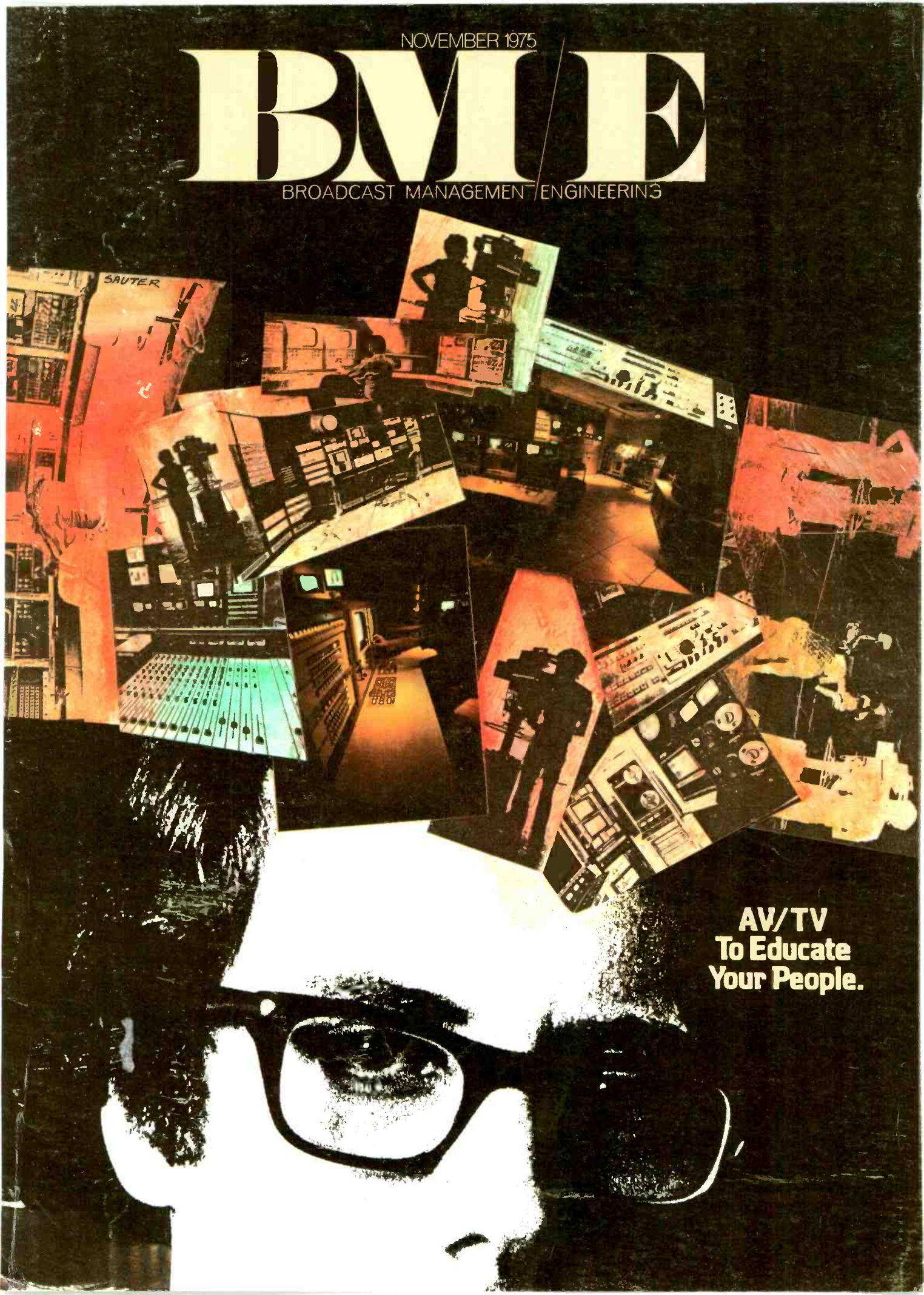
NOVEMBER 1975

BM/E

BROADCAST MANAGEMENT/ENGINEERING



AV/TV To Educate Your People.

SS 3159

The SS3159 stereo disc. reproducer provides complete facilities for professional stereo reproduction of disc. recordings. It is completely self-contained with SP10D turntable, tone arm, plug-in pickup cartridge, equalized preamplifiers, audio cue switching, power supply and pedestal assembly.

The turntable offers the highest quality, lowest noise operation available. It adds virtually nothing to the original sound as recorded on the disc. And with the advent of quadrophonic discs, it's imperative that vertical as well as horizontal "rumble" be reduced to a minimum.

