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BROADCAST **engineering**

July, 1975/75 cents

Update on **AUTOMATION**

page 18



KMOX LIVE JOURNALISM and the new breed



Automatically it's Revox.

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For More Details Circle (1) on Reply Card

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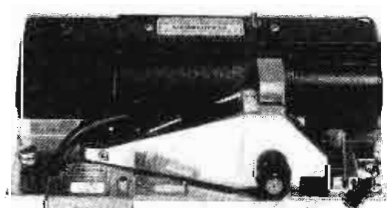
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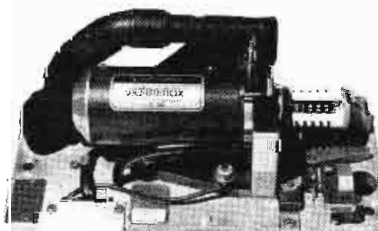
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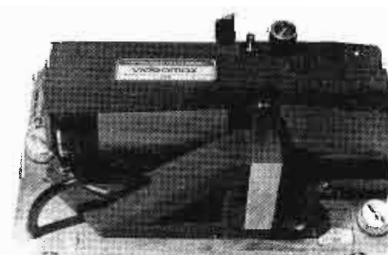
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RCA HIGH BAND

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22 Automation: You don't have to sacrifice quality. Getting into automation doesn't mean mechanics or machinery will speed up operations and improve timing, yet lower quality. It can even improve quality. **Myles Marks.**

28 Automation and your approach to timing. It has always been true that adding automation means extensive pre-planning. In this article, the author, an expert in the field, points out and explains why timing is a key consideration. **Morris Courtright.**

30 NBC Automates radio and information services. A behind-the-scenes report on how NBC has gone to automation on a national basis to improve its radio and information services.

32 A Challenge In The News...ENG and the new breed. An in-depth article on how KMOX-TV has gone all the way with LIVE journalism. As it turns out, there's a lot more involved than new equipment. It shows practical ideas as well as a new definition for broadcast journalism. **Alan Morris.**

About the cover

This cover was shot at KBEE/KBFM, Modesto, Calif. Pictured are Jerold Rosenthal, GM, and Dottie Vittick, salesperson. It fits the theme this month with a series of articles that begin on page 18. Photo courtesy of Sparta and taken by Dennis Carr.

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EDITORIAL

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Howard T. Head, *FCC Rules*
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Robert E. Hertel, *Publisher*

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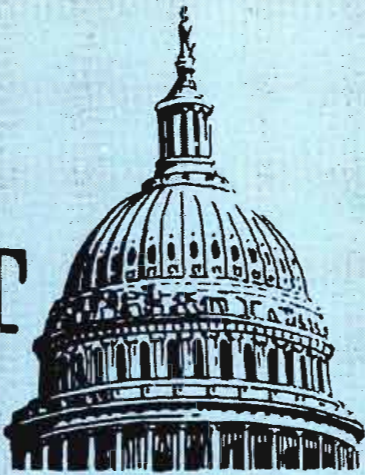
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DIRECT CURRENT FROM D.C.



July, 1975/By Howard T. Head and Harold L. Kassens

TV and FM Field Strength Curves and Methods Changed

The Commission has adopted new curves of field strength vs. distance to be used in predicting contour locations for FM and TV broadcast stations (see Feb., 1975 D.C.). In addition, a "terrain roughness" factor will for the first time be employed to take into account the influence of terrain. The new curves and methods will change the location of coverage contours for all FM and TV broadcast stations. Consequently, the Commission is requiring that all TV broadcast stations submit new maps of predicted contours at the next license renewal time. No similar requirement is being adopted for FM broadcast stations. The new procedures take effect July 11, 1975.

Essentially all television stations will find that the new procedures shrink their predicted coverage contours. Consequently, the Commission - expressing concern over possible loss of CATV carriage rights by UHF stations - has proposed a scheme of fixed mileages to govern the right of television stations to cable carriage. Until this point is resolved required cable carriage will continue to be based on the previous contour locations.

In adopting the new curves and techniques, the Commission also adopted a new method of making FM and TV field strength measurements first proposed by the Television Allocations Study Organization (TASO). The measuring method is intended to be used only in establishing grades of service within a town or city, and is not to be employed in determining contour locations.

Broadcast Auxiliary Applications Receiving Less Scrutiny

Faced with a deluge of applications for television auxiliary transmitters to be used for electronic news gathering, the Commission has decided to be less critical of potential interference problems arising from the grant of any application in the TV broadcast auxiliary service. These include not only TV pickup transmitters, but also those in the TV intercity service and even TV studio transmitter links (STL).

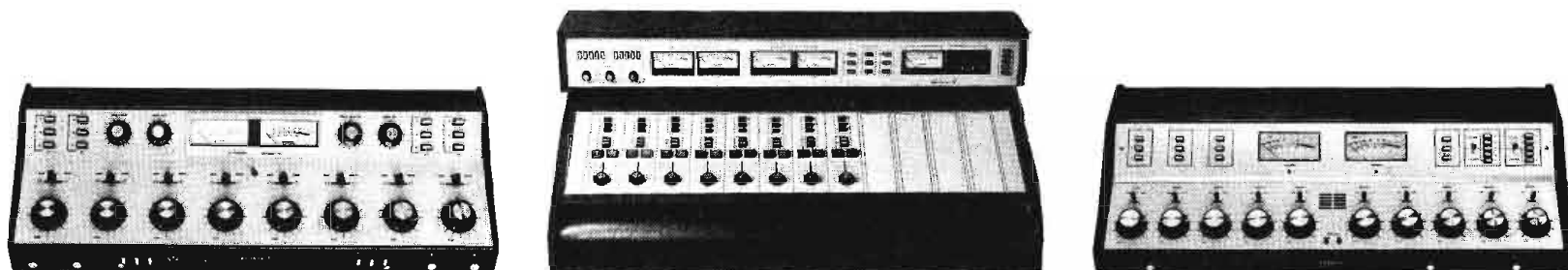
The Commission is placing increased reliance on the details of each applicant's proposal, which in accordance with the Commis-

(Continued on page 6)

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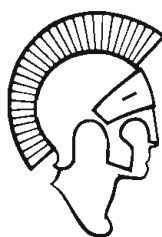
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For More Details Circle (3) on Reply Card

(Continued from page 4)

sion's Rules "shall endeavor to select frequencies or schedule operation in such a manner as to avoid mutual interference". The trouble is that these frequencies are shared among the various categories of auxiliary service, and there is an ever present risk of unexpected interference to some vital circuit, such as an STL. Licensees would be well advised to become increasingly vigilant to avoid unexpected interference to existing auxiliary operation.

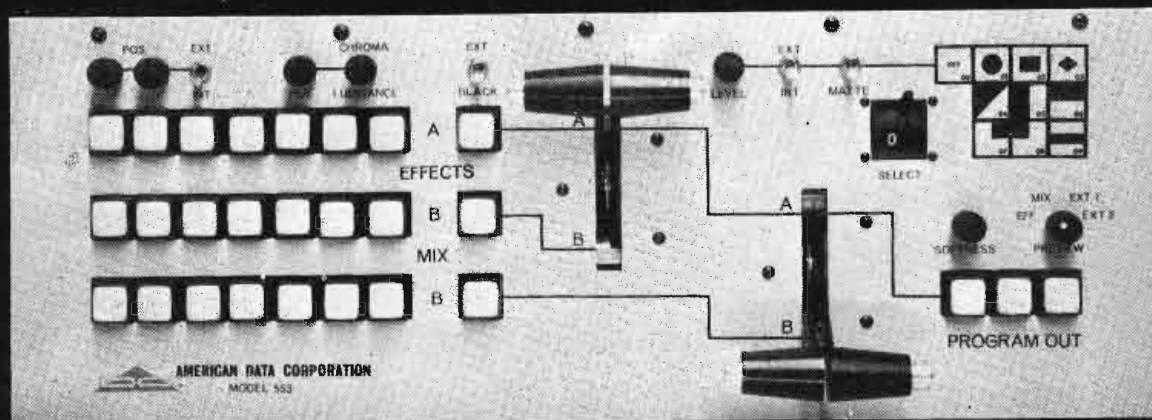
Emphasis on UHF Television Improvement

The Commission has instituted an inquiry to re-evaluate the suitability of the "taboos" which presently govern the allocation of UHF television channels and the siting of UHF television transmitters. In addition to provision for co-channel interference, the present allocations standards establish fixed mileage separation for eighteen additional channels - nine above and nine below the desired channel - employing fixed mileage separations ranging from 20 to 75 miles. The Commission's Laboratory Division recently released a report which includes a substantial amount of information on the taboo performance of existing receivers, but which reached no conclusions with respect to changing or eliminating any of the taboo requirements. All of the "taboos" arise from some aspect of UHF television receiver performance, and may vary substantially from one receiver to another.

Short Circuits

The American Broadcasting Company (ABC) is planning tests of circular polarization on UHF TV Ch. 19 at Modesto, California....A consultant for three Buffalo, N.Y. television stations has devised a scheme for "jamming" these stations' signals at the Canadian border in retaliation for Canadian cable practice of deleting U.S. commercials on these stations....The Commission has proposed the establishment of "Travelers Information Stations" employing 10 Watt roadside transmitters operating on 530, 1606, and 1612 kHz.... Prompt action is expected on the Commission's proposal to liberalize present rules governing the eligibility of AM stations for power increases and nighttime operation (see Jan. 1975 D.C.)....The Commission has cautioned cable operators to be alert to possible interference which might be caused by cable systems malfunctions to UHF radio navigation receivers in the band 328.6 to 334.5 MHz, although no cable systems are known to be employing frequencies this high.... The Commission has concluded that the "Fairness Doctrine" did not establish a listener's right to reply to a program expounding the Einsteinian concept of "curved space".

THE ADC 553



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The ADC Model 553 Vertical Interval Color Production Switcher is designed to provide small studio and remote van operators with a broadcast quality switching system that incorporates the latest state-of-the-art advances. SOFT WIPE and LINEAR KEY are standard features, but a new development from ADC allows the combining of two 553 systems for a system of unmatched capability and economy.

The special effects generator provides nine wipes, including a circle, square, diamond, diagonal, H&V splits and corner inserts. In key mode, the special effects generator provides a choice of self or matte key on internal or external sources, and an external chroma keyer may be used on the external input. True SOFT WIPES are provided, with control for degree of softness. The keying system is LINEAR in nature so that edge crawl and key breakup are minimized.

The Model 553 is self-contained and designed to mount in a standard 19 inch console or rack housing. Input selector buttons are momentary contact, illuminated with relegendable lens caps. A blackburst and color background generator is included in the switcher to provide fades or wipes to any color or black, and in conjunction with the matte keyer, will provide colored insert keying.



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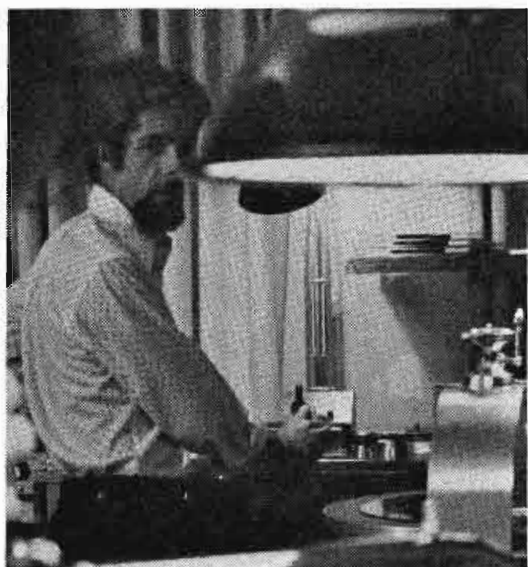
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Top Disc Cutting Studios, like The Mastering Lab, rely on Stanton's 681-Calibration Standard in their Operations.

Not everyone who *plays* records needs the Stanton Calibration Standard cartridge, but everyone who *makes* records does!

At The Mastering Lab, one of the world's leading independent disc mastering facilities, the Stanton 681 Triple-E is the measuring standard which determines whether a "cut" survives or perishes into oblivion.

A recording lathe operator needs the most accurate playback possible, and his constant comparing of lacquer discs to their original source enables him to objectively select the most faithful cartridge. No amount of laboratory testing can reveal true musical accuracy. This accuracy is why the Stanton 681 Series is the choice of leading studios.

When Mike Reese, principal disc cutter at The Mastering Lab, plays back test cuts, he is checking the calibration of the cutting channel, the cutter head, cutting stylus, and the lacquer disc. The most stringent test of all, the evaluation of direct to disc recordings, requires an absolutely reliable playback cartridge . . . the 681 Triple-E.

All Stanton Calibration Standard cartridges are guaranteed to meet specification within exacting limits. Their warranty, an individual calibration test result, comes packed with each unit. For the technological needs of the recording and broadcast industries, and for the fullest enjoyment of home entertainment, you can rely on the professional quality of Stanton products.

For further information write
Stanton Magnetics, Inc., Terminal Drive,
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All Stanton cartridges are designed for use with all two and four-channel matrix derived compatible systems.

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INDUSTRY NEWS

On the air for \$2,000

We're all aware of the typical citations and fines levied by the FCC, but one notice that seemed out of the ordinary came to our attention recently. It's important, because there probably are a number of stations who can get tagged for not knowing this rule and its interpretation.

The rule in question is Section 73.1206, and it deals with telephone conversations between the station and the party called. Specifically, the FCC requires that prior to recording a telephone conversation or broadcasting the conversation simultaneously with its occurrence, a licensee must inform the other party of its intent to broadcast the call.

Still plugging away at its backlog, the FCC recently ordered a Pittsburgh station to forfeit \$2,000 against a 1973 citation for repeated failure to give proper notice of its intention to broadcast telephone conversations.

The FCC stated that it had information indicating that a tele-

phone call by the station involved the use of indecent language by the party called, and that the entire call had been broadcast live by the station.

The station contended, in response to the liability notice, that the utterances made by the parties called by the station such as "hello" or "I listen to the new sound of..." did not constitute a conversation within the ordinary sense of the word and within the meaning of 73.1206. The station requested recession of liability.

As you might have guessed, the Commission said it has interpreted the word "conversation" to include any word or words spoken during a telephone call.

The Commission said that cash calls made by putting the party on the air before he or she is notified of the intention to broadcast that call "are not only invasions of privacy, but also expose the listening or viewing public to the answer of the party called no matter what the answer may be."

Emmy award to SMPTE

At the annual Emmy Award ceremony held in Hollywood, the National Academy of Television Arts and Sciences presented a citation to the Society of Motion Picture and Television Engineers for the technical development of the universal videotape time-code. The award was accepted by the President of SMPTE, Kenneth M. Mason, Asst. Vice-President, Eastman Kodak Co.

The videotape time-code, now a basic element in television broadcasting technology, makes the successful editing of videotape image and sound practically possible and is thus essential for the production of television programs on videotape.

This and other major technical engineering developments on which SMPTE is engaged will be demonstrated and discussed at the 117th Annual Technical Conference of the Society at the Century Plaza Hotel, Los Angeles, Sept. 28 to Oct. 3, 1975.

Ampex and EECO sign agreement

Ampex Corporation announced it has reached agreement with Electronic Engineering Company of California (EECO) to distribute EECO time code editing and synchronizing equipment and related electronic indexing and display products.

The two-year agreement gives Ampex exclusive worldwide distribution rights.

Future Shock... Now!

The tempo is increasing and the response time is decreasing.

You're handling a schedule with 600 to 900 events per day that requires thousands of manual operations . . . loading and reloading machines, verifying and reverifying material, sorting and rearranging, deleting and inserting new events, checking and rechecking, making machine assignments and reassignments, multiple prerolls, and complicated audio/video switching sequences . . . all by different people . . . and this schedule must be accurately confirmed on an FCC log.

Today's near impossible task . . . is rapidly approaching the impossible.

Help is Available... Now!

CDL's System 100 TV Automation System, *under your control*, will store and retrieve the schedule with entry error checking, make automatic time corrections, perform complicated audio/video switching sequences, assign machines, verify material, and print the "As-Aired" FCC log . . . **all automatically.**

In addition, optional modular accessories are available to automatically control the Ampex ACR-25, and to communicate directly with a Business/Traffic Computer System.

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Construction permit form error

An error has been found in the November 1974 edition of FCC Form 301 which will affect applicants for AM construction permits. Section V-A, page 1, paragraph 9 which reads "Frequency monitor" should be changed to read "Modulation monitor."

The error will be corrected when the form is reprinted. However, to correct for the error in the November 1974 edition, each applicant should take the following steps to ensure that the Commission receives all necessary information to

process its application:

1. Cross out "Frequency monitor." The use of a frequency monitor is no longer required by the Commission.
2. Type or print the words "Modulation monitor" instead. It is requested that this step be taken so that it will be clear that the information you insert pertains to your **modulation** monitor, not your frequency monitor.
3. Insert "Make" and "Type No." of your modulation monitor in the spaces provided.

NAB urges cablecast limits

The NAB has urged the Federal Communications Commission to adopt, without further delay, its proposed rule limiting cable television systems in the importation of sports events via distant signals.

The rule would prohibit such distant signal imports of games played by other teams in the same sport when the local team is playing at home. Broadcasters have urged that it also apply when the local

team's away games are broadcast back to the team's home territory.

NAB said in reply comments filed with FCC that the rule is needed to enable professional teams to regain control over distribution of sports events and to assure the public that "high quality sports programming will continue to be available over free television."

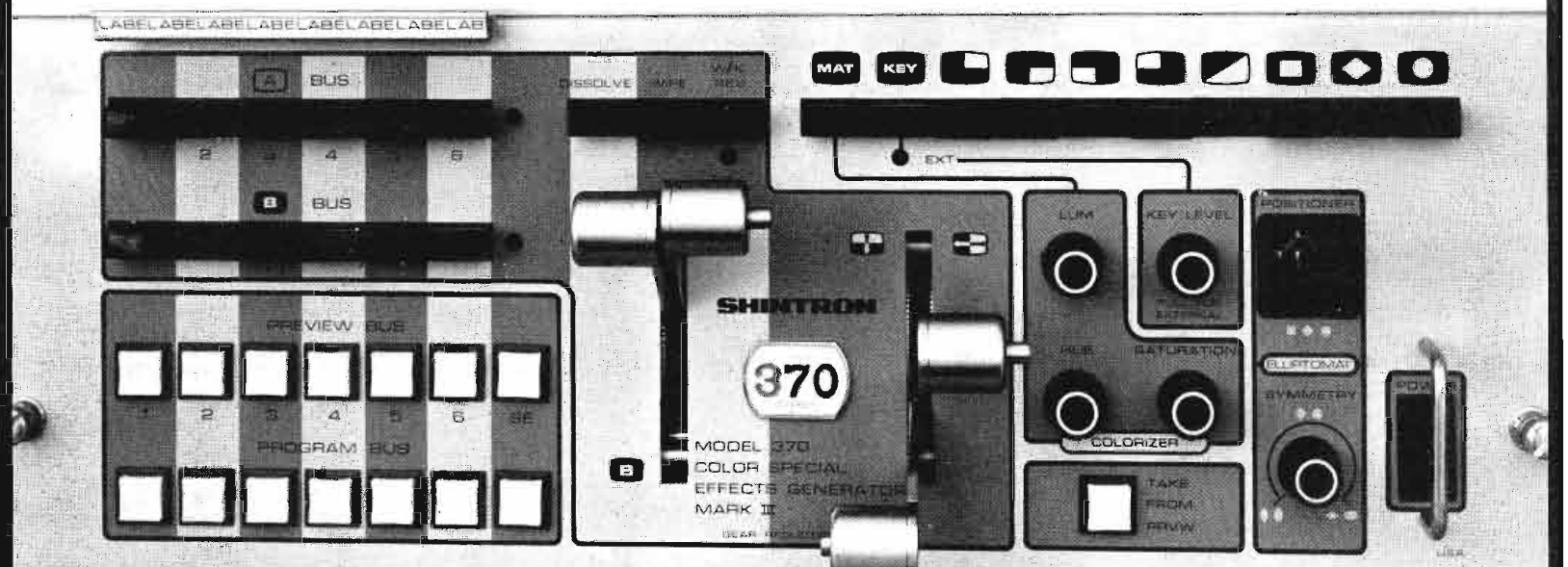
At issue, it said, is "the economic health and well-being of sports programming and...television's economic ability to continue to deliver this important source of programming to the public free of charge."

Noting that three years have passed since the FCC stated it would act on the proposed rule "expeditiously," NAB said cable interests have used that time to build new systems and sign up subscribers "on the basis of distant signal sports programming." They did so, it said, "with full knowledge of the proposed rulemaking" and obviously assumed the Commission either would fail to act or would refuse to order a distant signal blackout.

There is only one Special Effects Generator in a system...

THE MARK III 370

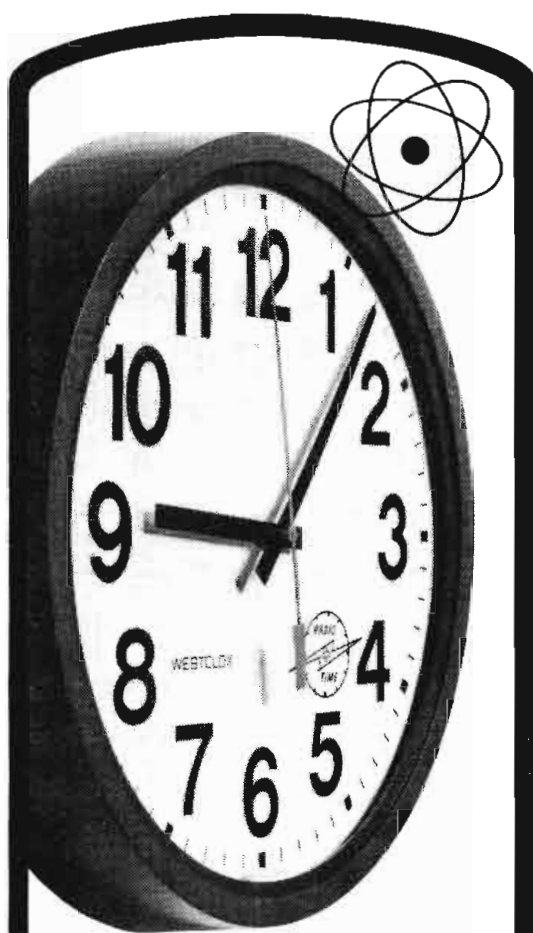
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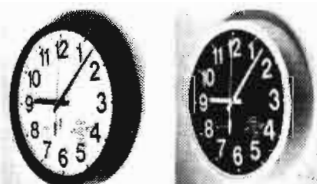
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Each clock contains a solid state radio receiver that is constantly tuned to the National Bureau of Standards' station WWV. Periodically the clock hears a signal that triggers the up-dating mechanism, correcting any minor deviation of the second hand.

The clock is also equipped with battery stand-by power. Line power surges, brown-outs, and power failures have no effect on the clock.

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A positive voice for SBE

At the end of his term of office the President is traditionally allowed to make a few remarks about the state of the Society.

I have been fascinated by the broadcast industry ever since I was old enough to ride my bicycle to visit the radio station in my hometown. I have observed the growth and changes in broadcasting and I feel compelled to comment on some of those changes—in particular, the deterioration of the technical operation in some segments of our industry and the tendency on our part to accept this as something we can't do anything about. "The program manager wants it to sound that way," "The manager won't spend any money." Unless we have made a reasonable attempt to educate the program manager and station manager about a quality product, we have contributed to

what Ron Merrell described as our "soldering-iron" image. Unless we have been an informed, productive member of the station's management team, we have helped write that equipment ad aimed at the manager instead of the chief engineer.

No matter what position you hold, i.e., management, supervisory, or operational, you must be aware of the potential changes in our industry and do your part to shape its development.

I believe that the SBE is beginning to be a positive voice in the broadcast industry, and I am very pleased to have served these two terms as your president. It has been a great honor, and I want to thank all of you for your support. I will continue to serve the Society as a member of the Board and on the Certification Committee.

**James C. Wulliman,
at Annual Meeting
Las Vegas, Nevada**

Chapter Meetings

Chapter 2: Northeastern Pennsylvania

John Kowalchik
RCA Solid State Division
Crestwood Road
Mountaintop, Pennsylvania
18707
(717) 474-6761

Chapter 2 members concluded this year's program on May 24th with an evening of dinner and dancing for their ladies. Regular meetings will resume in September.

Chapter 9: Phoenix, Arizona Leon Anglin SBE

P.O. Box 615
Phoenix, Arizona 85001
(602) 258-7333

The May meeting for Chapter 9 was held the 29th at the KTAR Studios.

The discussion for the evening focused on the proposed certification program.

Chapter 15: New York, New York

John Lyons
WWRL
41-30 58th Street
Woodside, New York 11377
(212) 335-1600

WQXR Presentation Theater was the location of the June 12th meeting for this chapter. The evening began with a presentation on a new design concept in FM Exciters by Art Silver, Chapter 15's program chairman, and concluded with a report by Mr. Frederick Barrett from the Sequerra Company, who spoke on a new State-of-the-Art FM Tuner.

(Continued on page 14)

For More Details Circle (10) on Reply Card

Today's Programmed Automation Can Increase Your Sales ...and Profits.

HERE'S HOW.

The Broadcast Industry has leapfrogged into the Age of Automation. You have got to believe that automation is the wave of the future in our business. In 1975, stations will spend over 14-million dollars on equipment and programming. The business side of broadcasting is also automating with English printout logging and computer billing. It is projected that 90% of all stations will have some type of automation by 1977.

An Automation System for Your Station.

Control Design has the right system, whether AM or FM, monaural or stereo, 1 kw or 100 kw, established or new licensee. *What is the best size for automation? Any size!*

Why Lose Weekend Sales?

More sales are lost on weekends than you realize. The prospective account, that you pitched all week, can be lost on a Sunday if your station suffers from "weekend personality letdown". That's the only time many businessmen have available to tune you in. *Automated programming has consistent high quality.*

Improved Format.

Whatever your style . . . Rock, Country Western, Middle-of-the-Road, Rhythm & Blues, or Ethnic, there's a wide choice of automated formats from the leading producers. *Automation brings the top talents, the top features, and the top music to your area.*

The Right Commercial at the Right Time.

If the log shows a commercial spot at a specific time, rest assured it will appear exact. There is no error because of the confusion of the moment, no missed or delayed events, no disgruntled sponsors, no makegoods. *Automated programming is accurate and precise. And, good business.*

Control Your Costs 24 Hours a Day.

It makes no difference if it's 3 PM on Tuesday or 3 AM on Sunday. Automation constantly gives the same quality, at the same cost, and with the same thorough attention to time and detail. The equipment can be programmed for 7 days of hands-off operation, sequencing up to 8,000 events from a multitude of sources. *Automation controls costs.*

People Are Important.

Each of your key men wears many hats. By eliminating the tedium of the day-to-day operations, they are freed for more profitable assignments . . . special local programming, sales, market planning, financial management. *Automated stations have better personnel utilization, higher pay scales, more job security.*

Meet Competition Head On.

