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June, 1974/75 cents

News lighting techniques page 20

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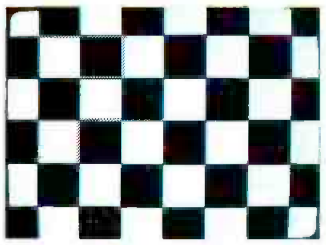

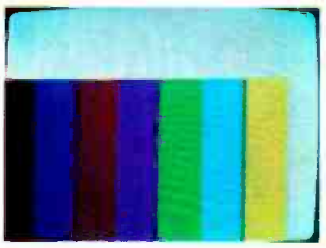

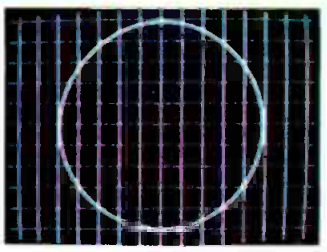

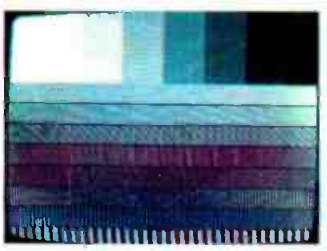

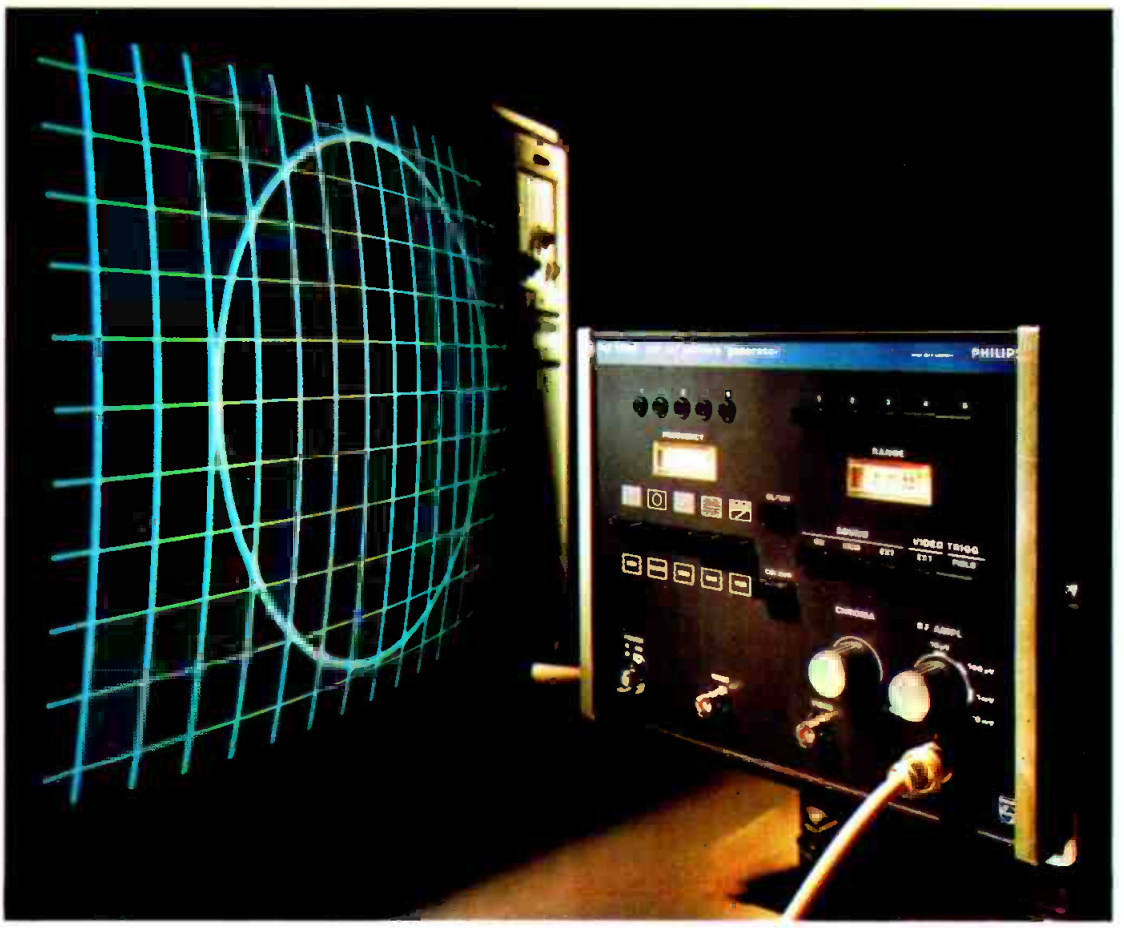

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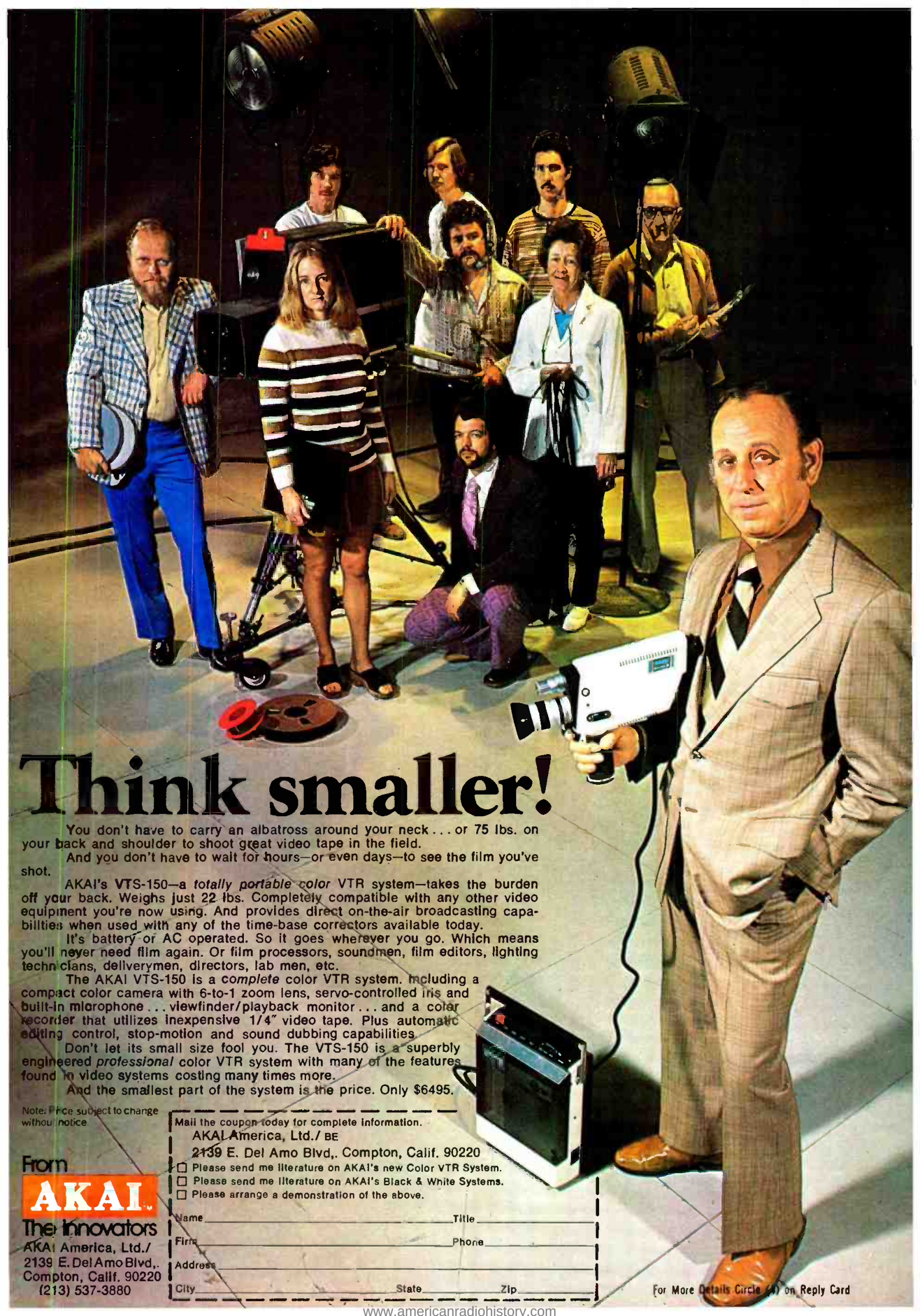

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June, 1974 • Volume 16, No. 6

BROADCAST ENGINEERING

The technical journal of the broadcast-communications industry

in this issue...

About The Cover

This month's cover shot was taken at WCVB-TV in Boston. Our lead TV article this month is by a network lighting director. See page 20 for news set tips. (Photo courtesy of Philips Broadcast Equipment Corp.)

Departments

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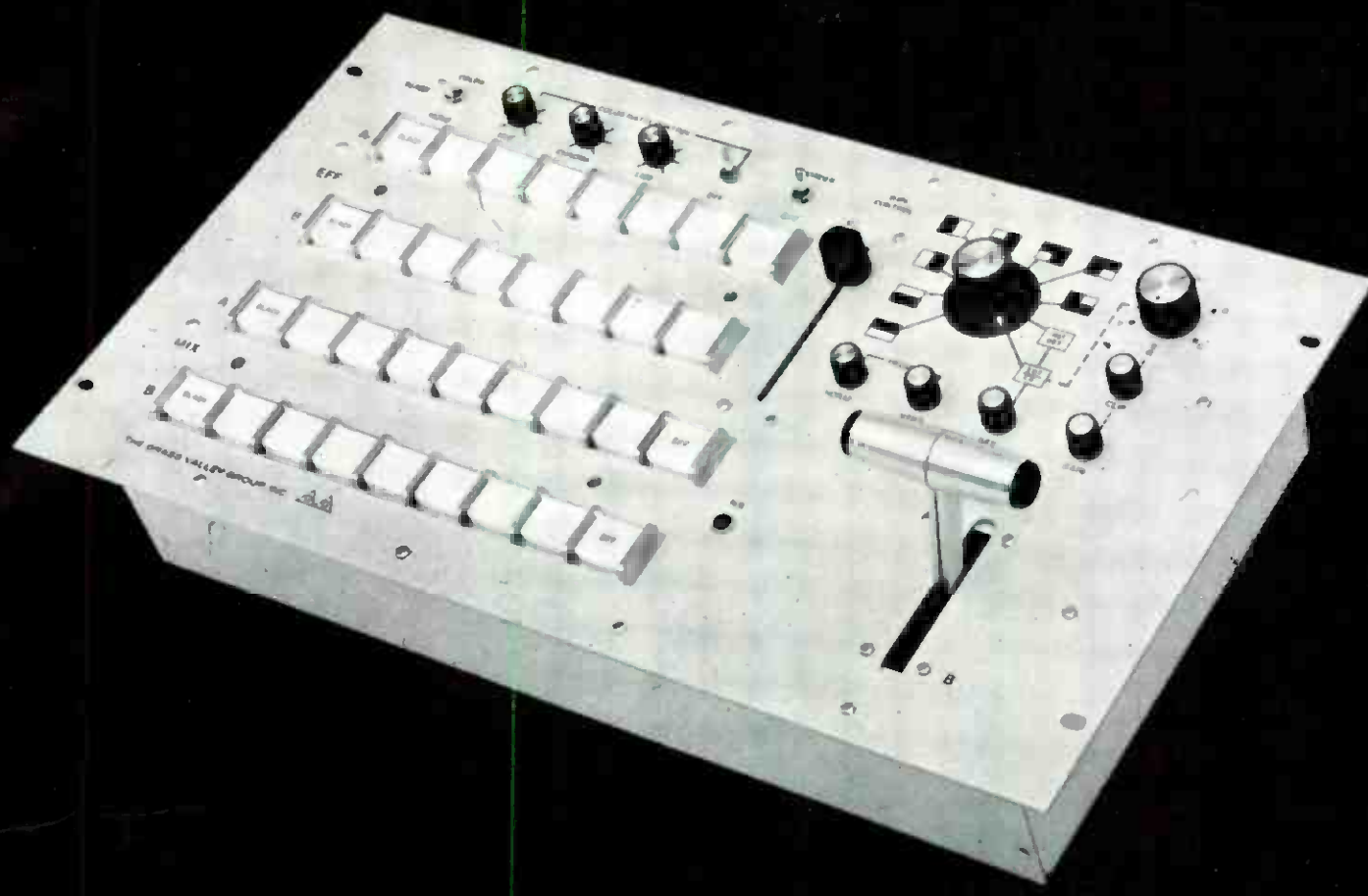

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June, 1974

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DIRECT CURRENT FROM D. C.

June, 1974

by Howard T. Head

Cable Systems Get Relief

The Commission continues to grant an increasing degree of relief from restrictions on cable carriage and other requirements. The cable rules have been amended to exempt small cable systems (those with less than 500 subscribers) from the network program exclusivity rules, and has invited comments on a proposal which would extend this exemption to all cable systems. In addition, the Commission has also proposed to amend the cable rules to permit unlimited importation of late night programming during periods when stations required to be carried on the system are off the air.

The Commission is also reviewing the requirement that systems having more than 3,500 subscribers originate something more than automated programming. Although the Rules require such origination, the Rule has been held in abeyance although a Supreme Court Decision upheld the Commission's authority to impose the requirement. The Commission notes that some 800 systems currently provide such origination, and expresses the hope that in spite of current adverse conditions cable operators will move toward the Commission's goal of making cable systems into outlets of local self-expression.

New Educational FM Rules Go Into Effect

The Commission has adopted new Rules reflecting the agreement with Mexico providing for educational FM channel assignments within 200 miles of the Mexican border. At the same time, the Commission has proposed mileage separation rules in the border area to govern channel allocations in this area.

The new rules are in essence the same as those applied for commercial FM stations and reflect the new agreement with Mexico. Although the proposed rules are intended to apply only in the border area, it should not be long before a similar proposal is made for the rest of the country.

In Alaska, where FM allocations are somewhat different from the rest of the continental United States, the Commission has authorized an educational FM station on Channel 261. Although it is to be operated by the United States Bureau of Indian Affairs, the Commission expresses the hope that its operation will eventually be taken over by some private, state or local entity.

Canada's DOC Concerned About Cable Leakage

Canada's Department of Commerce (DOC), which controls the technical regulation of cable systems in that country, has severely restricted the use of cable channels in the midband (88-174 MHz). The reason for DOC's concern has been the fear that cable radiation leakage

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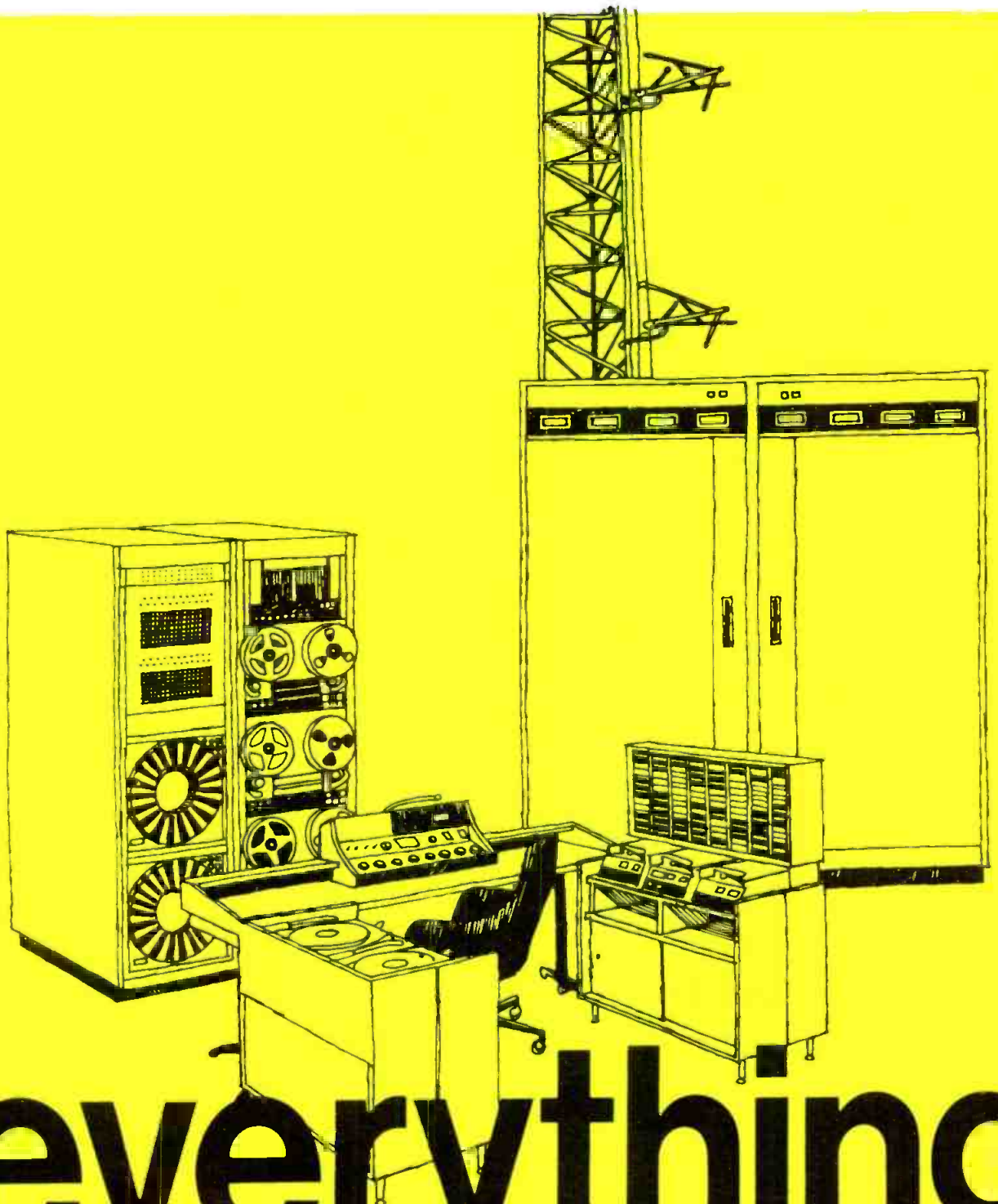

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on some of these channels, especially the lower channels in the group, might interfere with air navigation facilities which operate in the same bands. Tests have been conducted in Canada, and are being conducted in this country by the Department of Commerce, to determine the extent of risk involved in leakage on these frequencies from cable systems. Test data at this point are inconclusive, but there is some reason to believe that the DOC restriction represents excessive caution.

AM - FM Non-Duplication Rules Proposed To Be Changed

The Commission Rules now require that combination AM-FM stations in cities with a population greater than 100,000 engage in no more than 50 percent program duplication. Although a few exceptions were granted shortly after the adoption of the rule, it is now being generally applied and enforced.

The Commission has now proposed to apply the Rule to all cities regardless of population. The number of FM stations has doubled in the last ten years and for the first time in the history of FM radio, revenues are significant. In addition, the Commission proposes to prohibit all duplication in cities over 100,000 population except for news and public affairs programs.

FCC Correction For Measuring and Monitoring article in March issue of BE. FCC's John Taff explains that when the rule change was adopted, there was a change for TV frequency measurements. John's update is that 40-day measurement standard adopted for AM and FM was also adopted for TV stations, as the published rules will show.

Short Circuits

A Michigan U.S. District Court has sentenced a CB violator to 9½ years in prison for CB violations including counterfeiting CB licenses....The Commission has completed its reallocation of the frequency space previously occupied by television channels 70-83; translators may continue to operate on a non-interference basis... The New York City television stations have been authorized to relocate from the Empire State Building to the World Trade Center, although with the condition that the old facilities be maintained until comparative tests of signal quality can be made...The Commission has proposed to "drop in" television channel 6 at Mountain View, Arkansas, without the customary off-set carrier protection.... The Commission continues to deny requests for processing new AM applications where the eligibility rules are not met....An FM booster station has been authorized in Los Angeles in a shadowed area outside the station's 1 mV/m contour....The Commission's "Fairness Bureau" has ruled that a New York City television station was within its rights in side-stepping a controversy as to whether the Jewish Passover service is realted to Christian communion.

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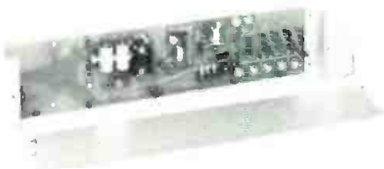
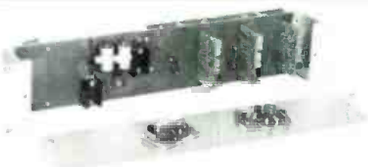
MODEL 811 COLOR SYNC GEN		EIA Specifications Totally Digital Proportional Oven	$625
MODEL 701–702 VDA – PDA		4 Modules Per Frame Looping Input Dual Outputs	$480 (Frame + 4 DA's)
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INDUSTRY NEWS

Rulemaking Proposed For AM-FM Duplication

Amendment of Section 73.242 of the rules to further limit the amount of AM station programming that may be duplicated by a commonly owned FM station in the same local area has been proposed by the Commission in a rulemaking notice.

In a Report and Order, 45 FCC 1515 (1964), the Commission adopted the present Section 73.242 limiting to 50% the amount of AM programming that a commonly owned FM station might duplicate if the FM station is located in a community of over 100,000 population. Duplication was defined to include the 24-hour periods before and after AM broadcast as well as the simultaneous duplication with computation being on an "average week" basis. The rule was not limited to cases where the AM and FM stations were licensed to the same city, so long as they were in the same local area. When it adopted the cut-off of 100,000 population, the Commission said that most channels assigned to communities of such size or greater were or soon would be in use.

Now there have been multiple filings for FM channels in communities even under 10,000, with few channels available to places of 25,000 and virtually none to ones over 50,000. The Commission also pointed out that in the last 10 years the number of independent FM stations has doubled, average revenues per independent FM station have almost quadrupled and their total revenues have increased seven fold. It also noted that the percentage of independent FM stations making a profit has climbed significantly and that FM set penetration has increased swiftly. To consider what needs to be done to properly reflect current circumstances the Commission proposed a change in the cut-off to apply the present 50% rule to communities below 100,000. **For stations in communities of over 100,000 population the Commission proposed a strengthening of the rule to prohibit all duplication except for news and public affairs.**

The Commission noted that while for the purpose of inviting comments it had used population or duplication percentage limits, commenting parties need not restrict themselves to these figures and were welcome to suggest others or even other methods that are not based on population and indicate their reasons why.

It also wished parties to consider a possible rule which would encourage extended hours of broadcasting by not counting the period of midnight to 6:00 a.m. in computing the amount of non-duplication required.

Comments are due by July 25, 1974, and reply comments by August 26, 1974.

ADC Contract Award

It was announced recently that American Data Corporation, an Airpax Company, has been awarded a $153,700 contract by the Greater Washington Educational Telecommunications Association, Inc. (WETA-TV), Washington D.C., for a 40 x 60 video/audio routing system. The system will utilize approximately 2700 of a state-of-the-art integrated audio/video switch circuits designed by ADC and manufactured by the Airpax Seminole Division in Fort Lauderdale, Florida.

