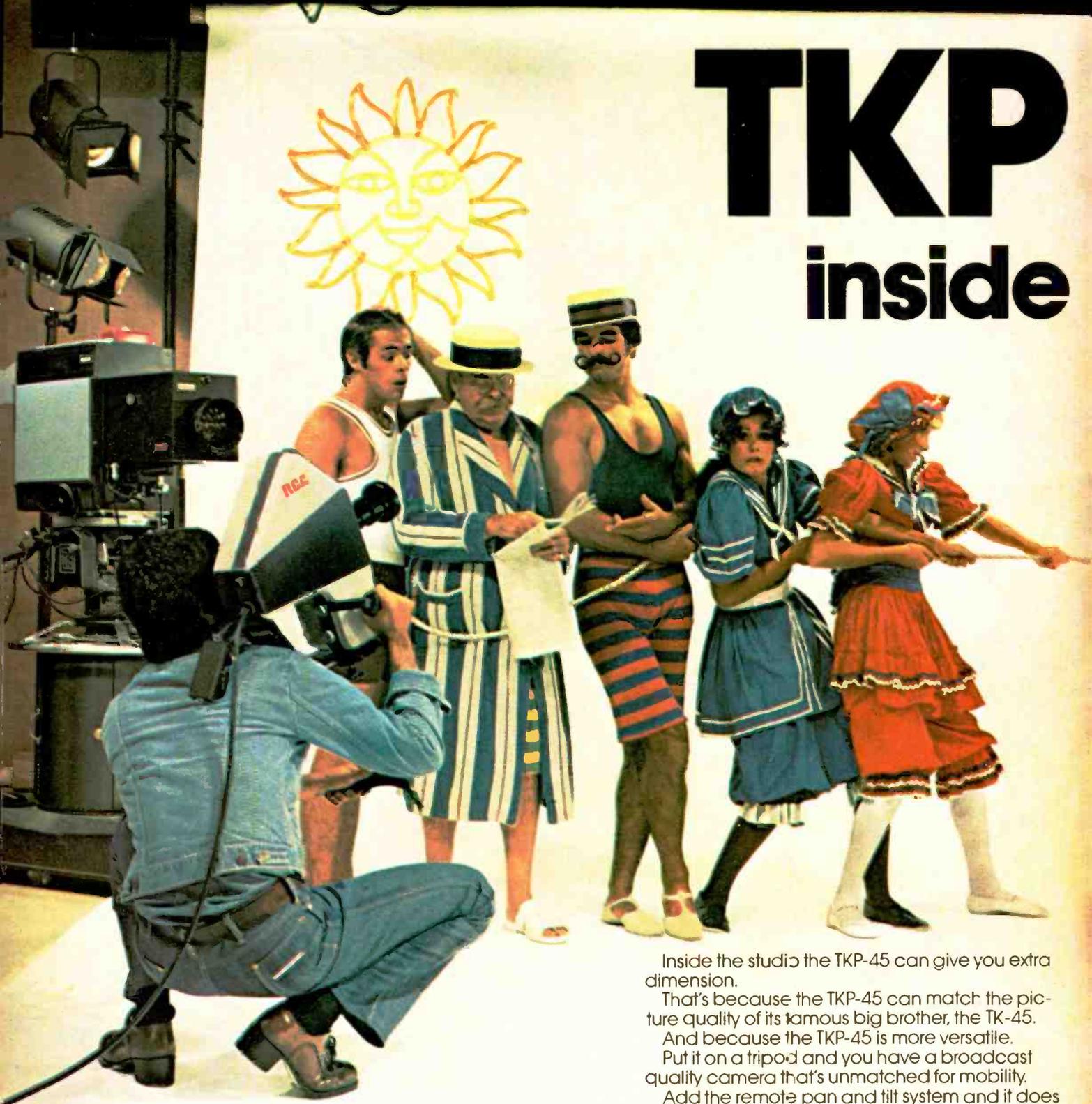
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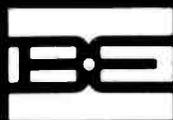
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eyes, for a broadcaster to pick specific areas of interest for which he could develop superior educational and informational programming for the children in his community.

Age group specificity in educational and informational programming also drew the Commission's attention. The most apparent distinction is between pre-school and school age children. Programming designed for school age children may be of little value to pre-schoolers who cannot read or write. In the past, stations programming significant amounts of children's material have been guilty neglecting pre-schoolers. This, the Commission says, will not do in the future. Age group specificity in programming is conceived of as a tool to meet the needs of all children, pre-school and school age alike.

Similarly, the Commission voiced concern over the disappearance of *weekday* children's television shows. Children "form a substantial segment of the audience on weekday afternoons and early evenings as well as on weekends." Since children do only 10% of their total viewing on weekends, the Commission does not believe that it is a "reasonable scheduling practice" to ignore the children's audience on weekdays. There are no plans to adopt a specific scheduling rule, but "considerable improvement" is expected of the networks and stations in this area in the future.

Advertising

For the first time, the Commission addressed the problem of whether the level of advertising on children's programs is "possibly abusive." The Commission concluded that it has ample authority to deal with overcommercialization of children's programs. This authority emanates from the numerous sections of the *Communications Act of 1934*, as amended, which refer to the public interest. Thus, the broadcasters' "special responsibility to children" makes the Commission's general policy against overcommercialization particularly important in the area of children's programming. Further, the Commission disavowed the allegation made by some that restricting the amount of time a station may devote to advertising constitutes censorship or an abridgement of freedom of speech.

Suggestions to completely ban advertising on children's programs were rejected as against the public interest in that such a move "could have a very damaging effect on the amount and quality of such programming." While advertising should provide sufficient revenues to assure that the broadcaster "will serve the children of its community meaningfully, the public interest does not protect advertising which is substantially in excess of that amount." So, too, a station need not rely solely on advertising revenues derived from children's program commercials to support children's program production. Rare, indeed, is the station that can boast a complete lineup of "self-supporting" programs.

Instead of adopting a rule completely banning advertising on children's television, the Commission in-

continued on page 26

YOU'RE ABOUT TO GET SOMETHING FOR NOTHING.

Fuji Videotape

55C Fifth Avenue, New York 10001 (212) 736-3335

- I'm interested. Tell me more about H701 High Band Videotape and your special offer.
- How can I lose? Call me about an order.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE () _____ EXT _____

Lower chroma noise.
Lower dropouts.
Lower abrasion.
Better consistency.
Better slitting.
Better winding.
Even better packaging.

... All without spending a cent more on videotape (in fact, you'll probably spend a few dollars less!).

The reason is Fuji's new H701 High-Band Videotape, and it's really something remarkable.

But don't take our word for it... send for complete specifications and prices. We'll show our appreciation with something more—a special introductory offer you'll find hard to resist.



Circle 119 on Reader Service Card

FCC Rules & Regs

indicated that it is willing to accept "the industry's attempt to regulate itself" by a "phased-in reduction" of advertising time.

The National Association of Broadcasters (NAB) Code will be amended as follows:

Effective Date	Minutes Of Non-Program Material Per Hour on Children's Programs	
	Saturday and Sunday	Weekdays
January 1975	10 min.	14 min.
January 1976	9 min. 30 sec.	12 min.

The Association of Independent Television Stations (INTV) will make the following reductions:

Effective Date	Minutes Of Non-Program Material Per Hour on Children's Programs	
	Saturday and Sunday	Weekdays
January 1975	12 min.	14 min.
January 1976	9 min. 30 sec.	12 min.

Broadcasters that comply with the above advertising restrictions will be deemed to have served the public interest with regard to its commercial practices. Stations that exceed these guidelines must sustain the

**Toymakers don't make
electronic news systems,
and we don't play around
with your broadcast
filming needs.**

Revolutionary Electronic News System

- Eliminates cost of film —
Saves money.
- Eliminates delay in broadcasting —
Saves time.



**ELECTRONIC
NEWS
SYSTEMS**

For more details call or write:
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P. O. Box 4074
North Little Rock, Arkansas 72116
501-835-6991

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burden of justifying such to the Commission. In discussing the level of proof that will be required, the Commission stated:

[S]uch stations should be prepared to make a substantial and well-documented showing of serious potential harm to support their advertising practices.

Advertising during children's programs will be reviewed on case-by-case basis.

The *Report* makes it very clear that the Commission is postponing direct Commission action until the effectiveness of the industry's self-regulation proposal can be assessed. Thus, should the actual level of advertising during children's programs fail to drop,³ broadcasters may be faced with rules limiting commercial matters on these programs.

Separation Of Program And Commercial Matter

Based on the conclusion that young children have "considerable difficulty distinguishing commercial matter from program matter," the Commission believes that fairness requires a "clear separation be maintained between the program content and the commercial message so as to aid the child in developing an ability to distinguish between the two." Two possible separation techniques are proffered. First, an announcement could be broadcast immediately prior to and after the commercial announcing the interruption and resumption of the program. Second, a "visual segment" could be broadcast immediately prior to and subsequent to the commercial which would sufficiently contrast with the program to aid children in distinguishing the two. Of course, the station is free to use any other method which clearly separates program content from commercial messages.

The Commission also addressed "host-selling," wherein program characters are utilized to promote commercial products, and concluded that such was not consistent with licensees' obligation to operate in the public interest. "Host-selling" exacerbates children's difficulty in distinguishing between programs and commercials, and is inconsistent with the licensees' primary function—service to children.

Finally, promotion of commercial products in children's programming is cautioned against by the Commission as being inconsistent with broadcasters' public service responsibilities.

Conclusion

The Commission concludes that the purpose of its *Report* is to "set out what will be expected from stations in the future. Full compliance is not expected until January 1, 1976, yet broadcasters will be expected to take immediate action where and when possible. Failure of broadcasters to respond in a satisfactory fashion might result in initiation of Commission rule-making proceedings on one or all of the children's television programming issues treated in the *Report*."

BM/E

³ The license renewal form will be amended to show how many minutes of non-program material were broadcast during both week-day and weekend children's programs. This will aid the Commission in determining 1) whether industry self-regulation is working and 2) whether the renewal applicant has served the interests of a significant segment of the public (i.e., children).



**For TV Sound
at its very best...**

Audio Designs NEW TV 32 Broadcast Production Console

Stringent electronic specifications Flexibility for expansion

ADM's all-new TV 32 Consoles are engineered to meet the most exacting requirements for television production. They are modular, multi-input (up to 32) by 4 submaster busses, TV Studio and Production Center units that will professionally handle any program material in large or small stations.

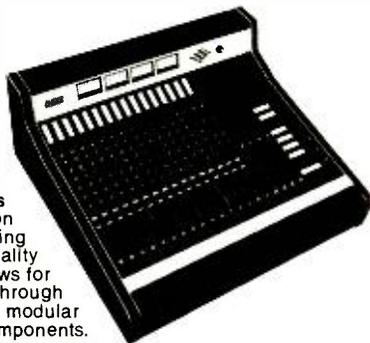
These full-featured, floor standing consoles incorporate the latest audio production philosophies into broadcast parameters. They are skillfully engineered to provide the professional broadcaster with the most demanded features. TV 32 Series Consoles offer exceptional flexibility for future expansion by plugging in additional modular components. Chances are one of our "stock" units will meet your requirements. If not we will be glad to design a custom console tailored to your exact needs.

ADM is a leading producer of highest quality professional audio consoles. Our key people have had impressive studio broadcast experience, and all of their expertise has been applied to our consoles.

An all-inclusive 5-Year Warranty covers parts and labor, and back-up technical assistance is always available from the factory. Write for Technical Brochure detailing all of the important features of ADM consoles.

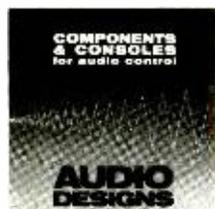
BC-5 Broadcast Production Consoles

A table-top version of the TV 32 using the same high quality components. Allows for future expansion through the choice of modular plug-in components.



AUDIO DESIGNS AND
MANUFACTURING, INC.
16005 Sturgeon
Roseville, Michigan 48066
Phone: (313) 778-8400. Cable: AUDEX

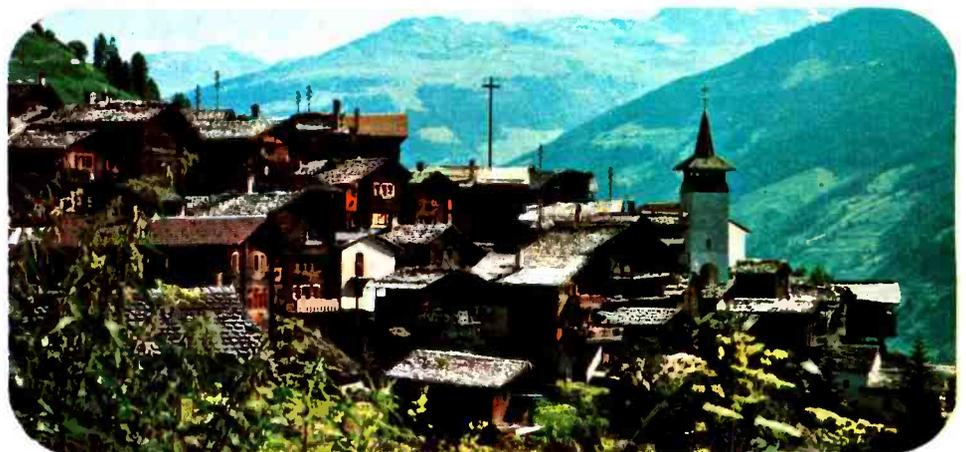
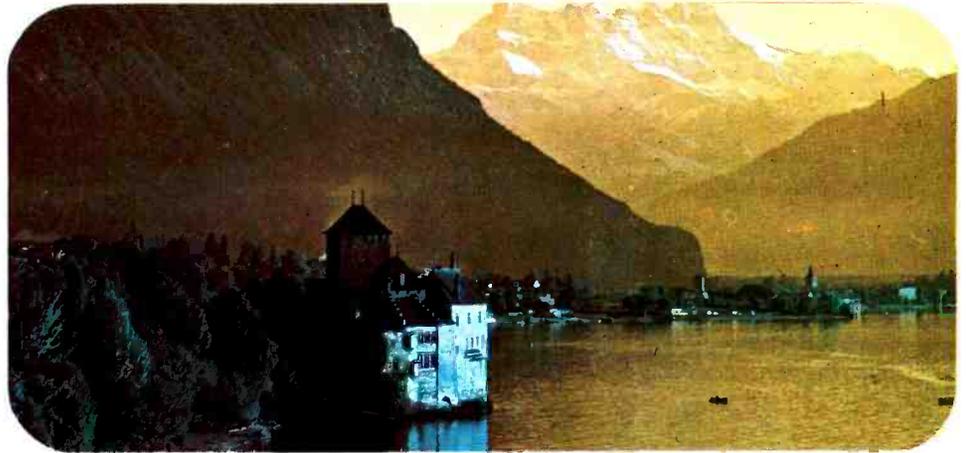
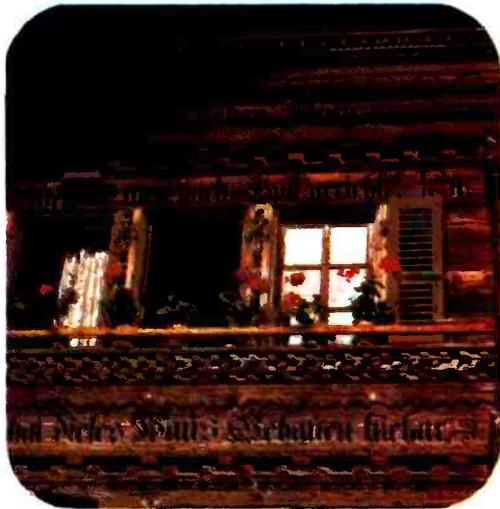
In Canada: TELAK
Scarborough, Ont.
(416) 438-3804



Circle 121 on Reader Service Card

9TH International Television Symposium And Exhibition

Montreux, May 23-29, 1975



Dear Broadcaster:

You are cordially invited to join BM/E in a special trip designed to take you to Montreux to attend the Ninth International Television Symposium and Exhibition. This biennial Symposium has become the industry's most preeminent convention drawing leading authorities from every part of the world. Over 60 renowned International companies will be exhibiting the state of the art in equipment.

BM/E's International TV Tour has been prepared to offer the least expensive air and land rates available to encourage American broadcasters to attend this important event.

Two programs are available. The prices differ according to the quality of hotel chosen in Montreux. A post-symposium offer is included in order to qualify the use of a 14 day GIT air fare.

Itinerary

- May 22 Depart New York (JFK) for Geneva via Swissair Flight No. 111.
- May 23 Arrive Geneva and transfer by Motorcoach to Montreux hotels. Attend TV Symposium—Welcome cocktail party and International Review.
- May 24 through May 29 Hotel accommodations with breakfast daily and attendance of TV Symposium and Exhibition.
- May 30 Depart Montreux after breakfast for Geneva where you will start your second week of personal business or leisure.
- May 30 through June 5 One week including car (Volkswagon 1200 or Fiat 127) (Two per car) unlimited mileage. 7 nights in a typical Swiss guesthouse (location of guest-house will be assigned before departure).
- June 5 Return to Geneva airport by noon to relinquish your car and check in for return to New York on Swissair Flight No. 110.

Tour Prices

Package A	Deluxe Hotel	\$885.
Package B	First Class Hotel	\$785.

Single Supplement Surcharge on request

The above Tour Price Includes:

- Economy-class air ticket New York/Geneva/New York based on 14/21 day GIT fare.
- Transfers by private motorcoach from Geneva to Montreux upon arrival and Montreux to Geneva on May 30.
- Registration Fee for International Symposium and Exhibition.
- 7 nights hotel accommodations in Montreux double-occupancy in Deluxe or First Class hotel according to choice.
- 7 Continental breakfasts in your hotel in Montreux.
- 7 days car rental with unlimited mileage. (Volkswagon 1200 or Fiat 127) (Two per car).
- 7 nights in a typical Swiss guesthouse (location of guesthouse will be assigned before departure).

Optional Accommodations to Above Offer

Second Week

1) Hotel accommodations at *Ambassador Hotels* throughout Switzerland.* The hotel will be allocated in the city of your choice or nearby, subject to availability—Cost \$15 per person per night including breakfast, taxes. (i.e. 6 nights \$90.)

2) *A.G.I.P. Motor Hotels in Italy** The AGIP Motor Hotels are located in most major Italian cities at a cost of \$9 per night—room only. Reservation guaranteed by 6:00 P.M. arrival.

* List of hotels available upon request.

For both options payment is requested in advance and vouchers are issued accordingly.

Please fill in the attached coupon and return as soon as possible. A deposit of \$100 per person made payable to BM/E must accompany your reservation request. In case of cancellation the deposit is refundable in full up to 30 days prior to departure.



BM/E International TV Tour

274 Madison Avenue
New York, New York 10016

Please enter _____ reservations for the trip. I have enclosed a \$100 deposit for each reservation requested.

Package A _____ Option I _____
Package B _____ Option II _____

Name (print) _____

Company or Station _____

Street Address _____

City _____ State _____ Zip _____

Phone No. _____

Wife's first name if she is traveling with you _____

GRANDSON

LOOK AT IT THIS WAY.

“Grandson”

will help make an impact on your listeners and your profits using proven multi-track production techniques. We guarantee you'll love GRANDSON'S new production results and unique versatility. Where else can you find an affordable, fully modular, professional recording/production console with 54 inputs—18 mixing positions—and on-air capability?

Ask us about GRANDSON today.



auditronics, inc.

P.O. Box 12637 / Memphis, Tenn. 38112 / 901/276-6338

The world leader in recording consoles at sensible prices.

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NEWS

cont. from page 16

ply two operational weather satellites in the ITOS series and parts for a third spacecraft. Named ITOS-H and -I, the spacecraft will be operated and managed by the National Oceanic and Atmospheric Administration (NOAA). The first is scheduled to be launched by NASA next year A television antenna test range has been opened by the **Gates Broadcast Equipment Division** of



Harris Corp., near Palmyra, Missouri. The range replaces the division's former test site at Syracuse, N.Y. Manufacturing facilities, office space, customer conference rooms,

and three test turntables are located at the site. The main transmitting site is located about 3 miles from the turntables The membership of the **Electronic Industries Association** voted final approval on the merger of the Association of Electronic Manufacturers into EIA.

The **National Association of Broadcasters** said it objects to any increase in rates charged by the American Telephone and Telegraph Co., for use of its lines by press wire services. AT&T has asked the Federal Communications Commission in the pending hi-lo tariff case for permission to restructure its line charges based on the density of use.

Laser Link Corp., Seattle, Wash., and **Western Electromotive**, Culver City, Calif. jointly announced the signing of a preliminary agreement in principal with respect to Laser Link's purchase of Western Electromotive for a total consideration of \$2,500,000 in cash and notes **C-COR Electronics**, State College, Pa. has appointed **Switzer Engineering Ltd.** as a maintenance facility for C-COR amplifiers in Canada **Cablecom-General, Inc.**, American Television and Communications Corp., and **Century Communications Corp.** announced the sale of Cablecom's wholly-owned subsid-

ary, **Vumore-Video Corp.** of Colorado, to **Century Colorado Corp.**, a joint venture of **ATC** and **Century** **Angenieux Corp. of America** has opened new facilities at 1500 Ocean Ave., 2½ miles from Islip Airport, Suffolk County, Long Island, N.Y. . . . The **William B. Tanner Co.** has authorized **Stanley Grayson**, President-Time Buying, to negotiate for the sponsorship of **Muhammad Ali's** next fight.

PEOPLE

Joseph W. Taylor has been appointed president of **Teleprompter Manhattan CATV Corp.** **Robert D. Eisenhardt, Jr.** has been named corporate vice president of **General Instrument Corp.** and president of its wholly owned **Jerrold Electronics Corp.**, while **Dr. William L. Firestone**, former president of **Jerrold**, has been appointed to the office of the chief executive staff there **Ms. Jeannene Cozad** has been appointed manager of **Continental Cablevision of Ohio's Xenia operations** **Dr. C. C. Humphreys** has been elected to the Board of Directors of the **William B. Tanner Co.** **Alan**

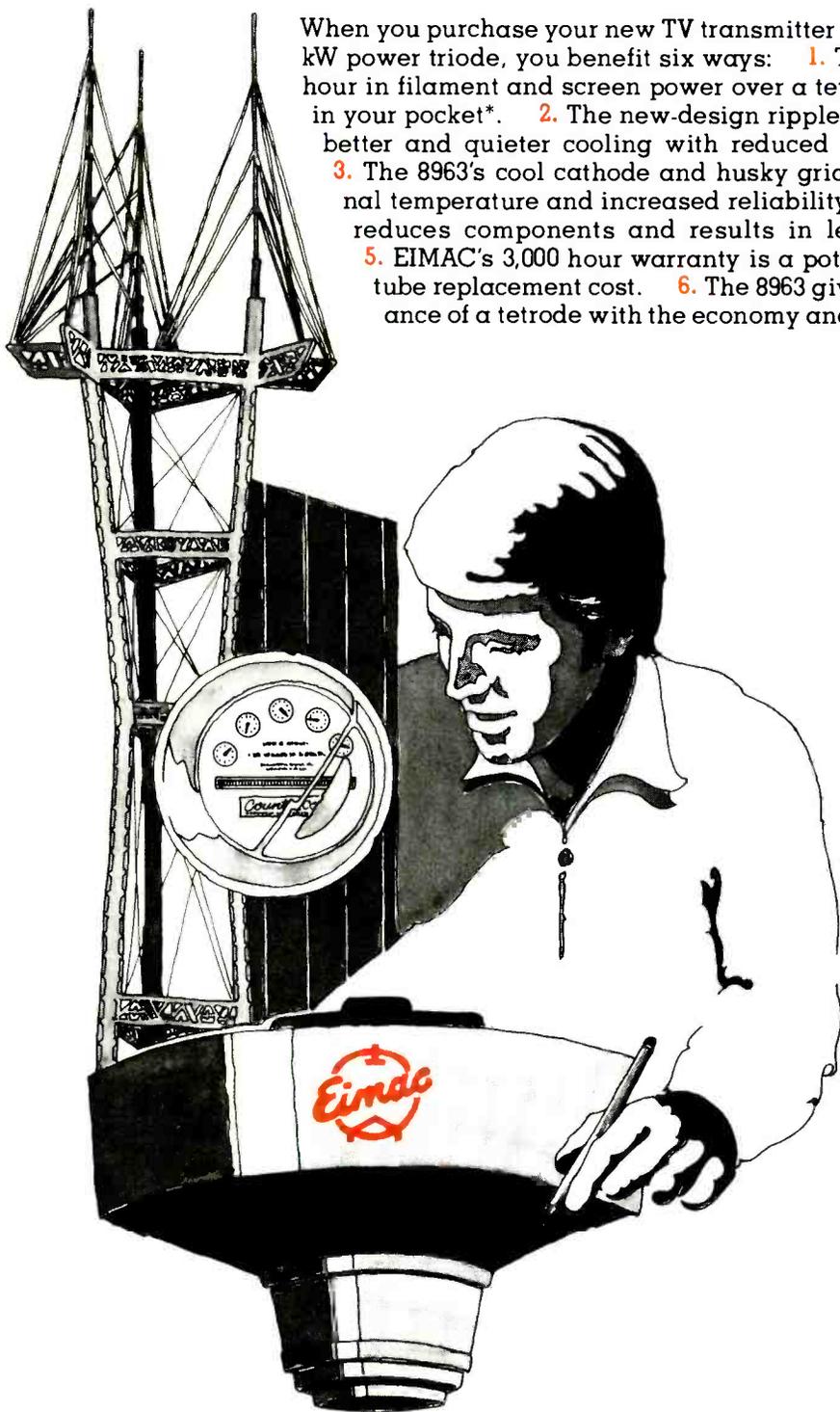
continued on page 33

TV Station Executives...

EIMAC's 1975-model 8963 TV triode saves you money six ways.

When you purchase your new TV transmitter with EIMAC's 8963 the new 25 kW power triode, you benefit six ways:

1. The 8963 saves 1200 watts per hour in filament and screen power over a tetrode. That's over \$250 a year in your pocket*.
2. The new-design ripple fin radiator of the 8963 gives better and quieter cooling with reduced blower power requirements.
3. The 8963's cool cathode and husky grid structure mean lower internal temperature and increased reliability.
4. Simple triode circuitry reduces components and results in less downtime and failures.
5. EIMAC's 3,000 hour warranty is a potential savings on tomorrow's tube replacement cost.
6. The 8963 gives you the gain and performance of a tetrode with the economy and circuit stability of a triode.



Put dollars in your pocket and enjoy improved transmitter reliability with the EIMAC 8963. For complete details, ask your TV equipment distributor or write EIMAC, Division of Varian, 301 Industrial Way, San Carlos, California 94070. Or contact any of the more than 30 Varian/EIMAC Electron Device Group Sales Offices throughout the world.