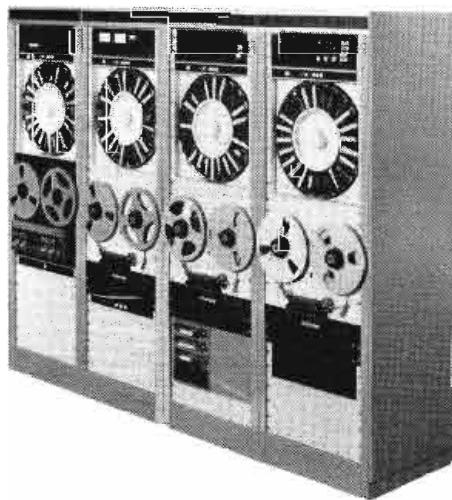
The automated station is in the best possible posture. It can provide top talent and entertainment like the largest conventional station: programming that is out of the reach of competitive size stations. It has firm control over costs. It frees personnel to better meet the radio needs of the community, and to more effectively sell and service customers in its marketing territory. *The automated station has the competitive edge.*

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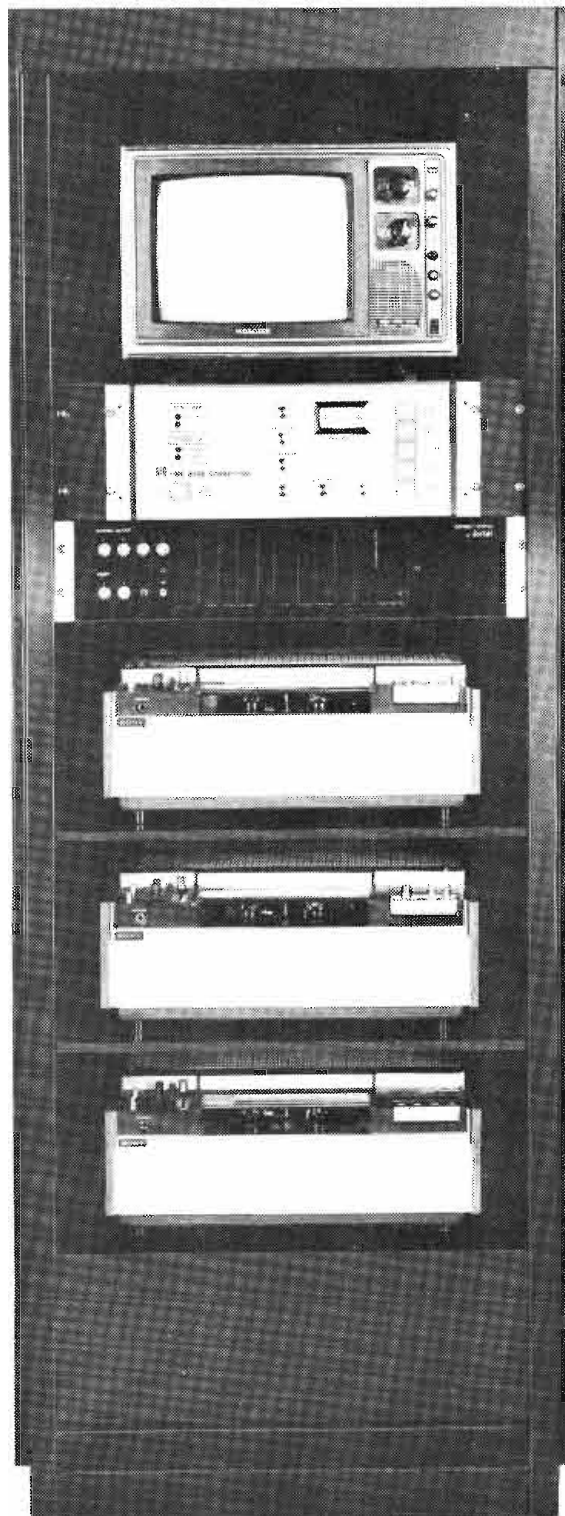
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address _____			
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(Continued from page 12)

Chapter 16: Seattle, Washington

Bob Ingalls
5441-187th Avenue, N.E.
Redmond, Washington 98052
(206) 543-7774

Chuck Morris led the May 14th discussion on electronic journalism and the instant news camera. On June 11th, members listened to Mr. Mark Sanders, product manager for Ampex speak on their Time Base Corrector Model 800.

Chapter 17: Minneapolis, St. Paul

Joel Clarke Humke
KSTP Radio
3415 University Avenue
St. Paul, Minnesota 55114
(612) 645-2724

Chapter 17 held its May meeting at the Rarig Center at the University of Minnesota. Mr. James Littlejohn and Mr. Ron Rentfrow, representatives for Collins led the program on the Collins Phase IV FM Exciter and a discussion on transmitter maintenance and studio design.

Chapter 32: Southern Arizona

H. J. "Bart" Paine
Chief Television Engineer
University of Arizona
Arizona Medical Center
Tucson, Arizona 85724
(602) 882-6644

May's meeting for Chapter 32 was held at the Willcox High School. The visit to their studios included a discussion on the CATV "Head End" and the school's color camera Quad VTR.

San Diego, California
Bill Montgomery
SBE 6841 Convoy Court
San Diego, California 92111

"NAB in Review by Selected Guest Speakers" was the program for May 29th. The evening also included a special presentation by Mr. Lou Broadbent on the Tektronix TM500 modular package. The June meeting featured Mr. Jack Williams of Pacific Records speaking on professional audio equipment.

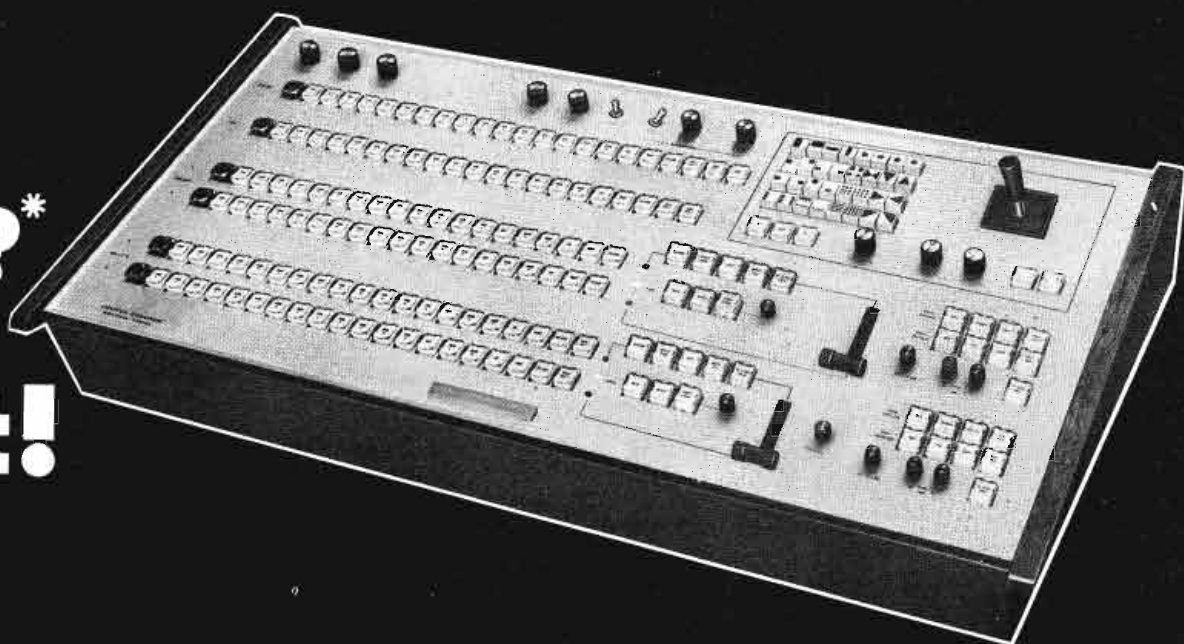
(Continued on page 16)

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(Continued from page 14)

SBE profile: **award-winner** **John T. Wilner**

This month's Profile features John T. Wilner, whose contributions to SBE and to the entire broadcasting industry are too numerous and too varied to be covered in a few paragraphs.

In 1934, armed with a B.S. degree in electrical engineering from Newark College of Engineering, John became a staff engineer with CBS Laboratories and worked on early television systems under Dr. P. C. Goldmark. In 1942 he went to Harvard University as project engineer heading the Radar Transmitter Group until 1944, when he returned to CBS Labs to work on the sequential color tele-

vision system, LP records, and UHF transmitter development.

From 1949 through 1969 John served as Vice President of engineering for the Hearst Corporation, where he was responsible for the design, construction, and operation of three television stations, four AM stations, and three FM stations. Then, seeking new challenges, John left the Hearst organization in 1969 and tried his hand in other areas, ending up as an associate in the engineering consulting firm of Kear and Kennedy, Washington, D.C.

However, the old desire to get his hands on nuts and bolts got the best of him, and he accepted his present position as Director of Engineering for the New Jersey Public Broadcast Authority. His task has been to develop a statewide educational TV network, consisting of four UHF outlets for non-commercial broadcasting, and he has successfully accomplished this project.

John has been a part of virtually every major advancement in our industry and has served on many

committees, including the PBS Engineering Advisory Committee and the NAB Engineering Advisory Committee, of which he is a past chairman. He is currently an SBE Director and heads the Certification Committee. While it may be a coincidence, John is uniquely suited for work on a committee such as this, engaged in upgrading the status of engineers within the broadcasting industry.

In 1959 John was the first recipient of the NAB Engineering Achievement Award, not only for his overall efforts on behalf of broadcasting, but also for his invention of the Image Orthicon Orbiter which cut the operational costs of high-quality TV cameras so drastically that such quality became practicable for even the smallest stations.

Those who know John can appreciate why the most prestigious award that broadcast engineers bestow upon their best was initially conferred upon a man whose qualifications set a precedent still difficult to match.

Broadcast quality video switching NOW under \$30 per crosspoint.

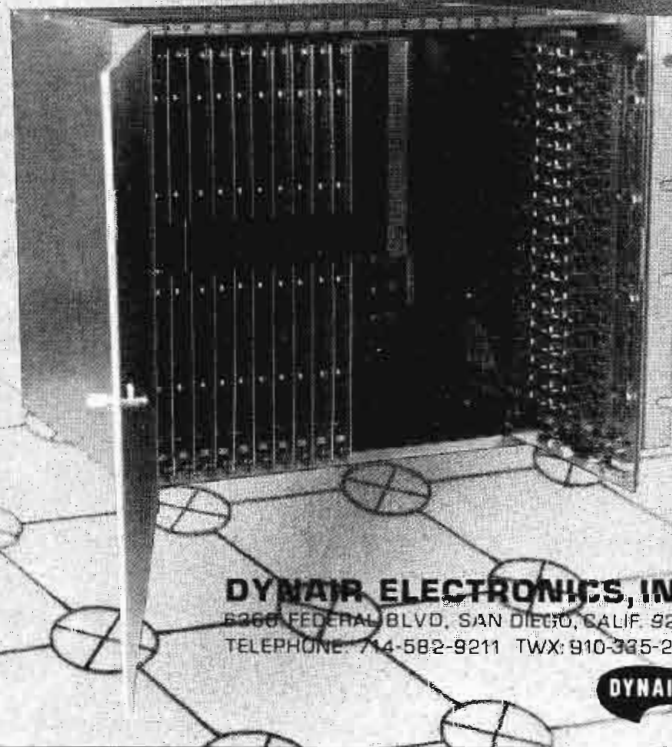
Input-output configurations are virtually unlimited with this modular, building-block, solid-state, video switch. And... this flexibility comes at reduced cost.

Starting with a single 14-inch by 19-inch rack frame assembly, the user can build to a 20-input by 20-output configuration by selecting plug-in switching and amplifier modules. Using the appropriate modules, configurations such as 10-in by 5-out, 20-in by 10-out or other configurations can be assembled. Greater capacities can also be accommodated... just add.

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Best of all, users will really appreciate the economy. By specifying the initial and future capacity for the system, the buyer purchases only the hardware needed now without being penalized later. High reliability solid-state video switching costs can be cut below \$30 per crosspoint... less than competitive switching systems. Compatible with our Series 8100 Solid-State Audio Switching Equipment, the new 1400 Series offers, spec for spec, the lowest cost quality switching equipment available today!

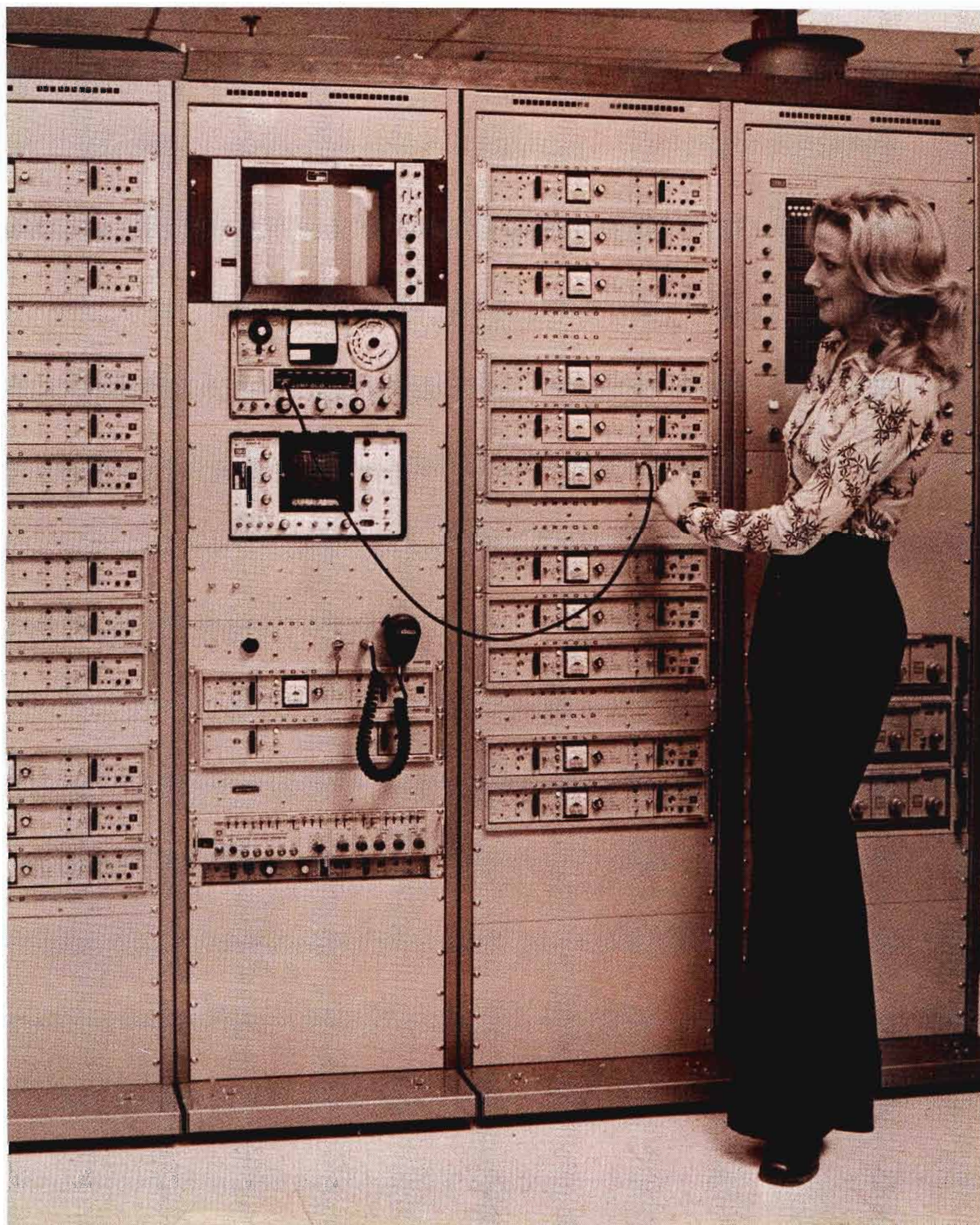


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JULY, 1975

CABLE engineering



NCTA tackles fee formulas

The NCTA Board of Directors has voted to re-affirm, with one modification, its position on pending copyright legislation for cable television. The Board's modification substitutes a blanket exemption for the first \$100,000 of gross subscriber revenues for all cable systems, in place of an exemption for all systems with fewer than 1500 subscribers.

The action was taken in a special meeting in Chicago called to review the Association's copyright position and, in particular, alternative copyright fee payment formulas. The Board had previously voted to re-affirm its support for the principle of copyright legislation for CATV, but had resolved to undertake further study of fee payment formulas.

Commenting on the Board's most recent action, NCTA Chairman Rex A. Bradley stated: "The Board believes that new copyright legislation for cable should exempt from liability cable carriage of local television signals. This approach is consistent with, for example, the Justice Department's position on CATV copyright liability."

"While the Board considered a number of approaches to a copyright fee payment formula—including liability for distant signals or microwave signals only—it concluded that attempts to apply an exemption for local signals on a system-by-system basis would result in placing the burden of liability unfairly on particular categories of cable systems."

"Thus the Board believes the fairest and most equitable approach for the entire cable industry and its subscribers is an exemption applied on an industry wide basis."

How To Stifle CATV

The chief spokesman for the cable television industry has charged that commercial television networks have engaged in a broad pattern of anti-competitive and abusive practices designed to stifle the development of CATV.

David H. Foster, President of the National Cable Television Association, recently told the Senate Subcommittee on Antitrust and Monopoly that network actions to retard cable and pay cable TV development "represent a sophisticated and alarming demonstration of power designed to perpetuate an entrenched oligopoly and deny to the American public its right to obtain new and more diverse communications services."

The Subcommittee, chaired by Senator Philip Hart, (D-Mich.), is holding hearings to determine whether pay cable TV is hamstrung by unreasonable restraints on trade by networks.

Foster told the Senators that ever since the FCC, at the urging of broadcasters, first assumed jurisdiction

over CATV, networks and broadcasters have engaged in a series of legal, public relations, and political maneuvers to contain cable growth.

Following are excerpts from Foster's testimony:

"Since the adoption of those (FCC) protectionistic rules in the 60's, networks and broadcasters generally have used each new rule-making proceeding at the FCC as a platform to oppose any easing of cable's regulatory strictures. Indeed, in most cases they argued and lobbied for **more** restrictive regulations on cable to prevent CATV from entering and competing in the marketplace."

"...to every proposal that would permit or encourage additional services for the American public they (the networks) objected. Each step, no matter how small, was seen as a threat to their control over the delivery of television entertainment programming to Americans—an oligopoly which in 1974 saw revenues of \$1.9 billion and pre-tax profits of \$331 million. Each step that the FCC took was met with delaying tactics, obfuscation, and outright opposition. The networks, it may be said, had their own theory of containment, and they played it to the hilt."

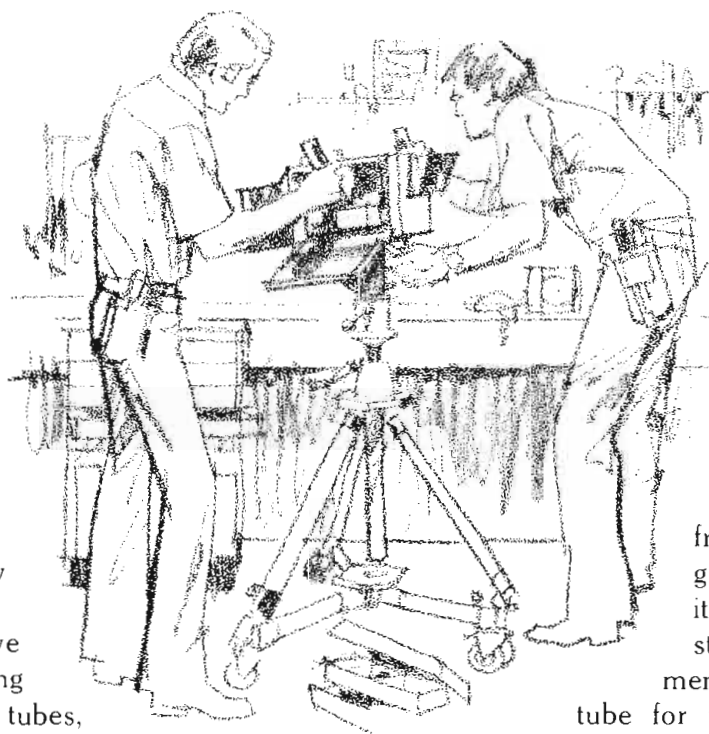
"The network's tactics have not been limited to the legal arena. Their tremendous information and promotion resources have been turned to the fray as well. Special organizations or committees under such not-too-subtle nomenclature as the "Free TV News Bureau" or the "Committee to Protect the Public From Paying for What it Now Gets Free on Television" have churned out the party line to support the more serious legal and political actions designed to hold cable back. Even the Television Information Office, whose apparent purpose is to promote television programming, has reminded us constantly and somewhat more subtly that this month's great lineup of network programs is coming to us **free**—a condition which may change soon unless we write to our FCC Commissioners and Congressmen."

"We believe that the entire effort is anti-competitive in nature and designed to throttle the pay cable industry...Throughout, their campaign has relied on red herrings, "Siphoning", although it is clear that no siphoning has occurred, the "shifting of the Super Bowl and World Series to pay TV", when it has been and is impossible to shift those events to pay TV, and "the demise of Free TV", when, of course, 1974 network profits increased 15 percent."

Embarrassing Oversight

In a recent report to the FCC, Vic Johnson of the Cable Television Information Center states that he feels an important issue was overlooked in the CTAC report on cable technical standards...an issue that

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Let's face it — even Plumbicon TV camera tubes wear out and eventually have to be replaced to restore your camera's original picture quality. If we learned anything on the way to selling over 30,000 Plumbicon TV camera tubes, we learned how important Service is to the telecaster. Especially when it's related to availability! No TV camera-user can afford to shut down his operation while "waiting for parts." Plumbicon replacement tubes are instantly available, at all times, through local distributors and through Amperex factory sales representatives. And Plumbicon tube distributors (your own local businessmen) are carefully selected for their ability to support Plumbicon TV camera systems with on-the-spot customer support and on-the-spot customer service.

No doubt it was picture quality that motivated you to select a Plumbicon CCTV camera originally. Today, when business conditions, more than ever, demand absolute peak performance

from every system, you can upgrade your camera's picture quality dramatically, simply by substituting a direct plug-in replacement, broadcast-grade Plumbicon tube for the industrial-grade Plumbicon tube now in your camera.



The broadcast-grade tube is the direct descendant of our original Plumbicon that revolutionized color TV broadcasting...and won an Emmy award from the Broadcast Industry. As a matter of fact, contemporary Plumbicon tubes outperform the original Plumbicon by a wide margin with such important improvements as Higher Resolution and Modulation Depth, Extended-Red Response and Minimum Lag.

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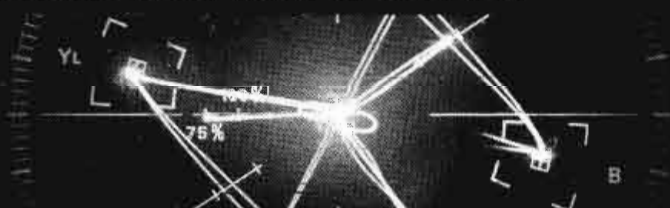
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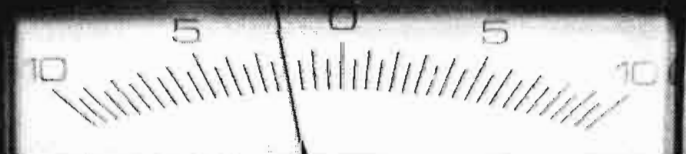
THIS ONE DOES ALL THREE

Color sub-carrier burst phase requires close attention to prevent visible color faults (objectionable hue shifts) during a production or duping. Especially if you want to keep normal fleshtones when using special effects, supers and chroma key during color productions. Phase shifts greater than 5 degrees can distort normal fleshtones creating visible color faults. This can result from mis-adjusted video equipment or from various cable lengths and amplifiers which create delays and different burst angles according to their location in a color video system. Phase shifts could also result from normal aging of various components throughout the video system. You can check for phase shift the old way or the VACC way.



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the old way



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the VACC way

VACC's Burst Phase Meter (model BPM-1) is a \$437.50 replacement for most vectorscope applications. The unit requires only ac power, video and subcarrier inputs. A easy-to-read analog meter indicates phase shift in the video burst relative to the subcarrier over a full 180 degree range with $\frac{1}{2}$ degree accuracy. (360 degrees phase range can be obtained with a coax delay line).

To learn more about how to avoid visible color faults or "Keep Those Fleshtones" write for your free copy of VACC's application note number 69. For technical data on the BPM-1 circle the inquiry number.



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could put the Commission in an "unhappy situation". The omission he refers to is the absence of a recommendation for improved technical picture quality standards for locally broadcast channels as delivered to cable subscribers.

The following are comments made in that report relative to distortions introduced to a locally broadcast television signal between the transmitted output and the subscriber's TV receiver input.

"As a result of this omission, the following scenario is occurring more frequently. A householder replaces an old TV set with one of the new large size color TV sets such as the RCA XL100, which can deliver pictures with exceptional clarity. Connecting the set to an off-air antenna, the pictures are great on the local channels. Connecting the same TV to the cable system, this new set has objectionable background noise in the picture. Complaints to the cable operator can result in correcting this problem either by improving the technical performance of the cable system or by modifying the alignment of the TV receiver by adjusting the sharpness control. This corrects the problem, but the picture is degraded to make the noise less noticeable and the result is that the performance of the new set is reduced to that of the old one.

"This is an intolerable situation for all: to the cable subscriber, who had hoped for better pictures on the new TV receiver or at least as good as off-the-air; to the cable industry that hopes to open up additional urban markets and has to provide that quality to get subscribers; to the local broadcaster who is unhappy with material degradation of his channel by the cable operator; and to TV set manufacturers who dislike having their new sets perform poorly on cable systems.

"What causes this condition? As the result of substantial advances recently in the TV receiver industry, new color television sets introduce less tuner noise, have better picture definition and include automatic color control. The reduced noise and higher definition in the TV set make cable system noise more noticeable and objectionable. The automatic color control increases the gain and associated noise whenever there is improper system response at color frequencies.

"How can the Commission solve this problem? I propose they set additional picture quality standards for local channels as delivered to subscribers of the cable system so that their delivered signals will be as good as those received directly off-air by non-subscribers on that channel. Cable systems can be built to these standards with present equipment and with minimal economic burden.

"The information to aid in setting the levels of these standards is readily available. Bell Telephone Laboratories have documented 20 years of testing the factors that cause degradation of a TV picture. CTAC's Panel 2 has compiled this information but unfortunately the Steering Committee provided no basis on which the Commission could use this information to make an informed decision. My recommendation is that appropriate standards fall where 50 per cent of Bell Labs observers felt that a

TV picture impairment was "not objectionable." This should be the minimum level of acceptability; and falls in the middle between the rating of #1, "not perceptible" and #7, "extremely objectionable" interference.

The problem of cable systems materially degrading local channels can be nipped in the bud by additional technical standards. Otherwise, the FCC faces the prospect of spending lots of time and money to deal with numerous complaints. I recommend to the Commission that the best way to ensure development of broadband cable is to impose required minimal standards on all systems, with added picture quality standards for local channels."

Midwest seminar

Four leaders of the audio-visual industry have been named to speak at the Third Annual Midwest Seminar on Videotape and Film, to be held in Chicago Oct. 17-18.

They are, Robert B. Pfannkuch, Vice President of Bell & Howell in Chicago; Wilton R. Holm, V.P. and Executive Director of the Motion Picture & Television Research Center in Hollywood; Thomas W. Hope, Publisher of Hope Reports, Rochester, N.Y.; and Jack B. Spatafora, Director of the New Trier Township Film Cooperative in Winnetka, Ill.

The Seminar is devoted to stimulating the use of film and videotape as interrelated media in business, education, medicine, and other fields. It has become a major forum for industry leaders, according to Dick Clausen, Seminar president. Last year's Seminar drew participants from ten states and Canada, and a follow-up survey showed enthusiastic approval of the Seminar program. Both Pfannkuch and Holm spoke last year.

Pfannkuch, head of Bell & Howell's Communications Materials Group, is responsible for developing applications of new technologies to the communications, education, and training fields. He will address the Seminar on "The State-of-the-Art in Videotape."

Holm is a past president of SMPTE, a veteran of Technicolor, Cinecolor, and DuPont, and an organizer of the Research Center of the Association of Motion Picture and Television Producers. His topic will be "State-of-the-Art—Immixture."

Tom Hope's "Hope Reports" is widely recognized as a major source of information about the film industry. A former A-V manager for General Mills and consultant to Eastman Kodak, he has also authored several books and contributed regularly to the Journal of the SMPTE. He will speak on "Communications—an Overview."

Reservations for the Seminar, and further information, can be obtained by writing to Midwest Seminar on Videotape and Film, P.O. Box 11376, Chicago, Ill. 60611. Reservations are \$45 if obtained before Oct. 1, and include a party on Oct. 17 and lunch on Oct. 18. The Seminar will be held at the Holiday Inn near Chicago's O'Hare Airport.