The system to be supplied under this contract will be housed in only two standard relay racks, reducing the normal system size by a factor of two. Technical specifications for the system will exceed those normally required for the most sophisticated broadcast television systems.

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Industrial Television Meet Tunes In To Macdonald

The International Industrial Television Association (ITVA) drew a record number of industrial and private television users at its sixth annual meeting in Chicago. The attendees heard keynote speaker Congressman Torbert H. Macdonald (D-Mass.) call for a permanent, closed-circuit color television installation in the U.S. House of Representatives. Such a system, he said, would greatly assist Congressmen in keeping up with floor activities while attacking "the mounting pile of work" in their offices.

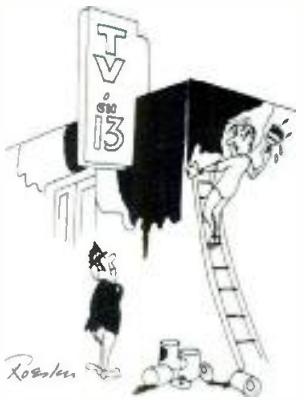
"Today, a Congressman must make a choice between working in his office or going to the floor, a mutually exclusive choice. If we take one, the other suffers. We must be on hand to vote on a broad variety of issues, and it's frustrating not to be familiar with all of them—but it's also patently impossible under the current operation," Macdonald said.

The Congressman also suggested installing television in the Congressional committee hearing rooms to make it easier for the Congressmen to keep up with what is happening, through multi-channel monitors, in each committee's daily activities. He also forsees such a video system feeding the commercial television networks when significant debates and votes take place.

New NCTA Head

Bruce E. Lovett was elected national chairman of the National Cable Television Association by the NCTA Board of Directors at their meeting in Coronado, California. The new slate of officers—Lovett, Vice Chairman-elect Rex A. Bradley, Secretary-elect Charles R. Henry and Treasurer-elect J. Orrin Marlowe—began their one-year terms at the 23rd annual NCTA convention in Chicago.

National Chairman-elect Lovett serves as vice president, corporate development of American Television and Communications (ATC) of Denver, Colorado. He is based in the Washington, D.C. corporate office. Lovett, an NCTA director since 1970, is presently the vice chairman of NCTA and chairman of the NCTA subscription cablecasting committee. He is a member of the Association's executive, pole line negotiating and satellite committees and is past chairman of the legislative committee.



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MST Opposes Short-Spaced VHF Stations

Lester W. Lindow, Executive Director of the Association of Maximum Service Telecasters, Inc., has severely criticized the proposal of the United Church of Christ and others to add up to 62 short-spaced VHF stations in the top-100 markets.

In November MST released a preliminary study of a similar OTP proposal which showed that it would not even meet OTP's unwarranted assumptions as to reduced mileage separations and otherwise would not be feasible from an engineering point of view.

Lindow also emphasized that the proposal would not impair or cripple UHF television — which is the single best hope for greater broadcast diversity, more educational stations, and a fourth commercial network — and would reduce VHF and UHF service to rural America and many medium-sized and smaller communities.

City CATV Ties

A bill authorizing Arizona cities and counties to enter into contracts with CATV companies and be responsible for regulating their operations was signed into law recently, according to Bruce Merrill, Arizona Cable Television Association president.

The law, which was introduced by the Senate State, County and Municipal Affairs Committee chairman Scott Alexander, was the result of a cooperative effort by the ACTA and the Arizona League of Cities and Towns.

Another bill, introduced in Alexander's committee, setting up a regulatory authority under the State Corporation Commission was defeated. The new law, which effectively resulted in a two-tier regulation in Arizona, passed the House without opposition and will become effective in 90 days. It was signed into law by Secretary of State Wesley Bolin, culminating a six-year legislative effort by ACTA members.

Pioneer Award To Reinsch

J. Leonard Reinsch, chairman of Atlanta-based Cox Cable Communications, Inc., has been inducted into the "CATV Pioneers". The organization honors those persons who have participated in the cable television industry at least 10 years, exerting significant, beneficial influence.

Reinsch became interested in the development of cable television in the early fifties. As president of Cox Broadcasting Corporation, he was one of the first broadcasters to embrace the fledgling cable television industry.

Reinsch served as president of Cox Broadcasting Corporation until his retirement in December, 1973. He has continued as chairman of Cox Cable Communications, Inc., a 56.2 percent-owned affiliate. Cox Cable operates 34 systems serving more than 314,400 subscribers.

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SBE Chapters Look Ahead

Brian Bailey of the engineering staff of the Public Broadcasting Service, Washington, D.C. watches a signal received via satellite at New Jersey Public Broadcasting's broadcast center in Trenton. Bailey, who supervises operation of the satellite's mobile ground terminal, visited Jerseyvision where the terminal was tested.

The ground terminal, a 32-foot dish-shaped antenna mounted on a mobile van receives television signals from the Canadian television satellite Anik 1. The ground terminal has been leased by PBS from Teleprompter Corporation with funding assistance from the Corporation for Public Broadcasting. Public Broadcasting is investigating satellite distribution as a possible alternative method of interconnection for the 244 PBS member stations.

The system was demonstrated to members and guests of the Society of Broadcast Engineers at their monthly meeting of March 13th at the Studios of PBS Station WNJT TV.

Reports on SBE chapter meetings and announcements of future events will be published in these pages monthly. It is important that chapters send information on meetings and other news promptly. Include photographs whenever available; preferred photo size is 8 x 10, but smaller sizes are also usable.

The deadline for submitting copy to the SBE editor is the 25th of the 2nd month preceding publication. For example, the date by when copy must be in the hands of the SBE editor for the August, 1974 issue is June 25th; and for publication in the September, 1974 issue, the deadline is July 25th, and so on.

Letters to the SBE Editor are encouraged. Send all copy for

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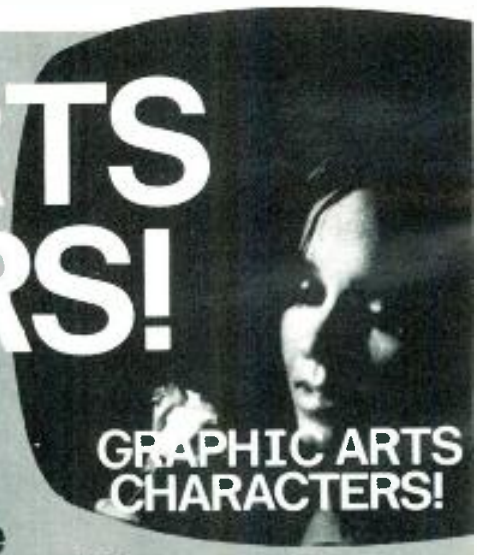

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This Is Your Journal

Through these pages, provided through the courtesy of the publisher of **BROADCAST ENGINEERING** magazine, members of the SBE may communicate with each other. Also, SBE headquarters can pass along information to the general membership and to other potentially interested and affected persons in the field of broadcast engineering. SBE chapters can report and announce information concerning their meetings or other activities; and we can air issues of vital concern to all those who are employed in any way in the field of broadcast engineering.

A means of communication is vital to any organization. Let's realize the potential of this unusual opportunity which is now available to us.

Some requests to members: When corresponding with the national SBE office, be sure to use your membership number. The national office is operated by Virginia Doss, assistant secretary-treasurer of the SBE. The mailing address is P.O. Box 88123, Indianapolis, Ind. 46202. If you change your address, notify Virginia as soon as possible. Tie tacks identifying you as an SBE member are available from Virginia for $3.50.

SBE members are urged to write articles for publication in **Broadcast Engineering.** If the article is accepted by both the SBE editor and the editor of **BE,** the article will be identified with the SBE logo and, in addition, the author will be eligible for payment for the article.

Whether the article is paid for, and the amount of the fee, are entirely the decision of the publisher of **BE.** Authoring an article is on of the most effective roads to advancement and professional recognition.

Chapters In The Making

Locations for possible future chapters are listed below. Information on planned meetings may be obtained from the contact listed in each case. Persons interested in

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development of chapters in other locations, contact Ms. Virginia Doss, assistant secretary-treasurer, SBE, P.O. Box 88123, Indianapolis, Ind. 46208. In some cases, an SBE officer or director might be available to attend an organizational meeting and explain benefits of SBE membership and chapter participation. Such special arrangements can be looked into through SBE President James C. Wulliman, Manager Engineering, WTMJ-TV, 720 East Capitol Drive, Milwaukee, Wisconsin. For help in promoting a new chapter, also keep the SBE Journal Editor posted.

Chapter Reports

Chapter 1: Binghamton, N. Y.
Chairman: Douglas S. Colborn
Horseheads, N.Y. 14845

In spite of most hazardous weather conditions, several members met at the Owego Treadway Inn, Owego, N.Y. on April 9th. A general discussion was held on operation of the chapter, the Mini-Vention which was again being planned by Larry Taylor for all-day October 11th at the Treadway Inn, and the upcoming Joint-Meeting with the Syracuse and Scranton/Wilkes-Barre chapters (at the Owego Treadway) on May 14th (6:30 PM dinner, 8:00 PM meeting).

Chapter 2: Northeastern Pa.
Chairman: Paul Evanosky
Pittston, Pa. 18640

Members met April 26th at the studios of WVIA to discuss general topics relating the operation of the chapter, future meetings, and the upcoming Annual Ladies Night to be held the Saturday preceding Mothers Day at Irem Temple Country Club, Dallas, Pa. This includes a business session, dinner and favors, refreshments, and dancing.

Chapter 9: Phoenix Ariz.
Chairman: Leon Anglin
Phoenix, Arizona 85001

The February meeting, held in Tucson, was a joint meeting with Chapter 32, at Furr's Recording Studio whose facilities include the very latest in recording equipment. Car-pooling helped to combat the gasoline crisis. The March 21st meeting included election of officers. Results were: Chairman, Leon Anglin, KTAR; Vice

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Chairman/Program Chairman, Early Mehaffey, KTVK; Secretary-Treasurer, Bob Golder, KTAR. The technical portion of the meeting featured Dr. Joe Palais, professor of electrical engineering at Arizona State University who spoke on laser communications and demonstrated holography. A tour of the new KAET TV facilities followed.

Chapter 11: Boston, Mass.
Chairman Ross Kauffman
Needham, Mass. 02194

The March 26th meeting, Mike Goldberg, vice-chairman presiding, held at WGBH-TV, included a discussion on the possibility of holding a "Mini-Vention" in the near future. The guest speaker was John Ball of the Public Broadcasting System who gave a talk on the status and future of satellite receiving stations. A complete satellite system was set up outside the WGBH-TV studios and Ball demonstrated how the present system was developed.

Chapter 15: New York, N.Y.
Chairman: John M. Lyons
Woodside, N.Y. 11377

A 6 PM dinner in the **New York Times** cafeteria, open to all members and guests at every meeting, was followed by the 7:30 PM meeting on April 11th in the WQXR Presentation studios, 9th floor, 229 West 43rd St. Edward Mullin, Director of Engineering, Ampro Corporation, spoke on New Developments in Cartridge Tape Design, centering his talk around Ampro's newest cartridge tape line, with emphasis on reliability. Congratulations were extended to John Lyons and Ed Karl on their election as national SBE Directors, and to Leo Reetz and Orville Sather for their nomination and election as Fellows in the SBE.

Chapter 16: Seattle, Wash.
Chairman: John Maxson
Issaquah, Wash. 98027

On April 10th, members and guests met at the Norselander Restaurant, 300 3rd Avenue, West, to hear informal reports from those who attended the SBE Annual Meeting and the NAB Convention in Houston on the latest technological advancements in broadcasting equipment. Nominations were opened for election of chapter officers for the coming year.

Chapter 18: Philadelphia, Pa.
Chairman: Larry Will
Trenton, N.J. 08638

The March meeting of the chapter was held at the studios of WNJT, Trenton, N.J. on March 13th. Brian Bailey of the PBS engineering staff demonstrated a 32 ft. transportable satellite terminal similar to the type PBS is planning to use domestically starting in 1976. The satellite terminal assembly and disassembly was completed in conjunction with WNJT engineering personnel and was trained on the Anik K and II satellites. Two English and one French CBC TV network signals along with the CBC radio signal were received loud and clear in Trenton. During the three day test, picture and sound quality exceeded that normally received on the terrestial network. The terminal is on nationwide tour of PBS member stations. The April meeting, held at Williamson's Restaurant, Presidential Apartments, with 6 PM bar courtesy of Kass Electronics, 7 PM veal cutlet dinner, and 8 PM meeting, featured a presentation by RCA and Kass Electronics on How to Get the Most From Your Film Camera Equipment by the Proper Use of Vidicons.

Chapter 20: Pittsburgh, Pa.
Chairman: Henry R. Kaiser,
Pittsburgh, Pa. 15212

On April 18th at Buddies Restaurant, Upstairs, 439 Market St., a 12-noon lunch was followed by a demonstration on Compact-Portable Digital Multimeter and other Test Gear, by Earl M. Crawford, sales engineer for WKM Associates, a Pittsburgh representative for electronics manufacturers.

Chapter 21: Spokane, Wash
Chairman: T. O. Jorgenson
Spokane, Wash. 99201

The chapter met on March 11th for its weekly meeting at the Castle Restaurant for lunch. Following that, there was a general discussion on the advisability of holding an evening meeting at some future date. Also, there was an open discussion on

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diesel engine and alterator power ratings. Chairman Jorgenson announced that Mr. Bondurant of the University of Idaho had applied for senior membership and urged others eligible to do so also.

Chapter 22: Central New York
Chairman: M. Miller
Syracuse, N.Y.

The March 21st meeting was held at the Headend, Syracuse Newchannels, Fayetteville, N. Y. and was presided over by Gary Hartman, chapter vice chairman. The technical session was conducted by Joe Majczak, Newchannels Chief Engineer. He was assisted by Doug Smith, Syracuse chief technician; they explained the complete system, answered questions from the floor, then provided a tour of the facilities. The April 18th meeting took place at the Northway Inn, Syracuse and centered around Telemet's new solid-state sideband analyzer, Model 3706 which features a 50 dB dynamic display and signal channel, crystal-controlled, plug-in tuner. Bob Griffiths of Telemet supported the presentation with slides plus having an actual unit on hand.

Chapter 25: Indianapolis, Ind.
Chairman: Don Morgan
Indianapolis, Ind. 46217

On April 16th a 6 PM dinner at Howard Johnson's was followed by a technical and business session at 8 PM at the studios of WRTV. The guest speaker was Harold Ennes, well-known author of a number of broadcast-related technical books and many articles. Ennes spoke on "Technical Writing". Results of the election were announced as follows: Chairman, Don Morgan; Vice Chairman, Dwight McPherson; Secretary-Treasurer, Odes Robinson, Jr. Appointed as Program Chairman was Bob Wyckoff, and Co-Chairman, John Guion.

Chapter 26: Chicago, Ill.
Chairman: Bradley Anderson
Chicago, Ill. 60680

The March 28th meeting, held at the University of Illinois Medical Center TV Studio, included a program by Ed Dervishian of Motorola, assisted by Ed Freeman, design engineer for Motorola. They spoke on an optical video link which uses a solid-state infra-red beam to transmit video over a 1000 ft. path, and also demonstrated the link using the actual equipment. Sustaining members of the Chicago chapter are Rich Electronics, Mike Dyer Distributor, Telemation Productions, and Swiderski Electronics. Assistance is also provided by A B E Credit Union and A B C. The April 25th meeting was held at WFLD Studios, Marina City. Tektronix sales engineer Bob Seaberg presented a program on the VIR Signal.

Chapter 28: Milwaukee, Wisc.
Chairman: Ed Wille
Waukesha, Wisconsin 53186

On April 30th, at Radio City Auditorium, WTMJ, Inc., Robert W. Seaberg, Field Engineer, TV Products, Tektronix, Inc., provided a program, "New Equipment Demonstration", in 2 parts. Part 1 included a coverage of the Tektronix Model 1440 Automatic Video Corrector and the Model 1441 Vertical Interval Reference Signal Inserter. Part 2 was a demonstration of the Model 7412 Spectrum Analyzer. Signals of local stations were observed and the engineers associated with those stations had the opportunity to look at their own signals, and observe bandwidth and spurious emissions. Chairman Ed Wille new owner and president of Ken-Com Engineering, was congratulated by the membership.

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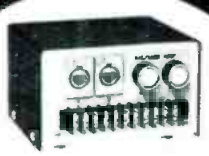

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Chapter 32: Tucson, Arizona
Chairman: Hobart J. Paine
Tucson, Ariz. 85717

At the meeting of March 26th, at the Straw Hat Pizza Palace, Charles Newcommer of RCA, an application engineer, presented a seminar on Vidicon Camera Tubes including the electronic lens method of beam focus and electrode voltages and dark current requirements. Literature on RCA vidicons was distributed. Later, the RCA representatives accepted the invitation of Rich Heatlyto KZAZ-TV to check out general alignment and dark current on the KZAZ TK-27 camera. Ten SBE members accompanied the group to view the check-out procedure. On April 25th, Bill Montgomery of Tektronix demonstrated the Tektronix 1440 Automatic Video Corrector. Bart Paine was congratulated on his election to the national SBE Board.

Louisville Chapter
Presiding Officers: Bob Wyckoff and Paul Kelly
Louisville, Ky.

The March 14th meeting, under presiding officer Charles Kendall, included a tour of the Allen Martin Studio where an audio console which will be used at WHAS was seen under construction. Use of a multi-track audio recorder for producing high quality sound tracks for making records were observed. The next meeting was scheduled for WKPC-TV Studio.

Southwestern Ohio Provisional Chapter
Chairman: John P. McNally, WCNW/WFOL
Box 50, Fairfield, Ohio, 45014

On March 27th, the chapter met at Symmes Tavern, Fairfield, Ohio for 6-7 PM cash bar, 7 PM steak dinner, and a business/technical session later. Guest speaker George Horning, Cincinnati Bell Telephone Co. spoke on Bell Telephone Labs development and use of the LASER.

Las Vegas, Nevada Provisional Chapter
Chairman: Joe DeAngelo, 1536 Sombrero Drive, Las Vegas, Nevada

This chapter now meets regularly. Contact Joe DeAngelo for information on future meetings.

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CABLE ENGINEERING

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FCC Proposes Late-Nite Carriage

Amendment of the Cable TV Rules (Part 76) to allow cable television systems to carry late-night programming on otherwise unauthorized signals when the stations they must carry are off the air, has been proposed by the Commission.

The Commission said it currently has several proceedings pending before it requesting rulemaking, special relief, and certificates of compliance which raised the issue of whether a cable television system may carry late-night programming on otherwise unauthorized signals.

The Commission noted that in regulating cable television it had attempted to insure that cable systems would offer the greatest diversity of programming without injuring the financial viability of local broadcast stations. Though most television viewers are content with a conventional late evening and early night program schedule, there is a small but significant number who watch television only late at night, the Commission said, and accordingly, a limited cable carriage of late-night broadcasting would further the public interest in program diversity.

In order to prevent any harmful impact on existing late-night local broadcasters and to preclude any head-on competition between them and imported signals, the Commission said the proposed rule would allow a cable television system to import late-night programming only from the sign-off of the last station which it must carry to the sign-on of the first station which the system must carry. The Commission pointed out, however, that the proposed rule would not extend similar protection to additional signals which a system may carry, since they are not licensed to serve the cable communities into which they may be imported and they need no protection outside of their usual markets.

Since television station schedules are not mechanistic enough to begin and end precisely on the hour, a pure sign-on to sign-off rule would create hardships for cable subscribers, the Commission said. Therefore, it would consider that a station had signed off on the hour if it terminated operations less than thirty minutes after the hour. The Commission stated that this provision would cover situations in which a local station broadcast public service announcements, devotionals, a formal sign-off and the like after it had presented the last major program of the day. This would enable a cable system to begin its importation of a late-night program on the hour, without waiting for the final and often formalistic termination of a local station's broadcast day. Similarly, the rule would allow a cable system to carry a program until completion, even though a local station had signed on. The Commission pointed out that this rule would not relieve a cable system of its obligation to carry all the programs of a station which it must carry if the system lacked sufficient channel capacity to carry both the imported and the local signal.

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FCC's Wiley Tells NCTA "You Have Nothing To Lose"

As conventions go, the recent NCTA national was not stirring or unusual. And as I searched for new equipment and something to get excited about, I recalled that the FCC Chairman was scheduled to speak on a subject dear to all attendees.

There is reason to be concerned, because the FCC is the gatekeeper on the industry, and as such, its Chairman must be a person to watch for signs, hints, and nuances about future actions and official introductions of attitudes.

We are presenting here a major portion of Chairman Wiley's address so that everyone will have an opportunity to collect the most meaningful impressions without being distracted by his amiable, if appealing, performance.

"Several hundred years ago, there lived a Frenchman named Blaise Pascal who was both a philosopher and a theologian. Now Pascal was not your garden-variety religionist and his views did not always reflect blind and unswerving faith. Pascal believed in the Almighty all right but he got there by a path which, by normal Christian concepts, was perhaps a bit unusual. Pascal's faith seemed sometimes to be premised on logic and—to put it quite baldly—the odds.

"As Pascal saw it, either God exists or He does not. If there is no God, the fact that you believe in Him or not really doesn't matter a whole lot. On the other hand, if there is a God, whether or not you believe may make—if you'll pardon the expression—a hell of a difference to you. Pascal's conclusion: why not **believe**—you have nothing to lose.

"Now, ladies and gentlemen, expressly disclaiming both sacrilege and self-deification, let me propose a slightly sifferent version of Pascal's equation: Wiley's support for the development of cable either exists—or it does not. And while I feel that a two year record of speaking and voting on every issue before the FCC should suffice to provide an answer satisfactory to everyone in this audience, apparently this is not the case. Accordingly, at a recent meeting of all of my supporters from the cable industry —in a phone booth on M Street—I suggested that perhaps a healthy application of Pascal's Law would be in order: why not **believe**—you have nothing to lose.

"And, for the record, the truth is that I **do** believe in the promise of cable, that I **do** recognize its potential for supplementing and diversifying the programming offered by conventional television and that I **do** feel very strongly that it is in the public interest that your industry grows and prospers. In my opinion, cable truly can be the medium of variety, the medium of multiformity and—as you have so aptly phrased it—the medium of choice.

"But in addition to the concept of diversification, the word "choice" is susceptible to a second and quite different interpretation: that of being select, high quality and mature. And it is on this subsidiary meaning of "choice"—as in the choice medium—that I would like to dwell for a moment. For, despite all of your current problems (economic and otherwise), I think the time has come for this industry to grow up and, indeed, to really become a quality medium.

Irrational Rules?

