When you're reaching for extra revenue in competitive AM markets, our Model 753 Modulation Monitor—the Extender—gives you an important competitive edge. It not only makes extremely accurate proof-of-performance measurements but, more importantly, it lets you modulate your transmitter to the maximum outer limits of coverage—in absolute confidence. Accuracy is better than 1%. The Model 753 is also fully adaptable for Automatic Transmission System (ATS) use, and has FCC Type-Approval No. 3-234.

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Exclusive features of the Model 754 include: frequency synthesized digital readout of carrier frequency (optional) and a unique IF filter design that optimizes off-the-air monitoring.

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You now have a single source for refurbishing RCA High Band and Low Band video heads and the Ampex Mark III, Mark X and Mark XV heads. No other refurbisher works harder at satisfying a broader range of customer services than Videomax.
24 KWWL Revs Up Election Returns. With a modest investment, this TV station designed a faster and more efficient method of reporting election returns. Rodney Hughes.

32 Elections Mean Community Involvement. Large or small staff, it does pay to get various local interest groups involved in reporting election returns. Phil Whitney.

36 How To Win On Election Night. Our Radio Workshop editor talks about ideas for reporting and handling elections. Peter Burk.

40 Audio Automation Quality Control. BE audio editor describes audio quality control tests that are easy to pull and that take up minimum time. Dennis Ciapura.

45 San Francisco Will Be Radio City. The National Radio Broadcasters Association will meet in September for their national radio conference. Exhibitors and hospitality suites are included.

48 Eliminating The News Blues. Manual and automatic color correction is discussed and all-station application examples are included. Neil Sclater.

About The Cover

Our theme this month is upcoming elections. The photo was taken at KWWL TV and the first of three articles begins on page 4. (Photo by Mike Jamieson)

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Dudley Rose, Graphic Designer
Joe Roizen, Video
Peter Burk, Radio Workshop
Dennis Ciapura, Audio Editor

ADVERTISING
Mike Kreiter, Director
Gloria Parmenter, Production
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Robert E. Hentel, Editor
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Selection of a pivotal wipe is obtained by depressing a unique pattern button. Selection of the rotational mode (R) or splitting mode (S) for conventional patterns is achieved by first selecting the conventional pattern (e.g., a square), followed by operation of a “shift” key. A total of 54 patterns is available.

Model 1600-7K is also available in PAL and PAL-M versions. For additional information on the system, including a demonstration video tape, contact your nearest Grass Valley Group field office.

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Radio "Freeze" Deluges Commission with Applications

A veritable avalanche of applications for new AM and FM radio stations and major improvements in existing stations was filed by the Commission's June 30 deadline establishing a "closed season" on the acceptance of such applications. During the month of June, the Commission received 85 applications for new AM stations (plus 171 applications for major changes in existing stations); 109 new commercial FM stations (92 major changes); and 76 new educational FM stations (32 major changes).

With these applications added to similar applications already on file, the Commission now finds itself with a total of 1,287 applications either for new radio stations or for major changes in existing stations. If the Commission continues to dispose of these applications at the same rate as the past several months, the last application will have been disposed of shortly after 9:30 a.m. Monday, February 26, 1979.

The Commission is acutely aware of the problem of processing these applications, and is reorganizing its processing staff. Proposals under consideration include expanding the processing staff, simplifying processing procedures, or contracting the job of processing to organizations outside of government.

CATV Eyes Smaller Satellite Receive Dishes

The cable television industry is urging the Commission to permit cable systems to employ satellite receiving antenna dishes smaller than 10 meters in diameter in order to reduce the complexity and cost of terminals to be used with satellite distribution systems. The present envelope requirements can be met at the commonly-used down frequencies in the 4 GHz band only by employing diameters on the order of 10 meters. This dimension is established for several reasons, including the need for a narrow antenna beam to avoid overlapping into adjacent orbital slots, minimization of side lobes, improved signal-to-noise ratios, and reduction of foreground noise pickup.

Cable industry spokesmen have reported performance satisfactory from the cable system's standpoint using antenna diameters as small as three meters, and an economical transportable earth terminal with an antenna aperture of approximately this size was demonstrated to Congressional staffers in Washington last month.
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Congestion is already heavy in the 4 GHz band, which must be shared with terrestrial common carriers. The Commerce Department's Office of Telecommunications (OT) has urged increased experimentation in the 11 to 14 GHz and 18 to 30 GHz bands as the ultimate home for this type of service.

Commission Acts on UHF Improvement Proposal

The Commission has proposed to amend its rules governing UHF television receivers to require that any television receiver which is shipped with a permanently affixed VHF receiving antenna also have permanently affixed an effective UHF receiving antenna. Alternatively, the receiver could be shipped with neither antenna permanently connected.

The proposal was issued in response to a petition by a coalition of TV broadcast organizations led by the Council for UHF Broadcasting (CUB). Still awaiting Commission action is a companion proposal filed by CUB asking the Commission to reduce the permissible noise figure for UHF receivers below the presently permitted 18 dB above kTΔf (See Sept., 1975 D.C.)

Both of these steps urged by CUB are part of an extensive "Action Plan" aimed at improving the quality of UHF reception by various actions by both governmental and industrial entities. Emphasis is placed on improved reception, improved transmission and an educational program aimed at both the general public and television technicians.

SHORT CIRCUITS

The Commission has contracted with the Office of Telecommunications (OT) to study the feasibility of VHF television drop-ins at Knoxville, Tennessee and Evansville, Indiana...The Commission has amended the AM rules to make clear that static drains and lighting chokes are permitted in shunt across the tower beyond the antenna ammeter; but be sure there are no shunt tuning components beyond the ammeter...The UHF translator rules have been amended to permit multiple output amplifiers from a single translator to serve different communities...A master antenna television system operator in the West has been ordered to cease and desist from the operation of a system which was generating and radiating the second harmonic of an FM signal in the frequency limits of Channel 7...The Commission received "no acceptable bids" for its television "receiver of tomorrow" (See June, 1976 D.C.)...Class D Citizens Band interference in the 27 MHz band is giving fits to both the Commission and viewers attempting to watch TV Channels 2 and 5; meanwhile the Commission is pressing forward with plans to expand the citizens band from 23 to 40 or more channels, some of whose harmonics would also fall within TV Channel 6...The Commission has informed licensees that the use of "tone clusters" as an attention-getting device is an acceptable practice so long as the frequencies of the EBS tones are avoided.
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Industry News

Radio News Award
Houston Station

Huston’s KEYH has recently received a major award in the 1976 Associated Press Broadcast Radio News Competition for an investigative story. The award was in recognition of KEYH’s investigation and reporting of events that led to the suspension of Houston Police Captain Ken L. Nixon in November, 1975.

KEYH’s award was in the Associated Press Broadcast News largest metropolitan category for cities with more than 300,000 population. Presentation of the award was made recently at the organization’s annual luncheon at the Fort Brown Hotel, Brownsville, Texas.

Commission Ease Rules on DA Designs

The Commission has amended the rules governing certain aspects of the design of directional antennas for AM stations to allow an antenna designer increased latitude in developing a radiation pattern that meets FCC allocation requirements. Many AM stations, in order to provide protection to other stations or to provide coverage in particular areas, employ directional antenna systems. The performance of directional antenna systems is predicted by mathematical calculations. In these calculations, the FCC rules provide for using mathematical assumptions.

On December 12, 1975, the Commission initiated this rulemaking proceeding to consider modifying some of these assumptions, in response to a request by the Association of Federal Communications Consulting Engineers (AFCCE). Under modified rules, two basic changes are made in the mathematical assumptions:

— the assumption concerning loss resistance in the antenna system (a method of determining the efficiency of the antenna system) was relaxed;
— the mathematical computation in systems using tall towers (over one-half wavelength) was increased for calculations providing a little or no radiation when there will be radiation.
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Industry News

FCC Asks For Comments On Operator Licensing

The Commission has initiated an inquiry to solicit comments and recommendations on the relevancy of its radio operator rules to the current state of the communications industry.

Under Section 318 of the Communications Act of 1934, the actual operation of all transmitting apparatus for which a station license is required must be performed only by a person holding an operator license.

However, except for ship, aircraft, broadcast and some common carrier stations, the FCC may waive or modify the provisions of Section 318, and to a large extent, has done so. For example, operator licenses are no longer required for the routine operations of stations such as Police, Fire, Business, Taxi and Citizens Band Radio. Only station licenses are required.

The Commission asked for comments and suggestions concerning the desirability of retaining or waiving the requirement for licensed operators for routine operations of broadcast transmitters.

The FCC asked for comments on the following, should it appear desirable to retain the licensing requirement for both routine and service operators:

- are current examinations producing technically qualified service operators;
- are the examinations outdated and can they be made, to the extent that licenses can be obtained, reflect the knowledge required in light of the current technical state of the communications industry;
- should a period of “apprenticeship” using a “beginner” class of license be required prior to issuance of a regular license to assure some degree of practical experience;
- in view of the wide variety of radio stations licensed by the FCC and unique requirements some of these stations, would it be desirable to have a basic operator/technician class of license and a special endorsement such as AM, TV, Land Mobile, Radar and Microwave;
- if so, what provisions should be made for persons now holding a Radiotelephone First or Second Class License.

The Commission also asked for comments on whether operator licenses should be issued for the lifetime of the holder, rather than for the five-year term; or should operators be required to take a renewal examination.

Comments are due by September 1 and should be received by September 15.

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Industry News

FCC Hits Fraudulent Billing

The Commission has amended its rule prohibiting fraudulent (double) billing practices by broadcast licensees. Under the amended rule (Section 73.1205), no licensee of a standard, FM, or television broadcast station shall "knowingly issue or knowingly cause to be issued" any bill, invoice, affidavit or other document containing false information concerning the amount actually charged for broadcast advertising, or which misrepresents the quantity of advertising actually broadcast, substantially or materially misrepresents the time of day it was broadcast, or misrepresents the date on which it was broadcast.

A new subsection (b) also added prohibiting licensees supplying any document to program supplier providing said information concerning the cost of the program or program matter supplied, including commercial matter, that contains fraudulent information. The Commission emphasized that it was a licensee's responsibility to see that its and employees do not issue documents containing false information.

On May 29, 1975, the Commission initiated a rulemaking proceeding proposing amending the fraudulent billing rule, noting that although the Commission had cautioned licensees against such practices, it had continued and complaints had indicated that these practices might be increasing. The Commission said that for adoption of the fraudulent billing rule in 1965, its concern was with the preparation of a licensee in fraudulent activity. The amendments became effective July 15.

The Commission said its concern in this proceeding was to require licensees to make a statement raising the same questions, regardless of whether the subject of the statement is commercial matter or other program matter. It said it also could see the necessity to treat fraudulent statements issued to program syndicates differently from those issued to others. It said the amended rule would make uniform the applicability of the rule to conduct in substantial part by employees.

In emphasizing the licensee's responsibility, the Commission said it proposed to find violation of the rule where employees issued documents containing false information and where the licensee knew or should have known that the licensee had knowledge and where the information appears to have been issued as the result of an error, mistake not indicating a pattern where reasonable diligence would not uncover the issuance of the information, such as careful reviewed wrongdoing.
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Chapter 3: Kansas State
Bob Fulkerson (KPTS-TV) introduced Curt Lutz, Regional Engineer for Harris to the CPR at its May 11th meeting. Lutz gave two presentations:
1) a talk and slides on micro-computers and application in automation systems
2) a talk and slides on the first solid state kW transmitter. (Bill Keegan, Chairman of the KTSB, P.O. Box 2700, Topeka, Kansas 66601, (913) 582-4000)

The New York Chapter met June 10th at the WQXR Presentation Theater to hear Jack Stephenson of Ampex Corporation, give a talk and demonstration of the new Ampex ATR-1000 tape recorder. He also gave presentation on the state of the art in tape recording and thereafter Ampex personnel at the meet answered questions from the members and guests. (Larry Strasser, ham man. WTFM Radio, Long Island Expressway. Fresh Meadows, New York 11365. (212) 357-8000).

Continued on page 17.
the company whose innovations over the past 12 years revolutionized color television cameras in the United States throughout the world, now puts its 3-Plumbicon picture and a beam-splitter prism into the most exciting new lightweight camera value on the market.

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SBE Journal
Continued from page 16

Chapter 17: Minneapolis

The chapter held its meeting May 22nd at KVBR Radio, Brainerd, Minnesota. Mark Patna, Director of Engineering was the host. The meeting consisted of tours of KVBR studios, the Translator Site and the KVBR-FM site. There were also talks and demonstrations of various pieces of telephone equipment for remotes and talk shows.

Raygor, Chairman, Rt. 1, Box 111, Chisago City, Minnesota X990 (612) 373-4807.

Chapter 26: Chicago, Illinois

The chapter met at Hele Packard on June 22nd to hear Montoya. Hewlett-Packard Products Engineer, talk about “State of the Art Digital Techniques” with emphasis on tube shooting in the data decades. (Robert Churchill, Chairman, 121 West Wacker Drive, Room 300, Chicago, Illinois 60601, (312) 276-5215).

Chapter 33: Southwestern

The May meeting of Chapter 33 was held on May 20th at WXIX-TV studios. The program was a discussion and demonstration of circularly polarized antennas. It was given by Bob Winn from RCA Antenna Engineering Department. A question and answer session followed.

The June meeting of Chapter 33 was held on June 17th at WCPO-TV studios. The program was a discussion and demonstration of the WCPO-TV instant camera associated microwave link. There was increased emphasis on new and especially ENG gear, this probably be a very interesting meeting. Williams, Chairman, 2092 Wood Place, Cincinnati, Ohio 45209 (513) 895-4964.

Chapter 34: Albuquerque, New Mexico

On June 10th Robert S. Berg from the Los Angeles branch of Harris gave a slide presentation on the application of pulse density modulation as used in the new transmitter at KOB and then one ready for installation at KBTV.
CDL has just raised the standard for video production switchers. Again.

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Pulse duration modulation avoids the use of any inductive reactance, e.g. modulation transformer, so that no ringing occurs permitting the passage of highly processed (clipped) audio waveforms without the attendant increase in peak amplitude produced by inductor energy storage and release. In a nutshell, this type of transmitter permits a modulation density, or loudness not attainable by conventional plate modulation. (Michael Langner, Chairman, Gaylord Broadcasting, P.O. Box 737, Albuquerque, New Mexico. (505) 765-5600).

Chapter 36: San Diego, Calif.
On May 26th the chapter met at KPBS-TV to hear Chris Cookson of RCA talk about the RCA TK76 Hand-Held Field and Studio Production Camera. The camera had been seen by many of the members at leading brodcasting shows but it was an opportunity for those members who had not been able to attend to become acquainted with RCA's hand- portable camera equipment. (Attention Bill Montgomery of Convoy Court, San Diego, California 92111).

Chapter 37: Washington, D.C.
Northern Virginia

The chapter held Its May meeting on May 26th at Deltronics in Springfield. Virginia. Delta demonstrated a number of products including their new current measuring system, next tour of the Delta factory. Thanks, Charlie Wright, presented an interesting evening.

The June meeting was with SMPTE on June 2nd. At the meeting there was a demonstration of the RCA TK76 camera. (Charles F. Riley, 22314, 703) 683-3211.

Chapter 41: Central Penna.

On May 27th the chapter at the WHP studios to hear Roberts of Harris Corp. discuss technical slide presentations for history and development of pulse duration modulation for transmitters. (Nelson Maus, Christie St. E31 N. Elora Road, Elora, PA 17317).

Nix On New Cuts

The National Association of Broadcasters has asked the Communications Commission to deny a request to establish Community Access Noncommercial stations, a new class of radio stations.