Next best thing to Outage Insurance

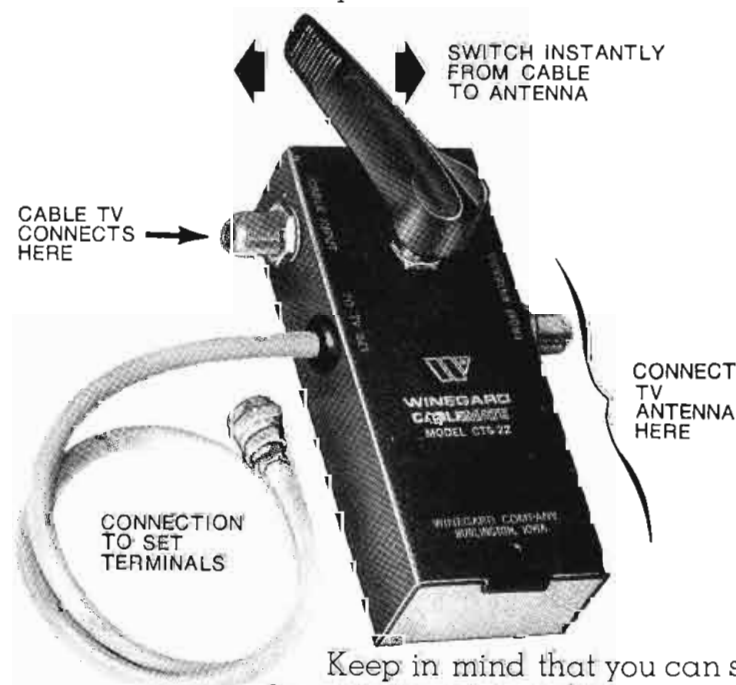
An outage on your system . . . even a short one that affects only a few subscribers . . . can cause plenty of headaches and bad public relations. Most people get pretty upset when they have no TV at all and outages sure don't lower your disconnect percentage.

Now some system operators have discovered that home TV antennas are the next best thing to outage insurance . . . an ally, not an enemy. When an outage strikes, subscribers who can switch easily to antenna signals just don't scream as quickly . . . or as loud . . . or as long.

Winegard Company (yes, we're the guys who make TV antennas) manufactures the most sensible cable-to-antenna switch you've ever seen. It was, in fact, designed for us by two engineers with long experience in CATV.

The important thing is that it works like a charm and is built to last almost forever. Isolation between antenna and cable inputs is enough to keep both signals from interfering with each other.

There are two models for CATV company installation in the subscriber's home. They are identical except one has a coax input jack for the antenna, the other has a 300 ohm antenna input. Either installs in a couple of minutes.



Keep in mind that you can sell the switches at a profit, sell them at cost or give them away on new hook-ups. No matter how you get Cablemates into subscribers homes you have the next best thing to outage insurance. How many do you want? FOR DETAILS & PRICES write



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Reasonable copyright

The Board of Directors of the National Cable Television Association has voted to re-affirm its support for reasonable copyright legislation with provisions for cable television.

Meeting in Washington, D.C. in special session and after extensive discussion and debate of its current copyright policy, the Board approved by a 26 to 2 vote the following resolution:

"A reasonable copyright bill must protect the rights of the viewing public as well as those of copyright owners. NCTA will work towards this end to reach a logical and equitable copyright bill. Therefore it is resolved that the NCTA Board supports the principle of reasonable copyright legislation which fits the realities of the industry today."

The Board also re-affirmed its program approved last November to effect necessary changes in current versions of copyright legislation. It directed the Association's staff to undertake immediate additional study of the copyright fee formula concept and report back to the Board at its next meeting.

Commenting on the Board's action, NCTA Chairman Rex A. Bradley stated, "The overwhelming vote in support of the principle of reasonable copyright payment is solid evidence that NCTA will keep its fundamental copyright commitment. The Board is still concerned about the impact of copyright liability on cable systems providing traditional antenna service—particularly smaller systems. For that reason we are re-examining all fee formula concepts—including the possibility of payment on a distant/local or off-air formula and a constant rather than escalating fee schedule—to determine which formula is more equitable and fits the realities of the industry."

Cable TV Information Center

Approximately \$106.7 million of the remaining \$185 million which the cable television industry must spend to comply with the Federal Communications Commission's

1977 deadline for compliance with channel capacity and access requirements would have to be spent by the industry to replace old cable and technologically obsolescent electronics, even if the deadline were postponed, according to comments filed independently by two members of the Cable Television Information Center.

W. Bowman Cutter, executive director of the center, and Edwin A. Deagle, Jr., director of analysis, filed the comments in response to the FCC's notice inviting views Relative to Postponing or Canceling the March 31, 1977 date by which Major Market Cable Television Systems Existing prior to March 31, 1977 must be in Compliance with Section 76.251 (a)(1)-(8). Their comments reflect the views of the individuals and not those of The Urban Institute nor its funding sources.

Executive Committee Additions

Daniel Aaron, vice-president of Comcast Corp., Bala Cynwyd, Penn. and Robert Weary, secretary-treasurer of Communications Services, Inc., Junction City, Kansas have been named to NCTA's executive committee, NCTA Chairman Rex Bradley announced. Aaron and Weary will join the present officers and immediate past chairman on the seven member committee.

Bradley also announced the appointment of the following persons to serve as heads of the Association's special or standing committees for 1975-76.

- By-Laws—George Nichols, Clinton Cable TV, Clinton, Ind.
- Convention—Beverly Land, Tele-Cable, Norfolk, Va.
- Community Services/Educational Television—Barry Lemieux, Continental Cablevision, Findlay, Ohio.
- Engineering—James Lahey, Muskegon Cable TV, Muskegon, Mich.
- Membership—Phil Wilcox, Communications Services, Inc., Junction City, Kansas.
- Public Relations—John Barrington,

Home Box Office, New York, NY.

- Utility Relations—John Gault, American Television & Communications, Washington, D.C.
- Financial Affairs—Jerry Green, TelePrompTer, New York, NY.
- FSLAC—Aaron Fleischman, Warner Cable, New York, NY.
- Independent Operators' Board—Joe Kusky, Willapa Harbor Cablevision, Raymond, Wash.
- Music Negotiating—Lawrence W. Kliever, Peninsula Cable, Hampton, Va.
- OSHA—John Wright, Cox Cable, Atlanta, Ga.
- Project '77—Nate Levine, Sammons Communications, Dallas, Texas.
- Re-Regulation—John Gwin, Cox Cable, Atlanta, Ga.
- Satellite—Russ Johnson, Tele-Communications, Inc., Denver, Colo.
- Subscription Cablecasting—Ralph Baruch, Viacom, New York, NY.
- Telco—Amos B. Hostetter, Jr., Continental Cablevision, Boston, Mass.
- Government Relations—Tom Soulsby, Communications Properties, Inc., Austin, Texas.

Wagner Honored For Contributions

Jay Wagner, President and General Manager of North Central Television, Inc., Sandusky, Ohio and Past President of the Ohio Cable Television Association received the NCTA Award for outstanding contributions to the CATV industry through state association activity.

Wagner received the award in ceremonies at the Annual Convention. The award is made annually to an individual in CATV who through his or her efforts with a state cable television association has made outstanding contributions to the advancement of the association and industry.

Wagner has been president of North Central TV, Inc. since 1971. Prior to that he was President and General Manager of WLEC in Sandusky.

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Portable Videocassette Player

The first low cost portable U-Matic color videocassette player to compete with portable motion picture systems was announced at the AECT Conference in Dallas by **Sony Corporation of America**.

Identified as the VP-3000, the newest machine in the expanding line of Sony U-Matic videocassette units is about the size of a portable typewriter. It can be carried easily because of its light weight.

The player has the Sony $\frac{3}{4}$ " U-Matic videocassette format. Pre-recorded cassettes can be played back on any standard television set without adaptors. It is simply connected to a TV set's antenna terminal for an immediate sales presentation with sound. Sony said the introduction of the VP-3000 is another step toward a single format aimed at standardizing color video use in business and education.

The player produces the same high quality image identified with all machines in the U-Matic videocassette line. It makes use of integrated circuits and can "freeze" a picture for study. It accepts the small Sony U-Matic 20 minute cassette, KCS-20.

The VP-3000 needs no special monitor. It can be connected to any standard TV set already in an office or school, thus making it as convenient to use as any familiar film presentation equipment.

For More Details Circle (102) on Reply Card

Outdoor Multi-tap

The CATV Equipment & Installation Operation of **GTE Sylvania Incorporated** has introduced a new low-cost, outdoor multi-tap for cable television transmission systems. GTE Sylvania is a subsidiary of General Telephone & Electronics Corporation.

The Series 3800 multi-tap offers a high-performance-to-cost ratio and simplified maintenance, according to Leman W. Dolby, Design Engineering Manager. "The 3800 combines the best performance characteristics of other comparably-priced units with a new seizure and other special features," Dolby stated. "It is available in 12 different tap values and its modular design permits changing values—by means of an easily in-

serted circuit card—without removing the cable. This reduces expensive down time and the need for spares."

For More Details Circle (103) on Reply Card

Super 8 Videoplayer

Super 8 Sound now has available stock of its new Kodak Videoplayer VP-1, a unit that uses Super 8 movie film, rather than magnetic tape, to produce a fully-interlaced NTSC composite video signal.

Audio is derived from the film's magnetic edge stripe. An integrated RF converter provides outputs on channel 2 or 3, for direct connection to the antennas of a normal color television receiver.

Available from Super 8 Sound, the videoplayers are modified to include a once-per-frame sync pulse output for fidelity double-system sync sound transfers to video tape.

For More Details Circle (104) on Reply Card

Nine-Inch CCTV Monitor

Javelin Electronics, division of Apollo Lasers, Inc., announces their all new, UL approved 9-inch CCTV monitor.

The VM-9A is all solid-state with easily accessible front panel controls and a handy carrying handle. It is corrected for use with standard and time lapse video tape recorders, has an EIA standard scanning system and 550 TV lines horizontal resolution. The VM-9A can be ordered in a rack mounted version and is available for immediate delivery.

For More Details Circle (105) on Reply Card

Dynamic Noise Filter

Burwen Laboratories has incorporated some of the latest technology in its consumer dynamic noise filter Model DNF 1201. The DNF 1201 is an active low pass filter which virtually eliminates noise from all sources without encoding. By sensing the high frequency content of programmed material, the DNF 1201 varies the bandwidth of the dynamic noise filter so as to accommodate program material while excluding unwanted high frequency noise. Through this technique, the DNF 1201 can achieve up to 14 dB of noise reduction without encoding.

The Burwen Model DNF 1201 incorporates a well regulated, shielded power supply to keep the overall system noise extremely low. All components are mounted directly on a printed circuit card to eliminate extraneous wires and to make it an

extremely rugged device. Through the use of the latest integrated circuit technology, the DNF 1201 has been reduced to an extremely compact size.

Another feature consists of input jacks that are mounted on a rear lip of the filter. This allows easy wiring even when the unit is self mounted, eliminating the need for crawling behind the component to make proper plug connections.

For More Details Circle (106) on Reply Card

Television Monitor Analyzer

Imero Fiorentino Associates, television lighting consultants of New York, Las Vegas and Hollywood, have designed a new simple to use filter to accurately set up a monitor's chroma and phase to insure color fidelity. It is called the Television Monitor Analyzer.

Monitor color bars are viewed through a specially designed filter, which only permits blue light from TV phosphors to pass through. After a few simple adjustments monitor set-up is complete. Full instructions explain how to use the IFA analyzer and its background theory.

Producers, directors, engineers and art directors will find the IFA Television Monitor Analyzer an invaluable aid in television production.

For More Details Circle (107) on Reply Card

High-Resolution Video Monitor

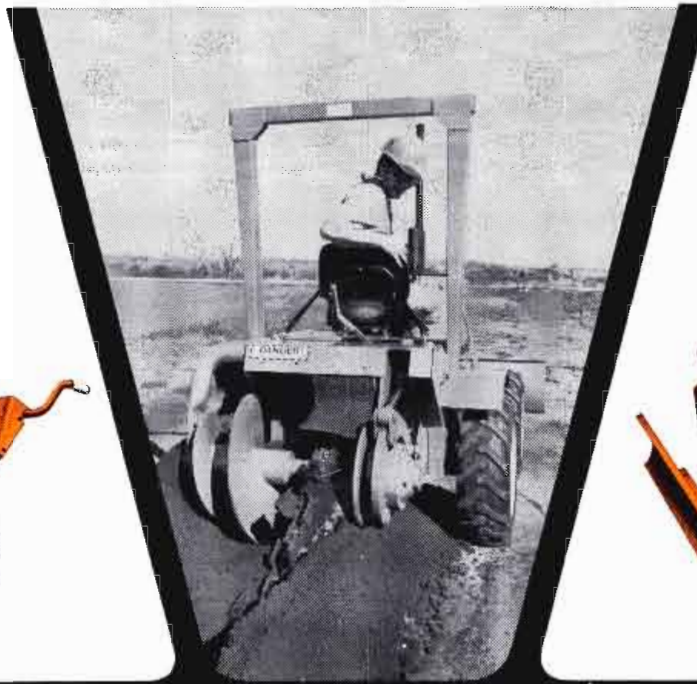
A new high-resolution video display is currently available from stock at **Sierra Scientific Corporation**, Northern California manufacturer of television cameras for industry, research, education and medicine.

Called the HD-1501, the monitor is a 15-inch (diagonal) CRT with rectangular corners and an 8-mil spot size. According to Dave Gilblom, Sierra's marketing director, the unit has a combined linearity and geometric distortion of less than 1 percent, and operates from all EIA and most industrial sync—including reconstituted sync from single-field disc recorders. AGC on sync separator effectively eliminates picture tearing.

The 1501 has full-range automatic line rate lock (10 to 60 Hz vertical, 15 to 37 kHz horizontal) and a DC filament regulator that provides constant current—stretching tube life and minimizing hum. Modular construction gives the 1501 enduring reliability while simplifying maintenance. Like all Sierra products it comes with a one-year parts and labor warranty.

For More Details Circle (108) on Reply Card

MODEL C



V30



Today, More Than Ever...

DITCH WITCH TRENCHERS Make \$ense!



MODEL M



J20

If your job calls for trenching, it makes sense to look to the people who have the most experience in the industry: Ditch Witch. Ditch Witch built the world's first service-line trencher more than 25 years ago and today offers the most complete range of trenching equipment available. The Ditch Witch Trencher Series is designed strictly for trenching. It includes two compact handlebar units and two four-wheel-drive models — the 18-HP J20 and 30-HP V30. If you require larger equipment, outfit one of the four Modularmatic vehicles as a trencher. The power range is from 30-HP to 100-HP. From 7-HP compact to 100-HP main-line equipment, Ditch Witch has the right machine for your trenching job. That's why today, more than ever, Ditch Witch makes sense.

Ditch Witch . . . equipment from 7 - to 195-HP.



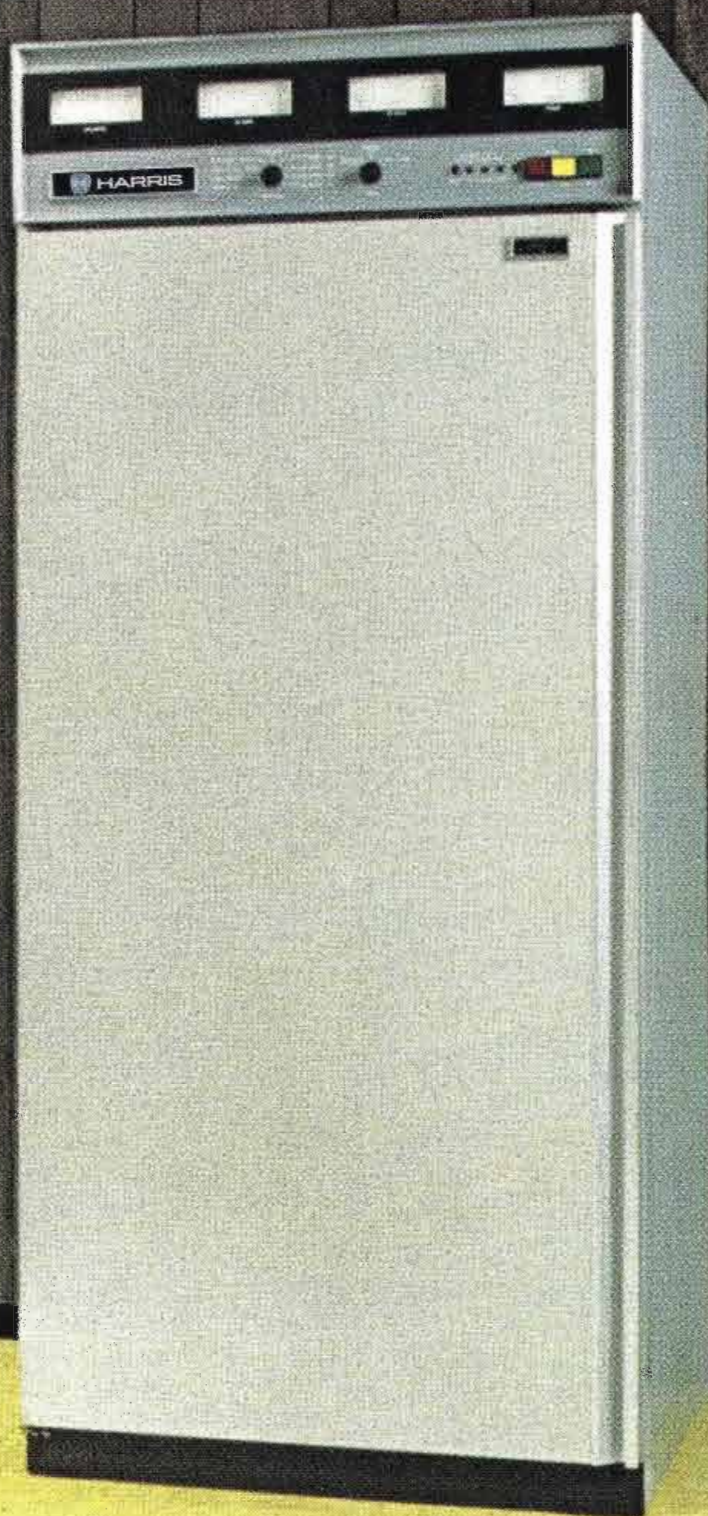
"Ask the man you see wearing this emblem how Ditch Witch Makes Sense for you!"

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Frequency Modulation, with the Pulse Duration Modulator, with IF Modulation . . . and now with total solid-state design and PSM.

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*Patent Pending

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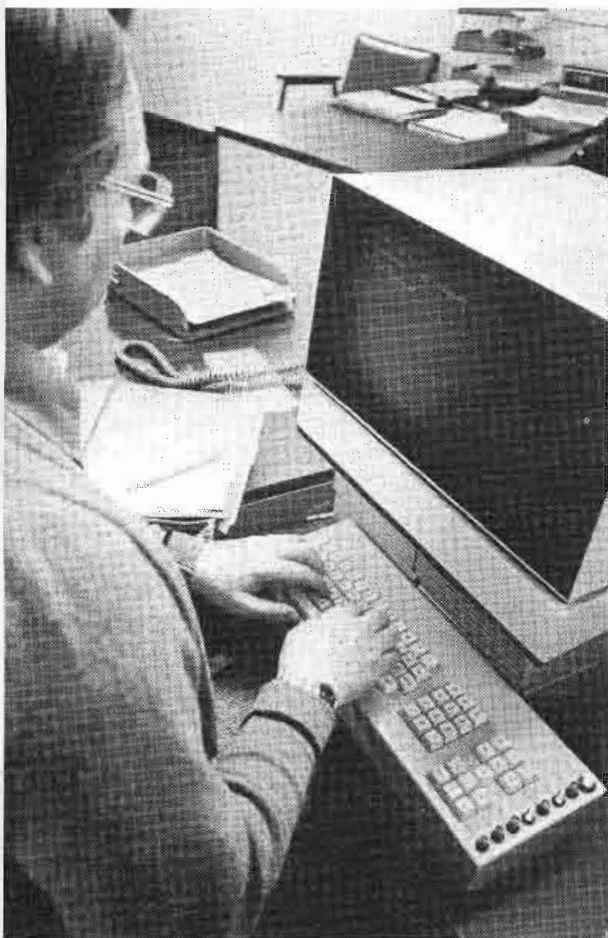
COMMUNICATIONS AND
INFORMATION HANDLING

For More Details Circle (15) on Reply Card

KSL-TV AUTOMATES

sales and traffic operations

KSL-TV recently finished the highest billing period in their history. Their traffic people say they doubt that the load could have been handled at all with the old manual system...at least not without the added expense of psychotherapy for the traffic manager!



Roy Richins, Continuity Director, enters a new ad contract via the CRT terminal in the traffic department.

When a television station's management decides that it's finally time to automate its time sales and traffic operations, there usually are only three choices available for doing the job: lease a time-sharing computer service, buy or lease a pre-programmed computer package, or buy a computer and do the job yourself.

At KSL-TV (CBS, Channel 5), Director of Engineering William D. Loveless decided that the third option had quite a number of advantages.

"The most prominent benefit was the long-term economy of owning your own system," Loveless explained. "The first year's cost for leasing a system would pay for our hardware, the second year's cost would pay for our software development, and each year thereafter would be money in our pocket.

"When you add to that the opportunity to use the computer for other tasks, the custom-tailored software, interfaceability with our other automated systems within the station, and faster data access, we decided the benefits far outweighed the disadvantages.

"Besides," Loveless added, "throughout the history of broadcasting, engineers have been successful at fabricating everything from consoles to transmitters; why not a computer system?"

Management at KSL-TV was somewhat encouraged in their decision by the fact that the parent company, Bonneville International, had been successful in the automation of program switching at KSL-FM and at sister stations KIRO-FM and KBRT (Loveless also serves as Assistant Director of Engineering

for Bonneville International, in addition to his post at KSL-TV). They also had built a system for computerized election return displays. But the new traffic system still was the largest project yet undertaken.

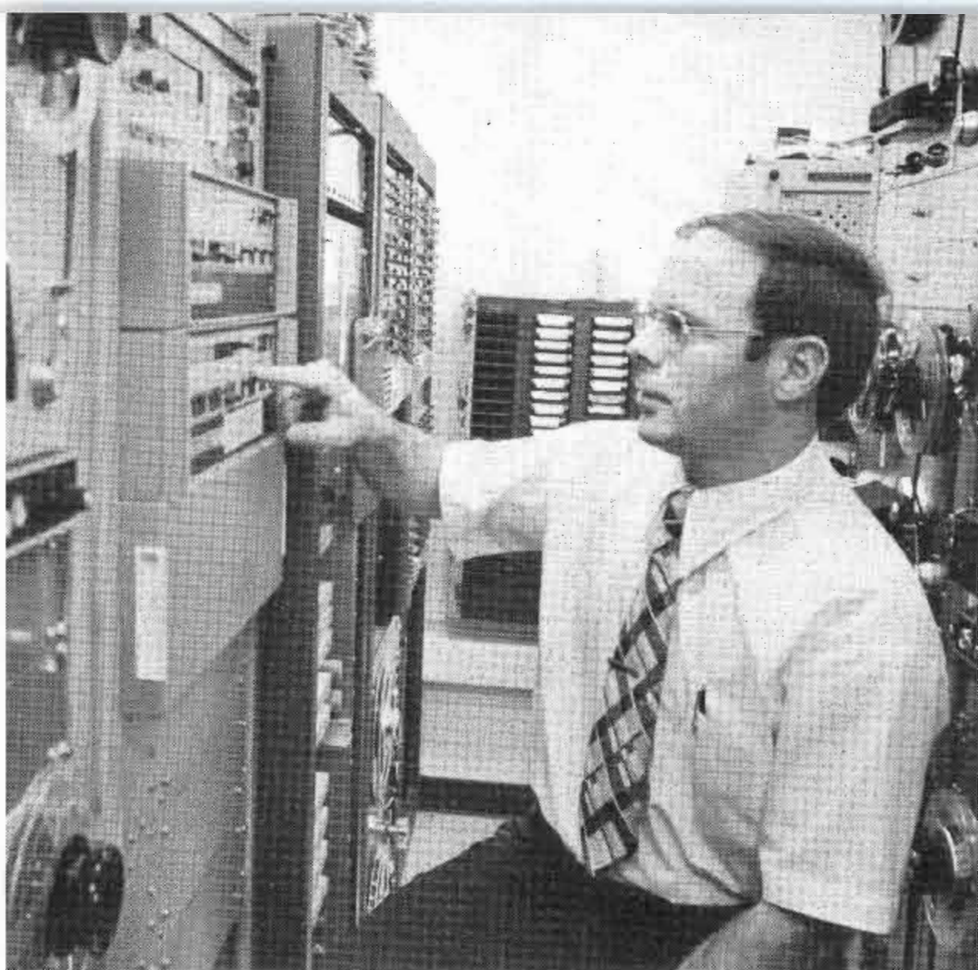
The hardware selected for the job was an SPC-16 minicomputer from General Automation, Inc., with 32K words of core memory. Bulk storage for the data base and operating system was provided by a Caelus 303 dual flying head disk drive with 2.5 million words of storage. Other peripherals included three Hazeltine 2000 CRT display terminals, two high speed line printers, a teletypewriter and card reader.

KSL-FM had been using minicomputers for automated program switching since 1968, and the election return display system had been designed on a small computer.

The SPC-16 was installed in the Fall of 1972 and Loveless' staff began familiarizing themselves with the new, larger system. One early task was the conversion of the program switching system to the SPC-16, followed by initial development work on the time sales and traffic system.

Writing Software

"The job of writing software has to be viewed in the proper perspective," Loveless emphasized. "It doesn't require the hundreds of man-years the commercial services claim, yet it shouldn't be taken lightly, either. It isn't something that can be done by one of the engineers in his spare time between fixing cameras. It requires a full time effort on the part of one or



William Loveless, KSL-TV Director of Engineering and primary developer of the station's traffic automation system, enters a program update on the minicomputer controlling program switching at KSL-FM.

two people."

At KSL-TV, those two people were Brent Sylvester and Gordon Smith. Their first task was to design the data base. They set aside portions of the disk to serve as contract records, skeleton log, continuity files, program titles, agency addresses and salesmen's names. System messages (lines that tell the operator that he has entered a non-existent date or is trying to place a spot in a day that has already passed, for example) were placed on the disk. Care was taken to use the disk space as efficiently as possible, yet at the same time files were made sufficiently large to allow for future expansion of business. The system that resulted now can schedule the station's time up to 12 months in advance.

With the data base defined, the job of writing each program module was started. Sylvester and Smith used assembly language to provide maximum speed and efficiency in the final system. Because the system was in-house and no telephone lines would be involved, the terminals could operate at 9600 bauds per second, four times the speed of the fastest leased services. They wrote programs for each type of entry and each type of listing that

the system could be expected to accommodate.

Growing Pains

"When the system first went into operation we had our teething problems," Loveless commented. "The traffic people had to make a number of emergency phone calls to the programmers and there were the usual problems of educating people in the use of the computer. But the system ran enough more smoothly than its manual predecessor that it was put into service with no period of parallel operation. We were fortunate that our programmers were in the station—problems were corrected quickly, almost as soon as they were encountered."

The system now in use at KSL-TV handles contracts, inventory, logs, programming and billing. A contract defining hundreds of spots can be entered within a few minutes and all spot placement occurs automatically. Confirmation contracts are printed as soon as the contract is entered and every time a modification is filed. A program whose time remains unchanged can be entered for a year in advance in just one single entry. Vertical and horizontal rotations can be produced automatically. Oversold

situations can be handled easily, with the computer considering both priorities and dollar values in the decision as to who stays on the log and who gets bumped.

The system has a manual mode that allows the operator to override any of the computer's decisions. Any spot can be moved or preempted at will, with the system notifying the operator of any product conflicts or oversold breaks, yet giving him the option of allowing them to stand.

"We developed a special 'pre-log' program with more than 100 error messages that make the system just about idiot-proof," Loveless said. "The operator can list just the commercials for a particular day and the computer flags any errors such as timing discontinuities, time left to fill, oversold breaks or wrong or missing continuity. As a help to the people who manage the videotape and film libraries, new materials appearing for the first time are specially marked on the log."

Spots that do not run as logged can be made good with any desired arrangement, including two-for-one or makegoods at a different rate. The reason for non-airing of the original spot is indicated on the customer invoice along with a clear explanation of the makegood process and associated charges and credits.

Helping The Sales Department

A powerful "sort" command allows any file to be displayed or printed in any sorted condition without disturbing the original file. For example, "sort contracts in order of expiration dates." This helps the sales department to get renewals of contracts. An intelligent system module called "Place" is used to move spots from the pre-empt file to the log automatically, per sales contract parameters. During soldout periods, "Place" will insure that the highest value



Continuity Director advises Liz Kirk on a makegood, which is entered in the computer at left and, in turn, automatically updates program logs and customer invoices.

spots are in the log and the lowest value spots are in the preempt file. Preempted spots are then made good on other days. And last minute program changes are handled easily, since "Place" will insure that the highest value spots are in the new program.