FOR FURTHER INFORMATION CONTACT:

McCURDY RADIO INDUSTRIES INCORPORATED
1051 CLINTON STREET, BUFFALO, N.Y. 14206 (716) 854-6700, TWX 610-492-3219

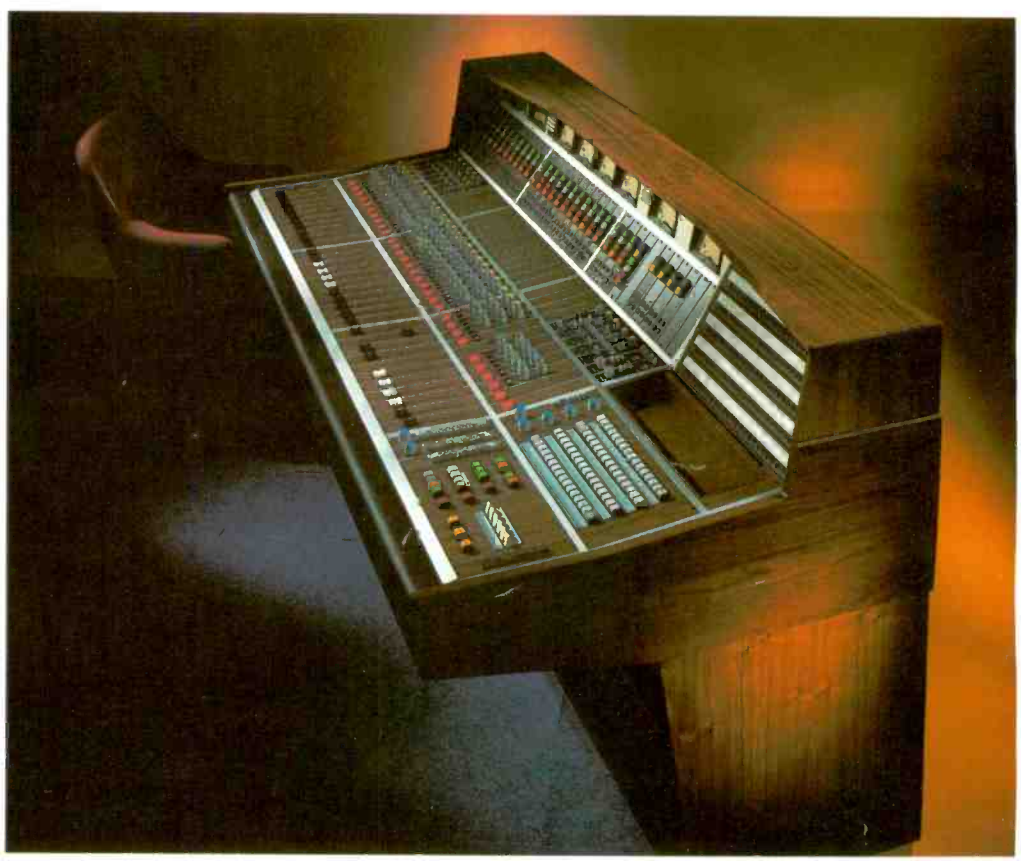
EASTERN SALES OFFICE: P.O. BOX 86 SADDLE RIVER N.J., 07458, (201) 327-0750 TWX 610-492-3219

IN CANADA: McCURDY RADIO INDUSTRIES LIMITED
108 CARNFORTH ROAD, TORONTO, ONTARIO M4A 2L4 (416) 751-6262 TELEX: 06-963533

SS 7800

The SS7800 Series of modular audio consoles provides complete professional facilities for mixing and shaping today's complex audio material.

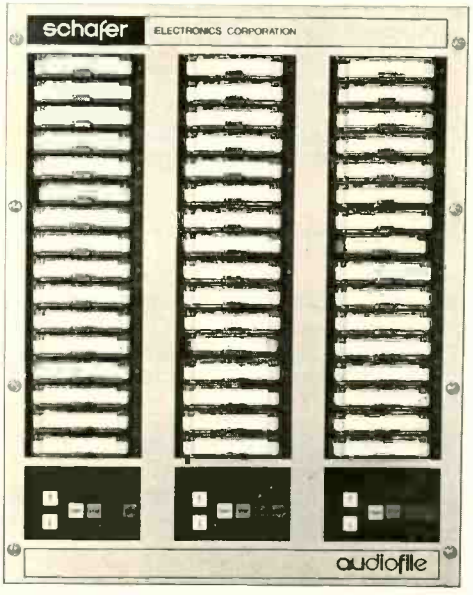
In addition to complete program mixing, monitoring and control, SS7800 Series consoles provide PA feeds and comprehensive Solo/Cue, Echo-Send/Receive, Foldback and talkback system facilities. A full range of options is also available including Equalizers, Compressors, Program Assign with Pan, and Remote Controls.