The new class, proposed by Tobi Kanter of Denver, would operate at 250 watts daytime and 100 watts nighttime. It would offer locally produced programs, musical, dramatic and cultural programming.

In its filing, NAB noted that last year it objected to a proposal for frequencies 530 and 1600 and would establish a local government service designed to transmit various kinds of information to the public.
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### Distortion
- 1%

### Phase Range
- 0 to 360°

### Rise Time
- 100 ±20 ns

### Tilt
- 1%

### Hum & Noise
- 50 Hz

### Gain Stability
- ±1%

### Pulse Width
- 0.250 ±0.050 ns

### Rise Time
- 100 ±20 ns

### Tilt
- 1%

### Hum & Noise
- 50 Hz

### Gain Stability
- ±1%

### Burst Phase
- 0 to 360°

### Tilt
- 1%

### Phase Stability
- ±10%

### Gain Stability
- ±1%

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For Demonstration Only Circle (67) on Reply Card
For More Details Circle (68) on Reply Card
KWWL Revs Up Election Returns

By Rodney Hughes

The Bicentennial spirit created an unusual atmosphere for the "American Way" of covering election returns this year.

KWWL-TV, in the past, has used several manually operated slide boards to create a different visual presentation for these special and exciting news events. Shortly before the 1974 elections, Tim KWWL-TV Vice President and Program Director, convinced management of the need to increase the speed and accuracy of displaying election results. After the design was set, the news department worked out the numbers...
Tom Peterson (KWWL-TV News) and Dr. Russell Ross ("U" of Iowa) anchoring a primary election with the help of their new returns board. These three display panels can handle 60 candidates. Whatever system you use, work with white numbers on black. (Photos by Mike Jamieson)
accuracy. One idea was using thumbwheel switches to select the number to be displayed. Figure 2. Since the displays have a 3.0 second turn around time, taking a few more seconds to dial in the data would not be an unreasonable request. The thumbwheel switches were also used to select which candidate position would receive the data. Therefore, all the data lines are wired in parallel and operate at the +24 VDC level.
You can automatically charge 5 Ikegami Battery Packs at one time.

Here’s how: Just plug in (up to) 5 batteries, push the ‘power’ toggle switch to ‘On’ and leave them alone.

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For More Details Circle (24) on Reply Card
KHP series relays on the relay chassis and LED's on the control panel are selected by the multiplexed output of the thumbwheel switches that are used to select the candidate position. Thus, the operator can be operating the board remotely and still know which candidate is being selected to receive the dialed in data.

When the print push button is operated on the control panel, the selected relay on the relay chassis connects the displays, for that position, to 110 VAC, -24 VDC, and an all clear bus. This push button remains illuminated as long as the display is printing, by latching one of the priority relays. Once all the digits have been selected, the external set of relay contacts on the display devices, which are wired in series, supplies -24 VDC to the all clear bus to dump the print cycle.

A special problem had to be overcome on the relay chassis. Assume the same data is going to be printed. Refer again to Figure 1. Because the relay takes X amount of time to operate, if both 110 VAC and -24 VDC are applied simultaneously, the motor will turn for X amount of time. This may cause the display to flip to the next number, depending upon the tolerances of each display. To overcome this, the three priority relays on the relay chassis cover two possible conditions:

1. The 110 VAC must be applied after the -24 VDC is applied.
2. The 110 VAC must be removed before the -24 VDC is removed.

Thus, the priority relays insure proper timing of control voltages to prevent an erroneous display.

After the control and data system was designed, the 140 candidate positions needed, were divided into seven groups of 20 candidate positions each. This enables the production department to utilize seven people responsible for displaying the election returns. The engineering department was able to construct the entire project in a modular fashion.

The most important advantage will be when a problem develops on election night. At least the whole system will not go dead, including the engineers responsible for an 18 month ulcer of constructing some 4 miles of wire, half of which was cut into one foot lengths.
The control panels went to work in Operations at KWWL along with (left to right) Margene Smith, Pam Magee, Marti Nargang, Don Johnson, Sandy Yoder and John Dodge.
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... says WOTV, owner of first Compositor Titling/Graphics System.

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Dear Paul:

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May I extend our thanks to you and to those members of your staff who have contributed so much in the preparation, design and provision of this forward looking equipment and especially to Dennis Fraser, Tom Meyer and Leo Lewis. It was great having those people work with us on this project and we hope that they will continue to support us as we come to be more knowledgeable and familiar with the equipment.

I just thought you might appreciate our words of thanks.

Sincerely,

R. C. Smith
Chief Engineer

April 23, 1976

RCS:rg
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Wish to thank Mr. Smith for his appraisal, and extend an invitation to all Broadcast Managers and Engineers to compare these Compositor I features with any other multfont character generator:

- "Mixed-Font" Pages. Some "multi-fit" systems can display only one font at a time. The Compositor I allows the operator to mix fonts on a page, within a row or within a single word.

- High-Capacity Disk Memory. Some character generators require a disk change between font changes, storage, and program loading. The Compositor I, all fonts, as well as the computer program and up to 800 composed pages, are stored on a single disk and are always available — from any keyboard location.

- Camera Quality Characters. The Compositor I obtains maximum character smoothness by using characters "elements" smaller than the limiting resolution of the television screen itself. It incorporates line-by-line vertical resolution and provides horizontal elements of only 2 nec width — in contrast to the 65 nec element width typical of other comparable priced systems. The Compositor I thus provides on-screen characters that are virtually indistinguishable from camera reproduced artwork.

- Automated Election Reporting. With the addition of the TED (Television Event Display) software package, the Compositor I automatically compiles, formats, totals, and displays election returns. No additional hardware is required.

- Selection of 28 Colors. With the EC-3000 Colorizer/Background Option, characters and/or backgrounds can be colored any one of seven hues, with each hue available at any one of four luminance levels. Black, white, and two levels of gray are also keyboard-selectable. Each character can be colored separately. Background colors can be changed in four-scan-line intervals and background color can be substituted for character color to provide multihued characters.

- Selectable Character Edging. The basic edging option (EO-3000) provides a selection of border, "drop" shadow, or outline; while the EO-3001 Expanded Edging Option adds "slope" shadow and multiple border/outline widths proportioned to the font size.

For more information about the Compositor I, send us the coupon below or call TeleMation Broadcast Sales collect at (801) 487-5399.

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For More Details Circle (89) on Reply Card
Elections Mean Community Involvement

By Phil Whitney, WINC, Winchester, Va.

Most communities expect their local radio stations to give them complete news coverage on election night—both local and national coverage. But without proper preparation, an election night can be hectic, especially for the limited staff. Happily, however, there are some shortcuts and advantages which broadcasters can take. These have proven helpful in several markets.

Get Started Early
The key to success is planning. As soon as possible, preferably six weeks or a month before election day, set up a meeting between broadcast media, election officials and radio amateurs or CB club. Local radio amateur organizations and CB clubs are usually happy to cooperate with the media. The experience gives them practical operating experience and helps them build a positive image in the community which often blames them for interference, real or imagined. They gain valuable experience which would benefit them in an emergency, and the station develops a rapport with them which would be valuable in an emergency situation.

During the meeting with the local organizations, arrangements are made which will facilitate a smooth operation. One subject to cover would be identification cards for amateur or CB personnel who collect the returns at the polling places. Ask the radio club to assign a member a job, then turn them over to election officials.

The operators usually show up at the polling places just before closing, identify themselves, take the returns either outside or wherever election officials request. They should fill out the election forms, mimeographed or printed at the station, to use when the returns come in.

About The Author
Phil Whitney is a broadcast engineer in the finest sense of the word. He goes back as far as you’d want, and yet it wasn’t too many years ago that he won the coveted Engineer of the Year Award from the NAB.

Over the years, Phil has written several articles for Broadcast Engineering. In fact, it was his idea that we devote time and space to a column now known as “Blue Bananas and Sag Tails”.

Meanwhile, Phil Whitney and the WINC staff go about their daily broadcasts in a winning, yet unassuming manner. So winning are they that WINC has won the Virginia Spot News Award four years in a row!

The tote board shown in this photo helps keep the station in total perspective as well as providing the local cable TV outlet a visual view.
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At polls where voting machines are used, the results will appear quickly. At polls where votes must be counted, the wait could be for hours. Of course radio amateurs don’t usually have much trouble finding something to do while they wait.

**The Base Station**

The amateur two-meter net has been very effective in rounding up the election returns and feeding them into news headquarters from the outlying precincts. Ten, eleven and even 20 meters have also been used, but there’s always the problem of DX causing QRM on ten and twenty. With today’s almost universal practice of establishing two meter repeaters, most ham groups can cover just any market, unless the station happens to be a 50 kilowatter.

Request the amateurs or CB groups to set up their own network within the framework the broadcaster needs. When hams use a repeater, it is often possible to have the base station at the broadcast station. When this can be done, the engineering department usually erects a ground plane antenna outside and brings the lead into the operating position. When a low-power transceiver is used to hit the repeater, there is little problem of the amateur RF getting into station equipment.

Higher powered AM units have been known to get into the station audio channels. Most two meter activity now, however, is on FM and usually at comparatively low power. The outside ground plant antenna should help to keep the RF out of the station equipment if there is a problem.

**At The Station**

When the returns come in, the report forms are handed to the secretaries who are doing the totaling, then on to the news department for use in analyses. They become a valuable reference and facilitate quick transcribing of the returns which come in rapidly at times.

It is good procedure to have a staff member at each of the candidate’s headquarters with either a remote pickup transmitter, tape recorder or telephone beeper setup to get quick reactions from the candidate or his representatives as the vote counting progresses, then a victory or withdrawal statement as the outcome becomes known. This is the frosting on the cake and sets the station getting the final statement out as an aggressive news operation.

On election night most of the staff understands that it is a special occasion which requires extra effort on the part of everyone as a team. The program or news director usually stays in the station, coordinating all activities and directing those outside either by telephone or two-way radio. He keeps things moving and fills the dead spots either with material from the network or the news wire. He should also have prepared background material on all phases of the election ready for use so that the entire show moves at a pace and sounds authoritative to the listener.

**Pooling Efforts, Trading Reports**

In communities with some broadcasters, it is often helpful to pool efforts. In the markets where there may be two broadcasters fighting for a small amount of business, there may be a pool of communication between them. In that instance, one station could request the amateurs to help another in the CB club.

Some stations work out a schedule with the local cable TV station, using announcers for the polls and taking their cable audio live on the air. This allows a few bodies in a pool effort, when the cable system has local origination facilities.

When the election is statewide, prior arrangements should be made with stations in other markets. These can trade reports on election night. If earlier such arrangements are made, the better are the chances of getting the best station coverage for each market. They are asked to get your progress reports into their area as you are to have their tape. These can be taped on the telephone and the tape put on a recorder for use when an opening arises.

When the candidate is in another market, this is probably the best way you will be able to get a victory speech actually. Sometimes if the station has made arrangements with has for agreement can be formulated to tape their coverage off an FM receiver and select the pertinent actualities, rather than going by telephone feed. Permission for use are, of course, necessary from each of the stations involved.

Election coverage, planned and handled, can do much toward building an image of competence and professionalism among the broadcasters. One thing that cannot be done is, don’t put either the amateur or CB reports directly on the air. This is not permitted by the

*Everyone gets into the act. Of course, the larger the station, the more explicit the duties.*

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Radio Workshop

HOW TO WIN ON ELECTION NIGHT

by Peter C. Burk, Workshop Editor

There is a growing trend in radio for stations to abdicate the role of covering elections to television. This shouldn’t happen because, as you know, God never meant for pictures to fly. Radio can give us the “local” coverage. Television to some extent is neutral. Television can cover elections for the whole country. Television shouldn’t happen covering elections for your area.

The key to good coverage of elections is advance preparation. Planning for a general election should start no later than September.

There are at least three ways to gather election returns. One is through the local county clerk, whose office may collect and post returns for the public and news media. A second possibility is the local newspaper which tabulates returns. You may, with the proper enticement, be allowed to sit in on the process. Those two methods require limited man-power. One person, a telephone and a cassette recorder will provide “bare bones” coverage. The addition of good quality remote pickup equipment and a second person to act as a runner will enhance the production.

A third suggestion is a system of “poll watchers” who will telephone your station with up to the minute returns. This requires a heavy commitment of “people power” but will produce a lasting image of your station as a professional organization.

A good way to get the necessary number of people to serve as poll watchers is to approach a service organization (Lions, Optimists, or other such groups) and ask them for their help. In return, your station can contribute an agreed-to sum of money for their coffers. You may have to set up several organizations if your county has a large number of precincts.

After getting an organization lined up, schedule a meeting or two. During these sessions, assign specific individuals to precincts and make certain each person knows where his precinct is located. Drill your poll watchers on the necessity for speed and accuracy. Supply forms that are simple to understand and that correspond with the order of parties and candidates on the voting machines or ballots. If you are in competition with other news media, don’t be afraid to tell your people they may have to use strong-arm tactics to get to the nearest telephone first.

Instruct poll watchers to arrive well enough in advance of poll closing so that they will have time to familiarize themselves with their surroundings and find out where the telephones are located. It is also prudent to have them double check figures. Each precinct will tabulate totals at varying speeds. The end result should be a smooth, constant flow of returns back to the station.

One precautionary measure should be taken. One or two members of the station staff should be on standby to cover precincts where poll watchers fail to show.

No matter how well the system planned, a human failure may occur.

On The Line

Since many of the polls will have their tabulations completed about the same time, it’s important to have several telephone lines for the station set aside just for poll watchers. Remember, you’re asking for volunteer help. If Priscilla’s answering service has to make more than one or two attempts to file her returns, she may give up and go to a Disney movie, leaving you no precincts.

A good rule of thumb is to use one line for each precinct. Rotating lines should be installed so that all watchers will be called the same number to call.

Assign unflappable people to answer the telephones in the most gentle and caution them to have good telephone skills repeated if there is any question.

Assign people to keep “running” totals as the night progresses. Lend runners to get the totals and come in from the phone operators to the people keeping an eye on the party totals and finally to the station person on the air.

Notations on the tally sheets and precinct numbers and the location can help the anchor person predict trends, if indeed there is a move. We get that deeply into voting patterns. It is important to get the poll watchers numbers on the forms so you can quickly locate a precinct that may be missing. Some poll watchers...
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For More Details Circle (26) on Reply Card
might decide to stop off at the pub
before phoning returns.

The anchor position deserves
some careful planning. If the
anchor person is to sound rea-
sonably intelligent, information
will have to be at his fingertips as fast
as possible.

**Background Atmosphere**

A director to coordinate the
various activities and punch the
buttons will allow the anchor
person to work with maximum
effectiveness. The director can be in
the same room with the announcer.
It isn’t necessary to create a sterile
control room environment for the
show; the extraneous sounds in the
background actually let the listener
in on the excitement of the action.
A form of communication must be
established between the director
and the announcer. You may use
pre-written signs or you might try
using an earphone so that the
director can give verbal cues. The
communication is needed, of
course, if the director is in another
studio.

The announcer should have a
wire service as close as possible to
stay on top of national and regional
races and to plug the holes when
the returns thin out. Ideally, the
printer should be within reach of
the announcer. Again, the sound
adds to the overall air of action. If
that isn’t practical, use a runner to
keep the information coming. Leave
**the studio door open for the outside
commotion.**

**Another Angle**

Rather than tie up reporters with
the actual collection of returns,
assign them to cover various elec-
tion headquarters and track down
candidates, party bigwigs and other
political types who will make good
interviews both during the counting
and after the results are tabulated.
These reports can be phoned back
to the station, put on cartridge and
used by the anchor person as
needed. Live reports add even more
excitement to the sound of the event.