"The advantages of do-it-yourself flexibility were really brought home to us when the Sales Department found the "avails" listing too detailed to be very useful," Loveless added. "In less than one week we completely revamped the "avails" listing program to permit several formats that can be set up by the operator. The sales people have whatever listing they need."

Real-time Operation

Another major improvement came with the recent conversion of the system to real-time operation. The entire program was modified to be re-entrant and the computer is now available to multiple users

simultaneously. One operator can enter contracts, another can do continuity, and a third operator, at a remote terminal in the Sales Department, can find information for a client on when his spots are scheduled. The sales people now have instant access throughout the day to up-to-the-minute information on what has been sold and what is still available.

In fact, they have interfaced their fourth data port for dial-up teletype service to their sales representatives nationwide, via the TWX network.

"It appears now that the system is a success. KSL-TV has just finished the highest billing period in its history and our traffic people have expressed doubt that the load could have been handled at all with the old manual system—at least not without the added expense of psychotherapy for the traffic manager."

Roy Richins, Continuity Director, agrees.

"During the last three months of 1974 the station was sold out more than two months in advance, with a waiting line for cancellations. One of the nicest features of the system, for us, is the absolute control of inventory. No position goes unsold. 'Irregs' are held down spectacularly by immediate spotting of situations such as 64 minutes of material scheduled in an hour's worth of log, or ad copy for Chun Ling's Chinese Restaurant scheduled to fulfill the contract of the Hole in the Wall Gallery. Last-minute orders now can be handled easily since the next day's log need not be printed until an hour or so before quitting time. And it only takes three minutes to print a 35-page log."

The only complaint received from the sales department has been that the system won't age accounts receivable—yet. For Richins, however, it means a staff of only two or three people can do the job previously done by seven people.

New Sony U-matic news team... from action to broadcast in 30 minutes.



Or even less time. With less equipment. And at less total cost than you're probably paying now for news-gathering and teleproduction.

The major networks, ABC, CBS, and NBC, and many stations nationally are using the new Sony U-matic VO-3800/2850 Videocassette System.

All your work is done on economical, reusable videocassettes. After location taping, either microwave the signals or send the cassette to the studio for quick and accurate editing. Or go right on the air with the use of a time base corrector.

You eliminate film cost and processing time, especially when important events break close to air-time deadlines.

You start with the Sony VO-3800 portable VideoRanger™ recorder and a color camera, such as the Sony hand-held DXC-1600. The VO-3800 can record three 20-minute cassettes on a single battery charge. It has NTSC color and EIA monochrome standard signals, remote control, two separate audio tracks, automatic power shut-off, and on-the-scene playback capability.

Accurate electronic editing is achieved with two Sony VO-2850 mastering recorder/editors and the Sony RM-400 Remote Automatic Editing Controller. The RM-400 provides search, pause, and automatic back-spacing. The VO-2850 has a signal-to-noise ratio in excess of 45 dB for video and audio, also separate editing capability for video and two audio tracks.

Of course, the VO-3800 portable VideoRanger™ or the VO-2850 editor can be used independently of each other. In addition to electronic news gathering, these versatile new videocassette units can add new capability and economy in production of documentaries, on-site retail spots, and general studio use.

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For Demonstration Only Circle (17) on Reply Card

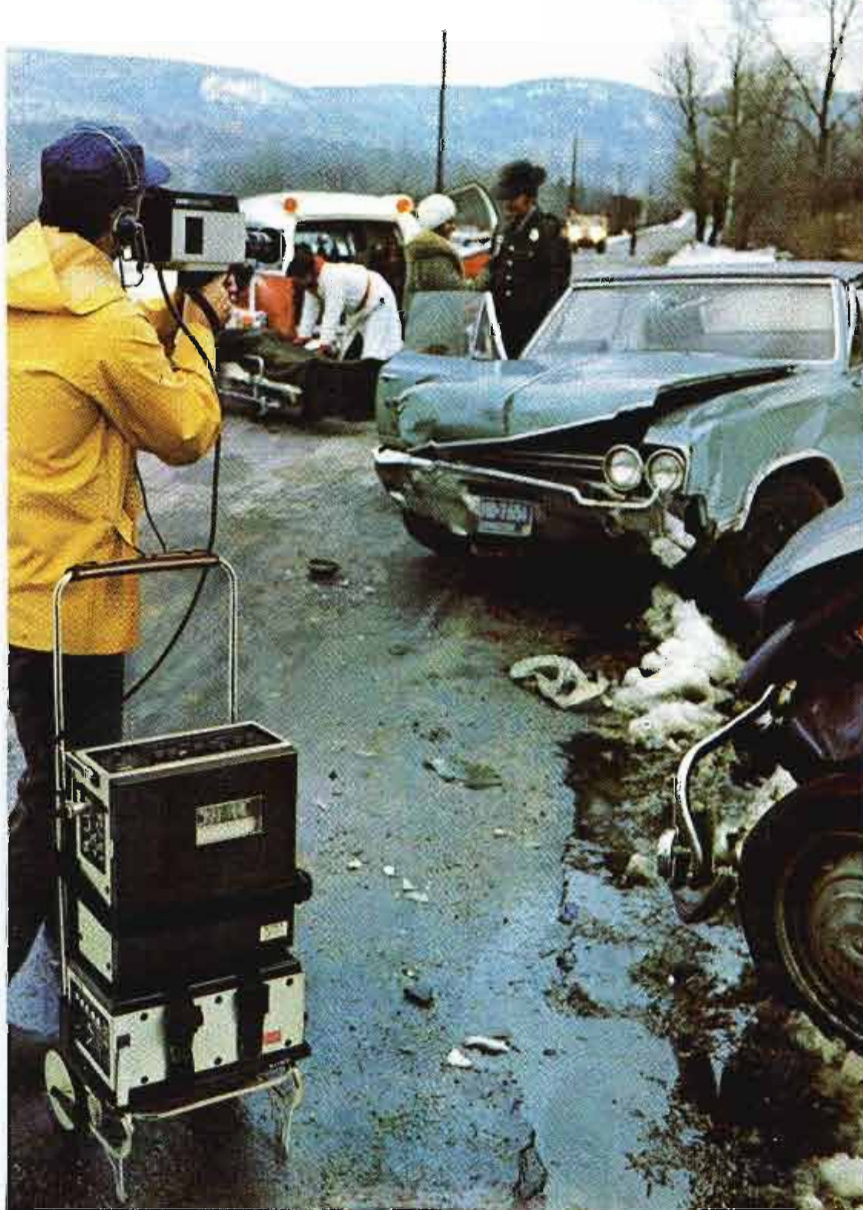




Fig. 1 Engineer, Carl Erny (left) and Director, Mike Andrews enter data from the program schedule via the local keyboard into the system. (All photos by Myles Marks.)

AUTOMATION:

You don't have to sacrifice quality

By Myles Marks

"Stand-by to roll film!"... "Roll video-tape!"... "Change slide!"... "Booth!" These and many more similar commands familiar to the television engineer may some day be as obsolete as the round-screen television receiver. The automated station-break has finally been introduced to television station control rooms. At WIIC-TV, however, we take it even further....

WIIC-TV in Pittsburgh, Pennsylvania, is an NBC affiliate owned by Cox Broadcasting Corporation. For the past five years, chief engineer Robert B. Wehrman has worked diligently to renovate the two studio control rooms and master control room of WIIC. "The way it was put-in here at WIIC," says Wehrman, "was a step-by-step approach. We first put-in a switcher. We operated the switcher manually for about a year. During this time we worked with Grass Valley to develop the software and all of the features we wanted to see in the

automated system. And then a year after the installation of the switcher, we installed the computer and went into the computer switching of events. By this time, everybody was pretty familiar with the switcher and I think softened the blow of the change of operation with the computer." Bob continues: "I'd hate like the dickens to go full-blown from a total manual operation to a total automated operation ...I think that would be extremely difficult."

Hardware Employed

The Grass Valley APC-2000 automatic technical switching system works with a Digital® PDP-8E mini-computer at WIIC. It is the first installation of its kind in the United States. Status read-out monitors are strategically located throughout the station. Everyone concerned with the "on-air" functions has a monitor in front of him. The booth announcer has a read-out

above his picture monitor so he can time out his copy and know when to expect cues.

The APC-2000 system performs all functions previously executed by human beings without human error: It rolls films and video-tapes, changes slides, starts audio cart machines, performs video wipes, dissolves, fades, inserts, undercuts and "takes." If a video-tape recorder has to be started to record a program from network for delay broadcast purposes, it can even be programmed to start the recorder at an exact time...all with "hands-off" operation! The only pre-requisite is that the machine controls be switched to REMOTE and delegated to the computer. As with all operations, all program and commercial material must be loaded and cued. However, the use of metallic sensing tape is used exclusively at WIIC for cueing purposes of films on our six TP-66 projectors. Since our TCR-100



Fig. 2 Computer status read-out monitor in the announcer's booth is located above the on-air picture monitor, aiding the announcer to determine when he will receive cues.

video-cart machine went into operation last July, we are assured that a video-taped spot message will run exactly the same each time it is aired. Video-tapes loaded on our four TR-70s are cued exactly five seconds from first audio. This is accomplished by physically putting a white transverse line on the back of the video-tape located at the proper pre-roll distance on the leader. When this line is opposite the right-hand tension arm of the TR-70, we are assured that the tape is cued properly.

Operation of Software

Since the main program of the APC-2000 system was specifically designed for WIIC's operations, the only feature that deserves mention here is that incorrect or extraneous information cannot be entered into the computer. For example: a time of 13:01:15 PM does not exist. Therefore, it cannot be entered into the computer. In the VIDEO SOURCE column, machine designations that do not exist in our control rooms likewise cannot be entered.

Four types of entries in the TIME column may be entered at the discretion of the director: (1) A

MANual time indicates that whatever is on the air will remain in that status until a MANual TAKE command is executed. Pre-roll status is displayed at the top-right of the read-out: 0 seconds for slides, 2 seconds for films and video carts, and 5 seconds for video-tapes. (2) A CLoCK time will remain on the air until a programmed time (e.g. 9:58:46PM) initiates the NEXT EVENT. (3) A segment time or duration time may be entered which continuously counts-down the time remaining (in one-second increments) of the program material until the NEXT EVENT switches to AIR. (4) An external cue (EXQ) command may be entered for use with feature films. In this mode, an event will remain on the air until an external cue is sensed by the computer which will initiate the NEXT EVENT. In this mode, however, a "bumper-slide" **must** be the NEXT EVENT entered due to pre-roll times of films and tapes. The slide is held on the air for the duration of the following pre-roll time. At WIIC, whenever a sensing-tape cue foil goes through the projector that is programmed EXQ, it initiates the NEXT EVENT and simultaneously stops the projector.

Complete audio-follow-video is incorporated in the APC-2000 system as long as no information is programmed under the AUDIO SOURCE column. Conversely, if audio from a source other than the programmed video is desired, it may be entered in the AUDIO SOURCE column. Where no change of audio or video is desired from the preceding event, two dashed lines (--) must be entered in the respective source column. Wipes, fades, dissolves and undercuts may be accomplished by entering this data in the VIDEO and/or AUDIO TRAnsition columns. The PROGRAM column serves no operating function other than to give an alpha-numeric display of the scheduled program material.

Fail-Safe Operation

Two fail-safe features are employed in the APC-2000 system. First, any event on-the-air may be changed to a MANual event by merely depressing the HOLD button. Likewise, a segment time may be either retarded or advanced by one-second increments each time these respective buttons are depressed. Similarly, a NEXT EVENT may be eliminated by depressing



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The McCurdy approach to engineering and construction of a packaged system allows the user to easily locate his new equipment without the added burden of wiring to auxiliary equipment.

All aspects of the broadcast function, from news booth to music production center, can be assembled into a unique and functional package.

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For More Details Circle (18) on Reply Card



Fig. 3 In the WIIC-TV control room, computer read-out monitors are mounted above the VTR's. In the film chain area, they are suspended from the ceiling. Chief Engineer Bob Wehrman also has a monitor in his office so he can keep tabs on control room operations without being there.

the DISCARD NEXT EVENT button.

Secondly, actual computer switching may be monitored by observing the Grass Valley audio-follow-video switcher. The on-air status corresponds to the PGM bus, and the NEXT EVENT status corresponds to the PRESET bus. Since the switcher is paralleled to the computer, any on-air change or NEXT EVENT change may be executed by manually operating the switcher.

One Step Further

At WIIC not only do our station breaks (within Network times) air "on-time" and re-join Network "on-time," but we have been able to achieve the same accuracy within commercial cut-aways of our local, live productions! By installing a MANUAL TAKE and HOLD button in our production control room, all cutaways are programmed into the computer. To initiate a cutaway, the video switcher merely depresses the MANUAL TAKE button and the

computer airs the commercial material. At the conclusion of the commercial cluster, it returns control to the production control room. This alleviates much of the confusion in the control room especially during a newscast when last minute changes are made during the commercials. The director can concentrate on his newscast and the switcher has enough time to set-up his next shots. If at any time something should happen to the computer, the video switcher merely depresses the HOLD button and the remainder of the production can be carried out manually.

Automating Concerns

Aside from the initial capital investment of approximately \$100,000, most of the problems stem from sources other than technical. Wehrman explains: "From a sales and programming point of view and also from traffic, you have to know what a computer does. If you say to a computer you are to

play a thirty-second spot for this advertiser, that's what he's going to get: thirty seconds. That computer isn't going to automatically give him thirty-one seconds because somebody wrote a little long copy. If a computer gets instructions for thirty seconds, it means thirty seconds; no more, no less. To sum everything up, the management team has to understand what is involved and what they're getting." The only other problems encountered, after the initial "bugs" in the software were worked-out, were with the people working with the computer becoming familiar with the operation of it.

Before a station decides to automate their engineering department, careful consideration of all aspects must be made. Wehrman says it this way: "I think everybody has to understand what they're getting into including the general manager, the program director, and the sales managers....If it is designed to reduce costs, normally they'll find

COMPARE FM ANTENNAS BEFORE YOU BUY!

Compare all elliptically or circularly polarized FM antennas and you'll find JAMPRO'S PENETRATOR leads the others in 19 important categories. It has more outstanding performance features than any other comparable FM antenna on the market today. The PENETRATOR has the widest VSWR bandwidth for best stereo now, and quadraphonic sound when you are ready! It is unique, it has a patent for five features not found in any other FM antenna. Only the PENETRATOR made by JAMPRO insures maximum power gain by using internal transformers together with phase and amplitude tests. It has the lowest windload, with and without deicers! It comes with a 2 year warranty, a first for the industry. Compare these six bay high power antennas offered for 50 KW and 100 KW ERP stations, taken from printed company literature in February, 1975.

SUPPLIER	JAMPRO	RCA	GATES	COLLINS	SHIVELY	PHELPS DODGE	CCA
1. Antenna Type Number	JSCP-6	BFG 6A	FMS-6	37CP6	6810-6	CFM HP-6	FMC-HP-6
2. Safe input power rating	40 KW	36 KW	40 KW	40 KW	40 KW	30 KW	40 KW
3. Power gain ratio DB	5.05	5.06	5.05	5.00	5.18	5.2	5.2
4. Trimmed 1.1/1 VSWR bandwidth	±200KHz	±100KHz	±100KHz	±110KHz	±150KHz	±100 KHz	NS
5. Axial ratio-polarization	2DB	NS	NS	NS	NS	NS	NS
6. Impedance match at each bay?	Yes	No	No	No	No	No	No
7. Factory VSWR plot in I.B.	Yes	No	No	No	No	No	No
8. Factory phase/amplitude checks.	Yes	No	No	No	No	No	No
9. Tuned on tower like customers?	Yes	No	No	No	No	No	No
10. Antenna factory pre-tuned?	Yes	Yes	Yes	Yes	Yes	No	No
11. Quadraphonic capability?	Yes	NS	NS	NS	NS	NS	NS
12. Manufactured by seller?	Yes	No	No	No	Yes	Yes	Yes
13. Dual Deicer wattage?	Yes	No	No	No	No	No	No
14. Antenna shop painted?	Yes	Yes	No	No	No	No	No
15. Weight with mtg. bckts.	498.5#	381#	496#	512#	NS	404#	404#
16. Wind load 50/33 PSF, EIA	673#	920#	883#	1301#	727#	780#	780#
17. Deicer wind load, 50/33 PSF	770#	1040#	NS	NS	NS	NS	NS
18. Warranty - guarantee	2 Yr.	1 Yr.	1 Yr.	1 Yr.	1 Yr.	1 Yr.	1 Yr.
19. Antenna List Price	\$7,250	\$7,642	\$7,245	\$6,900	\$5,505	\$5,000	\$6,545
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that their costs will increase to a certain extent. I think if you hold costs and man-power to the same level you're kind-of ahead of the game. If you put in a system with the hope of reducing costs by eliminating man-power, you're probably kidding yourself."

When Wehrman was asked what plans he has for the future concerning WIIC's operations, he replied, "We'd like to bring information from traffic directly into the technical computer so that any kind of spot message is automatically entered into that computer. Machine assignments and any modification such as transitions would have to be done on the computer, but the basic spot information might be put into the technical computer directly by a hard-wire interface or through a medium such as magnetic tape.... On the other side of the coin, after a spot has run, we would like to be able to feed it back to the Cox Data Computer for log de-brief purposes and for final invoicing. So it completes the chain from sales order, through traffic, through actual on-air, and back to the final invoice. I think this is the ultimate goal that we have to look at but we may not get to it all at once."

Bob also thinks that automation will have very little effect, if any, on the future job market in the television engineering field.

The advantages of an automated television engineering department are obvious: Program and commercial material air exactly on-time and run exactly the same way each time they are aired; sloppy "dead air" is virtually eliminated; technical personnel have more freedom to concentrate on other duties (e.g. production, picture quality, audio levels, etc.); human error is substantially reduced especially in executing complicated station-breaks; and no longer will network programs recorded for delay broadcast purposes be without their opening billboards or credits because someone forgot to start the tape machine on time.

Television automation is here today and will probably become the state-of-the-art in the near future. However, it doesn't look like the computer will replace man power to

achieve its goal; it will only enhance it! Bob says: "...As far as I know, you still have to have human beings to load machines...checking sound levels, checking picture quality. I don't know of any kind of device that would **really** check that properly. You have to have human supervision of machines, cameras, equipment...there's no practical way to get around it."

The computer may not be a panacea, but it's not the "Cancer" most people associate with the word: AUTOMATION. Like everything else, it has limitations and restrictions. However, it does do a pretty good job of what it is designed to do. Does a station have to sacrifice anything to obtain automation? "From a quality standpoint," says Bob, "absolutely not!"

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For More Details Circle (20) on Reply Card

AUTOMATION *and your approach to timing*

By Morris Courtright

Glittering Las Vegas, glittering equipment displays and another NAB passes into history. Wandering among the displays in the vast exhibit hall, a sense of nostalgia worked its way to the surface. What has happened to automation?

Not too many years ago there was a plethora of systems being touted by a small army of manufacturers, expounding a variety of promises. This year the equipment displays could be counted on the fingers of one hand. The manufacturers, though fewer in number, are more insistent.

As expected, the promises are still there. What about these promises? Is automation the absolute answer to station problems? Will it really solve all your programming problems and counter the effects of inflation on the station balance sheet?

The obvious decrease in numbers of systems shows that the many promises have been tempered by the crucible of the marketplace. As stated during the seeming headlong rush to total automation (BE, June 1972), the veil of euphoria has disappeared and automation has revealed itself as a very handy workhorse to have around, but not as a

panacea!

It is interesting to note the automation companies that have survived the years of competition, particularly in light of the various promises made. The underlying promise in the heyday of automation seemed to be: "Install this electronic marvel and your programming, personnel, and (most important) financial problems would evaporate."

Has this really happened? Obviously not, because what was left unsaid in many cases was that automation creates its own set of problems. (BE, Dec '70 & June '71). What has survived are those systems that did in fact live up to the major part of the promises while minimizing the new problems created.

The real key to success lies with those stations that truly defined the expected format and then shopped for the system that would perform the expected tasks. In these cases automation fulfilled its promises, and the accompanying new problems were really minor and well worth the effort of overcoming them. When a system was bought based on promises without a true evaluation of what it was to do in a

particular station environment, disaster ensued. Now, as before, the starting point is to define intended use (BE, Sept. 1970).

Admittedly, defining the tasks can be a most traumatic experience. Traumatic because it means you must honestly evaluate your station's operation and programming. In some cases it means admitting to yourself that your present programming in no way compares with that of Los Angeles or Chicago, and that, in actuality for your particular market, attaining the "big city" sound via automation is too expensive for the market.

Thus, it is a question of how sophisticated the programming must be in your market, and how much sophistication can you afford. Basically, the automation systems that are still with us appeal to two levels of sophistication, with various degrees in between offered as "options".

Your Approach To Time

In a nutshell, the level of sophistication is determined by the approach to time at your station. In this case I am talking about real-time or time of day. In some markets programming must be done on a split second basis, while in others a more casual approach is adequate, or even expected.

As an example, it is expected that the network be joined on time. This is fairly simple in itself, and it can be done fairly inexpensively. However, if you want to "time out" the music to join the network on a split second, it becomes much more expensive. So you must answer the question, what is really being done now, and what really meets the needs of the market? Do I want to guarantee a spot sale to run immediately prior to the news, or can I sell it to follow the news? Either can be done with automation, but the cost to accomplish the task varies considerably.

The next basic question to answer is about staff capability. The automation system must be programmed, and your staff must program it. Many of the more complex and sophisticated systems require attention to minute details. Is your staff ready for this, or do they take

Management Highlights

Morris brings forward some essential questions about station automation. No other equipment purchase calls for so much soul-searching, but it does pay off.

Our surveys over the years show us that the major problems lie in operator inputs. Close behind comes the system purchased as a panacea. You'd be surprised how many systems have been thumbled by engineers. If your engineer is not a part of the decision making team, look for system problems.

The studies do show, however, that equipment reliability is not a problem. The real problems come from those seemingly illusive and subjective points.

the more casual approach of approximate times? Automation will do either, but the cost difference can approach \$10,000.

Some systems have a tremendous event storage capacity, and require that each separate event be programmed in detail to achieve split-second timing. Others treat the music as a basic background to keep going unless interrupted for a commercial, which means the only daily worry for the staff is to see that the right commercials are on hand to run at times close to those desired.

How Tight? How Loose?

Flexibility can be achieved with either system, and it is not necessary to sound like a "music machine". The difference is in the approach to minute program detail. Do you really want a digital clock and playback unit dedicated to deadrolling a music selection in order to join network on a split second, or can you use a simple timer to fade music into net.

The Wrong Way In

When looking at automation, look beyond the spinning reels, glittering chrome and flashing lights. All automation systems use similar reel-to-reel, cart playback and cart handling equipment. The real difference is in the complexity of the control system, and the sophistication required to keep its programming current. Obviously, the needs for "Gotham City" are not those for "Podunk". While there are many degrees of sophistication between these two extremes, you must first determine in your heart and your mind (and your pocketbook) which basic approach is to be followed. It is entirely too common to start with the large complex system, decide you can't afford it, and wind up with a scaled down system that is rather inflexible. When, on the other hand, if you had started with the simpler system and built-up from it, you probably could have had a much more flexible system for the same money. Flexibility and complexity do not necessarily go hand in hand.

As of last count there were about 7,840 AM & FM stations in the United States. The majority of these are located in small to medium size markets—markets where a more casual approach to split-second timing is not only adequate, but in many cases expected! These are also the markets where the crunch of rising costs is creating problems, and where automation can be a real benefit if approached realistically. For these, the majority of stations, I say don't be dazzled by the glitter of systems. Ask yourself some questions; not can I or my staff, but do **we** really want to face up to the maintenance and programming detail required by the large system? Or, are we really looking for something to relieve us from day-to-day detail? Again, the basic question is your approach to time at your station.

Automation can help offset the rising costs, it can improve your programming, it can ease your management burden; but, only if you have made a realistic system choice.

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NBC AUTOMATES

radio and information services

The age of the pre-programmed station is here. Today's sophisticated automation systems are handling jobs that no one ever thought possible five years ago. The newest innovation in the use of automation has come from the National Broadcasting Company. NBC radio, with the inception of its full-time News and Information Service (NIS), has put automation to use in a way that staggers the imagination.

The NBC NIS is unique in many ways. First, it is on-the-air continuously, 24 hours-a-day, rather than just five or ten minutes each hour. Second, it must provide sponsors all across the country with commercials at the time-of-day they want them. A spot running at 10 AM in New York is not running simultaneously in Chicago or Los Angeles. Many sponsors want their spots run at local time, nationwide. This is why NBC needed a sophisticated system of Network line switchers that would also handle the regional insertion of commercials.

The NBC NIS engineering and programming staff looked at automation to handle this all-important task. The requirements were tough: handling regional commercial cut-aways on a specific time basis, and rejoining the NIS feed on a specific time basis; programming all spots by time; and providing for the addition of automatic verified logging of each spot actually running, when desired.

In addition, each automation control unit had to be capable of being programmed automatically from a scheduling sheet prepared by the NIS traffic department in New York. NBC radio bought three Schafer 903 automation control units, with Schafer Audiofiles, and external list/load capability. One 903 was placed in New York to feed the Eastern time zone; one was placed in Chicago to feed the Central time zone; and one was

placed in San Francisco to feed the Western time zones.

How Does It All Work?

The NBC NIS feed is originated in studios in New York's Rockefeller Plaza, and is fed directly to a Schafer 903 control unit. That control unit feeds the Network line to the East Coast affiliates and to Chicago, where the line is again fed into a 903 control unit. From Chicago, the feed goes to the Midwest affiliates and to San Francisco where another 903 is located feeding the Western U.S. affiliates. At specific times each hour, a tone burst is fed from the originating studios in New York. This tone activates each 903 to drop the NIS feed, play regional commercials, and then another tone returns each system to the news feed from New York.

All of these switching routines are pre-programmed into each 903 control unit at the minute, and even second, they are to occur. One variable makes the entire system more complex. If for any reason, the NIS news feed must be continued past the normal commercial-break time (for a Presidential News Conference, or extremely timely news) the systems, on command, can be made to bypass the commercial breaks normally scheduled.

In these specific cases, the next regularly scheduled spot break will be automatically cued and readied for play. This requirement was requested by NBC, and it guarantees, that even in extenuating circumstances, commercials will be broadcast at the time scheduled, and that spot breaks will not "back up" because one cluster was purposely not played at its scheduled time. Of course, make-goods have to be made-up for any purposely missed break, but these can be easily noted by the NIS traffic department.

Going Even Further

NBC radio has carried this new concept one step further in three of its owned FM stations, WNWS-FM in New York, WNIS-FM in Chicago, and KNAI-FM in San Francisco. Each local FM outlet has its own 903 that carries the NIS feed, and by exact time leaves the NIS to insert local spots, PSA's, ID's, and news. The local news studio is activated each hour at the appropriate times. At the end of each local news segment the NIS feed is rejoined automatically at the exact second it resumes. The 903 also has an override function that can schedule the local station's newsroom at any time for fast-breaking local news, and then can return to the NIS feed.

More Attention To Local News

The entire concept of automation for NBC radio and its owned FM stations means that both NIS personnel and local station personnel can devote almost full attention to news and news gathering, rather than being tied down to a console waiting for spot breaks. It also means that there is no longer a reason for missing commercial breaks. With automation handling this task, that potential problem ceases to exist, and so do the billing and make-good problems that accompany missed spots.

At NBC's NIS and at NBC's owned stations, manpower is being used efficiently with automation handling spots and scheduling local news blocks. Any station interested in a better bottom-line, more efficient use of key people, or with limited resources has to consider the advantage of having an extra man in the newsroom, as opposed to sitting behind a console waiting for local "avails" in the NIS feed... a very inefficient job!