Eimac
division
varian

*Based on an 18 hour transmitting day at 3¢ per kWh—and rates are going up (Business Week, Oct. 5, 1974)

Circle 124 on Reader Service Card

**THIS IS THE TUBE-
THE ORIGINAL 1¼ INCH PLUMBICON®
THAT WAS IN THE CAMERA
THAT REVOLUTIONIZED TV BROADCASTING
TEN YEARS AGO...**



**THIS IS THE 2/3 INCH VERSION
OF THAT PLUMBICON TUBE...
IT WILL CHANGE THE ENTIRE COURSE OF,
AND ADD IMPORTANT NEW DIMENSIONS
TO ELECTRONIC JOURNALISM.**



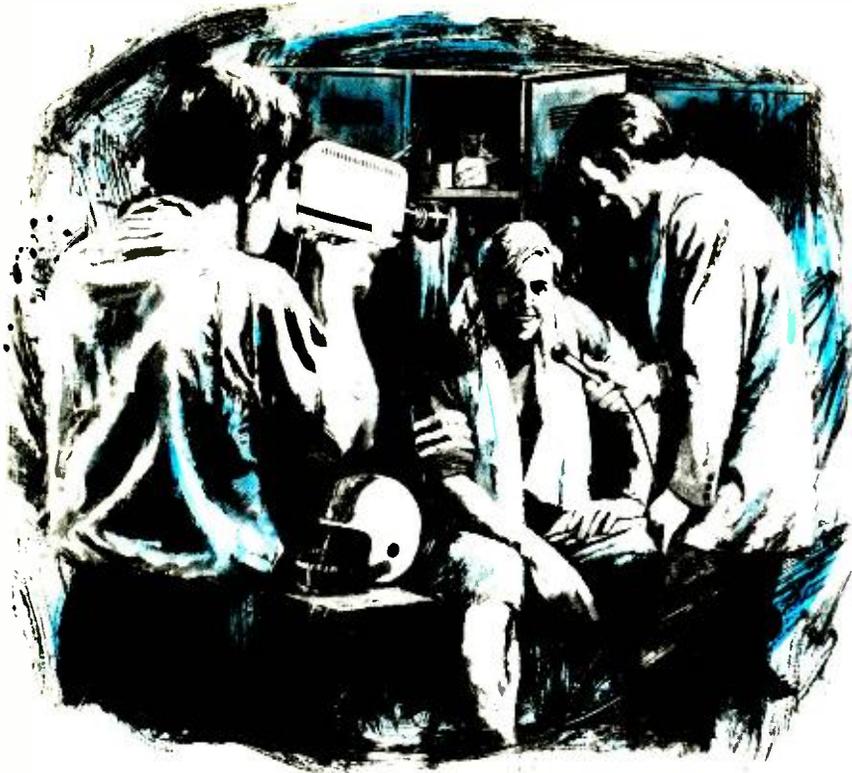
Amperex®

TOMORROW'S THINKING IN TODAY'S PRODUCTS

Sold through
North American Philips Electronic Component Corporation

*Trademark of N.V. Philips of The Netherlands

www.americanradiohistory.com



If broadcast journalism is distinguished primarily by its "immediacy," why should your viewers have to wait until color film is processed before they see your news telecasts?

Until now, they've had to wait because there was no TV camera tube made that was small enough for a really portable color camera capable of producing broadcast quality pictures in broadcast quality color.

The new 2/3-inch Plumbicon camera tube is now available for a new generation of portable, hand-held color cameras which will provide the same startlingly realistic color and dynamic resolution that revolutionized color telecasting ten years ago when its big brother was originally introduced.

With the 2/3-inch Plumbicon tube you'll get quality, and you'll get it without the delay and logistical complications of film.

The Amperex 2/3-inch Plumbicon TV camera tube offers:

- Better dynamic resolution than any other TV camera tube in the 2/3-inch category.
- Obviously superior color rendition.
- Excellent highlight-handling capability.
- Essentially zero lag over a wide range of lighting conditions.
- Low (and stable) dark current, combined with high signal-to-noise ratio for sharp, clean, noise-free images.
- Stable operation over a wide temperature range.

For additional information, contact Amperex Electronic Corporation, Electro-Optical Devices Division, Slatersville, Rhode Island 02876. Telephone: 401-762-3800

Amperex

TOMORROW'S THINKING IN TODAY'S PRODUCTS

Sold through
South American Philips Electronic Component Corporation

Circle 125 on Reader Service Card

Henry has joined Fairchild Industries of Germantown, Md., as General Manager of its Broadcasting Group, and will carry forward Fairchild Broadcasting's program of acquiring radio and television broadcast properties.

Randy S. McCallister was appointed product analyst for RCA Broadcast Systems, Camden, N.J. . . . The Teaneck, N.J. office of LaSalle Audio will be under the management of **Irv Joel**. **Mr. Howard Lieberman** has been appointed Sales-Engineer . . . Continental Cablevision of Ohio, Tiffin, Ohio, has named **Lyle H. Kneeskern** Director of Engineering . . . **Lawrence Malkin**, specialist in electronic equipment financing, has joined Advanced Leasing Services, N.Y. . . . The Board of Directors of Sansui Electric Co., Ltd. announced the election of **Keizo Fujiwara** as President of Sansui Electric Co. and President of Sansui Electronics Corp., Woodside, N.Y.

Robert W. Cochran has joined Electro Sound, as Vice President of Marketing and Sales . . . **James Parton** has been appointed Chairman of the National Advertising Review Board . . . **Steven K. Beatty** has been appointed the Altec Regional Manager for the upper mid-west area . . . New International Industrial Television Association President is **Robert McEmber**, Manager of Training Techniques, Eastern Airlines Flight Training Center . . . **Donald G. Chandler** has been appointed General Sales Manager at Anadonda CATV . . . **Martin McAndrew** has been promoted to Director of the Operations Center and Production Services of the Hughes Television Network, N.Y. . . . **Harold C. Blakeslee** has been promoted to Vice President of Business Planning at Consolidated Video Systems . . . **Nyall D. McMullin** has been named Vice President of Marketing, also at Consolidated Video Systems . . . **Terry Kulchar** was appointed Chief Engineer for Television Production Center, Pittsburgh, Pa. . . . **James H. Geer** has accepted the post of unit chairman of the Financial Division of the United Fund of Greater New York's 1974 campaign.

Andrejs A. Vanags has been named manager, IVC Canada, Ltd. . . . **Charles A. Downing** has been promoted to the newly created position of National Field Operations Manager for CableData, Sacramento, Calif. . . . **Jeffrey B. Rosen** has been appointed account representative for AVA Electronics Corp.

Electronic News Gathering: It Is Off The Launching Pad, With Full Flight Ahead

TV cameras such as the PCP-90 have been used for years, but news departments never really had a total system for handling news electronically. Simpler cameras, truly portable VTRs, TBCs, editing systems and light-weight microwave gear have changed all this. ENG is now taking off like a jet.

For several years the broadcast industry has been watching closely as the quality/weight ratio of "portable" video cameras and tape recorders climbed up from the low level of a decade or so ago. In the early stages, "portable" units often deserved the old engineer's put-down for overweight equipment: portable was "anything with handles, not bolted to the studio floor." Portable video cameras were totally outclassed by 16mm film equipment in maneuverability, reliability, and above all, picture quality.

But the video camera and tape recorder designers kept hacking away at the 16mm's lead. In the last three years the breakthroughs began to occur that carried electronic news gathering over a critical line in its relation with film. Although there may still be a flock of arguments about whether a video camera or a film camera is "better" on any given count, the video equipment is now clearly good enough to spur broadcasters of many varieties and needs into opting for inherent advantages of electronic news gathering.

Leading the march into ENG have been, first, the CBS network and CBS-owned stations, all of which have been or soon will be equipped for ENG (see separate stories on the CBS net and on station KMOX). But both NBC and ABC have caught fire from the CBS demonstrations of ENG, and plan to equip all their owned stations (see separate stories).

In addition, a sizeable and growing number of network affiliates and independents are joining up; we present brief stories on some of them in the following. The number and variety of the stations on the list is strong testimony to the special qualities of ENG.

Electronic news gathering is, of course, the use of all electronic equipment for picking up on-location, at-the-scene spot news, any event that takes place away from the studios and from a location where studio-style cameras can be set up in advance, with all the paraphernalia that entails. In the usual form, it is built on a portable-camera-tape-recorder combination, easily carried by a crew of one or two: plus in many cases a mobile van with microwave units which allow material to be radioed back to the studio. Essential, too, has been the time base corrector (see separate story on that in this issue), which allows material from helical-scan VTR's to go on the air. In an accompanying box we list the equipment that has been

mainly responsible for the parade into ENG.

The most obvious advantage of an all-electronic system that is easily carried to the news scene is speed in getting the material on the air: the time for processing film is eliminated. On top of that, the time for bringing a recording back to the studio can also be eliminated when even that delay is judged undesirable. Many, if not most users of ENG have the option of putting news directly on the air from the portable camera, using the microwave link noted above. The viewer in his home sees the news as it actually happens—there can't be any faster news coverage than that. It makes the "break-in" news sequence especially attractive, because that piece of news really is happening right at that moment.

However, probably most news programming will continue to consist of material edited into a continuity with in-studio comment and background visual material. Electronic news gathering works beautifully for this, with the help of recently developed, easy to use tape editing equipment. The material can be microwaved in, recorded at the studio, edited swiftly by the news director, dubbed into quad with other material for immediate or later broadcast. Or when immediacy is not overriding, the material can be recorded in the mobile unit, and the recordings brought back to go through the same editing process.

Mention of the role of the news director brings us to a major change in news organization, possible with ENG, which many station operators are hailing. The news director or "news coordinator," a new title, has a new kind of control over the handling of news. Via microwave, he can watch it as it happens, or he can monitor it as it is recorded off the air link, and decide how to use it immediately. He can talk to the location crew as they work, give them directions or additional background, based on his knowledge of other happenings that have been reported to the studio. Users testify that the news coordinator can give the news a far more interesting "shape" and immediacy, and gets more "truth" into the breaking news.

This new function has led to a new kind of facility—a recording-monitoring-editing position, right in the news room, where the news director or news coordinator can keep track of one or more mobile crews, direct their activities, record and edit what they send back,



St. Louis is the proving ground for a lot of electronic journalism. At left, KMOX-TV, crew aims at famous St. Louis arch using Ikegami camera and recording on Sony's new portable cassette unit. Station was first to abandon film entirely. Conversion took place in September.



First major station to adopt Akai TV camera and one-quarter inch recorder for instant news was WSD-TV, St. Louis. That was eleven months ago in February, 1974.

(see pg. 36). Users of ENG testify that this change in the news handling system has turned out to be their major gain; with more experience, they expect to find more and more ways of using the system to make the news attractive, effective, speedy. Other changes in news handling are described in a number of the individual station stories that follow.

But what about the economics of ENG? Equipping the standard two-man ENG crew can cost as little as \$7000 (for the camera and tape recorder), as the accompanying story on stations using the Akai VTS-150 relates. Microwave equipment, a van for the crew, will add as much, or more, again, and editing and re-

ording equipment in the studio has to be figured, too.

But the total is still comparatively modest; and there is the saving in cost of non-reusable film, and in film processing, which most users figure to pay off the cost of the new equipment in a few years.

The accompanying stories present reports of how ENG is performing at a number of stations, which should put our generalizations into more concrete terms. New stations join up every day. By the time this sees print, there will be many more of them. The factors that are bringing them in are evident: they are the advantages of ENG outlined here and in the station stories that follow.

More News More Easily Through Electronic News Gathering at KMOX-TV

There are other stations that will claim the title of being the very first in doing all-electronic news gathering but KMOX-TV, St. Louis, has undisputed title to being the first major TV station to convert completely from photographic film to electronic image sensing cameras. Its news operation has been greatly enhanced by the September 15th transformation. KMOX-TV has a non-compromise system and what goes on at this station will have to be emulated by others.

Electronic news gathering has far more significance than simply reducing the lag time between a news happening and news airing. Instantaneous news reporting is indeed possible if a microwave path can be established between the camera and the studio. And, at the very least, all electronic news stations will chalk up a number of scoops over the film competition. But

there are more plusses to be gained than instantaneous news and exclusive reports. As Tom Battista, general manager of KMOX-TV says, "We're able to do more per day and do it less expensively." The electronic camera crews are able to handle twice as many assignments as film crews. Battista says the cost of film stock alone has been costing the station nearly \$70,000 a year. That expense has been reduced considerably since videotape, while not cheap, is reusable. Battista feels that the cost per story using ENG is only about 40 percent that of going the film route. Not only is there a saving in using videotape compared to film, but the ENG crew requires fewer technicians. A KMOX-TV sound-on-film, not counting the reporter, consisted of three people; the ENG crew is two people.

Over the next three years all other CBS owned-



A new post was created at KMOX-TV with the adoption of ENG. Fred Burrow has the title of executive news coordinator (ENC). The ENC functions as an assignment editor, an executive producer and is second-in-command to the news director. He monitors the activities of all reporters and crews in the field.

Camera pick-up can be cabled into van, or recorded on a portable VTR and then played back for microwave relay to the station.

and-operated stations will convert to total ENG systems. They will draw from the St. Louis experience.

KMOX news system is a totally-integrated system. The station divides the system into three elements: the camera and associated equipment, the means of transmission, and the method of editing.

The news gathering equipment includes a truck (van) equipped with a portable miniturized camera (Ikegami), a portable videotape recorder (IVC BCR-100 or Sony 3800), microwave transmission gear (Nurad and Microwave Associates), and a complete two-way voice communications system.

The means of transmission includes several microwave paths and channels. Basically the microwave signal is transmitted from the van either directly to the studio and antenna or to one of two relay points on a 7 GHz band. (The band from the relay stations to the studio is 2.2 GHz.) If the van is in a shadow area because of hills or tall buildings and cannot beam directly to the studio antenna or a relay station it may have to drive to a more convenient location. Assuming that can be established and further assuming there is a clear path between the van and the near vicinity of the camera, a third microwave link (13 GHz band) can be set up from the camera to the van.



Ikegami camera is usually carried on a shoulder strap. Here it is set on a tripod.



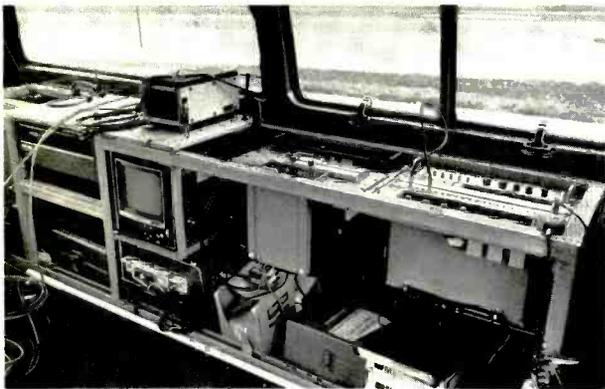
In this case the transmission can be broadcast immediately by interrupting normal programming. If the story does not warrant immediate broadcast, the event can be recorded for later transmission to the studio. Recording in the field is done either on a IVC cassette unit, the BCR 100, which usually stays in the van, or on a hand portable and battery-operated Sony VO 3800.

After the story has been recorded on videotape at the station, a news writer/editor selects those portions of the tape to be used for broadcast. KMOX-TV makes two recordings. A SMPTE time code is added to both tapes. The first is put on inexpensive IVC unit (700 Series) for viewing by the editor. The second is a "master" recorded on an 800 series IVC unit, which is part of a Datatron 5050 editing system. After the writer/editor has made frame edit notations, the list is turned over to a technician who operates the 5050 to produce an edited tape. When the final edited tape is available, each individual story is dubbed through a time base corrector on a quad cassette for play on the station's ACR-25 quad cassette system. A CVS 504 time base corrector is used.

There may be instances where a story will not be broadcast that day (mini-documentaries). In this



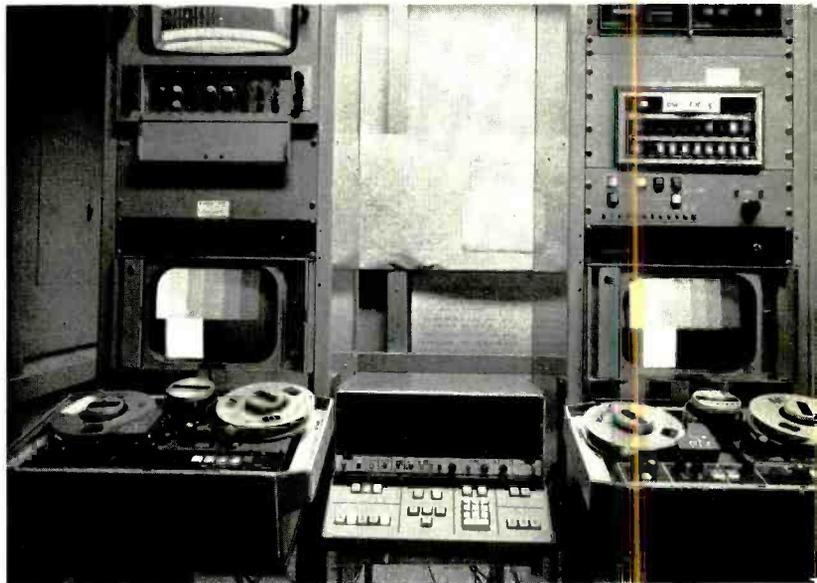
If there is a direct line between the camera and the van, the signal can be sent via RF (13 GHz) to the van for further microwave relay. Small unit with cone antenna aimed at building window is Microwave Associates MA-13P unit. Dish antenna is from Nurad.



Inside the van is microwave video equipment, two-way radio communications gear, monitors, color bar test generator and time code generator. Some units have IVC BCR-100 recorders. Others work with Sony 3800s.



News transmitted from microwave vans is recorded twice at station. One tape is on above recorder for editing; second becomes master on VTR associated with Datatron editor (below). Writer/editor identifies scene to be included by time code numbers.



After scenes for edit have been picked, list is given to technician who assembles final story on right hand recorder, above.

case, the story is recorded on videotape at the scene and the tape is physically transported to the station where it is held for editing and broadcast at a later date.

With the introduction of ENG, traditional newsroom roles have been restructured and a new position, the executive news coordinator (ENC), becomes key to the entire newsroom operation. He functions as an assignment editor, an executive producer and is second-in-command under the news director.

He sits behind a specially-built console in the newsroom where he is able to monitor the activities of each ENG crew. He is responsible for determining whether or not an incoming story merits immediate broadcast.

He is in direct audio and video communication with each reporter in the field and is able to back up the reporter's work with his own seasoned news judgement, by directing the reporter to ask specific questions, for example.

The executive news coordinator is able to enhance the reporter's coverage of each story because he may be privy to late-breaking information (from another crew, from a wire service or another newsroom source) that has some bearing on the story.

Thus, KMOX-TV is able to utilize the full re-

sources of its newsroom when covering each story in the field. On occasion it has been able to show a videotape recorded early in the day to city officials for reactions. No more excuses, "I haven't heard their statement."

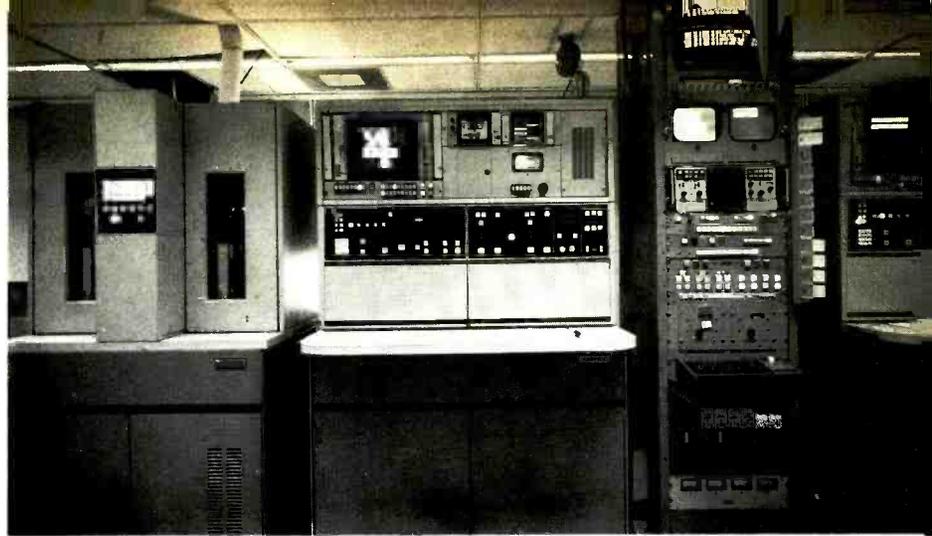
For the viewer in St. Louis, this means witnessing important local news events instantly as they are happening at any time during the broadcast day—and not just during regularly scheduled news broadcasts. Instantaneous coverage of local news traditionally has been provided only by radio. (It is an interesting point that KMOX-TV news director, Herb Humphries, recently came from KMOX all-news radio.)

Further, significant breaking news stories can be covered over an extended period of time via a series of live news cut-ins interrupting normal programming. During the short time that KMOX TV has been doing news via electronics, it has been broadcasting an average of five live news stories each week. As a result of ENG, viewers see more local news on any given day since ENG crews can cover assignments more quickly—KMOX operates with three news crews. More regional news is being covered because there is no problem in getting a story back to the station. During the day BM/E visited KMOX-TV, a crew was

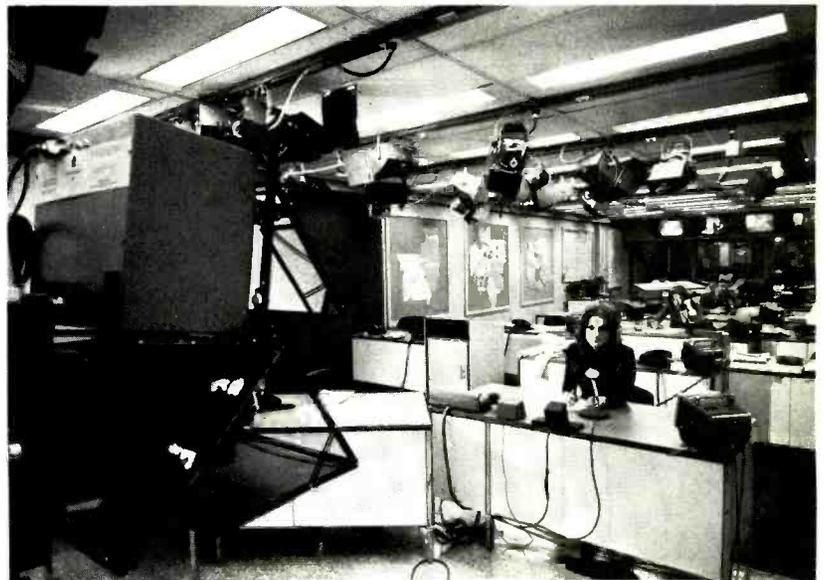


Close-up view of ENC's station in news room. Monitors can show what is coming in over microwave. Two-way radio equipment and phone system to the right. To left, not shown, is more two-way radio gear on 450MHz band. Behind chair is assignment chart, other radio receivers monitoring police bands, etc.

At opposite end of news room from ENC station are reporter's desks for on-camera newscasts.



After edited tape is available it is fed through a CVS-504 TBC and dubbed onto the ACR-25 for final on-air presentation. (See photo below).



sent 50 miles south via helicopter to Potosi to cover a story involving political corruption. While the event could not be relayed back from the helicopter, the van for this crew was driven as far south as the microwave range permitted. This meant the story was relayed to the studio in the shortest possible time. The station ended up with an exclusive for the day.

News gathered electronically offers another significant advantage over film recording. Material starts to flow in earlier in the day. Usually newsrooms are be-

dled from 3 p.m. on, since that is usually the earliest time that processed film becomes available. At KMOX-TV, developing stories are in the station on videotape by 10 a.m. or earlier. A story can be edited and canned freeing the writer/editor for later news or the story can be developed in more depth by getting add-ons. Again, the day BM/E was at KMOX-TV, such a story was unfolding. The final presentation was a neat insert and assemble edit job made up of several segments reported during the day.

Station CITY, Toronto, Never Owned a Film Camera

When CITY went on the air in the fall of 1972, it was a maverick station in several ways. It's hard to say what made it most famous—the fact that it was a peanut powered UHF (64kW) designed to be carried by the extensive cable TV network in Toronto, or the “blue” movies it ran when the kiddies were in bed. Both of these factors were responsible for its immediate success in the marketplace, but its bottom line turned black in short order for another reason. It was truly the first station to produce its news by all elec-

tronic means and it was the first station to standardize around one-inch helical tape standards. These related decisions cut operating cost significantly. But CITY strove for a high quality product and that meant an electronic editing system was a desirable tool. CITY's engineering director at that time, Bob Cezar, developed an operator-proof control track pulse counting editing system to do the job (that product is now on the market known as the TRI EA-5 editor—see separate box). This helped CITY do a pro-

Time Code Versus Control Track Pulse Counting Editing

At least three different editing approaches are being used in news operations: 1. SMPTE time code editing with the VTR being either a U-Matic cassette unit or a reel-to-reel unit, 2. Control track pulse counting editing using a U-Matic VTR and 3. Control track pulse counting editing using a reel-to-reel VTR. In the latter two, the pulses are related to frames.

Examples of the first approach are found at WLAC, Nashville, which uses a Datatron 5050 editor with the Sony V02850 cassette unit and a KMOX-TV, St. Louis, which uses the Datatron 5050 with IVC 800 series reel-to-reel VTRs. An example of the second is WCBS-TV, New York, which is using Sony 2850's and the Sony RM-400 editing control unit. An example of the third is CITY, Toronto, which uses the Television Research International TRI EA-5 frame pulse editor with open reel machines, typically 800's or 960's.

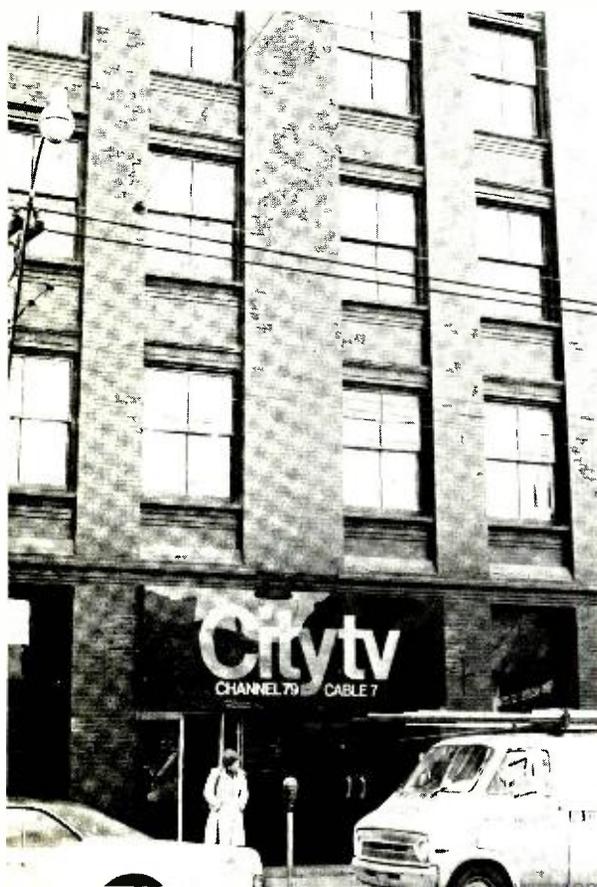
SMPTE time code editing is accurate down to a single frame for precise edits of either audio or video but the equipment is the most expensive of the three. The 5050 costs \$16,400 (without VTRs). The Sony RM-400 will permit edits within 6 or 8 frames typically and possibly better but you can't rely on it. It costs only \$1000 (however, the VO 2850 with which the editor works is \$6000). The TRI unit will enable you to get closer edits—either on frame or not more than two or three away. It costs \$4600 along with the necessary interfaces for the VTRs.