A staffer should be assigned the
responsibility of “tape coordina-
tor.” His primary function is to
record voices and actualities from
the field and shuttle them in to the
director. He should be able to
record cassettes from several phone
lines, your remote pickup receiver,
and a cassette recorder. As the
reports come in from the field, they
can be dubbed directly to cart,
timed, and labeled. A large sign
with a lead-in for each cart can be
made for the director to hold up in
front of the anchor man.

Since the pace of elections can
be quick at times, the reports
should be edited in the field and
delivered to the station ready to
be used. The reporters can make it
easy to use the tape coordinator by
giving an approximate countdown at the start of each
report. Strive to make coverage sound
as if you have reporters wherever the
action.

Background information can
deserve to be gathered on
hand along with telephone lists
of neighboring stations with
which you can swap stories of interest.

Make sure each reporter has a
transistor radio earphone em-
in his ear. This not only keeps
him going live, but helps him
keep abreast of the returns. He’s
to say during an interview with
Clapsaddle, WHIM is reporting
that Phil A. Buster is ahead by
thousand votes. What do you
make of this big lead?"

Another reporter can zip
to the newsroom to collect
copies of outlying counties and
around the state. And, after
time, someone should be given
the task of getting all the
reports condensed into usable
stories for the “morning show”
complete election wrap.

Everyone on the staff from
general manager to the
clerk will probably have a task as

---

**WOUA news director**
Mark Minnick
anchors election
night from a
temporary studio
while newsmen
Norm Cooling
prepares last minute
on-air script. Sound
from the wire
machine and
typewriter help
create an active
atmosphere for the
show.
It's election night. The one exception should be the chief. Murphy's Law was passed on presidential election, and once, election night brings out little gremlins. It isn't very smart if the control room catches on fire while ace photographer Skip Signal paces at some remote precinct.

Getting Started

I can avoid a tense atmosphere by starting off the evening with a bit of a party. Have pizza or some other delicacy at hand in beforehand, and let the station get started with a full stomach and in a good mood. Also, encourage your listeners to help out with the election effort...assuming you speaking terms with family members. The feeling of a "team" instills pride in what is done and makes for a better election sound.

Now we've concentrated on the basics of election coverage. Generally, the technical aspects planned carefully and properly Murphy is to be beaten at a game. The key thought is simple. Election night is not the time to experiment with lots of new gadgets. Along the lines, make each electrical union as if it were going to be used at the arts and crafts fair. You'll have to get started a little bit but it'll save time when it counts.

We've remote pickup units, and some from the intended well in advance. If you only one dead spot in town, and to be right where you planned to use the RPU. If possible, have a backup hand and ready to use. Operating in the field has been an embarrassment for one engineer. During the night you check things out thing seems fine, how is it you change pattern or power? Your reports will prove to you that your connected line is clean. At the send line, it's pretty hard to see the recorder for a line the way, some of the new won't go into record without moving. This eliminates the very handy technique of using the microphone for the intro, pressing play for the actuality and then back to record for the close. Too bad.

Use Your Own Imagination

Coverage of an event as it happens is what radio does best. What has been lost is the ability to make the listener use his imagination. It would probably be difficult for many of us to present a radio format without the use of records over and over and over. Covering an election is one step in the direction of recovering the ability to use radio to its full capabilities.

Take the opportunity. It doesn't come along that often these days. With some planning and a little sweat you can have one hard, long day and go home blurry-eyed with the feeling that at least once in the last 365 days you did something that "knocked 'em dead." You did something that was important. You actually did provide a public service.
Audio Automation Quality Control

By Dennis Ciapura, BE Audio Editor

Modern automated broadcast stations often employ three to six reel-to-reel tape decks as well as a number of cart playback units. Even keeping track of the frequency response of this number of program sources can be a full time job in itself when done by the usual methods. It is surprising that in an age when automation of broadcast programming has reduced the amount of manual labor required to get a well controlled, top quality signal on the air, little has been done to make comprehensive testing of these systems as commonplace as it should be.

Even the very best quality audio automation gear will only provide an air product as good as the maintenance program that rides herd on the myriad of audio parameters which combine to create what we call the "sound" of the station. Multiple program sources complicate the situation from the standpoint of source-to-source uniformity, too. Non-uniform response from one tape deck to the next is a dead giveaway of a sloppily automated station, aside from being poor broadcast practice.

One partial solution is to run a standard alignment tape through each tape source each week to assure proper operation of each unit. As anyone who has done this procedure very often knows, this can be time consuming task. Aside from being time consuming, a frequency response check alone is only half the job—how about distortion checks? Testing tape decks for distortion can be a rewarding effort because a "muddy" or "scratchy" sound can often be isolated quickly, but, unfortunately, distortion testing for tape decks at the station level is almost non-existent.

One reason is that low distortion test tapes are difficult to obtain and interpretation of the test data is not as straightforward as you might think. When attempting to measure distortion with a common nulling type of harmonic distortion meter, any speed variation will result in the test signal falling out of the notch, thus clouding the true distortion reading. Since tapes hiss is rarely more than 50 dB down, which will show as 0.3 percent distortion, the rather high noise level of tape systems can be a problem too.

The state of maintenance at most automated radio stations these days goes something like this. Since the annual proof tests the system for distortion, frequency response and noise from the console input to the transmitter output, it is assumed that the station will accurately reproduce what the automation system puts out. Meanwhile, automation audio maintenance usually consists of routine mechanical maintenance, frequency response checks with a standard test tape once in a while and, at some stations, a phasing check and adjustment when the response is checked. It is assumed that the tape heads, playback preamps and all intervening electronics are distortionless. Now that's a pretty big assumption!

Better And Practical

Fortunately, there is a better way. A new breed of lightweight, relatively inexpensive low frequency spectrum analyzers has been available in the last couple of years and these units can be just the ticket for speeding up routine testing of tape deck performance, thus making complete testing of each source practical on a routine basis.

The low frequency spectrum analyzer makes it possible to measure amplitude vs. frequency rather than amplitude vs. time, as an oscilloscope does. This means that the amplitude response of a system across the audio range can be plotted. If a variable speed tape deck generator is synchronized to the sweep of the display, the frequency response of the system can be displayed. The most powerful of low frequency spectrum analyzers is one that is coupled with storage capability. Such a type of test setup will plot frequency response and freeze the screen for detailed examination and/or photographic recording.

Units like the Tektronix 4030, which we use for many magazine's lab tests of new equipment, contain a built-in test generator. The Tektronix 4030 is available with a 20 to 20,000 Hz sweep scale to conform to typical audio testing configurations, as linear sweep ranges from 100,000 Hz for filter tests. Vertical deflection sensitivity is either 10 dB or 2 dB per division.

The low frequency spectrum analyzer is a very useful tool for quality control of automated broadcast stations. As anyone who has done this procedure very often knows, it can be time consuming task. But the results are well worth the effort. Continued on page 42.

The author is shown using new "tools of the trade". Ciapura checks scope camera photo in this article. The photos were taken directly a low frequency spectrum analyzer.
Maintenance...As The Manufacturer Sees It

Broadcast automation equipment is becoming more complex and more different all the time. If you think your statement is contradicted, you're right. But, it's also the new breed of digital broadcast automation gear has brought the ability to handle the complexity, if you know the approach. To get a broad idea of how automation can be most efficiently be used at the station level, we'd like to visit an automation factory and talk to the folks who make the stuff and see how they had to say about fielding. After all, they design and build it, and if they can't fix it, who can?

The host company was Control Corporation, and their R & D department is Tom Kitaguchi, who had an opportunity to talk to some length, particularly in detail, to field service of digital gear. Tom had 17 years of experience before joining Control Design, having worked in the circuit design for Bunker and Martin Marrietta. He's a CD28APM at the end of his finger in the shot of a loaded system. This unit understands English and is the easiest automation system program that we've ever worked with semi-engineers.

Least equipment manufacturers don't usually like to admit that products fail (but neither do we), and we do give Control Design a credit for their candor in discussing these topics with us. But, let's say, anything more complicated than a pet rock has got to drop out sometime, and your trusty old programmer is no exception. You would hope that your trusty new programmer will display some measure of restraint in this area.

However, let's assume that some unforeseen gremlin has taken up residence in the inards of your digital automation system. First of all, we ask Tom to think for a while and describe the largest or most frequent difficulty in servicing digital automation systems in general. His reply didn't surprise us, for as we had suspected; lack of familiarity with digital circuitry at the station engineering level was his report. This is not to say that broadcast engineers are short on smarts or that the new systems are too complicated to be successfully repaired at the station level.

The simple truth of the matter is that the state of the broadcast automation art has reached the point where the station engineer cannot be expected to completely understand how his system does everything that it does. It is difficult for full time design engineers to keep abreast and broadcast engineers should not feel guilty, inadequate or incompetent for not understanding totally all the details of how the mini-brain works, and it's not necessary.

Many engineers are discouraged by the futility of trying to troubleshoot digital circuitry by the classic DC or signal flow method and become soured on digital equipment. The correct approach is to learn how to use a logic probe and become familiar with the logic flow as well as the audio flow so that the defective module or card can be located and replacement obtained.

In many cases it is not practical or advisable to attempt to troubleshoot a defunct logic circuit right down to the defective component, and it's not necessary. You may be surprised to know that it sometimes takes a great deal of time to troubleshoot a circuit even at the factory where super test gear, 100 percent spare parts and the guy who designed it are all available to the repair technician.

Many manufacturers operate an emergency service to assist engineers who have problems in the field and provide replacement modules and cards. The station engineer need only locate the defective sub-assembly.

What we are getting at is a whole new approach to equipment servicing. Learn how your system works at a module level and understand as much as possible about how the electronics works. For example, the audio circuitry and power supplies should not be formidable troubleshooting problems, but leave the really hairy digital problems to the factory. If you learn how to use a logic probe, you can sometimes find the defective component very quickly with no further assistance, but if that doesn't work, trade in the card.

With automation systems like those built today, the use of redundant circuit cards in both digital and audio switching sections makes it possible to keep the most important sections of the system operative in the event of a circuit failure. All the redundancy in the world, however, won't help if the engineer is not aware of which circuits are redundant. So we see that the emphasis should be placed on knowing how to use the modular building blocks in modern digital systems to their best advantage, thus simplifying the service process.

In the beginning we said that broadcast automation systems were getting more complicated and simpler all the time and they are. They are more complex electronically, but for the broadcast engineer who plays his cards right, simpler to service.
Figure 1. Shown here are 70, 700, and 7000Hz test tones and harmonics at tape deck output. Harmonics for 70Hz are -50dB or 0.3 percent. For 700Hz, -60dB or 0.1 percent, and -50dB for 7000Hz or 0.3 percent.

Continued from page 40

analyzer can paint a very detailed frequency response graph in 90 seconds, but the method really earns its keep in the distortion measuring department. When set for 10 dB/div. vertical response, it is possible to display the fundamental audio frequency and all significant harmonics in a single trace. The harmonics really show up since the screen is eight divisions high and a harmonic amounting to 0.1 percent or -60 dB. would be six divisions of vertical distance from the fundamental.

With a narrow bandwidth setting, noise does not enter into the picture at all, only the distortion components of nonlinearity. Since we are looking at the reproduction of the input signal and the spurious outputs that result from the imperfection of the reproducing equipment as they really are, with no nulling or gain setting functions, the method is ideal for tape work and thus valuable for automation maintenance where several units need to be checked often.

Three Range Tests

To be able to paint a comprehensive distortion test in one sweep of the screen so that test time can be minimized, careful selection of the test frequencies to be utilized is required. Ideally, we would like to have a distortion check in the bass range, one in the mid-range and one at the high end. To be able to paint three fundamentals and harmonics up to the limit of the audio range test frequencies of 70 Hz, 700 Hz and 7,000 Hz were chosen. 70 Hz was chosen because it falls between the 50 and 100 Hz frequencies usually used for low-end testing and is really low enough to give a good indication of how strong, low frequency music fundamentals would be reproduced.

700 Hz falls in the mid-range portion of the spectrum and is high enough in frequency to allow for the second and third harmonics of the 70 Hz tone to be clearly seen. Since FM stereo bandpass is usually limited to 15 kHz, there is little point in using a fundamental above 7 kHz for the high-end test since even the second harmonic will be on the edge of audibility. The spacing across the screen also allows for unobstructed viewing of the harmonics associated with the 700 Hz mid-range test.

For tape deck testing the test tone must be recorded on tape, and this task is not as difficult as it may seem. Using a Scully 280, we were able to easily generate test tapes with less than ½ percent distortion at the low end. 0.1 percent in the mid-range, and less than ½ percent at the high end. The duration of the tones should be timed to match the sweep speed of the spectrum analyzer as it traces across the screen. A 90 second sweep speed is most practical for two reasons. First of all, it provides greater resolution than faster speeds and secondly, is easier to synchronize.

The test tones were applied to the tape at full 0 reference level using Ampex 406 tape which will not saturate at 7 kHz even at full level. The end result of using the distortion test method just described is that a very accurate picture of the mid, low and high frequency distortion of a tape deck or tape source of an automation system can be obtained in 90 seconds or about as much time as it might take to decide whether the meter is properly nulled using conventional methods.

For normal audio equipment where there is no time lag between input and output, the tape generator built into the frequency spectrum analyzer can be used to paint a frequency response graph with 2 dB/div. vertical deflection. This type of response testing is great for consoles and transmitters, but it is not possible to get a tape deck result since the tape deck is a high speed device that precedes the tape deck result because the space between the record and playback heads of a tape deck result in time lag that precludes triax generator/analyzer synchronization.

After experimenting with various pink noise techniques, the conclusion was finally discarded for lack of precision and difficulty in obtaining repeatable results. The best method was to use the tracking generator to apply an audio band sweep to a test tape and manually synchronize the beginning of the sweep to the spectrum analyzer with the sweep from the audio sweep on the test tape. The tape deck output cannot be displayed through the spectrum analyzer input, however, since the exact coincidence of input frequency at tape and analyzer output is impossible to obtain such synchronization due to the limitations of manual start timing. The problem was solved by using a storage oscilloscope coupled to a conventional preamp with a second sweep timing coming from the spectrum analyzer. This provides a linear voltage vs. arithmetic frequency display. In other words, our graph will be a straight line from 20 to 20 kHz frequency range. The graph from left to right, by reading output voltage vertically, is the spectrum analyzer output overlay constructed to convert the vertical divisions into decibels for convenience.

The two test procedures described each require about three minutes of test time to accomplish. Assuming a stereo system, frequency range and distortion measurements of both audio channels will be made about three minutes of test time, course, as with any test procedure, there is some space between test points and set-up time, but there is no doubt that low frequency spectrum analyzer testing of tape decks is the hottest thing on phosphorescent screens.

www.americanradiohistory.com
As for the Beyer DT109 microphone/headphones, they are in a class by themselves. Highly sensitive and capable of withstanding immensely high sound pressure without overload or distortion, they feature modular construction with a unique multi-pin plug in lead allowing separate wiring of left and right headphone channels, independently of the microphone.

Add featherweight comfort and effective ear sealing together with a wide frequency, true cardioid, broadcast quality microphone specially designed to work under extremes of temperature and humidity, and it is easy to understand why the DT109 has become so popular for live remote broadcasting, studio, film, television, disc jockey and language laboratory applications.

Together or separately, our remarkable Silent Partners will open your ears to recording and broadcasting possibilities you never knew existed.

Your nearest Revox/Beyer dealer will be delighted to arrange an introduction.