Circle 160 on Reader Service Card

500 +

INDUSTRY STANDARD



It's taken less than a year for the Schafer AUDIOFILE to become the new standard of comparison. The reason? Simple: We put more into it, so you could get more out of it.

So many AM, FM and TV stations have ordered AUDIOFILES from Schafer that we're having a hard time keeping up. So, order yours now . . . and even if you have a short wait, be patient. The AUDIOFILE is worth waiting for.

A year ago Schafer ran this ad.

Today, the Schafer AUDIOFILE is the *uncontested* INDUSTRY STANDARD. Over 500 AUDIOFILE modules have been delivered, and we're well into our second 500 now. *That's success.*

Find our why the Schafer AUDIOFILE is the #1 multiple cartridge machine.
Call today for details . . . or if you can wait a few days, mail the address form below.

schafer

a Subsidiary of Cetec Corporation

Schafer Electronics Corporation
75 Castilian Drive, Santa Barbara Research Park
Goleta, California 93017 (805) 968-0755

SEND MORE INFORMATION ABOUT THE AUDIOFILE!

Name Title

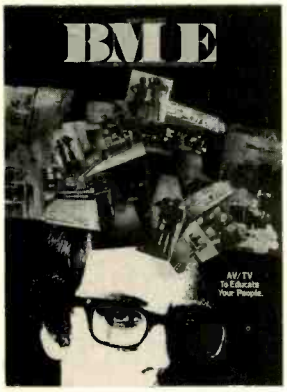
Station/Company

Address

City State ZIP

Circle 100 on Reader Service Card

BM/E
BROADCAST MANAGEMENT/ENGINEERING



Art Director Gus Sauter created this original assemblage from Syracuse University and the Xerox Training Center photographs to convey the idea that there are plenty of AV/TV tools to reach the minds of learners.

BROADBAND INFORMATION SERVICES, INC.
295 Madison Ave.
New York, N.Y. 10017
212-685-5320

Editor
James A. Lippke

Associate Editor
Robin Lanier

Contributing Editor
Robert Wollins

Editorial Assistant
Karen Goudket

Art Director
Gus Sauter

Manager
Publication Services
Djuna Zellmer

Circulation Manager
Barbara B. Connolly

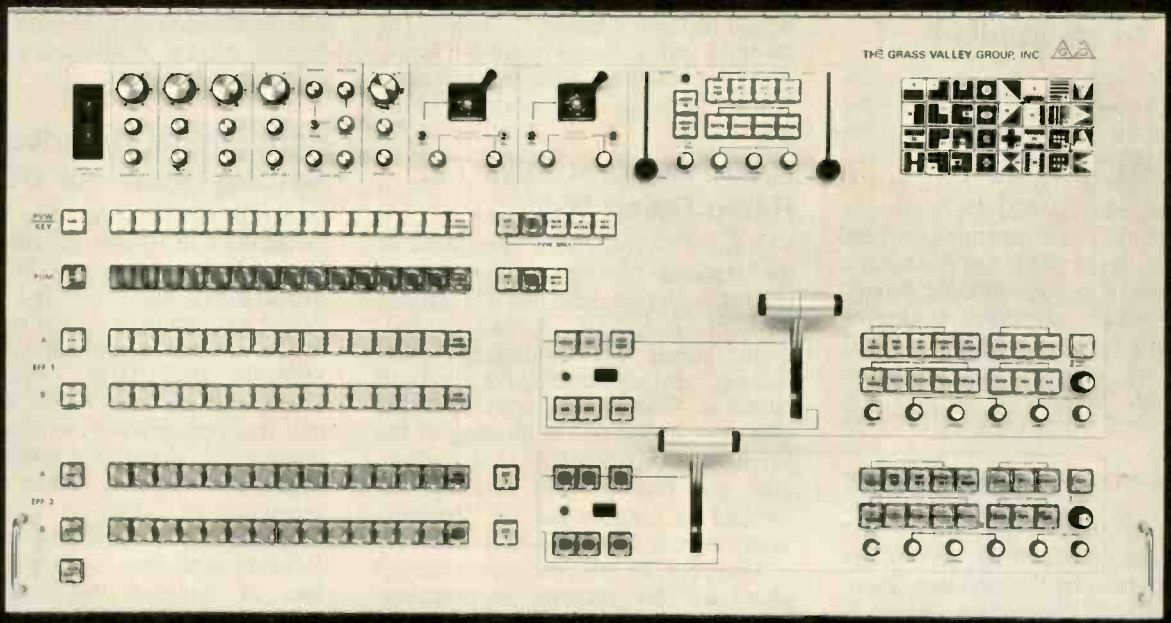
FCC Counsel
Pittman Lovett Ford and Hennessey

Publisher
Charles C. Lenz Jr.