"I think, for example, that it is time that there was a better effort—within your ranks—to understand and appreciate the concepts which underlie the Commission's regulation of cable television. Frankly, I am somewhat weary of hearing that our rules are irrational, that they were created simply to impede you and, most of all, that old bromide that they are simply the result of a Commission sell-out to the established interests of the broadcasting world. This is not the case and you know it or, at least, you certainly should know it.

"Instead, what the Commission did in adopting the 1972 Cable Television Report and Order, and what it has done subsequently, was designed to assimilate this new technology into an existing telecommunications structure, a structure in which—at this point—millions of Americans have a very definite interest and which—let's face it—you presently need as much as anyone. Now the rules the Commission adopted are not perfect and some changes may well be in order. But the answer to needed change is not insinuation and innuendo concerning the Commission's independence and integrity but, rather, a reasoned and fully documented case. To put it as candidly as possible: if your wish, as one of your new leaders recently declared, is for an FCC free of vested interests and dedicated to public service, I am here to tell you that your wish is granted and it is time—indeed overtime—that you begin to recognize it.

What's A Friend For?

"In this same regard, I think it is time that you stop looking for advocates within the Commission or, to put it more directly, regulatory security blankets. Frankly, I think this whole business of trying to determine who's a friend of what industry is downright silly and demeaning. It's not my business to be your friend—and I don't intend to be. It **is** my business to see that you get a fair shake and, more impor-

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tantly, that if you have something of value to offer the American people, you get a decent opportunity to present it to them unimpeded by "overregulation". And you can be assured that I will do my business fairly, efficiently and as expeditiously as possible.

"And, finally, I think it is time—if I may respectfully say so—for you, as an industry, to pull together and to recognize that, whatever differences may exist on individual issues between big systems and small, and between MSO's and independents, you have much more in common than in contrast. You are embarked—really as pioneers—in developing a new industry, a new technology, a new medium which has tremendous possibilities for the betterment of our entire society. And, thus, while there will and should be honest differences between you, I think—again if I may presume to say—that they are fully capable of resolution within your existing industry structure.

"In this connection, I have been impressed with the leadership which you have received over the last several years. You have been blessed, in my humble opinion, with officers who are honest, sincere and far-sighted. And, frankly, I think they need and deserve your support. Let me make it "perfectly clear"—so to speak—that when your leaders have the courage and, to my way of thinking, the wisdom to tell you that the basic objectives of the Consensus Agreement should be fulfilled, they're going to have my support. Nothing could be more in your interest, as I see it, than to lay to rest, once and for all and in a fair and even-handed manner, the nagging issue of copyright. And let me make that perfectly clear.

The New Ethic

"Several weeks ago, ladies and gentlemen, I addressed your friends and—as **Variety** magazine would say—my friends, the National Association of Broadcasters. In that speech, I called for the establishment in broadcasting of a New Ethic—and, to sum up what I am saying in this speech, I want to call today for a New Ethic in cable, a New Ethic which aims for quality service to the American public—even when you're the only game in town; a New Ethic which voluntarily complies with FCC rules—even when you know we have no forfeiture authority for a failure to do so; a New Ethic which recognizes that the local broadcaster (whose programming you transmit) is also providing a useful service to the public and needs to make a decent living as well as you; a New Ethic which accepts the fact that the FCC has a tough job and can do without inadequate explanations by you to your subscribers of the **reasons** for our regulations, frantic and often inaccurate last-minute lobbying on certain issues and, as indicated, repeated allegations of impropriety and favoritism; a New Ethic which recognizes that—in this industry as in life in general—your word is your bond; a New Ethic which strives for a medium which truly presents a choice and not just an echo; and, finally, a New Ethic which is willing to decline the temptations of short-range advantage for the ultimate realization of the enormous potential, in terms of public service, which cable truly represents.

"I call for such a New Ethic for your industry and I want you to know that I am confident that you will meet your responsibilities and fulfill the promise of this great communications technology. In turn, it seems to me that—in rejecting the role of a friend or advocate—I do have a responsibility to provide a regulatory climate in which to the extent that you perform, we will be in a position to similarly perform our regulatory obligations to the American public.

Industry Maturity

"In this connection, when I talk about the cable industry coming to maturity, let me acknowledge that governmental agencies also go through stages of development. Gradually, we come to learn that true progress is built upon a foundation of step-by-step improvement—and not by bureaucratic masterstrokes. We also begin to understand that no solution, however satisfactory it may seem at any given time, can withstand the windstorms and erosions of technological and societal change. Ultimately, we learn that government must constantly review and revise its policies,

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rules and procedures if they are to remain effective.

"Over the last two years, I have been in charge of a program designed to eliminate outdated and unnecessary regulation pertaining to the broadcast industry and, particularly, the small radio station operator. In my opinion, the burden of regulatory complexity and government paperwork falls most heavily on the little guy, the individual who least can afford it. And, thus in appropriate circumstances, we have attempted to reverse two almost immutable tendencies in government bureaucracies: the same rules for everyone without recognition of their necessity and advisability for the small operator, and the same rules for all time without recognition of the constant need for reevaluation where necessary. I have called this program revised-regulation or, for short, re-regulation—and, to me, it represents not only governmental action at its finest but, more pertinently, a concept which, if appropriate to broadcasting, should be appropriate for cable as well.

Re-regulation Task Force

"And so, today, I am pleased to announce the formation of a Cable Television Re-regulation Task Force within the FCC's Cable Bureau. Like its counterpart in the Broadcast Bureau, this group will review the Commission's experience to date with each and every one of our cable rules and forms. It will seek to eliminate unnecessary regulations, procedures and paperwork—particularly for the small system operator. And it will endeavor—where possible—to simplify what I know is one of the most complicated set of rules ever devised by the mind of man.

"While the re-regulation task force will be looking to our **past** cable experience—and trying to apply its lessons to the present—the Commission additionally has recognized the need to look to the **future** and to anticipate the problems that lie ahead. Therefore, I want to take this occasion also to announce the formation of a second special group, the 1977 Task Force. Obviously, this new committee takes its name from the projected deadline of March 31, 1973, by which all cable systems—those operating prior to 1972 as well as the new ones—must be in uniform compliance with the Commission's rules. The 1977 Task Force has been given broad authority to collect all relevant information, define problems confronting both agency and industry, and make whatever recommendations it deems necessary to the systematic transistion from substantial to uniform compliance.

"However, the mere appointment of two major task forces does not solve the pressing problems of this industry nor the constant concern of keeping the Commission current. The number of complicated and important issues with which the FCC must deal, not only in cable but in all of the other areas within our regulatory ambit, is literally staggering. The only way that we can meet our responsibilities and keep pace with the virtual telecommunications revolution which is taking place in this country is to adopt procedures which will insure an orderly, expeditious and continuous flow of paper from the staff to the Commission to the public. And we are doing just that.

"We have formed an executive team within the Commission, made up of our operating Bureau and Office chiefs, which will meet on a regular basis with me—at least weekly—to plan the Commission agenda, to establish deadlines, to develop priorities, and—jointly rather than parochially—to discuss and agree on recommendations to the Commission to meet the communications needs of this country.

"I think the system is working and—thanks to the dynamic leadership of Dean Burch under whom many of these items were initiated—we have in the past six weeks taken the following actions:

- exempted systems of fewer than 500 subscribers from our regulations on network program exclusivity;
- issued a Notice asking whether any further modifications in these exclusivity rules should be adopted, including the question of increasing the exemption level above 500 subscribers as well as the possibility of criteria other than system size;
- issued a Notice of Inquiry on mandatory program origination in-

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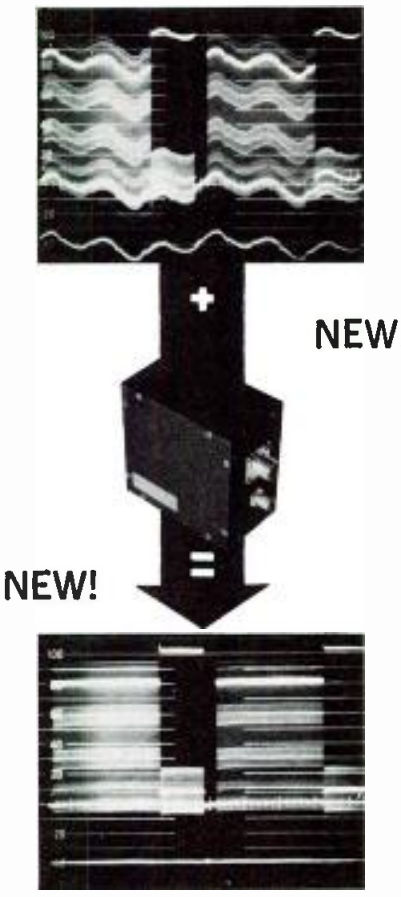

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cluding the possibility of raising the exemption level;

• issued, last week, a Notice of Proposed Rule Making concerning whether a cable system should be permitted to carry late-night programming on otherwise unauthorized signals when its must-carry signals have largely signed off for the day;

• released, also last week, our response to the 29 recommendations in Part I of the Federal/State-Local Advisory Committee report in which we not only clarified the rules under which we both must operate but, more significantly, launched seven separate and far-reaching inquiries involving such areas as shared use of access channels and facilities for systems in smaller communities; franchising requirements and qualifications; line extension provisions; franchise duration and expiration standards; transfers of control; subscriber complaints; and, finally, technical standards and the possibility of total federal preemption or, alternatively, a moratorium on new non-federal technical standards;

• certified 65 new systems, granted certificates of compliance for 165 existing systems and, last week alone—due to the aggressive leadership of Bureau Chief Dave Kinley and a lot of hard work by his entire staff—presented some 39 cable items to the Commission, which has to be some kind of record.

"In conclusion, ladies and gentlemen, I hope that you can see that a new ethic also pervades the FCC and the manner in which its business is done—an ethic, commenced under previous chairmen and I hope continued under my leadership, in which difficult and sensitive issues are squarely faced, exhaustively considered and—finally—fairly and promptly decided. I can promise you no more but, without question, you deserve no less.

In turn, I will look to you for a New Ethic in cable's development—a New Ethic which I think you know is right, a New Ethic which I believe you can deliver and a New Ethic to which we both know that your subscribers are fully entitled. I think it will happen—like Pascal, I'm going to believe: after all, I have nothing to lose." □

Schlafly, Thomas Win Technical Achievement Award

Hubert J. Schlafly and Thomas M. Straus have been named recipients of the second annual National Cable Television Association Outstanding Technical Achievement Awards, NCTA.

Schlafly, executive vice president and a co-founder of TelePrompTer Corporation, received the award for outstanding achievement in the area of systems operation. Straus, a senior engineer at Theta-Com of California, was honored for outstanding achievement in engineering and manufacturing. The awards were presented by NCTA President David Foster at the Engineers Reception at the 23rd annual NCTA convention. The winners were selected by a special committee of the Society of Cable Television Engineers.

Schlafly, widely recognized as one of the leading technical authorities in cable television, helped found TelePrompTer in 1950 while he was director of television research for Twentieth Century Fox. A vice president of TelePrompTer since its inception, he served in 1963-64 as president of TelePro Industries, Inc.

Schlafly presently is industry coordinator of the Cable Technical Advisory Committee of the Federal Communications Commission and was chairman of the NCTA domestic satellite committee. He serves on the Cable TV Task Force of the Institute of Electrical and Electronic Engineers, was first chairman of the Broadband Communication Section of the Electronic Industries Association and was an advisor to the National Academy of Engineering's Committee on Telecommunications.

Schlafly holds a number of patents and has authored technical papers and studies on cable television, broadband communications, microwave and related subjects.

Straus is best known in the cable television industry as a pioneer in the development of multi-channel microwave systems. With Hughes Aircraft Company, the parent company of Theta-Com, since 1959, he was program manager of its AML microwave equipment development project.

NCTA Directors Affirm Support Of Copyright Bill

The Board of Directors of the National Cable Television Association has reaffirmed its support for Sen. John L. McClellan (D-Ark.) and passage of reasonable copyright legislation containing provisions for cable television. The board, meeting in Coronado, Calif., adopted the following resolution concerning the copyright matter:

"In view of the complete vindication of the industry's position on copyright liability in CBS vs. TelePrompTer, any copyright legislation must be reasonable in terms of the interest of both the public and the industry. The NCTA Board of Directors reaffirms its support of Sen. McClellan and expresses its confidence that he and his subcommittee will be able to report out a fair and equitable copyright bill."

Covering the local sports this summer? It is a high interest subject area, and has built-in advertisers.

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NEW PRODUCTS

CCTV-CATV Teleproduction System

Amid all the discussion about the many new single product TBC companies, **Television Microtime, Inc.,** continues to announce and demonstrate new additions to its MICROTIME family of products. The family includes Time Base and Velocity Error Correctors and teleproduction accessoriess which are geared to the needs of each segment of the television industry including education and training, direct broadcast, and two significant applications in CATV.

The company's TBCs and accessories can be used separately or combined into a complete teleproduction system designed to process low-cost openreel and cassette VTR signals. The new system was demonstrated at the National Cable Television Association convention to a large group of CCTV and CATV production personnel.

Specific units in the new system included the MICROTIME 388 and new 390 HETROCOLOR TBCs, the MICROTIME VSD-30 Video/Sync Director, MICROTIME SG-23N NTSC Color Sync Generator Module, and the MICROTIME SG-28N Gen-lock Color Sync Generator with Derived Coherant Subcarrier (DCS) capability, SL-15 Capstan Servo Accessory. All of the units have been designed and integrated into a single teleproduction system which can be understood and operated by non-technical personnel.

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Cable TV Modulator

A new television channel modulator, combining high-performance at a relatively low price, has been introduced by **Blonder-Tongue Laboratories, Inc.** The new unit, the AVM 4920 Television Channel Modulator, accepts both audio and video signals from camera, tape recorder, film chain or television demodulator in either color or monochrome. It provides an output signal which exceeds NTSC standards for television signals.

A key feature of the unit is the incorporation of internal bandpass filters for precise frequency control, so that no additional filters are required. The AVM 4920 is thus suitable for adjacent channel operations. The filter circuit eliminates spurious output in the visual signal while a precise AFC circuit provides an aural carrier/visual carrier separation of 4.5MHZ ± 1 kHz. All spurious outputs are 60 dB below visual carrier level.

The AVM 4920 also provides for two sound inputs: at 600 Ohms unbalanced with -10dBM minimal; and with low Z microphone with -59dBM minimal.

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Versatile Digital Multimeter

A new automatic digital multimeter, the Model 8600A, using the latest LSI technology has been announced by the **John Fluke Mfg. Co.,** Inc., Seattle, Washington, manufacturer of precision electronic instruments and automatic test systems.

Price of the new 26 range, 4½ digit instrument is $599. With a basic DC accuracy of 0.02%, the Fluke 8600A features five ranges of DC Volts, five of AC Volts, five of DC current, five of AC current and six of resistance. Autozero and autorange are standard. For minimum loading, up to 1,000 mehohms input resistance is offered.

All DC ranges from 200 millivolts through 1200 Volts are continuously protected to +1200 Volts or 1700 Volts peak AC. AC bandwidth to 100 kHz offers 10 microvolt resolution. From 200 Ohms full scale through 20 megohms full scale, the 8600A takes a continuous 250 V RMS or DC. A front panel fuse protects all AC and DC current ranges from 200 microamperes full scale to 2 amperes full scale.

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Digital Clock

The **SPARTA** Model DC24 Digital Clock provides both a bright visual display of correct time and Form C contact closures to perform timing functions in broadcast or other automation systems. The DC24 is standard 19" rack mount width by 3½" high by 10" deep.

Options for the DC24 include Reset Board (approximate time corrections up to four times per hour), Net Join Board (exact time corrections either

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once or twice per hour, as for joining network news in broadcast automation applications), and Oscillator Time Base and Battery Backup Board (maintain exact time independent of line frequency variations or power interruptions).

Controls on the front panel, directly below the LED readouts, enable the operator to halt the clock altogether ...advance the seconds counter rapidly ...advance the minutes counter rapidly ...or light the LED display momentarily when operating the DC24 on battery. The reset time switches appear on the rear of the chassis.

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Voice-Activated Gain Controller

Shure Brothers Inc., has announced a new device that can be used to deal a hands-free "death blow" to most of the background noises that often plague multiple microphone tape recording and public-address installations.

This new unit, called the Model M625 Voicegate, is a voice-activated microphone gain controller with a response-shaped "voice-frequency" sensor.

Functioning between the microphone and the mixer, the Voicegate attenuates the microphone output signal by approximately 16 dB - until the microphone is excited by a voice. The Voicegate then removes the attenuation almost instantaneously, allowing the unattenuated microphone signals to enter the mixer. Thus, it allows all microphones in a multi-microphone installation to be "on" when required — without ambient noise pickup, without feedback danger, and without the need for a sound engineer to monitor and control microphone gain.

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"NO, NO, LERSCH! - I SAID TILT THIS CAMERA!"

Special Effects System

Chromatech (TM), **Technicolor's** new special effects system, is now available with a remote control option. The remote controller is available in a 3½" square panel mount, or in a 1¾" x 19" rack mount.

Chromatech, first introduced in October, 1973, is a special video processing device for superimposing two sources of NTSC video into one composite TV picture, without the undesireable halos and black outlines usually associated with chromakeyers. Chromatech has the ability to cast foreground shadows on background scenes; the ability to see thru glass, cellophane and smoke, and offers complete freedom from typical dark outlines around foreground objects.

The new remote units are DC controlled, thereby permitting the remote controller to be placed in the operations control panel, and cabled to the main Chromatech chassis which will normally be located in the switcher.

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FM Educational Antennas

A series of six FM educational antennas have been added to the series of circularly polarized antennas offered by **Phelps Dodge Communications Company.**

Because of the normally lower powers required in educational service, the new antennas are fabricated of 7/8 inch stainless steel tubing. The circularly polarized antenna is a 1½ turn helix and the strictly horizontal element has a "U" configuration. These antennas are complete with matching harness of RG type cables designed to mount on tower legs or support pipes 1¼ inch to 2¾ inch diameters. The multi-element arrays are designed for an element spacing of 10 feet.

Six models, designated Catalog Nos. ECFM-1, -2, -3, -4, -5, and -6 are available. Power rating in kilowatts varies from 0.2 to 0.5.

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Portable Color TV Camera

At the National Association of Broadcasters convention, **Fernseh** unveiled its new KCN Broadcast-Battery operated Color Television Camera. This system is designed for television interviews, up-to-the-minute spot coverage for breaking news stories and adds a new flexibility to the Fernseh family of professional camera systems.

Fully synchronized NTSC output video signals can be used directly on air, directly tape recorded or both via a portable microwave data link.

Its compact design and light weight results in point for point comparison to film cameras in similar applications, while allowing full broadcast quality reproduction at much lower light levels.

The camera head, weighing approximately 15 pounds, can be separated from its back pack up to 50 feet. The total portable system weighs under 39 pounds and can cover a one hour program before recharging is necessary. Extended broadcast operations can be accomodated with other option battery packs.

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Unbreakable Tape Cartridges

Fidelipac, a division of TelePro Industries, Inc., Cherry Hill, N. J., is now manufacturing their line of NAB Standard automatic tape cartridges of high-impact resistant Plexiglas (R) DR acrylic plastic.

According to Roger W. Cappello, Sales Manager of Fidelipac, "Plexiglas DR is one of the most durable products now available to the broadcasting and recording industries. Its resistance to breakage and chipping saves considerable time and money, particularly for those heavy users who own 10,000 or more cartridges. And, unlike other cartridges, the new Plexiglas DR Fidelipacs can tolerate the strong cleaning solvents needed to remove sticky identification labels.

"So far as our injection molding is concerned," Cappello continues, "Plexiglas DR permits us to manufacture to a high degree of tolerance allowing the finished Fidelipac to align with optimum accuracy to the record/playback deck. The plastic's high heat rating is also a definite plus when our cartridges are used in tropical zones."