Once you have met them, you will wonder how you ever did without them.
then scheduled to be rebroadcast in Sacramento. The show required two receivers, so it called for both stations to promote combined listeners to have "Quad Parties".

"In the final analysis," Gabbert said, "this is the first attempt at network broadcast of discrete four channel stereo. It is both innovative and exciting."

Not ALL AM

While this sounds very much like a strictly FM assignment, remember that lots of interest has been generated in AM stereo. And when the NAFMB changed its name to the NRBA, they made it clear that the organization and its activities would be directed to both AM and FM.

If you haven't already made plans to attend the conference, now is the time to get started. Drop a line to NRBA, 500 Fifth Avenue, New York, NY 10036, or call back and ask Saldan at NRBA headquarters (212) 869-8873.

NRBA Exhibitor List

ACTION
Aetna Business Credit
Ampex
Anpro Corp.
Arbitron Radio
The Associated Press
BCS/Kamen Sciences
Belar Electronics
Blackburn & Co.
Bonneville Broadcast Consultants
Broadcast Electronics
Broadcast Marketing Co.
Broadcast Programming International
Kent Burkhart & Associates
Cablewave Systems
Cumex Corp.
Cavox Stereo Productions
CBS Technology Center
CCA Electronics Corp.
Century 21 Productions & Prgmg.
Cotec (including Jampro, Schafer, Sparta, and Vega)
Chicago Radio Syndicate
Collins Radio Group
Concept Productions
Control Design Corp.
Cox Data Services
CSI Electronics, Inc.
*Disc-Location
Dolby Laboratories
Drake-Chenault Enterprises
Eastman Radio
Electro Sound, Inc.
Fax Net, Inc.
Fidelipac
Harris Corp. (Gates Radio Div.)
H. G. Productions
IGM
Inovonics
International Tapetronics
Johnson Electronics
Kalamusic
Dean Landsman Radio Services
LPB, Inc.
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Master Control, Inc.
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Paperwork Systems, Inc.
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QRK Electronic Products
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RCA Broadcast Systems
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Time & Frequency Technology
*TM Programming, Inc.
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UMC Electronics
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*Hospitality Suite only. Others are exhibitors.
MOSELEY ASSOCIATES announces the
MODEL TFL-280 AUDIO LIMITER*

FM mono, stereo, quad — TV Audio • Excellent Leverage — greater than 50:1 • Extended Control Range — 60dB • Clipping not routinely produced • Fast AGC attack times — less than 20 microseconds • Very low harmonic distortion • Optional plug-in audio low-pass filter • Operation over wide temperature range • No Test Mode — run proofs thru TFL-280

The TFL-280 Audio Limiter precisely controls the audio levels of FM and TV aural meters. FM monaural, stereo, phonographic, FM SCA, TV aural are all processed. This frequency-selective limiter cleanly solves the problems associated with the transmission of pre-emphasized audio, including the ringing (over-modulation) produced by low-pass audio filters. Using agile limiting circuitry, clipping and its attendant problems are essentially eliminated. Monolithic semiconductor arrays, wide-band operational amplifier circuitry and distortion-reducing techniques are some of the technological advances incorporated into the TFL-280. Other features are accurate metering of limiting, optional plug-in audio low-pass filter, operation over wide temperature range, and thorough RF shielding and filtering of complete unit.

FL-280 will be unveiled for the first time in Booth A-307 during the NRBA Convention in San Francisco. See there — or contact our Marketing Department for direct Bulletin 255 describing the TFL-280.

For More Details Circle (70) on Reply Card

111 CASTILIAN DRIVE GOLETA, CALIFORNIA 93017 U.S.A.
(805) 968-9621 TELEX: 658448 CABLE: MOSELEY
TV stations are getting the annoying blues and greens out of their news film, correcting sour colors in old TV movies, and shaping up their videotapes with an automatic color correction system. Designed for use with film chains, electronic color conversion can "paint" video signals to wipe out the leading causes of color mismatch: black-white imbalance, colorimetry errors, and variations in film processing.

Color mismatch in TV pictures on the viewer's set may be due to the interspersing of live, videotaped and filmed program material or it may be caused by variations in the quality of the projected films or slides. Non-uniform color densities in film are due to errors in film exposure or processing. If the filming was done under adverse lighting conditions or the film processing strayed from the narrow limits of time, temperature or chemical mix, you can expect color errors.

Another factor, color temperature, is introduced when films are processed for projection with a light having different spectral characteristics from the light source employed in the telecine chain; color variations will be apparent. Also, the splicing of color film strips processed by different methods leads to color mismatch.

Color errors can also occur in live programming where cameras of different design or manufacture are used—even when they are properly adjusted and operated. These errors are due to differences in response between the video tubes and their related optical trains.

Different Problems, Different Solutions
WZZM-TV, Grand Rapids, Mich., wanted to improve the quality of its news film that was frequently shot under adverse lighting conditions. In addition, the station had been troubled by a residual green cast in its processed films. Filters did not solve the lighting problems and a concerted effort on the part of the station's lab technicians and the film manufacturer failed to root out the cause of the green cast.

Dale Wolters, chief engineer at WZZM, heard about a new color correction system and thought that it could solve both problems at once. Wolters says, "As soon as it was put in service, our news film showed a definite improvement—flesh tones became natural and the sky looked normal." As an afterthought he added: "Our local news film now looks better than many of the filmed stories from the network."

The color corrector was coupled to one of the station's two film chains and, according to Wolters, both are run together about 20 hours a day. "That one film chain handles all of the news film and movies—everything but the commercials which are run on the other chain," he explains.

Although Wolters says that the color corrector is operated more than 99 percent of the time in the automatic mode, he is particularly impressed with what can be done in the manual mode. "We are able to make significant off-line improvements in old movie films that have discolored with age," he says, explaining that the films can be run through the corrector as many times as needed to preview the required corrections and the final results can then be videotaped for later replay. He tells of one instance where money that had turned to a revolting sepia in an old commercial film was restored to an acceptable green with manual "painstaking.

Mr. Wolters reports that station management may purchase another system for the other film to help balance the workload.

Two TV stations in the area are using color correctors to accomplish different objectives. KSD-TV, a network affiliate, is primarily concerned with improving news videotape color correctness, while KPLR-TV, an independent, is funneling all of its program material through the majority originating from home films, through its color corrector.

Ed Risk, chief engineer of the TV station says of the system: "We're glad to have it—it does everything in the world, but helps." He explains that the system must be aware of the situation where an electronic color corrector will help and must not expect to overcome poor signals or equipment.

"We are using the color corrector for news tape correction only," Risk, since the use of film and stations diminishing.

The color corrector is an integral part of the station's overall design and solution, hard at work protecting the internal distribution system. He reports that the color corrector is most often used in automatic mode (taking minor small deficiencies), "but perhaps once a week we might get something that is so bad we have something about it manually,"

KPLR-TV, by contrast, sends incoming pictures to its transmission equipment regardless of source, through the color correction system. To achieve this unusual air-line application, the station assembled an equipment package of its own design made up of a station-built process amplifiers and automatic gain control, color corrector system and a
When FCC approval is granted, RCA will be able to help stations improve their signals with three circularly polarized TV antennas.

One is a top-mounted Fan-Vee for Channels 2 through 6. It uses individual radiators for horizontal and vertical polarization. They are phased to produce the circularly polarized pattern.

Another circularly polarized antenna, the End Fire Helix, is for Channels 7-13. It uses three small reflecting dishes mounted per layer around the top-mounting pole to produce an omnidirectional circularly polarized pattern.

A panel antenna for face mounting on the tower (Channels 7-13) may be installed as a horizontally polarized antenna, with the ability to be converted to circular polarization.

Ask your RCA Representative for full antenna information.

Four 55 kW vapor-cooled klystrons are used in the TTU-165c. A unique triplexing system developed for the WTAG-TV transmitting plant combines the outputs of three of the klystrons. As shown in the diagram, visual amplifiers 1 and 2 are combined through a 3 dB combiner to produce 110 kW peak power. The signal is fed through a 4.77 dB combiner where it is added to the output of visual amplifier 3 for combined visual peak power of 165 kW.

For More Details Circle (15) on Reply Card.
Monte Walpole, KSD-TV, St. Louis, is shown here making color correction adjustments from the remote control panel.
automatic level control.

Combination of equipment put together forms a very
five package that enables producers to produce network quality
at low cost," declares Hal
vice president and general
of KPLR. He asserts that
mission's use of the color
in that way is unique and
and the recommendations
on-CSF Labs.

says that the station is
ined of the value of color
in, but it wanted to en-
ue the equipment's ability to
completely automatically,
a day, seven days a week,
aving to be touched. "The
matic and manual paint-
are nice, but for us:
operation is far more
ut," he stated.

or color corrector is mos-
in automatic, and when it
ng good dark blacks and
whites there is almost
't handle," he said in-
ing why the station designed
lt its own preliminary
nd AGC stages. "They
at the color corrector is
 signal levels it needs."

ation manager said that
V was bothered more by a
n green cast in its slides
s, and that this situation
inly corrected. He also
at the color corrector is
in correcting color camera
s during live programming.

How It Works

Color correction behind the
these stations was de-
Thomson-CSF Labs. The
package is a three-
color correction system
of an NTSC color cor-
m500A); a sensor unit
550) and a remote control
555). Together, the color
and sensor handle the
mmon black-white im-
itions automatically,
nual controls on the color
permit an operator to
or, at least minimize,
ere color problems such as
mstracking.
reed as two 1½-inch high
ack mounted cases with an
ected remote control for
ounting, the equipment
ctly on the NTSC en-
coded output of telecine chains,
camera chains and videotape re-
corders. And, as you've already
en, no two stations are using it in
exactly the same way.

The color corrector "disas-
bles" the NTSC video signal into its
stituent components so that
access may be gained to these
ponents for correction pur-
poses, either automatically by the
sensor or manually with the color
Corrector controls. The luminance
ponent of the NTSC signal is
first removed and isolated from the
chrominance component.

The chrominance component is
then demodulated to form R-Y (red
minus luminance) and B-Y (blue
minus luminance) signals that are
sent to a mixing matrix and the
sensor unit. The R-Y signal is also
sent to the phase detector which
also receives a burst gate pulse
needed to form a color correction
signal. Both of these signals control
the 3.58 MHz color oscillator that
supplies subcarrier inputs to the
internal demodulator and modu-

ator.

Color gain and gamma control
circuits provide manual control of
all variables, or they can be
controlled by the output of the
sensor. Re-encoding and modula-
tion circuits (including the R, B,
and G black-level controls) re-
semble the video signals to form
the final correction signal that is
added to the main video in the
output amplifier. The color corrector
also contains circuitry for color
killing to prevent mis-correction of
monochrome signals.

Sensor Subsystem

The sensor unit is selected with a
switch for automatic or semi-
automatic black and white level
control. It works on the
red and blue color axes to
remove residual coloration (chroma)
from the black and white regions of
the composite NTSC encoded
signal. The unit automatically
provides the feedback that otherwise
would be introduced by manual
controls in the color corrector
circuitry.

A feedback arrangement gener-
ates and adjusts the correction
control signals and sensor circuitry
examines the uncorrected signal for
maximum and minimum luminance
levels. If a chrominance level is
found in the black and white
regions, a circuit determines the
relative phase and amplitude of the
error component and generates a
maching signal of opposite phase.
When summed with the error sig-
nal, the correction signal cancels
the unwanted chrominance com-
ponent.

The sampling is continuous with
the error signal integrated over
eight to ten TV frames. These ad-
justments are automatically up-
dated at one of several attack time
rates that can be selected. Correc-
tion release-decay time is also
selectable in several steps.

Correction Limits

The system is designed to correct
NTSC signals containing improper
black and white video levels only if
those limits are within specified
ranges. Black must be within the
range of 7.5 to 12 IRE units and
white must be within the range of
95 to 100 IRE units.

When these levels are absent, no
corrections are made because it is
possible that neither black nor
white were intended to be in the
picture. However, active corrections
for the presence of chroma are
made in magnitudes up to 20 IRE
units. No correction is made for
greater magnitudes because the
chroma could be a desired part of
the picture.

The system cannot overcome the
effects of poorly adjusted or detec-
tive film chains and cannot correct
signals that depart from NTSC
standards.

Editor's Note:

Automatic color correction sys-
tems will continue to be a factor in
technical color fidelity at station.
But, as we all know, the end result
must have some effect on the
viewer. As much television as we all
watch, it's obvious that some tech-
nical help is needed. As Ed Risk
says, it doesn't do everything in the
world (for the signal), but it helps.

The examples cited here show
how one system was used to solve
color problems. Other manufac-
turers can be found on page 82 of
the Broadcast Engineering 1976
Buyer's Guide. And as a reminder,
the Reader Service cards in our
annual Buyer's Guide are good for
one year from the date of publi-
cation.
Controlling Two Stations
With One EBS Unit

Just wanted to send you a copy of a scheme I worked up here for controlling two independent stations with one EBS unit, with no patching and a minimum of switching. This system also provides good impedance matching and allows the entire control room facility of an AM station to be used for actual EBS emergency programming into the AM and an FM station as well.

I realize that there are many schemes which would work equally as well, but naturally I favor my own. If you think it might be of interest to your readers, please feel free to use it.

When planning for the new EBS system installation at WSSV/ WPLZ, it was felt that means must be provided to make the system operation as simple and foolproof as possible. The diagram shows our system, which provides for separate AM and FM testing, and for simultaneous operation in emergencies. Provision is also provided for simulcasting a regular program without a lot of patching schemes being necessary.

The left and right audio lines from the WPLZ automation system are fed into an auxiliary, locally constructed EBS control unit, as is the AM line. The FM lines go through the normally closed contacts of relay K1, and the AM line through the normally closed contacts of K2. An 8-pole, 3-position rotary switch selects the three EBS functions: AM TEST, FM TEST, and OPERATE. Transformers T1 and T2 are Thermador 25A46 interstage transformers containing two 500-ohm primaries and two 500-ohm secondaries and are used for coupling between the AM, FM, and EBS tone generator. The EBS unit is the TFT 760.

When the EBS FUNCTION switch is in AM TEST, it activates the COMMAND switches on the TFT closes relay K2, coupling the AM signal through transformer T2. At the same time, the two-tone signal is fed into winding 2-4 of T2 and coupled into the AM line. Our TFT was modified in accordance with TFT Application Bulletin 75-02 for automatic reset, so after the tones end. K2 is deenergized, the line is returned to Originally. K2 was omitted, as was found that there was excessive amount of bass roll off the audio fed through T2 at some time, and rather than re-engineering the system the relay was added.

In FM TEST, activating COMMAND switches closes the EBS tones and the EBS tones are fed to the transmitter through winding 2-4 and 6-8 of T2 and 1-3 and 6-8 of T1. The automatic switch deenergizes K1, connecting transmitter back to the automatic system.

In the OPERATE position K1 and K2 close and the transmitter both transmitters simultaneously in SIMUL, before the tones end relays stay energized and emergency programming can be broadcast by both stations. Switching back to NORM will place the station in normal operation. The AM position may also be used for simulcasting a regular emergency program which originates the AM, and saves patching schemes.

In normal operation, the remote operator activates the MAND switches for the AM after the EBS announcement ends. For FM, he monitors.

Continued on
This is all you need to get moving with Dolby FM

Over the first time you came across 8-track cassettes? And how surprised were you that music could sound so good in a convenient form?

Now the same principles are being used to improve FM broadcasting. The in-flight effect of the Dolby system as used on airplanes is a bit more subtle than with cassettes. But the overall results are just as important. Dolby FM is cleaner, with sparkling high frequencies free of limiting. And, of course, noise is reduced, which often increases the area of good reception.