A system that counts pulses cannot be quite as accurate as a time code system since counting circuits may miss a pulse depending on the speed and repeatability of the transport mechanism, tape stretch, etc. The TRI unit has a still-frame mode and permits reels to be rocked back and forth by hand (like a film Movieola) to zero in on a single frame. Once the desired edit point is found, a Perform Edit button is pressed. Prior to executing the final edit, a rehearsal can be run. Users report phenomenally precise editing, often right on the frame.

The Sony system does not permit such close control because one simply cannot reel the tape forward and backward by hand for single frame viewing. If you go past a desired edit point, you have to rewind and try again. A slow motion forward-only mode is offered, but the operator has to press a button to stop the capstan and a button to rewind. The reflex time of the operator might typically be 6 or 8 frames or pulses. An experienced operator can adjust for this but he can't consistently hit a single frame if such precision is necessary (usually it is not since one can find an audio pause or a few identical video frames for an edit point). If a time code generator is used with the Sony VO 2850 the operator can get very close to the desired picture by subtracting the time lapse it takes to press a button and get the tape to stop. The Sony unit does permit slow motion and the tape does not rewind entirely into the cassette as was the case with earlier cassette players, thus the time to do an edit is reasonably short.

It is safe to expect even further refinements in U-Matic editing. Currently the National Video Corp. of Glendale, Calif. is modifying a Panasonic machine which permits variable slow speed motion in both the forward and reverse direction. This feature in conjunction with still frame gets close to the Movieola (R) approach. Station engineers who have visited Japan, report that Sony will have something like this, too.

Creative people can do quite a competent job with either the TRI or Sony system. If a station is locked into a contract which permits only union technicians to operate tape equipment, editing becomes a little harrier, since two people are involved. Such stations find use of the SMPTE code invaluable since the editor writes down frame cuts and the technician simply executes the edit decision list. Needless to say, the process is still ridiculous, especially if the editor is forbidden to touch the start or rewind buttons.



First all-electronic news reporting started with this modest UHF station in Toronto which went on the air in September 1972.

fessional job of reporting on what it calls the CITY SHOW.

CITY's newsgathering equipment was simply a Sony camera and a portable tape recorder—the port-a-pak approach. This gear is still used which means that when CITY news switches from the studio newsmen to an on-the-site report, it is in black and white.

Originally CITY took the reels from a port-a-pak and played them back on a rack-mounted 1/2 in. Sony through a 3M proc amp. This proc amp could not properly build up a sync signal so the VTR was also looped through a gen-locked sync generator which fed back into the proc amp. This reprocessed signal was dubbed onto IVC 960's. A pair of 960's controlled by the EA-5 editing system made accurate editing possible. As soon as time base correctors became available, a TBC was put in the path. CITY got one of the first CVS units. The station also has the new Ampex 800 TBC to improve the stability of its on-the-air 960 VTRs. This TBC can be used to stabilize the output



Reporter John Burke can edit his own news stories with CITY's simple but accurate TRI-EA-5 editing system.



CITY reporters think local as this photo portrays.



Tapes from portable equipment can be played on the Sony half-inch unit, left rack. There is a proc amp in second rack and a TBC to the far right.



CITY is unusual in that the principal on-air equipment consists of IVC-960's. These units, in production room, are equipped with editors. Ampex's Model 800 TBC is used.

of the news playback VTR.

Because editing is such a simple technique with the unique control features of the EA-5 system (flashing illuminated pushbuttons direct the operator's actions sequentially through the edit process), CITY has now turned the editing function over to the reporter. A special reporter edit room is located adjacent to the newsroom. Tapes made on the portable machine are played on a local playback machine and the signal is routed to the engineering room for processing. The processed signal is then dubbed on to IVC 825 as machine A of the editing system. Machine B is an 870 for insert and assembly editing.

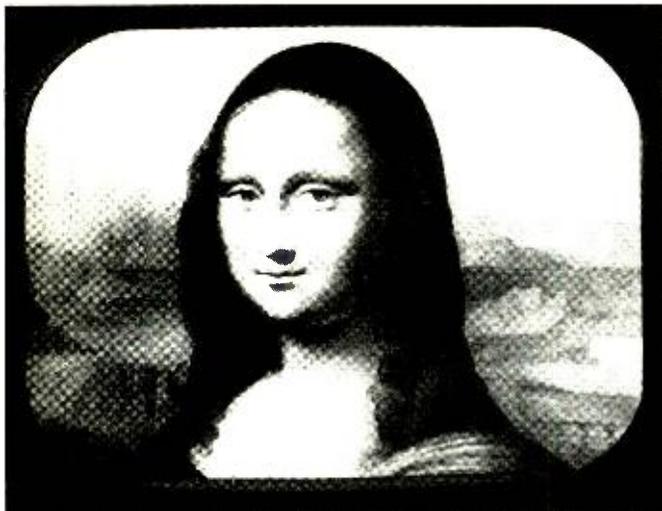
A CITY SHOW can be characterized as news in the magazine type format. It's an hour long program between 8:30 and 9:30 (and repeated the following morning). CITY is not out competing for the fast breaking headline but rather tries to develop a larger picture of what's back of the headlines, its significance, etc. Thus, a reporter may interview a number of persons in getting a fuller picture. The ability to edit a lot of material shot at different times and places is important. Unlike operations in larger situations a single reporter follows through writing the script, editing the material and then later appearing in the studio while the material is aired.

They Got Into Electronic Journalism for Under \$7000 (Per Crew)

As this is written, the low-cost portable video system in widest use for ENG is the Akai VTS-150, which includes a camera and a matching VTR that records on 1/4-inch tape. At just under \$7000 for the combination, the VTS-150 is giving more than 30 television stations the qualities they want: the total weight of the two

units is only 22 pounds, the picture is for all practical purposes up to 16mm quality (in fact, some stations, as noted in the following, are using the camera as a supplementary studio unit). The system has a good record for reliability.

Just how this camera/recorder combination can do



Now, even with heterodyne color systems,

The TBC-800 can keep your masterpiece from becoming a mess

For a long time, now, a good many videotape production managers have overlooked one of the most important differences between quad and helical VTR equipment: most of the quad machines have time base correctors; most of the helical recorders don't.

Nowadays, high quality helical recorders have servoed capstan motors, which is a step in the right direction. Now, the Ampex TBC-800 is a further step toward insuring good playback performance including insert edits.

The only way to arrive at a completely stable playback signal is to run everything through a time base corrector. That's what happens inside every broadcast station quad VTR, and that's what you have to add to your capstan servoed helical VTR output before you'll have a masterpiece of a production.

When you buy an Ampex TBC-800, you add the final link in your helical production process. You'll be able to show your production the way you visualized it, without tearing, without flag-waving, without color errors, and without jitters. And if your program is good enough for broadcast use, your videotape will meet all FCC requirements for picture stability.

To use an Ampex TBC-800 digital time base corrector, your helical VTR must be a non-segmented model, with a capstan servo. If your machine employs a color-under system, you'll need our optional heterodyne accessory that plugs right into the TBC chassis.

Once you have a TBC-800 with this option, you'll be able to switch back and forth between direct and heterodyne color. It's an ideal combination for every application, including electronic journalism.

Your local Ampex distributor has information about the TBC-800 and can arrange for a demonstration. Or you can contact us directly for a free brochure. Either way, you'll be a lot closer to taping a masterpiece.



Ampex TBC-800

AMPEX

Ampex Corporation
Audio-Video Systems Division
401 Broadway
Redwood City, California 94063
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what it does, within its constraints of cost, size, tape dimensions, etc., is amazing its owners, but they all agree that it does open to them the full range of ENG methods, as outlined in other stories here. The output of the VTR can be dubbed up to quad (through a time base corrector) for editing and future broadcast; the VTR output can go directly on the air, through a time base corrector. The camera output can be recorded or go directly on the air. As the following stories tell, a number of stations link the camera directly to the studio via microwave when there is a "hot" news break, for either recording or immediate broadcast. There is an in-camera editing facility that allows preliminary editing to be done at the news scene.

Apparently the only penalty the user pays is inability to work at extremely low light levels. It is hardly surprising that very-low-light capability could not be combined with the system's outstanding capabilities in other directions, at the price established. Users agree that this characteristic is not a restraint in 90% or more for their news gathering in the field.

KSD-TV, A Premier News Station, The First To Use the Akai Combination

In 1973 in St. Louis was named the number one TV news station in the U.S. for the important evening news segment, by TV-Radio Age magazine. It was also the first station in the country to acquire the Akai camera-recorder system for covering fast-breaking news. The first story put on the air through the system was in February, 1974.

KSD-TV, like most of the other stations in the reports in this issue, wanted more immediacy for fast-breaking news.

"The new light-weight system enabled us to tape a news event at 9:55 p.m. and have it on the 10 p.m. news," says general manager Ray Karpowicz. Mr. Karpowicz, like other station managers in ENG, uses it in different ways. First it can be a news camera system by itself, with the reporter bringing a recording to the studio. Secondly, it can be used for live TV presentation through KSD-TV's microwave van. Thirdly, it can be used in conjunction with the van at those locations that the van cannot broadcast from. Karpowicz cited the example of a plane crash in a gully or extremely low area, with the video reporter taping at

the location and returning to the van stationed on higher ground to beam the story back to the studio.

The Akai system, Karpowicz says, is used with Consolidated Video System's 504 time-base corrector. "We need a digital video signal corrector to feed the program material into our broadcast channel and the CVS model works very well," he said.

KSD is also dubbing to quad through the time base corrector. Some material is edited at the scene by use of the facility built into the tape recorder. Further editing can be done after the material has been dubbed to quad.

In the microwave mode, KSD uses the Akai camera with its own camera control unit, by-passing the tape recorder electronics. They have found the video signal from the camera stable enough to be mixed into the system along with studio cameras.

WCBD, A Pioneer in 100% ENG

WCBD, In Charleston, S.C., is one of the very first stations in the country to abandon film entirely and switch to the ENG system for all field reports on its newscasts.

Steve Currie, Director of Broadcasting, explained, "Last July 19, we turned off our film processor, and we haven't turned it on since then."

That was the date when four Akai VTS-150's went into service at WCBD. Since then, they have been used in a variety of situations—field reports, live studio broadcasts, even commercial production. The biggest test so far was on election night in November.

"We could never have done our election coverage without the Akai systems," Currie said flatly.

He continued, "We used two of the cameras as live studio cameras—one as a rover for studio cut-aways, the other on a separate set for in-studio interviews. The broadcast quality was at least equal to that of our regular studio cameras, if not superior."

The other two systems were used in the field.

"In one case," Currie recalled, "We declared Mendel Davis the winner in his race for a congressional seat at 7:20 p.m. By 7:35, we were able to air a tape showing him at home watching us declare him the winner plus an interview with him."

All evening long, WCBD aired features on events that took place no more than 10 or 15 minutes before they were broadcast. Even that small delay could have been eliminated by live remotes, but the Charleston area does not have the microwave service that would be needed for that.

On regular news broadcasts, WCBD tapes all its news feature stories in the field, editing in the camera as each story is being shot.

Then the recorders are brought back and set up in a separate VTR control room in the newsroom. Tape segments of the news show are cued and re-cued on those units for playback during the broadcast, with the help of a CVS-504A time-base corrector.

WCBD has also used the Akai systems to produce commercials. In one instance, the Democratic gubernatorial candidate needed a commercial on a rush basis. The stations taped it and completed it in time for it to air on 10 stations throughout South Carolina before the election.

KSD-TV engineers Fred Steurer (left) and Howard Guenther (holding tape recorder) operate Akai combo while newsmen John Auble interviews drivers during last May's truckers strike.



continued on page 44

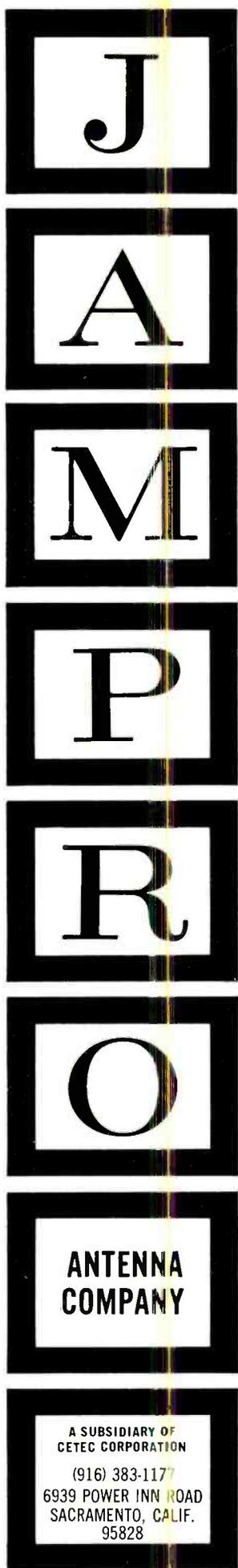
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WCBD-TV has four Akai camera crews and has abandoned film entirely.

"Because of the short amount of time we had, it would have been impossible to do it with film," Currie said.

Time was the primary motivation for Currie to install the Akai systems.

"We wanted to speed up our news coverage," he said.

But there was another motivation, too.

"The economic considerations were very favorable," Currie noted. "We were able to increase our use of visual material without an increase in cost that would have been involved with film. In fact, our initial investment on the switch to video tape was about \$40,000, and we anticipate we'll save that much over the next five years just in film and processing costs."

KRIS—On The Way To Full ENG

KRIS, the NBC affiliate in Corpus Christi, Texas, is rapidly making the transition from film to tape in its news department.

The station has had one Akai VTS-150 on trial for some months. Based on that experience, two more Akai systems have been ordered, according to Tony de Haro, news director.

"When we get all three Akai's in and operating, we will be 90 percent video and 10 percent film," de Haro said.

A major reason for the shift away from film was the need for greater flexibility, de Haro explained. "We have only one film chain, so everything we've done in the past has been single system. But now, most of the film we shoot will be silent B-roll material, and we'll use the video tape as an A-roll. In effect, we are able to go to double system without the expense of a second film chain."

de Haro also cited other advantages of tape over film.

"Take the example of a guy who makes one spontaneous comment that's a gen in the middle of an other-

wise boring speech," he said. "With film, you usually miss that comment because you can't afford to shoot the entire speech, and you can't always second guess the speaker.

"But with the Akai system," he continued, "we just crank away with tape and select only the important parts for broadcast. The key to the whole thing is that you can afford to overshoot and still be selective in what you air, whereas the tendency with film is to run what you shoot, no matter how bad it might be."

Based on that, de Haro estimates that KRIS will pay for its three Akai systems within one year with the amount it saves on raw film stock and processing costs alone.

KRIS found the Akai system invaluable on election night.

de Haro recalled, "There were no major issues and no hotly-contested races in our area, yet we still had to fill seven minutes out of every half hour which the network gave to the local stations. If we had stayed in the studio, it would have been deadly dull. But we took the Akai out and did man-on-the-street reaction interviews and taped events at local campaign headquarters. We had those pieces on the air 10 minutes after we shot them, and they really livened up our seven-minute segments."

KUTV: Speeding Up the News

KUTV, the NBC affiliate in Salt Lake City, is currently using two Akai color video systems for both live and tape segments on its daily newscasts.

Rick Spralling, news director, says "the VTS-150 has been a big help on late-breaking stories."

He cited two recent examples: Ralph Nader was scheduled to arrive at the airport at 6:15 p.m.—a quarter hour after the start of KUTV's news show.

"We had tape of his arrival on the air at 6:45," Spralling recalled. "We would never have been able to do that with film."

A few weeks ago, President Ford arrived in Salt Lake City at a similarly awkward time for news stations. But the Akai system came to the rescue again. "We taped the event, put in on a remote deck and sent it to the studio by microwave," Spralling said.

The VTS-150 got its first live test at KUTV on Election Night in November. The system was assigned, with a reporter, to a major candidate's headquarters and beamed back live remote coverage when the candidate made his victory speech to supporters.

In that instance, the system was tied in with a time-base corrector.

"The camera and the recorder have been far more dependable than we thought they would be," Spralling said.

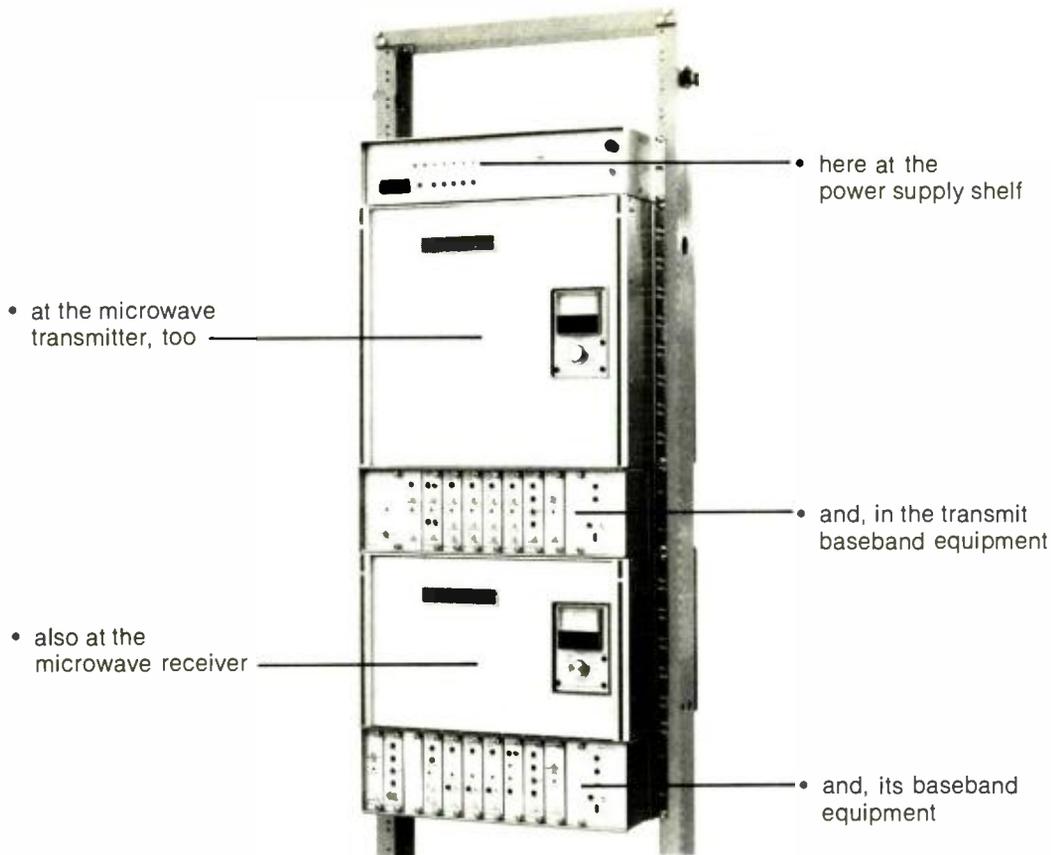
For that reason, the station is now using the Akai systems to shoot three to four news stories a day. About one-third of those are edited directly in the camera, while others are transferred to quad for editing purposes.

At KPRC, ENG Conquers Space As Well As Time

The Akai color video system allowed KPRC, the NBC affiliate in Houston, to get a story on its 6 p.m.

continued on page 46

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FV13F All-Solid State Fixed Microwave is one of the new Farinon series of IF Heterodyne microwave systems for point-to-point relay (intercity and STL) of video signals in all frequency bands from 2 GHz to 13 GHz. Practical advantages include:

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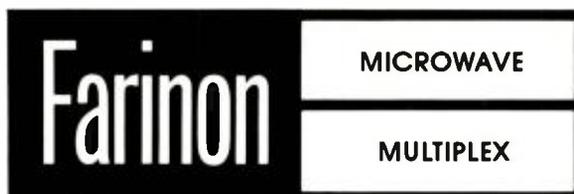
• **A -24 v. battery plant** (or commercial mains) will power any terminal or repeater configuration. The transmitters' injection-locked power amplifiers provide 1-watt output, conservatively rated.

• **And you can add transmitters and receivers** without disturbing existing systems.

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KPRC-TV sends its crew out of town and sends hot news back via common carrier microwave.

newscast, even though the story took place only an hour earlier and several hundred miles away.

Ray Miller, news director, explained, "There was going to be an important vote on a proposed new state constitution at the capital in Austin. We have a bureau there, but it has only film cameras. Normally, we air freight film back to our studio, but that takes time."

"Knowing that, we sent the Akai system to Austin

and taped the actual vote in the legislature. We semi-edited the story there, and then rented time on a common carrier microwave. We transmitted it at 5 p.m., copied it on two-inch tape here, did some more editing, and led the show with it at 6 p.m."

Although KPRC still relies heavily on film, late-breaking situations like that occur often enough that the station uses the Akai system an average of twice a week.

"When time is critical," Miller said, "Its the only way to go . . ."

KETV: Portability is Aid To Public Affairs Programming

The Akai color video system is not restricted to news applications. KETV, Lexington, Kentucky's largest state educational television network in the country with 13 separate transmitters serving the entire state, is using the VTS-150 for much of its locally-originated public affairs programming.

Jim Blevins, program manager, explained: "The key to the whole thing is the portability of the system. It can literally go anywhere. We are therefore able to use it to shoot in a lot of situations where large camera equipment would be intrusive.

"We use it in schools, including classrooms, and we cover a lot of community events with it."

Blevins is also pleased with the broadcast quality of the system.

"We send it out to 13 locations all over the state," he said, "So it has to be good."

KETV is affiliated with the Public Broadcasting Service (PBS).

WLAC-TV, Nashville, Wanted A "Live" Look for More of the News

The management of this CBS affiliate in the southern city also wanted to widen news coverage, make it faster and more efficient, get it on the air faster, and cut costs by reducing use of film in favor of reusable magnetic tape. Development of the system was assigned to Ralph Hucaby, vice president and director of engineering.

Mr. Hucaby naturally took a careful look at the electronic news gathering systems developed by the CBS Network and the CBS-owned stations, as described in other articles in this issue. To replace film crews and provide mobility, he bought two Ikegami portable cameras; microwave communications equipment from Microwave Associates and Nurad remote control antennas.

The portable units and the microwave equipment are installed in two vans, which take them to the news scene. Thus WLAC has the two optional methods of getting news on the air which are becoming close to standard in ENG: microwaving back to studio for immediate broadcasting; microwaving back for recording in the studio and later broadcast.

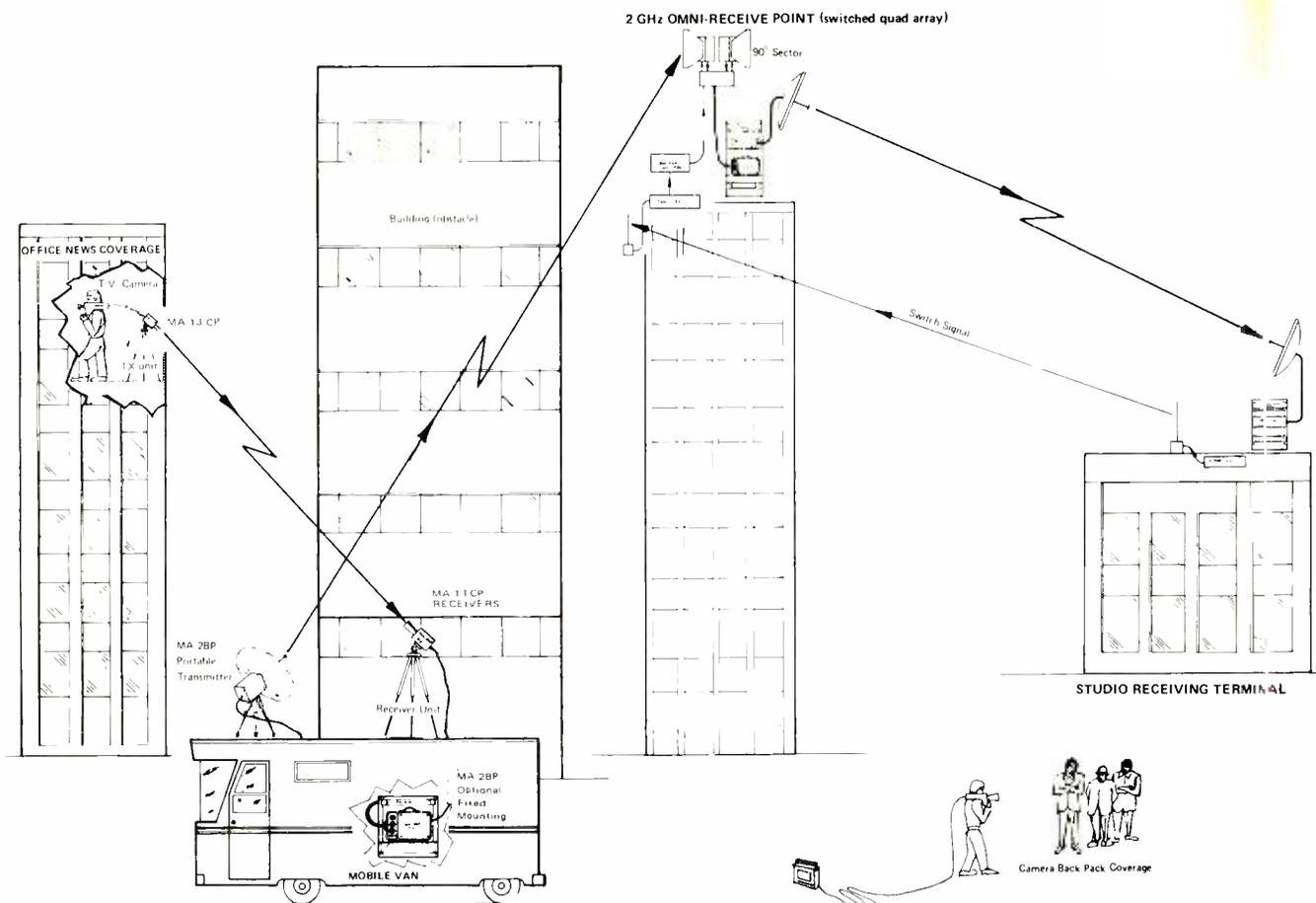
A variation on the first method is available if the news scene is in a bad location for microwave transmission to the studio: recording in the van and moving

to a better spot for the transmission. Recording in the van is with a Sony VO-3800 VTR. The microwave linkage is solid up to about 15 miles from the studio, which gives the crew a very large area for immediate coverage, with the option of getting news from outside that area to the studio fast by recording at the scene and moving inside the coverage area.