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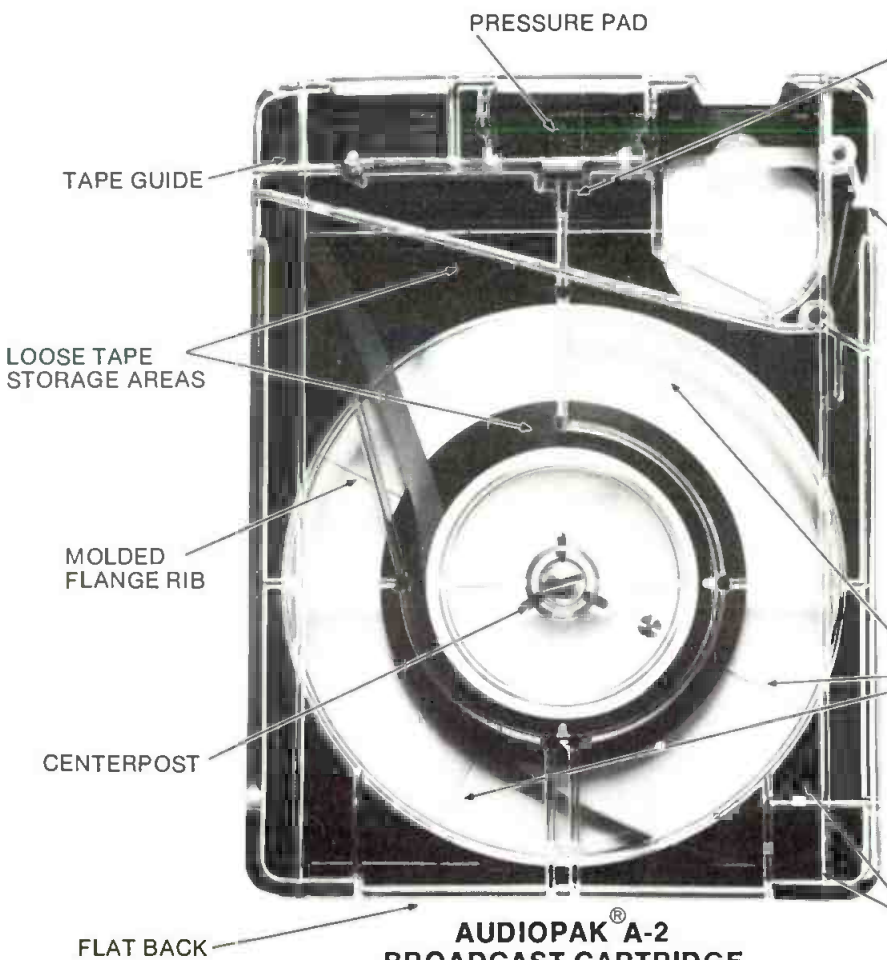

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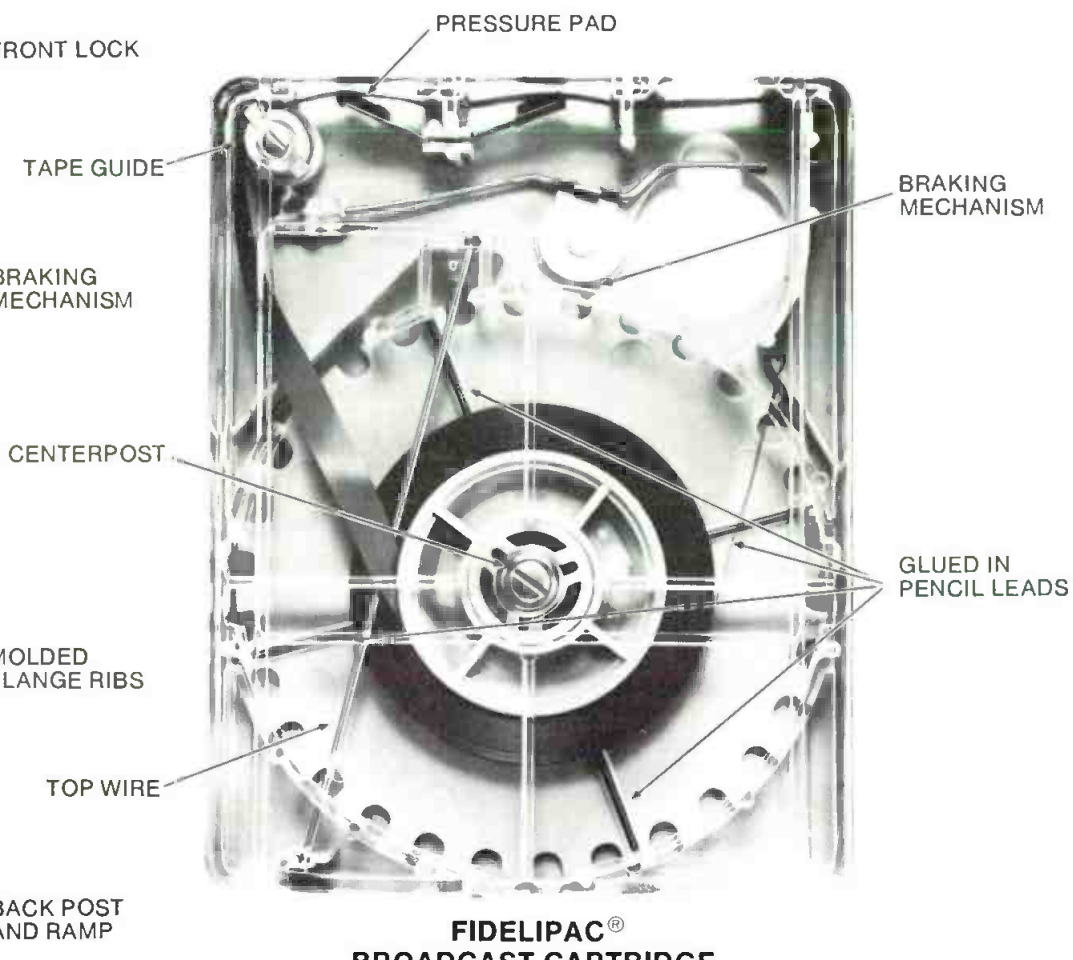

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Lighting for projections and chroma key

By William F. Schelling
Head Lighting Director, CBS-TV

When using rear or front projection, the lighting director must first be concerned about the amount of foot lamberts that the projector is capable of delivering and then about the density of the slides. This will determine the light levels he must use to allow the projections to be crisp and clear when he has a composite picture using the projection and the newscaster. If there is too much light on the newscaster, the camera has to iris down making the projection dark and unclear. Here is where the lighting director now must measure the output of his projector and determine if he is getting enough punch out of it or not.

If he lights his newscaster at too low a light level to accommodate his projection, he then may have poor picture quality and no depth of field, making his picture look flat and uninteresting. **This he cannot allow.**

If all of the above is solved and working, his next concern is when focusing, the spill light from his fresnels must be cut off so that there is a minimum of ambient light spilling on the projection screen only. As more light buildup appears on the screen, the less efficient his projection becomes. It will look washed out and lose definition and chroma.

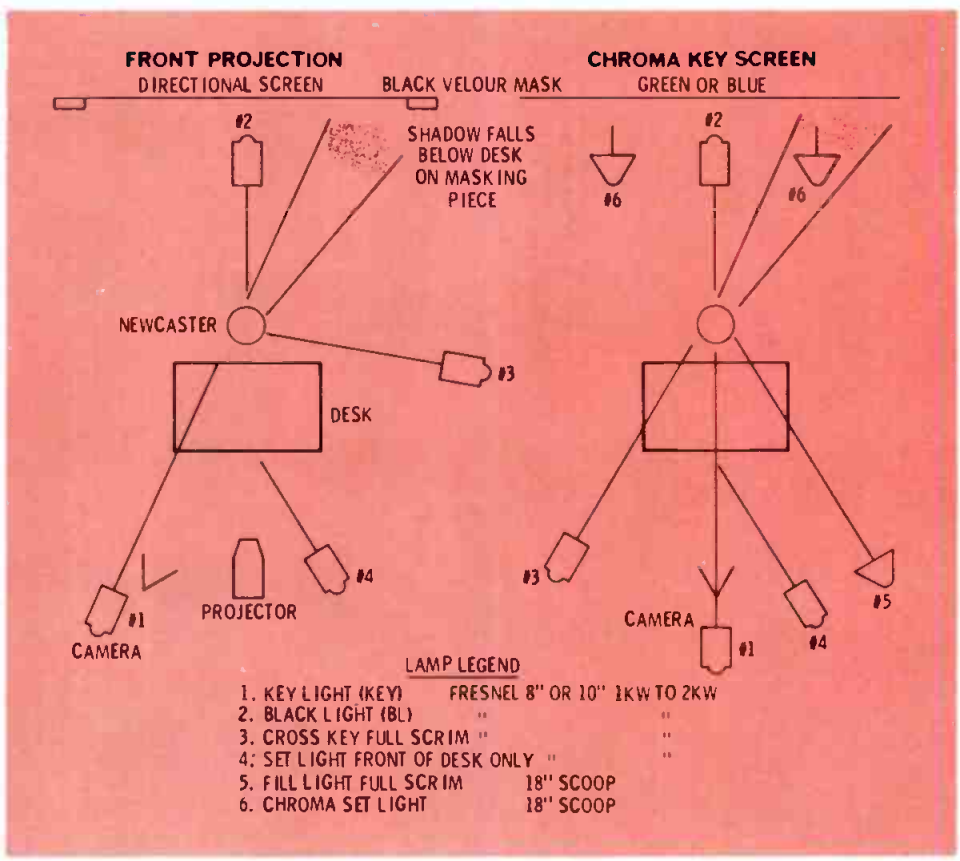
The selection of equipment must be made with greater discrimination to see that barn doors are working properly, that the lekos selected do not have secondary spills. Scoops and broads are out because of direct fill light hitting the screen. Reflection from back light and keys have to be checked to see if they are not reflecting light on the screen behind the newscaster. Here is where a matte material should be used on desk tops to prevent this from happening.

A dark felt does two things, it stops bounce by absorbing light. It also is used to absorb sound.

Separation

Another critical point is separation. There must be enough separation (eight feet rule of thumb minimum) to allow his key shadow to fall below the camera angle of the screen also allowing enough clearance above the head with the key light. This gives some margin so that the key is not clipped too close above the newscaster's head. The separation also allows the crosses to fall in a large enough pattern to cover lateral movement by the newscaster while clearing the projection screen.

Ambient buildup from other units in the area can be a problem;



Management Highlights

Lighting may be an art, but certainly not a black art. I asked the author to tell why - in easy-to-understand terms - network news so often looks far superior to the local news show.

I think you'll find that the head lighting director of a television network has his problems, too. But in this article you get a chance to see how he solves the very real problems that are ready and waiting to plague all stations' local news show.

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so after lighting the newscaster, measure the light on the screen (F. C.). Then go on and light the weatherman, or whomever else your particular news uses in its news complex. Then go back and measure the light on the screen. If there is more light now than last measured but not over 12 F. C., you now have to go back and adjust barn doors or hang flags. Any flag hung in the set should be of a matte black card or material so that it does not bounce more light around the set.

Using Chroma Key

Chroma key is one of the most used and discussed electronic production techniques to come along in television since the effects bar on a technical directors console. Between hearsay, myth, and complete confusion about this technique, there is a simple way to light a chroma key screen, map, module, drop, eye and/or scenery.

There are two basic colors used for chroma key: chroma key blue and green. The industry designated these as chroma key colors because after much trial and error, these specific green and blue colors keyed the best. Since that period of four or five years ago, we have been given much latitude in the green and blue areas. We use many tones of green or blue from light to dark. We paint flat and relief maps using the different tones to make the areas stand out. Most news shows today use a chroma key screen or map in back of their commentator for insertion instead of a rear or front projection. The use of this technique has aided the lighting director in many ways, but he must understand the problems of chroma key first for it to be an aid to him.

Now that we have discussed the problems of projections, let us discuss the good points and shortcomings of chroma key. First of all, you have your choice of luminaires; light spill does not deteriorate chroma key the way it decreases the efficiency of projections. The lighting director is able to use fill light if he so chooses.

The light level is at the discretion of the L.D. He now has no limiting factors because he has no projection to consider. With all new and sophisticated color equipment around today, such as the PC 70 series, or the TK 44, the new Ferenzy, or Thompsons, etc...., there is no need to light above the 250 F.C. level. **(It is a lot more comfortable and easier to control and less cumbersome to hang by using lower light levels.** Always remember this.)

The only other basic problem that affects chroma key as well as projections are shadows. If these appear you will have video tearing or a malfunction of chroma keying. Separation is an all important factor (8' - 10' from screen to subject); it lessens the problem of contamination where the color bounces back onto the newscaster. Light level is also important. It should be kept at low light levels (50 to 100 F.C.; this in itself reduces contamination.

If you are lighting a map, use just enough light to make it look good to the camera and no more. Chroma key will work with light levels as low as 50 F.C. Here is where video must aid the L.D. in setting up the chroma technical gear to be able to work at these levels with comparative ease. The equipment is capable of doing this; so now it is up to the video operator. Most video people would rather work at these levels because of the problems of bounce and contamination which, in the end, they also have to live with.

There are ways to overcome these problems. When using blue, if there is a problem of bounce which leads to contamination, use a yellow filter in the back light. Yellow will absorb blue, thereby decontaminating the blue bounce. When using green, use magenta. These are to be used only if you cannot solve the contamination problem by (a) separation, (b) less light, (c) angle of luminaires lighting the chroma key, (d) re-align technical gear, (e) or malfunction of technical gear.

Filter Facts

Let me touch on an explanation of these filters for a moment. The filters I have just mentioned are called subtractive filters or colors. The three subtractive colors are magenta, yellow, and cyan. When the three colors are laid over one another, the cumulative result is black or an absorption body—henceforth subtractive. The three primary colors are red, green, and blue. When these colors are laid over one another, the result is white or additive colors—this will reflect light, not absorb, as do the subtractive colors.

To clear this up in your own mind, take a green primary gel and lay a piece of magenta over it on a light box. Turn the box on. You now have black; the magenta has

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Workshop in simplifying

By Harold Ennes

Every technician in the AM-FM-TV field should have a practical understanding of "logic" circuitry. Basic to this understanding is digital math. Yet I am aware of a significant number of practicing technicians who have, in essence, "given up" on any type of extended training in this most important subject.

If you are one who has settled for a nebulous "understanding" of basic digital math, recall the subtle theme in the **Wizard Of Oz.** The Scarecrow, who possessed more reasoning power than any of the others, desired a brain. The Tin Woodsman, most sentimental of the lot, desired a heart. The Lion, who showed plenty of guts in the pinches, desired courage. The only "phony" was the wonderful Wizard himself.

If you have mastered just fundamental math associated with the basics of electronics, you have all that is required in reasoning power to really **understand** binary (or any other base) of digital math. This coverage will assume fundamental electronic training, but a complete lack of exposure to digital relationships. Thus if you feel you do not really grasp the "digital math" you have studied, disregard all you have "learned" thus far.

A small number of exercises will be given at the end of each Part. Solutions to these exercises will appear at the beginning of the next Part. This will enable you to check your progress. The final Part V of this series will be devoted entirely to detailed Practice Problems and Solutions.

The Bistable Flip-Flop

The bistable flip-flop is the foundation of logic and digital structure. It uses either a positive or negative trigger (never both) to change its state from OFF to ON, or ON to OFF. It is "stable" in either mode, and does not change state between triggers.

You know that a flip-flop (or any

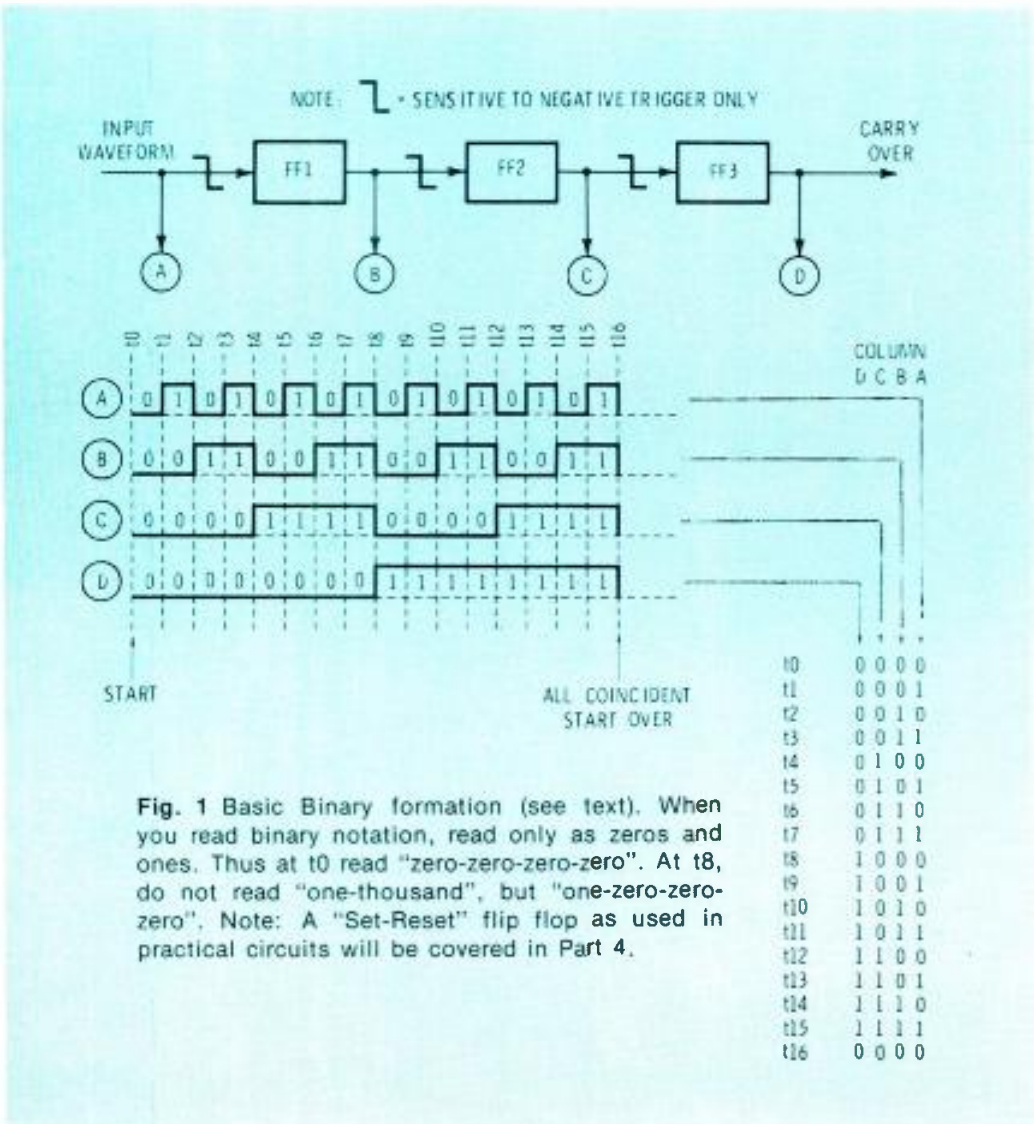

Fig. 1 Basic Binary formation (see text). When you read binary notation, read only as zeros and ones. Thus at t0 read "zero-zero-zero-zero". At t8, do not read "one-thousand", but "one-zero-zero-zero". Note: A "Set-Reset" flip flop as used in practical circuits will be covered in Part 4.

Table 1

DECIMAL (TENS) SYSTEM FOR FOUR DIGITS

POSITIONAL WEIGHT	10^3	10^2	10	10^0	
EQUIVALENT	1000	100	10	1	
50 4 826 =	4	0	0	0	
		8	0	0	= 4000 + 800 + 20 + 6
			2	0	
				6	
	4	8	2	6	
	MSD			LSD	

Table 2

BINARY TABLE FOR FOUR BITS

BINARY WEIGHT	2^3	2^2	2	2^0	
DECIMAL EQUIVALENT	8	4	2	1	DECIMAL COUNT
	0	0	0	0	0
	0	0	0	1	1
	0	0	1	0	2
	0	0	1	1	3
	0	1	0	0	4
	0	1	0	1	5
	0	1	1	0	6
	0	1	1	1	7
	1	0	0	0	8
	1	0	0	1	9
	1	0	1	0	10
	1	0	1	1	11
	1	1	0	0	12
	1	1	0	1	13
	1	1	1	0	14
	1	1	1	1	15
	MSB			LSB	

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digital math part 1

multivibrator) has two output pulses of opposite polarity. Don't worry about the mechanics at this time. The binary system uses only zeros and ones, that's all. A given output is either a 0 (low), or a 1 (high). The outputs reverse in polarity for a change in state.

Just put the waveforms down as in Figure 1 and analyze as follows:

(a). The input pulses (waveform A) is a series of zeroes and ones. At time t0, all "1" outputs are "0", and we are going to "count" or "accumulate" only the "1" outputs in this example. Thus the series of flip-flops and associated "storage" can be termed a **counter** or **accumulator,** either term is correct.

(b). Waveform B is the "1" output of FF1. Note that the first negative transition of the input waveform (A) occurs at t2, and the next negative transition at t4. So waveform B has two zeroes and two ones in consecutive order. Copy it down in column B; a series of two zeroes and two ones.

(c). The first negative transition of wave B is at t4. This turns FF2 ON. The next negative transition is at t8. This turns FF2 OFF. You now have a series of 4 zeroes and 4 ones; put them down in column C.

(d). The first negative transition of wave C is at t8. This turns FF3 ON (Wave D). The next negative transition is at t16. This turns FF3 OFF. You have a series of 8 zeroes and 8 ones; put them down in column D. Note that at this point all pulses are coincident (0 to low) and the process starts over. You have gone as far as possible with four digits in the binary system.

The Power Of A Number

In our conventional decimal system, $10^1 = 10$ and $10^{-1} = 0.1$. So 10^0 must lie between 10^1 and 10^{-1} to represent 1. Thus $10^0 = 1$. **Any** number raised to the zeroeth power is equal to 1. So $2^1 = 2$ and $2^{-1} = 0.5$ and $2^0 = 1$.

Table 1 reviews the decimal (base 10) system for four digits. The 10^0 column contains units of ones, the 10^1 column is units of tens, 10^2 is units of hundreds, and 10^3 = units of thousands. Thus the number 4,826 = 4000+800+20+6. The power is normally termed the **positional weight** of the number. Thus a 6 in the 10^3 column would represent 6,000 while a 6 in the 10^0 column represents only 6. The least significant digit (LSD) is in the 10^0 column while the most significant digit (MSD) is in the 10^3 column when this is the highest power in the system.

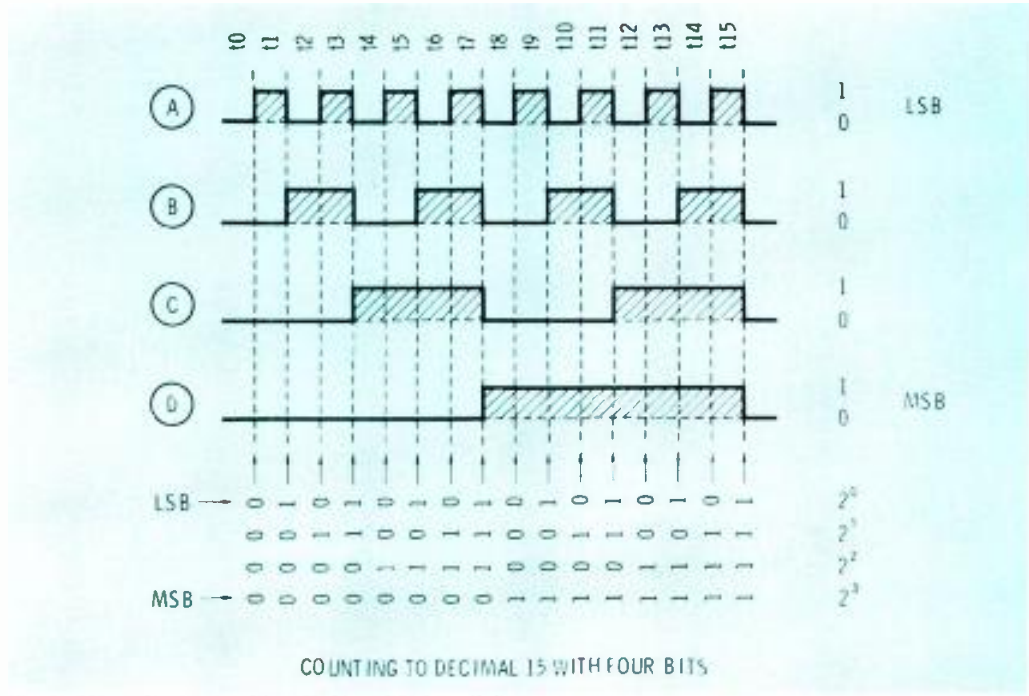

Fig. 2 Counting to decimal 15 with four bits.

Table 2 reveals the corresponding binary system for four bits. (A "bit" is an abbreviation for **binary digit**.) Here, instead of ascending powers of ten, we have ascending powers of two. Only zeroes and ones are used. A 1 in the 2^0 column (least significant bit or LSB) is equal to 1. A 1 in the 2^1 column is equal to 2. A 1 in the 2^2 column is equal to 4. A 1 in the 2^3 column (MSB for a 4-bit system) is equal to 8.

To convert any 4-bit binary to its equivalent decimal value count from right to left and give each 1 its equivalent decimal value from the "weight" of its given position. For example, binary 0110 is simply 2+4 = 6. Binary 1001 is simply 1+8 = 9. Binary 1111 = 1+2+4+8 = 15.

Note that the rows starting with 0000 in Table 2 correspond to columns D-C-B-A of Figure 1.