The only extra station equipment required is the Dolby Model 334 FM Broadcast Unit. The unit accurately compresses the signal in accordance with the Dolby B-Type characteristics and changes the effective transmission time-constant to 25 microseconds. This allows the station to reduce or eliminate any high frequency limiting required previously.

Already moving with Dolby FM in the US:

140 FM stations now equipped to transmit Dolby FM signals

33 consumer products now available to receive Dolby FM signals

Listeners can hear for themselves, as FM signal is compatible when received on their normal equipment after Dolby decoding.

In fact, some listeners like to take advantage of every opportunity for improved reception. They use Dolby circuitry in their home systems, and find that Dolby encoding permits them to increase their level—which is good for both the listeners and the station.

Naturally, the noise is reduced. But that's not all. Dolby compression is standardized, recoverable compression. By using Dolby encoding instead of the conventional high frequency limiting normally required during transmission, the station gives the listener at home the opportunity of recovering the full frequency range and dynamics of the signal. Furthermore, depending on the amount of limiting previously used, many stations find that Dolby encoding permits them to increase their level—which is good for both the listeners and the station.

If these prospects excite you, we think you will soon be wanting to check out the Dolby Model 334 FM Broadcast Unit. $1,350 and 11 inches of rack space are all you need to get moving with Dolby FM—an improvement we think both you and your listeners will appreciate.

Dolby Laboratories Inc.

For More Details Circle (31) on Reply Card

731 Sansome Street
San Francisco CA 94111
Telephone (415) 392-0300
Telex 34409
Cable Dolbylabs

346 Clapham Road
London SW9
Telephone 01-720 1111
Telex 919109
Cable Dolbylabs London

*July 1976. The products are tuners, receivers, and music centers with Dolby decoder circuits; requiring no extra wiring, adaptors, or calibration procedures. Write for the latest list of FM products made by Dolby licensees. Technical literature describing these developments is available.
FM signal and when he hears the opening, he activates the COMMAND switches (with the EBS FUNCTION switch in FM TEST, hopefully). The EBS cartridge for the FM station carries a 35 Hz tone at -18 db during the 25-second silent period to disable the automation "silent sensor".

K1 and K2 are Potter & Brumfield KHP17D11, and all audio lines are brought out to patch panel jacks "just in case," so the EBS system can be patched out in case of a stuck relay.

This system works very well and is very popular with the operators since EBS testing is simpler than the old carrier break method they now have one-switch activation to boot.

By the way, switching the line through 12 causes about a 2 db drop in line level, which is unnoticed with normal constant and limiting. The H-pad on the FM was necessary since line levels are normally used on 10 lines than on the AM line.

P. H. Beka, WSSV/613
Petersburg, VA

Station-to-Stations
Pays Better

Mark IV-T
Weatherminder

The original weather console designed especially for radio station local programming. Although many have tried to copy it for the last 20 years we can and will, on request, send you a list of hundreds of radio stations that still use and prefer the Mark IV Real professional equipment at a modest price.

Texas Electronics, Inc.
P. O. Box 7225B
Dallas, TX 75209  (214) 631-2490
Information Needed

Dear Mr. Burke for a fine article (despite the pegged VUs).
Lawrence P. Kenney
WZRD

Video History

Part 2 of the "Videotape Recorder Revolution," on page 52 (May '76), shows a photograph of the inventors of the Ampex video tape recorder.

Philip Gundy, who appeared in that photo, left Ampex in 1961 and joined Cetec Corporation as Executive Vice President. Cetec's broadcast group includes Schafer Automation, Sparta Electronics, Vega Electronics, CETEC Audio, and Jampro Antenna Company. He retired last year, after 35 years in the broadcast equipment business.

Thought this information would be helpful to readers of Joe Roizen's fine article which tells of the present whereabouts of the original team of video tape inventors.

Peter K. Onnigian
President,
Jampro Antenna Company

Xmtr Help Needed

I am interested in contacting station engineers who have had experience in operation of RCA-3B FM transmitters. Of special interest is experience in converting or modernizing such units.

I am also interested in obtaining catalog sheets and/or operating manuals for such transmitters.

Recently I came upon a station where an engineer had cut an antenna to frequency, a Collins unit, I believe. It may be of interest to some engineers to read an article about such FM antenna conversions, procedures, planning and problems involved, etc.

I have enjoyed your magazine since its first issue in 1959 and still have most of the issues. I need a few issues to complete my file and have a few extra copies of back issues for trade for those I need. Would like to hear from anyone who has a complete file or would care to trade or sell some issues before 1964.

Harold A. Jahnke
421 Central Avenue E.
Hampton, Iowa 50441

Professional

ITC's 750 Series Reproductor

1/2 Track Stereo $1150

- Fully serviceable in the equipment rack.
- Straight-line tape threading.
- Complete access to head with flip-top head cover.
- Professional +8 dbm output with 10 db headroom.
- Safe tape handling provided with differential braking.
- Optional motion sensing / start memory.
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For more information contact your automation company or call ITC collect at 309-828-1381.

INTERNATIONAL TAPETRONICS CORPORATION
2425 S. Main; Bloomington, Illinois
Marketed exclusively in Canada by McCurdy Radio Industries, Ltd., Toronto
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For More Details Circle (34) on Reply Card
Paul Richard, chairman of the Board of Directors of Thomson-CSF, died June 7. Vice Chairman and President Jean Pierre Bouyssonie moves to the position of President and Chairman. Michel Vils became President of Thomson-Brandt and Chairman of Thomson-CSF. Jean-Marie Fourcon was named to replace Paul Richard as member of the Board.

Ampex Corporation announces the appointment of Richard Srinsky as National Marketing Manager for its audio-video systems division, and Chas. Steinberg as Vice President of audio-video systems and data products.

George W. Hamilton has been assigned a position of Manager of International Sales Administration for the Broadcast Products Division of Harris Corporation. He is reporting to John Delisso, Director of International Sales.

Newest members of the National Association of Broadcasters Board of Directors are Don J. Thurston, President-General Manager, WTMN, North Adams, Mass., as Chairman, and Dott Jones, President, PSB Radio Group, Fond du Lac, Wis., as Vice Chairman...Richard H. Crop, President of LPB Inc., announces the appointment of Harry N. Larkin to the post of Marketing Director.

For the third time in 57 years, RCA Corporation elected the same person to hold the position of President and Chairman of the Board, Anthony Conrad...Robert N. Hurst has been appointed as staff of the RCA Broadcast Systems training staff.

Felix D. Bonvouloir is now serving as the Manager of Regional Sales for International Video Corporation. He is headquartered in Glencoe, Ill....William E. Beard has been named by MICROTIME as Central Regional Manager, his offices in Minneapolis, Minn.

After 40 years with Eastman Kodak, Norm Phillips, a Vice President and General Manager of the company's marketing division, is announcing plans to retire. Anthony Frothingham, an Assistant Vice President and Assistant General Manager in the marketing division, is succeeding Phillips as General Manager.

CCA Electronics Corporation announces the following appointments: Bruce D. Buck as President International Sales and Edward Lauman as Field Manager, Saudi Arabia...Elven Harvey, Jr. is the new Vice President of Engineering and has been elected to the Board of Directors.

Jarrell C. Lester, a new member of the Regional Sales staff of Video Tape Division, Photo Film U.S.A., Inc. ...Audiotronics Communications...
Is Docket 20508 Really "Unsound"

Staff members of the Cable Television Information Center termed "unsound" the provisions of the FCC's access and channel capacity decision (Docket 20508), which require a cable system to provide a composite access channel only where there is sufficient activated capacity and proof of demand, as well as the Commission's failure to require converters to meet access obligations.

In a Petition for Reconsideration filed June 21, Sheila Mahony, the center's Executive Director, and four other staff members said that these newly adopted rules represented "a fundamental reversal of long standing FCC policy of encouraging surplus channel capacity" as a means of fostering cable's growth. This decision by the FCC replaces the rules adopted in 1972 which would have required major market cable systems to provide four access channels and 20 channel capacity by 1977.

In their petition, the center staff members urged the Commission to adopt a policy which leaves the determination of delivered channel capacity to negotiations between cable operators and the franchising authority without Commission review. The staff also called for the requirement that large systems (over 3500 subscribers) provide at least one composite access channel, subject to a waiver based upon a demonstration of financial hardship by the operator. They also suggested that medium-sized systems (1000-3000 subscribers) with adequate capacity be required to make one composite access channel available with the modulation equipment necessary to permit transmission of the signal.

In urging the Commission to reconsider its decision, the staff members said that this reversal in Commission policy which limits cable's capacity "subverts the basic value of cable to the national communications system." The staff noted, "Without excess channel capacity, the development of alternative uses and special services will never flourish, for the regulatory and economic constraints which apply to broadcasting will also become the dominant considerations in cable. Without capacity, access is impossible."

In its "zeal" to relieve the financial burdens of cable operators, the Commission has "ironically" shifted the burden "to those who were to be the beneficiaries of the Commission's access and capacity requirements," noted the staff members.

As for the Commission's decision not to require converters, the staff said that the Commission should withdraw from negotiations between operator and municipality to leave this area to the influences of the marketplace. A munici- which "is permitted to negotiate with an operator for a package of broadband communications services" should not be "prohibited from requesting the installation of converters to ensure deliverable capacity that it seems to be sufficient.

The Cable Television Information Center, a part of The Free Speech Institute, is a private, nonprofit advisory group which assists governments in the development of cable television in the public interest.

Commission Hits Franchise Fees

The Commission has amended its cable television rules to indicate that, to the extent any franchise fee is above three percent of the franchisee's gross subscriber revenues per year, and a waiver request for a higher fee is denied, the excess fee will be considered void.

On August 13, 1975, the Commission proposed changing the wording of Section 76.31(b) of its rules so that applications for certificates of compliance containing franchise fees inconsistent with the rules might be processed with less unnecessary delay.

(Section 76.31(b) specifies that franchise fees imposed on cable television system operators should not exceed three to five percent of gross subscriber revenues per year from cable television operations in the community. If a franchise fee exceeds 3 percent, the cable system will not receive certification until the reasonableness of the fee is approved by the FCC.)

That proposal resulted from a Commission report and order in Docket 20272 in which the Commission addressed the problem of duplicative and excessive over-regulation of the cable television industry.

In that proceeding the Commission determined that "some of the most significant delays" in obtaining certificate of compliance applications occurred when franchise applications were submitted that do not conform with the rules.

The Commission then changed its processing procedures so that certificate applications are no longer held pending removal of the inconsistent franchise price by the franchising authority.

Instead, certificates are issued, but the violative provision is considered null and void if the operator has been preempted by federal regulation. The Commission said, however, that due to the wording of Section 76.31(b), it was not clear whether it could void the franchise fees. It initiated the rulemaking proceeding to change that language to allow for federal application of processing procedures.

The Commission pointed out that the proposed change will enable it to treat as "null and void" a franchise fee to the extent it violates the limit imposed by Section 76.31(b) of the rules, which a waiver is not obtainable.
Sports Continue To Hold Center Stage On Cable

The Federal Broadcasting Company has signed additional CATV systems to air its SportsPackage, a 70-hour per week package. This brings the number of cable systems airing the FBC package to 40 and the number of subscribers to more than 1,000,000.

The systems include Hawkeye Cablevision (Des Moines, Iowa); TV Systems Inc. (Honolulu, Hawaii); Cities Communications (Appleton-Beloit, Wisconsin); Warner Cable (Oshkosh, Wisconsin); C-K Cable (Kenova, West Virginia); CableCom General (Oklahoma); First Illinois Cable TV (Springfield, Illinois); and Texarkana TV Cable Company (Texarkana, Texas).

At a recent meeting of earth station vendors, antenna manufacturers and representatives of large television industry, a unified approach to handling small-diameter earth satellite stations was initiated and hosted by Home Office, the national pay TV network, at its headquarters in New York.

Participants in the day-long meeting agreed to a technical approach to FCC approval of the earth stations. Present FCC policy requires receive stations to have a minimum diameter of 29.5 feet (29.5 ft.).

A device for Home Box Office Engineering for Robert Tenen, it appears that television transmission—as opposed to other satellite transmission services—will tolerate higher adjacent channel interference levels.

A would make possible smaller, less costly receive-only antennas for television reception. The requiring a change in the FCC's present position on the spacing of satellites in orbit. The separation policy originally led to the stipulation for a 9-meter-or-larger earth receive station.

Technical papers showing the acceptability of the earth station were assigned to representatives of several companies. Tenen said a follow-up meeting to review these papers is now being scheduled.

Pointed out that while the FCC has permitted operation of small earth stations for experimental and special services', applications, the goal of the conference was to achieve FCC approval for normal, day operational use of the small stations in transmissions.

The full technical package is completed, it was made available for filing with the FCC by those interested in installing a small-diameter earth station. In addition, HBO plans to file for installation of such a station to serve a building location in Manhattan.

Continued on CE-4
FCC Approves NY Cable Law

The Commission has ruled that Section 817 of the New York Executive Law is consistent with FCC rules insofar as it permits the state’s Commission on Cable Television (CCT) to allocate and collect its operating expense by assessing a fee of up to 2 percent of “gross annual receipts” among the various cable systems in the state.

It also found that CCT has made the special showing required to justify cable operators in the state paying in excess of 3 percent of their total gross subscriber revenues when the state fee is combined with an applicable municipal fee.

However, it found that insofar as the state fee, when combined with a applicable grandfathered municipal fee, exceeds 5 percent total gross subscriber revenues of a cable system, Section 817 was not consistent with FCC rules.

The action was in response to a petition by CCT for Commission advice on whether its system of assessment of its operating expenses on New York cable systems was consistent with the FCC franchise fee limitations contained in Section 76.31(b) of the rules.

(That section states that a franchise fee shall be reasonable (in the range of 3-5 percent of the franchisee’s gross subscriber revenues per year from cable television operations in the community, including all forms of consideration, such as initial lump sum payments).

If the fee exceeds 3 percent of gross revenues, the cable system will receive FCC certification unless the reasonableness of the fee is proved on showings by the franchisee that it will not interfere with the effectuation of federal regulatory goals, and by the franchising authority that it is appropriate in light of planned local regulatory goals.)

CCT noted that Article 28 of the New York Executive Law, effective May 24, 1972, provides a comprehensive state regulatory program applicable to cable television systems and for the establishment of the CCT charges with the action of the regulatory program.

It said Section 817 of Article 28 established a procedure by which CCT’s costs and expenses that are defrayed in the first instance out of the state treasury, are reimbursed by the cable television industry in proportion to a company’s gross receipts, not to exceed percent of a company’s gross receipts for the 12 months designated by CCT.

Sports Continued from CE-3

It was noted by HBO Senior Vice President Heyworth, that the acceptance of a small cable station by the FCC would bring the cost of installations within the reach of many smaller television firms which cannot afford the low stations now being installed at a total of $70,000 to $100,000.

The FCC has proposed comprehensive legislation prohibiting the dissemination of obscene or indecent material by radio communication and cable television.

The FCC said its action was necessary because recent court decisions in the First Amendment and technological advances in the community that out dated existing statutes. If approved by the Congress, the proposed legislation would amend the Communications Act of 1934 to make a criminal offense for any person to disseminate obscene or indecent material by means of wire communication or cable television, and that a Federal Communications Commission would be empowered to impose various administrative sanctions for such dissemination.

The term ‘obscene” is defined in keeping with recent decisions of the Supreme Court to patent offensive representation or verbal depiction of sexual intercourse, masturbation, or exhibition of a human genital or excretory organs which appeals to the prurient interest of the person applying contemporary community standards and which lacks serious literary, artistic, political or scientific value.
A newly-formed in-house advertising agency, Idiotronics Corporation, will be headed by R. Grindinger as Director.