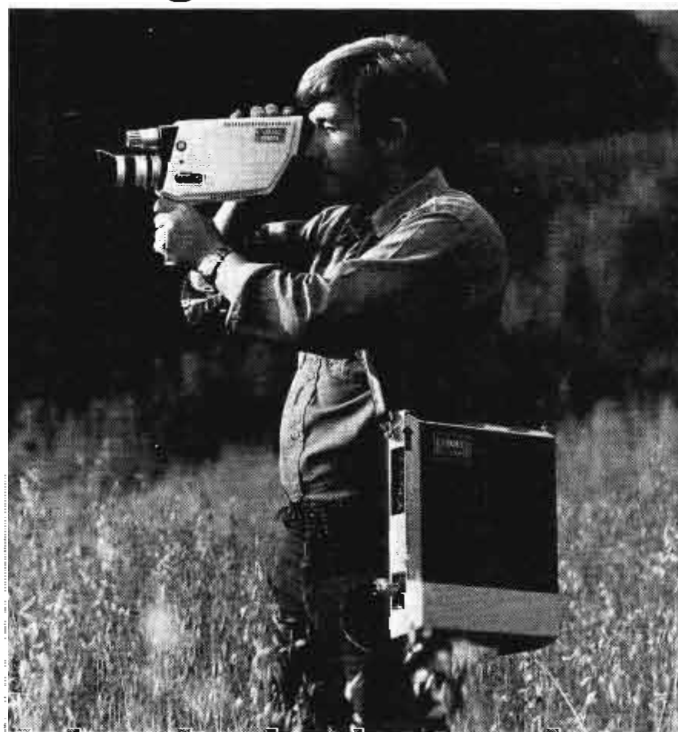
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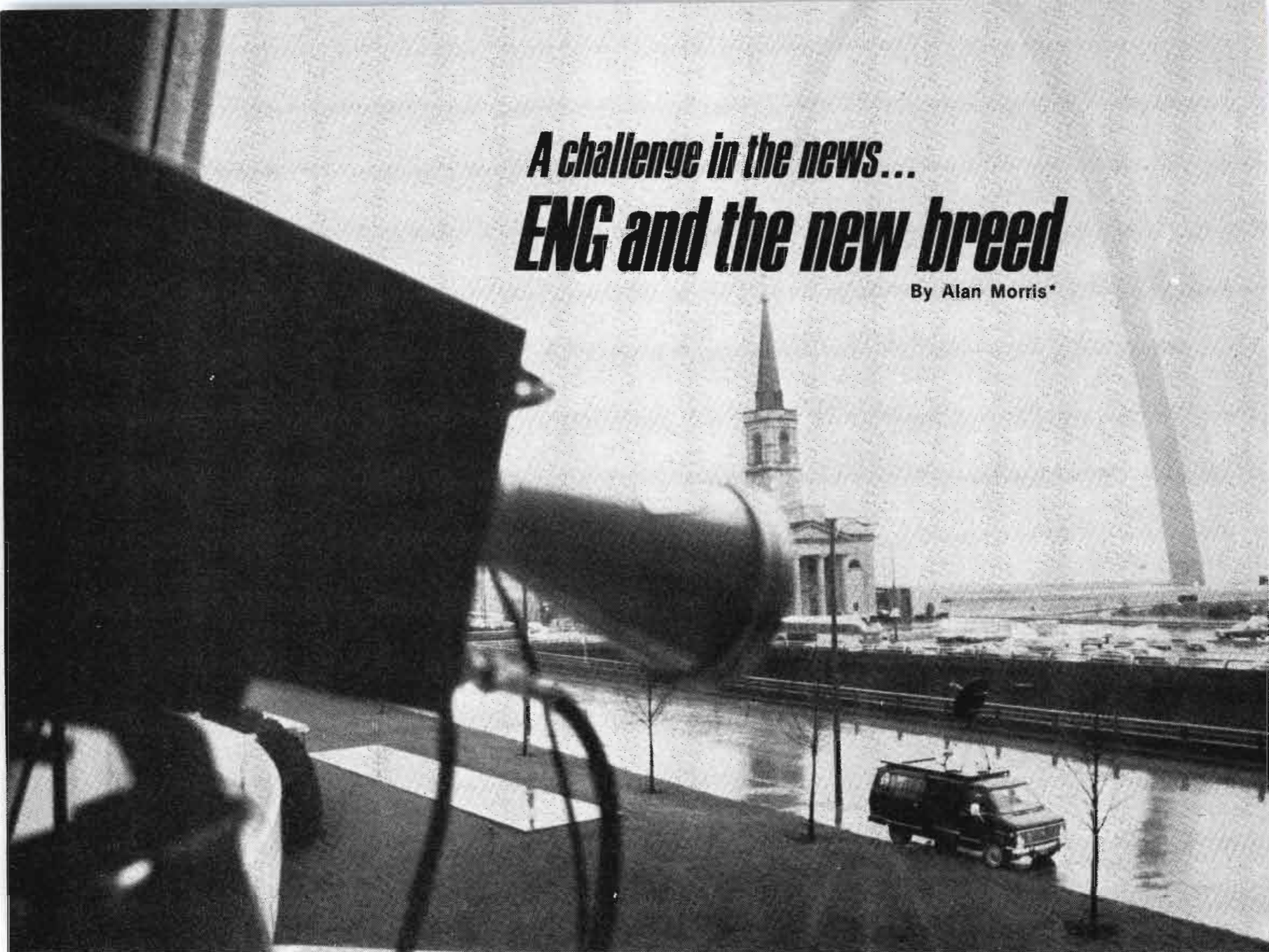
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For More Details Circle (22) on Reply Card

July, 1975

A challenge in the news... ENG and the new breed

By Alan Morris*



A portable 13 GHz transmitter sends a signal from an office window to the van where it is retransmitted to KMOX-TV after bouncing off the Gateway Arch. (Photos by T. Mike Fletcher)

A recent survey conducted by the CBS Television Network Engineering Department shows that 21 percent of CBS affiliated stations are using some form of electronic newsgathering (ENG) and that by the end of 1975, 37 percent of CBS affiliates will be equipped for ENG—at least on a partial basis.

Affiliates of the other networks are also following suit as are a number of independent stations across the country. The January 1975 issue of **Broadcast Engineering** highlighted some of the stations that were using electronic newsgathering on a limited basis.

With the current rush into various forms of ENG, we feel it is time to pause and review the experiences of the first television station in the country to convert to a total ENG system.

*Manager, Information Services, CBS Television Stations, and Div. of CBS, Inc.

KMOX-TV, CBS Owned station in St. Louis, completely abandoned the use of newsfilm and went to a total ENG system September 15, 1974. The station had been partially equipped for ENG since February, 1973, using one Akai crew and three film crews. This approach proved to be less than adequate for KMOX-TV's newsgathering purposes. With total conversion to ENG, the station was equipped with three Ikegami HL 33's, which had been developed in Japan in conjunction with CBS engineers. (A fourth Ikegami has been added and is used from time to time by the station's documentary crew and as a back-up for the regular news crews when cameras are pulled for maintenance.) The only film used at KMOX-TV now is that supplied by George Groce, the station's news correspondent in Washington, D.C.

In addition to the Ikegami cameras, KMOX-TV adapted three Chevrolet Sports vans with Microwave Associates and Nurad transmission equipment, heavy duty truck batteries, IVC 100 helical scan videotape recorders, television monitors, portable lights, power packs, a portable 13 GHz short-range transmitter, two-way radios, police and fire department radio scanners and the necessary audio-video supporting gear. In addition to the IVC 100 recorders, which are permanently mounted, KMOX-TV has added the more portable Sony VO-3800s to give each news crew greater mobility in the field.

In The Newsroom

The newsroom itself took on a different look with the conversion to ENG. Since KMOX-TV broadcasts directly from the newsroom, the standard studio cameras were



Executive news coordinator Fred Burrows confers with news director Robert Schaefer before interrupting regular programming for a live news report.

already in place. The greatest change was the addition of the executive news coordinator's (ENC) console. Specially built to KMOX-TV's specifications, the ENC console is the nerve center of the entire ENG system and gives the newsroom a "mission control" atmosphere. A critical journalistic innovation of ENG, the executive news coordinator functions as an assignment editor, an executive producer and is second in command under the director of news. Fred Burrows is the ENC at KMOX-TV.

Seated behind the console, Burrows has, at any given moment, the entire picture of the KMOX-TV news operation. It is he who decides if an incoming story is important enough to be broadcast live. After conferring with director of news Robert Schaefer, he punches a button on the console, notifies central control to interrupt pro-

gramming, and tells the reporter and crew in the field that their "feed" will be broadcast live. If the story does not warrant immediate broadcast, Burrows notifies the tape assembly room to record the story for editing and later playback within the regularly scheduled news broadcast.

The tape assembly room is located to the extreme rear of the newsroom; here the incoming microwave feeds are monitored. Master recordings are made on IVC 825 helical scan tape recorders with a SMPTE time code track. A Datatron 5050 computer-editor is also located in the tape assembly room and is used in the final step of the editing process. Technicians in tape assembly communicate with news crews via 450 MHz and 460 MHz radios. The 460 MHz was used by the station when it had film crews, but sometimes was

subject to extraneous interference from taxi companies, etc. The 450 MHz was added with the introduction of ENG. It is a more exclusive frequency and can be used as a backup for broadcast audio transmission.

Tape assembly technicians also have communications with central control, studio control rooms, the media room (which combines both telecine and video-tape), the executive news coordinator in the newsroom and the editorial decision booths.

Separating the ENC console from the tape assembly room are four glass-enclosed editorial decision booths where the edit decision-making process begins. An IVC 760 helical scan recorder records the incoming story and this becomes the "work print" tape. A television monitor displays the incoming story as well as the replay of the "work

print." A time code reader is mounted below the monitor for logging of edit points within the story. While viewing a live incoming story or a replay for the "work print," a newswriter assigned to that story can, at any time, press a button on the time code reader panel and freeze the display of numbers. This allows the news-writer to log an exact frame number as an edit decision. Later, the frame numbers are given to a technician who enters them in the Datatron computer-editor. The final assembling of the story is done electronically.

The newswriter has communications with the reporter in the field (to confer, if necessary, before an edit decision is made), the executive news coordinator and the tape assembly room.

It should be noted that all recording, editing and final assembly of a news story is entirely on helical scan tape. Only after the executive news coordinator approves the story in final form is it dubbed through a time base corrector, onto a two-inch quadruplex videotape cassette, from which it will be broadcast.

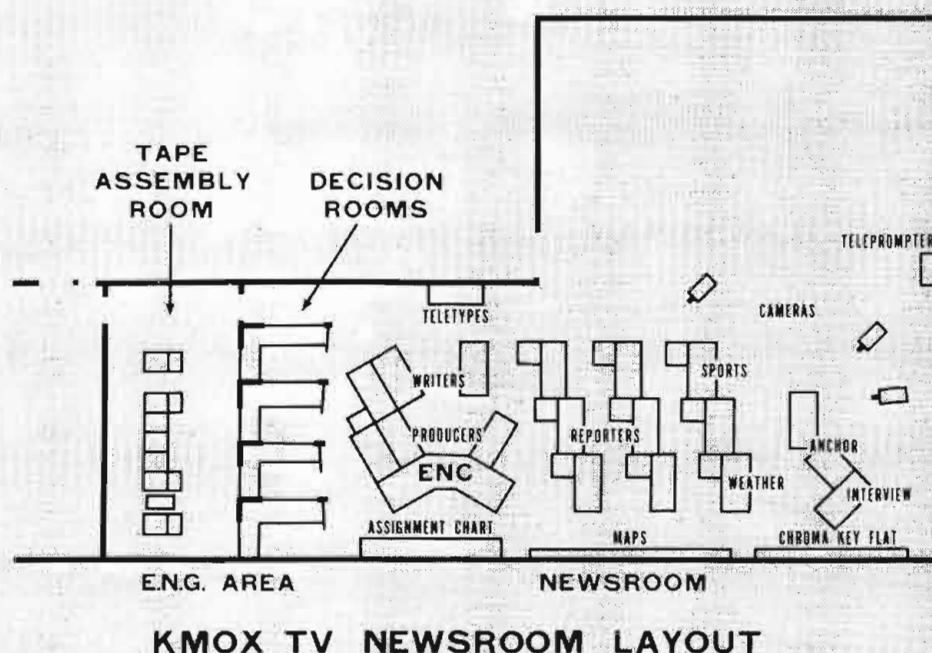
News Monitoring Flexibility

Fred Burrows looks at three monitors on the ENC console. The first monitor shows him the story being transmitted back to the station via a multi-directional receiver antenna atop a building in Clayton, a suburb west of St. Louis,

Management Highlights

The KMOX-TV LIVE journalism story gives a lot of inside tips that can be used by stations with maximum or minimum involvement in the new approach to the news. But you should take special note of the ground rules used at KMOX-TV: air the story when it has a very real news value (not because you have the equipment to report directly from the field), and the successful LIVE operation calls for a new breed to newsmen.

This is a success story obviously based on a thorough and professional approach to the news. The effort was aimed at opening a new dimension in the news without sacrificing quality.



The second monitor shows him a story which is being beamed directly to the receiver antenna on KMOX-TV's building in downtown St. Louis. Both receiver antennas are remote-controlled electronically by a technician in tape assembly. (Two different transmissions can be recorded at the station simultaneously.) The third screen allows Burrows to watch the progress of a story in final assembly on the Datatron computer-editor or any story being viewed in any of the decision booths. By flipping a switch on the ENC console, Burrows also can monitor the other stations in St. Louis.

News crews in the field have two methods by which they can cover stories—the "live" mode and the "record" mode. In the "live" mode, the event is transmitted directly back to the station as it is happening. The incoming story is then recorded in the tape assembly room and in one of the decision booths unless, in Burrow's judgment, the story warrants immediate broadcast.

Using Microwave

The "live" mode is most desirable from KMOX-TV's point of view because the sooner a story is received back at the station, the sooner it can be edited for the regularly scheduled news broadcast. In those instances where a direct microwave transmission cannot be established, the "record" mode is used: the story is then taped in the field on a Sony VO-3800 or IVC

100, the news van is moved a short distance to where a microwave link can be established and the videotape is played back for transmission to the station.

One of KMOX-TV's biggest problems when converting to ENG was determining those areas from which a direct microwave link could be established—either with the receiver antenna in Clayton or the one in downtown St. Louis. During the first several weeks after the conversion to ENG, the crews carried small cans of red spray paint. Each time a direct microwave link was established, a crew member would spray a small red "X" on the pavement behind the rear wheels of the van. Then, if the crew, or another crew was called upon to cover a news event in that area, they knew exactly where the van had to be parked to establish a strong microwave signal. The method was primitive, but it worked.

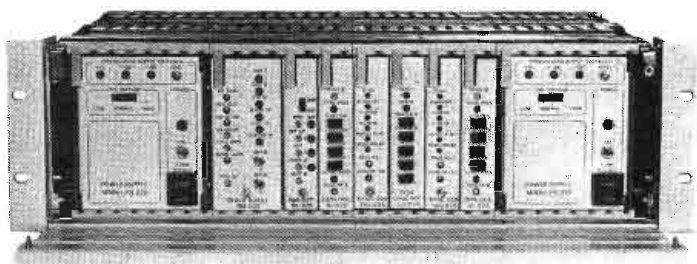
The crews no longer need their cans of spray paint. Information to establish microwave links is now contained on a huge map hanging behind Burrow's console in the newsroom. When he sends a crew on assignment, he refers to the map and tells them where to park so they can transmit the story in the "live" mode.

Remote's Remote

If the news story is taking place some distance from the van, where the camera cannot be linked to the van by cable—for example, in a high-rise office building—the crew

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TeleMation's *Precision* Line Terminal Equipment



Within TeleMation's "525 Series" audio and video terminal product line, certain units are designated *precision* as distinguished from their *broadcast* counterparts. The *precision* designation is much more than a simple "marketing label". *Precision* is a demarcation assigned through TeleMation R&D that puts a particular product into a separate, unique attention category, from design concept through manufacture and quality-assurance verification. All this to assure the buyer that the product not only meets or surpasses all known competitive products in its performance parameters, but also that it is designed to operate for months and even years without need for periodic adjustment or any other routine maintenance. This philosophy and practice, then, take the *precision* units in the 525 Series terminal equipment into a quality/stability/reliability realm that is usually associated with instrumentation electronics.

TeleMation has used a number of design techniques in accomplishing the high performance and stability achieved by these products. For example, one-percent-tolerance resistors having a temperature coefficient of 20PPM/°C are generally used as gain-determining elements and wherever drift would affect stability. They provide both freedom from temperature drift and freedom from the effects of aging that are common to the less expensive resistors normally used in video products. Junction matching — each PN junction being matched with an NP junction to cancel the characteristic 2.2mv/°C drift of silicon junctions — is also employed to improve stability and prevent offset drift in DC-coupled outputs.

Feedback is extensively used in *precision* grade units as a means of insulating performance characteristics from the effects of component variables. Audio amplifiers are typically high-gain op-amps inside 100-dB feedback loops, while video amplifiers are typically transistor pairs inside 40-dB feedback loops. In these applications, a 2:1 change in the gain characteristic of any active component will have negligible effects on overall circuit performance.

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Frequency Response to 10MHz	0.20dB	0.25dB
Hum and Noise	72dB	66dB
Distortion, 50Hz Squarewave DC Mode	.1%	<.15%
Distortion and Tilt, 50Hz Squarewave AC Mode	.20%	<.25%
Output return loss @ 5.5 MHz	38dB	35dB
Input return loss @ 5.5 MHz	43dB	40dB
Bounce and Overshoot DC Mode	1%	—
Bounce, AC Mode (Monotonic)	8 sec.	5 sec.
Overshoot, AC Mode	None	None
K Factor	.25%	0.5%
Input Offset Compensation Range	>3VDC	>2VDC
Common Mode Rejection, 60Hz	>70dB	>60dB
Common Mode Rejection, 5MHz	>43dB	>40dB

A functional schematic of this amplifier along with a product description is available on request. We suggest you compare this circuit to that of any competitive product. We feel you will agree that the stability and long-term quality performance intrinsic to our *precision* design will justify whatever small additional initial cost might be involved through including such quality electronic devices in your broadcast system.



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uses a small portable 13 GHz battery-powered (or AC-powered) transmitter to beam the signal out the window to the van for retransmission to the station. The range is approximately one mile and its use is dependent on getting a parking space with line-of-sight from window to van.

KMOX-TV crews have plotted the entire city. The only area from which a microwave link cannot be established is an area north of St. Louis, blocked from both receiver antennas by apartments and office buildings. But there is always the unexpected.

A news crew recently was sent to the Illinois side of the Mississippi River, north of St. Louis, where police were dragging the river for two missing young women. Bob Bauer, a member of one of the ENG crews and a former film cameraman at the station, was on the roof of his van trying to establish a microwave link.

"I kept panning the dish left and right and they kept telling me they weren't getting a signal," he explains. "Finally, Fred Burrows came on the two-way and suggested we record the story on tape and move closer to town for transmission." As Bauer began to lower the microwave dish, the radio came alive. "Hold it right there," said a technician in the tape assembly room, "we've got a perfect signal."

Bauer locked off the dish. "It was aiming directly into the river," he added. "And that's how we learned that in some cases we can bounce the signal right off the Mississippi."

Another cameraman-turned-ENG crewmember, Charles Bohn, says he's established microwave links by bouncing the signal off the pavement in center city. "I've aimed the dish down at the pavement and the signal has bounced from the street to the Gateway Arch and then to the receiver on top of KMOX," he notes. "But, early in the game, we found it was more of a problem to establish a clear sound signal than a good picture signal."

To solve this problem, the station innovated. When the crew in the field had established its microwave link and the picture signal was maximized, a technician in tape assembly would hold the hand mike of his 450 MHz radio close to the

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Ralph Hucaby, Vice President & Director of Engineering at WLAC-TV, Nashville, Tennessee operating his Electronic News Gathering System which includes a Datatron Model 5050.

people to use the editor. Several of our news personnel became very proficient on the Vidicue with only a short period of training."

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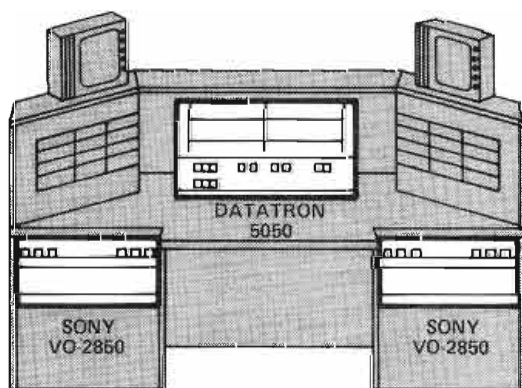
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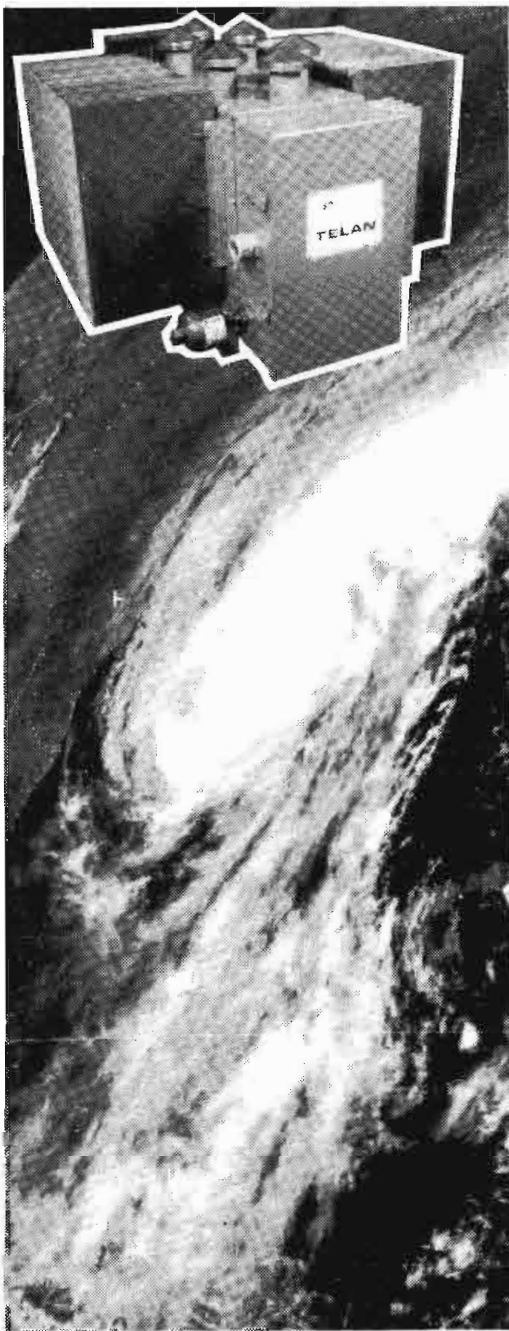
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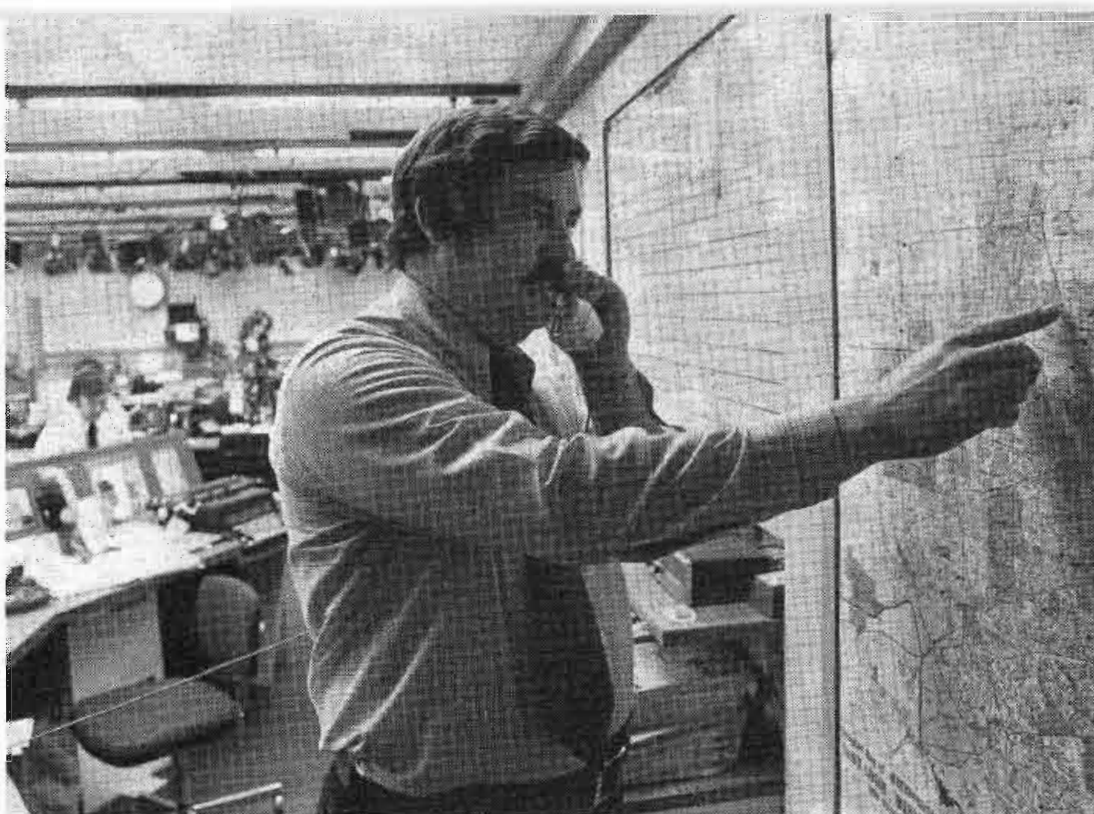
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Burrows is shown sending a crew on assignment. Referring to his map, he tells the crew exactly where to park in order to establish a microwave link.

speaker carrying the incoming audio signal, retransmitting the signal back to the crew. A crew-member on top of the van, listening to his 450 MHz, would adjust the dish ever so slightly until the noise was at a minimum. Recent modifications of the transmitter and receiving equipment has solved the signal-to-noise ratio problem and this procedure is no longer needed.

The Advantage Of Going Live

When the crews in the field are transmitting their stories in the "live" mode, the maximum advantages of ENG can be realized. Burrows, behind his ENC console, can see the event as it is unfolding. He has direct communication with the reporter and suggests additional or different story angles. Unlike the reporter, he can see just what the story will look like on the air. He can tell the reporter to do something over again, if necessary, and he can keep the reporter informed of late breaking stories in other parts of the city which may effect the reporter's handling of that particular story.

"Basically," says News Director Schaefer, "ENG enables you to begin quality control—better pictures, better questions—while the

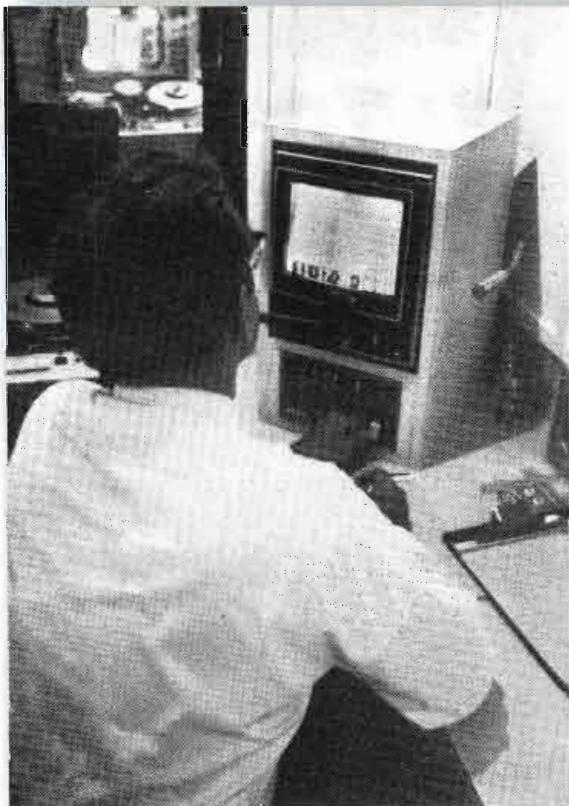
story is still being done instead of waiting until hours later when you see the film and have to say to the reporter, 'Can you go back and try to get this picture or ask that question?' Since you know what you're getting from the beginning, you don't second-guess yourself. You don't schedule a story to run long, then when you see the footage, discover it wasn't worth it and go through the embarrassment of having to put it on the air anyway."

When a story is being covered in the "record" mode in the field, the cameraman has another means of quality control. He records a few seconds of the scene, then stops the Sony and hits the playback control. Viewing through the eyepiece of his Ikegami, he can see what has just been recorded and check lighting conditions and picture composition before beginning the actual taping.