NOVEMBER 1975/VOLUME 11/NUMBER 11

BPA BM/E, BROADCAST MANAGEMENT/ENGINEERING, is published monthly by Broadband Information Services, Inc. All notices pertaining to undeliverable mail or subscriptions should be addressed to 295 Madison Ave., New York, N.Y. 10017. BM/E is circulated without charge to those responsible for station operation and for specifying and authorizing the purchase of equipment used in broadcast facilities. These facilities include AM, FM, and TV broadcast stations; CATV systems; ETV stations; networks and studios; audio and video recording studios; consultants, etc. Subscription prices to others: $15.00 one year, $25.00 two years. Foreign: $20.00 one year, $35.00 two years. Foreign Air Mail: additional $24.00. Controlled circulation postage paid at East Stroudsburg, PA.

MODEL 1600-3D
SWITCHING SYSTEM



FEATURES

- 16 inputs (including color black and color background)
- 6 output buses: M/E-1 A & B, M/E-2 A & B, PGM, & PVW/KEY
- 2 complete mix/effects systems, each with modulated positioner, color matte generator, and pattern generator
- Color black generator
- Non-sync inhibit system
- Color background generator
- Camera tally system

OPTIONS

- RBG chroma keyers
- Shadow key system
- Chroma key switching matrices
- Borderline generators
- Quad split generator
- Downstream keyer with insert fade and fade to black controls
- Auxiliary switching buses with separate control panels

THE GRASS VALLEY GROUP, INC.
A TEKTRONIX COMPANY

Station Plaza East
GREAT NECK, NY 11021
(516) 487-1311

4419 Van Nuys Blvd, Ste 307
SHERMAN OAKS, CA 91403
(213) 990-6172

1644 Tullie Cir, NE
ATLANTA, GA 30329
(404) 634-0521

P.O. Box 482
MABANK, TX 75147
(214) 887-1181

810 W Bristol Street
ELKHART, IN 46514
(219) 264-0931

BROADCAST INDUSTRY NEWS

Best Method For AM Stereo To Be Studied

Three major industry organizations, the National Association of Broadcasters, the Electronic Industries Association and the Institute of Electrical and Electronic Engineers' Group, have established the National AM Stereophonic Radio Committee to determine the best method standard AM radio stations may broadcast in stereophonic sound. The Committee, organized at the request of the FCC, will study in detail the various systems for providing stereophonic broadcasts by AM stations and will report the results to the FCC.

This action is in concert with the work of the National Stereophonic Radio Committee which led to FM stereophonic broadcasting, and studies now in progress by the National Quadraphonic Radio Committee, which is looking toward four channel FM broadcasting.

Under the parent Committee, there will be a Steering Committee and a number of working groups to study transmitters, receivers and systems and to conduct appropriate evaluation tests. Members will be announced later.

CBS Takes Delivery Of 300th Ampex Recorder

(Right to left) CBS Records Eric Porterfield, director of recording engineering, and Calvin Roberts, vice-president, operations marketing, share a happy moment with two Ampex representatives, Al Slater and Frank Rush, after taking delivery of an Ampex MM-1100 multichannel recorder. The 24-track professional recorder represents the 300th machine shipped since Ampex introduced the model in 1973.

NAB President Says TV, Radio Doing Well

Vincent T. Wasilewski, president of the National Association of Broadcasters, says that radio and TV stations have come through the current economic period "in astoundingly good fashion" and predicts that the trend will continue. Wasilewski, who made the statement at the recent meeting of the Michigan Broadcasters Association, also said that in 1974 revenues increased for both media and "business seems to be holding up well this year."

Last year, he said, radio experienced about a 7.6% increase in revenues, about a 7.8% increase in costs, and an average profit margin of 5.. Television revenues were up about 8.3%, operating costs up 7.8%, and the average profit margin was 17%. All figures are before Federal Income Taxes.