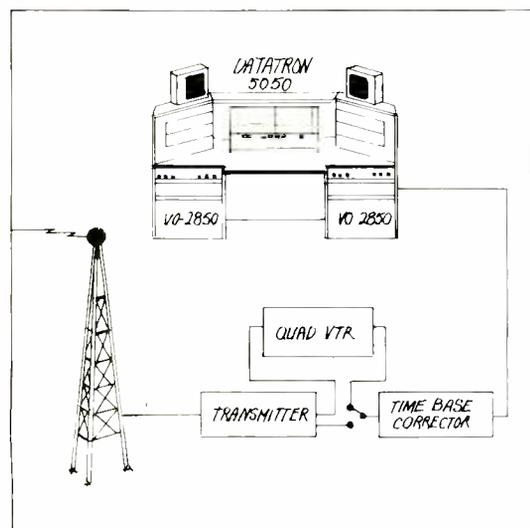
The vans are radio dispatched and can respond quickly to a "breaking" story. They leave the station at 6:00 a.m. and except for one crew change, they do not normally return until 11:00 p.m.—being dispatched from story to story.

It was felt that a videotape cassette system for the news recording was preferable to reel-to-reel, since it requires less tape handling and gives greater tape protection. Considerable study and experimentation with available systems by Mr. Hucaby and his engineering development team, led to the choice of the Sony VO-2850 machines for use in the newsroom for recording, editing, and air playback. Playback is through a CVS-504A Time Base Corrector.

To further compliment this system, Mr. Hucaby selected the Datatron 5050 Electronic Tape Editor. He had seen Datatron's 5050 editors at the NAB show in March, and wanted the speed, single frame editing



Uses of microwave at WLAC and other stations is depicted by this drawing adapted from a Microwave Associates data sheet. Videotaped news can be transmitted from van to studio.



Studio at WLAC TV records on Sony VO 2850a which work with Datatron 5050 editor system.

CBS Gave the ENG Wagon An Early Push; Other Nets Soon Joined

The camera was the PCP-90, hardly portable by today's standards, and the tape recorder was the 80-pound Ampex 3000, but CBS equipped some news

accuracy, and simplicity of operation provided by the unit.

(See separate story in this issue on editing systems for ENG.) Datatron engineers had already interfaced the 5050 to all the other leading VTR's (including those manufactured by Ampex, IVC and RCA), so they were able to complete the 2850 interface in less than two weeks. This provided WLAC-TV with the two machine video tape editor needed to complete their advanced electronic news gathering system.

WLAC-TV reports immediate benefits from the new system. "Live" stories are done within every newscast to increase viewer interest by letting them see news "as it happens." All stories are viewed by news personnel in the newsroom as they are received, giving them an opportunity to participate in the story via radio.

WLAC-TV expects cost advantages from the transition, too. For one thing, they are recording on reusable tape rather than film. They can afford the flexibility of complete coverage, since they can erase and reuse the tape after editing. Because film is not reusable, any station making the transition to ENG can realize substantial savings. WLAC-TV expects to pay off the transition costs in approximately five years.

crews with them in early 1971, to get some preliminary guidelines on the plus and minus of electronic news gathering.

"We had been looking with unhappiness for some time at the 15 million feet of film we shot every year covering the news," says Marshall ("Casey") Davidson, CBS vice president for news operations. "In addition, we badly wanted more speed in news coverage. We made up our minds to find out just how electronic news gathering would work in day-to-day network operation."

When the ENG crews produced a series of outstanding news "beats" for CBS, in 1971 and early 1972, not only the CBS management but also those of NBC and ABC got the message, and the swing to ENG became inevitable. Obviously lighter, more maneuverable equipment was highly desirable.

"We went to Tokyo in 1971 and again in 1972 to survey Japanese development of light-weight cameras," says Davidson.* "Our objective from the first was an electronic news crew that could replace a 16mm film crew directly with no important penalties. Some of our engineers kept worrying over the difficulty of getting studio quality into a light camera. I kept telling them that it was 16mm quality we had to equal."

A joint development effort with Ikegami produced the camera that Davidson was looking for. The Ikegami mini-camera, as described in other articles in this issue, is now one of the main forces in the ENG movement. Both the CBS network news operation, and the CBS owned stations, have been or are being equipped with Ikegamis. (See separate story on KMOX.)

Teamed with the Ikegami, in current CBS network operations, is the Sony portable U-Matic, model 3800. A two-man crew handles the two easily, with all the attendant benefits set forth in the several direct-experience accounts of ENG in this issue.

Davidson points to some advantages of ENG that apply particularly to a wide-ranging network operation. "We can take the equipment abroad with the greatest ease. Last spring we covered Nixon's visits to the Near East and Moscow with ENG crews. In Moscow we had the first of the Sony editing units* with us. We were able to get the edited material onto the satellite, for transmission to the United States, within a very short time of shooting it. On the way to the satellite, the program went through various European

*Engineering development was under the direction of Joseph A. Flaherty, Gen. Mgr. of Engineering and Development, CBS Television Network.

**This refers to the Sony 2850-plus-R400 editing system, used not only by CBS but by NBC (see separate story) and by a number of separate stations.



CBS News White House correspondent Robert Pierpoint and ENG crew in Moscow.

relay points, which ordinarily apply conversion to PAL or Secam, or NTSC, as the case requires. Since our signal started out in NTSC, the conversion equipment was completely by-passed. It was the very first time ENG originated material had been transmitted half-way around the world; there were no preliminary dry runs! When an excellent picture flashed into our New York offices, there was a spontaneous cheer."

Davidson notes that ENG is especially valuable for foreign news assignments where there are no film processing facilities. Instead of shooting film, which has to be sent back to the U.S. by plane and then processed, ENG-produced material can be radioed in for airing or recording as required. One such assignment was the meeting of President Ford and the President of France on the island of Martinique, scheduled for mid-December (after this article goes to press). CBS used ENG for its Martinique coverage.

Davidson emphasizes that the ENG movement has just begun. Looking at lab developments like the digital camera, he expects the future to bring even smaller, more efficient cameras, recorders, and microwave units.

"Once you are all electronic," he says "the bars are down. You can process your signal in a number of different ways; you have the tremendous resourcefulness of electronics. And there is the wide-ranging opportunity for continued development of better equipment. In ten years the way we handle the news now will look very old-fashioned."

NBC: Working A Steady Shift To ENG

The National Broadcasting Company, like CBS (see preceding story), is pushing steadily into electronic news gathering after a number of early experiments, mainly with the PCP-90 and the Ampex 3000.

NBC's present activities and general objectives were outlined briefly by James Kitchell, General Manager of News Services, in a BM/E interview. Mr. Kitchell first pointed out that at NBC, the network and the owned stations are all under a single management, in contrast with the CBS separation of network and owned stations into two operations.

"We wanted excellent quality 'up front,' that is, at

the camera," said Mr. Kitchell, "to offset the inevitable loss down the chain, small as that might be. Our early experiments with the PCP-90 and Ampex 3000 showed them both to be excellent, but both much too heavy and bulky to play the role the 16mm camera has filled for years, and replacement of the 16mm camera, as far as ease of use and portability are concerned, was what we were after."

NBC equipped some crews at their WRC in Washington, and at WNBC, New York headquarters, with Ikegami cameras when that new portable became available about three years ago. The cameras fed

Sony 3800's. The objective was to expand the quantity of news handled by the all-electronic method, to learn how the system would work with more kinds of news.

With all the indicators highly positive, NBC kept looking for equipment that would match their requirements more closely.

"We liked the prototype of the Fernseh portable camera, shown at the March NAB convention in Houston," said Mr. Kitchell. "We worked with Bosch on certain changes we thought desirable, and encouraged them to accelerate their production plans. As a result, we made an initial order for about 30 of the cameras, with the first five due in December. The cameras will go to all our owned stations—New York, Los Angeles, Washington, Chicago, Cleveland."

To work with the cameras, NBC will continue to use the Sony 3800, portable U-Matic and the Microwave Associates microwave transmission equipment.

"Sony may not have planned exactly this application of their U-Matic," said Mr. Kitchell, "but at the moment it is in our view the tape system with the best combination of quality and portability. For the in-studio recording and editing, we are using Sony 2850's, with their new R400 editing control. The whole system has been working beautifully. Our own engineers have added an edit preview capability to the Sony system—we can review a complete edit before actually making it."

Mr. Kitchell pointed to high-speed viewing search as an editing capability needed to make the current compact tape editing equipment fully as easy to use as film editing equipment. He said he was sure it would come in time.

"The microwave operation is a bit of a jungle in some cities," he noted. "Getting usable frequency allocations is sometimes difficult; good transmission paths are sometimes not available. However, we believe this will straighten out in time because the direct remote-camera-to-air mode of electronic news gathering is one of its most exciting benefits, and microwaving the material in provides unparalleled speed in news coverage even when the material is first recorded."

He said that electronic news units were becoming more and more important for network coverage away



NBC will use lightweight Fernseh KCN camera for its news operations.

from the operating stations, particularly on foreign assignments, NBC took electronic news equipment to cover President Ford's trip to the Far East, and used it exclusively for the Ford meeting with the President of France on the island of Martinique in mid-December (as did CBS and ABC—the meeting was the first large foreign news event covered entirely by ENG, as far as the American television industry was concerned).

"We will probably be doing about 50% of our news coverage electronically in three years or so," Mr. Kitchell predicted, "and perhaps 85% will be electronically gathered by 1980. Whatever the precise ratios, the long-term trend is certainly in that direction."

The hardware industry, he said, which initially was more or less prodded into ENG by the networks, is now fully aware of the potential and is rapidly becoming highly competitive in the field.

"We can look forward to a high rate of development in portable and video cameras, VTRs, and microwave equipment," he said. "The whole electronic news gathering technology will be in a state of flux for some time. We at NBC are keeping our eyes open for new equipment that may do the job better, and I know the other networks are doing the same. Electronic news gathering is just at its beginning."

ABC Is Testing ENG; A Number Of Other Stations Are Using It, Or Planning To

Although apparently not as fully committed to the idea as the other networks, the American Broadcasting Company has equipped some news crews for it at each of the net's owned stations, with the assignment of covering fast-breaking news, for the net and for one station. The crews have Ikegami cameras, Sony 3800 portable U-Matics, and Microwave Associates 13-GHz units (for camera-to-van hops) and 2 GHz equipment for the haul back to the studio. The RF allocations group of ABC is actively working on lining up microwave frequencies for its O & O stations.

ABC, a spokesman there told BM/E, does not presently consider this as a first step toward a wholesale conversion to ENG, but rather as a trial effort, which will be analyzed over a period of use before further moves are made. The news management sees ENG as highly valuable for certain restricted kinds of news,

but wants much more data on the operation before deciding whether to extend it broadly. One objection ABC personnel have to present equipment centers on what they see as the slowness of tape editing, as compared with film editing; they look for further development as needed to bring this score fairly even.

Some stations* around the country using ENG, or planning to, are the following:

WNAC, Boston: Ladislav Hlavaly, chief engineer, says he is currently using the CIE camera and Ampex recorder for some news stories; looking actively at new equipment for this purpose, including Akai, Ike-

* Other stations previously reported in BM/E to be doing electronic news includes WSNL-TV, Happaug, N.Y. (Akai cameras, IVC recorders) and WTOG, St. Petersburg, Fla. (JVC camera and recorder.) See also *Broadcasting*, Aug. 19, for others.

gami, and advance information on a new IVC portable camera.

WCVB, Boston: Using a PCP-90 camera, in a van equipped with interview space; also in the van are Ampex 3000 recorder and Microwave Associates microwave equipment. The van originates a considerable part of the news coverage of the station. Steve de Sarnick, director of engineering, wants to extend the operation, and is considering a range of equipment.

KSTP, Minneapolis—George Merrill, chief engineer, reports use of two Editel portable cameras for a substantial part of the station's news gathering. Has microwave as well as record capability. He says he would like to do all location news electronically, because it helps maintain the station's high position in the local market.

KARD, Wichita, Kansas—Will get an RCA TKP-45 in February for location news and remote religious meeting pickups. Will be linked to studio by microwave. Greg Gamer, news vice president, says film will continue to be important, with ENG important in certain areas.

WYES, New Orleans—Bob Moran, chief engineer of this public station, reports a RCA TKP-45 will be used for covering community happenings at remote locations (the station does not produce spot news in the same sense as a commercial broadcaster). Among the meetings to be covered are public hearings, legislative sessions, and other similar ones.

Help for stations wanting to get into ENG is coming from a rather unusual source: a veteran film newsman who has been converted to ENG. Jimmie Mundell of Little Rock, Arkansas, a film news man for a number of years (and pioneer in color TV news and use of portable lighting), says he was highly skeptical of ENG until he experienced the new, simplified video tape editing (in his case, with the new TRI EA-5 editing system), which helps put ENG on an equal foot-

ing with film. Now he believes in ENG so strongly that he has set up a company, Electronic News Systems, Inc., which will rent or sell the gear to stations. Mundell is calling on telecasters to spread the ENG story; among other things, he tells them that the savings on film will go a long way toward covering the lease agreements.

The Breakthroughs That Opened The Way to ENG

Very light cameras and tape recorders producing material comparable to 16mm film in picture quality were, of course, the basic technical "breakthrough" that opened the ENG flood-gates, as recounted in the accompanying stories.

Another essential, everybody agrees, is the comparatively inexpensive, stand-alone, time base corrector. "It was all made possible by that remarkable black box, the time base corrector," says Ruppert Stow of CBS. On another page in this issue we present a comprehensive summary of TBC's currently available, including five new brands that have reached the market just within the last month or so.

Greatly facilitating the "instant news" mode of ENG, with microwave links carrying the picture directly from remote camera to studio, is a remarkable new microwave antenna system recently introduced by Nurad, Inc., and used by nearly all the ENG stations. The achievement of this system is to make available at roughly the \$10,000 level a "selective polarization" mode: the antenna can be switched for high sensitivity to right-hand circular polarization, or left-hand circular, or horizontal, or vertical.

This allows the operator to select a signal, when he is among serious reflections, since each reflection reverses the sense of a circularly polarized signal (the transmitter antenna is circularly polarized). High discrimination against multipath interference is thus available. When tall buildings or other objects prevent line-of-sight transmission, it is often possible to aim the transmitter at a reflecting surface that will get the signal to the receiver; by selecting the right polarization mode, the operators can maximize the received signal.

The "diffraction" mode, with a portion of the signal coming down over the edge of a horizontal barrier that blocks the line-of-sight, can also be maximized, since this mode produces horizontal polarization in the diffracted signal, and the antenna sensitivity can be made high for that. Users testify that in many or most difficult transmission situations within the range of the microwave system, the operators can get satisfactory transmission by trying various antenna orientations and polarization modes, while monitoring the received RF level. This adjustment process usually takes no more than five to ten minutes.

The most widely used microwave electronics is that of Microwave Associates, in two forms: 2 GHz for the haul from remote to studio, since this frequency is substantially unaffected by rain, smog, etc; a very compact 13 GHz system, with small horn antennas, as a "cable replacement" for very short hauls, from camera to van, van to tall building, etc. (some stations will use 7 GHz for this link).



CEI-290 back-pack color TV camera although not designed for news is currently used by WNAC.

RCA's new TKP-45 weighing 20 lbs. is slated to go to a number of TV stations early this year.



Unretouched monitor photograph of an off-the-air ABC network program, November 23, 1974, at 2:20 P.M.

Electronic Video Compression is no Big Thing!

It's just another little first from CVS. It lets you shrink a video picture and place it where you want it.

Video Compression is a capability optionally available with the CVS 600 Digital Video Synchronizer. Now you can not only lock an incoming asynchronous signal to station sync automatically but reduce that video signal to one-fourth size and locate it in any one of six positions on the CRT. The output of the Video Compressor is keyed for mixing with other signals.

The basic CVS 600 does the synchronizing job with less than half the power, one-third the weight, and less than one-third the rack space of the only other synchronizer available. And the price—compared to the other unit, it will save you about \$15,000.



The CVS 600 and the Video Compressor are now in production. If you would like some literature on the products or would like to see a video tape of what it's all about, just let us know.



Consolidated Video Systems

3300 Edward Avenue
Santa Clara, California 95050
(408) 247-2050

Circle 129 on Reader Service Card

Time Base Correctors: Now It's A Wide-Open Field

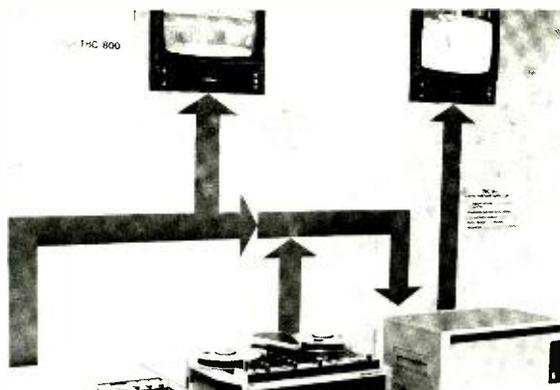
If plans stay firm, seven or eight brands of stand-alone time base correctors will be available shortly after this magazine sees print, a drastic change from the two-brand market of the TBC's first years. Using preliminary information from the manufacturers, BM/E here supplies some general guidelines on matching a TBC to the job the broadcaster wants it to do.

For the past three years the stand-alone time base corrector has kept broadcasters in a stir with its promise to raise inexpensive helical-scan VTR's to the level of "broadcast-quality originators." The company that pioneered the TBC, Television Microtime, Inc., and the one that joined up very early, Consolidated Video Systems, have both enjoyed solid demand, riding their head start with this new, comparatively inexpensive device that satisfies widespread need.

The March, 1974 NAB show in Houston made it plain that the two-brand TBC market was nearing its end. Eight other manufacturers showed prototypes there, including such weighty names as Ampex, CBS, IVC, and 3M.

Five of the manufacturers promising TBC's at Houston, planned to have production models on the market by January, 1975 (or earlier in some cases). In November, while this article was being prepared, a Canadian firm, Digital Video Labs announced a TBC with outstanding specifications, with deliveries starting in November and full production by January. And at the NAB convention in Las Vegas (see separate story in this issue for a convention report), Edutron, Inc., of Gainesville, Florida introduced another new unit, the TBC-110, aimed at "narrow window" applications (± 10 microseconds) at the very low price of \$2950. (See table for main characteristics of the current models.)

In addition, Television Microtime set January as the release date for their new 600 Series of digital TBC's, which, according to the preliminary data, set something of a new direction for this company—the 600 Series are put forward as nearly "universal," applicable to a wide range of VTR's, rather than tailored to specific types of VTR's as were TMI's earlier models.



Ampex TBC display at NAB.

What do all the new choices mean to the broadcaster? To help him sort them out, BM/E presents here detailed stories prepared especially for this issue by Ampex, TMI, CBS, and 3M,* giving the general design philosophy of their respective units. In addition, we have extracted similar material from published stories of IVC-Quantel, CVS, Digital Video Labs, and Edutron. In the following, we summarize some of the main facts about choosing a TBC that emerge from these stories.

We can see a general swing to digital operation in the models listed, defining "digital" as the conversion of the program to digital form for storage in the TBC memory, and reconversion to analog form before it reaches the TBC output. Of the nine models listed, only the Edutron, Kansas State, and TMI Model 610 are analog in operation. In the early TBC days, digital and analog models (based on delay lines) competed for the top jobs. Now we can see that the digitals will, in general, be used for the "wide window" jobs, in which a variety of VTR's must be brought up to broadcast quality. The analog models (which are priced lower) will be for less demanding jobs (CATV, CCTV), or, at the other extreme, the most demanding "narrow window" jobs (TMI Model 610).

Because the TBC by its nature tends to take on a "cure everything" label, we have to ask first, is there anything a TBC *can't* do? Yes indeed—one fact that is obvious but can stand restating is that a TBC can't improve poor picture quality that is not directly related to time base instability. If the taped program has poor lighting, wrong color, fuzziness, and low s/n ratio, these faults will turn up in the signal coming out of the TBC. When we say a TBC raises videotaped material to "broadcast quality," we mean that picture faults caused by time base instability have been brought below objectionable visibility, or within allowable limits.

What is "allowable?" As far as the transmitter itself is concerned, the FCC says that the color subcarrier must be 3.579545 MHz, ± 10 Hz, and the horizontal and vertical scanning rates are, of course, tied to that by ratios making the horizontal 15,734.264 Hz, ± 0.044 Hz, and the vertical 59.94 Hz. In addition, the phase of the color subcarrier must be within 10 degrees of the color burst phase.

* In late November, 3M announced its withdrawal from the TBC race. 3M's material has been deleted from this report.

These FCC requirements must be met by the stability of the sync generator that is a feature of all the units discussed here. Or it can be provided by the house sync, which can be applied to the time base corrector output in various ways. A TBC must obviously guarantee "FCC stability" as to the subcarrier frequency.

However, it has been found also essential, to avoid visible color faults, to keep the residual color jitter below certain levels. It has been found in practice that color faults—streaking, etc., just begin to be visually objectionable if the residual time base jitter is somewhere between about ± 5 nanoseconds and ± 10 nanoseconds. This has led to a de facto industry TBC standard of ± 2 to ± 4 ns for the residual jitter of the *corrected* signal.

It is important to note that the standards for monochrome broadcasting are far more relaxed. Residual time-base jitter up to 25–30 ns is acceptable, and the industry's specs reflect this fact.

What the foregoing means is that TBC *failure* is the appearance in the picture as played back, of faults such as the following, arising directly from time-base instability: color streaking, hue shift, blurring, flag waving, switching rolls, jitter, etc.

The poor results may spring, though, not from TBC "failure" but from applying to the TBC a signal that is outside the correction range. Every TBC imposes specific limits on the quality of the signal that is acceptable for correction. The most obvious is the time "window." There seems to be general agreement that the optimum window, balancing cost against TBC usefulness, is about $\pm 1\frac{1}{2}$ H lines, or about 160 to 190 microseconds. TBC makers say this will cover most of the instability the broadcaster will encounter with most of the helical machines he is likely to use.

But any VTR can be out of whack, with time base instability well beyond this agreed-on limit. That simply means that a TBC cannot be expected to cover up all faulty performance on the part of the VTR.

A special form of time instability is the step discontinuity that occurs when a multi-head, segmented, VTR is slightly out of adjustment, a common enough situation. Some TBC's are inherently poor at handling large step discontinuities, and the makers recommend against using them with segmented machines. Specifically, when the correction reference comes entirely from averaging a time base over a number of H-lines, it will obviously take the TBC several lines, at least, to adjust to a large step discontinuity. (Some units have ingenious circuitry for minimizing this). The result would be some picture instability after each discontinuity—every 15 lines or so with a quad machine.

The noise in the recorded program may also limit TBC action. As the s/n ratio of the recorded program falls below about 40–45 dB (for most systems), the time positions of the sync pulses are more and more obscured by the noise, and the TBC has a less and less precise reference, impairing the precision of the output. Some of the makers (see specs) give an input s/n number, which must be met or bettered if the TBC is to make the residual-jitter specification fully.

The TBC itself, of course, should not degrade the s/n ratio unacceptably. The industry has evidently settled on a range for the internal s/n ratio of about

50 to 60 dB as preserving "broadcast quality." The same general reasoning applies to other major characteristics of the TBC: differential gain, differential phase, amplitude-bandwidth, transient performance. The limits here too are set by visible picture degradation, and the figures given by the makers naturally accord with general industry experience.

Generally speaking helical machines will supply non-phased color. And they will differ in the handling of color: wide-band; heterodyned (color under) in record and playback or only in playback, etc. The TBC buyer must determine whether or not the unit he considers will handle the color-method of his helical machines.

Some TBC designs are not recommended by the makers for use with a VTR that is not capstan-servoed; if your VTR is line-locked or battery-locked, check carefully on this point.

Are some helicals unredeemable by any TBC? If the average, inherent time base instability of your VTR is substantially wider than the industry standard "window" of around 180 microseconds, you are in trouble. But the general opinion is that about 90% of the helicals a broadcaster might use, when in proper operating condition, will make the grade. One fault that might be overlooked: very heavy compression could reduce the ratio of sync amplitude to signal amplitude so severely that the TBC might not have enough reference to grab onto.

However, the broadcaster has a way of getting broadcast quality material from helicals that are a little outside the limits: the popular "dub up to broadcast," or two-pass time-base correction, he dubs from his helical onto a quad, through a TBC. Then the quad can go on the air through its internal TBC. In other words, instabilities that would be unacceptable, if put on the air, may be within the correction "window" of the quad's own TBC.

Another fact: even though the TBC cannot raise a given VTR completely to the broadcast level it may improve the signal very substantially, to the point of making it "professional" in grade, for CCTV, video production (mixing with other sources), etc. Thus the TBC could find very wide usefulness in the exploding "video communications" field, including CATV.

What has been said here is clearly preliminary, general. The field experience of the next half year or so will teach us a great deal more about the TBC than we can know now.

The Ampex TBC-800 Time Base Corrector

Four years of research into methods of digital time base correction have given Ampex's TBC-800 superior performance over most existing time base correctors. Ampex's approach is based on its experience in proven video products and solves these practical problems:

- Selection of the correct memory technique
- Lowest signal-to-noise ratio
- Quality signal processing
- Lowest price for the desired quality
- Correct size of window.

After the correct design approach is selected the quality of performance is still the result of how well

the designs are executed. The TBC-800 is a result of many years in time base correction development and quality signal processing.

The goal in digital time base correction is to combine broadcast quality and reasonable price. Ampex wanted to handle signals from quad type recorders if this was possible. Here's how Ampex's approach succeeds.

The heart of any time base corrector is its memory. In the analog type time base corrector the memory is either fixed or variable delay lines or a combination of both. Long delays of one or more horizontal lines become expensive to build and large in size.