Now re-draw Figure 1 as shown by Figure 2. The "1" state of each flip-flop is the shaded area. You have "accumulated" or "counted" 15 ones by t15 to get a decimal equivalent of 15. Look at it like this:

Waveforms A to D are either in a "1" state or a "0" state regardless of pulse duration. At t0 you have no pulses = 0000. At t1 you have 1 pulse of 0001 = 1. At t2 you have accumulated 2 ones; one in waveform A and one in waveform B, for a binary count of 0010. Since this 1 is in the 2^1 column, it is equivalent to decimal 2. You have now counted to 2 one time, or 2^1.

Continue this reasoning on to t15. At this time, you have eight 1's in wave A, four 1's in B, two 1's in C, and a 1 in D for a total of 15.

Each flip-flop has divided by 2 which is its basic function. So you have a single "1" state in wave D for 8 input pulses, or a divide-by-eight divider. It is a **divider, accumulator** or a **counter** depending

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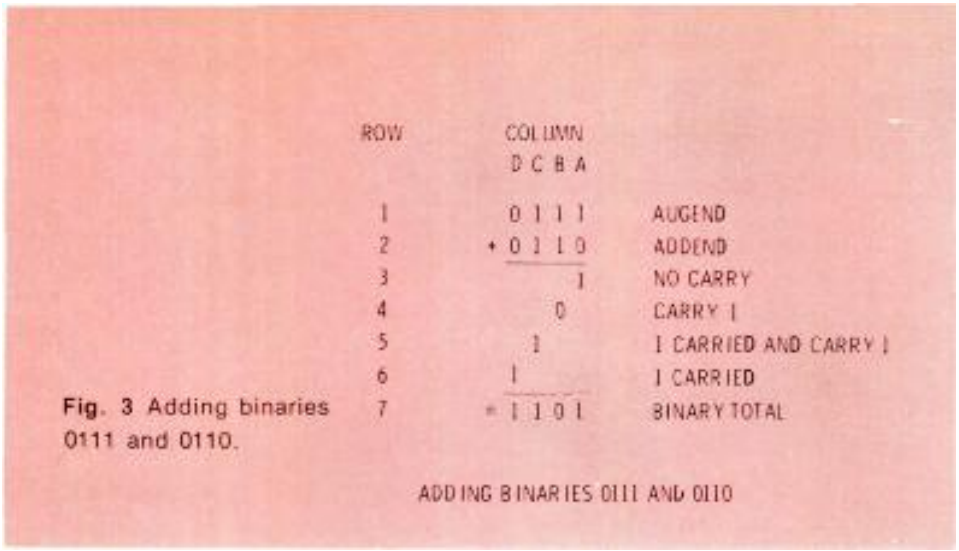

Fig. 3 Adding binaries 0111 and 0110.

Table 3

BINARY TABLE FOR ADDITION			
BINARY A + B + PREV CARRY	SUM	NEW CARRY
0 + 0 + 0	0	0
0 + 0 + 1	1	0
0 + 1 + 0	1	0
0 + 1 + 1	0	1
1 + 0 + 0	1	0
1 + 0 + 1	0	1
1 + 1 + 1	1	1

upon circuit application.

Now this may be entirely logical to flip-flops, but is it logical to you? You can't draw numerous waveforms to handle binary arithmetic. You will need to work it out on paper.

Do It On Paper

Start by writing down four zeroes:

0000 (Make this equal to zero)
+ 1 (add 1)
0001 (this equals 1 in the decimal system)

Now add another 1 to get a decimal value of 2.

0001
+ 1

When 1 is directly under 1 in the binary system, the sum is 0 and a 1 is carried to the next column to the left. If there is already a 1 in that column, the sum is again 0 and the 1 carries to the left again, etc. So:

0001
+ 1
0010

This equals 2 in the decimal system because you have accumulated two pulses (two ones) and the "1" is the second space to left under the column 2 (Table 2).

Now add another 1:

0010
0001
0011 (This is 1+2 = 3 in the decimal system)

Add another 1:

0011
1
0100 This is 4 in the decimal system, since the "1" is now in the third space to the left ($2^2 = 4$) as in Table 2.

When you continue this process to 1111, you have developed the 4-bit binary table of Table 2.

For practice, add 0111 with 0110 as in Figure 3. Row 1 contains the augend and row 2 the addend. Row 3 shows the addition of 0 and 1 = 1 with no carry. Row 4 adds 1+1 giving 0 and carry 1. In row 5 column C you already have two 1's with a previous carry of 1. In this case, you must put down your previous carry as shown; then you still carry 1 to the next column. In row 6 column D you simply record the carried 1. The total of 1101 is in row 7.

Check this in decimal form. You know that binary 0111 is equal to decimal 7 (1+2+4 = 7). Also that 0110 = 6. So 7+6 = 13, and binary 1101 = 13.

Table 3 reviews the binary table for addition. We will refer back to this as we progress.

Fractions

You have already noted that the digits on the left of the binary point are coefficients of increasing **positive** powers of 2, with 2^0 adjacent to the binary point. The digits on the right of the point are coefficients of increasing **negative** powers of 2, with 2^{-1} adjacent to the point.

Table 4

BINARY TABLE WITH FRACTIONS									
BINARY WEIGHT	2^3	2^2	2^1	2^0	POINT	2^{-1}	2^{-2}	2^{-3}	2^{-4}
DECIMAL EQUIVALENT	8	4	2	1		1/2 (0.5)	1/4 (.25)	1/8 (.125)	1/16 (.0625)

See Table 4 and note that a "1" immediately to the right of the decimal point would be equal to 1/2 or 0.5, while a "1" in the fourth place to the right would be equal to 1/16, or 0.0625. Thus 0000.1 in binary = 1/2 or 0.5 decimal, while 0000.0001 = 1/16 or 0.0625 in decimal form. For example, the decimal equivalent of binary 0101.01 is:

BINARY		DECIMAL
0×2^3	=	0
1×2^2	=	4
0×2	=	0
1×2^0	=	1
0×2^{-1}	=	0
1×2^{-2}	=	0.25
0101.01	=	5.25

In practice, of course, you simply disregard all zeroes and note the binary weight of the "1" for each position. When you get familiar with binaries, you would look at 0101.01 and say: 4+1+0.25 = 5.25. In a 4-bit binary you simply have (from left-to-right) 8-4-2-1 plus any fractional quantity.

Going Beyond 4 Bits

You will note from Figure 1 that

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the output of FF3 is termed a "carry over". This could feed another flip-flop whose output would then be $2^4 = 16$ in decimal form. If added to the waveforms of Figure 1, it would have a series of sixteen 0's and sixteen 1's. The 1's would start at t16 or the negative transition of wave D. You would then have 5 bits of information, counting the input waveform as 1 bit. Table 5 lists the positive powers of 2 for values up to 4096 decimal equivalent. Note that each additional power (weight) doubles the decimal equivalent value. Thus Tables 2 and 4 can be expanded to as many powers as required for a particular application. For example: binary 100101 = 32+4+1 = 37. Binary 1100101 = 64+32+1 = 101. Simply count the spaces to the left and give it the appropriate decimal equivalent, then add. In counting from right to left, just say 1-2-4-8--16-32-64-128-256-etc.

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Substraction

Binary subtraction is no different than decimal subtraction, the same "borrow" rules apply. For example:

```
 1111 (decimal 15)
-0110 (decimal 6)
=1001 (decimal 9)
```

In this case binary subtraction is simpler than the decimal form since 15-6 requires "borrowing" the 1.

Now suppose you have:

```
 44.00
-10.25
=33.75
```

Observe here that you borrowed twice until a number existed (third digit from right) to borrow from. The 44-10.25 in binary form is:

```
  101100.00 (decimal 44)
- 001010.01 (decimal 10.25)
= 100001.11 (decimal 33.75)
```

Table 5
POSITIVE POWERS OF TWO

POWER OF2	DECIMAL EQUIVALENT
2^0	1
2^1	2
2^2	4
2^3	8
2^4	16
2^5	32
2^6	64
2^7	128
2^8	256
2^9	512
2^{10}	1024
2^{11}	2048
2^{12}	4096

Table 6
TABLE FOR BINARY SUBTRACTION

A - B	DIFFERENCE	BORROW
0 - 0 =	0	0
0 - 1 =	1	1
1 - 0 =	1	0
1 - 1 =	0	0

Making the first digit the one to the extreme right, the procedure is as follows:

1st digit: 0-1 is a difference of 1 and borrow 1.

2nd digit: No 1 exists to borrow yet. So 0 in top row becomes 1 and 1-0 = 1 and borrow 1 carried over.

3rd digit: Still no 1 to borrow from. So 0 in top row becomes 1 and 1-0 = 1 and borrow 1 carried over.

4th digit: Still no 1 to borrow so 0 in top row becomes 1 and 1-1 = 0 with borrow 1 carried over.

5th digit: Now a 1 exists to borrow, so it becomes a 0 and 0-0 = 0. No carry.

The remainder is self-explanatory.

Another example:

```
 0110 (decimal 6)
-0011 (decimal 3)
=0011 (decimal 3)
```

1st digit: 0-1 = difference of 1 and borrow 1.

2nd digit: 1 borrowed from top row (becomes 0) and 0-1 is a difference of 1 and borrow 1.

3rd digit: 1 borrowed from top row (becomes 0) and 0-0 = 0.

4th digit: 0-0 = 0.

Table 6 tabulates the rules for binary subtraction.

When we progress to the "fascinating complement" (Part IV of this series) you will find binary subtraction much simplified. But anything is "simple" only when understood, and understanding comes best when taken in slow steps.

Exercises For Part I

1. Why is it necessary to have a practical understanding of binary math to use and maintain modern broadcast equipment?

2. Convert the following binaries to equivalent decimals: (a) 0110 (b) 1001 (c) 0101.101 (d) 1110.01.

3. Find the sum of the following: (a) 1001 + 0101 (b) 0101 + 0110 (c) 1111 + 0111 (d) 0011.01 + 1100.1.

4. Find the difference of the following: (a) 0111 - 0011 (b) 1000 - 0010 (c) 1011 - 1010 (d) 1100.1 - 0110.01.

Solutions to these exercises will be found at the beginning of Part II which takes up binary multiplication and division. □

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How to order and install that weather machine

By Pat Finnegan
BE Maintenance Editor

Weather reports have always been a high interest item. What's more, it's a very real public service in times of severe weather. Above you see a station tower that came down in a storm. No one was hurt. But it pays even the station to know for its own sake.

An Extel[R] Corp. all electronic printer leased from RCA Service Co. in use at WLBC, Muncie, Ind.

Weather reporting has taken on a more important role in broadcast stations with each disaster. With the U.S. Weather Bureau's present ability and speed in pinpointing severe weather conditions (both in prediction and in actuality), the need for speedy relay of this information to the public is a role the broadcasters have undertaken as a real public service. The news wires do pick up and transmit weather information and alerts, but there are times when the network can't be interrupted immediately for local weather situations that develop quickly.

Many Stations now have a direct wire service to the Weather Bureau and others are considering this avenue. Because of FCC rulings, the Station may own or lease its teleprinters from others than Ma Bell.

A New Language

A Station considering its own printer equipment will need to learn a new language. Many have had difficulty communicating with the telephone company in the past due to a "language barrier", because the broadcaster and telco often use different terminology. The teleprinter people use another language yet! But for you to order equipment that will do the job you want on the Weather Wire, you need at least a knowledge of a few terms that will enable the teleprinter manufacturer or lease company to supply the correct equipment. It may be possible to turn the whole project over to an outside concern, but you should do some of the basic investigation of the needs yourself.

There are some basic bits of information your supplier will need to know: The code or type transmission used; The speed of printing; The alerting signal; and any other selective calling feature you

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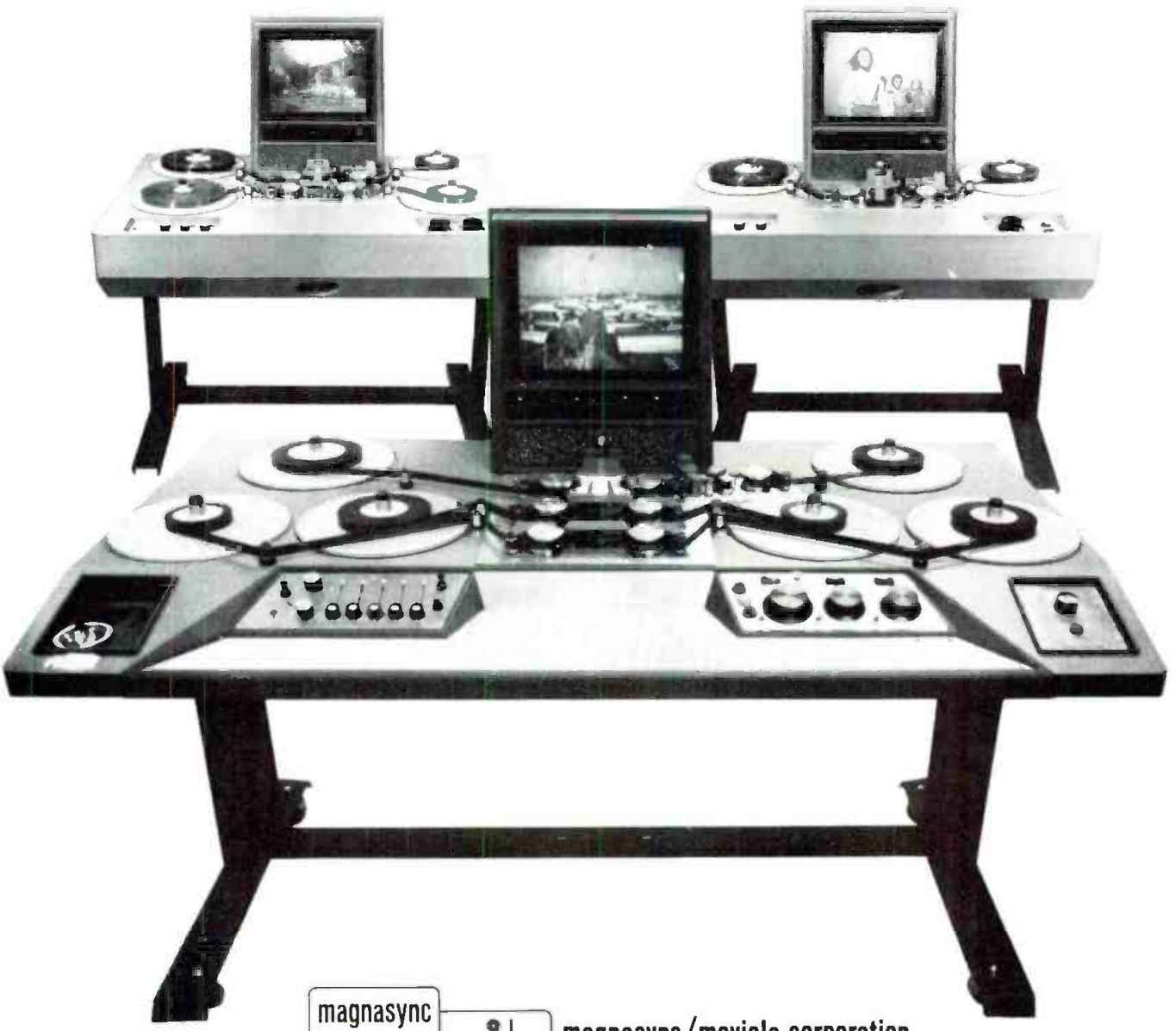

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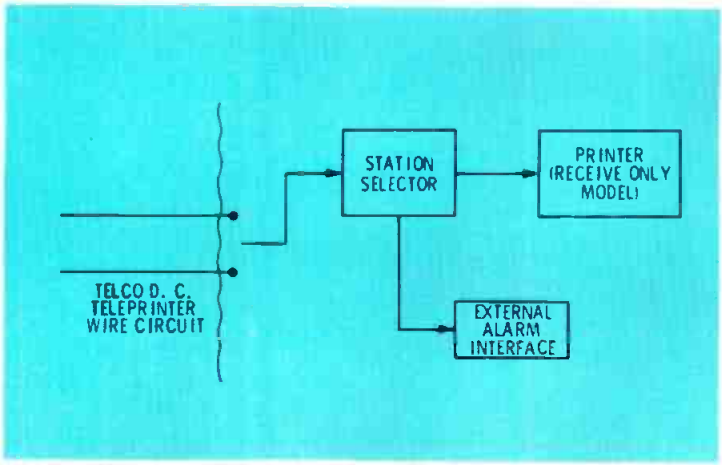

Fig. 1 Typical arrangement and equipment needed for a station teleprinter setup.

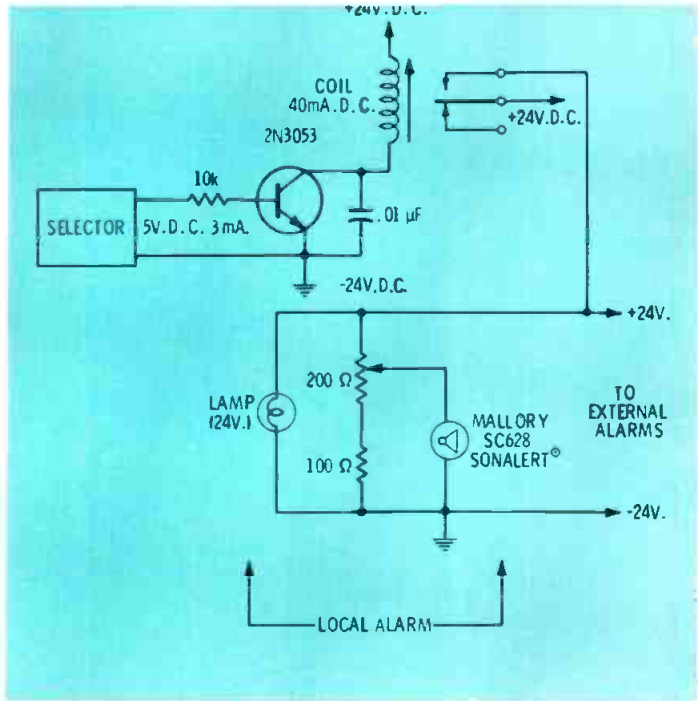

Fig. 3 If the selector alarm is IC logic output, this circuit can act as an interface and a local alarm. With values shown, transistor will conduct as low as 4.34 VDC and draw 0.22 ma from the IC source.

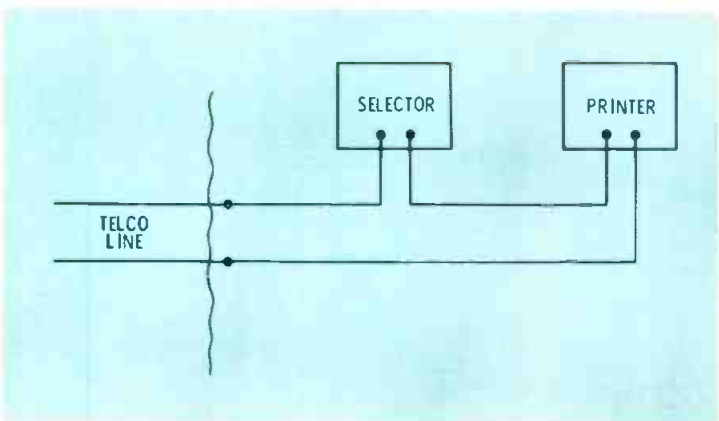

Fig. 2 This is a DC circuit, the selector and printer should be wired in series so as not to load the Telco lines.

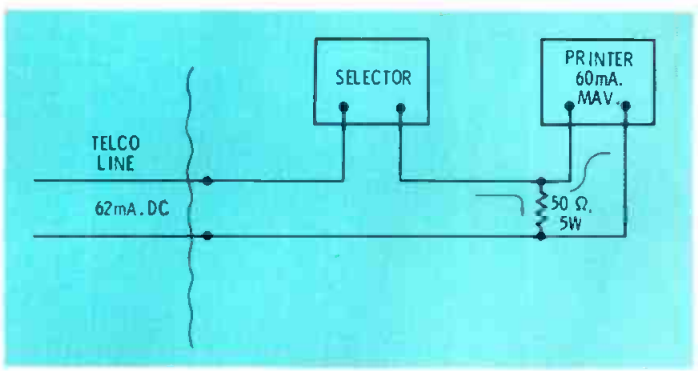

Fig. 4 If line current is more than maximum printer can accept, use a shunt resistor across the input of the printer only.

will need. The Weather Bureau in most areas of the country transmits in 5 level Baudot code, and the printing speed is 75 wpm. The alerting signal for severe weather is: two upper case H's followed by lower case W. The Baudot is an old Telegraph Code and the 5 level means there are 5 pulses for each character. The Baudot Code can only accommodate so many characters, so to expand this ability, a shift signal is sent out that produces the "upper case" characters. If you would compare this to a standard typewriter keyboard, in order to print a capital letter or symbol, a shift key must be pressed first so that the carriage can move into position to print the upper character on the key. By using a shift, the number of characters on the keyboard can be doubled, and so it is with the teleprinter. On the teleprinter keyboard, however, when a shift signal is sent and the H key pressed, the symbol # will print out. This is in Baudot code.

The severe weather alert signal will be two upper case H's, followed by a letter and then a lower case W. The printout will look like this: # # A W. There may also be some letters following. The first two symbols will set up the machines on the wire, the letter A (in Indiana) will open up all the machines on the wire in the State, and the letter W will fire off the alarms. If there is some other letter than A, it will be a selective alarm and only those machines programmed to accept that letter will fire, the others will ignore the alarm signal.

The speed of transmission is important because the receiving machine must be synchronized to the sending machine or the result will be unintelligible garble.

To make certain of the particular codes and other information as used in your state, consult with the Weather Bureau officer in your area. The Weather Bureau is divided into Regions, States, and Districts. So, contact your State Office.

Equipment Needed

The U.S. Weather Bureau furnishes the service free of charge, that is, the messages and the transmission. You must order and pay for a circuit from the telephone company. In this service, order: a

(Continued on page 47)

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A Final Thought

The instruction books and service manuals provide the details necessary for installation, both electrical and mechanical, as well as remote control. Contact Bell & Howell, for technical literature and the names of the local sources who will help you select the best combination of lens, lamp and equipment to project 16mm films for TV program distribution or local display.

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What's a proof prove?

By Dennis Ciapura
BE Consulting Editor

We've written articles before on Proof of Performance but never one like this.

In "FCC Perspectives On The Proof", **BE** June 1973, we discussed some of the shortcomings and ambiguities of those proceedures with Harold Kassens, one of the Commission's best known and most respected broadcast experts. In a very candid reply, Mr. Kassens pointed out that the Proof rules were formulated in the late 1930's and in some cases haven't kept pace with the engineering situation as it is today. Let's take a look at some of the weak points in the rules and see what we can do to improve the situation.

Why The Proof Is Irrelevant

Prime examples of unrealistic requirements are found in the rules for frequency response and distortion tests. These measurements are required to be made with the signal applied to the microphone input terminals of the console. It is incredible to think that while almost all of the programming that the listener hears comes from a record or tape source, we make no proof tests on these segments of the system at all.