Wasilewski also said that FM stations did particularly well with sales increasing more than 22% on the average, while operating costs increased 18%. Broadcasters are optimistic about the future, he says, and they estimate that in 1975 profits will increase 8.5% for AM, 22% for FM and 12% for TV.

NAB Urges FCC To Cut Rules On Automation

The National Association of Broadcasters wants the Federal Communications Commission to update outmoded regulations and free broadcasters to provide Americans with completely automated radio and TV service.

The NAB comments, in a response to an FCC inquiry, said that fully automatic electronic transmission systems are feasible and authorization by the FCC for their use would encourage "birth of a new generation of broadcast equipment."

In its 75-page filing, the NAB pointed out that technological development has made U.S. broadcast equipment increasingly more sophisticated while at the same time the FCC has held back its implementation with the rules and regulations of the Communications Act adopted in 1934.

Educational Broadcasters Set Big Show For DC

Under the general title "The American Revolution in Communications," the National Association of Educational Broadcasters has scheduled a highly varied and intensive annual convention for November 16 through 19th, at the Sheraton Park Hotel, Washington. There will be nearly 100 individual talk sessions devoted variously to the interests of educational programmers, engineers, managers. There will be a screening of Japanese instructional programs, and an exhibit of American software from firms such as Time-Life Inc. A featured luncheon speaker (17th) is Ben Bagdikian, writer and communications critic.

SCTE Begins Publication Of Technical Magazine

The Society of Cable Television Engineers began publishing COMMUNICATIONS/ENGINEERING DIGEST last October. According to Robert Bilodeau, president of SCTE, "C/ED will be an outlet for technical exploration, examination and problem solving."

Judith Baer, executive director of SCTE, will serve as managing editor. Editorial offices are located at 1300 Army Navy Drive, Arlington, VA 22202.

Changes In FCC Community Interest Rules Opposed

Proposed new regulations of the Federal Communications Commission will isolate broadcasters from their communities, according to UNDA-USA, the national association of Catholic broadcasters and communicators. The comments were filed with the FCC on proposed changes in rules which require broadcasting stations to determine community problems and interests and to produce programs in response to those findings.

The UNDA-USA claims that the

changes would allow broadcasters to isolate themselves from their community which would lead to a deterioration of programming.

Specifically, the UNDA-USA opposed a change which would exempt stations broadcasting to communities of less than 10,000 people from most community ascertainment procedures. The exemption would extend over an "experimental" period of three years.

Children's TV & Arts Conference To Be Held

Action for Children's Television (ACT) will be holding its Fifth National Symposium on Children's Television and the Arts November 2,3,4 at the Atlanta Memorial Arts Center in Atlanta, Ga. The three-day symposium will concentrate on the creative opportunities for a media merger between children's TV and the arts, with a series of workshops that will include film and video presentations.

For further information contact ACT, 46 Austin St., Newtonville, MA 02160; 617-527-7870.

No-Battery, No-Electric Radio Developed

Mr. George Baglietto of San Francisco has invented a unique and useful radio receiver that incorporates a small spring driven generator. With this device, the need for batteries is eliminated, since the radio receiver is operated by winding it such as one might wind a clock. This does away with the problems of batteries going dead at the wrong time and their frequent replacement.

Mr. Baglietto is now negotiating for the sale or licensing of his invention. For information, contact Lawrence Peska Associates, 44 Montgomery St., Wells Fargo Building, San Francisco, CA 94104.

Many Americans Think TV Should Cover Congress

A recent poll conducted by the Roper Organization shows that a majority of Americans feel that TV cameras should be allowed within Congress to cover important legislative sessions and debates.

The poll, conducted for the Television Information Office, reveals that 68% of a national sampling favor at least partial TV coverage of major Congressional events while 27% feel it would be better if there were no TV coverage of Congress.

Chairman Wiley In Favor Of FCC Reform

At the September meeting of the International Radio and Television Society, Richard E. Wiley, Chairman of the Federal Communications Commission, came out strongly in favor of FCC regulatory reform. He pointed out that in the last few years over 300 FCC rules have been modified or eliminated.

One area that Wiley feels in particular should be reviewed is the application of the Fairness Doctrine in the larger radio markets. Wiley feels that in a market such as Chicago, which has some 65 commercial radio stations, there would be enough different points of view broadcast without government regulations. The fact that a few stations may choose to allow only one side of a particular issue to be broadcast should not cause all stations to be so regulated.