Delay lines are actually serial access memories or S.A.M.s for short. The memory is loaded with new information continuously and after a fixed time the

Selected Characteristics, Time Base Correctors (as reported by manufacturers)

Make Model and Price	Window	Stability of Output	S/N Ratio	Bandwidth	Diff. Gain	Diff. Phase	VTR's Accepted (Specific models are not a complete list in any case—illustrative only)	Reference Method
Ampex TBC-800 \$11,500	Greater than $\pm 1H$	$\pm 2.5ns-C$ $10 \pm n s-M$	60	$\pm 0.2dB$ to 4 MHz	2%	2°	Non-segmented helicals, direct color, capstan servo. Heterodyne color with optional accessory. Examples: Ampex 5800, 7900 series; some IVC's in 700, 800, 900 series.	Averaging (line-by-line optional)
CBS CLD-1500 \$15,000	$\pm 1.5H$	$\pm 4 ns-C$ $\pm 20 ns-M$	55	$\pm 0.5dB$ to 3.6MHz -3dB at 5 MHz	1%	1°	Non-segmented helicals, direct color, capstan servo. Heterodyne color with optional plug-in. Optional accessory capstan-locks U-Matic VTR.	Averaging
CVS-504A \$12,500	± 90 microsec.	$\pm 4 ns-C$	50	$\pm 0.5dB$ to 3.6 MHz with direct color; to 2.5 MHz, hetero	3%	3°	Non-segmented helicals, direct or heterodyne color, capstan servo. Line-locked can be dubbed up to quad.	Averaging
Edutron TBC-110 \$2,950	Greater than 10 microsec.	$\pm 5 ns-C$ (direct); $\pm 20 ns$, (hetero and mono)	50	$\pm 1dB$ to 3.6 MHz -3 dB at 4.5 MHz	5%	5°	Any helical scan VTR, H-locked, V-locked (capstan servo), direct or heterodyne color. Line-locked can be dubbed up to quad.	Line-by-line
Digital Video \$13,500	Greater than $\pm 3H$	$\pm 2 ns-C$ $\pm 20 ns-M$	56	$\pm 0.2dB$ to 4.2 MHz -3 dB at 4.56MHz	2%	2°	Any quad or helical with capstan servo. Line-locked accepted with optional accessory. Heterodyne color requires slight modification of VTR.	Averaging (line-by-line optional)
IVC TBC-2000 \$15,000	$\pm 1.5H$	$\pm 4 ns-C$ $\pm 25 ns-M$	56	$\pm 0.5 dB$ to 4 MHz	3%	3°	Helical, capstan servo, direct color. Line-locked brought to broadcastable level with heterodyne corrector. Examples: IVC 760, 825A, 870; Ampex VR-5800, 7800 series.	Averaging
Television Microtime 640 \$12,500	$\pm 1.5 H$	$\pm 2.7 ns-C$ $\pm 20 ns-M$	55	$\pm 0.2dB$ to 4.2 MHz -3dB at 5.5 MHz	2%	2°	Any quad or helical, direct or heterodyne color, H-lock, V-lock (capstan servo) or line-locked.	Line-by-line
Television Microtime 610 \$9,850	8.8 microsec.	5° rel. to ref. subc. color; $\pm 17 ns-M$	60	Uses switched LC binary delay lines with inherent wide-band capability	2%	2°	Any quad or helical, direct or heterodyne color; intended for applications requiring absolute minimum in signal degradation.	Line-by-line
Kansas State Network, TC-100 \$2,950	$\pm 0.25H$	$\pm 25 ns$	46	Not comparable—luminance and color on separate tracks.	5%	3°	Intended mainly for CCTV, CATV, pay TV in hotels, etc. Will improve any VTR for these purposes, or for dubbing up to quad.	Averaging

Options: Dropout compensator is standard with Ampex, CBS, Edutron, Digital Data and optional with IVC. Many have heterodyne color adapters as options. Noise reduction is option with Digital Data.

Sync generator, processing amplifier: Each of the listed TBC's includes a sync generator and processing amplifier which together can produce corrected signals with fresh time base and phased color. In most cases the TBC correction can be controlled by, or gen-locked to, external sync.

Stability figures: The output stability specifications shown are for residual color jitter, and are related to the empirical finding that color faults attributable to time base instability are visually negligible if the jitter is about 5 ns or less. The FCC stability requirement is of course tied to the color subcarrier frequency tolerance of ± 10 Hz; this is a function of sync generator stability and is guaranteed in each case.

Segmented vs. non-segmented: A segmented mode (all quads, a few helicals) includes switching between two or more heads within a horizontal line. Non-segmented modes include no head switching within a line.

Averaging vs. line-by-line: Systems using an averaging method obtain a time base reference over a number of lines, and respond relatively slowly to large step errors, while handling slow or small errors promptly. Line-by-line systems respond relatively quickly to large step errors, and are faster to correct errors in velocity within a line.

same information can be read out in serial fashion. Obviously digital memories can work in the same manner and are commonly called shift registers.

Shift registers can be read out at a different and varying rate from the writing rate. Since the read rate can be varied proportionally to the time base error they can be used for time base correction. The data must be read in serial fashion; thus, step errors which occur at the time of head switching cannot be easily accommodated.

It is difficult to read and write simultaneously in a shift register type of memory. To solve this problem the memory must be segmented into two or more portions—one for loading while the other is being unloaded. Thus if a large dynamic correction range is desired you must provide more effective memory.

What was really needed was a memory that could skip or drop memory to handle step errors and for reasons of economy be able to read and write effectively at the same time. Fortunately, a random access memory or R.A.M. satisfies both of these requirements. The TBC-800 uses R.A.M.s or random memory.

An ideal video processing device should be transparent or said another way, should not degrade the signal it is passing. Since the TBC-800 was to be used in the highest quality broadcast markets, its quality had to be truly superior.

The useful bandwidth of a domestic broadcast signal is 4.2 MHz. A truly standalone TBC cannot define the input recorder bandwidth. Many recorders have spurious and unwanted signal above 4.2 MHz. Digitizing of a signal also produces spurious signal above 4.2 MHz. When these two spurious signals beat together they can result in an unwanted signal visible in the picture. To eliminate this possible problem the Ampex TBC-800 includes an input filter to suppress these unwanted components.

Signal-to-noise ratio is an important measure of performance in any video signal. A good TBC should not add any significant noise to the signal being passed. When a video signal is digitized it is divided into separate discrete steps or levels. The number of levels determines the ability to resolve precisely the signal being processed. The fact that the signal is now digital rather than analog causes minor errors in the signal level. The greater the number of bits used the smaller this error will be. This error is known as quantizing noise. It is generally agreed that an eight bit digitizing system will produce faithfully broadcast quality signals. An eight bit binary system can detect 256 levels.

When a video signal is digitized an electronic circuit must decide the level of the incoming signal. At some point between two levels an area of indecision is encountered. The electronic circuits cannot decide on either level and fluctuates between them. This region of indecision results in noise. The smaller the region of indecision the less the effect this noise will have on the output video signal. Ampex has developed special circuits which keep the quantizing noise level to its theoretical value. The equivalent signal-to-noise ratio of the TBC-800 is 60 db, truly broadcast quality.

Another video recorder defect is signal dropout. The TBC-800 includes circuits which replace dropouts with the video signal with in-phase chrominance information from a previous line. The R.F. signal in

the recorder is used to detect the signal dropout.

As an option further signal improvement can be obtained by the use of a line-by-line velocity compensator. Shift register memories cannot correct rapid velocity errors on a line-by-line basis since they cannot drop or add bits. They must average over several lines and therefore are only sensitive to slow velocity errors—another reason why the TBC-800 uses a random access memory. The velocity errors on single scan per field recorders are corrected so they are no more than 2°. This option greatly improves the ability of the user to make quality multigeneration dubs. However, the velocity compensator cannot handle step type errors from quad machines.

The window on the TBC-800 is more than plus or minus one horizontal line. When the recorder reaches the end of the correction range a line must be either added or dropped. Special care was used in the design of this function so that no picture change can be noticed other than the one line shift of the picture up or down.

Many other features such as the built-in sync generator, the phase corrected output sync shaping filters, and the controlled pulse processing make the Ampex TBC-800 an outstanding machine.

The CBS Viditec Time Base Corrector, Model CLD-1500

The CBS Laboratories Viditec Time Base Corrector is designed to work with any non-segmented format helical VTR satisfying the following basic requirements:

- Playback signal-to-noise ratio of at least 40 db;
- Playback time base variations such that color subcarrier is held to within ± 7.5 kHz of standard frequency;
- Maximum horizontal phase excursion not exceeding window of approximately 190 micro-seconds;
- Capstan capable of being servoed to local sync reference during playback;
- Sufficient bandwidth for direct recording of NTSC video or heterodyne color.

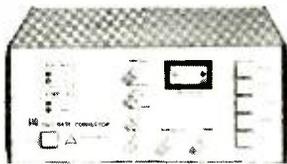
The Viditec design philosophy may be described as:

- 1) stabilizing the *frequency* variations created by the VTR by means of a digital, "elastic" memory with a "writing" clock which tracks the VTR playback frequency variations and with a "reading" clock determined by local sync; and
- 2) adjusting the H and color phase errors as part of the memory "reading" function.

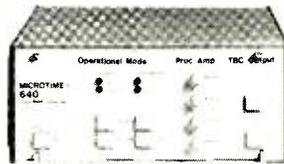
Thus the uniqueness of the Viditec design is the elimination of an H-sync dependent phase-lock servo loop to generate either a write-clock or a read-clock. In this way, the system avoids the "hook" at the top of the picture when the servo attempts to phase correct a skew error of several microseconds, or following H sync dropouts. In the Viditec, the write clock is servo-locked to playback color burst only (in direct color mode) requiring corrections of only some fraction of the 280 monosecond color period.

H phase correction is subsequently achieved after the video has been frequency stabilized in the readout of memory and it does *not* involve a phase-lock loop time-constant. Full H correction is immediately achievable.

Honestly now, which TBC is



ANALOG.



DIGITAL.

Only MICROTIME can give you an unbiased answer. Because we are the only people who make both analog and digital time base corrector systems. Sometimes one system is best, sometimes the other. With MICROTIME, you always get the system best for you:

The new MICROTIME 640 TBC is now in production. This state-of-the-art TBC overcomes all the VTR and signal format restrictions of earlier digital units. With its wide window, it easily handles wild and wiggly signals from low-cost VTRs with large tension errors. It offers an outstanding signal-to-noise ratio and optimized differential phase and differential gain.

The 640 also offers direct/heterodyne processing, a built-in Proc Amp, and is the only digital with Signal Status Indicators.

Our MICROTIME 610 HETEROCOLOR analog TBC is an outstandingly versatile and cost-effective performer where VTR signals are more stable. As the most advanced analog TBC in the industry, it replaces all the separate stand-alone units that preceded it and handles the output of any VTR from quarter-inch to quad, NTSC direct or heterodyne color, EIA broadcast

or industrial sync.

Experience. We introduced the first stand-alone TBC three years ago and have been known for reliability ever since. You'll find our equipment designed with such unique features as front-panel Proc Amp controls to control and optimize the signal quality. Rear-lighted operating mode selectors. Input Signal Status indicators. And hot new features like DCS (Derived Coherent Subcarrier) mode, to let you dub up from a battery-pack to quad. A combination of features available in MICROTIME TBCs and nowhere else.

Our approach. We never try to sell you any TBC until we understand your system's requirements. Then, if a TBC will help, we'll recommend the MICROTIME model that's your best price/performance buy—we're not locked into pushing one system or the other at you. We meet your needs—not vice versa.

Send for our free new illustrated applications brochure that discusses time base error correction in non-technical language. Or call us for the name of the nearest distributor and a no-obligations demo at your facility.

Ask us. We're the only people who offer both.

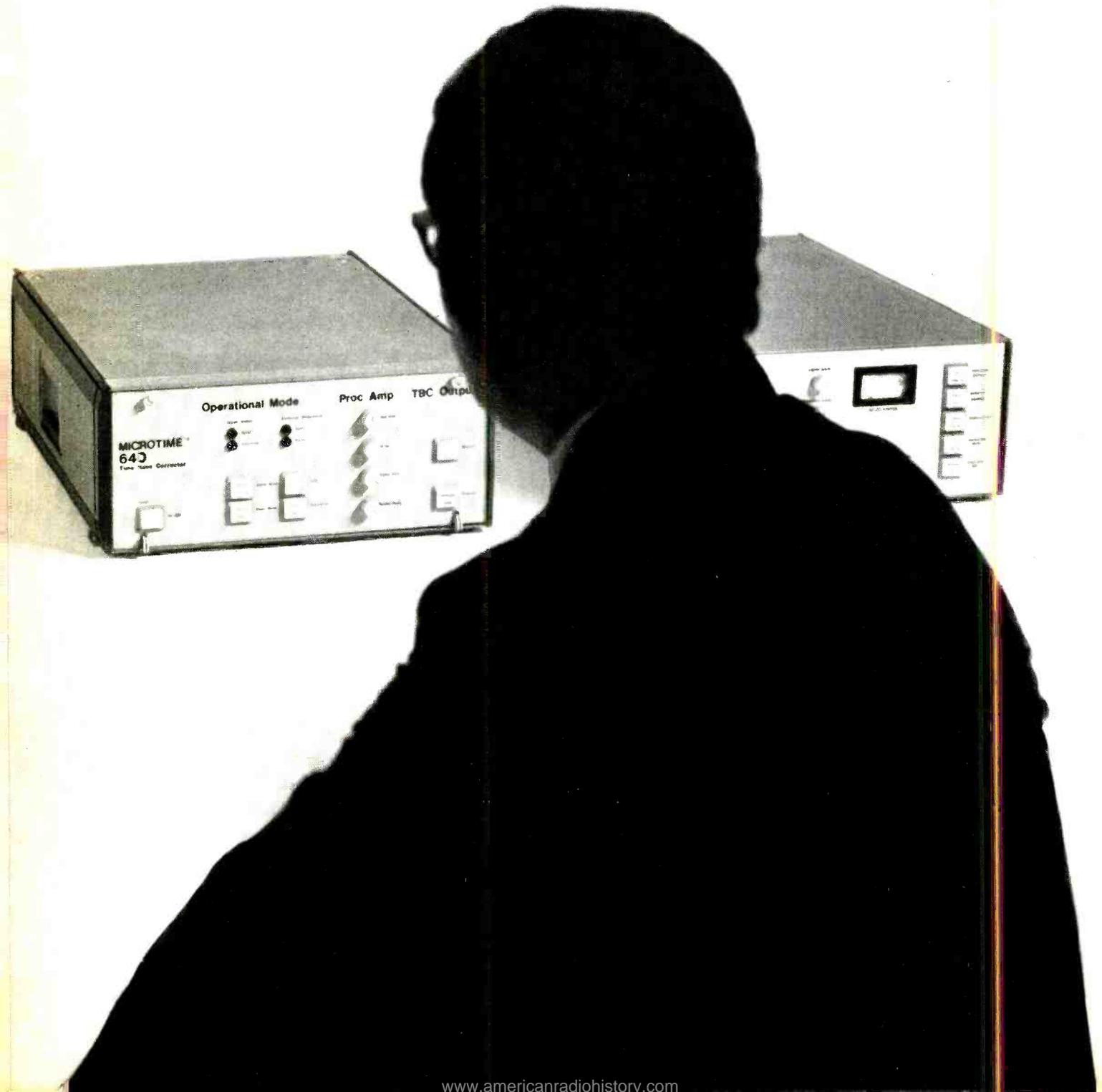


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GREAT IDEA CONTEST FINALISTS

Pick Windjammer cruise winners by voting for the best Great Idea of 1974. Four lucky engineers will each get a free Windjammers Cruise for two in the Caribbean. Your vote will decide! Simply tell us on the Reader Service Card ballot which idea you think most deserving in each of the four categories: AM Class I & II, AM Class III & IV, FM and TV. Do it now.

Presented below in the four categories are nearly two dozen of the 84 Great Ideas which appeared in BM/E earlier this year. These ideas got the highest ranking on scale of ten scoring. We want you to pick the final winner by telling us which ideas you like best. In most cases, the entries are as they originally appeared. In some instances we have edited out details of circuit descriptions for space purposes. You can

Stuffing the Ballot Box Unnecessary

In some of the monthly voting, an entrants gross score was enhanced by hordes of 10-ratings sent in by buddies. In compiling the list of finalists we took this "stacking" into account. You don't have to "electioneer" for your friends. Good ideas are recognized at other stations and we have finalists who got there even by totally ignoring multiple votes from a single station.

refer back to the original if you wish to.

The range and scope of Great Ideas contributed in 1974 exceeded our expectations. And the ingenuity displayed in solving problems reveals BM/E's broadcast engineer readers to be a creative group. Even small stations have great talent on their staffs as the entries under AM Class III & IV show. If we were surprised at all, it was the fact that a solution to an industry problem didn't have to be profound or complex. Sometimes quite simple ideas got the greatest kudos.

We should add that some great Great Ideas published earlier are not amongst the finalists. Many, many contributions, of video engineers in particular, ranked well and we were forced to eliminate some very deserving entries which were only a few points below those presented.

We thank every engineer who took time to enter the contest—and those who voted. Many readers told

us on the Reader Service Card that the Great Idea contest was the greatest, but failed to cast a specific ballot. Maybe they all were so good you couldn't make up your mind. So we urge you again to vote. And if you have adopted an idea or two for your own station, tell us that—simply write a note on the Reader Card.

To remind you once again, there will be one winner in each of four categories: AM (5 kW and below); AM (10 kW and above); FM and TV. Nine runners up will receive Certificate of Merit awards: Audio (four awards)—TV, FM, AM (Class I or II), AM (Class III or IV); RF (four awards—same classes as audio; and Video (one award)—TV. Winners will be informed in February and announced in the March 1975 issue.

AM CLASS III, IV

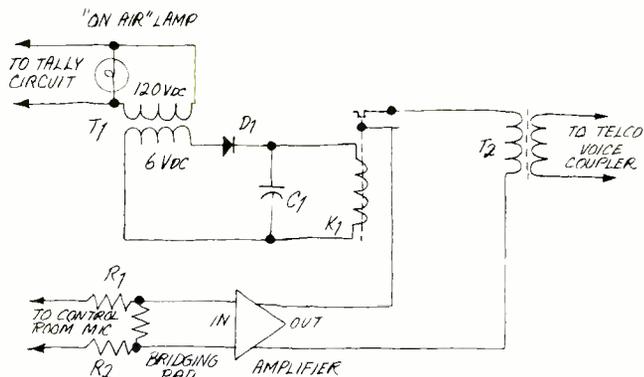
1. Telephone Operation on Talk Shows.

*Michael Brooks, Engineer, WTHD/
WAFL-FM, Milford, DE*

Problem: To eliminate the need for our non-technical operators to do anything to place a call on a live show "on-air" other than the operation of the control room "beeper pot" and punching up the desired phone line. At the same time we were also looking for a solution to prevent the degradation of the quality of the announcers voice when used in conjunction with the limited response of telephone head sets or desk sets.

We also wanted to solve the recurrent problem of incoming callers being unable to hear the pre-delayed voice of the operator-DJ, which occurred when talking to a distant hand set or desk amp.

Solution: The accompanying schematic shows the system we developed. The idea was to take a feed from the control room microphone through a resistive bridging network. The only trick involved was the use of a relay to disconnect the amplifier microphone signal from the tele-



Brooks' telco circuit

phone when the control room mic pot is in the neutral position.

Note that a switched feed could have been taken from the control board. However, to preserve our low level of hum and noise and freedom from switching transients it was decided to avoid any "piggy-backing" or "jerry rigging" inside the master control board if possible. Hence we developed the relay interrupt circuit, driven by the "on-air" tally circuit.

Some jockeying of levels was necessary to match the wide range of phone line levels on incoming calls. It was also decided to give the announcer an "edge" of approximately 6dB over the incoming callers to maintain dominance with the help of our normal program AGC system. The system has also ended the callers' complaints of inability to hear the announcer on a pre-delay basis.

This idea originally appeared as No. 30, May, 1974.

2. Add-on Relay Finds Cart Splices.

Gary L. Glaenger, Chief Engineer, KEEY-AM/FM, St. Paul, Minn.

Problem: To build an inexpensive cart splice finder utilizing the existing machine.

This unit cues carts to the splice prior to recording spots. It is built in a Gates cart recorder-reproducer. The circuit utilizes the machine's 8 kHz cue tone. The tone is keyed continuously to hold the Stop circuit through relay K1 wired to the detector contacts.

Solution: When the Start button is pushed, +24 VDC is steered via diodes D1 and D2 to the Start Circuit and to relay K1. When the playback head picks up the cue tone, the relay looks in through the 8 kHz detector contacts, relay contact K1-1, and the relay coil. Contacts K1-2

and K1-3 hold the Stop circuit closed. Contact K1-4 keys the 8 kHz oscillator in the record amplifier.

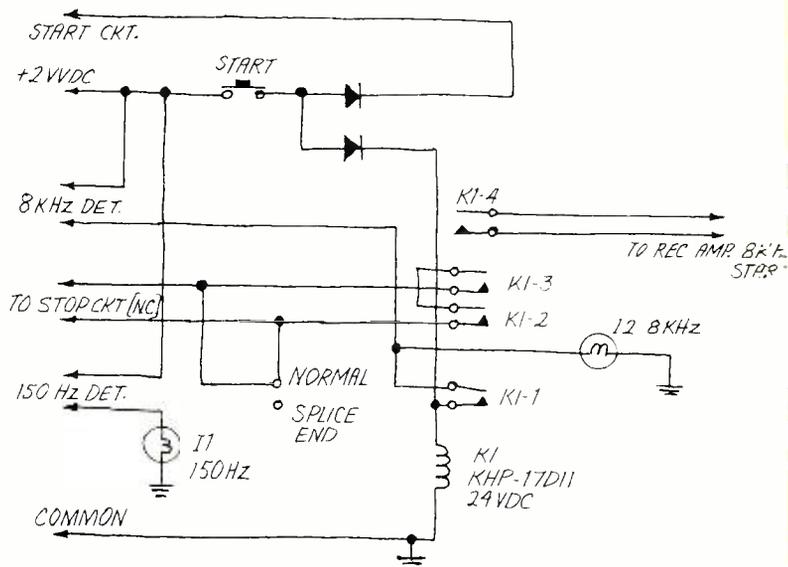
When the splice travels over the playback head, the cue tone drops out. Detector contacts open, causing K1 to drop out and stop the machine.

Switch S1 returns the deck to normal operation by completing the Stop circuit.

Lamps I1 and I2 were added to visually indicate 150 and 8000 Hz tones during normal operation. They are well worth the added effort, especially if carts are to be used in an automated system.

A very-well-made splice may pass over the heads undetected. This is caused by relay K1; the detector does drop out, but relay inertia prevents K1 from doing so. To insure proper operation of the splice finder, it is a very simple matter to place a small length of splicing tape on the oxide side of the tape.

The circuit also give a good indication of pad and corner post problems, as the Start button is released.



Glaenger's splice finder

either the pad is worn or misaligned, or the post is not seated.

This idea originally appeared as No. 50, July, 1974.

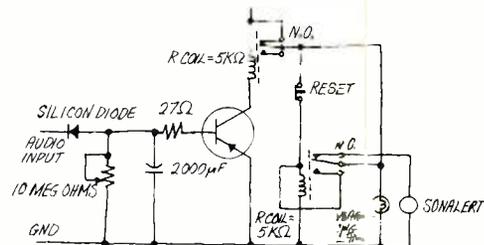
3. Cheap Silence Sensor

Bob Shellady, KXIC AM/FM, Iowa City, Iowa

Problem: To alert studio personnel that no audio is being broadcast.

Even the best of operators can be the victim of "nothing on the air" situations. The problem is to detect the loss even if a carrier is present.

Solution: A homebrew silence sensor is attached to the speaker terminals of any available receiver. It is set for intervals of low audio and can be either mini box- or rack-mounted. Total cost: under \$20



Shellady's silencer

The 2000 uF capacitor is charged through the diode by audio at the speaker terminals of the receiver. The transistor is held at cutoff by that charge. A 10 megohm potentiometer across the capacitor bleeds the charge off at a rate determined by its setting, allowing a change in time constant for alarm purposes. The 28 V relay is used to allow the sander (we used a Mallory Sonalert) to be

GREAT IDEAS

cut off when desired, but will automatically reset upon restoration of audio to prevent inadvertent disabling of the unit. Operation voltage can be tapped from the host receiver. If the receiver doesn't finish sufficient charging voltage, insert a common voice coil-to-line transformer between the speaker terminals and diode cathode.

This idea originally appeared as No. 56, September, 1974.

4. Equalizer for Remote Lines.

Howard L. Enstrom, General Manager, KBMY, Billings, Montana.

Problem: To develop an inexpensive equalizer that would allow improvement of program quality on many remote pickups.

Solution: This is a KBMY-built unit designed to fill the need for equalizing remote lines which are ordered for a one-time use only, when it is not economical to go to the expense of having the local telephone company equalize such lines.

The remote program line equalizer design is divided into two basic sections. Either section, one a low frequency cut-off, the other a high frequency equalization, may be switched into the signal path independently, or both may be switched in so as to be in tandem. The latter condition would permit restoration of high frequencies while, at the same time, reduce objectionable hum or very low frequency room resonance.

The design simply makes use of either of two series capacitors, for 4 kHz or 8 kHz equalization, and combinations of paralleled resistors

to alter the effective capacitive reactance of the elements at various frequencies. Operation of SW-4 to any of the six positions then becomes, in effect, a slope control. The best curve needed to compensate for the line loss may be achieved using a combination of either 8 or 4 kHz equalization and the chosen slope control setting.

For more permanent lines, the sending end might be provided with an audio generator source calibrated for constant level, while careful adjustments are made at the receiving end for measured equalization. In most cases, a near-perfect reciprocal of line losses may be achieved.

Equalizing losses, however, must be incurred. Thus, a high-quality line amplifier must be used in conjunction with the unit when severe losses must be compensated for.

The unit employs the high-quality WE 111-C output coil which is connected in a 600-to-600-ohm configuration. To assure that the coil looks into a purely resistive load, a minimum-loss 6 db. pad is wired in. Thus, we have the need to overcome not only equalization losses, but the additional pad loss. An amplifier used for utility purposes ought to have an available gain of about 50 db, with a 600 ohm input and 600 ohm output impedance.

The Lo-Frequency Cut-Off and

the High Frequency Equalization sections may be connected to tandem by operating SW-1 In and SW-2 In. Zero attenuation is achieved when the unit is left in the program circuit and Sw-1 and Sw-2 are in the Out positions.

This idea originally appeared as No. 22, April, 1974.

5. Beacon Flasher Takes Load Off the Contacts.

D. Khalil Jones, Studio Engineer, KID AM-FM TV

Problem: To eliminate the arcing on tower light flashers.

A constant headache for stations required to operate flashing beacons on their towers is the often premature pitting of contacts. These flashers must switch at least 1000-watt loads and most of them use a set of mechanically cam-driven contacts. These contacts need considerable attention to keep them in good operating conditions.

Solution: Use a Triac to switch the load and use the contacts to operate the Triac. This has solved the contact problem. We have been using three of these modified beacon flasher circuits for several years without electrical failure.

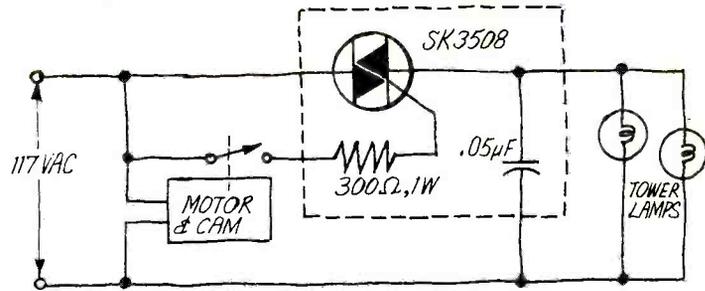
This idea originally appeared as No. 58, September, 1974.