Big Brother?

Quality control notwithstanding, how do reporters feel about newsroom management watching over their shoulder as their story is taking place?

"There was an aura of Big Brother when we first started," says Penny Crone, a reporter who began her career with newspapers. "I'm used to it now. There have been



Newswriter Jack Griffin begins the editing process on a story by playing back the "work print" tape. He freezes the display of numbers on the monitor and logs the exact frame number as each edit decision is made. The numbers are then turned over to a technician in the tape assembly room where the final editing is performed.

many times when the executive news coordinator has helped me with information on a story. He's like a city editor on a newspaper. He has privy to information from a lot of sources—other reporters in the field, the wire services, police and fire department radios. He's seen other stories coming in today and he's got a pretty good idea how my story will fit into tonight's package."

Crone's feelings are echoed by News Director Schaefer. "Big Brother is really not an issue. Good, seasoned reporters welcome the suggestion of anything they might not have thought of themselves to make their story better. And they're grateful to know if something they're shooting isn't coming off or if there is something happening elsewhere that they ought to know and ask a question about on the spot. It means they are not going to feel embarrassed by going on the air later with a story they feel is anything less than it might have been. For learning reporters, it's a help to be able to ask for and get ideas on how to

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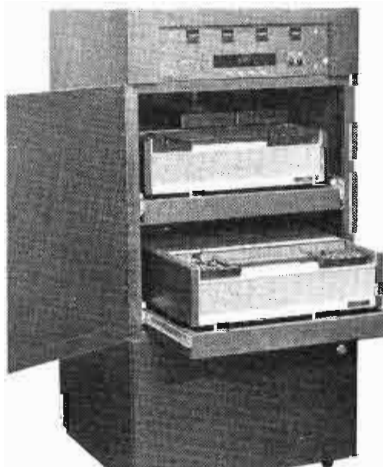
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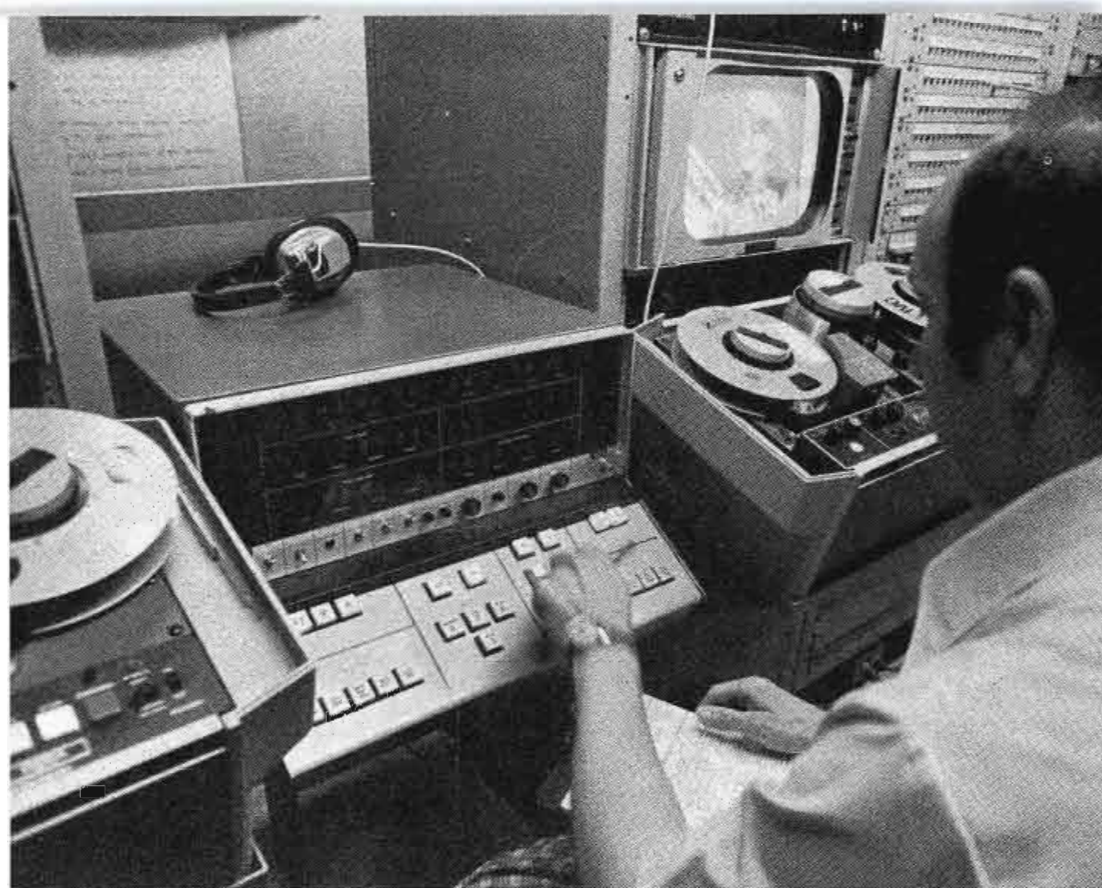
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In the tape assembly room, technician Jim Hunze enters frame numbers into the Datatron computer-editor in the final step in editing a story. The story is built on the recorder at his right from a master tape at his left.

handle the story in front of them."

But, Schaefer is quick to admit that ENG demands more of reporters. "With film, they always had a crutch," he notes. "If they didn't like something they said or did, they'd do a second take, or a third. Now they must be prepared to think on their feet. If you're on the air live, you don't have time to mull over exactly what you want to do with an interview, much less have an hour or two to fool around with a piece of film."

What were some of the other problems KMOX-TV encountered when it began covering news electronically?

"At first," notes Schaefer, "there was a hesitancy to do any production pieces. The reporters were working with new tools—tools they weren't familiar with, so they weren't thinking in terms of 'B' roll for their stories." As the acclimation process continued, the reporters began to include "B" roll in their stories and, in some instances, "C" roll.

"ENG doesn't hurt production," says Burrow's assistant, Fred

Caesar, "it enhances it. We are able to add production values with the Datatron editor which were not possible with film."

Another problem early on, according to Schaefer, was when to interrupt programming for live reports. "There were a few instances when, I'm afraid, we went on the air for the sake of being live. Today, before we interrupt regular programming for a live report, I ask all my people to consider if we would go live if the story were a film piece. We have to rely on our news judgment now more than ever before."

Going live during a regularly scheduled news broadcast is a different matter, but with its own problems. A way had to be found to cue the reporter at the scene of an event to begin his report. A portable air monitor was added to each van, but this proved unsatisfactory. It was cumbersome, and there were interference problems. Also, the reporter was not always positioned close to the van. Each reporter was then equipped with a custom-molded earpiece carrying



The "Battista Sling", a lightweight metal dolly, gives KMOX-TV plenty of flexibility. Dolly includes lights, mounted camera, microwave transmitter, recorder and power supply. Note that lights can be extended and camera is on a tilt and swivel head.

program audio, but the director of the news broadcast still had no way of communicating directly with the reporter. Finally, a "program interrupt" was added in the studio control room. With the flick of a switch, the director can now interrupt the program audio and talk into the reporter's ear.

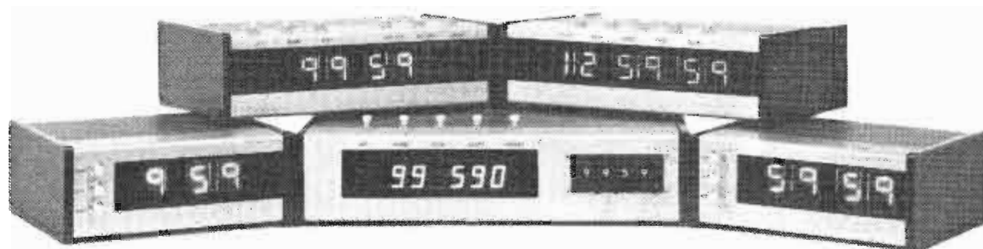
With any live telecast, there is always the problem of the unexpected. A recent recorded story serves as an example. Covering a routine fire, the crew wanted to get a few shots of an old woman sitting in her rocker outside the burning building watching firemen rescue her ten cats. Up walked a man with a hoe slung over his shoulder and he told the crew to stop. The incident was quickly smoothed over by a policeman standing nearby, "but we couldn't help thinking, 'What if this were live,'" says Schaefer. "What if some nut you never counted on as part of a story just comes wandering on camera?"

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contributes greatly to its coverage of the St. Louis community. Story count has increased 20 percent over the days of all-film crews. This has enabled the News Department to select the most newsworthy stories from the total gathered, rather than having to use every story to fill its broadcasts. And, of course, the station is able to cover those stories breaking close to or during air time.

Being the first totally electronic newsgathering operation in the country has made KMOX-TV a novelty and has brought a steady stream of visiting broadcasters from Japan, Great Britain and Canada as well as inquiries from station operators throughout the United States.

"Don't forget, we're still working with first generation equipment," notes Thomas M. Battista, KMOX-TV Vice President and General Manager, "and we're learning something new about what works and what doesn't work each day."

Battista, in fact, learned that when crews were covering a fast-moving story in the "record" mode,

the combination of camera, back-pack, Sony recorder, portable lights and powerpack constituted an unwieldy mass of equipment and often hampered the crew's movement. So he got together with some of his staffers and designed the "Battista sling," a lightweight metal dolly on wheels.

The "sling" is constructed in such a way that there are compartments for the back-pack, AC power pack, Sony recorder, portable lights, cable, a special mount for the Ikegami and the portable 13 GHz transmitter. The "sling" fits securely on the floor of the van, can be rolled to the scene by one man or carried across muddy terrain, stretcher-fashion, by two men, giving ENG an even greater mobility.

Battista envisions the day when miniaturization of microwave equipment, power packs and batteries and the camera itself will obviate the need for a van and an ENG crew will go out on the street in a normal-size sedan.

"But," he cautions, "no matter how advanced or refined the equip-

ment, its success is still dependent on the people who use it. Reporters must learn to think differently in their approach to stories. Spontaneity is the key. And news producers have to be more flexible in their approach to each news broadcast."

Tom Wolzien produces KMOX-TV's 5 PM and 10 PM news broadcasts. Having worked with film for a number of years, he's an enthusiastic convert to ENG. "Because of the electronics, we're doing a better job. Better—not necessarily easier—because the pressure of working closer to news time is more intense. There's no lag time at all any more. Sometimes we go on the air and have only 50 percent of the broadcast locked up because there's a lot of late-breaking news. That means we've got to leave time open for the live reports. We don't have the security of diagramming everything ahead of time."

KMOX-TV was the first station with a total ENG capability. As Battista notes, "I have a feeling we won't be the last."

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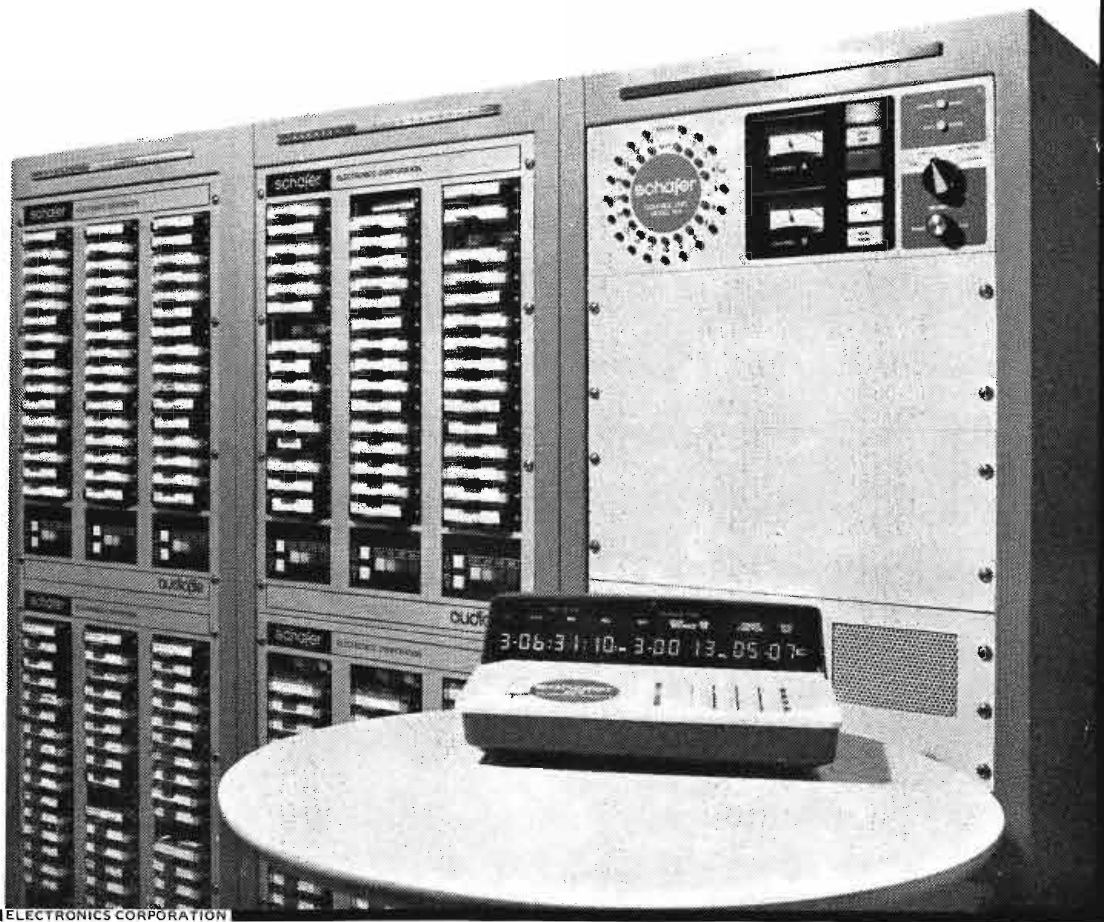
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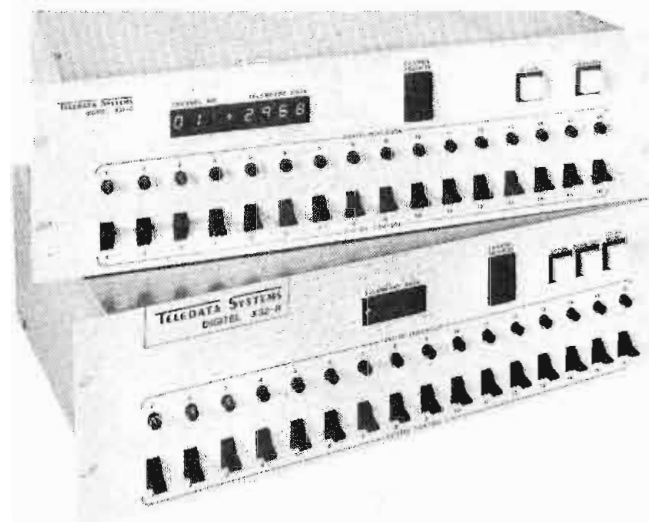
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PEOPLE IN THE NEWS

International Video Corporation, Sunnyvale, Ca., announces the following promotions and appointments: **Bert H. Dann** has been named Vice President, Engineering; formerly Vice President and Technical Advisor to the President...**Robert G. Marmioli**, formerly Eastern Distributor Sales Manager, has been named National Distributor Sales Manager and will continue to be headquartered in the company's White Plains, New York office...**Hugh F. Gillogly** was appointed Direct Regional Manager responsible for broadcast sales in the Central Region. Headquartered in Glenview, Ill., he was formerly Sales Manager for Hitachi Shibaden Corp. of America.

Other IVC appointments include: **Dennis J. Sheehy** as the new Corporate Treasurer...**Donald J. Morgan** as Director, Product Management...**Carter G. Elliott** as Director, Corporation Communications...**Ronald Wells** named Distributor Sales Engineer for the company's Western Region.

Assuming the position as a Group Vice President at Superior Continental Corporation in New Jersey is **Robert C. Pittman**. He will begin immediate operating direction of Continental Telephone Electronics and Continental System Supply...Named as system manager for Warner Cable Corporation's cable television complex in Kern County, Ca., is **Kenneth L. Tryggstad**. Ken will be responsible for the operations of the system which serves over 27,000 subscribers in that area and will be located in Bakersfield, Ca.

Newly-elected officers of the Catholic Television Network (CTN) are **Msgr. Pierre Du Maine**, San Francisco, president; **David Moore**, Los Angeles, vice-president; **Sr. M. Irene Fugazy**, New York, treasurer; and **Charles E. Hinds**, Chicago, secretary. The board of directors consists of representatives of each of the 10 stations in the network. The stations are owned and operated by the archdioceses of Chicago, Boston, Detroit, Los Angeles, New York, Milwaukee, San Francisco, and in the dioceses of Brooklyn, Miami, and Rockville Centre (N.Y.).

Announcing an executive personnel realignment is Ted Snider, President of Snider Corporation, Little Rock. They include: **C. G. Gardner**, Vice President, Marketing and Corporate Development has been named Group Vice President...**John T. Reeder** was named Manager of Programming and Station Relations for the Arkansas Radio Network...**Rusty Gold** was named a Vice President of Snider Corporation and will continue in his position as General Manager of KKYK Radio, as well as handling additional Corporate responsibilities.

Coming from Minneapolis is the appointment of **Norman H. Hansento** product manager in the professional audio products of Telex Communications, Inc. In this position Hansen will be instrumental in expanding amateur radio and citizens band product sales...Also from Telex is the naming of **Richard**

Powell to national sales manager for the company's broadcast, amateur radio and citizens band equipment. He will be responsible for national sales and distribution of professional audio tape recorders and communications accessories made specifically for the broadcast industry and for the amateur radio and CB markets.

Recipient of the National Academy of Television Arts and Sciences' 1975 Trustee Award is **Dr. Peter C. Goldmark**, president of Goldmark Communications Corp. The award was presented May 19 in Hollywood, Ca., during the "Emmy Awards" telecast. He received the award for his many outstanding technological contributions to the field of communications such as the development of the LP phonograph record, the first practical color television broadcasting system, and electronic video recording.

Raymond H. Herzog has been elected as chairman of the board by the 3M board of directors succeeding Harry Heltzer. Herzog will also continue as president and chief executive officer....**Sheila Mahony** has been named executive director of the Urban Institute's Cable Television Information Center....**Ronald Chisenhall** has been appointed as division marketing engineer of the Electronic Display Division of Ball Brothers Research Corporation where he will serve as technical interface with the division's engineering staff as well as with customers.

Announced as Sales Manager of Comrex Corporation, Sudbury, Massachusetts, is **Lynn E. Distler**. Comrex are manufacturers of remote broadcast audio equipment....**Smith, Cooper Associates** has been appointed CATV Management consultants for the cable television system in Bedford, Indiana owned and operated by Buford Television, Inc., of Tyler, Texas. They will be responsible for CATV Management and engineering aspects of the Buford system; and will assist Buford in their CATV expansion plans. Smith, Cooper Associates now serves in a management capacity for cable TV systems in Arkansas, Pennsylvania, Ohio, and Indiana; and in a market advisory capacity to Continental Communications, Inc., a CATV sports program producer.

Robert W. Santora has been named a member of Jerrold's headquarters sales staff, where he will be available to provide support to all of their regional offices.

Jonathan Hall has been appointed to the newly-created position of assistant director of the Radio Information Office of the National Association of Broadcasters. Hall's duties will place him in the Public Relations Department and he will report directly to NAB vice president and director of the Radio Information Office, Charles T. Jones, Jr. Hall joined the NAB staff two years ago as regional manager for the Northeast having begun his career with WHIS AM-FM-TV in Bluefield, West Virginia.

ELECTRONIC NEWS GATHERING ANTENNA'S

OMNI-DIRECTIONAL

Four antenna array for omni-directional coverage. Provision for adding additional high gain antenna for troublesome paths.

MULTIPLE POLARIZATIONS

Capable of receiving Horizontal, Vertical, Right Circular and Left Circular polarizations.

SOLID STATE

Reliable Solid State polarization control permits fast on line switching.

REMOTELY CONTROLLED

Quadrant and Polarization remotely controllable via telcom lines.

LOW WIND LOAD

Module construction permits easy mounting and low wind profile.

TRANSMITTING ANTENNA

Transmitting antenna's is available with either fixed Right Circular Polarization or switchable circular polarization. Remotely controllable feeds for existing 2 and 4 ft. parabolic dish.



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For More Details Circle (38) on Reply Card

Remote Hummm!

On several occasions we have experienced hum problems with our remote broadcast lines. Although a call to the phone company will eventually cure the problem, it sometimes takes several hours for them to find and correct the trouble. The hum is so severe at

times that we have had to cancel the remote broadcast, causing problems and short tempers all around.

I tried several filter arrangements, ending up with a high-pass filter that chopped the bass off at 100 cycles, causing a rather tinny

sound. Better, but still not very good.

I finally realized that I had a high-Q, variable frequency notch filter sitting right on my work bench - my harmonic distortion meter. This instrument was able to eliminate the 60 cycles hum (or 120 cycles, for that matter) without affecting the quality of the broadcast.

To use this technique, you simply connect the incoming remote line to the input terminals of the distortion meter. Connect the output terminals to the console, and adjust the distortion meter tuning and balance controls for minimum hum. Keep in mind that the output gain will increase if the sensitivity control (distortion percentage) is turned to a lower range. Also remember that the incoming line is balanced, so use a transformer to isolate the meter, unless you want to generate your own hum. Usually, unbalancing the line to the console will cause no ill effects, as it is rather short.

If the trouble is in an open side of the telco loop, the distortion meter will not eliminate the tinny sound caused by the open side. However, it can help eliminate the 120 cycle hum that usually accompanies this condition.

Although the best cure is with the telephone company, this trick will sometimes salvage a valuable remote. It also shows another use for the ever-valuable Harmonic Distortion Meter.

Hollis W. Duncan
KDLK
Del Rio, Texas

WBEN in Buffalo has designed and built probably the most modern broadcasting facility in America. And ITC is there with 9 open reel units and 37 cartridge machines!

Jerry Klabunde, WBEN's Director of Engineering, has guided the immense studio project. He chose ITC equipment for this innovative station, and so...

We asked Jerry Klabunde about ITC's 850 reel-to-reel machines.

"These reel-to-reels just won't quit, and that's it! They just won't quit. We've had no mechanical

problems, no electronic problems, no failures. Nothing! And we have nine of them operating 24 hours a day, 7 days a week. The 850 Series is fantastic in automation, where we use ours, particularly with the motion sensing. The people who load the machines, since the tape is supplied "tails-out," have to rewind the tape and cue fast. With motion sensing, it's just beautiful! They don't damage the tape. From a mechanical standpoint, the thing is built like a battleship!

"I'm not just satisfied... I'm overjoyed! I mean you guys are dynamite and the machines are dynamite. Quality has to be up front if you're concerned about air sound. There's no choice. I don't care what kind of a guarantee some of the others have. I know you guys are there. I know when I pick up the phone there's a Bob Tria, a Kerry Meyer, or someone, and ten seconds later there's something in the mail to me. And not because it's Jerry Klabunde but because that's the way the company is operated.

"ITC guys are dynamite people to work with. ITC itself sold me on the 850 because you and your equipment have never given me any real trouble. You're just that kind of a company. I believe in a company that puts its customers first, and that's the philosophy you people live by... I like people like that."

Why don't you find out for yourself? Call us collect (309/828-1381) and ask us some questions about ITC's 850 Series open reel equipment. You'll be talking with experienced broadcasters who know your needs and are anxious to help.



The 850 Series... Open Reel Equipment With ITC Behind It.



INTERNATIONAL TAPETRONICS CORPORATION

2425 South Main Street • Bloomington, Illinois 61701

Marketed exclusively in Canada by McCurdy Radio Industries Ltd., Toronto

For More Details Circle (42) on Reply Card

Electronics Class Needs Equipment

The electronics class at Petersburg High School in Petersburg, Virginia is in the process of forming a non-commercial, educational FM broadcasting station. What is needed now is any donation of equipment that could be used for this station. Anyone having equipment or wanting to assist these people can contact J. A. McPhearson, instructor, Petersburg Technical-Vocational Education, 633 West Washington Street, Petersburg, Virginia 23803.

NEW PRODUCTS

Computer Controlled Editing

Central Dynamics has developed the PEC-102 as a frame-accurate editor for creative people in a complete system approach for computer controlled VTR editing. It's a total design concept of hardware, software, and service.

Mimic CRT diagrams for Off-line and On-line edit modes graphically display current status of all operations, including data entry, scene location, edit rehearsals, and automatic assembly.

The PEC-102 offers instant "call-up" and control of all computer programs, as well as giving edits on any frame with accurate color framing. It uses the SMPTE code for recovery and display for faster edits. Audio edits can be offset from video and executed in the same pass. The system stores up to 600 edit scenes, and any edit scene can be called up, displayed, rehearsed, and changed at any time. It also has automatic control of audio/

video switcher with full mix/effects capability.

For More Details Circle (80) on Reply Card

EBS System

In response to the new FCC regulations for emergency broadcasting, Time and Frequency Technology, Inc. has developed an all new EBS broadcast system. The TFT Model 760 system consists of independent modules: a two-tone EBS generator, a two-tone EBS decoder and a receiver which can be either AM frequency synthesized or FM fixed-tuned. These modules are available as a total EBS system package or may be purchased separately, depending on individual requirements.

The TFT two-tone generator produces the required 853 and 960 Hz tones simultaneously with an accuracy of ± 0.25 Hz. This stability is accomplished by synthesizing the tones from a crystal oscillator. The tone decoder may be used with the TFT AM receiver or FM receiver or any audio

source having the EBS two-tone signal at 200 MV RMS or greater. Advanced phase-locked-loop decoders are used to achieve narrow bandwidth. A signal averaging circuit provides a 10-second delay and prevents false turn-on.

For More Details Circle (81) on Reply Card

Camera Tube

The North American introduction of a newly designed 30mm Coaxial Leddicon® camera tube was made by English Electric Valve North America Ltd. This separate mesh device with user switchable integral mesh capability was developed to enable single camera tube inventory at the station as well as to replace Plumbicon, Vistacon and earlier Leddicon tubes.

Technically, the 30mm Coaxial Leddicon contains two internal cylinders to replace the supporting wires previously used in other camera tubes. The result of this is that the Coaxial Leddicon may be operated in any rotational position whether the camera is set-up to utilize separate or integral mesh camera tubes without degradation of picture quality. This

RAPID-QTM CART MACHINES

RQ 71 Series for all size cartridges

Custom 3000 Series for "A" size cartridges



- Record/Playback
- Playback Only
- Single Units
- Multiple Units
- Monaural
- Stereo

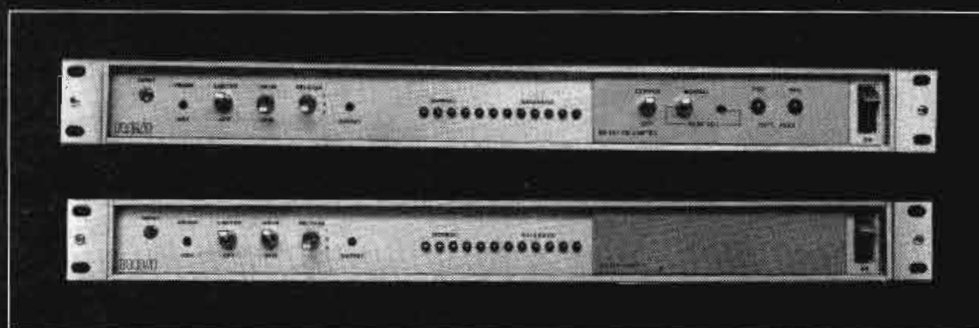
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For More Details Circle (55) on Reply Card

AUDIOWAVES

A good amp is like a clean windowpane.



Which means that a good amplifier transmits as much audio information as possible with as little distortion as possible. Just as a clean window lets a clear image through.

For example, harmonic distortion on our Type BA-40 distribution amplifier is 0.3% max. at +24 dBm, if you're interested in the engineering specs.

You'll find an RCA amplifier for just about any application you can name: pre-, program, distribution and monitor amps, as well as our new line of audio signal processing systems with totally new technology.

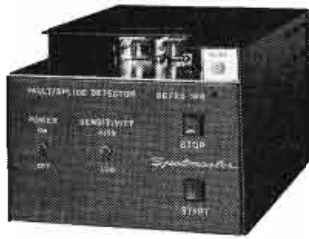
Talk to your RCA representative. RCA Broadcast Systems, Camden, N.J. 08102.