In essence, the FCC rules as they are now written, require no minimum audio standards for almost everything heard on the air: the broadcast station is tested as though it is a huge P.A. system! The engineer completing a proof can be assured that the newscasts and station ID's meet "FM standards" and that's about all, unless of course, the entire day's broadcast is done live over the control room mic—a rare situation, indeed.

In any event, the rules are rather ambiguous about the matter of patching out the AGC amplifiers to defeat the AGC, so the fellows who interpret this as a valid proceedure can patch out a part of their system to do the proof. Many engineers perform the required tests, then go back and make their own series of tests that are more realistic and tell the real story. It looks like the real performance standards are evolved by each individual broadcaster, and that certainly contributes to greatly varying audio quality from station to station.

Is There Purpose?

At this point a very basic question arises. . .Would everyone's best interest by served if the rules that are irrelevant to normal operation were dropped entirely? After all, the devotees of this school of thought could point out that everything is going O.K. anyway with almost all of the air product exempt from any regulation. **Why burden the broadcaster with the requirement to gather superfluous data through the mic. channel?** Why not leave fidelity standards up to the broadcasters **officially.**

On the other hand, perhaps we should exchange the old rules for new ones that provide for realistic tests that really show what a broadcast facility's capabilities are. Of course, we could also choose to shrug our shoulders and leave things as they are in the hope that some future re-regulation might come closer to the way things ought to be. Well, tomorrow's re-regulation is today's proposed rule change, so, let's have a hand in making the rules that we must work with!

No one is more of a practical expert in the broadcast arts than the broadcast engineer in the field. He assembles the studio and transmitter facilities and is charged with the responsibility for their proper technical operation, including conduct of the Proof. It is only natural, therefore, that the cummulative opinion of the nation's broadcast engineers should bear a great deal of weight with the FCC. The Commission is extremely receptive to input from the field. We cannot emphasize this point enough. **The Commission wants your opinion.**

The FCC is charged with the task of working for the best possible utilization of the airwaves, and is eager to gain the benefit of your day to day experience with the equipment and technical problems. However, **THERE IS NOTHING FOR THE COMMISSION TO HEAR IF NO ONE SPEAKS UP!** The following questionnaire is your ballot for a more meaningful Proof.

About The Questionnaire

The questionnaire gives you an opportunity to call for either elimination of the more unrealistic portions of the proof, or their replacement with new rules that are aimed at modern broadcast technique. The choice is yours. If you support replacing or revising the rules, several alternatives are provided. In any case, the question of allowing stations to operate with Dolby encoding and 25 usec. pre-emphasis is a separate issue which you can vote either way on regardless of whether or not you favor dropping or changing the other rules.

If there is a great deal of interest in standard test record and tape method, we will propose specs for these signal sources, have samples made and base an article on the results.

The changes described are rather obviously deduced, but if you have any additional comments or suggestions please use the "remarks" space or attach additional sheets, if required, to get your idea across. **The results of the survey will be submitted to the Commision as a petition for rule changes.** The combined opinion of the nation's broadcast engineers will go a long way toward affecting important Part 73 re-regulation.

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Broadcast Engineering
Proof Change Survey

Check each block which describes a rule change that you prefer. Please read the form entirely before checking the portions that you prefer.

A. 73.254 b

(b) The licensee of each FM broadcast station shall make equipment performance measurements at least once each calendar year: Provided, however, that the dates of completion of successive sets of measurements shall be no more than 14 months apart. One set of measurements shall be made during the 4 month period preceding the filing date of the application for renewal of station license. Equipment performance measurements for auxiliary transmitters are not required. Equipment performance measurements shall be made with equipment adjusted for normal program operation and shall include all circuits between the main studio microphone terminals and the antenna circuit, including telephone lines, preemphasis circuits and any equalizers employed, except for microphones, and without compression if a compression amplifier is installed. The measurement program shall yield the following information:

Yes ☐ No ☐ 1. Elimnate 73.254 b entirely.

Yes ☐ No ☐ 2. Reword the last part of the paragraph so that it reads: Equipment performance measurements shall be made so as to include all equipment and circuits between the main studio input terminals to which the primary sources of normal programming (record and/or tape or microphone) are connected and the antenna circuit, including telephone lines, equalizers and pre-emphasis employed.

Add to the above one of the following:

Yes ☐ No ☐ 3. Any compression amplifiers normally included in the program chain shall be included in the measurements, but with their A.G.C. functions disabled for the frequency response tests only.

Yes ☐ No ☐ 4. Any compression amplifiers normally employed in the program chain shall be included in the measurements, but with their A.G.C. functions disabled for frequency response and noise tests only.

Yes ☐ No ☐ 5. Any compression amplifiers normally employed in the program chain shall be included in the measurements, but with their A.G.C. functions disabled for all tests.

Yes ☐ No ☐ 6. Reword the last part of the paragraph so that it reads: Equipment performance measurements shall be made so that a standard test record and/or tape is reproduced on the equipment normally employed as the primary sources of programming, including all telephone lines, equalizers and pre-emphasis employed between the source(s) and the antenna circuit. (Your choice of either 3, 4 or 5 above provides the proper end to this wording as well.)

The measurement program shall yield the following information:

73.254 b (1)

(1) Audio frequency response from 50 to 15,000 hertz (Hz) for approximately 25, 50 and 100 percent modulation. Measurements shall be made on at least the following audio frequencies: 50, 100, 400, 1000, 5000, 10,000 and 15,000 Hz. The frequency response measurements should normally be made without deemphasis; however, standard 75 microsecond deemphasis may be employed in the measuring equipment or system provided the accuracy that the deemphasis circuit is sufficient to insure that the measured response is within the prescribed limits.

Yes ☐ No ☐ 7. Reword the above so that it reads the same as it now does except that the measurements would be required only at 100% modulation.

73.254 b (2)

(2) Audio frequency harmonic distortion for 25, 50 and 100 percent modulation for the fundamental frequencies of 50, 100, 400, 1000, and 5000 Hz. Audio frequency harmonics for 100 percent modulation for fundamental frequencies of 10,000 and 15,000 Hz. Measurements shall normally include harmonics to 30,000 Hz. The distortion measurements shall be made employing 75 microsecond deemphasis in the measuring equipment or system.

Yes ☐ No ☐ 8. Reword the above so that measurements are required only at 100% modulation with modulating frequencies of 50, 100, 400, 1000, 5000 and 7500 Hz.

Yes ☐ No ☐ 9. Add an I.M. distortion test at 80% modulation with modulating frequencies of 60 and 10,000 Hz, 4:1.

B. 73.317 a (2)

(2) The transmitting system shall be capable of transmitting a band of frequencies from 50 to 15,000 hertz (Hz). Preemphasis shall be employed in accordance with the impedance-frequency characteristic of a series inductance-resistance network having a time constant of 75 microseconds. (See Fig. 2 of § 73.333) The deviation of the system response from the standard preemphasis curve shall lie between two limits as shown in Figure 2 of §73.333. The upper of these limits shall be uniform (no deviation) from 50 to 15,000 Hz. The lower limit shall be uniform from 100 to 7,500 Hz, and 3 dB below the upper limit; from 100 to 50 Hz the lower limit shall fall from the 3 dB limit at a uniform rate of 1 dB per octave (4 dB at 50 Hz); from 7,500 to 15,000 Hz the lower limit shall fall from the 3 dB limit at a uniform rate of 2 dB per octave (5 dB at 15,000 Hz).

Yes ☐ No ☐ 10. Reword the paragraph so that it it reads the same as it now does with the following addition: Stations will be allowed with no further authority required, to broadcast with the standard Dolby "B" noise reduction characteristic and 25 usec. pre-emphasis curve, provided that the Commission is notified within 10 days.

Obviously, the changes outlined here would carry with them changes in other parts of Part 73 to allow for monitoring equipment time constant changes, etc., but these alterations logically follow and are therefore omitted here for brevity.

ADDITIONAL REMARKS: _____

Mail this completed Survey page to:
Broadcast Engineering Editor
1014 Wyandotte, Kansas City, Mo. 64105

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Detecting cartridge splices

By Jerry Ayers
Engineering Supervisor, WOAF, Kansas City.

An annoying "blurp" frequently occurs when a splice goes past the playback head in an audio tape cartridge machine. One certain way to eliminate this is to ascertain that the splice does not occur during the program portion of the cartridge.

One obvious way to determine the location of the splice is to observe a playing tape cartridge and stop it when the splice is seen. This is a time consuming process and the splice can be missed easily. Therefore, an automatic means of detecting tape splices in tape cartridges would be desirable.

There are commercial "splice finders" available. And there also are designs for converting convential cartridge machines to a splice-finding mode, but usually these modifications destroy the usefulness of the machine for conventional recording and playback uses.

At WDAF, a Gates ATC record-playback cartridge machine has been modified to locate splices in the cartridge tape. The machine still functions in a normal manner and is used daily in record and playback operations in addition to splice detection when needed.

To accomplish this, the record and playback head configuration for both the program and cue tracks must not be changed. See Figure 1 for the normal head configuration of an audio cartridge machine.

For the splice sensing to function, three basic changes must be incorporated into the machine circuitry. First, when the machine is started, the 1 kHz Cue tone must be recorded continuously. Second, while the Cue playback circuitry senses the 1 kHz cue tone, the machine must remain running and in the record mode. Third, when a splice passes the playback head, the Cue playback sensing circuit relay drops out, stopping the machine with the splice just past the playback head. This is the ideal location for the splice to occur because it can be visually observed. Also, when a recording is made on a cartridge with the splice in such a location, the splice will be played back in blank "cue-up" tape rather than during program tape.

Specific instructions for modifying a Gates Criterion Series record and playback units will be discussed. However, this basic technique can be adapted to many other popular makes of cartridge machines. For the Gates Criterion Series modifications, only two external switches are needed, a four-pole, two-position (Mallory 3242J) and a Normally Open, SPST momentary push-button (Arrow-Hart 80511E). The switches can be mounted in a convenient location near the cartridge machine. At WDAF, the switches are mounted in a panel immediately above the record unit. Figure 2 shows the wiring for the two switches.

1. Run wire from relay K3, terminal 8 to J1, terminal 15.

Bill Godden, engineering production supervisor, and Cathy Heafley, FM Traffic, using a Gates machine to detect splices. It's important to note that this method does not eliminate the machine from its normal use.

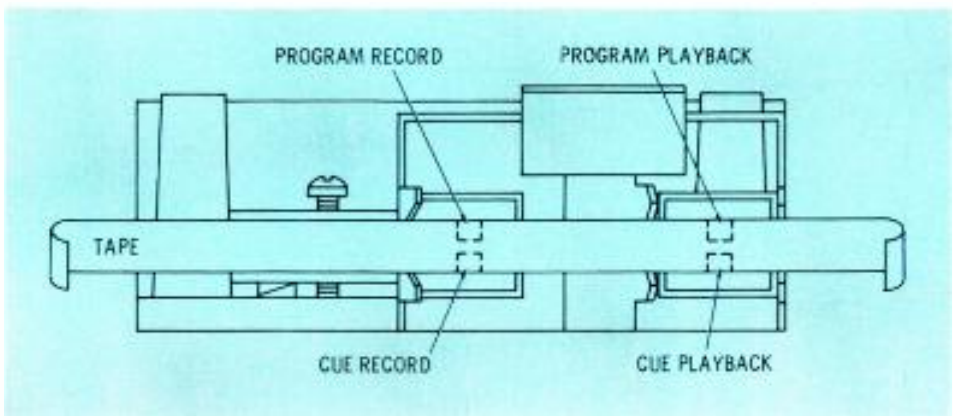

Fig. 1 Cartridge tape head configuration.

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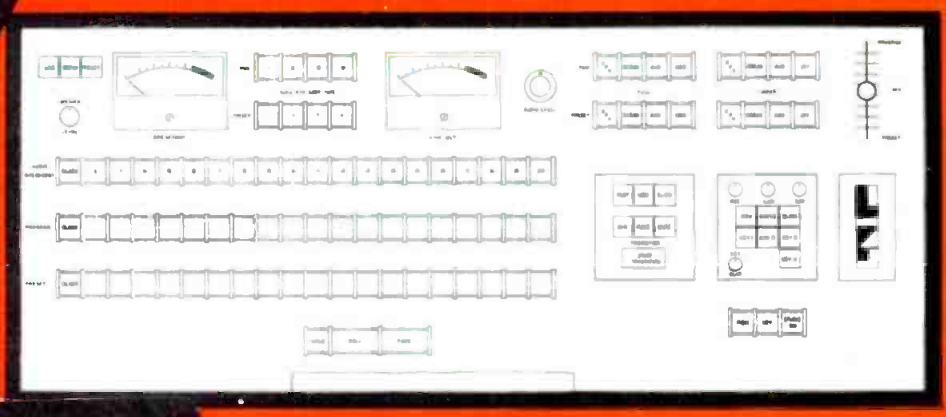

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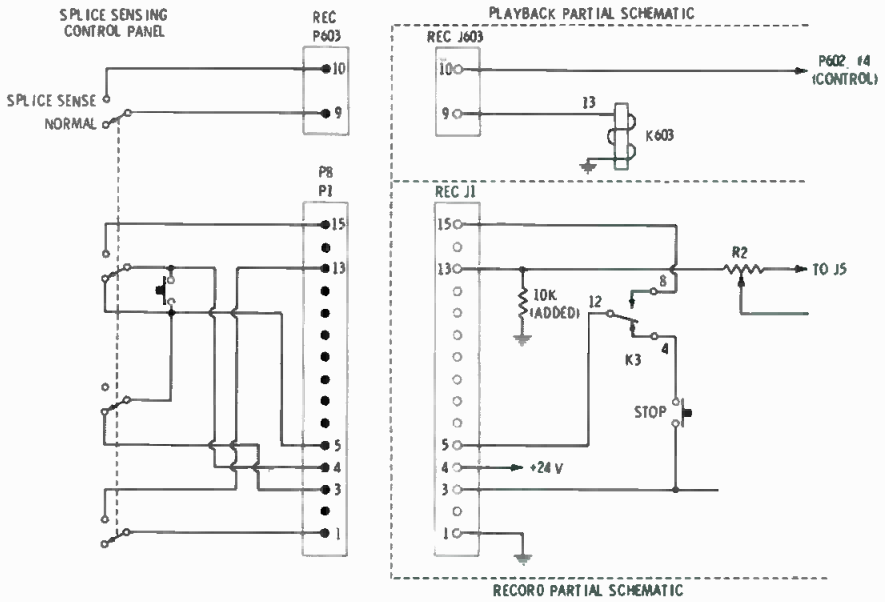

Fig. 2 Schematic for building in the splice detection circuitry.

2. Remove and tape wire that goes to J1, terminal 13. (This is normally auxillary cue and was not used in our installation. Other unused terminals could be used, or an additional connector could be added.)

3. Add 10k, ½w resistor between low side of R2 (cue sensitivity) and ground. Run wire from low side of R2 to J1, terminal 13.

The remaining connections to J1 are unchanged from the original wiring. Terminal 1 is ground, Terminal 3 is used for "remote start", and Terminals 4 and 5 are used for "remote stop".

The record unit modifications are also shown in Figure 2. These changes allow the 1kHz primary cue oscillator to run continually when the mode switch is on "splice sense". This is accomplished by:

1. Add a wire from P602, terminal 4 to unused terminal 9 of J602.

2. Add a wire from K603, pin 13 to the unused terminal 10 of J602.

After the appropriate connections have been made within the cartridge machines, cables must be made up from the switches to appropriate Cinch-Jones connectors for access to the record and playback units. These connections are

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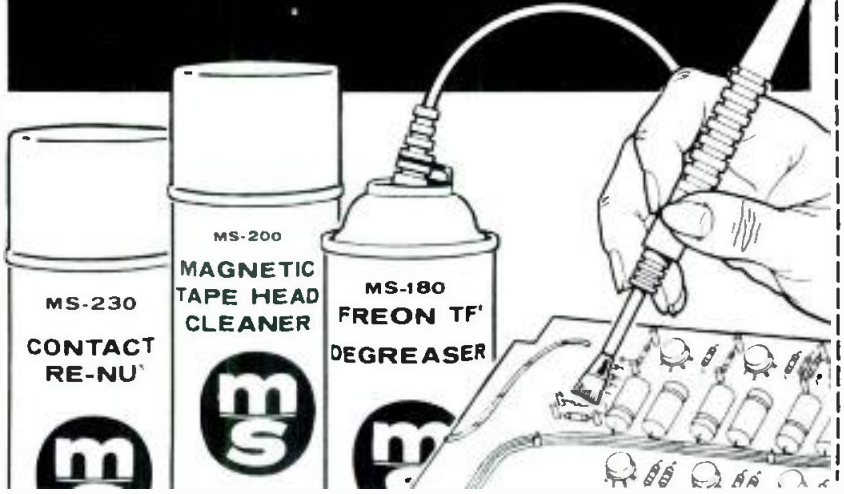

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obvious as shown in the schematic diagram of Figure 2. With all modifications complete and proper cabling connected between record and playback machines, the unit can be tested.

With the 4PDT mode switch in "splice sense" position, insert cartridge, push and **hold** "push to start" momentary switch. When the start button is depressed, the cartridge will run and after several seconds, K3 should pull in and hold. Set cue sensitivity (R2 in playback unit) control to position where K3 just barely pulls in and holds. (The momentary pushbutton switch must be held in during this adjustment). This setting is critical in that K3 should hold while a cartridge is running until a splice passes the heads. At the instant a splice is detected, K3 should drop out, stopping the cartridge. Of course, badly wrinkled tape, missing oxide, or other damaged areas on the tape will cause K3 to drop out as if a splice passed the heads. This interruption would disrupt the program as a dropout similar to a splice and may be even more objectionable. If a cartridge has dropouts in addition to the splice, it probably should be rewound with new tape.

Be certain the cartridge used in setting R2 sensitivity is typical of cartridges normally used. It must reproduce a normal output level for the splice detector to function properly. Once the sensitivity is set correctly for the usual cartridge, most splices will be consistently detected. On some cartridges, however, K3 may not lock. In these cases the splice detector will not work. This is usually an indication of low output from the tape and is a sign the cartridge should be closely inspected for wear. You may want to cull out these low level cartridges to prevent future problems.

(*Continued on page 51*)

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Power reduction for pre-sunrise operation

By Jack Layton
Abington, Pa.

With the advent of daylight savings time on a year round basis, many daytime only stations have been granted approval to begin operations one hour prior to sunrise with 50 Watts of power. The problem confronting many chief engineers is how to reduce power from a 250, 500 or 1000 Watt transmitter down to 50 Watts.

Various schemes using resistors to lower plate voltage have been tried. One difficulty sometimes encountered with this method is the fact that the modulation transformer no longer sees the same load as when the transmitter is operated at its rated power.

A different method, and somewhat superior, is an RF power divider at the output of the transmitter. Unused power is dumped into a dummy load while the remainder is delivered to the transmission line or the common point of a directional antenna system. The advantage of using this method is that the transmitter runs with its normal operating parameters.

A Divider Network

The divider network consists of two L networks, with their inputs paralleled across the output of the transmitter. The parallel connection of the L networks must present the same impedance to the output ter-

Author (at right) discusses operation of parallel networks engineer John Troxell of WTEL engineering staff.

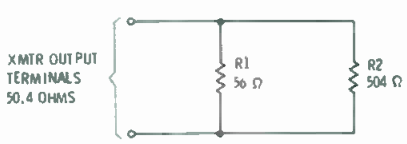


FIG - 1

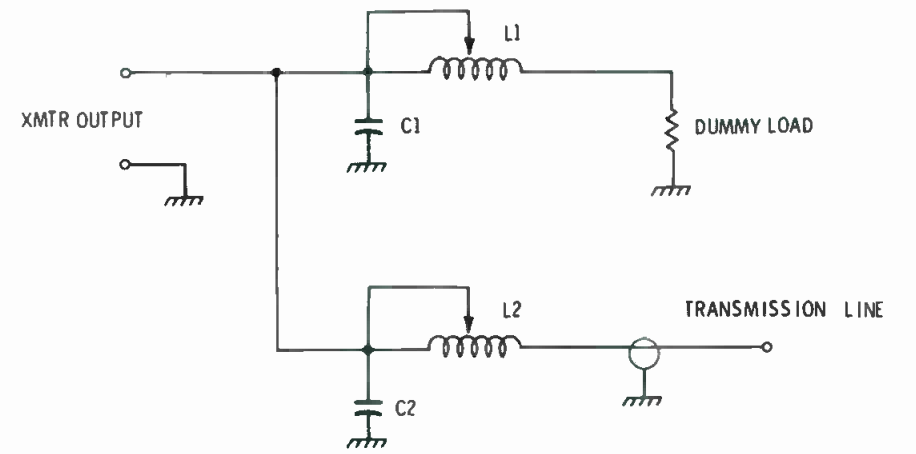
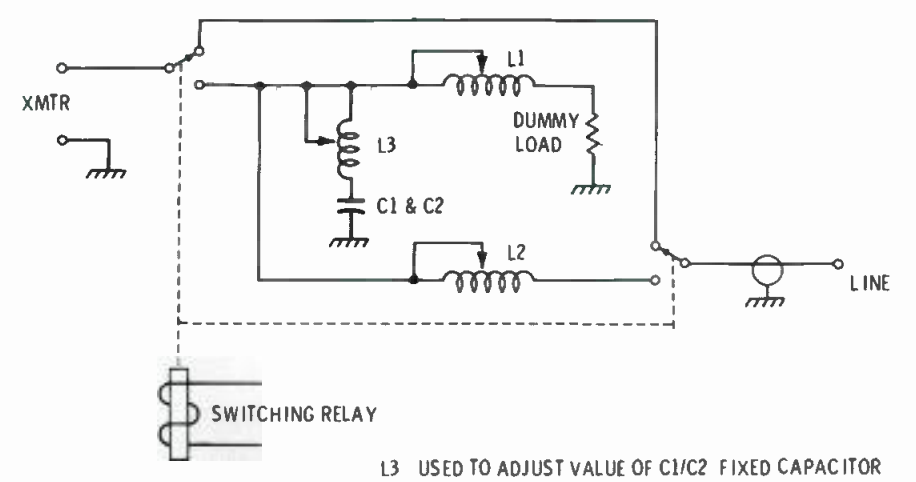


FIG - 2



L3 USED TO ADJUST VALUE OF C1/C2 FIXED CAPACITOR

FIG - 3

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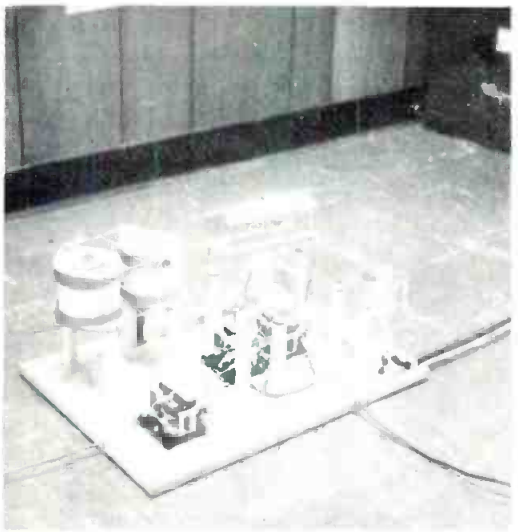

The L network constructed by the WNAR staff ready for installation.

minals of the transmitter as it sees when the transmission line is directly connected for normal operation. This is desirable to avoid a change in the operating parameters of the transmitter when switching from pre-sunrise to normal operation.