The National Broadcasters Club announces the results of their June elections: President—Leonard M. DeCesaris, RCA; First Vice President and Treasurer—James Marquis, Public Broadcasting Service; Vice President—Wally Briscoe, National TV Assn.; and Secretary—Patty Grace, NAB.

Board members are: Tuft; Grace; Sam Gray, FCC: Russell Eagan, Ellis and Rowe; Charles Lovett, American TV and Communications; board members confirmed for another year are: Briscoe; Charles Macatee, WMAL, Washington, D.C.; Warren Zwicky, Storer Broadcasting; Gordon Prestholdt, A.D. Ring & Co.; and Sam Gray, NAB.

The Federal Communications Commission announces the appointments of four officials: Jerold L. Cohn, Deputy Chief of the Cable Television Bureau; Roscoe E. Long, Chief of the Broadcast Policy and Rules Division; Philip Permut, Chief of the Common Carrier Bureau Policy and Rules Division; and J. Clay Smith, Associate Counsel.

Bob Swanson is now serving as Chief Engineer at WVL in Nashville...Bob Galen has joined KARN, Little Rock, Ark., as morning host and Chief Engineer...James B. Barnes, Director of Programming and Development at KETC-TV, St. Louis, is another three year term on the Board of Directors of the Adult Education Council of Greater St. Louis.

Peter Sieler joined KEVN-TV/KIVV-TV, Rapid City, S.D., as Station Manager...Marvin Young, Chief Engineer, WSVL, Shelbyville, Ind., died June 23 of a heart attack. Young, 53, had been with the station since it began broadcasting in 1961 and served as Chief Engineer in 1964.

Mike Pappas is now working as President of Big 4 Broadcasting, owner of KTRB Radio and KBOS Radio, Modesto, Cal....Mike Pappas has been named President of KMUW-TV, Sacramento, Cal....Jerry Pappas is the new President of Pappas Vision Inc., owner of KMPH-TV, Tulare, Cal....

Alice Santos is operating as General Manager of KBOS Radio, Tulare, Cal....Azevedo now occupies the position of Sales Manager of KGEN Radio and KBOS Radio, Tulare, Cal.

Radio station executives, Jerry Fitch, Elliott and William F. O'Shaughnessy, have been added to the Radio Information Office Committee of the NAB.

Interested in CATV will want to note that Harris has been elected chairman of the NAB Television Association.
How To Massage The Message

I have been enjoying your "Blue Bananas" in addition to the other excellent articles, and I thought this may be of interest.

KRBB-AM and KRBB-FM have a program every hour called "Community Events" which feature news about civic clubs, church revivals, etc. Recently, we received a letter asking that we announce a revival at one of the local churches with a closing statement informing us that MASSAGES would be brought to all by Rev. ----------.

Luckily, we never read anything "cold" on the air.
I hope this brings a chuckle to all of your readers.

Paul S. Demaree
General Manager
KRBB
Sallisaw, Oklahoma

Epat Drawkcab?
You Knew It Could And It Did

In my last week of college radio, at WYBC, New Haven, I found myself alone in the studio for several hours running three independent programs: While our FM channel carried our regular, Sunday classical-music schedule, one of our carrier-current AM channels carried two remotes, back-to-back (one each from the chapel and the stadium), while our other carrier-current AM channel carried a review of all the listening assignments for History of Music 10, whose final exam was the next day.

Cueling up records and answering for the FM programs, simultaneously listening to my phone call: "I'm just a friend, mind you, but...isn't the tape backwards?"...It was.

Another time, good training: off in a bright blue haze off the air. Had the station warned me to keep my eyelids open in a few minutes ahead of my time, our rip-and-rend newscasts, I'd broadcast this little gem right off the UPI wire: "Said one witness of the crash, 'It was terrible! There was this awful noise, everyone was running and screaming!'

Paul S. Demaree
General Manager
KRBB
Sallisaw, Oklahoma
Run, detrimental to that same employer. If...the relative happens to have the same (or better) qualifications than the stranger...no problem...at least not now apparent.

What do YOU think? Send us your views.

Take 2...Do You Want To Be A Producer?

We are holding auditions. The ASTV is thinking seriously of producing its own "in-house" documentary. We will script, cast, shoot, edit and then peddle it...Well, maybe not peddle...but certainly plug it and aim to make it available for distribution.

The idea was first presented at a meeting at the West Point chapter back in May. The thinking was: We certainly have the talent in the Society. The equipment can be made available. So, why not? Although there is no agreed-on subject as of now, we had toyed with the idea of something tied-in with the Bi-Centennial. Inasmuch as we have chapters or members from Boston down to Washington, and this entire region is rich in the history of the founding of this nation, we might exploit this potential. But, as we said, we have not made a decision yet. We now ask our membership to get involved. Send us your ideas as to what you think would be a suitable or appropriate theme for an ASTVC package. AND...if you would like to play a part in that production, please so advise in your letter. Direct all mail concerning the above to: Mr. Tom Jocelyn, ASTVC, Box 296, Sparkill, NY 10976.

Take 3...John Cordone Retires

He is not retiring from the industry...only from the Board of Directors of the ASTVC. Johnny, one of the ASTVC's EMMY winners, has announced that he will not seek reelection to the Board this next election. Although John did not spell it out, the fact that he has recently moved "on" to becoming a TD at ABC may have been a factor in his decision.

Slow fade to black...
**Commission Adopts EEO Guidelines**

The FCC has adopted new equal employment opportunity guidelines designed to reaffirm the Commission’s commitment to genuine equal employment opportunities, strengthen the elements of equal employment opportunity program, and provide an opportunity for self-evaluation and effectiveness of such programs by broker and full-service stations.

This action was the result of a notice of proposed rulemaking released on July 25, 1975. It asked for comments on certain changes in the current EEO guidelines including a model EEO program, new enforcement procedures, and raised the threshold for filing a written EEO program. Three or more full-time employees to more than five full-time employees.

Under the new guidelines, the Commission adopted, with minor modifications, the model program proposed in the notice of inquiry in the model program, which is designed to serve as a sample program, contains ten elements in sections devoted to a licensee's recruitment techniques and sources, training efforts, the availability of women and minorities in the applicable labor force, and a job structure analysis to be submitted by licensees employing 50 or more full-time employees.

**New Filing Threshold**

The Commission also amended its EEO regulations to provide for a new filing threshold for those stations required to file written EEO programs that have five or more full-time employees. The 91,889 full-time employees, representing 84.9 percent of the broadcast industry's total full-time workforce would still be covered by the written EEO program. The Commission noted that if it requested comments on an exemption from the exemption of full-time employees, the more than ten-threshold represented a more reasonable standard.

The Commission affirmed its use of the term "zone of reasonableness" standard in certain cases and indicated that it was in the process of developing a new processing standard for noncontested cases which would be "more in tune with the standard used in contested cases." The Commission also noted that it would continue to make reporting requirements and conditional review where it appeared that a licensee's EEO program was passive or not achieving desired results.

In addition, the Commission indicated that it requires that a licensee set forth goals and timetables "to demonstrate the applicant's good faith intent to increase minority and female utilization."
Discreet Quad Stereo Network

The world's first Discreet Quadrophonic Stereo Network Broadcast took place July 24 in California.

Billed as a "Complete Sound Experience," the program was aired throughout most of Central and Northern California. K-101, San Francisco, was the flagship station, and the show involved the combined efforts of EBRG, San Francisco, and KZAP and KSFM, Sacramento.

The show was produced from K-101's custom-built four channel studios. K-101 broadcast two of the four channels over its stereo signal on 101.3 mc and the remaining two channels over KBRG's signal on 105.3 mc. The show was rebroadcast over KZAP (98.5 mc) and KSFM (102.5 mc).

The program featured a variety of music and artists. It took two stereo receivers to listen to the experimental broadcast, so all four stations promoted to their combined listeners to have "Quadraphonic Parties"—invite a friend with another stereo system.

Commission Amends Rules

The Commission has amended its rules to allow UHF television translator stations to use multiple output amplifiers. Only UHF translators with 100 watts or less power that are not operating on channels listed in the FCC's Television Table of Assignments will be eligible to use these amplifiers.

Under the former rules, use of multiple output amplifiers was limited to VHF translator stations.
Quality Control
Continued from page 44

A Word About Standards

Since there are no sweep frequency and low distortion test tapes of the type described here available from test tape manufacturers, they must be made by the broadcaster. This is not a difficult task, and very good tapes can be made on any professional quality tape deck. Since the spectrum analyzer deals in relative values, the exact levels are not critical, but care must be taken to assure that the recorder used to generate the test tape is in perfect alignment.

Start out by adjusting your mastering deck for as perfect reproduction of a standard NAB alignment tape as possible. Most decks can be made flat within a dB from 50 to 15,000 Hz. Next, adjust the bias for lowest distortion reproduction of a 0 level input signal. With most decks, adjusting the bias for maximum output with 1 kHz level input then adding an exact dB of bias results in lowest distortion. If the tape deck has the distortion adjustment, use marked linearity, the next step to adjust it for minimum third harmonic, which is the type of distortion inherent in magnetic systems. Any second harmonic you see is most likely due to electronics.

After the bias has been set, the record equalization and azimuth should be adjusted for the least possible record/play response. With most decks, it is possible to get alignment close enough to duplicate a standard NAB tape within 0.8 dB. Now the 90 second sweep tones and the tracking generator can be recorded with good accuracy. I found the Scully 280 that we used to make the prototype tape, not perfectly flat up to 17 kHz.

The distortion test tones can be recorded at full level. I will take a little more drive at the low and high end to come up exactly the same output level as low, mid and high, but once the exact level is not really critical since on the screen we will be looking for the difference between a fundamental and its harmonics, and not the absolute value.

If the results are to be recorded on a scoping camera, such as the expensive Polaroid, can save a lot of time. The photos for this story were taken from the face of antronix storage display in an IBM series mainframe, which accepts SLAN spectrum analyzer data and a precam. The photos can be as an ongoing record of the system's audio performance, making it easy to spot slow degradation before it begins to affect listeners.

As the trend toward larger engineering staffs continues, we readers may ponder how a deal below one is possible, so alas the sophistication of automation radio formats, which often use more tape sources. What it amounts to is more work for the people. Less people with better methods can keep quality up even if years of routine never detects a defect, you might like to bet the success of a station on it?

Specifically designed for automated systems

Otari, Japan's leading producer of professional recorders, announces the ARS-1000 Automated Radio Station Reproducer. This new machine is based on the successful MX-5050 professional recorder, with several components modified to meet the special needs of the automated broadcaster for consistent quality and greater reliability under heavy duty continuous operating conditions.

Compare these features:
2500 hours MTBF; 7 5/8 or 5 3/4 ips; front switchable speeds; preamp in head assembly for minimum RFI and improved S/N; optional 25 Hz sensor; improved low frequency response for reliable 25 Hz sensing; +4dB 600 ohm output; improved flutter performance; plug-in boards with gold-plated contacts; nation-wide parts and service from Otari MX-5050 service centers (mechanical parts are interchangeable); one year parts and labor warranty.

If you're considering automation, ask your automated system supplier for full details on the ARS-1000 or call Otari.

Otari Corporation
981 Industrial Road
San Carlos, California 94070
(415) 593-1648 TWX 910-376-4890

For More Details Circle (43) on Reply Card

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BROADCAST ENGINEERING
**Hand-held ENG Camera**

A versatile, "take-it-anywhere" hand-held camera for professional video productions is now available from the Broadcast Division of Philips Video Systems Corp. Known as Philips LDK-11, the camera has any design features for a wide variety of on-site television assignments, such as electronic news gathering, local station commercial productions, documentaries and panel events.

For flexibility, the LDK-11 may be battery or AC powered. The system design permits operation of the camera either as a fully contained portable unit, or as a remote-controlled camera when integrated with additional cameras in a multi-unit field pickup.

Manufactured in the U.K. camera head with lens weighs only 15 pounds. It contains a 2/3-inch Plumbicon pickup tube and integral bias light to maximize lag at low light levels. Extensive pickup quality is a Keithley beam splitting prism which provides high quality pictures suitable in colorimetry with all cameras. For added operational efficiency, it is equipped with metric white balance and automatic iris.

*For More Details Circle (80) on Reply Card*

**AM Modulation Monitor**

A new AM broadband modulator that measures up to positive peak modulation of broadcast transmitters has been introduced by Time and Frequency Technology, Inc. The Model 753, the new generation monitor has an internal

Continued on page 64
New Products
Continued from page 63
noise level of better than -75dB, distortion of 0.15% at 99% modulation and audio frequency response of ±2%. Built-in meter attenuator is provided for proof-of-performance measurements. Linear phase filter design is used to achieve zero overshoot for square wave modulated RF carrier. The Model 753 is FCC type approved for AM broadcast monitoring.

By adding the Model 754 RF Preselector, broadcast stations, consultants, and regulatory agencies can tune in any one of the AM broadcast stations and precisely monitor its modulation and frequency off-the-air. A low cost tunable frequency-synthesized RF preselector is also available for off-the-air modulation monitoring.

Optional carrier power level alarm, absence of modulation alarm, off-frequency alarm and over modulation alarm are available. By adding external inhibiting detecting circuitry, it is fully available for Automatic Broadcast Transmission System (ATS) operations.

For More Details Circle (81) on Reply Card

Transmitter Conversion Kit
Wilkinson Electronics announces a kit to convert the RCA BLS BTASH, BTA10G and BTHM AM Broadcast Transmitters to solid state power supplies.

These kits are adaptable to configurations, including cutback for remote power change or non-power change.

For More Details Circle (82) on Reply Card

Audio Attenuators
A new line of audio attenuators is available from Modular Products, Inc., a unit of Metrotech Devices, Inc. of Bohemia, New York.

The new models, 8160-MOD, 8260-Stereo (2-gang) and 84 Quad (4-gang); utilize a press conductive plastic resistance element in a 600 ohm cost impendence ladder network configuration in conjunction with a finger precious metal wiping contacts. The mirror-finish elements are rated in the millions of cyclic operation.

Resolution is infinite, and accuracy is within ±0.1%. Maximum attenuation is 95 dB, with interchannel isolation in multi-gang units greater than 80 dB.

All three models are housed in the same standard size cabinet. They feature a black anodized aluminum faceplate with a permanent, easy-to-read epoxy scale, calibrated in infinite attenuation. A slide type inductive knob is provided. Dimension 1 1/2" wide x 7" high x 3 1/4" deep. External connections are made through a P.C connector furnished with each unit.

Available as an option, a wall mounting SPDT microswitch provides both normally open and normally closed contacts, and eliminates the need for remote CUE, channel ON/OFF, and other desired functions.

For More Details Circle (83) on Reply Card

You Have a Right To Expect More from Scully's Family of Recorders.

And look what you get with Scully's 280B/284B series. One to four tracks. Plus these important features:

• Optional DC capstan servo
• Motion direction sensing logic
• Innovative low-noise electronics
• Functionally illuminated controls
• Optional 14" reel capability
• Reproduce-only version (285B)
• Variable speed accessory with L.E.D. speed read-out

For multi-channel application, Scully has the 284B-8, one inch 8-track master recorder with DC servo and 14" reels. You'll solve a lot of recording problems at once with the versatile Scully family.

Sales, service and replacement parts are available from over 200 worldwide distributors.

Get the facts. Write, Telex or phone:

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Mountain View, California 94043
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For More Details Circle (45) on Reply Card

BROADCAST ENGINE

www.americanradiohistory.com
Now is the time to buy Harris' Circularly Polarized Television Antenna.