RCA

Microphones • Consoles • Tape and Transcription Equipment
Automation Systems • Amplifiers and Speakers

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Spotmaster® TWO IN ONE



BEFSD-100

Self-Contained Fault/Splice Detector

FAULT DETECTOR: Automatically checks tape surface for drop-outs, wrinkles and blemishes.

SPLICE DETECTOR: Automatically locates splices to improve production efficiency.

Two switch selectable sensitivity settings allow detection of both splices and tape faults. Automatic positioning opposite capstan opening permits easy inspection.

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assures better color registration, sharper focus and a total absence of "ringing". Comes equipped with factory replaceable light biasing for superior "low light" level picture quality and virtual elimination of "smearing".

For More Details Circle (82) on Reply Card

Automatic Videocassette Control System

Avtel has developed an automatic videocassette control system that can be configured, through options, to fit the needs of almost any operations that use videocassettes extensively.

This system, sold under the brand name Digitrol, has a digital CMOS logic dual event timer, making the system programmable over a 24-hour period. Options include a record function that allows auditing commercials, a time base corrector, and commercial insertions by timer or cue tones. Monitors for the system are available in color, monochrome, and with a cross pulse option.

With multiple repeat capability, the system can be used with field training programs.

For More Details Circle (83) on Reply Card

Post-Production Switcher

Shintron has introduced their Model 367 chromatic post-production switcher. It is a total color production switcher with a built-in helical genlock NTSC sync generator and a SMPTE edit code generator/reader in one rack mount package.

Shintron developed the Model 367 especially for post production applications. Designed to be the central piece of a post-production system, Model 367 facilitates editing, identifying and assembling of tape libraries.

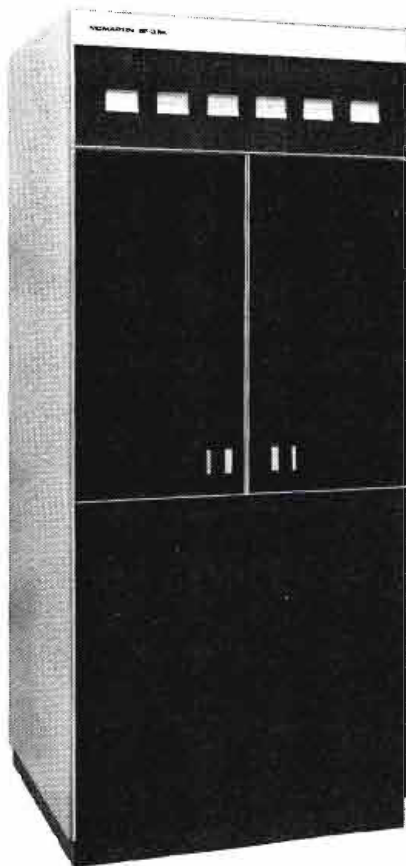
The heart of the color switcher is a 4-input 3-bus organization with totally vertical-interval switching by momentary contact lighted push buttons. The switcher has an additional key input and a complete tally system. Its rear panel interfaces with UHF, BNC, Sony and Panasonic connectors.

For More Details Circle (84) on Reply Card

TV Automation

VIMAX 27 is the **Vital Industries** way to TV automation. It involves a new, modular concept that is easy to operate and requires no computer training.

the NEW McMARTIN FM TRANSMITTER • BF-3.5K



traditionally, McMARTIN engineering has supplied the AM/FM broadcaster with the finest professional equipment. The new BF-3.5K is one of those products.

excellent efficiency for power output levels from 2000 to 3500 watts.

the high performance solid state B-910 exciter, is the heart of the system

superb bandwidth characteristics and operating stability

optimum stereo and SCA performance — zero bias, grounded grid PA — no neutralization . . . no screen grid or bias voltage supplies are needed

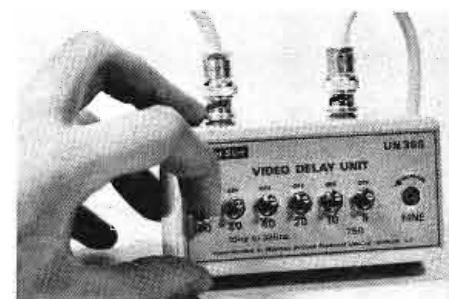
standard features include illuminated pushbutton switch controls, output reflectometer, memory-type LED status indicators, built-in harmonic filter, remote control capability of metering and operating functions

McMartin

McMartin Industries, Inc. 4500 South 76th Street, Omaha, Nebraska 68127 (402) 331-2000

For More Details Circle (72) on Reply Card

Video Engineer's Timing "Tool"



In every TV station, remote truck, or audio/visual department the video engineer has video timing problems. When he has a Matthey "UN360" in his tool bag he can deal with video timing up to and beyond 360° of phase at color sub-carrier.

It's fast to plug into cables. It's quick to switch to the required delay and a screwdriver vernier gives ± 4 ns of fine trim.

The performance is suitable for full color timing and can be inserted directly into the video path without any extras. The equalizers are built inside the "UN360."

The "UN360" is in use by ABC, NBC and CBS and many TV engineers across the nation. Put one in YOUR tool bag — it's a real aid.

Television Equipment Associates, Inc.

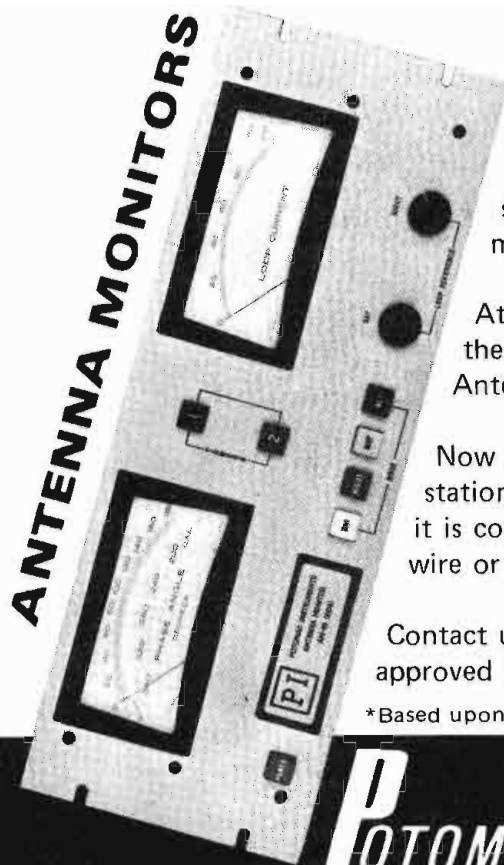
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For More Details Circle (45) on Reply Card

FCC Rule 73.69 + \$1660 = AM-19(204)



The FCC now says that you must have an approved Antenna Monitor. Since this is an added expense, consider carefully what is required of the monitor versus what it will cost.

At \$1660*, the Model AM-19 (204) is the lowest priced, FCC type approved Antenna Monitor available.

Now after several years of use at many stations, it has proven its reliability. And, it is compatible with virtually every type of wire or wireless remote control system.

Contact us now on this and other FCC type approved Antenna Monitors.

*Based upon 2 tower, DA-2.

POTOMAC INSTRUMENTS
932 PHILADELPHIA AVE.
SILVER SPRING, MARYLAND 20910 (301) 589-3125

For More Details Circle (46) on Reply Card

A full spectrum of equipment can be controlled in any configuration and quantity. It has complete logging facilities for management and FCC purposes, and complete plant communications with auxiliary monitors.

The VIMAX 27 offers 64 characters per line, with 27 events displayed at one time.

Other features include multiple pre-rolls without time restrictions, full transition capabilities including fades, dissolves, pattern wipes and inserts. Optional mass data storage is available for advanced scheduling of from 27 events to one year.

For More Details Circle (85) on Reply Card

Time Base Correction System

EduTron has developed a low-cost time base corrector that will work with any helical scan VTR whether it is H-locked, V-locked, line-locked, reel-to-reel or cassette.

Called the TBC-110, this unit includes internal velocity compensation that continuously adjusts the error correction line-by-line to prevent color streaking.

The internal sync generator is the heart of the TBC-110. It can be slave

locked to studio sync and burst. Its proc amp includes front panel control for video gain, set-up, chroma gain, and chroma phase.

For More Details Circle (86) on Reply Card

TV Studio Titling System

Video Data Systems, Inc. has developed and introduced their new TV studio titling system, the T-1000. It's a compact, economical and versatile system that is completely self-contained.

Features include two channel output - one program and one preview. It has two character sizes- 18 or 36 scan lines, and it uses a standard electric typewriter keyboard style. It offers full editing capability, vertical interval page switching, two page memory, keyed titles, one or two line title window, and character blink.

Applications include use with sports events, broadcast titling, CCTV, video tape editing and cueing, medical instruction, industrial training, and any application requiring written communications for additional visual impact.

For More Details Circle (87) on Reply Card

THE NEW STANDARD COVERS AM BAND PLUS HARMONICS TO 5 MHz



The Model FIM-41 Field Strength Meter has many more features —

- Measures Harmonics to -80 dB
- High Adjacent Channel Rejection
- Ganged Oscillator/Receiver Tuning
- Stable Operation over wide Temperature Range
- Low Battery Drain Circuits
- Front Panel Speaker
- Large illuminated Meter and Tuning Dial
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For More Details Circle (47) on Reply Card

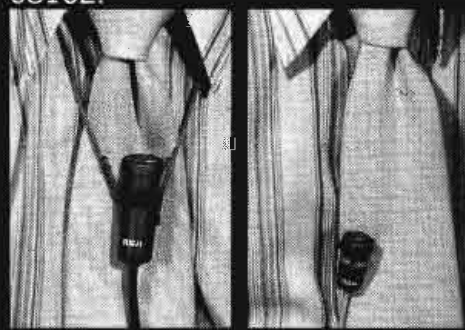
AUDIOWAVES

The perfect beginning.
RCA Microphones

Sound decisions start with a microphone. That's why RCA offers a complete line.

There are velocity, pressure and dynamic mikes to choose from. And when you want particularly faithful reproduction of speech or music, RCA ribbon microphones, with their excellent bass response, are what you need.

See your RCA representative. It could be the perfect beginning of a sound relationship. RCA Broadcast Systems, Camden, N. J. 08102.



RCA

Microphones • Consoles • Tape and Transcription Equipment
Automation Systems • Amplifiers and Speakers

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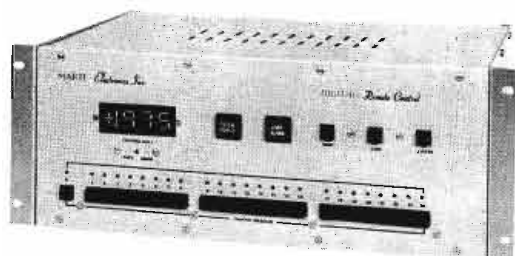
Automation Control System

The basic Spartamation control package requires only the addition of music and commercial tape transports to complete an automation system with the required capacity.

If random selection of cartridge announcements is needed, a Random Access Memory is available, with up to 4,000 audio events from as many as 19 multi-cartridge reproducers. The output of the RAM appears as a single audio source to the Model 1052 Program Controller, or it can be used as the main controller for both music and commercials. The RAM features keyboard data entry and battery backup to preserve stored data in the event of a power failure.

The key elements of the **SPARTA** control package are: DC24 Digital Clock for system timing; LAM1 Line Amplifier/Monitor Panel for adjusting and monitoring system audio; 1052B Automatic Program Controller for selection of audio source sequence, which includes the TS25 Tone Sensor/Filter for end-of-selection tones on music tapes; 4500-Series automation cartridge reproducers for IDs, jingles, etc.

For More Details Circle (88) on Reply Card



NEW

MARTI DRC-24

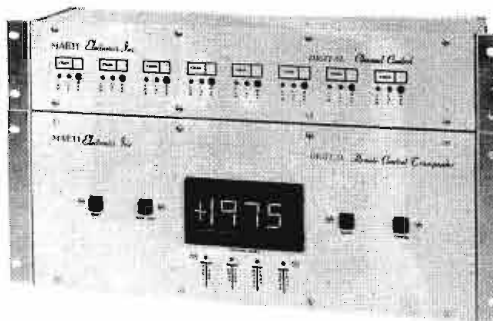
Digital Remote Control

FEATURES ★ Single Button, Direct Channel Select ★ Exceeds All FCC Requirements for Accuracy of Antenna System Data ★ Studio and Transmitter Units Phase Locked to Common Clock. ★ Telemetry Accuracy 0.1% ★ Basic 8-Channel System Expandable to 16 or 24 Channels. ★ Fully Digital for Radio Circuit or Wire-Line Operation ★ Plug-in Modules for FSK Frequency Change ★ Adaptable to Multiple Transmitter Control from Multiple Control Points. ★ Status/Tolerance Limit Alarm ★ Status Indication (Optional)

The Marti DRC-24 is a completely Digital Remote Control, Telemetry and STATUS/ALARM (optional) system, providing the ULTIMATE IN ACCURACY, SIMPLICITY, AND SPEED OF OPERATION. Channel selection is accomplished simply by pressing a SINGLE button. The data for the selected channel is then read from the large digital panel display. Raise/Lower commands can be given for the selected channel by pressing the Raise or Lower button.

The integrity of the entire digital process is assured by validation of received data transmission by checking proper start, parity, and stop bits, A FEATURE FOUND IN THE MOST SOPHISTICATED DATA PROCESSING EQUIPMENT. THIS ADVANCED DESIGN FEATURE VIRTUALLY ELIMINATES THE POSSIBILITY OF ERROR IN CHANNEL SELECTION, COMMAND, AND TELEMTRY DATA.

The extra features and unsurpassed value of the Marti DRC-24 system result from application of advanced MOS/LSI (metal oxide semi-conductor/large scale integrated) circuit technology. Each DRC-24 system employs eight (8) 40 - pin plug-in replaceable MOS/LSI circuits, containing the bulk of the complex digital circuitry, an unbeatable success formula basic to American dominance in the digital calculator market.



MARTI Electronics, Inc.

P.O. Box 661 • 1501 N. Main • Cleburne, Texas 76031 • 817/645-9163

For More Details Circle (70) on Reply Card

Positive Peak Flasher

A positive peak flasher that meets the FCC's rules for 125 percent positive peak modulation indication is now available from **Wilkinson Electronics**.

This rack mounted unit, called the PPF-1A, is all solid state and will work with most modulation monitors. When used with the Wilkinson TAMM-1A modulation monitor with the monitor's polarity switch in the negative position, the monitor's main flasher and meter will indicate negative peaks, while the PPF-1A will show positive peaks.

Modulating the transmitter with asymmetrical modulation at 125 percent on positive peaks will light both lamps, indicating maximum permissible modulation.

For More Details Circle (89) on Reply Card

Closed Circuit Automation Products

TeleMedia Electronics has introduced a new lineup of automation products for the closed circuit and cable TV industry.

They are specializing in automated videocassette playback systems designed for use in schools and colleges, buildings with existing master an-

EB'S 760

**EMERGENCY
BROADCASTING
SYSTEM
READY
WHEN IT
COUNTS!**

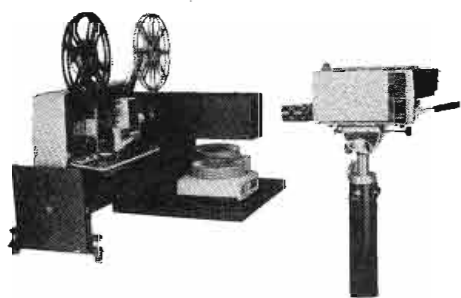
Write or call for full
facts on the most
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you'll ever make.

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For More Details Circle (48) on Reply Card

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MOBILE MULTIPLEXER!

Save the high cost of an extra color camera
Studio camera adapts to film chain
use in seconds

Use standard TV zoom lens

Input: Two 35mm slide projectors in
dissolve mode plus 16mm or Super-8

Mobile Multiplexer saves studio space

At \$975.00,

out performs units at twice the price!

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BUHL

For More Details Circle (49) on Reply Card

July, 1975

tenna systems, and Cable TV systems.

Their Cine-Matic II system includes an automatic digital program controller, videocassette players, audio/video modulator, and custom cabinets. Several models of the digital program controller are available, offering from one to six playback times per day and control of up to 10 videocassette machines.

Another new item is their digital cue-toner. This is an inexpensive accessory that enables the user to insert cue tones on existing video tapes or tapes not supplied with proper cue tones. The cue-toner includes a digital counter/timer.

For More Details Circle (90) on Reply Card

Random Access Memory System

IGM, an old name in the automation business, has come up with a new random access memory system (RAM). Employing the IGM-developed Audabus chassis technique and memory technology, the IGM RAM is the first static-type, read/write memory system available to the broadcaster.

The basic RAM system is supplied standard with 2,048 steps of directly addressable, directly programmable memory capacity. The RAM may be expanded at any time desired to 4,096 events.

The unit features: link, cancel back, skip-stop update, and auxiliary switching capability; flagged event search for quick access and memory editing.

The RAM is programmed through its front panel keyboard. It may be used, with appropriate interfacing, as the main control center of an entire automation system, or it may be configured as a sub-controller to a master control unit. It is compatible with most automation systems.

For More Details Circle (91) on Reply Card

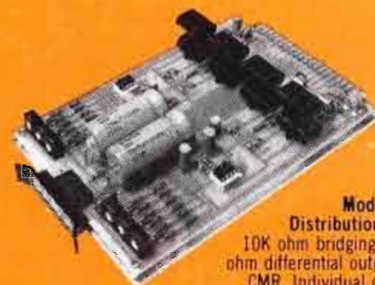
Logic Analyzer

The Model 80 Logic Analyzer has been introduced by Digital Broadcast Systems, Inc.

This instrument provides the user with an accurate and economical means of interpreting digital circuit operation on a conventional oscilloscope.

As many as 8 traces can be selected by a front panel switch giving the user a real time display of complex logic and timing relationships of both

NEW* from Roh complementary audio functions aid system design



Model 211 1X6
Distribution Amplifier
10K ohm bridging input. 600
ohm differential outputs/40 dB
CMR. Individual output level
controls. 60 dB/600 Hz
channel isolation.



***Model 223 6X1**
Active Mixing Network
10K ohm differential inputs/
50 dB CMR. 600 ohm output.
Individual input level controls.
Unity to +20 dB gain adjustment.
60 dB/400 Hz channel isolation.



Model 227 4X1
Remote Crosspoint Switch
600 ohm transformer inputs.
600 ohm bus output. TTL,
CMOS, compatible DC control.
Unity to +10 dB gain adjustment.



***Model 234 1X4**
Remote Crosspoint Switch
10K ohm bridging input. 600
ohm transformer outputs. TTL,
CMOS compatible DC control.
Unity to +20 dB gain adjustment.



Models 202, 203, 204
1, 3, and 10 module powered enclosures
include plug in power supplies and barrier
block module termination.

25 modules, 4 enclosures
and the necessary accessories from
a single source,

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For More Details Circle (43) on Reply Card

synchronous and asynchronous signals. A panel mounted trigger select switch permits any one of the 8 inputs to trigger the scope and/or to drive external circuitry, frequency counters, etc.

Other features include a narrow "glitch" detector mode, variable display rate, external clock input (to 10 MHz), and standard BNC I/O connectors.

For More Details Circle (92) on Reply Card

Video Editor

The Edimatic-100 is a simple editor from **Recortec** which uses pulses from an electronic timer such as the Recortec Video Tape Timer to automatically control 2-inch VTR's in a master-slave editing configuration.

The Edimatic-100 permits rapid assembly of a sequence of selected segments of the master tape onto the slave tape. The Edimatic-100 gives frame-accurate edits as long as there is no slippage. Zero slippage is attainable in video tape recorders with buffered tape drives such as the AVR-1 and those with the Recortec R-MOD installed. The Edimatic-100 gives precision on-line edits on these VTR's without expensive SMPTE code equipment or time-consuming cue tones.

The unit provides automatic search of the master tape, automatic simultaneous preroll of both VTR's a choice of preview or edit modes, and includes an electronic tape timer reading out in hours, minutes, seconds and frames.

Operationally, a real time cue sheet is prepared from the work tape using the tape time hold function of the Edimatic-100 to determine the entrance and exit points of all the selected segments.

The Edimatic-100 is equipped with preset switches to enter the cue points and with the usual search, preview, edit and stop switches for automatic control of the VTR's and the video switcher.

To assemble a segment onto the slave tape, the entrance point of the segment is entered into the unit through the preset switches. When the search switch is pressed, the master VTR searches for the entrance point, then both VTR's are rolled back for six seconds. At this point the operator may select either the preview or edit mode.

For More Details Circle (93) on Reply Card

Automatic Tape Cartridge

After five years of research and development, the **Fidelipac Division of TelePro Industries Incorporated**, has introduced a totally new Automatic Tape Cartridge at the 1975 NAB Show, Las Vegas, Nevada. Named Master Cart, it has been developed to assure superior performance, particularly for stereo operation.

Unlike any other cartridge now on the market, Master Cart's tape path past the machine heads and guides is controlled primarily by the cartridge machine. This neutrality of tape flow in the cartridge is assured by a completely new tape wind path plus

precision molding of the cartridge case, hub and reel. Furthermore, performance is repeatable, not only each time the cartridge is used, but also from cartridge to cartridge. All the individual user need do is align his recorder/reproducer heads and guides to a single standard (easily accomplished with the various test tapes and gages previously developed by Fidelipac). An additional feature is a minimum of parts. This has been accomplished not only to assure superior cartridge performance but also for easier maintenance and re-loading.

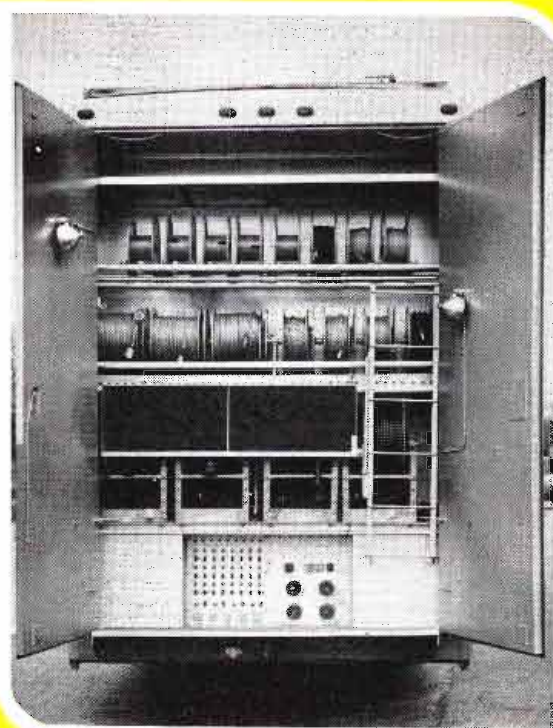
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TV Demodulator

A new television demodulator has been introduced by **Comark Industries, Inc.**

The Model CI-2400B Demodulator spans the gap between the use of a low-priced simple diode with its inherent limitations and an expensive off-air receiver. The instrument contains features found only in higher-priced precision demodulators. The CI-2400B Demodulator provides a flat response by means of video correction, eliminating mixing and IF filtering. A bypassable sound notch working with a high-Q trap at the aural carrier frequency provides 70 dB (typical) intercarrier attenuation.

Front-panel controls provide a means of varying chop-pulse width and position when the integral chopper is triggered from vertical sync ("Int" mode). As an added feature an "Ext" mode is also provided allowing



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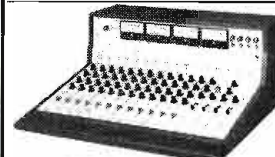
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the CI-2400B to be used in closed-loop video correction utilizing a VIR signal. In the latter mode, the CI-2400B accepts a zero-carrier reference drive pulse from a VIR-corrector (such as the Tek 1440) to control the chop-pulse width and position and the front-panel pulse controls are automatically disabled.

For More Details Circle (95) on Reply Card

Stop Motion Video Tape

Sony Corporation of America is now marketing three new video tapes of different running time capacities. The tapes are available through the company's franchised U-Matic videocassette dealers.

The new tapes are the KCA-60, with one hour capacity, the KCA-30 for half-hour use, and the KCS-20, a 20 minute tape for portable and desk machines.

The tapes, in videocassettes, incorporate a new binder suitable for stop motion applications. Using the new tapes, the VO 2380 and 3800 videocassette recorders can show still frames for up to 15 minutes.

The KCS-20 tape replaces the
(continued on page 55)

the new

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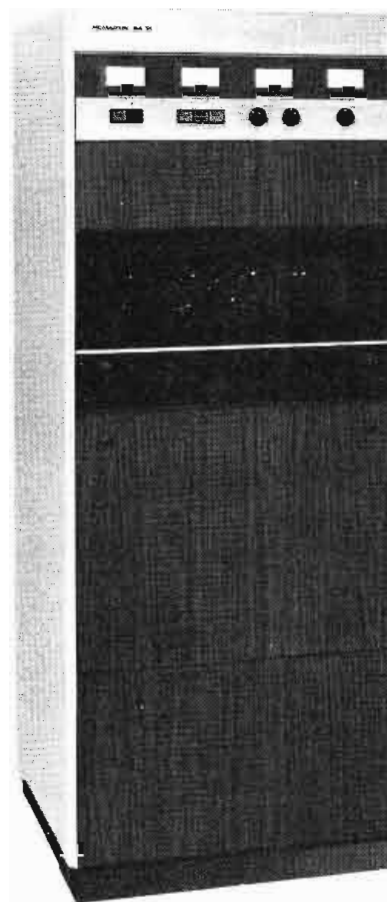
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Otari's new MX-5050 is a compact professional recorder that's scaled down in size but not in performance or features. Make no mistake. The Otari MX-5050 is not another hi-fi recorder. Instead, it's a creative working tool for the professional recording engineer.

The MX-5050 is designed to handle a wide spectrum of professional recording and production assignments: audiovisuals, broadcast programming, rock groups, high school and college bands, church and religious recording, drama classes, and local theater groups.

Look at the professional recording features the Otari MX-5050 has to offer: two or four channels, front panel edit and cue, precision mounted splicing block on head cover, synchronous reproduce for over-dubbing, motion sense to prevent tape damage, XL connectors, 600 ohm + 4dB output, balanced line transformers, built-in mic preamps, extra reproduce head (1/4 or 1/2 track) on two channel version, plus much more.

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Gibraltar Cradle Head has "Quick-On" plate and is available with one or two handle operation.



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Zoom in!

Take 1:

WOR—NY reports picketing by IA film types has ended....But, final resolution has not yet been achieved. The positions of about 150 members of the Radio & TV Division of IA working at WOR-TV are hairy at best. There appears to be an upcoming period of legal maneuvering....How well, if at all, this will succeed at WOR would seem to depend on who will appear on the scene to "go-to-bat" for the Radio/TV engineers. It is understood that there has been talk of "splitting" away from IA and (through NLRB action) going their own way until another affiliation (?) can be arranged.

Take 2: Introducing the "CAMMY"...AND Miss TVC...

Hollywood has long had its Oscar....The ATVAS has its EMMY....We (the ASTVC) now have our CAMMY!....Our plans for the immediate future include awards to be given by, and in the name of, our society. While we will continue to formally honor members of the society who have won awards such as the EMMY, we shall henceforth establish our own nominating system for future recipients of the CAMMY....The exact details have not all been worked out at this time, but we anticipate requesting nominations from the membership and all others working alongside our members who might be in a position to recognize outstanding performance and/or achievement on the part of members....We solicit your comments....

As for MISS TVC, why she'll make the presentation, of course! Please submit your nominations (preferably 5x7 black & white photo) for MISS TVC of 1975 to the ASTVC, Box 1189, Radio City Sta., NYC 10019. ATTN: CAMMY awards committee....This young lady will be our official hostess for the coming year. All unmarried young ladies over 18 years of age are eligible.

Slo-fade to black....

BROADCAST ENGINEERING

(Continued from page 53)

former KC-20 videocassette.

Sony also announced the availability of the VSK-35 video tape splicing kit. The kit is designed for owners of the AV-8400 Video Rover. The kit can transfer manually threaded tape onto an automatic threading reel, identified as the RH-5AT.

For More Details Circle (96) on Reply Card

Multitrack Audio Production Link

Ampex Corporation has introduced an electronic device designed to link the MM-1100 and AG-440 series recorder/reproducers with the RA-4000 automatic programmer for use in multitrack audio production.