The operation of these parallel networks is best visualized by looking at the circuit as parallel resistors. This shown in Figure 1. The values of R_1 and R_2 must be in the correct ratio to distribute power properly. In addition, when the two are in parallel, the resultant resistance must be the same as the characteristic impedance of the transmission line, or the common point resistance where a DA is being used.

For example, let's assume that R_1 is a dummy load with a resistance of 56 Ohms and that R_2 is a coaxial transmission line with a characteristic impedance of 504 Ohms. When these are connected in parallel, they will present a load of 50.4 Ohms to the output terminals of the transmitter. This can be determined by the formula for parallel resistors. The power will be split in a nine to one ratio. By applying Ohms Law, you can see that when the transmitter power output is 500 Watts, 450 Watts will be disappated in the 56 Ohm dummy load, while 50 Watts will be delivered to the 504 Ohm transmission line.

Now, 56 Ohm dummy loads are hard to come by and the 504 Ohm coaxial line is even harder to find these days! However, if an L network is used to make a 50 Ohm dummy load look like 56 Ohms and another L network is set up to make the station's normal 50 Ohm transmission line look like 504 Ohms, the end result will be the same.

Determining Ratios

To determine the power/resistance ratio the following formula will apply:

$$\frac{P_1}{P_2} = \frac{R_2}{R_1}$$

Where:

P_1 = power to be disappated in the dummy load

R_1 = resistance looking into the input of the dummy load L network

P_2 = power to be delivered to the transmission line

R_2 = resistance looking into the input of the transmission line L network

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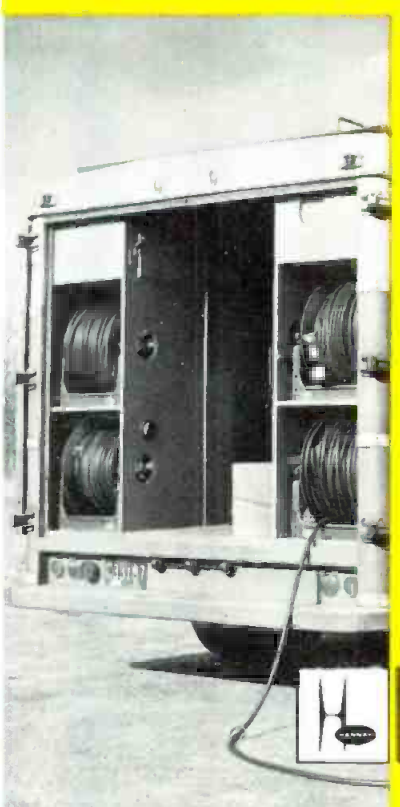

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The circuitry of the parallel L networks is shown in Figure 2. The network made up of L_1 and C_1 transforms the resistance of the 50 Ohm dummy load up to the proper value of resistance shown in column 5 of Table 1. The network consisting of L_2 and C_2 must have an input resistance equal to that shown in column 6 of Table 1.

The data in Table 1 has been tabulated for 250, 500 and 1000 Watts of transmitter power, assuming that the power to be delivered to the transmission line is 50 Watts. With the resistances shown in columns 5 and 6 in parallel, the resultant load, as seen by the transmitter, will be very close to 50 Ohms.

The exact values of reactances used in the networks is determined by the following formula:

For L_1 and L_2

$$X_L = \sqrt{R_L R_{in} - R_L^2}$$

For C_1 and C_2

$$X_C = \frac{R_L R_{in}}{X_L}$$

Where:

X_L = inductive reactance in Ohms

R_L = resistance of the load (the transmission line or the dummy load)

R_{in} = desired resistance of the input to the network (shown in columns 5 and 6 of Figure 1)

X_C = capacitive reactance in Ohms

Once the reactive values of X_L and X_C are known they can be translated into coil values in microhenrys and capacitor values in microfarads at your operating frequency by use of the following formulae:

For inductors -

$$L = \frac{X_L}{2\pi f}$$

Where:

L = inductance in microhenrys

f = operating frequency megacycles

X_L = inductive reactance in Ohms

For capacitors

$$C = \frac{1}{2\pi f X_C}$$

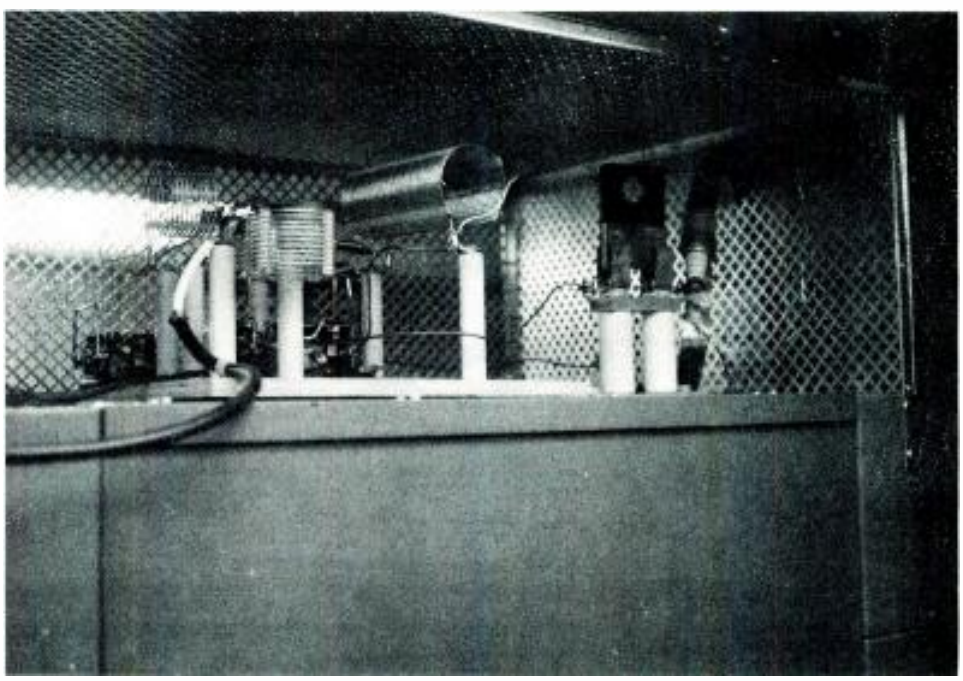
Where:

C = capacity in microfarads

f = operating frequency in megacycles

X_C = capacitive reactance in Ohms

Capacitors C_1 and C_2 can be combined into one unit whose capacitance is equal to C_1 and C_2 in parallel. A fixed capacitor, whose reactive value is slightly larger than that required, should be used. A tapped inductor is inserted in series with this capacitor to arrive at the precise value of X_C that is required.



The network is shown here installed and caged on the top of the station's RCA 500 Watt transmitter (WNAR).

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The entire network is best set up with an RF bridge. Individual adjustment of each reactive component to its calculated value should be carried out. When the network components are tied together, and the dummy load and transmission line are connected, the input of the parallel networks should be very close to 50 Ohms resistance with no reactance.

Figure 3 shows the schematic of the completed divider unit, with the necessary relays, to change from pre-sunrise to normal operation. Plug-in RF metering jacks in the input leg, as well as both of the output legs, are an added convenience but are not absolutely necessary.

Resistance/Reactance Components

It should be noted that if the dummy load or the transmission line presents any appreciable amount of reactance, in addition to its resistance, the combined networks will exhibit other than a purely resistive load to the transmitter. Most lower priced, and even some of the higher priced, dummy loads show significant amounts of inductive reactance, in addition to their resistance. The actual resistive/reactive components of the loads should be measured with an RF bridge. Any inductive reactance present in the dummy load can be washed out by using less inductance, in a like amount, for the value of L_1.

The same can be done for reactance present at the input to the transmission line. However, if a large amount of reactance is present at this point it indicates a bad line or misadjustment of the coupling network at the base of the tower. This situation should be checked. Its actual cause should be identified and corrected.

Needless to say, the dummy load must be capable of disappating the entire quantity of unwanted transmitter power at 100 percent modulation.

This system enables you to operate the transmitter at its normal operating parameters and rated power. It wastes no more energy, and sometimes less due to better effeciency, than the insertion of resistors to reduce plate voltage. □

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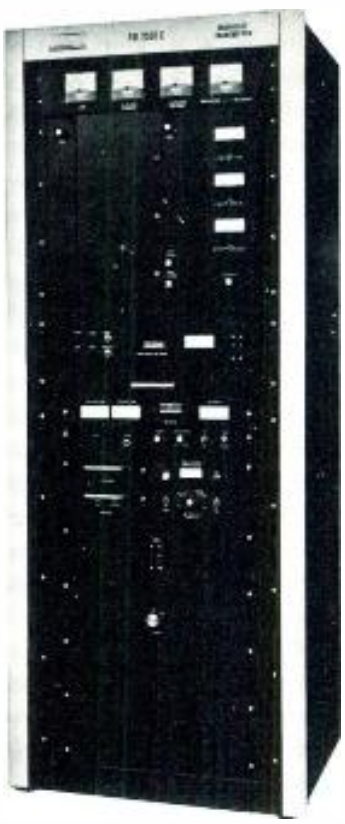

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PEOPLE IN THE NEWS

TeleMation, Inc. announced the appointment of **Donald T. Rozak** as Manager, Special Accounts, for the company's Corporate Marketing Division....**Alan V. Gregory**, general manager of the Analog Products Division of Signetics Corporation, was elected a vice president during a recent meeting of the board of directors....The promotion of three Belden executives has been announced. **Donald J. Walsh** has been named vice president and general manager of Belden's Transportation Division in Oak Brook, Ill.; **Richard F. White** becomes vice president-manufacturing of the Richmond, Ind.-based Electronic Division; and **James D. Eaton** has been appointed corporate director of engineering and research for the corporation in Geneva.

Donald T. Rozak

David Kinne

Ronald L. Stier

After twenty years of successful activity in behalf of Rohde & Schwarz, the last fifteen years as President of Rohde & Schwarz Sales Co. (USA) Inc., **Rudolf Feldt** has resigned from his post....Berkey Colortran, Inc., a division of Berkey Photo, Inc., announces the appointment of **David Kinne** as manager of Berkey Colortran's Rental Division in Burbank, California....New assignments for two managers in Belden Corporation's Electronic Division have been announced. **Ronald L. Stier,** most recently division marketing specialist, has been named to the new post of marketing manager. **Michael J. LaPorte,** formerly assistant sales manager, has been promoted to general sales manager. Both men, presently based at Belden's corporate offices in Geneva, Ill., will relocate to the electronic Division's offices in Richmond, Ind.

Bussco Engineering Inc., designers and fabricators of Bus interconnect devices for computer back panels, has recently announced the appointment of **William M. Pollack** as Vice President and General Manager of their new facility at El Segundo, California....Eastman

Michael J. LaPorte

William M. Pollack

George Underwood

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Kodak Company has announced the appointment of **Hartwell T. Sweeney** as director, sales development, motion picture and television markets, in the marketing division's motion picture and audiovisual markets division (MP & AVMD) of the U.S. and Canadian Photographic Division. He succeeds **John A. Pistor** who retired February 1.

James E. Thompson has been appointed to the newly created post of Sales Manager with Recortec, Inc., Sunnyvale, California....**Harry H. Breeze** has been elected Secretary and Director of Corporate Development of Scientific-Atlanta, Inc., succeeding **William L. Davenport** as Secretary. Davenport, who has served Scientific-Atlanta since 1959 as Vice President, Treasurer, and most recently Secretary, remains as a Director of the corporation, and Corporate Counsel.... **George Underwood** has been appointed Vice President, General Manager of Cornell Dubilier's Fuquay-Varina North Carolina Operations....The promotion of Charles F. Hedblom to the position of Product Line Manager of Transducer Products was announced by Ailtech.

Dave Woolf

Vicki Sagers

Ed Gallagher

Dave Woolf has been promoted to manager of marketing services at Davis Manufacturing Division of J I Case....Concord Communications Systems announced the appointment of **Richard P. Boyd** as Vice President of Sales and **Edward Pessara** as National Sales Manager....Dictaphone Corp. has announced the appointment of **Saul Freedman** as Ansafone Product Sales Manager, a newly created position in the Information Products and Systems Group....TeleMation, Inc. announced the appointment of **Vicki Sagers** as manager of the company's Advertising Department. Two new regional broadcast specialists have been added to the company's sales force. **Linton D. Hargreaves,** based in TeleMation's Dallas office, will serve broadcast customers in Texas, Louisiana and Mississippi. **M. L. Thompson,** assigned to TeleMation's Atlanta office, will cover the broadcast market in Georgia, Florida, Alabama and Tennessee.

Lynch Communication Systems Inc. (NYSE) announces the appointment of **Thomas A. Rourke** as president of Lynch Circuits Inc....**Bill E. Smith** has joined Audio-Video Concepts, Inc. as Production Supervisor....**Ronald J. Siebert** has been appointed Assistant Manager of Industrial Distributor Sales of International Rectifier Corporation's Semi-conductor Division....**Ed Gallagher** and **Jon C. Clayton** have joined Strand Century Inc. as regional marketing-sales managers for television, motion picture and photographic studio lighting.

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What do you do with your off-duty hours if you work in the engine room of a tugboat? Well, if you're Richard Kihn of Anahuac, Texas, you learn electronics with CIE. As he tells it: "Even before I finished my course, I passed my First Class FCC License exam and landed a job as broadcast engineer with KFDM-TV in Beaumont, Texas. Then in my first year at KFDM, I finished my CIE course, earned two raises and became a "two-car" family! Not bad for an ex-tugboat hand! "I'd recommend Cleveland Institute of Electronics to anybody interested in broadcasting."

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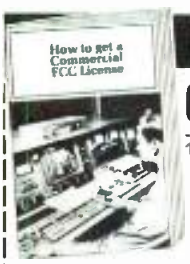

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July 13, 1972

Mr. Morris T. Covington
Director of Research
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Dear Morris:

This long overdue letter will let you know how very pleased we are with the continuing good service from our Taft Audio Distribution Amplifiers.

As you know, I had six of these amplifiers on the test bench for six weeks and abused them in every way possible. I did not experience a single failure; in addition, they held their specifications in every way.

I had evaluated several "well-known" distribution amplifiers before I tested the Taft DA, and I knew then that this was the DA for us. It is right in every way: size, individual power supply, number of outputs and performance. After several months of hard and continuous service, I am still well pleased with all fifty two of them.

I will recommend your Model 5002 Audio Distribution Amplifier, and also your Model 4002 Monitor/Power Amplifier without a moment's hesitation.

Yours very truly,

William E. Thomson
Audio Engineer

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(1) 18 isolated 600 ohm outputs (80 db)
(2) 20-KHZ ± .25 db, .25% total distortion (with "EQ" and "Rolloff" in flat position)
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bookreview

Linear Microelectronic Systems, written by A. G. Martin and F. W. Stephenson, aims to present the undergraduate student of electrical and electronic engineering with detailed instruction in the analysis of linear active systems.

Following an introductory chapter on the mathematics of circuit analysis and circuit theory, basic concepts of transfer functions and network singularities are introduced.

A discussion of active devices serves to introduce the student to the ideas of device modelling; basic circuit models for the bipolar and field-effect transistors result from this approach. Having described the fundamental transistor connections, a wide variety of amplifier forms are studied. These include a review of devices currently available in IC form.

The following two chapters consider the nature and application of feedback, both positive and negative. The effects of feedback and methods for analysing the degree of system stability follow naturally from the discussion. The problem of ensuring system stability is also discussed.

Advanced analysis is treated by means of the nodal admittance matrix and instruction is given in the study of networks containing several amplifiers. This theory is applied to examples taken from analogue computing and network theory. Examples to illustrate the use of amplifiers are taken from the wide variety of techniques for designing RC active filters. The text concludes with a chapter on the practical aspects of amplifier design and application.

This book is available through Crane, Russak & Company, Inc.

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In recent years, the application of the light emitting diode (LED) has avalanched into an exciting and interesting field both for the commercial user and for the hobbyist.

LED Circuits & Projects, written by Forrest M. Mims, III, is a completely up-to-date book containing a brief introduction to the theory of LEDs and then progresses to cover circuits and their applications. Installing LEDs, operating hints, LED detector circuits, multiple-color LEDs, and much more are discussed.

Source/sensor pairs, indicators and displays, communication systems, intrusion alarms and ranging systems are some of the circuits covered in other chapters.

The last chapter explains diode laser theory and operation. It discusses laser structures, electrical-optical properties, SCR pulse generator, laser safety, etc.

This is a valuable reference source for application of the light emitting diode. It is available through Howard W. Sams & Co., Inc., Indianapolis, Ind.

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Station to Station

Another Look At Dead Air

I enjoyed your article on WLCC and KLSD in the October issue. With limited money, the only way new educational stations can be built or old ones continued is with the help of local broadcasters. School budgets do not allow for capital expenditures so donations of old equipment are most helpful to educational stations and a tax break for broadcasters.

WVSU was started in 1967 on $150 and the help of local radio and television interests. A number of disc-jockies and staff personnel that had their first experience with radio at WVSU have moved on to positions with radio stations in Birmingham. I would like to commend the local radio, television, CATV stations for the help they have given educational radio over the years.

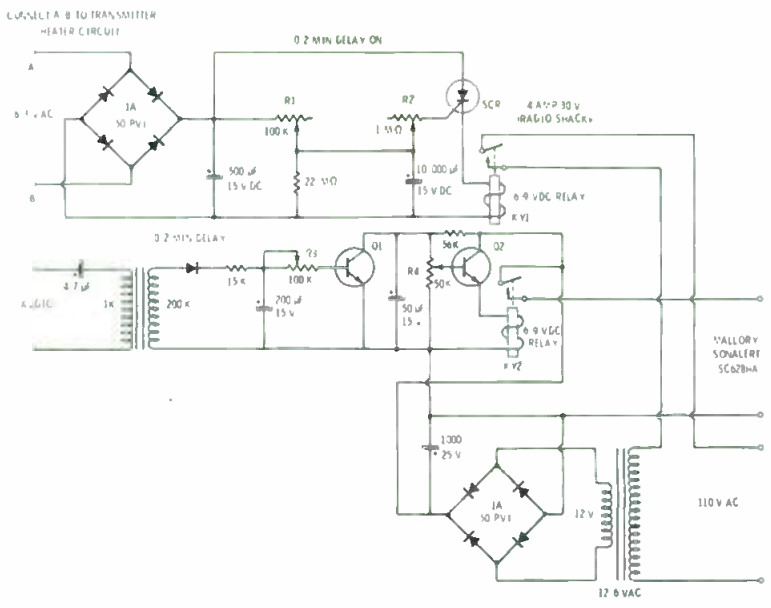
Here is a diagram of a dead air alarm we have installed. I got the idea from your article on station WDZ, Aug. 73. The alarm comes on after the transmitter has been on for fifteen minutes to allow for a warm up period before we sign on. We run a number of educational tapes and the alarm will sound in all rooms of the studios in the event of an equipment failure or early end of tape. (Announcers have a habit of doing other things during a tape show.)

The turn-on delay can be left out or made using the IC 555 Timer. If you have a surplus 10,000mf cap. such as the ones used in computers, it will work in the circuit I used. Parts were not expensive and most of them came from Radio Shack.

The Sonalert came from a local radio wholesaler and is available with different tones and voltage inputs. I used the 6-28 VDC model so that the wires would not have to be in a pipe. (Electrical code) 115VAC models are also available. I used the SK3024 for Q1 and 276-2018 for Q2 (Texas Inst. for Radio Shack).

R1 through R4 are trim resistors. For the delay adjustment, set R1 to maximum and then wait 30 minutes. Adjust R2 until the SCR just fires on. Readjust R1 for the delay time. This will activate the dead air alarm 15 minutes after the transmitter is turned on.

Alarm circuit: with no audio, adjust R3 for minimum time and then adjust R4 for enough bias to close KY2. Adjust R3 now for delay time. Alarm will reset within 5 seconds after audio is restored. The audio connection is made to a 600 Ohm line from AGC to transmitter.



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Q1 is Radio Shack number 2016 (RCA SK3024), and Q2 is Radio Shack number 2018 (RCA SK3054). Of course, a NE555 IC timer can be used for the 20 minute delay timer.

(Editor's Note: It might be worth checking into the new Signetics NE556. It's a dual IC delay timer. Both the 555 and the 556 sell for about $2.)

Richard J. Comer, Jr.
WVSU-FM
Birmingham, Ala.

Tips For Handling MOS Devices

The inherent high input impedance of MOS devices, coupled with practical limits of oxide breakdown voltages imposed by process and performance requirements, renders MOS devices highly susceptible to damage caused by electrostatic potentials and charges of the order encountered in normal component handling.

Thus, to prevent damage to MOS devices, Advanced Memory Systems, Inc. recommends observing the following guidelines in preparation of work areas and handling procedures:

- Wherever MOS devices are handled (receiving, inspection, assembly, engineering, etc.) ground connections to the power-line ground ("third wire") should be provided.
- All equipment such as soldering irons, testers, power supplies, oscilloscopes, etc which comes into contact with MOS devices should be grounded.
- Benches should have a metal surface which is grounded.
- Bench stools should be grounded and covered with conductive material, so that electrostatic potentials are not generated by sliding across the seat.
- Grounding straps should be installed at work areas, and worn whenever MOS devices are touched. One end of ordinary shielding wire is grounded while the other end is looped to fit over the operator's wrist.
- For safety there should be a series resistance of about 100K ohms between the operator and the powerline ground. This can be accomplished by either using a conductive foam around the wrist or by connecting a resistor between the wire and the power-supply ground.
- Clothing made of nylon or other synthetics which generate electrostatic potentials should not be worn.
- MOS devices should be kept in containers made of conductive material. Outside of their containers, MOS devices should be stored with all pins imbedded in conductive foam or foil.

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(Continued from page 30)

Standard, DC Teleprinter Line. This will be a metalic wire circuit between you and the test board without transformers. The telco will supply the DC signaling current for the transmission.

The printer needed is a Receive Only (RO) model and it should be one that will stand up under heavy usage. There are several makes and models available today for your selection. These may range from those with a high percentage of its components mechanical, to those with little mechanics and about 80 percent electronic. The mechanical models contain many rods, levers, etc. The electronic use IC memories, counters etc. And of course, there are those for light duty and others for heavy duty service. All of these can be made to work on any of the standard transmission speeds and codes but they will not accept all codes and speeds and automatically work with the one in use. They must be preset at the factory for the particular code and speed to be used. This is why it is important to get the correct information before ordering.