6. Talk Show Monitoring System.

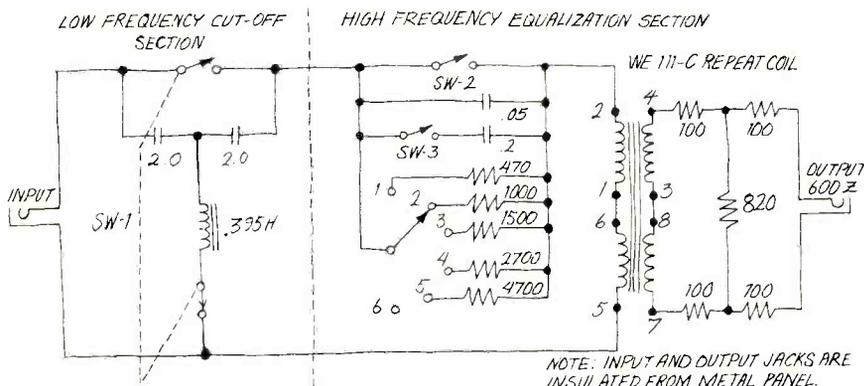
James Cate, Chief Engineer, KOKX, Keokuk, Ia.

Problem: To relieve overloading of the phone system during talk shows.

After initiating a talk show, we found that the receptionist was devoting her full time to keeping track of which incoming calls had, and had not, been answered by the announcer.



Jones' beacon flasher

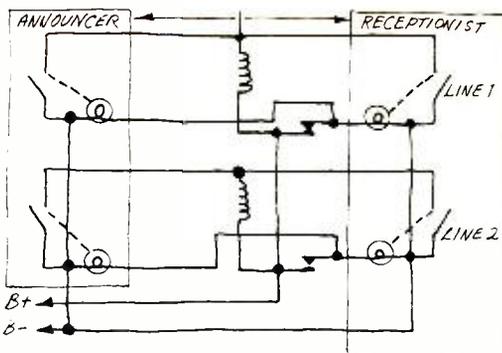


Enstrom's equalizer

er. If the receptionist became involved in a long distance phone call or some other distraction, a person relieving her of the incoming call was completely lost as to which calls were for what purpose. We also found that our only intercom line (part of the phone system) was being used constantly for the talk show.

Solution: The system consists of two identical boxes; one for the receptionist, the other for the announcer. These boxes (shown as a two-line circuit in the figure) have one push button switch for each incoming line and are thus marked. These switches also have a translucent button that allows an indicator lamp to be seen. The two boxes are connected together by pulse type relays (momentarily energized) and are energized whenever a button is pushed.

Now when a call is for the talk show, the receptionist pushes the appropriate button for the proper line.



Cate's talk show monitor

Her indicator lights, as does the announcer's. The announcer, upon seeing this, answers the proper line and pushes his button. This turns off both the announcer's and the receptionist's indicators, and the receptionist knows that call has been answered.

With this monitor system, she can spend more time attending to her

normal duties. If she leaves her desk during a show, the replacement can tell immediately who the incoming calls are for, and which have not been answered. The intercom line is not used at all for the talk show and interoffice calls can proceed as usual.

This idea originally appeared as No. 84, November, 1974.

Enter Now

Great Idea Contest 1975—More Prizes

BM/E continues the Great Idea Contest in 1975 starting with the March issue. Prizes are expanded—three Grand Prizes plus ten secondary prizes. Top prizes are 15-inch Panasonic color TV sets. Secondary prizes are Panasonic AM-FM Clock radios. Eligibility will be the same as in 1974, but categories are changed slightly. Major change is to recognize control circuits and systems separately.

To enter now use the entry form below.

Entry Form for BM/E Great Idea Contest—1975

Mail to: **Editors, BM/E**
274 Madison Avenue
New York, New York 10016

Name _____ Title _____

Station Call Letters _____

Address _____

City _____

State _____ Zip _____

Telephone No. _____

Licensee _____

Class of Station at which idea is used (check one)

TV _____ FM _____ AM _____

Category: Audio _____ RF _____ Video _____ Control _____

Objective or Problem: (in few words; use separate sheet for details) _____

Solution: (Use separate sheet—500 words max)

I assert that, to the best of my knowledge, * the idea submitted is original with this station; and I hereby give BM/E permission to publish the material.

Signed _____ Date _____

* If you feel credit for prior work or antecedents should be given to someone outside of the station, indicate to whom and when:

Rules for BM/E's Great Idea Contest

1. Eligibility: All station personnel are eligible. Consultants to the industry may enter if the entry indicates the specific station or stations using the idea or concept. Manufacturers of equipment or their representatives are not eligible.

2. How to Enter: Use the Official Entry Form on this page or simply send BM/E a description of your work. State the objective or problem and your solution. Include diagrams, drawings, or glossy photos, as appropriate. Artwork must be legible but need not be directly reproducible but not exceeding three in number. Camera reproducible material is preferred. Length can vary, but should not exceed 500 words. BM/E reserves the right to edit material. Entry should include: Name, title, station affiliation, and the class of station—TV, FM, AM. Indicate if idea is completely original with you.

3. Material Accepted for Publication: BM/E editors will make all decisions regarding acceptability for publication. If duplicative or similar ideas are received, BM/E editors will judge which entry or entries to accept. A \$10 honorarium will be paid for each item published.

4. Voting: Every reader of BM/E is entitled to rank the ideas published. This can be done on the Reader Service Card in the magazine or by letters or cards sent to the BM/E office. To vote, readers should select the three ideas they like best and rank them 1, 2, or 3.

5. Winners: Relative ranking of each month's entries will be published periodically. Top-rated entries for various categories will be republished in late 1975 for a second and final round of scoring. Final winners will be picked in February 1976 and notified by mail. Winners will be published in the March 1976 issue of BM/E.

6. Prizes and Awards: Three top prizes will be awarded: a color TV set for the entry receiving the most votes in the respective categories of AM, FM and TV. Ten AM-FM radios will be awarded as secondary prizes for the highest voted entries in the following additional categories (except the three top winners): audio (three prizes one each in categories AM, FM, TV); (three prizes one each in the categories of AM, FM, TV); Control (three prizes one each in the categories of AM, FM, TV); Video (one prize in TV).

GREAT IDEAS

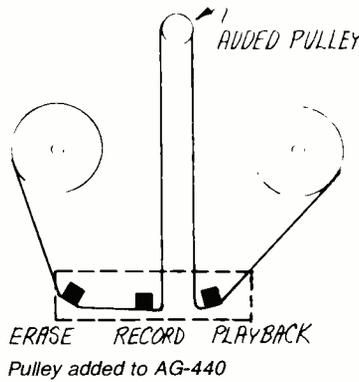
AM CLASS I, II

**11. Modified AG-440
Rebroadcasts Delayed-
Tape Program.**

Jack Hurray, Engineer, WIXY-WDOK,
Cleveland, Ohio

Problem: To design a tape delay which has the following features: 1) it should use open reel tape with 1.5 hours capacity which can be saved for rebroadcast; 2) the disc jockey can easily go from delay to live programming; 3) no splices to run over as with cartridge-type delay systems; 4) delay time is 4 secs. at 7.5 ips; 5) the machine should stop automatically about 5 secs. after the board operator punches the Delay-Live ("panic") button.

Solution: Our station built a tape delay by modifying one Ampex 440. However, different systems can be adapted from this idea. The only mechanical modification necessary was to reduce the tape hold-back tension. Also, a small hole was drilled at the top of the transport for the pulley wheel used to extend the distance the tape travels from record to playback heads. The pulley, mounted between the tape supply and take-up reels, is used to loop the tape during talk



shows but not when the tape is rebroadcast. Capacitor C2 keeps the machine running to erase the tape that has not reached the playback head.

This idea originally appeared as No. 65, October, 1974.

**12. Transmitter
Switchover Relay Retains
Continuity.**

Dennis Feely, Chief Engineer, WTNJ,
Trenton, J.J.

Problem: To switch monitor, audio and antenna signals and cable paths between the main and auxiliary transmitters without losing the versatility of individual control of monitors. Since it was a problem to disconnect the RF monitors from the main transmitter to use on the auxiliary unit when performing on-air

frequency adjustments, it was necessary to develop a relay switching arrangement to have individual control over the switching of the antenna, audio and monitors. Also found necessary was a remote control Master switch to allow switching of all functions at once.

Solution: The schematic diagram shows the switching used. The right-most section controls the switching for the modulation and frequency monitors. A DPDT coax relay takes care of the RF which is controlled by K1. Relay K2 activates K1 and, as in all the relays, it is connected as a holding relay by its own contacts. In the ON mode (or Main) K1 is not energized by K2; the monitors are connected to the Main transmitter. When switch R1 is depressed, this energizes K2 which is held in by its own contacts (9&5) and through contacts 3 and 11 of K8 and G1. If switch G1 or K8 is energized, the holding circuit will break and allow K2 to return to the Main position. Also, should power fail momentarily, K2 will return to the Main position.

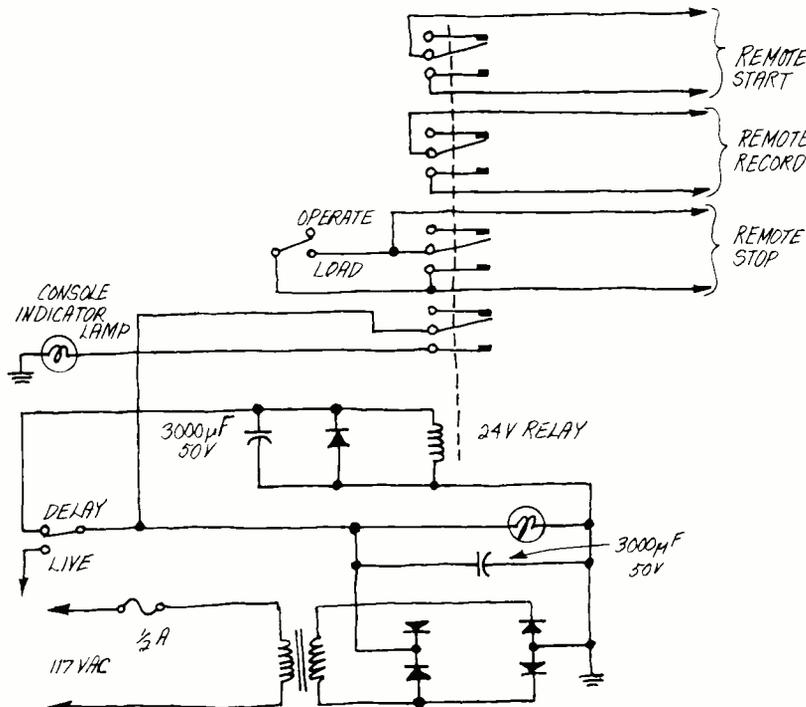
The middle section switches the audio. Undergrounded shielded cable eliminates stray RF or AC hum from being induced into relay K3. It also follows with the same holding circuits as the RF monitor relay.

The third section switches the antenna relay. It is equipped with its own disconnect switches; even though AC is continuously applied through K4, the antenna relay is connected so as to switch one transmitter into the phasor and the other into the dummy load. This section also includes holding circuits.

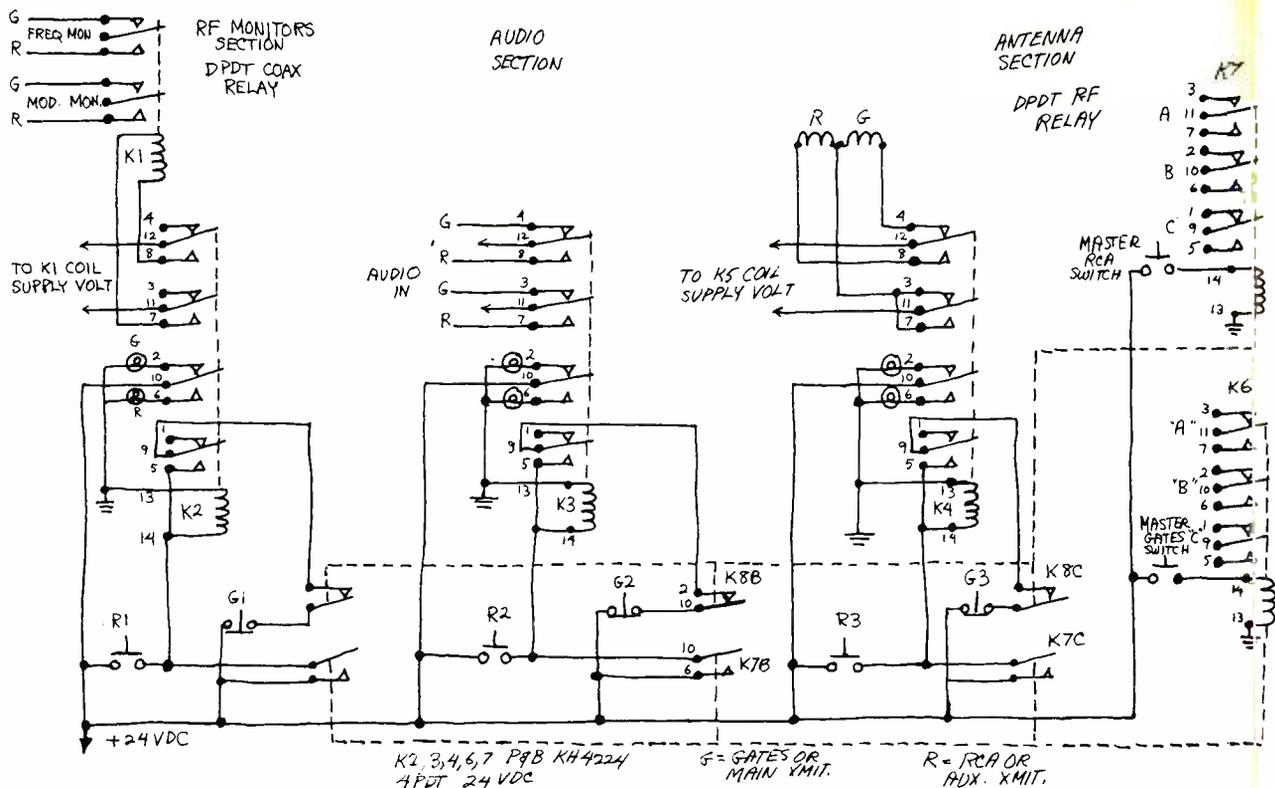
The last section contains the two master switches. Both are the momentary-contact type to allow easy compatibility with a remote control system. The master RCA switch uses the normally open contacts to activate all three relays simultaneously while the Gates master control switch uses are normally closed set and releases all the holding circuits simultaneously.

Tally lamps indicate the status of each relay. The system was mounted on a blank rack panel. Quick disconnect wiring via a terminal block provides switch and tally lamp accessibility for remote connections. The relays are plug-in types.

This idea originally appeared as No. 74, October, 1974.



Hurray's delay system



Felly's continuity system

13. Motor-Driven Coupler Eliminates Limit Switches.

Manuel Taitz, Transmitter Supervisor, WSB-AM, Atlanta, Ga.

Problem: To protect remote-control, motor-driven transmitter RF output pots without resorting to limit switches.

Solution: When installing remote control on both the WE 407A and Continental 317B transmitters, I used the friction drive pulley and disc from the fine-tuning control of two scrapped TV tuners. The friction-drive pulleys are attached to the motor pulleys, and the driven discs to the pots. This permits the drive to slip without damage when the pot reaches the end of its travel, yet provides local control of the pot by turning the drive by hand.

This idea originally appeared as No. 47, July, 1974.

14. Automatic AM Turnoff/ Alarm for Combo Jocks.

Fred Clinger, Chief Engineer, WBCO/ WBCO-FM, Bucyrus, Ohio

Problem: To alert the night shift combo operator (at an AM/FM facility) to shut down the Am transmitter. Night shift operators, often

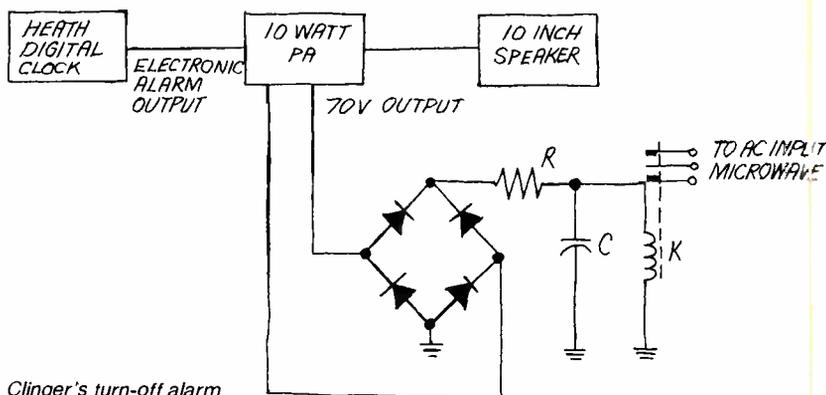
both jock and engineer, sometimes don't turn off the AM transmitter at the proper time—and leave the station open for an FCC citation. The problem at our AM/FM station was solved using a Heath Co. digital clock to operate an aural alarm. Then, if the boardman misses this cue, the unit automatically shuts down the microwave remote controller, which turns off the AM transmitter.

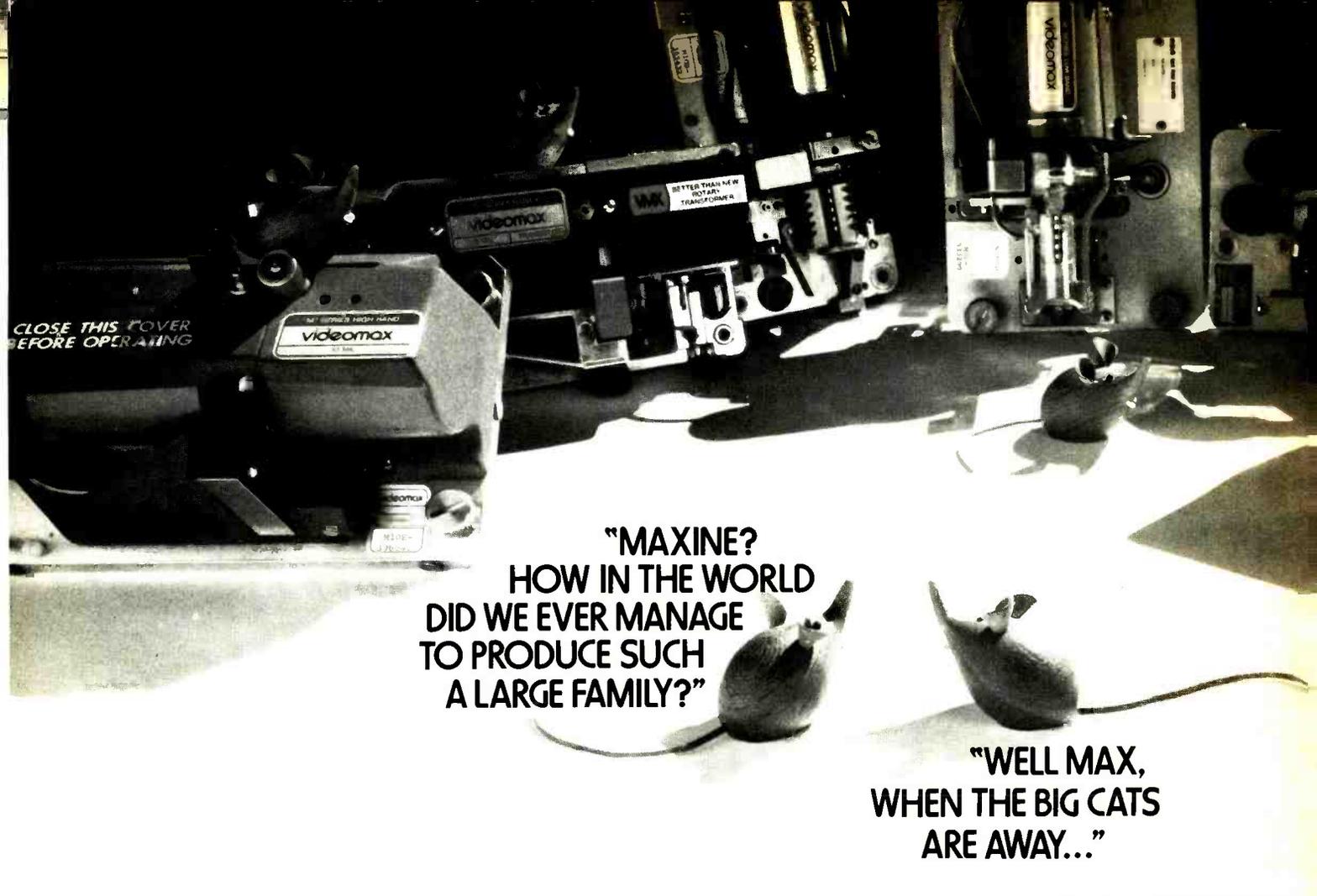
Solution: The digital clock alarm goes off, and generates an electronic tone, which usually can be heard via a small speaker mounted in the bottom of the case. Alarm output for our application is taken from the speaker terminals and fed to a 10-watt PA amplifier. The amp drives a

10-in. speaker mounted in the control room.

Output from the 70-volt line in the PA amp is applied to a diode bridge rectifier. The resulting DC signal charges capacitor C1 via resistor R1. Sufficient voltage across C1 trips a 12 VDC relay, which breaks the AC power to the microwave unit. This action shuts down both transmitters via the microwave carrier relay, and the filament circuits in the transmitters.

We have found this to be a very good educational tool. First, the combo man learns very quickly since he gets an ear-shattering beep from the PA. Then, after a few seconds the microwave shuts down both AM and FM transmitters. This means





**"MAXINE?
HOW IN THE WORLD
DID WE EVER MANAGE
TO PRODUCE SUCH
A LARGE FAMILY?"**

**"WELL MAX,
WHEN THE BIG CATS
ARE AWAY..."**

GREAT IDEAS

that he will be off the FM band about four minutes, due to the cold-filament lockout on the FM transmitter. This happens to the combo man once or twice before he learns to shut down the AM facility on time.

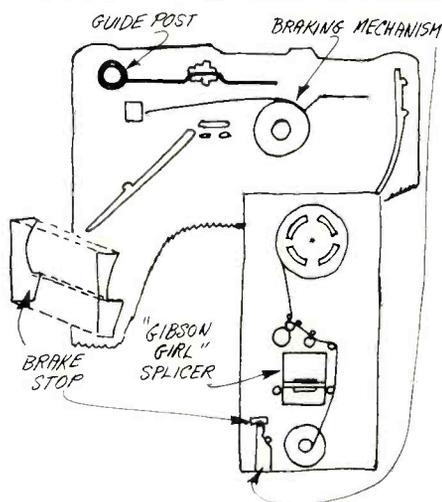
This idea originally appeared as No. 43, June, 1974.

FM

20. Semi-Automatic Cartridge Winder.

Chuck Marsh & Don Cowden, WHFB, Benton Harbor, Mich.

Problem: To reduce the time consumed in measuring, splicing, and assembly of in-station custom-length tape carts. We prefer to wind our own carts for two reasons: the overall cost is less; it permits us to wind them to any desired length at a moment's notice.



Marsh & Cowden's cart winder

Solution: We devised a modification to our Spotmaster Cart Winder that, besides winding tape on the cart, also aids measurement and tape splicing. Removing the newly wound reel from the winder, placing it in the cart body, measuring and cutting the tape so ends are parallel, and applying and trimming the splicing tape is eliminated with this method.

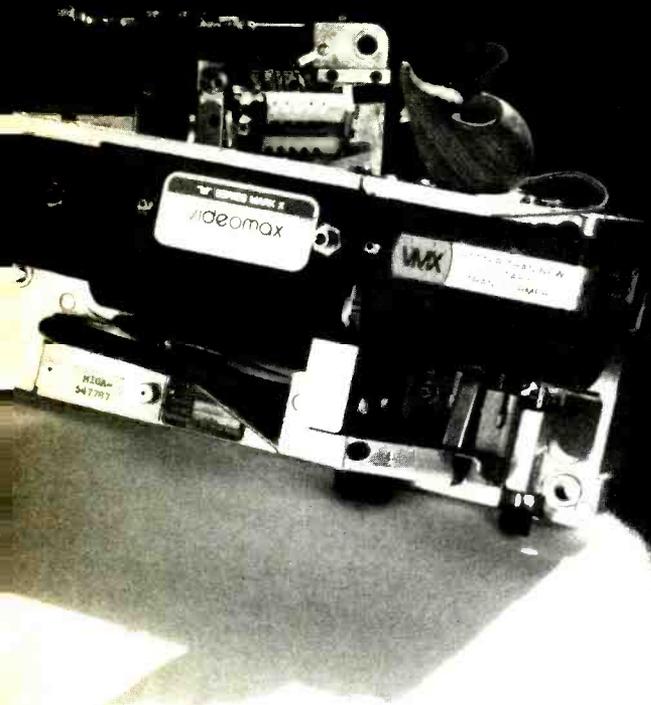
The parts necessary for the modi-

fication came from a discarded cartridge and a small "Gibson Girl" splicer.

The posts used as tape guides are fabricated from two nylon cartridge posts glued top-to-top. The reel braking mechanism is also taken from a discarded cartridge and cut to size on a grinder. The stop used to hold the brake is simply a piece of cartridge body cut to size and notched.

When winding a cart, the spring is pulled back and held in place by the notch. When measuring and splicing the tape, the spring is released and allowed to slip into place between the notches on the cart reel, thus holding the reel motionless while the proper amount of tape is threaded out and into position on the splicer. After splicing, remove the reel and place in the cart body, insert the retainer arm, and secure the top cover. All the parts are attached to the cart winder with a water-base glue, bonding them to the winder with sufficient strength yet still allowing them to be removed without damage.

This idea originally appeared as No. 69, October, 1974.



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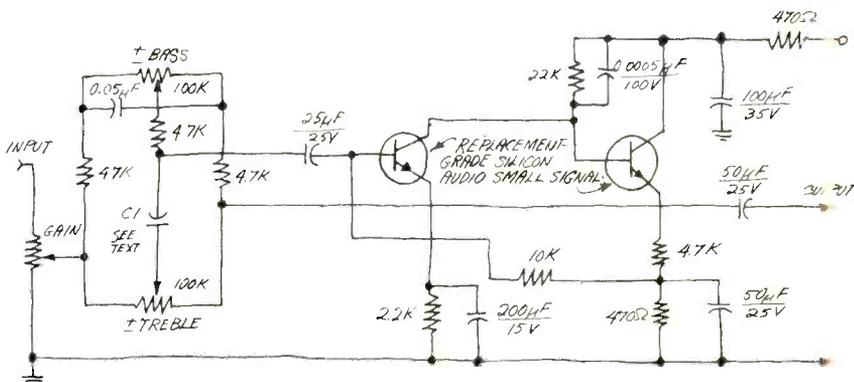
Circle 131 on Reader Service Card

21. Inexpensive Multi-purpose Audio Equalizer.

Philip Sonksen, Chief Engineer, KLSS-FM, KSMN-AM, Mason City, Iowa

Problem: To equalize program lines, microphones or almost any audio source without spending a lot of money. The equalizer I have constructed is being used to tailor the response of our Telco program lines to the FM transmitter, which, at times, leaves something to be desired. The equalizer is also being used to adjust response characteristics of microphones throughout the station, such as in FM and AM control rooms and in news and commercial production studios. It also becomes invaluable when it is rack-mounted in the commercial production room, to be patched in between different sources on the patch panel for such purposes as tape dubbing or equalizing a poor-quality tape.