The device, Auditec II, permits the multiple tracks of voice, music and sound effects to be recorded and mixed in synchronization with the video.

Through interface with the recorder and programmer, electronic splices may be set up, previewed and executed immediately, or maintained in memory so that entire audio-video edit sequence may be accomplished in

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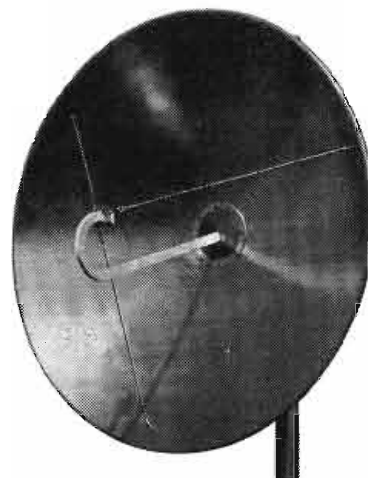
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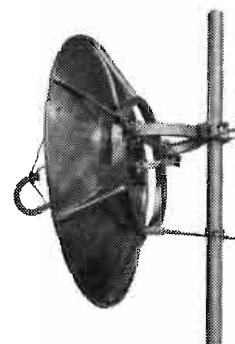
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A unique backframe is designed into this new center-fed feed antenna, so it can withstand 125 mph wind (200 KM per hour) with 1 inch (25mm) of radial ice. Maintains deflection to less than 0.1° in 70 mph (110 KM per hour).

This high efficiency antenna meets or exceeds EIA Standard RS-222B and RS-195A. It features a low profile for bulk crating, continuous polarization adjustment and is pressurable to 10 PSI. Feed guy wires included on models 6 feet and larger. High Performance "Shroudome" and Ultra High Performance antennas also available.



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a single continuous operation.

One track of each recorder is used for a digital synchronization code, leaving all remaining tracks for record and mixdown of the desired master audio recording for video broadcast.

For each multichannel recorder linked to the RA-4000, one Auditec II is necessary.

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VTR Edit Timing Control

A new low-cost Tape Edit Timing Control has just been announced by Beta Technology, Inc., of Farmingdale, N.Y. The same unit is available in either a vertical model, No. 601, or in a horizontal configuration, No. 602.

The Beta Edit Timing Control Unit is designed for operation with video tape machines equipped with splice control and splice logic. It makes an accurately timed video switch by eliminating the usual 18 frame delay between "record" and "video switching". Both Model 601 and 602 are easily mounted or removed for maintenance.

For More Details Circle (98) on Reply Card

Digital Logging

The new all solid-state Model DLS-1 Digital Logging System, recently introduced by Moseley Associates, Inc., of Santa Barbara, California, offers a number of new operating features. The DLS-1 Digital Logging System operates independently, or in conjunction with the Moseley Associates Model DRS-1A Digital Remote System. The Model DLS-1 Digital Logging System will record up to 20 parameters plus time of day in columnar format at preset time intervals, or when an out-of-tolerance condition occurs.

Other standard features of the Model DLS-1 Digital Logging System are selective channel muting and external digital (BCD) inputs.

For More Details Circle (99) on Reply Card

Cart Reloading

A new service is being offered by Calico Video to owners of 2-inch quad video tape cartridges in the television industry. Primarily a reloading service, they have already proven to be a reliable and economical answer for reusing cartridges or spools after the tape has degenerated beyond use for commercial recording and playback.

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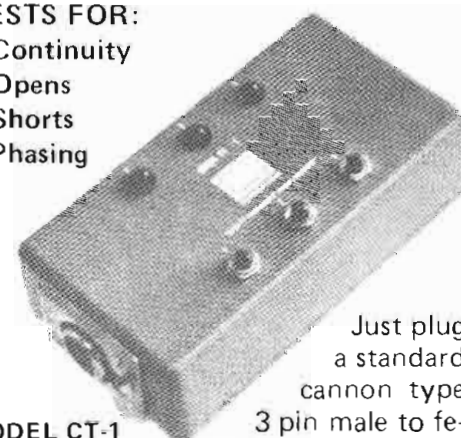
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BROADCAST ENGINEERING

Velocity Correction

Consolidated Video Systems, Inc. has announced the introduction of two new options to its 504A series time base correctors for improved overall performance.

The first option is Model 5042 Velocity Corrector. It is designed to correct the velocity errors remaining in a direct color VTR signal when played through a CVS 504A series TBC.

The second option is Model 5044 Heterodyne Phase Corrector. This product is designed to be used in conjunction with Model 5042 Velocity Corrector to permit the correction of velocity errors from heterodyne color VTRs when the signal is played through a CVS 504A Series TBC.

CVS recently announced a signal-to-noise ratio specification of 57 dB for its 504A series time base correctors as a result of several accumulated design improvements.

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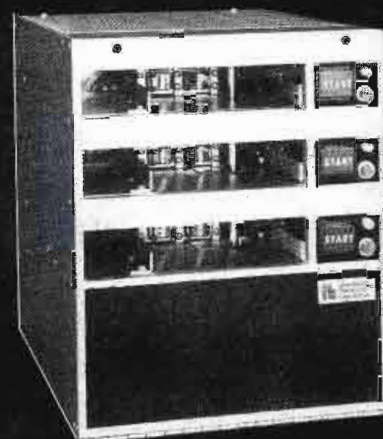


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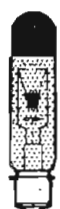
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P.O. Box 1575
Thousand Oaks, Calif. 91360
(805) 492-5055 (213) 889-7769

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WANTED

WANTED: All surplus broadcast equipment especially clean A.M. & F.M. transmitters, capacitors, capacitors. Surplus Equipment Sales. Clark & Potomac Phase monitors. 2 Thorncliffe Pk. Dr. Unit 28 Toronto 17, Ont; Canada 1-73-tf

WANTED: Surplus broadcast equipment suitable for 10 watt FM educational broadcast station. Transmitter and studio equipment are needed. Tax exempt status. Contact: Midland Lutheran College Business Office, Fremont, Nebraska 68025 - Attention: Jack Calhoun (radio), Phone: (402) 721-5480. 6-75-2t

WANTED: Education Public Broadcast Station needs surplus broadcast equipment, 1 or 1.5 kw FM transmitter, and studio equipment. Tax exempt status. Contact Boulder Community Broadcast Association, 885 Arapahoe, Boulder, Colorado 80302. 6-75-6t

CBS Volumax and Audimax or just Volumax. Good condition. State price. Jack Smith, KVVU-TV, 1800 Boulder Highway, Henderson, Nev. 89015. (702) 565-9755. 7-75-1t

WANTED: 375' self-supporting tower; Gates 10 kw transmitter. 1965 or newer. Must be operating. No junk. 4158 Veith Ave., Madison, WI 53704. 7-75-1t

500 FT. GUYED TOWER, at least 36 inch face, base insulator, and two beacons and four sidelights. WQIZ-WPWR, Box 903-904, St. George, SC 29477, 803-563-4371. 7-75-1t

WANTED—Used Bruel and Kjaer audio test equipment for hearing aid tests - test box, spectrometer, measuring amplifier pistonphone, etc. Contact Bob Sumption, Berrien Springs Public Schools, P.O. Box 130, Berrien Springs, Michigan 49103. Ph. 616-471-7724. 7-75-1t

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ONE STOP FOR ALL YOUR PROFESSIONAL AUDIO REQUIREMENTS. Bottom line oriented. F.T.C. Brewer Company, P.O. Box 8057, Pensacola, Florida 32505. 7-71-tf

HELIX-STYROFLEX. Large stock — bargain prices—tested and certified. Write for price and stock lists. Sierra Western Electric, Box 23872, Oakland, Calif. 94623. Telephone (415) 832-3527. 1-73-tf

REBUILT CARTRIDGE TAPE EQUIPMENT. Spotlessly clean and thoroughly tested. 30 day moneyback guarantee, ONE YEAR warranty. Also, **REPAIR AND RECONDITIONING SERVICES** for cartridge equipment by factory trained technicians. Send for complete information: AUTODYNE, Box 1004, Rockville, Md. 20850, (301) 762-7626. 1-75-tf

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NEW Paps hysteresis synchronous motor HS2 20.50-4-470D as used in series 400 and 500 machines. Price \$49.00 each prepaid, while they last. 90 day warranty. Terms check with order only, no COD's. Not recommended for Tapecaster series 600 or 700.
TAPECASTER TCM, INC., Box 662
Rockville, Maryland 20851
1-72-tf

EQUIPMENT FOR SALE (CONT.)

SPOTMASTER EQUIPMENT AND PARTS now in Texas from Sales Southwest 4002 Houston Highway, Victoria, Texas 77901. 512-578-4323. 4-75-6t

BUILD YOUR OWN TV AND RADIO PRODUCTION EQUIPMENT. Easy, inexpensive, (mostly IC). Plans or kits: Special Effects Generator, Automatic Logger, Vertical Interval Video Switcher, Solid State Lighting Board, Preset Audio-Video Board, Preset Lighting Board, Crystal Controlled Wireless Mikes with Matching receivers. Subsonic Tone Control for audio tapes, 8MM SOF Cameras and Projectors, Distribution Amplifiers (Sync. Video, Audio), Audio Control Boards (Studio & Remote) Proc-Amp with compensation and regeneration for adapting Helical Scan VTR's to broadcast standards. PLUS specialized correspondence courses in Telephone Engineering (\$39.50), and Integrated Circuit Engineering (\$49.50). Plans from \$5.95 to \$15. SUPER CATALOG plus years updating of new devices Air Mailed \$1.00. Don Britton Enterprises PO Drawer G, Waikiki, Ha. 96815. 5-74-24t

MICA AND VACUUM transmitting capacitors. Large stock; immediate delivery. Price lists on request. SURCOM ASSOCIATES, 1147 Venice Blvd., Los Angeles, Cal. 90015 (213) 382-6985. 6-75-tf

STODDART RADIO interference-field intensity meters. Stoddart NM-22A, 150KHZ-32MHZ. Complete - \$2,195, less antennas - \$1,595. Stoddart NM-30A, 20-400MHZ. Complete - \$1,295. Stoddart NM-52A, 375-1000MHZ. Complete - \$1,495, less antennas - \$1,095. All are in excellent condition and calibrated prior to shipment. Surcom Associates, (213) 382-6985. 6-75-tf

DELTA RG-1 receiver generator for sale. New condition. \$1,275. McClanathan & Associates, P.O. Box 750, Portland, Oregon 97207. 6-75-2t

FULL LINE TUNING and phasing components available, including contactors, also large supply separate contacts for E. F. Johnson contactors. Write: Geleco Electronics, Ltd., #2 Thorncliffe Park Drive, Unit 28, Toronto 17, Canada. Phone: (416) 421-5631. 2-75-tf

SPOTMASTER, FIDELIPAC, RUSSCO, ROH, ELECTRO-VOICE, OTARI, RAMKO, SCOTCH, STANTON, NORTONSON, SHURE, SENNHEISER, TELEX, MAGNECORD, and VIKING are all items distributed and serviced by COMMUNICATION MEDIAS/BROADCAST EQUIPMENT DISTRIBUTORS, P.O. Box 54, Allentown, Pa. 18105. 215-437-0607. "Sudden Service" our specialty. 6-75-12t

CCA AM250-D TRANSMITTER—Excellent condition. Low hours, used as auxiliary. May be heard on the air. \$2900.00 FOB, San Bernardino. La Vern Garton, 714-885-6555. 6-75-4t

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CAMERA CABLE HALF PRICE—Beldon 8280 and R.C.A. MI-94-D. 75 cents per foot. Roy Jones, 2455 North 750 East, Provo, Utah 84601. 7-75-1t

RECORD/PLAY ELECTRONICS NEW LANGEVIN MONO SOLID STATE \$250 each, also matching HEADS GE TORQUE MOTORS \$40. SPECIAL PRICE for LOT. Discontinuing this product. Contact DAVE OR WALLY TAPEATHON, Box 814, INGLEWOOD, CA. 90301, (213) 776-6933. 7-75-1t

TEKTRONIX 545B with IAL plug in. WENY-TV, 607-739-3636, Larry Taylor. 7-75-1t

EQUIPMENT FOR SALE (CONT.)

GATES FM5B 5000 watt FM transmitter, less exciter, 3 Bay circularly-polarized Shively-Labs Antenna, tuned to 95.9 mhz, sufficient 1-5/8 co-ax to reach 300 ft. top of FM antenna, into building 30 feet. Package \$5,000.00. Will sell separately, transmitter \$3,000.00, CO-AX & Antenna \$2,000.00. WQIZ-WPWR, Box 903-904, St. George, SC 29477, 803-563-4371. Available within 6 months. 7-75-1t

540 FEET ANDREW 7/8 inch foam dielectric coaxial cable rg-17a/u. new. Make offer. Call or write: Richard Feutz, WTKM, Hartford, Wis. 53027. 414-673-3550. 7-75-1t

FOR SALE—3 KW, General Electric, FM, monaural transmitter. Mint Condition. Contact Joe Coursen (912) 386-3416. 7-75-1t

USED MONOCHROME and small amount of color television equipment for sale. List available. Write R. Moffat, Mid-Florida Television Corp., Box 6103-C, Orlando, Florida 32803. 7-75-1t

SPARTA BAWER Model 701 - 10,000 Watts AM Transmitter, High Performance Modulator. One year of use, like new. Frequency 1500 KHz - F.O.B. Burbank, California. Electronica Archiga, S.A., 316 Hidalgo St., La Paz, Baja Calif., Mexico - Contact Mr. Acuna - Phone: 2-06-00. 7-75-1t

745' STAINLESS G-5 TOWER, in service, \$17,000 - cash or trade. 880' 6-1/8" transmission line, \$12,000. Write WXON-TV, Box 2020, Southfield, Michigan, 48075 or call 313-355-2901. 7-75-2t

FOR SALE, Television Equipment: 2 - newly refurbished, RCA low-band headwheel panels. Make offer. George Woody, 218-727-6864. 7-75-1t

COMPLETE TV STATION: Channel 12, High Power TV Transmitter plant including 1400 ft. tower, 35 kw GE transmitter. RCA Travelling Wave Antenna and Radomes, input and monitoring equipment, etc., etc. For Sale in place but must be relocated. Now operating in the U.S. ADDRESS ALL ENQUIRIES TO: Mr. D. L. George, Imagineering Limited, 83 Barber Greene Road, Don Mills, Ontario, M3C 2A2, Telephone (416) 446-5432. 7-75-1t

CCA—AM 250-D transmitter. Excellent condition. On air now as auxilliary. \$2900.00. LaVern Garton, 714-885-6555. 7-75-5t

2 TTV12A's Channel 22 with Filter Plexer; other equipment; 400 ft. 31/8 coax. Priced to sell. L. Levine, 1212 Kirkwood Drive, Ft. Collins, Colo. 303-493-6458. 7-75-1t

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FOR SALE: Heliac-Cable HJ-7-50 1-5/8 inch. Used four months. Due to antenna conversion, over 300 feet on reel ready for shipment. Price \$3.00 FOB. Contact Bill Pruden, P.O. Box 1076, Roanoke Rapids, N.C. Telephone (919) 537-1023. 7-75-1t

FOR SALE: Two Microwave Associates MA2A microwave units: 2 model 8562 transmitters and 2 model 8563 receivers excellent condition. Frequency 2033.5. Also 2 8-foot Marks mesh dishes 2 GHZ. Will sell all \$11,000 or best. Guaranteed excellent condition. Contact Len Gawrych, West Indies Television, Box 5, Christiansted, St. Croix or call (809) 773-2739. Also, COLLINS, SSM-107 Microwave STL link with 120' Andrew Elliptical waveguide connectors and Andrew dishes. All new, crated and unused. 11GHZ, 24 volt system, all rack mounted. \$15,000 or best offer. Valid reasons for disposal. 7-75-2t

FOR SALE: RCA TR-708 highband video tape machine—good condition—loaded cavec, DOC, editor, TEP, RCO, 3 heads \$55K. Contact Don Hain, WQLN-TV, 8425 Peach St., Erie, Pa. 16509, or 814-868-4654. 7-75-1t

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HELP WANTED

MOVE UP from your present job in broadcast engineering. We handle all engineering jobs and openings coast to coast. Send full resume confidentially now. The AMPS Agency, 6331 Hollywood Blvd., Suite 623. Los Angeles, Calif. 90028. Tel: (213) 462-7301. 8-73-tf

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 Ave., Gainesville, Fla. 32601. Phone 904/378-1581.

VIDEO TAPE EDITOR/ENGINEER: Midwest teleproduction facility needs top notch video tape editor. Must be experienced in time code editing techniques. Send resume and salary requirements to: Broadcast Engineering, Dept. 327, 1014 Wyandotte St., Kansas City, Mo. 64105. 6-75-2t

OPPORTUNITY for talented, ambitious broadcast engineer with computer programming skills to work in expansion of large Statewide Television system, remote controlled transmitters using computer techniques, extensive microwave expansion. Excellent challenge. Paid hospitalization, 3 weeks vacation plus 12 holidays per year. Salary range \$9,000 to \$12,000. An equal opportunity employer. Send detailed resume to Gerald H. Warr, Transmission Engineer, P.O. Drawer L, Columbia, S.C. 29250. 6-75-2t

WANTED: Committed Christian television engineer qualified in VTR, color camera and microwave maintenance for studio and remote truck operations. Christian production center in southeast. Salary commensurate with experience and ability. Send resume to P.O. Box 25328, Charlotte, North Carolina 28212. 6-75-2t

CHIEF ENGINEER needed to work with new ownership of KSEL AM/FM radio Lubbock, Texas. Excellent opportunity for a person with responsible record of technical directional experience. Must understand value of production sophistication as well as transmitters. Stations will move to new studios and offices. Career security with 50 year old EOE company of broadcast integrity. John Kreiger, President. 806/745-2828. 7-75-1t

BROADCAST ENGINEER. Wanted for modern AM, FM stereo, full color VHF TV. Must be capable of moving into assistant chief engineer's position and assume many department responsibilities. First phone required along with three years minimum in broadcasting. Solid technical ability and maintenance experience a must. Good opportunity. Send resume, photo and salary requirements to Director of Engineering, Kuam, P.O. Box 368, Agana, Guam 96910. 7-75-1t

HELP WANTED (CONT.)

FIELD ENGINEER—RUPERT NEVE INCORPORATED, a world leader in professional audio control equipment for the Broadcasting, Music Recording and Film Industries, requires a field engineer to locate in Bethel, Connecticut. The person we need will be required to travel within North America to commission equipment and also be responsible for the maintenance of equipment at Neve headquarters, as well as providing complete customer service. The successful candidate should have experience in the audio industry and be thoroughly conversant with state-of-the-art audio experiences. Must be first class trouble-shooter. Qualified applicants are invited to submit their resumes including salary history to: Rupert Neve Incorporated, Berkshire Industrial Park, Bethel, Conn. 06801, Attn: D. C. Neve. All replies will be acknowledged and held in strict confidence. 7-75-1t

TV-TECHNICAL/HELP WANTED: Chief Engineer of top 10 UHF needs maintenance engineer. Must be a "working" engineer capable of studio and transmitter maintenance. Should be knowledgeable on live cameras and film chains. Good salary and fringes offered. Equal Opportunity Employer. Write: Broadcast Engineering, Dept. 328, 1014 Wyandotte Street, Kansas City, Mo. 64105. 7-75-2t

TELEVISION CIRCUIT DESIGNER: Thomson-CSF Laboratories, Inc., manufacturer of television broadcast equipment, has an immediate opening for a senior level Electrical Engineer experienced in the design of color television cameras or related broadcast equipment. Strong capability in circuit design and B.E.E. degree are required. Send resume to Thomas W. Schwartz, Director of Personnel, Thomson-CSF Laboratories, Inc., 37 Brownhouse Road, Stamford, Connecticut 06902. 7-75-1t

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BROADCAST ENDORSEMENT and third phone preparation on cassettes. Illustration book includes current FCC-type exams. Radio License Preparation, 1060D Duncan, Manhattan Beach, Calif. 90266. 8-74-tf

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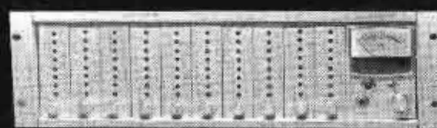
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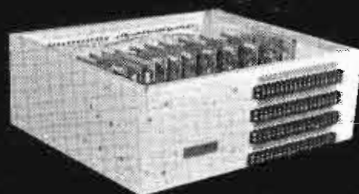
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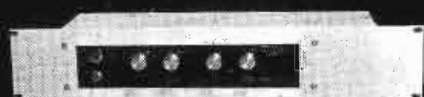
**MIC & LINE
AMPLIFIERS**



AUDIO DISTRIBUTION AMPLIFIERS



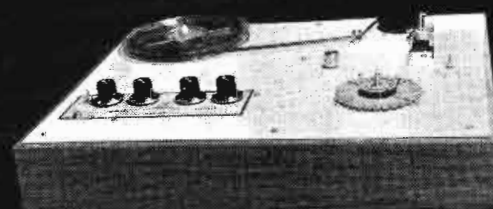
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Preamps costing almost 3 times more will not compare with these units. RIAA/NAB equalized ± 1 db, 0.5MV sensitivity at 1KHz for +4dbm out, balanced outputs, -75db s/n at 10mv in, 0.05% distortion, +21dbm max. out. Internal power supply.

MP-8E Mono \$86 SP-8E Stereo \$137

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Dual function and superb performance. Inputs for mic and line, ± 0.5 db response 10Hz-20KHz, 67db gain on mic channel(s) +26db gain on line inputs. Balanced inputs & outputs, +21dbm out max, 0.1% distortion. Internal power supply.

MLA-1E Mono \$98

MLA-2E Dual Mono/Stereo \$139

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From 1 in/6 out to 20 in/80 out in one small package. Whatever your distribution requirements we have an answer. All units meet or exceed the following specifications: Balanced bridging/matching inputs, balanced 600ohm outputs, ± 0.5 db response 10Hz-20KHz, ± 3 db 5Hz-40KHz, 26db gain, +21dbm out. max. capability, 0.1% or less distortion, outputs isolated by 80db, hum and noise 90db down referenced to +21dbm out. Internal power supplies.

DA-6/E	Table top. 1 in/6 out.	\$131
DA-6R/E	Rack mount. 1 in/6 out.	\$149
DA-6BR/E	Rack mount. 1 in/6 out. Individual level controls for each output.	\$165
DA-6RS/E	Rack mount. 1 in/6 out stereo or 2 in/12 out mono.	\$229
DA-16BR/E	Rack mount. 1 in/8 out stereo or 2 in/16 out mono. Individual output level controls, selectable metering & headphone monitoring.	\$287
DA-2080/E	Rack mount main frame with protected	

power supply, metering & headphone monitor. Will accept up to 10 slide in modules. Each module has 2 inputs & 8 outputs. Individual output level controls & selectable meter switch. Up to 20 in/80 out.

DA-2080/E	Main Frame	\$150
DA-2080/E	Modules 2 in/8 out	\$135 ea.

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Our new series 35 audio controller introduces a new concept in audio mixing. Allows separation of controls from the audio functions. Controls can be placed in any convenient location in the studio, while electronics may be mounted anywhere for easy maintenance & hookup. Remote DC control for completely unaffected audio.

This versatility gives you a custom designed console at a standard production model cost.

Features include; 8 channels, mono, dual channel mono, stereo, dual channel stereo, or combinations; paralleling 2 units for quad, fail safe power supply & plug in interchangeable cards.

Performance specifications are; 0.3% or less distortion, 124dbm equivalent noise on low level channels, approximately 25w power consumption, -70db crosstalk, balanced bridging/matching inputs & response within ± 2 db 20Hz-20KHz. Series 35 audio controllers start at \$1200.

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So easy to use & accurate that our largest winder competitor has been using one of these to load their own carts.

Eliminates guesswork. Set the dials to the length desired. The exact amount of tape is fed onto the cart or cassette hub and then shuts off automatically. Also has exclusive torque control for proper tape pack on different size hubs. Winds at 30 IPS.

ACL-25/E	\$185
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Winders also come in higher speed models (ACL-60 series). Same operation as above but winds at 60 IPS. Accepts 14" pancakes.

ACL-60T/E	(tone stop only)	\$266
ACL-60B/E	(Blank tape loader)	\$331
ACL-60BT/E	(for both prerecorded and blank tape)	\$375

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Exceptional reproduction! Internal muting. ± 2 db response from 20Hz-40KHz. 25w music power, 20w RMS into 8 ohms. Hum & noise 65db below rated outputs.

Distortion less than 0.25% at less than 20w out, 1% or less at 20w. Works into 4-16ohms. Balanced bridging inputs, variable bass contour, internal overload & short circuit protection.

SMA-50/E	Table top (mono)	\$125
SMA-500/E	Rack mount (mono)	\$142
SMA-1000/E	Rack mount (stereo-40w)	\$196

REMOTE POWER CONTROLLERS (DUAL)

Safe, transient free means of controlling 110V/AC. Turntables, on the air lights, etc.

PR-2	(toggle switch on/off)	\$39
PR-2B	(momentary contact actuation)	\$54

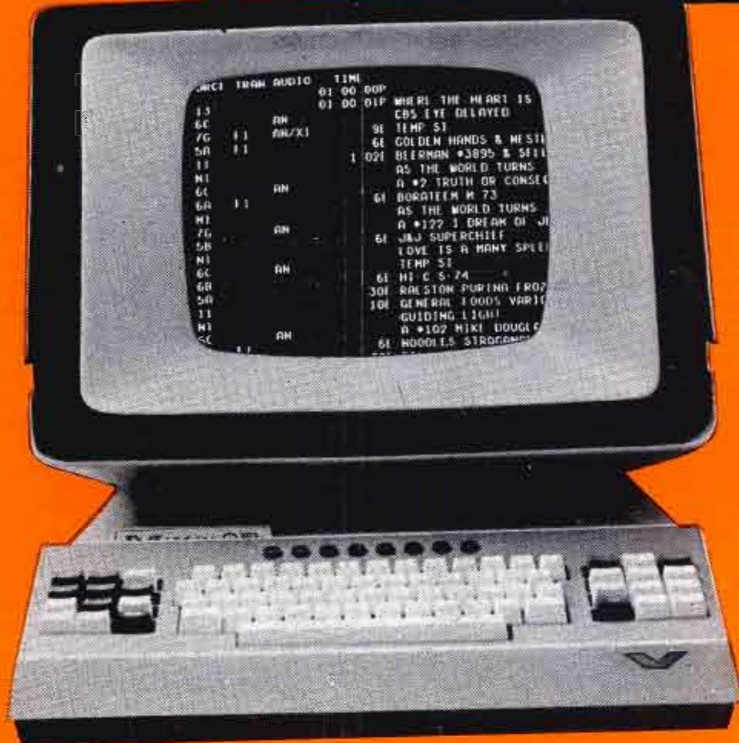
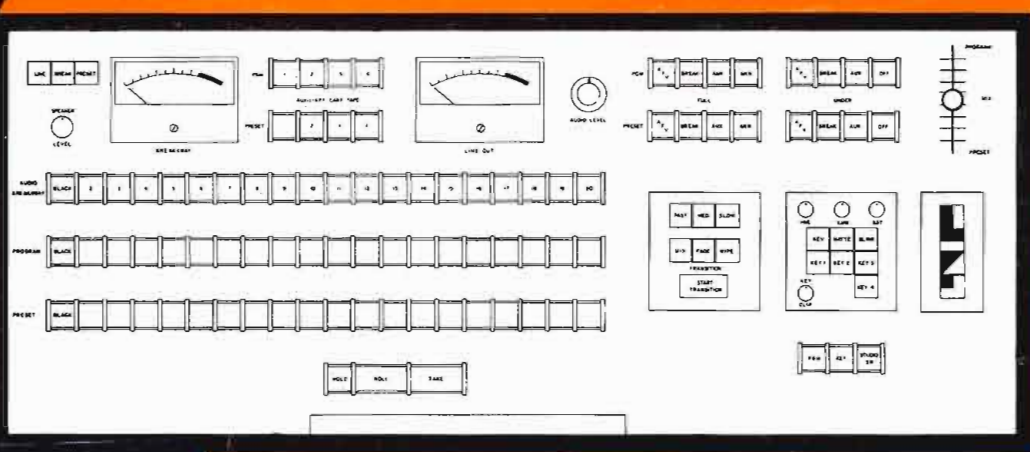
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