For the alarms and other special functions or selective symbols you will need in your Station application, a "Station Selector" is often required. This selector is an outboard unit that has additional circuitry that can't be incorporated within the teleprinter itself. What the printer can accommodate will depend upon the particular make and model you select. Some of these selectors may be supplied by the teleprinter manufacturer, but they are often supplied by an outside concern. One such company is Universal Technology, Inc. of Verona, N.J. which has many standard interface equipments that can be adjusted to do many of the extra functions required in a teleprinter installation.

Installation

Many Stations are buying and installing their own printers and providing their own maintenance, so here are a few pointers.

If your selector is an outboard unit, wire it in series with the printer when attaching to the telco line. In this manner, you have both an interlocking arrangement and will not load the telco line. This is a DC line with the telco supplying the current, so if several units (printers or selectors) are placed across the line in parallel, a greater load is placed on the telco line.

This current supplied by telco will be regulated at about 62 ma. DC. A printer adjusted for DC input will have a tag on the input terminals or cable showing the type circuit and the limit of current it can handle. The electronic model by Extel® Corp. will have a maximum limit of 60 ma. After connecting the printer and the selector, the actual line current should be measured by inserting a DC milliammeter in series with the line. If there is transmission on the line, it will be impossible to get a true measurement as the meter will dance a jig trying to follow the pulses and the effective overall reading will be low. Wait until the end of the message. When the line goes quiet, the meter will stand still and give a correct reading.

When the line current is higher than the printer input design calls for, the printer will be overloaded. This overload, depending upon its severity, will cause possible damage to the printer input circuitry, garbled printout, or only some characters may be in error because it fails to shift. If the printer has no provision on the input for adjusting to the higher current, shunt a 50 Ohm 5 Watt resistor across the printer input. This will not affect the line too much, but it will provide some of the current with a shunt path across the printer and the printer will work reliably. This resistor should be only across the printer input, not the line itself or the selector may not perform properly.

Alarm

The selector used will determine the type alarm system that must be used. If its alarm output is a pair of dry relay contacts, the external alarm can be whatever you desire to add on to it. But if it is IC logic level output, this will require an interface of some type before external systems can be added. Such logic output may only supply about 3 ma. of current at about 5 VDC.

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The logic output, however, can drive one of the small electronic alarms for a local alarm at the printer or newsroom.

Maintenance

There will be periods when the network will be very active and other times it will be idle. So, if the printer has not printed out anything for some time, it could be that the circuit is idle or it could mean that the circuit is dead. On each printer there is a circuit alarm lamp. When there is transmission, this lamp will flicker on and off rapidly, following the transmission pulses. This is a normal situation.

During periods the line is idle, this lamp will be out. This too is normal. But, if that lamp is on steady and at full brightness, the circuit has gone open, either locally or the telco line. Open the circuit at the telco terminal and insert the DC milliammeter in series with the line and measure current. If the line current is there, the circuit is open to the printer, so check for a loose plug or other break in the line. But if the current is not there, inform the telco that the line is in trouble.

There can be another cause for no printing — the power plug pulled or a blown fuse. Under these conditions, the signal alarm lamp will not light either, but there is a power pilot lamp that should be lit if the power is OK. Another quick check for power: Turn the power switch off and back on. You will get a bell if power is OK and if the print head is away from the left margin, you will get a carriage return.

The signal is a DC signal, so the printer cannot work if the line polarity has been reversed for some reason. During the installation, the polarity of the line and cables should be marked so this can be checked quickly at a later date. If the line has been reversed, the printout will be garbled.

The print heads should be kept clean, especially those on an electronic model. These heads are a battery of small solenoids with a needle-like plunger that pops out of each solenoid to provide its dot of the 5 x 7 dot matrix. When the ribbonless type paper is used, these plungers contact the paper directly and can pick up paper dust that may eventually clog the solenoids. To clean, turn the machine off and tilt the printhead away from the platen. Use a brush to wisk away any paper dust accummulated and with a needle or other small tool, work the plunger in and out several times by inserting the tool through the small port in the rear of the solenoid. This will clear the solenoid.

Summary

A Station may buy or lease its own teleprinter equipment for use on the Weather Wire. Check with the Weather Bureau in your State for the correct signal, speed and alerting signal and symbols in use. Careful attention to these details will provide a smooth operation from the start, but if incorrect information is programmed into the machine or selector, it won't work properly, if at all. And to save on maintenance and later down time, select a machine that can stand up to heavy duty usage. □

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NEW PRODUCTS

Time Base Corrector

A new digital signal processor that combines time base correction, plus dropout and velocity compensation functions in a single unit, and permits helical scan videotape recorders to produce broadcast quality signals, has been introduced by **International Video Corporation**, Sunnyvale, Calif., and Quantel Limited of Great Britain.

Michael A. Moscarello, IVC president and chief executive officer, said the new TBC-2000 digital signal processor is the most sophisticated and reliable digital system ever developed and substantially outperforms competitive products. It is designed for capstan servoed helical scan VTR's including all open-reel, cartridge and cassette recorders.

The TBC-2000 produces a 56 dB signal to-noise ratio—substantially higher than any other digital correction device.

The TBC-2000's window (a measurement of extremes in signal variation) is the widest of any available digital signal corrector. It is ±1.5 lines (190 usec).

Four line storage, also the best in the industry, eliminates color breakup in wrong field edits.

Dropout and velocity compensation, processing amplifier, and EIA sync pulse generator are also included. The TBC-2000's output can be genlocked to studio sync.

For More Details Circle (65) on Reply Card

Color Production System

Hitachi Shibaden has announced a new low-cost, two-camera color teleproduction system. Designed to provide a modestly priced portable color television studio, the model "HSPC" utilizes two of Hitachi Shibaden's new FP-1500 single-tube color cameras. The single-tube design does away with complicated optical separation systems common to multiple tube cameras. The result is no overlapping of color images due to misregistration.

This type of system is able to withstand the external shocks asso-

(More...)

The new Revox A700 – $1695
the performance is shattering

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ciated with portable use. Each of the cameras is equipped with a rear-rod control zoom lens having a range of 5:1. Collapsible tripods and dollies for camera support are provided with the package. Two portable cabinets with built-in carrying handles are utilized to house the control equipment. Included with the system are three 5" video monitors, four input audio mixer with monitor amplifier/speaker six input vertical interval switcher/fader, RS-170 color sync generator, three headphones and all necessary cables and connectors.

For More Details Circle (66) on Reply Card

Pre-Sunrise/Auxiliary Transmitter

LPB Inc. announces the immediate availability of their 50D 50 Watt AM Transmitter, earlier models of which have been used by Armed Forces Radio and college broadcasters for many years. The 50D version utilizes a broadcast quality crystal and all other refinements to meet a proof of performance and the other requirements of Part 73 use as an auxiliary transmitter. (The FCC has no provision for considering the issuance of Type Acceptance on a 50 Watt transmitter.)

The LPB 50D is ideally suited for the new 50 Watt pre-sunrise authorization or as an auxiliary transmitter. Total price is $1,495, f.o.b. Frazer, Pennsylvania via motor freight. Delivery is 60 to 90 days from receipt of order.

For More Details Circle (67) on Reply Card

Character Generator

Datavision, a manufacturer of video generation equipment, has announced a new character generation system offering high-character resolution. Prices given are much lower than ever before available for equipment of this type.

Designated D-3400, the system consists of: a Model D-3000 Video Character Generator, a Model D-4000 Random Access Memory which uses low-cost "floppy" discs for storage, and an Address Keyboard for access to the memory. The equipment was recently demonstrated at the NAB Show.

According to Frank D'Ascenzo, Marketing Manager for Datavision, "The D-3400 System is the first low-cost video character generation equipment to provide truly high-quality character structure, and other features most asked for by studio engineers. The floppy disc memory system is ideal for this type of application, since each disc has the storage capacity of 300 pages of information, is easy to use, costs only a few dollars and any title or page is accessible in about ½ second."

For More Details Circle (68) on Reply Card

Portable Color TV Camera

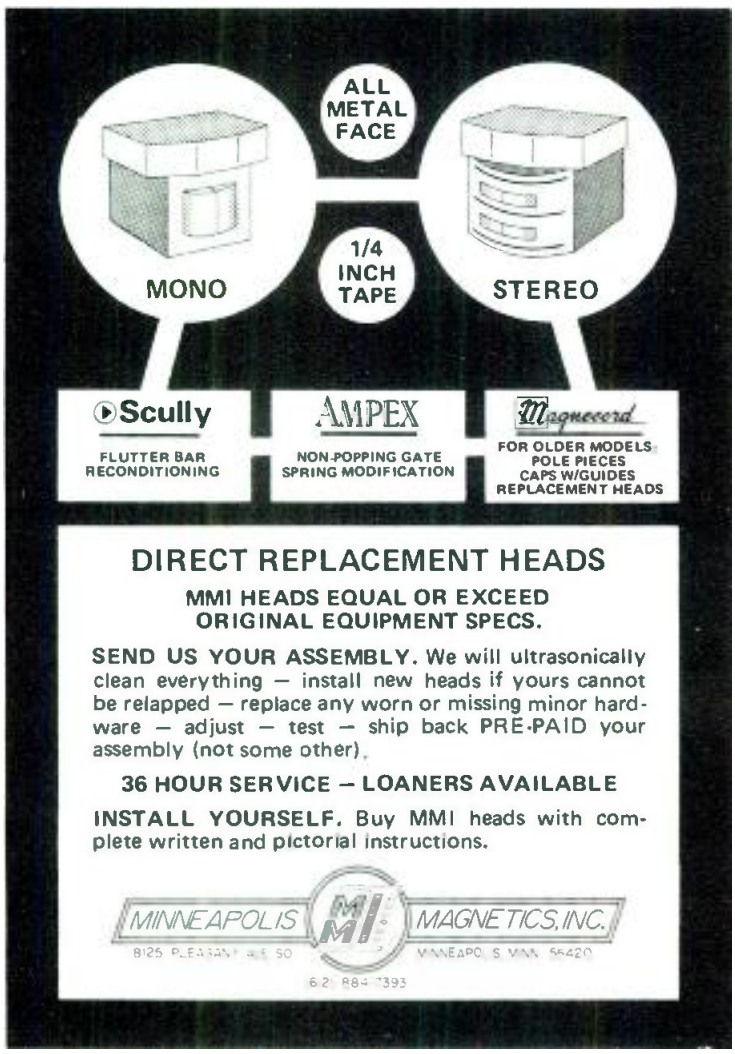
RCA's new portable color TV camera, the TKP-45, gives the operator indoor/outdoor maneuverability and camera angles not possible with studio models. Its developers, **RCA Broadcast Systems,** Camden, N.J., claim big-camera quality performance for the 20 pounder which will operate with up to 1,500 feet of small cable, less than one-half inch in diameter. The cameraman can use the camera's three-inch electronic viewfinder to compose his picture. The TKP-45 was a featured new product at RCA's exhibit at the 1974 NAB convention in Houston, Tex.

For More Details Circle (69) on Reply Card

Microwave Remotes Antenna System

Nurad, Inc. has announced the new "Quad Polarized" microwave antenna system Model 20 QP-1 that is designed to solve many of the microwave problems of auxiliary television broadcast operations.

The system consists of an omni-



For More Details Circle (43) on Reply Card

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directional array of four "Quad Polarized" antennas with remote selection of antenna and polarization. It is designed to operate with existing microwave equipment at a central receiving location. For the mobile or remote location a dish type circularly polarized antenna NURAD Model 20 CR-2 is used with the remote transmitter.

For More Details Circle (70) on Reply Card

TV Source Synchronizer

S. Oyama, President, NEC America, Inc., and Lyle O. Keys, President, TeleMation, Inc. have jointly announced the sale of two NEC FS-10 Frame Synchronizers to NBC, New York and Burbank, California.

The FS-10 Frame Synchronizer was introduced to broadcasters at the recent NAB Convention in Houston. The sale to NBC came after their post-NAB evaluation of the unit at their New York facilities.

The first product of its kind, the FS-10 represents a revolutionary step in handling non-synchronous video sources. It allows switching and special effects of asynchronous sources (studio/remotes/networksatellite) without the usual program disruption.

Through digital conversion of the analog signal, a complete frame of video information is stored in a 3-megabit semi-conductor memory at the incoming frame rate and reconverted synchronous with local reference sync. Conversion is made with no detectable loss in picture quality.

The product is manufactured by Nippon Electric Company, Ltd., Tokyo, Japan, and marketed by their wholly-owned subsidiary, NEC America, Inc., New York. TeleMation is NEC America's exclusive sales representative for the FS-10 Frame Synchronizer in the United States and Canada.

For More Details Circle (72) on Reply Card

Professional Recorder/Reproducers

Ampex Corporation featured its MM-1100 and AG-440C Series of professional audio recorder/reproducers at the 1974 Audio Engineering Society convention in Los Angeles May 7-10, according to Charles A. Steinberg, vice president - general manager of the Ampex audio-video systems division.

The MM-1100 second generation multichannel audio recorder/reproducer is designed for professional audio mastering applications. Since the delivery of the first MM-1100 in February of 1973, more than 175 have been placed in service at professional recording studios throughout the world.

The Ampex AG-440C audio recorder/reproducer, introduced in February of this year, is designed for use in recording studios and radio stations and for professional recording applications in education, industry and government.

Other Ampex equipment at the AES show included its Time Code Synchronization System, the AD-15 professional audio tape duplicating system, the AG-600B portable audio recorder/reproducer for professional recording applications and the AG-500 solid state recorder/reproducer designed for broadcast, studio, educational, commercial and government uses.

For More Details Circle (73) on Reply Card

Overmodulation Limiter

From hard rock to classical, the new **UREI Teletronix** BL-40 MODULIMITER provides the AM broadcaster with independent adjustment of RMS compression and peak limiting to prevent overmodulation without clipping. It gives continuously variable symmetrical or asymmetrical limiting; constant 95% + modulation or a more conservative dynamic approach.

MODULIMITER uses a patented electro optical attenuator which offers exceptionally smooth RMS compression characteristics, and a new FET peak limiting section with instantaneous attack and triggered release to provide protection from overmodulation without clipping or distortion.

Frequency response is ± .25 dB 30 Hz - 15 kHz, ± .5 dB 20-30 Hz and 15-20 kHz. Distortion: less than .5% T.H.D. 30 Hz to 15 kHz. Signal-to-noise ratio is better than 70 dB at threshold or RMS limiting.

For More Details Circle (74) on Reply Card

Cartridge Splices

(Continued from page 36)

Occasionally a splice is tight enough that it will not be detected, and the cartridge will run continuously until stopped by switching the mode switch to "normal". When the 4PDT mode switch is in "normal" the machine will function as it did prior to the modifications. All conventional record and playback of cartridges remain unchanged. Should the mode switch accidentially be left in "splice

(More)

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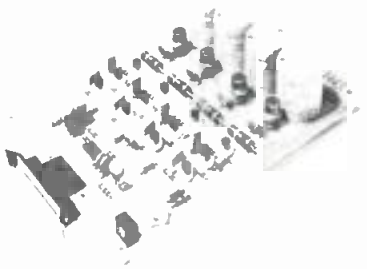
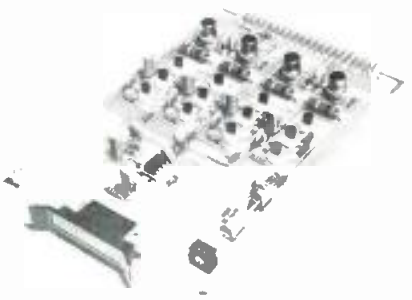
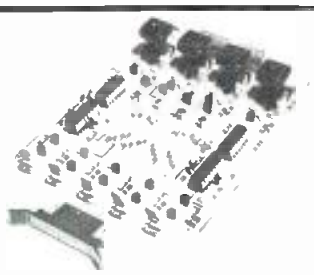


MODEL 227 4 x 1 remote crosspoint switch. Balanced transformer inputs. Adjustable output bus level. $210



MODEL 217 4 channel or 4 x 1 remote crosspoint switch. Output bus may be assigned to required channels. $130



MODEL 221 4-stage universal tally/lamp driver. Incorporates expandable interlock clearing function. $130

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sense" and a recorded cartridge put in the machine for normal playback the recording will not be damaged because the machine cannot start in this mode unless both the start button and the "push to start" switch are pressed.

It is not necessary to use erased cartridges in the detector as the cue tone is recorded continually and the machine will not stop until a splice is detected. Of course, all cartridges must be erased after the splice is located. This modification has been in service for over a year at WDAF. It is used whenever needed to detect splices in critical applications. □

Lighting

(*Continued from page 21*)

absorbed the green. (By putting magenta in the back light, you have just eliminated the contamination by absorbing it.) The same thing will happen to the blue contamination if yellow is used. Use these methods only if contamination occurs.

If you now see too much magenta or yellow, put a piece of scrim in the back light over the filter rather than dimming. Dimming will introduce a different kelvin temperature and color and may effect the results of the above methods.

I have talked about contamination in the last few paragraphs. Let me make clear that I am speaking about the unwanted bounce off a chroma key screen, whether it is blue or green, that is projected onto the subject or prop that is not intended for chroma keying. Many times on your home television you will notice a halo around the news commentator that seems to be keying, or his shoulders or hair that is keying. This is contamination. Here is where you must make a determination as to whether it is lighting, or incorrect alignment of technical equipment, or just a plain malfunction. □

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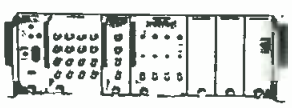

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"PARTS — for SPOTMASTER cartridge units. IN STOCK — IMMEDIATE DELIVERY, overnight to PA, NY, & NJ. COMMUNICATION MEDIAS, Box 54, Allentown, PA 18105 (215)-437-0607 or 437-9447. 10-73-12t

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Performance	Electro Sound ES-505	Studer A-80
Mechanical		
Timing Accuracy	±0.1%	±0.1%
Wow and Flutter 7½ ips	−0.08 rms	−0.07 rms
Electronic		
Frequency Response 15 ips	30-18K Hz ± 2dB	30-18K Hz ± 2dB
Signal-to-Noise 15 ips— Two Track	63 dB Unweighted	62 dB
Distortion	0.4% 2 HD @ 500 Hz Peak Record	−1.0% @ 1K Hz. Operating Level
Price	$3,395	$6,670

ELECTRO SOUND, INC.
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Sunnyvale, CA 94086
(408) 245-6600 Telex: 34-6324
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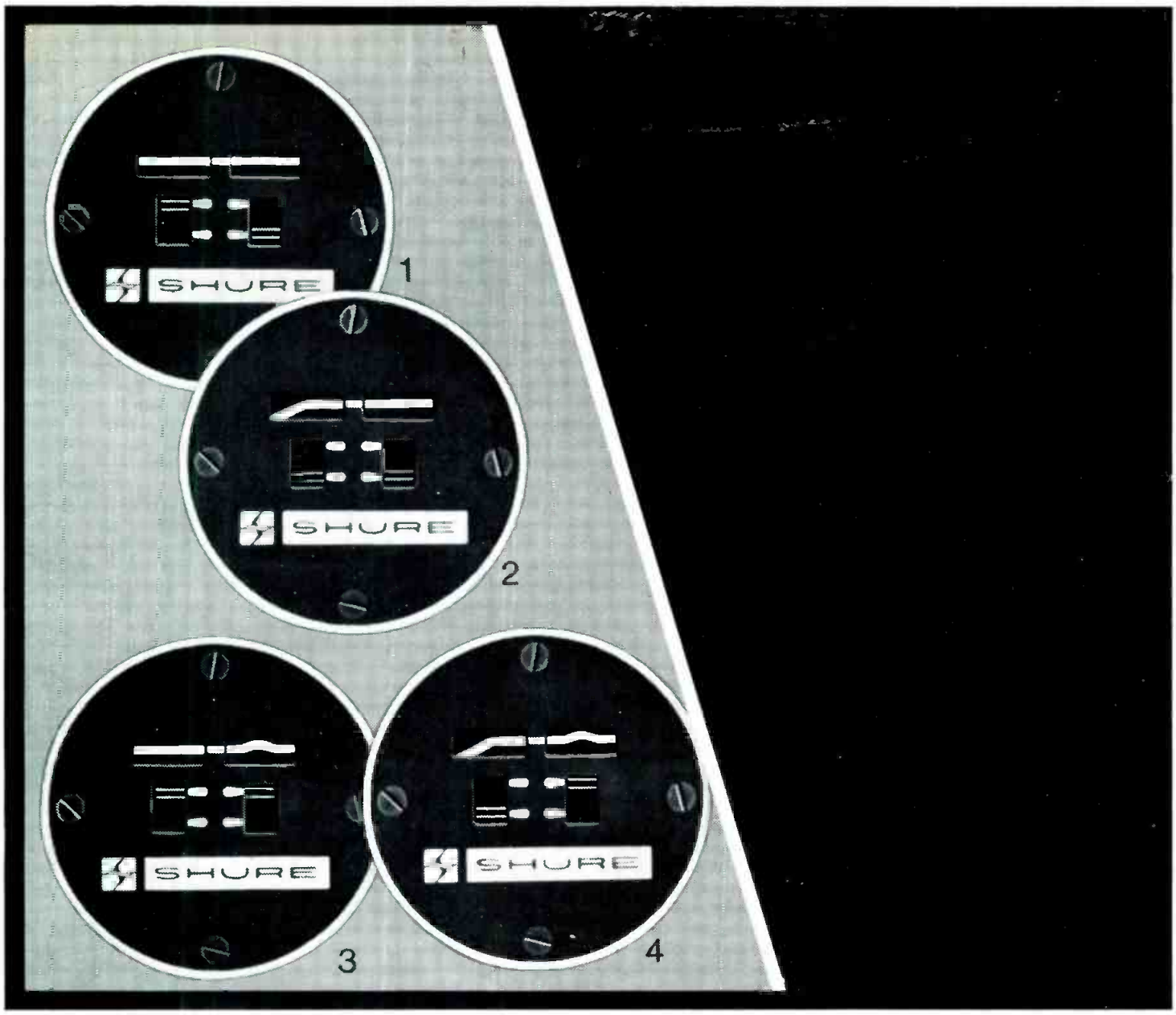

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The extraordinary Shure SM7 professional microphone features something you've never seen before: a *built-in Visual Indication Response Tailoring System* that offers you four different frequency response curves—and shows you the curve you've selected with a graphic readout (see above) at the back of the microphone! Choose: 1. flat response; 2. bass roll-off; 3. presence boost; 4. combination of roll-off and presence. And there's more: the SM7 delivers exceptional noise isolation with a revolutionary pneumatic suspension mount . . . an ultra-wide, ultra-smooth frequency response . . . an integral "pop" and wind filter . . . and a cardioid pickup pattern that looks "text-book perfect." The Shure SM7 Studio Microphone was extensively field-tested in recording studios and broadcasting stations! Write:

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