Solution: The following equalizer can be built for under \$15 (mono; under \$25 for stereo). The reason the equalizer is so inexpensive: it has no power supply of its own and bor-



Sonksen's equalizer

rows power from other sources: it contains no inductors or transformers.

Gain is about unity. A few words of caution: anything much higher than 0 dB will overload the equalizer, and inputs of less than -35 dB will tend to produce white noise.

To use this equalizer for microphones, it must be inserted between the first and second stages of amplification in a control board. A microphone used directly on the input of the equalizer will produce excessive white noise at its output. Distortion from -20 dB to 0 dB, however, is

low.

Noise level also depends on the power supply filter. Using a battery supply, for -10 dB input, noise level was -70 dB with no equalizing boost or cut. The input of the equalizer is medium-to-high impedance; the output is relatively low impedance.

Rf radiation does not affect the performance of the equalizer. By changing the value of capacitor C1 (0.001 uF), you can alter its frequency characteristics. By increasing the value of C1, you can move the high-frequency curve of the equalizer down to high mid-range which

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transmitter, and hold it on for as long as you speak. A short time delay (determined by the value of C1 and R1) cuts down on chatter between words. Audio is coupled straight through the hybrid to the transmitter mike input. A small pad may be needed to match levels.

Audio from the r.p.u. receiver is introduced to the hybrid at T2.

To balance the hybrid, I use the receiver's squelch noise and adjust for best null at the transmitter mike terminal.

This idea originally appeared as No. 54, September, 1974.

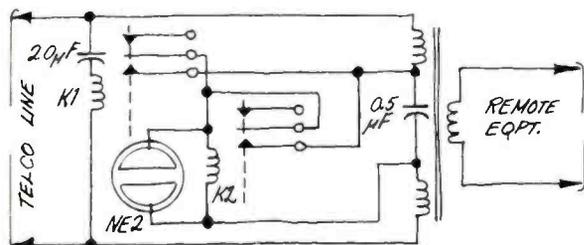
24. Voice Coupler Auto Answerer.

C. Donald Rees II, V.P. Chief Op., WAMX-FM, Ashland, Ky.

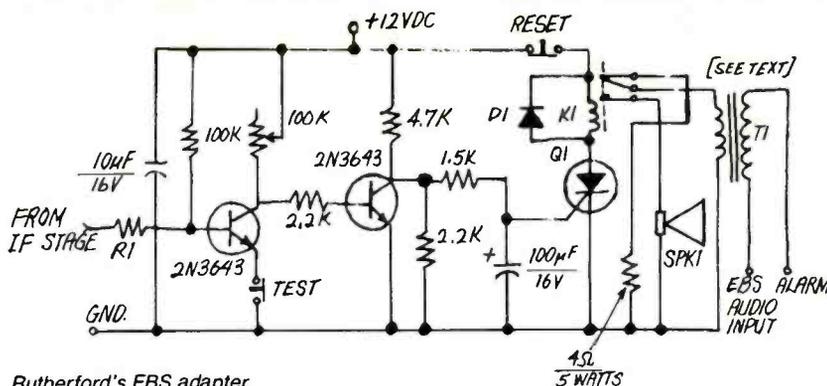
Problem: To prevent telco dropout while using a voice coupler for remote broadcasts. When the connection is broken, it often is not possible to restore it unless the remote crew takes equipment off the line, or until a phone company operator restores the connection. Besides taking time, it can cause havoc if the line is lost in the middle of a barnburner.

Solution: Our device automatically answers the voice coupler line at the remote site and connects the remote equipment to the line. Should the line drop out during the broadcast, it will automatically disconnect. Then the station engineer, oftentimes a technically inexperienced disc jockey, redials the voice coupler number and the remote unit will reset everything.

A low-power AC relay and capacitor detects the ringing voltage on the line and energizes DC relay K2. It pulls in and answers the circuit. Current flow through the coil resistance is sufficient to allow the relay to hold the line until the circuit is broken by either the calling party, or circuit failure. Neon lamp NE2



Rees' auto voice coupler



Rutherford's EBS adapter

flashes whenever the unit answers a call and gives the remote crew a visual indication someone has called. It also acts as the ring voltage load as NE2 fires.

The repeat coil is type IIIc.

Note that the circuit must be used on a local exchange loop. It may not work on some telco carrier circuits.

This idea originally appeared as No. 33, May, 1974.

25. A Simple EBS Adapter.

Terry Rutherford, Engineer, WKNO TV/FM, Memphis, Tenn.

Problem: To construct an EBS carrier alarm for use with a solid-state receiver.

Solution: We built a simple, inexpensive solid-state carrier alarm using two 2N3643 transistors, one SCR, and one relay. The alarm was used with a solid-state receiver and performed well.

Resistor R1 (5.2K) is connected to the emitter of the receiver's first IF amplifier. Voltage varies with signal strength across this emitter resistor. When the station's carrier is interrupted, the bias of Q1 will increase slightly and collector voltage drops. Transistor Q2's bias decreases a few tenths of a volt and allows the collector voltage to increase. With this collector voltage increase, Q1 is triggered on, and K1 pulls in. Audio alerting the operator feeds via the output transformer to the speaker.

The 100K pot in the collector of Q1 adjusts the alarm's tip point.

Tune in the station and measure the SCR's gate voltage; adjust the pot for a bias that will not trigger it whenever the carrier is interrupted. When setting the pot, the Reset switch is held down.

This idea originally appeared as No. 52, September, 1974.

26. Improving the Sound of Stereo When Played Monophonically.

Mark J. Wharton, Chief of Radio Technical Operations, AFRTS, Los Angeles, Calif.

Problem: To improve the mono (sum) signal from a stereo cartridge when heard in a mono reproducer. Most stereo carts reproduce sound badly when both channels are heard on a mono FM receiver. This usually results when the two channels are inadvertently phase-shifted with respect to each other. This is caused by poor tape guidance or head misalignment. Since the left- and right-channel signals do not sum correctly at the transmitter, the result is a drastic loss of high frequencies in mono receivers.

Solution: One possible solution to this problem is to use a sum-difference matrix at the cart recorder and record the sum signal (L + R) on track 1 and the difference signal (L - R) on track 2. Upon playback, tracks 1 and 2 would be de-matrixed to form L and R signals. Theoretically, any degree of phase shift between tracks 1 and 2 will still produce a perfect mono signal. Phase errors will affect stereo separation, but this is minor compared to the huge frequency response errors the present recording scheme causes in mono receivers.

This idea originally appeared as No. 51, July, 1974.

Continued on page 76

The same technique is employed in heterodyne color mode except that the write clock is compared to H sync, but without requiring it to correct the H phase error, only the differential displacement of a fraction of 280 monoseconds.

Consolidated Video Systems—CVS 504

(Extracted from published material of CVS).

Until now, the correction of helical video signals has been severely limited by the conventional window of correction of no more than 4 microseconds. CVS has provided a digital storage and processing capability to enlarge that window to more than 90 microseconds in either direction.

In the color interlace mode, the CVS 504 can literally create phased, interlaced color signals from heterodyne color VTRs without a capstan servo. By engaging the color interlacer switch, tapes played on such machines as Sony $\frac{3}{4}$ " U-matic cassette recorders can be dubbed to a quad (or any other capstan servo'd recorder) and, when they are played back, they will contain phased, interlaced color signals. This feature produces a signal which interlaces and phases heterodyne color recordings. The frequency of this signal is well within the tolerance of any capstan servo'd recorder to capture.

Included in the CVS 504 is a full EIA sync generator with normal H, V, burst flag, 3.58 subcarrier, composite blanking, and composite sync signal outputs. Optionally available in "PC plug in" form is a full EIA gen-lock generator for complex systems interfacing.

With a capstan servo'd VTR, the CVS 504 literally color locks within milliseconds once the VTR reaches vertical lock. The total lock up time required from the time you hit the play button to full color lock varies from 2 to 5 seconds depending on the tape path of the recorder involved.

The CVS 504 couldn't care less whether you're even or odd when you edit into the fields. It has a sufficiently large window to correctly reproduce the field sequence regardless of where the edit falls.

Perhaps the most misunderstood aspect of a VTR's recording is its velocity error. In general, a velocity error is a frequency error, not an error in time. Since the CVS 504 locks to both the horizontal sync and the color burst frequencies of the input video, it can correct to the average of the frequency error of what the signal is whether V locked or not. Inherent, therefore, in the CVS approach to time base correction, is velocity compensation.

Included in the CVS 504 is a self-contained processing amplifier. The output signal contains re-inserted sync, blanking, and (if color) burst information.

IVC TBC-2000, Time Base Corrector

(Extracted from material published by Quantel, Ltd., manufacturer).

The Digital Timebase Corrector will enhance the quality of any VTR output. It is capable of producing pictures of broadcast quality from the better grades of machines. The VTR should ideally produce video out-

puts with a signal to noise ratio of 40 dB. A reduction in the signal to noise ratio will cause only a gradual degradation in timing correction.

When operated in conjunction with a machine capable of having its capstan servo-locked to an external source, the timing correction, hue and subcarrier frequency will fall within standards associated with broadcast quality video tape systems. When operated with a simpler machine which cannot have external capstan locking but which relies on 60 Hz line locking, the timing correction and hue will maintain the high quality; however, the color subcarrier may lie outside the broadcast specification. A heterodyne corrector may in this case be used to move the subcarrier onto standard frequency.

A video analog-to-digital converter accepts the clamped video signal and samples the level at intervals defined by the input clock generator. At each sample the data is converted to an 8 bit digital data word which allows 256 levels to be defined. The ADC sample occupies only 100 pico-seconds and the data conversion 66 ns.

The input horizontal sync and burst signals from the sync separator lock the write clock generator to the off tape signal. The write clock generator will lock up to either the color burst or the horizontal sync pulses at each horizontal line frequency. The locking mode may be selected from the front panel or remotely. An "auto-burst" locking mode provides normal operation for color signals but allows automatic change-over to the horizontal interval locking mode when the burst is missing.

In principle the data is written into the store under the control of the write clock generator and is read from the store under the control of the read clock generator. The read and write operations are interleaved and are controlled by the store control system. A further input to the store control provides magnetic tape dropout reinsertion information when this option is specified.

The capacity of the store is sufficient in this case to allow gross timing errors at the input whilst maintaining a corrected signal at the output. The store capacity is the equivalent of four complete horizontal lines providing a correction window of ± 1.5 lines.

The analog signal from the DAC has new sync and burst information reinserted in this stage so that the output synchronizing data is in perfect condition.

The equipment may be locked to a comprehensive selection of external signals. The output sync separator allows the TBC to be locked to a source of composite video. Such a signal would be appropriate in the case of an off-air/VTR presentation.

The Television Microtime Model 640

The 640 is for correction of NTSC direct color, heterodyne color and monochrome signals from single or segmented head helical VTRs. The 640 will accept RS-170 and RS-330 composite sync.

Several operational modes allow simple interfacing to H lock, V lock (capstan servo'd) in either direct color or heterodyne modes, or no lock VTRs. The basic system design allows correction of all presently known heliscan VTR video signals referenced to external (house) sync. Either external house sync or the

continued on page 70

sync references from the TBC internal stable sync generator may be used in this mode.

No-lock VTR video signals are corrected using the internal sync generator mode which slowly follows the input video at a rate low enough to allow the TBC to remove virtually all time base errors which cause objectional effects in the areas of raster jitter, signal resolution and color fidelity.

The sync generator can reference to external sync or black burst; or to its own internal crystal-controlled oscillator; or slowly follow the off-tape video (see above). An advanced vertical reference can be switched in, to bring the output into phase with the reference. If the advance is switched off, two lines of input video are deleted and reference sync is inserted in the processing amplifier.

There is also an H phase adjustment, with a range of -10, +2 microseconds. Status indicators show the video amplitude, the presence of burst, the presence of external sync and burst.

Digital Video DVL 2002.

The DVL 2002 "Video Processor" has been produced not simply as a time base corrector, but as an interface between the present, rather fragile analog television system and the precise world of digital storage and logic. The standards selected were vital to the concept. Sampling the video at 4X subcarrier provides picture elements less than 70 nanoseconds apart with 768 elements per active picture width. A video bandwidth of 7 MHz is possible for high quality applications. An 8-bit digital word defines each picture ele-

ment as one of 256 levels of .4% each. The samples are precisely on the I and Q color axes, permitting excellent luminance—chrominance separation as required by many advanced video processing systems.

Edutron TBC-110

The TBC-110 delivers line-by-line time base correction, using the Ac-Delay_{tm} (Active Delay) technique in correcting time base jitter for any helical VTR signal.

The Ac-Delay technique eliminates the expense of analog to digital and digital to analog conversion. It does not contour the video waveform nor quantize the noise. You can couple the TBC-110 with any helical scan VTR.

Step errors up to 10 microseconds are removed during the vertical blanking interval. The system targets the variable active delay to achieve less than 5° velocity phase error at the right-hand edge of each horizontal line. An interlace mode rephases incoherent color subcarrier from heterodyne VTRs, permitting full production using color mixes with capstan locked heterodyne recorders, and dubbing up to quad or capstan locked helicals from line-locked heterodyne VTRs.

In the process mode, the unit removes short-term jitter, then heterodyne processes color information using FCC-stable subcarrier. This permits higher quality cable casting from line-locked recorders such as Sony U-Matic. The sub-carrier is not phased with sync because of incorrect speed on line-locked VTRs.

Follows average speed of line locked VTRs, and provides sync to lock studio cameras and other VTRs.

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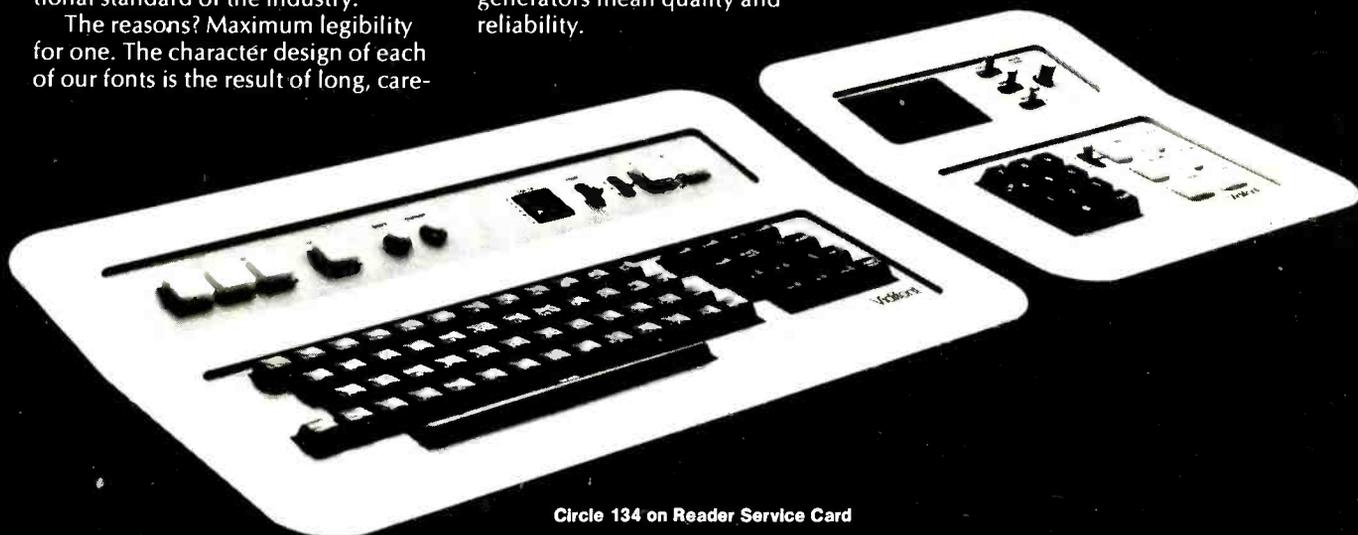
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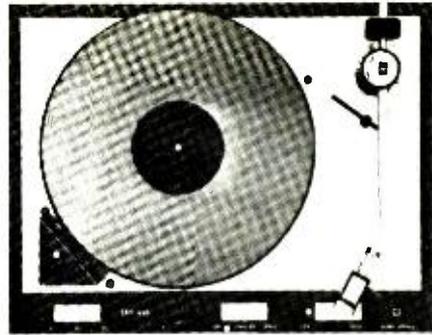
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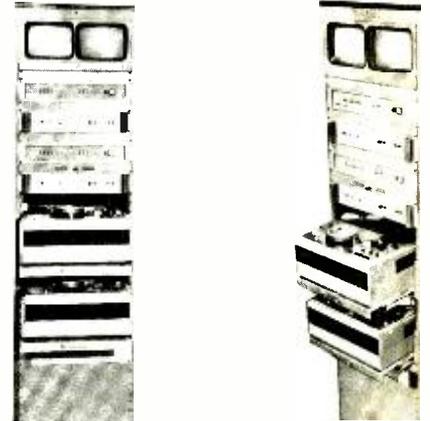
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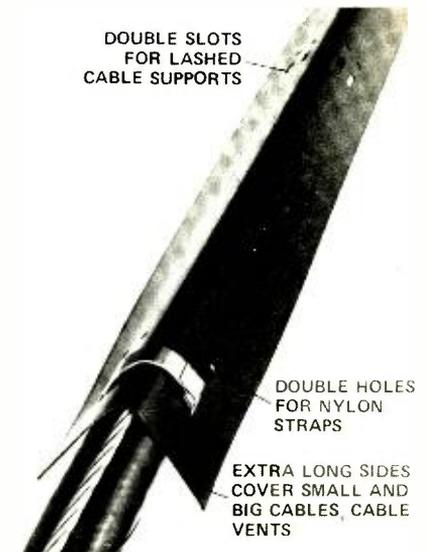
PRODUCTS

Video-audio logging system provides 24 hours of TV programming on one 7-inch reel of video tape with intelligible sound playback at time lapse speed. Included is the Video-Audio



Logger (Model TVR-321-24A), Television Time-Date Generator (Model TG-3201) and Video Monitors. GBC CLOSED CIRCUIT TV CORP. **300**

Plastic shield prevents cable damage caused by squirrel bites. Device shape is an inverted V so that ro-



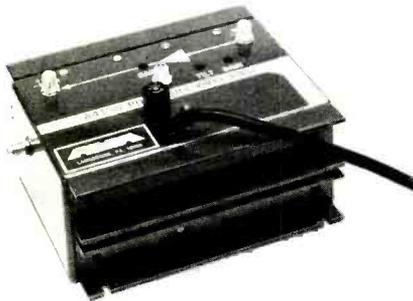
dents cannot keep a foothold or use cables for their runway. Available in four lengths: 4, 6, 8 and 10 ft. COMMUNICATIONS TECHNOLOGY CORP. **301**

Television demodulator, Model CI-2400B, provides flat response by means of video correction. A bypassable sound notch working with a high-Q trap at the aural carrier frequency provides 70 dB typical inter-carrier attenuation. \$975. COMARK INDUSTRIES. **304**

Two-man camera crane, the Kestrel,

is available in both manual and powered form. The jib gives a height of 23 inches to 77 inches and will lift a total load of 500 lbs. The manual version provides the tracker with steering, tracking and jib elevation control. The jib is under the cameraman's control in the powered version. LISTEC. **305**

CATV 50-300 MHz push-pull amplifiers, Models A-4145 and A-4150, are for large multiple dwelling in-



stallations. A-4145 offers 45 dB gain; the A4150 has 50 dB gain. AVA ELECTRONICS. **306**

Water-repellent hydrophobic coating is made from fumed silicone dioxide used for coating RF insulators and other materials requiring moisture-free operation. Coatings are available for tedlar, teflon, polyester, and ceramic materials, and can also be applied to metallic surfaces like the interior of a waveguide. Coatings are available at \$15 per quart, or \$40 per gallon, FOB. ANTENNAS FOR COMMUNICATION. **309**

Viewfinder mixer from Matthey provides a fast method of mixing any one of 18 picture inputs with up to 5

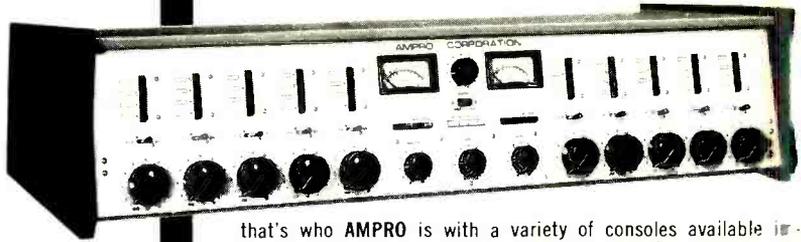


main TV camera outputs, giving a mixed picture in the main camera viewfinder. Device is 19-inch rack mounted. TELEVISION EQUIPMENT ASSOCIATES. **311**

Series of six **automatic pressurization dehydrators** used with elliptical waveguide, coax cable, and rigid line systems, consists of three models rated at 0.2 SCFM, and three at 1.3 SCFM. Models APD-20, -21, -22 are rated at 0.2 SCFM and -40°F dry air dew point output at 95°F, 95% relative humidity input. The model APD-130 automatic pressurization dehydrator is designed for operation in larger systems of coax and

continued on page 74

the source!



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AMPRO also manufacture a complete line of automatic tape cartridge recorder/reproducers and multi-cartridge units. Financing available to qualified buyers. Call Alex Meyer collect or write today for details.



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CP-16/A camera

A specially designed locking pivot-arm on the bracket permits maximum flexibility in positioning the microphone and light fixture in relation to each other.



CP-16R/A camera is shown with Mike/Lite Bracket, RE50 microphone, and Cinema Products' new *Sturdy-Lite* quartz focusing spot (operating at 600 watt-120 volt AC/DC or 250 watt-30 volt DC).

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One important reason is that you don't need an RF amplifier. This results in a much cleaner RF signal. Interference from intermodulation products of unwanted signals is virtually eliminated.

What's more, TFT monitors are easy to install. Just plug-in the antenna. You don't need several tuning stages. And they're stable. Once in operation, they don't need periodic maintenance or tuning.

TFT monitors also have wide-range AGC. So, signal strength variations at the remote location won't affect monitor performance.

Both analog and digital (BCD) outputs are available on TFT monitors

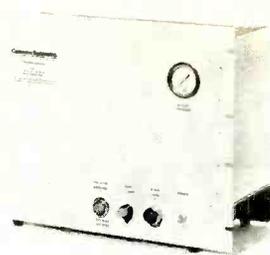
for use with remote logging equipment. You can also choose a number of alarm options: Carrier-Off; Loss-Of-Modulation; and Off-Frequency.

TFT remote-optimized monitors come in either frequency *and* modulation, or modulation-only models: for AM, FM, and TV (UHF or VHF). Every model also has high level inputs for direct connection at the transmitter.

All TFT monitors meet applicable FCC requirements and make FCC-required proof-of-performance measurements. Frequency models can be calibrated directly against NBS with the TFT Model 735 WWV receiver.

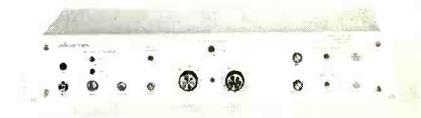
For a demonstration on *your* frequency, call or write TFT at the address below. In Canada: Glen-tronix, Ltd., Don Mills, Ontario, Canada.

PRODUCTS



waveguide. The models -131 and -132 are identical to the -130, except for electrical characteristics which vary as does the APD-20 series. **CABLEWAVE SYSTEMS. 312**

Sweep receiver, Model 1860, recovers broadband sweep energy from a CATV system for display while rejecting interfering 15.75 kHz sync information. Intended for use with



Model 1850 Sweep Transmitter or Model 1801A CATV Sweep/Signal Generator, the 1860 determines the frequency response of a CATV system during broadcast time with little loss of program material. \$1049. **WAVETEK INDIANA. 313**

Aural studio-transmitter link, Model PCL-505, is available in the 150-174 MHz, 215-240 MHz, 300-330 MHz, 450-470 MHz and 890-960 MHz bands. The system accepts one program feed, monaural or stereo, and two additional subcarriers. The PCL-505C accepts a quadraphonic stereo signal. **MOSELEY ASSOCIATES. 317**

Guitar pickup device, designated the P800 Buffalo Pickup, uses an electret condenser microphone. The



pickup has its own 9-volt power supply which can be attached to the performer's belt or clipped to a mike stand. \$99.50. **GROUP 128. 319**

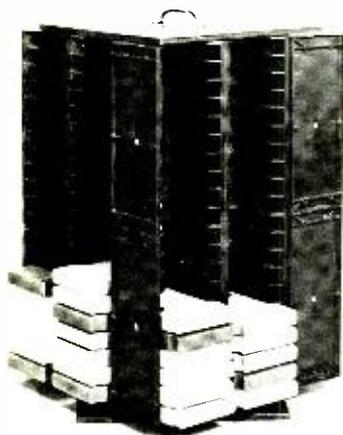
Battery-powered photometer, Model FC-200, directly measures both illuminance and brightness over a 0.1 to

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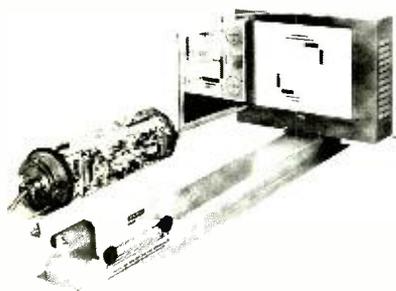
30,000 footcandle range. The photocell is cosine corrected and color corrected to match the human eye. Metric calibration is optional at no extra charge. SPECTRA. **320**

Modular audio cartridge storage system holds 10 carts to a module. Racks may be jointed together. Up



to 160 carts can be stored in a revolving carousel system. SIMPAC. **318**

Camera test jig, Model CTJ-2, features adjustable camera stand to permit accurate alignment of the optical axis of the camera lens with the



center of the test pattern. Two RETMA test patterns are included: an EIA Linearity Pattern and a 1600-line resolution chart. COHU. **321**

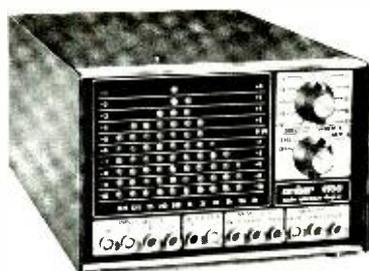
Plumbicon tube, Model XQ1025G, is for use in the green channel of three-tube color TV cameras. The tube provides an increase in green channel modulation depth of 50% (typical), compared with the standard XQ1020G. AMPEREX. **322**

Video time lapse tape recorder, Model XL-5000, has four speeds, will record for 1, 24, 48, or 60 hours on a standard half-inch 2400-ft. reel of video tape. Manual or motorized frame advance is standard. JAVELIN ELECTRONICS. **323**

Aspheric prime lenses for 35mm cameras are supplied in BNCR-type mounts. Series includes a 24mm (T1.6), 35mm (T1.4), 55mm (T1.4) and 85mm (T1.8). They are especially adapted to night-for-night

photography with available light. CINEMA PRODUCTS. **324**

Audio spectrum display has a vertical column of tenlights for each of ten octaves, shows signal amplitude in



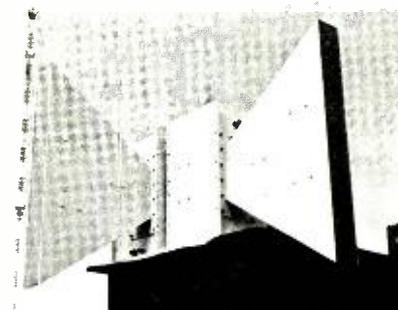
each octave over 20 dB range with 2 dB intervals or 10 dB in 1 dB intervals. \$1800. AMBAR. **329**

Remote digital display work: from any source of BCD data (TT/DTL Compatible) uses 5 V DC power. It is housed in 1/16" thick case, for front-panel mounting. NATIONWIDE ELECTRONIC SYSTEMS. **328**

Twin channel reverb unit uses four special alloy transmission lines per channel. Model R-500 has both low and high impedance connections, LED level indicators, S/N ratio of 75dB. \$500. CLOVER SYSTEMS. **330**

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One knob gives you control over $\pm 40\%$ chroma level and another over $\pm 100\text{ns}$ chroma delay. Adjusting the chroma does not effect the luminance signal.