The new Harris CBR (cavity backed radiator) CP antenna is developed, pattern tested for CP and horizontal radiation, and ready to go.

You can install it today and radiate a horizontal pattern. Then, when approval comes from the FCC, you're ready for circular polarization, with minor field modifications.

The Harris CP antenna offers the very finest in signal transmission, with significant reduction of ghosting effects in problem areas. In addition, signal-to-noise ratios in fringe areas are improved. And the extremely wide bandwidth inherent in the Harris design permits multiplexing of any two or more stations in the VHF high band channels.

For complete information about the Harris circularly polarized TV antenna that's "slightly ahead of its time", write Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

For More Details Circle (86) on Reply Card

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

CW Klystron Amplifiers

Harris introduces two five-cavity, conical klystrons for use as amplifier tubes in both visual and aural sections of UHF-TV transmitters.

VA-953H and VA-954H each have a gain of at least 47 dB, 35 W peak-of-sync output with an 0.7 W of rf drive, up to 42% efficiency at peak-of-sync, and one dB is at least 7 over the tuning range.

For More Details Circle (85) on Reply Card

www.americanradiohistory.com
New Products
Continued from page 65

Time Calculator

ESE has introduced its latest digital timing product. A four digit
60 minute time calculator/timer which adds or subtracts minutes and
seconds, and at the flip of a
switch, can count and display elapsed time.

The timing and calculating
modes may be mixed so that an
operator may time an interval in
the timing mode, flip the switch
and add or subtract a time value,
then switch back to timing an
additional interval.

Since the display does not change,
the ES 230 can be used as a
presettable timer by entering a time
while in the calculator mode and
then switching to timer mode.

The ES 230 has been used by
broadcasters to calculate time seg-
m ents for programming, as well as
by time study personnel.

The unit measures 3½" h x
8½" deep x 6¼" wide and weighs
2½ lbs. and operates from 117
60 Hz.

For More Details Circle (46) on Reply Card

Stereo

Generator

QEI Corporation, Kresson, New Jersey 08053, has announced
availability of its new Stereo Generator Model 772. The Model 772
meets or exceeds FCC requirements for stereo FM transmission.

The stereo signal is generated through the use of a time division
modulation technique to reduce the complexity of the circuit and to minimize
the number of adjustment points. This technique passes both left and right
signals through identical circuits to ensure close phase and amplitude tracking, resulting in minimum cross talk.

A precision phase linear low-pass
filter is used to attenuate unwanted harmonics of the 38 Khz
switching wave.

The output is high level (4)
low impedance. A low impedance
output of less than 300 ohms is
used to preclude high frequency attenuation of the composite signal by the coaxial output cable.

The frequency response is
within 0.5 dB from 30 Hz
to
KHz and offers stereo separation greater than 40 dB across the
transient distortion left or right.

The unit has built-in triax
pre-emphasis. Crosstalk from
subchannel and subchannel
to
main channel across the
band, 30 Hz to 15 KHz, is
at
46 dB and the suppression of
8 KHz switching signal better than
55 dB with total noise output of
0

The Model 722 has special
phase equalized 15 KHz low pass
input filters available with new phase relationships. This is done to ensure minimum crosstalk and maintain
transient distortion at all frequencies.

The QEI Model 772 is made
standard 19" rack mount, requiring
only 3½" of rack space and is
contained with its own power supply. The generator circuit is
mounted on three circuit boards;
steering generator assembly; a
and power supply assembly.
power input is 115/230 V single phase, 50/60 Hz. All trim controls are located on the panel with input and output sections on the rear apron.

More Details Circle (87) on Reply Card

Power Drop-Off Alarm

WATTCHER® RF Power Monitor/Alarm series 3162, by Bird Electronic Corporation is designed so that power drop-off below a preset level will cause the transmitter itself to shut off, thus eliminating maintenance. It is then left in the position where it is possible to connect a new transmitter for on-the-spot replacement.

For More Details Circle (88) on Reply Card

Audio-Video Routing Switcher

Image Video Limited of Toronto, Canada announces the introduction of a new line of audio/video routing switches. These switches feature ultra conservative design and extremely low crosstalk. This product has been well received in Canada by Television Broadcasters and particularly by the Canadian Broadcasting Corporation.

For More Details Circle (89) on Reply Card

Sportscasters

Official Headset of the 1976 Olympic Games

eliminate Off-Mike Problems With The Sportscaster Headset

Sportscaster headset with integral dynamic mike from Television Equipment Associates gives you complete freedom of movement and simultaneous monitoring of two sources.

The headset has a

- Dynamic boom microphone: 400 ohms, frequency range 50-15,000 Hz. Sensitivity 2mV (loaded) for close speech.
- Double headphones: independently wired, 200 ohms each 50-15,000 Hz. Single 'phone version available.
- Vented foam cushions eliminate perspiration and let you hear ambient sound and are interchangeable with ear-enveloping cushions.
- Weight: 8 ounces. Practically unbreakable components. Optional cough switch.

Television Equipment Associates, Inc.
Box 260 • South Salem, N.Y. 10590
(914) 763-8893

For More Details Circle (71) on Reply Card

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For More Details Circle (48) on Reply Card
New Products
Continued from page 67

Videotape Editing System
A new videotape editing system capable of performing more artistic special effects and storing edit decisions has been introduced by Ampex Corporation.

The Ampex EDM-1 editing system features a computer-controlled switcher with special effects and a floppy disc memory, which can store as many as 3200 edited scenes. It can interface with up to eight online or off-line video, audio, or disc recorders.

The EDM-1 was demonstrated for the first time at the National Association of Broadcasters convention in Chicago March 21-24.

Unlike present computer editing systems which store and recall scenes by digital time code address, the EDM-1 has an exclusive computer filing system that permits individual scenes to be identified by both time code and real language.

This feature permits the operator to call up a particular scene in a real language tag without having to identify the scene by a cross-reference set of numbers.

With the optional file management system, the EDM-1 can save time by reducing the amount of tape shuttling required when scenes are recorded in random order on master tapes.

The EDM-1 remembers the location of each scene on the master tape and calculates the efficient way to assemble them. The least amount of shuttling required for each scene is then transferred to the correct location required for the correct sequential assembly.

The basic EDM-1 consists of a computer, operations control unit and video monitoring, an automatic switcher with special effects, a color display monitor, a conventional function calculator, a type-writer styled keyboard, special job-oriented selector keys, and a computer processing unit.

For More Details Circle (90) on Reply Card

Automatic Telecine
Cohu's CAT is a complete do-it-yourself telecine film editor, with full NTSC color output. It can handle 35mm slides, 16mm motion picture film plus half-inch video cassettes. It features a color encoder/ enhancer/auto balance/color hue and saturation, and allows the user to individually adjust red, green, and blue color.

Cohu's CAT is also a full color image generator which can perform color separations and cross-colors, and can do effects, such as dissolves and fades. It has a computer interface unit which allows the user to control all functions from a remote location.

For More Details Circle (91) on Reply Card

FM Educational Antennas
In the FM educational channel, Phelps Dodge offers six new antennas. Because of the normally low 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 antenna.

For More Details Circle (49) on Reply Card
horizontal element has a configuration. These antennas complete with matching harness type cables and are designed for use on tower legs or support 1¼ inch to 2¼ inch dia. The multi-element arrays are designed for an element spacing of 5 feet.

In models, designated Catalog CFM-1, -2, -3, -4, -5 and -6 available. Power ratings in watts varies from 0.2 to 0.5. Gain ratings range from 0.43 to 1.2; field gain from 0.65 to 0.86, gain in dB from -3.66 to 2.3 at one mile. 1 kw, MV/M HP 90 to 239.

Incorporating the general design features of other Phelps Dodge communications circularly polarized antennas, the new FM educational series is less susceptible to snow and assure phase coincidence of both vertical and horizontal components.

The unit to be displayed will be two 2000 watt per bay circularly polarized antennas designed to fill the void which currently exists between an educational series rated at 200 watts per bay and the standard antenna series rated at 5,000 watts per bay. Designated Catalog Nos. CP-1000 and HP-1000 the two new antennas are parallel fed so that a 2-bay antenna is rated at 2 kw, 3 bay at 3 kw, etc.

For More Details Circle (92) on Reply Card

Video Delay Series
Television Equipment Associates

is introducing a new video delay package from Matthey Printed Products which will accommodate any delay from 10 to 2,120 ns.

The product consists of a 5½" Vero card frame which accepts eight cards and is supplied with BNC connectors in and out. A ±4 ns. vernier is supplied on the front panel of each card. Matthey equalized video delay PC modules can be fitted to the

Continued on page 70

When accuracy Counts...Count on Belar
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Why is the Jamieson Processor No. 1 in TV?
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JAMIESON'S ADVANCED DESIGN TECHNOLOGY FEATURES

- Film advance virtually tension-free. The demand top-overdrive in transport uses no clutches, floating rollers or film sprockets.
- Smaller machines take only half the floor space.
- Solution volumes reduced 15 times over open-tank designs.
- Temperature in primary solutions is controlled to an accuracy of a few hundredths of a degree.
- The elliptical shape of the tube protects the film and provides high induced turbulence.

For More Details Circle (50) on Reply Card
Continued from page 69

card to accommodate any video delay from 10 to 2.120 ns. equalized
to 5.5 MHz and padded to 3 dB.

For reasonably permanent installa-
tions, the cards are delivered with
the final 150 ns. of delay un-
connected for completion by the in-
staller. For installations where
reasonably frequent delay changes
are anticipated, the card panels can
be supplied with six switches and
the ±4 ns. vernier which would
provide infinitely variable delay of
310 ns. in seven ranges from 10 to
2.120 ns. Cards for mounting pulse
and blanking delays are also avail-
able.

The principal feature of the
Matthey 5.25 series is the conven-
ience of changing timing require-
ments by the addition and sub-
traction of Matthey delay modules
on the cards.

For More Details Circle (93) on Reply Card

Battery Sequences

Frezolloini Electronics Inc. intro-
duces the Frezzolino Battery Se-
quencer with built-in charger for
use with their HL-33/35 1k
Battery Packs for Electronic
Gathering (ENG) portable cam-
eras.

The Frezzolino Battery Sequen-
cer automatically charges five or
less
the battery packs at one time
use simply plug in one, two, or
five HL-33/35 Battery Packs, regard-
less of their sta-
charge. push the “Power”
switch to “On” and leave it
alone.

The Frezzolino Battery Sequen-
cer will bring each Battery Pa-
squence to its full-charge rate
in ten hours or less, as nec
When fully charged, each Bat-
Pack automatically goes on
tickle-charge rate. A lamp, lit
lighted, indicates “Ready”. At
indicating, disconnect one, or
of the Battery Packs, and use it.

The Frezzolino Battery Sequen-
cer was field-tested, before going
into production, by a TV network
Department. The Sequencer was
designed for either mobile or
station operation.

The company also manufac-
tures individual FREZZI HL-15
Ikegami Battery Packs. indi-
FREZZI Chargers for the Bic
Packs. other FREZZI SEQUEN-
ER/CHARGERS, and Control
Systems, plus other electronics
products for O.E.M. applications.G
or write the Sales Manager for
information.

For More Details Circle (94) on Reply Card

Folding Cart

Gruber Products, manufacturer
of the WHEELIT line of radio
carts, has developed a new fold-
cart for the broadcast and
market. The Model ENG-1 is
for transportation and use out-
to-be
able television equipment. It is
designed that it will accept any
portable VTR equipment or
power supplies as well as a
various back packs of some
broadcast type cameras such
as Ikegami HL-33 or HL-35. For
KCN-40, Philips LDK-11 or
390, etc.

With the addition of a Quick-
Model 7900 elevator column for
choice of various heads, it be
a mobile operating unit. The
of the cart becomes the base
tripod.

For More Details Circle (95) on Reply Card

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Other cartridge machines are copies of ITC’s, but won’t
perform like ITC’s. The differences are inside. Design
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services are ITC marks of leadership in quality cartridge
equipment. We’ll prove it with our 30-day guar-
antee of satisfaction. Write. Or phone us collect:
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For More Details Circle (51) on Reply Card
NEW FM AND TV FIELD STRENGTH METER FIM-71

- Accurate - Direct Reading - Volts or dB
- 45 MHz to 225 MHz - Continuous Tuning
- Peak or Averaging Detector (switch selectable)
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- 140 dB Measurement Range (1 μV to 10 V)
- 4½-Inch, Mirrored Scale, Taut-Band Meter
- Front Panel Speaker
- Recorder Output
- Rugged, Portable Package
- Calibrated Signal Generator,
- 45 MHz to 225 MHz
- Battery or External Power
- Use as Signal Source/Selective Voltmeter for Insertion Loss Measurements of Filters, etc.
- Measures FM Harmonics to -80 dB
- Price = $2,500 complete with dipole antenna.

932 PHILADELPHIA AVE.  SILVER SPRING, MD.  20910
(301) 589-3125

CONTACT US FOR DETAILS.

Frequency Counter

Systron-Donner's new Model 6054B Counter provides coverage from 0.02 to 24 GHz in one band with one connector input. Eleven digits give displayed readings. Innovations of this new counter include (1) automatic microwave measurements to 24 GHz, (2) sensitivity of -20 dBm in the 18-24 GHz range, (3) ability to accept signals with high FM, (4) tracking of rapidly changing frequencies and (5) built-in warning and protection against high power inputs.

Optional features include remote programmability, data interchange per IEEE STD 488-1975, choice of three higher stability oscillators, rear input connectors, and IF offsets.

The counter also incorporates the new FLACTO (frequency locked automatic computing transfer oscillator) measuring technique. The 6054B is 3.5 inches high by 16.75 inches wide (8.9 x 42.5 cm); weight is 30 lbs. (13.6 kg.).

For More Details Circle (125) on Reply Card

Continued on page 72

Just A Friendly Reminder

In case it happened to slip your mind and you are one of the few remaining directional stations yet to comply with paragraph 73.69 of the FCC Rules... you have until June 1, 1977 to have in operation a "Type Approved" antenna monitor.

WE CAN HELP YOU
We have supplied over 90% of all "Type Approved" antenna monitors (both meter and digital readout) now in service.
We invite your questions concerning installation, operation, remote control, sampling systems, etc.

YOU CAN HELP US
When the last deadline rolled around our order backlog resulted in an eight month delivery cycle. If you order now, you can avoid the last minute rush; we can deliver as required, and you will not risk missing the June deadline.

ASK THE EXPERTS!

932 Philadelphia Ave.  •  Silver Spring, MD.  20910  •  (301) 589-2662

For More Details Circle (53) on Reply Card

August, 1976
New Products
Continued from page 71

**FM Exciter Model**

QEI Corporation is now marketing their own FM Exciter Model 675 for use in the standard FM broadcast band. This state-of-the-art, all solid-state unit, equipped with silicon transistors, diodes and ICs, is unique in that it is the first totally synthesized FM exciter on the market. With a highly stable 8 MHz crystal as the reference, its divider circuits can produce any output frequency in hundred kHz increments in the FM band. Using a phase lock loop circuit, the frequency-modulated oscillator exhibits the same frequency stability as the 8 MHz crystal, supplying full MPX with no spurious responses.

An AFC locked lamp indicates when the FMO is locked to the reference xtal oscillator. If the FMO is not locked, sensing circuitry cuts off the locked lamp and it no longer indicates an in operation condition. The RF output of the exciter is also shut down.