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GREAT IDEAS

TV

**30. Random Access
Storage System for
Cassettes & Film.**

*Steve Smith, Dir. of Engineering, KCMO
TV, Kansas City, Mo.*

Problem: To upgrade a video cassette and spot film handling system.

Solution: Standard office file storage cabinets meet the requirements of storing large quantities of quad VTR cassettes and spot film reels. Two office filing cabinets, manufactured by Remington Rand, were installed next to the video cassette recorder. One cabinet, 8 ft. wide by 5 ft. deep and 9 ft. high, holds 1440 VTR cassettes. Fifteen of these fit perfectly in each of the letter-size drawers. The second cabinet, a 10-foot model, holds 1620 cassettes.

A similar cabinet for tab cards was installed adjacent to our film islands. The old spot film racks were cut into 14-in. sections. Two were placed in each drawer which provided capacity for 26 spot film reels. The 8-ft. cabinet has a capacity of 7840 reels. Thirteen spot reels are allocated to each drawer. A 10-ft. tab cabinet will hold 10 080 spot reels.

A media inventory control program was created for use on an IBM System 3, Model 10 computer. Revised listings, by house number and advertiser, are produced every two weeks. Copies are distributed to Master Control, Projection, Traffic, Promotion, and Programming.

Traffic sends new media to engineering along with a check-in slip. Films are added to the inventory list and filed. Video tapes are dubbed to cassette and entered in the inventory listing. The original VTR spot reels are stored by house number in the Film department.

When the films and tapes are no longer needed, Traffic issues a release form which includes disposition information.

The traffic computer puts the in-house number on the program schedule. Engineers and projectionists make out daily pull lists which are in numerical order, instead of "at random," as on the log.

*This idea originally appeared as
No. 75, October, 1974.*

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Circle 147 on Reader Service Card

31. Head-Clog Indicator For VTRs.

William Gramling, Engineer, WRC,
Washington, D.C.

Problem: On all commonly used quad VTRs, there is no indication of a clogged head while recording until the machine is stopped at the end of the program. Making a protection copy on another machine is not always possible and is expensive in any case.

Solution: The cue track on the tape is not normally used and is available for use as a clog detector. For this purpose, the cue-erase head circuit has a switch installed so the erase can be disabled. The video band will remain in the cue track during recording. The cue head circuit is also modified so the head can be switched to remain in the playback mode during recording. The output of the cue track is amplified, noise-clipped through a diode and fed to the input of a scope. The display is a horizontal line with narrow pulses on it. The pulses represent video bands passing over the cue head. A clogged head will show as a missing pulse in the series. The video head can be cleaned to save the rest of the program. The missing of a pulse can be made to sound an alarm with the use of an "and" gate. The height of the pulses can be used as optimizing indicators.

This idea originally appeared as No. 5, February, 1974.

32. Contour Clipper De-spikes the TK-44.

Elden D. DuRand III, Staff Engineer,
WAVE-TV, Louisville, Ky.

Problem: To eliminate chroma spikes by clipping the video contour signal.

Some cameras, like the RCA-TK 44 series A and B, may exhibit excess contour enhancement when adjusted for optimum scene sharpness.

Contour enhancement circuits generate spikes used to simulate a fast transition between areas of differing contrast. The effect usually appears as a white shadow around areas of differing contrast on the monitor.

But when taping an overly crisp picture due to excess contour en-

Continued on page 78

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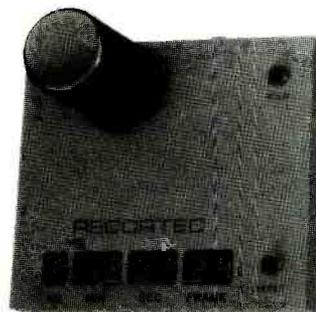
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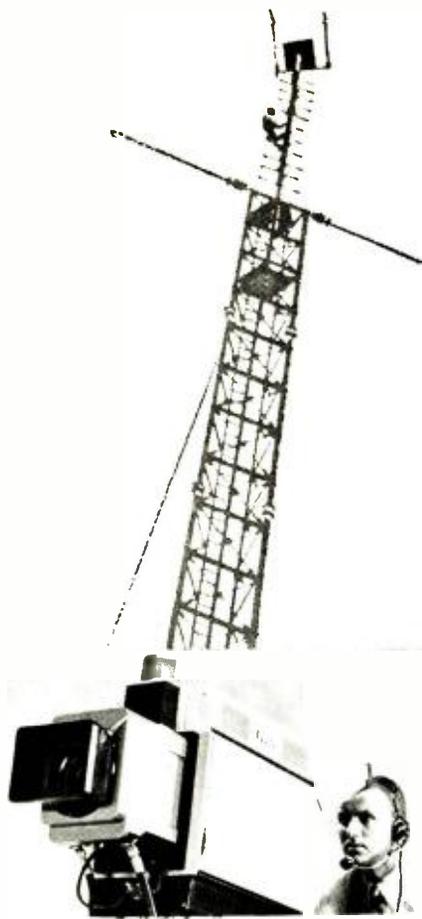


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GREAT IDEAS

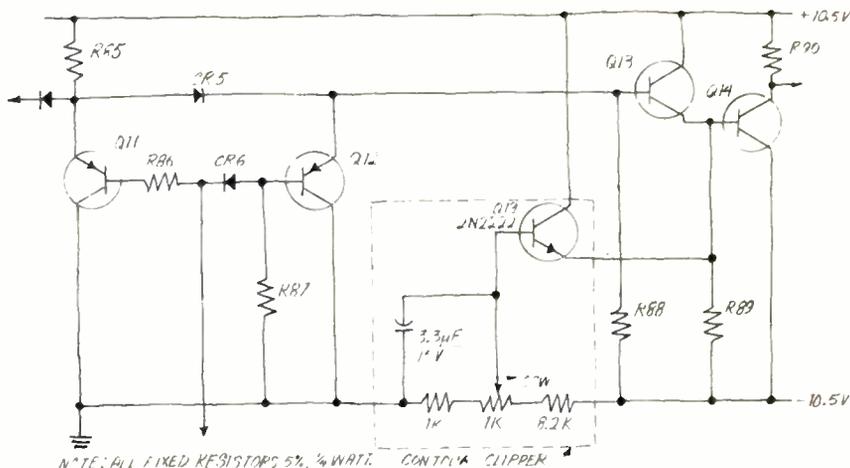
hancement, the contour signal causes the modulator in the VTR to over-deviate. When played back, the tape exhibits black streaking in areas where spikes caused excess modulation.

Solution: The contour clipper removes the top of the contour spikes, yet leaves the crispness information in the video signal. An in-house designed circuit board, adapted from *RCA Service Company's* design for this type of circuit, mounts all the

components on the colorplexer module. The potentiometer, shown in the schematic, is situated in a previously unused hole found on the colorplexer front panel.

The additional components consist of a DC amplifier which uses module resistor R89 (the emitter load of Q13 in the colorplexer luminance board) as its load. This add-on amplifier, Q19, sets the cutoff point of Q13, and causes it to clip the contour signal before the subcarrier is added.

This idea originally appeared as No. 45, July, 1974.



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transmitters

33. An Inexpensive Automatic Film Processor.

Harry Holbert, Art Director, WTRF-TV, Wheeling, W. Va.

Problem: How to process Ektachrome film more efficiently than by the hand process used at a station, but without investment in a large automatic processor.

The result of three years of model building, experimentation, trial, and active use at WTRF-TV and now covered by U.S. Patent No. 3,724,353: a simple automatic film processor that will take care of the moderate quantities of Ektachrome film for slides produced daily.

Solution: The processor works by moving the film from one bath to another along a horizontal line traverse. The solutions are in open-top containers in a line along a horizontal platform. At each solution, an eccentric gear lowers the film, held in a Nikor development reel, into the container. It stays there the required time, is raised, and moved horizontally to the next solution.

The timing is accomplished with a motor-driven cam, revolving at 1 rph, that successively trips a series of microswitches. Timing can be adjusted by realignment or replacement of a section of the cam. The solutions are agitated by slow vibration around the horizontal axis of the platform, plus a 60-cycle electromagnetic shake.

The containers hold one pint of solution apiece to process a roll of 35mm film, or a quart for two 36-exposure rolls. The early stages of the process, which must be done in the dark, are in a light-tight compartment, from which the carriage merges automatically, to continue through the half dozen or so remaining stages.

This idea originally appeared as No. 3, January, 1974.

36. Automatic Burst-Phase Corrector

Myles H. Marks, Engineer, WIIC-TV, Pittsburgh, Pa.

Problem: VTRs today do almost everything automatically—except set the burst phase, which must be adjusted manually for each type played. A few IRE units more or less than standard chroma saturation is

Continued on page 80

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- Experimenting With Electronic Music**—How to simulate musical sound. 180 p. No. 666 \$ 7.95
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Company _____

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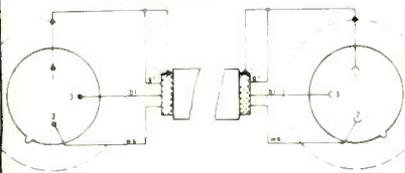
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GREAT IDEAS

not nearly as objectionable as the burst phase being off a few degrees. This problem is amplified when a series of tapes from different sources must be edited together.

Solution: A vertical interval reference signal (VIR) has been discussed, but not yet established. The proposal is to replace this with a VIT consisting of $\frac{1}{2}$ line of Cyan and $\frac{1}{2}$ line of Magenta. This choice is made because in a standard color-bar presentation these hues contain equal amounts of Blue. If the burst phase varies, an amount of Blue is subtracted from one color and added to the other.

As a tape is played, this two-colored test signal is demodulated and processed, and the Red, Blue and Green components separated. The phase of one test hue (Cyan or Magenta) is inverted and it is added to the other. Then, if the burst phase is correct, the Blue signal should be zero. Any other value will be an error signal, indicating how much the phase is off and in which direction—positive or negative. The error signal can be applied to the burst phase control circuit, to shift the phase until the error voltage nulls.

This idea originally appeared as No. 4, February, 1974.

34. Locating Faults and Breaks in Cable Bundles.

Harry F. Palmer, WKRG-TV, 3200 Emelye Drive, Mobile, Ala.

Problem: To locate and identify opposite ends of single cables, or cable bundles within a facility.

A 20-pair audio cable runs between our studio and control room. All cables are neatly laced in a bun-

dle the length of the run. A short was suspected between two of the pairs, but ohmmeter measurements could not locate the short accurately enough to permit opening up the bundle and repairing the short.

Solution: A portable solid-state generator and companion detection device is used to identify cable ends. The tone generator is connected to each of the cable pairs and the short is located within inches of the fault with the detector probe. This method eliminates the risks of first opening up and exploring through several feet of the bundle, and damaging the conductors while doing so.

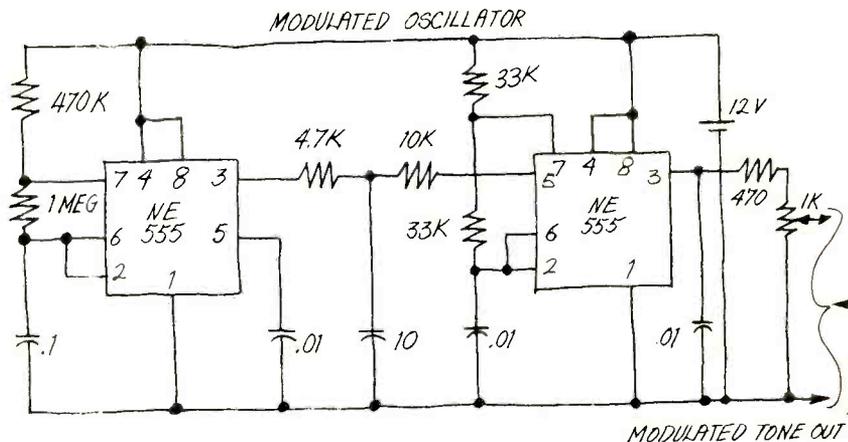
The generator consists of two oscillators, one modulating the other. The tone output warbles to insure that the generator signal cannot be mistaken for other studio test tones.

The detector consists of two separate devices: a search coil and a probe. The former locates opposite ends of cables, or identifying unknown cable runs. The latter probe may be nothing more elaborate than a standard probe such as that supplied with a VOM or VTVM.

Generator output amplitude is such that electrical contact with the cable under test is rarely necessary. Identification usually consists of touching the insulation on the correct cable.

The search coil probe is used to find the exact location of shorts. When a tone is fed into the faulty pair, and the search coil probe is moved parallel to the cable, it will be loudest at the short. Open circuits may also be found in a similar fashion. Tone amplitude now remains steady until the physical break is reached, and then will gradually fall off.

This idea originally appeared as No. 57, September, 1974.



BM/E CLASSIFIED MARKETPLACE

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DISPLAY CLASSIFIED ADVERTISING: \$32.50 per inch 1x; \$30.00 per inch 6x; \$27.50 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 35¢ per word; minimum \$3.50. BLIND BOX NUMBER: \$1.00 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

EMPLOYMENT OPPORTUNITIES

FIELD SERVICE ENGINEER

Extensive Travel. All Benefits. Experience in Color video and switching systems preferred. Contact: **Mr. Buzan, Vital Industries, Inc., 3700 N.E. 53rd Avenue, Gainesville, FLA. 32601** Phone: (904) 378-1581.

POSITION WANTED

Are things really changing? I am an experienced black newscaster-announcer-D.J. with some college. Third phone: will relocate. Tape and resume available. Box 1174-L, c/o BME, Blue Ridge Summit, PA 17214.

EQUIPMENT FOR SALE

Two—IVC 150 Plumbicon Color Cameras with:

Extended red, Lenco CEC 810 Broadcast Encoders; One RTH Servo Iris 10:1 Zoom Lens; One 6:1 Nikor Zoom Lens; Two Gibraltar Quick-Set Heads and Dollies; 50-Ft. Cables, and Remote Camera Control Units. \$25,000.00

One—MOD RSS Teleprompter Unit with Two Displays; Control Unit, Cables; and IBM Typewriter. \$3,500.00

CONTACT: John M. Allison; Taft Broadcasting Corporation; Houston, Texas 77027. Phone: (713) 622-1010.

GATES EASTERN SERVICE CENTER

East coast headquarters for broadcast and recording equipment. Gates Broadcast Equipment Division, Harris Corporation, 130 E. 34 St., N.Y., N.Y. 10016 (212) 889-0790.

Broadcast mixer for remote out of studio programming. Can be used as inexpensive second console for college and small radio stations. D.J.'s can now originate programming at home. Simultaneous mixing of two stereo phonographs, a tape machine and a microphone. Precue for all inputs with built in monitor headphone amplifier. Send for literature. \$325. Professional discount, use letterhead. G.L.I. Box 2076, DEPT BM E, Brooklyn, N.Y. 11201 Phone: (212) 875-6992.

Solid-state audio modules-console kits, power amplifier kits, power supplies, Octal plug-ins - mic, eq, line, disc, tape play, tape record, amplifiers. Audio & tape bias oscillators. Over 50 audio products. Send for free catalog and applications. Opamp Labs, Inc., 1033 N. Sycamore Ave. Los Angeles, Calif. 90036. (213) 934-3566.

STODDART NM-30A Radio interference-field intensity meter, 20-400 MHz. Like New condition - 1966 Manutac tube. Complete with AC PS, Dipole antennas, cables, tripod, and inst. book. Calibrated prior to shipment. \$1,595. Surcom Associates. (213) 382-6985.

For Sale: Approximately 2,000' 51.5 ohm 3/8" flanged Stealite used transmission line. Line in excellent condition - removed due to complete transmitter plant replacement. Contact Jack Jopling, Chief Engineer, WJBF-TV, Augusta, Georgia. Telephone 404 722-6664.

Panasonic 3130's 1/2" color VTR's. Both have about 40 hrs. on them. 3130 with Technisphere modification for video only insert - \$1500. Straight 3130 - \$1200. The VIDCOM PEOPLE, 2434 Reading Road., Conti., Ohio 45202. Phone: (513) 381-1960.

EQUIPMENT FOR SALE (Cont'd)

UPDATING YOUR STUDIO EQUIPMENT? We buy and sell good surplus and used video equipment for the broadcaster, CATV, and CCTV. DELCOM CORP., 6106 E. 32 Place, Tulsa, Okla. 74135. Phone: (918) 663-9416.

Spotmaster model 500AR-114C mono. record/play rack mount cartmachines. \$269.00 ea. Weigand Audio, R.D.3, Middleburg, PA. 17842. Phone: (717) 837-1444.

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The complete and reliable source for new and used broadcast equipment. Request our free listings. Broadcast Equipment and Supply Co., Box 314, Bristol, Tennessee 37620.

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We wish to buy the following equipment: One 5 kw Broadcast Transmitter, One complete studio tape recording equipment, One transistorized STL and Remote control amplifier, One guyed 360 foot tower.

Please send price, model, and photograph to: XEM, V. Carranza No. 213, Chihuahua, Chihuahua Mexico, or phone area code: 91-141-50399 attention Ing. Roberto Garces.

WE NEED USED 250, 500, 1KW, 5KW AM Transmitters, 250, 1000 Watt FM transmitters. No junk. Guarantee Radio Supply Corp., 1314 Iturbide St., Laredo, TX. 78040.

UPDATING YOUR STUDIO EQUIPMENT? We buy and sell good surplus and used video equipment for the broadcaster, CATV, and CCTV. DELCOM CORP., 6106 E. 32 Place, Tulsa, Okla. 74135. Phone: (918) 663-9416.

Need 36 or 42 inch 500 ft. FM tower. KNNR, Rochester, Minn. (507) 288-7700.

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PROGRAM SERVICES (Cont'd)

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Broadcast Technicians: Learn advanced electronics and earn college degree by correspondence. Free brochure. Grantham, 2006 Stoner Ave., Los Angeles, CA. 90025.

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FRANCHISE OPPORTUNITIES

VILLAGE OF MANCHESTER LEGAL NOTICE

The Village of Manchester in Ontario County, New York, invites applications for a cable television franchise. Applications shall be prepared and submitted in accordance with a "Request for Proposals" available from the undersigned. Applications will be accepted until 2:00 P.M. E.D.S.T., February 3, 1975 at the Village Clerk's office, 4 Clifton Street, Manchester, New York 14504. All applications received will be available for public inspection at the Clerk's office during normal business hours.

by: Dorothy Ann Liberati
Village Clerk
(315) 289-4340

continued on page 82

BE TMS 200 TURNTABLE PRE-AMPS



Versatility is the perfect description for our new BE TMS turntable pre-amps. For example, phase reversal on one channel gives five modes of stereo/mono operation including independent dual channel mono and mono playback of stereo recordings. Transformer output.



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FRANCHISE OPPORTUNITIES (Cont'd)

The Village of Chittenango and the Town of Sullivan, in Madison County, New York invites applications for a cable television franchise. Applications shall be prepared and submitted in accordance with a "Request for Proposals" available from the undersigned. Applications will be accepted until March 15, 1975 and all applications received will be available for public inspection during normal business hours at the Town Clerk's Office.

Anne Lennox, Town Clerk
R D #2
Chittenango, N.Y. 13037
Phone: (315) 687-7191

LEGAL NOTICE

The Town of Fallsburg, Sullivan County, New York, invites proposals for a Cable Television Franchise. Proposals shall be prepared and submitted in accordance with "Request for Proposal" available from the undersigned. All inquiries for a "Request for Proposal" must be accompanied by a non-refundable certified check in the amount of \$50.00, made payable to the Town of Fallsburg. Proposals will be accepted until 2:00 p.m. February 28, 1975. All proposals received will be available for public inspection during normal business hours at the address below.

Ruth Rosen, Town Clerk

Town Hall
South Fallsburg, NY 12779
(914) 434-8810

REQUEST FOR PROPOSALS

1. **GEOGRAPHIC AREA**—That the part of the Town is described as follows: That area known as the hamlet of Loch Sheldrake and its environs, bisected by New York State Route #52 from the point where that highway enters the Town of Fallsburg from the Town of Liberty line to the intersection of Town Road #74, known as Murphy Road, and including all lands within three miles of said portion of New York State Route #52.
2. **SYSTEM DESIRED**—The system shall comply with all rules and regulations of the Federal Communication Commission and the New York State Commission on Cable Television in the provision of construction, number of channels of TV and basic services.
3. **FRANCHISE TERMS**—Franchise terms and all other matters in proposals will be in compliance with Section 594.6 of the Rules of the New York State Commission on Cable Television.
4. **FRANCHISE FEE**—The Town of Fallsburg will receive 3% of the gross revenues annually received from subscribers in the Town of Fallsburg.
5. **FILING OF PROPOSALS**—Sealed written proposals will be received by the Town Clerk at the Town Hall in South Fallsburg until 2:00 p.m. February 28th, 1975.
6. **FURTHER INFORMATION**—Further information can be obtained by contacting:

James D. Holzhauser
Administrative Assistant
Town Hall
South Fallsburg, New York 12779
(914) 434-8810

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SALES OFFICES

Broadband Information Services, Inc.
274 Madison Ave. New York, N.Y. 10016

EASTERN & MIDWESTERN STATES

274 Madison Avenue
New York, New York 10016
212-685-5320
Kenneth F. Luker, Jr.

WESTERN STATES

1111 Hearst Building
San Francisco, California 94130
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Encino, California 91416
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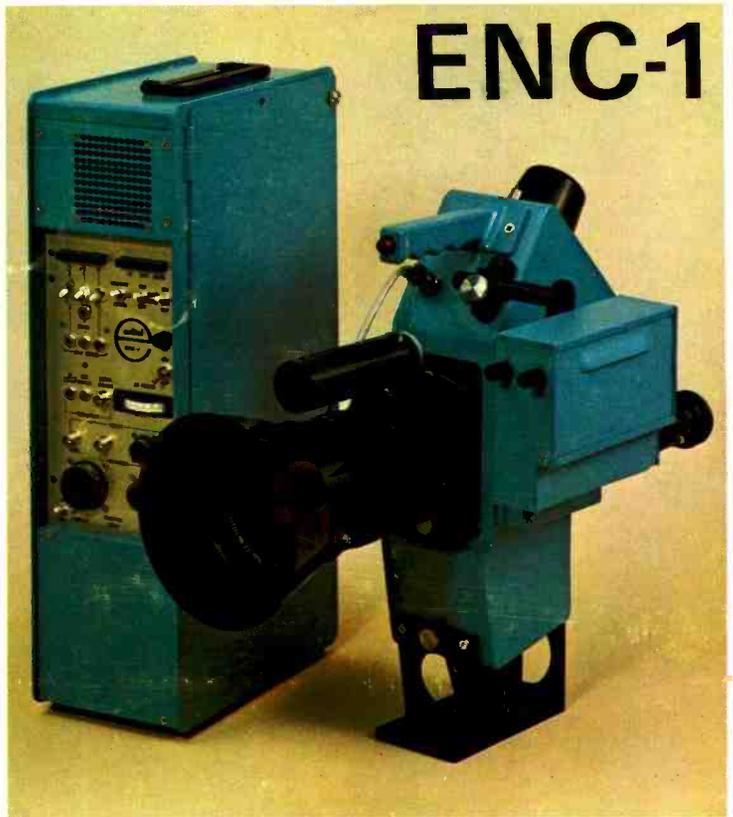
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Dunstable Woodside Estate, Dunstable, Beds., United Kingdom.
Dunstable 601441



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ENC-1

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6:1 Zoom Lens 18.5-110mm F2.3
1" Electrostatic Viewfinder

ENC-1 CAMERA BACK PACK

+12dB R,G,B Gain Controls
External Centering Controls
D.C. Voltage Meter
Battery Power Pack
A.C. Power Pack

ENC-1 STANDARD EQUIPMENT

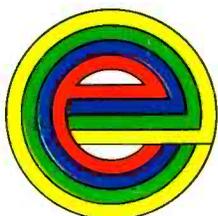
Metal Transit Cases
Hand Held Hip Harness
Systems Line-Up Charts
Interconnect Cable (5ft.)
Battery Charger

FEATURES

NTSC/PAL DIRECT FROM BACK PACK
WAVEFORM DISPLAY IN VIEWFINDER
LOCKABLE TO ANY COLOR SIGNAL
INTERNAL COLOR BAR GENERATOR
INTERCHANGEABILITY OF LENSES
FULLY ACCESSIBLE FOR EASY MAINTENANCE
LOW LIGHT LEVEL OPERATION

OPTIONAL EQUIPMENT*

10:1 Zoom Lens 15-150mm F2
Automatic Iris
Tri-ax Camera Control
Image Enhancer
Interconnect Cable 24 ft.
Monitoring Package
Studio Viewfinder and Mount



editel Communications

5610, Chemin Bois Franc
Montréal, Québec H4S 1A9
(514) 331-2951
Telex 05-24587

24293 Telegraph Road
Southfield, Michigan 48075
(313) 353-1660
Telex 23-5449

*Subject to change without notice.

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