The Model 675 operates with either mono or stereo input signals and can be pre-emphasized to a 75 usec or optional 50 usec time constant. The unit has an adjustable power output of 5 to over 20 watts and is virtually VSWR proof to ensure total protection for the output stages. The power amp can withstand any magnitude or phase of VSWR. The Model 675 can accept a 600-ohm balanced mono line. And by means of a front panel screwdriver adjustment, the Exciter can be tuned over a range of approximately plus-minus 500 kHz.

The Exciter circuitry is modular with three circuit boards: an IF and phase lock assembly; an IF and PA assembly; and a power supply regulator assembly. Zener diodes and SCRs are part of the power supply voltage regulation system, maintaining DC output voltage at a high level of stability. The power supplies are also overload protected.

With 1M distortion typically less than 0.25%, FM noise better than -70 dB, and AM noise -55 dB, the Exciter gives a stereo separation better than 40 dB from 30 Hz to 15 kHz when used with the QEI Model 772 Stereo Generator. It has an output impedance of 50 ohms.

The Exciter fits a standard 19" x 19" rack mount. With an optional meter panel the Model 675 can be used as a complete power transmitter. It operates on either the 105-125V or 210-215V, 60 Hz, single phase power line. Either line voltage input is possible by a simple jumper change.

For More Details Circle (97) on Reply Card

**Open Reel Recorder/Reproducer**

International Tapetronics introduces a new open reel Reel 3000 Reproducer, the 750 series. This unit uses plug-in assemblies (three relays, circuit cards and more). The machine is constructed of several individual operating units.

The list of features on the 750 Series includes: audio monitoring during either recording or playback; fixed tape guides for alignment; Play/Record Syncrization (PRS); “safe” mode.

For More Details Circle (64) on Reply Card

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- System Electronic Distribution, Pty., Castle Cove, N.S.W.

For More Details Circle (55) on Reply Card
The accidental erasure of audio; accidental erasure of recording; accidental erasure of material. The chief application of the TSU is for rapid, remote cueing of video taped material. Up to 10 cue points are stored in the TSU memory. A second application of the TSU is for selection and program integration of news material provided by network news services.

Broadcast
Cart Machines
versions of the new UMC cart broadcast cartridge tape are available for rack desk-top mounting. For cartridges, the Type 10 with its 5 1/4" width may be three-in-a-row rack configured. Below, the Type 20 is nearly stacked one above in record/playback combination for processing A, B, and cartridges.

For More Details Circle (56) on Reply Card

Eraser/Splice
Locater
national Tapetronics' ESL Eraser/Splice Locater is a design innovation combining both theLocater and locating the splice into the step. The completely automatic Locater locates the splice and automatically releases the cartridge fully erased.
The direct-capstan motor provides acceleration to about four times normal playing speed, without undue stress on the tapes.

For More Details Circle (98) on Reply Card

Tape Search
Unit
The Tape Search Unit (TSU) is one of the new microprocessor-based systems introduced by Recor tec to offer the broadcaster a range of tape controllers. The TSU works with any quad VTR equipped with Recor tec's Reel-Servo Modification (R-MOD) or with any other buffered tape drive such as the Ampex AVR-1, IVC-9000 or the Video Memory VM-1000.
The microprocessor in the TSU automatically stores and recalls up to 10 cue points with frame accuracy. Cue points may be entered manually through use of the control panel lever switches or may be automatically inserted at the push of a button while the operator watches the scene material on the monitor.

Add On
Microphone Mixer
Shure Brothers Inc., Evanston, Illinois, has announced a new add-on accessory microphone mixer that offers a way to add up to six additional low impedance, balanced microphone inputs (switchable to line level) to a sound system.

Named the Model M677, the new unit is designed as a "slave" mixer for Shure products such as the M67 and M68 series microphone mixers, the SE30 gated compressor/mixer, the M610 feedback controller, and the M63 audio master.

When used with the Shure M67 and M68, the new M677 provides a method of stacking mixers and

Continued on page 74

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New
UMT series

TRINITRON PLUS

BETTER H. V. REG.

BLACkER BLACKS

BRIGHTER WHITES

LIGHTER WEIGHT

BETTER LINEARITY

SONY
TRINITRON

SONY
UMT 1203

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For More Details Circle (96) on Reply Card

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FOR MORE INFORMATION Please call (212) 787-3050, or write Education Division, Imero Fiorentino Associates, Inc., 10 West 66th Street, New York, N.Y. 10023

gives two additional microphone line level inputs over those available when stacking two four-channel mixers.

By using an M677 with a SE30 Gated Compressor/Mix operator can convert the input mixer system of the SE30 nine-input mixer for application such as high quality sound reinforcement, radio or television broadcasting, and sound recording.

By combining an M677 with Shure M63 Audio Master, one can have a six-channel microphone mixer (microphone or line level signals), a 600-ohm line output VU meter, and a headphone monitor. The M677 in combination with the M610 provides 6 inputs per octave graphic equalizer.

The new Shure M677 Mix Operator can be powered either from the normal 10 to 30 Vdc output of the audio master mixer or from a battery.

A67B Battery Power Supply.

For More Details Circle (57) on Reply Card

New Concept Automation

IGM/Northwestern Technical Inc. of Bellingham, Washington will unveil a totally new concept for broadcasters.

Designated the MARCV (Manual Assist Remote Control), the system is designed to provide electronic access and automatic sequencing of program elements in a live studio or control room operation. This removes much of the pressure from the operator and allows him to pre-set switching instructions so that he may concentrate on the creative aspects of programming rather than mechanics.

With its TV display and entry keyboard, the MARCV allows access to any of seven sub-sources, each with up to seven sub-sources, and is designed to interface with and control tape decks, cartridge machines, sub-source devices, such as IGM's Instant Go-Cart. The operator may sequence these devices in any desired, up to 32 events in any order, and may make changes, deletions or substitutions instantly at will.

The display screen projects...
Slow-Motion Disc Recorder

New versions of the color Motion Disc Recorder were introduced by Eigen Video at NAB this year. The new versions have 200 second time capacities. The discs record consequence as alternate tracks in each revolution to achieve continuous operation. Each track is recorded before re-recording by dual-magnetic heads.

Versions of Eigen's Color Motion Disc Recorders are available for editing and post production in a freeze frame, time-lapse, jump-cut and animation effects. A fast disc recorder equipped with "Memory-Cue" capability. The disc recorder will respond to a start command from the commonly marketed automatic editing equipment, run to the exact field, and "freeze." For More Details Circle (103) on Reply Card

ENG Camera Heads

A television camera head specifically designed for ENG and studio cameras is now available from Innovative Television Equipment.

The ITE-HS Hydro Head utilizes hydraulic dampening in both pan and tilt modes. Featured are a quick release camera mounting plate (permanently attached to the camera); independent lock-in friction controls for both pan and tilt; adjustable control handle; and counter balance torsion spring for any center of gravity requirement. The ITE-HS can be used with all ITE trolleys, tripods and pedestals. Available accessories include tele-

Continued on page 76

QUALITY TALKS FOR WKEE

Continental's new 5/10 kW AM transmitter is setting records for acceptance. It has performance and efficiency, with the closest sound around. Listen to Continental quality talks.

Rapid-Q Cartridge Tape Equipment

For More Details Circle (60) on Reply Card

STE -100 Stereo Phase Enhancer

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New Products
Continued from page 75

 scopic control handle, right-hand zoom and control handles, wedge adapter and wedge plate.

Cameras of up to 50 pounds can be mounted on the ITE-H5. Construction is of rugged, lightweight cast aluminum.

For More Details Circle (106) on Reply Card

Rackmount Oscilloscope

A 17-inch-deep, 15 MHz rackmount oscilloscope is being introduced by Tektronix as a new member of its T900 Series of oscilloscopes. The new T922R has specifications similar to the bench model T922.

The new rackmount has switchable inputs on the front and rear panels that provide mode change—

from a general purpose test instrument to a monitoring oscilloscope. The T922R measures 5¼ x 19 x 17 inches and operates at 2 mV/cm sensitivity. Greater than 80 dB of isolation guards signal integrity.

C5-A Camera operation has single sweep and graticule illumination.

The rackmount has ancillary rear panel inputs/outputs: external trigger out, gate out, sweep out, vertical signal out, Z-axis input.

Outputs can be used to drive external recorders or other instrumentation.

The T922R has 12kV 8 x 10 display.

For More Details Circle (107) on Reply Card

Portable 4-Channel Oscilloscope

Cold switching—internal remote control—combined with a highly-efficient, compact, versatile power supply inside a standard, lightweight frame are the keys to the realization of the world’s first portable four-channel oscilloscope.

Philips has introduced a portable 50 MHz oscilloscope with 5 mV sensitivities and an 8 x 10 cm display, that weighs 9.5 kg. PM 3244. Up to six signals can be displayed simultaneously—the four input signals and two differential signals.

Triggering for the main timebase can be from any of the four input or composite signals, the incoming line supply, or externally. The delayed timebase can be triggered from the four inputs, the composite signals and externally. The four channels also provide X-Y possibilities, including dual-trace X-Y plays.

The direct conversion supply can be run from any AC supply between 90 and 270 V at 46 to 60 Hz or any DC voltage between 100 and 200 V, without switching. Current consumption of the oscilloscope is 29 W, enabling five oscilloscope operations on a full PM 8901 battery pack.

The PM 3244 is the latest in Philips’ range of oscilloscopes and fits into the same under mounting frame.

For More Details Circle (130) on Reply Card

Slide Rule Calculator

Shure Brothers Inc., Evanston, Illinois is now offering a slide rule calculator which sound engineers can use to perform many of their computations in design and installation of indoor sound reinforcement systems.

Designated the Model SRC.1, the new Shure calculator provides means for calculating: (1) reverberation time and acoustical absorption coefficients; (2) telephone output voltage and sensitivity ratings and (3) attenuation and resistance values.

Supplied with the Model BCG is a 16-page brochure containing operating instructions, appendix charts and tables, bibliography listing sources of additional information.

For More Details Circle (131) on Reply Card

Earth Station To KC

Station KBMA-TV, the independent UHF station in Kansas will be operational with what is believed to be the first true earth station set up by a station, in time for the Radio Convention.

KBMA-TV has already filed the earth station, which will be jointly owned by the Kansas UHF and Transcommunications Corp., a multi-purpose communications firm located in Green Conn. Transcommunications will purchase the earth station and lease it back to KBMA-TV.

Another area of rapid growth is electronic news gathering, utilizing hand held color TV cameras in conjunction with portable videorecorders and lightweight microwave links. A special session will allow users and equipment manufacturers to air their problems and to display the latest available equipment.

The convention will be opened by Admiral of the Fleet, The Earl Mountbatten of Burma, Chairman of the National Electronics Council. The event is sponsored by the Electronic Engineering Association, Institution of Electrical Engineers, Institute of Electrical and Electronic Engineers, Institution of Electronic and Radio Engineers, Royal Television Society and Society of Motion Picture and Television Engineers.

For information contact: Exhibition organizer: The Secretary, International Broadcasting Convention, P.O. Savoy Place, London WC2R OBL, England.

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8. Martin STL Systems Log over TWO MILLION (2,000,000) Broadcast Hours each Year.
9. AVAILABLE FROM STOCK.

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WANTED:
All surplus broadcast equipment especially clean A.M. & F.M. transmitters, modulators, Field Strength Meters, etc. High prices. All custom duties paid. Surplus Equipment Sales at The Tromich Co. Dr. Unit 28, Toronto 17, Ont., Canada (416) 421-5631.


GOOD COLLINS 21E transmitter: Call 408-475-0172 or write Grant Wharton, P.O. Box. Aiglo, Calif. 93503.


EQUIPMENT FOR SALE

FOR SALE—CBS Stereo Audiamax #4450A, Serial #5277 and Volumax #4110, Serial #3322 Asking $1800, call McGraw, (517) 774-3118.

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WHATSOEVER YOUR EQUIPMENT NEEDS—new or used—check us first. We specialize in broadcast equipment. Send $1.00 for our complete listing. Broadcast Equipment & Supply Co., Box 475, Bristol, Tenn. 37620.

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A FEW COMPETITIVELY PRICED used Revox A77 & A700 decks available. Completely reconditioned by Revox, virtually indistinguishable from new at half the price! Standard 90 day warranty rebuilt or rebuilt machines. Satisfaction guaranteed. Example, A77 with Dolby, $675, plus shipping. Write requirements to EESS. Box 854, Hicksville, N.Y. 11802 (516) 921-2620.

MOTORS FOR SPOTMASTERS

New Paps hysteresis synchronous motor HS2-92, $472 used in series 400 radio machines. Price $49.00 each prepaid, while they last. 90 day warranty. Terms check with order to GOPS. Not recommended for Telecaster series 600 or 700.

TAPECASTER TCM, Inc., Box 662 Rockville, Maryland 20851.


CCA AUTOMATION EQUIPMENT—$999 AR-1000, 2 in 1, $999 Reels plus all accessories. 60 day trial period, if condition and almost never used. WUPU, Box 1433, Bartow, Florida 33830 (813) 533-9903.

FOR SALE: TR-22 High band color video tape machine, in perfect condition. $575.00. $75.00. $25.00 to cover depreciation. Send reply to organizations.

SPARTE/BAUER Model 710 AM Transmitter, 10 KW serial number 101, high performance modulator—like new in use. Year free warranty. Price $7,100.00. 8-76-21. Used $17,000.00. Contact Edward Aiatarene, (213) 965-2441 and (714) 966-5685.

TWO 3M DROPOUT COMP. WITH VR-1200 INTERFACE used once. Best offer. C. Eppol, WKTV, P.O. Box 2, Utica, N.Y. 13503.


FOR SALE/IMMEDIATE DELIVERY—ATC AUTOMATION EQUIPMENT. Programmer SP-10-G, Switcher AMS-10-S, Digital Clock DO-10, Time Sensitive DO-7C-2, Auto Recorder DO-7C-2, Auto Control Panel, Equipment installed in 6" rack with top, side panel and rear door, $2,500.00. F.O.B. George Moyer, WDEL, Wilmington, Delaware 19899.

IGM DUAL LEVEL MEMORY. This dual level MOS has been converted to single memory with 900 steps. May be reconverted to dual level with any component requirements. $900 per stop in either upper or lower level. Also, eight spare electronic component boards for the MOS. Total price $1,200. Contact George Moyer, WDEL, Wilmington, Delaware 19899.

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TELEVISION MAINTENANCE, or Electronic Technicians on Broadcast Color Television Equipment to work in either Northern New Jersey or Orange County, California. Send resume to: V.F.C. P.O. Box 266. New Hyde Park, N.Y. 11040.  7-76-11

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VIDEO SALES ENGINEER—Professional Video Switcher manufacturer requires aggressive, creative sales engineer. Solid background in professional video sales and/or engineering necessary. Degree helpful but not mandatory. This is a great opportunity for someone willing to grow with a small, yet fast growing, company located in Gainesville, Florida. Salary commensurate with experience and ability. Write in complete confidence, detailing experience and general background, to Industrial Sciences, Inc., P.O. Box 1499, Gainesville, Florida, 32602.  8-76-21

TELEVISION ENGINEER—First Class FCC license Background in Ampex 1200 maintenance required. Famous year-round Colorado recreation area. Contact At Large, Inc., KIHE-TV, Box 789, Grand Junction, Co. 81501. 303-242-5000.  8-76-11

CAMPUS SYSTEMS T.V. ENGINEER—Large medical school located in central Virginia needs top engineer to maintain and troubleshoot equipment in audio-visual department. Must have experience in color television systems. Excellent benefits. Contact: University of Virginia, Personnel Dept. Madison Hall, Charlottesville, Virginia, 22903. An equal opportunity employer.  8-76-11

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