Wiley also feels that the so-called "equal time" requirement concerning political broadcasts, Section 315, should be reviewed and amended. In major races, such as presidential, this regulation can hold back free political discussions such as the Kennedy-Nixon debates of 1960 by forcing stations to give equal time to small parties

continued on page 8

that have entered the race.

Wiley concluded by saying FCC is an important aid in the regulation of the broadcast industry, but that ultimately the responsibility for programming in the public interest is the burden of the industry itself.

Political Equal Time Rule Reversed By FCC

On September 25, 1975 the Federal Communications Commission ruled that radio and TV broadcasts of candidates news conferences and political debates will no longer open up equal-time access for all their opponents. The FCC's 5-to-2 ruling received strong objections from the Democratic National Committee.

It is expected that this ruling will have important effects on the upcoming 1976 Presidential election. Under the old rule, a Presidential news conference occuring while the President was running for office was not bona-fide news and fell under the restrictions of the equal time rule. Recently, President Ford held a news conference off-camera so as not to create the opportunity for other declared candidates to get equal air time. Under the new rule, however, news conferences held by the President or by any other candidate can be treated as bona-fide news events and are thus exempt from the law that would require all legally qualified candidates the same equal opportunity for broadcast time.

It now becomes the responsibility of the news industry to determine what is truly a news event and what is campaign publicity.

British Firm Offers Computer Music System

The British company Electronic Music Studios claims to be the first to offer a computer music system in an "off-the-shelf" package. Called Computer Synthi, EMS claims it will make exisiting sound synthesizer installations 10 times more productive.

Computer Synthi is made up of a PDP-8/A minicomputer, two cassette tape drives, analog-to-digital and digital-to-analog converters, an array of pushbutton and slider controls, input/output plugs, sockets and patch panels, and a 16-position light emitting diode display. The system facilitates the programming of audio synthesizers with thousands of events over hours of output and the selective, easy editing of output. The price of the system, which can be used with any voltage-controlled equipment, is approximately $28,000 (including computer).

The U.S. agent is EMSA Inc. (contact Mr. Hafner), 460 West St., Amherst, MA 01002; 413-256-8591.

Part I of NAB Handbook Ready

Part I of the sixth edition of the *National Association of Broadcasters Engineering Handbook*, the first new edition in 15 years, is now being mailed to NAB members who have already placed orders. The new edition contains 19 chapters, over 500 pages, and hundreds of illustrations, reference data, graphs and charts. The *Handbook* is being offered to members for $30 per copy, retail price is $45.

Midwest SBE Convo Big

photo courtesy Richard Scott, Indiana U.

The Society of Broadcast Engineers Midwest '75 Convention, Sept. 16-17, Indianapolis, turned out to be a large affair—both in exhibitors (41) and attendance (nearly 1200).

ENG equipment was prominent and RCA showed the new configuration for its backpackless TK-76 camera. Among the technical papers was a status report on circular polarized TV antennas. Satellite developments for broadcast were discussed by Alan Peyser of Comsat.

Demodulation measurements were discussed by Telemet; display of demodulation equipment was shown by Telemet and Optek.

Washington Symposium Is Strong Draw For IEEE

Registration nearly a third above that of recent years brought full-house crowds to the technical sessions of the 25th Annual Broadcast Symposium of the Institute of Electrical and Electronics Engineers, held at the Washington Hotel, Washington, D.C., September 25th and 26th.

The two luncheon meetings and the banquet September 25th were also sell-outs, with addresses by Chairman Wiley of the FCC, R.E. Lee, FCC Commissioner, and Louis Schwartz, Washington communications attorney.

In his talk, Wiley put himself strongly on the side of de-regulation, as he has in other public appearances lately, and also "plugged" the automatic transmitter as a development that he, personally, believes should be part of the near future.

Three papers, all of comprehensive technical content, attested to the current strength of the movement toward circular polarization for TV antennas. They were given by G.W. Collins of Harris Corp., Dr. O. Ben-Dov of RCA, and Dr. Raymond J. DuHamel of Jampro Corp.

The extremely rapid advance of domestic satellite transmission for broadcast and pay-cable nets was attested in a report by Hubert J. Schlafly of Trans Communications Corp. Electronic news gathering got attention in a report on polarized microwave antennas, by T.J. Vaughn of Micro Communications, and in one on frame accurate editing equipment for U-Matic video recording, by Louis Pourciau and others of Television Research International.

Dr. Raymond Wilmotte gave some highlights from his recently completed

continued on page 12

PRIME TIME

YOU CAN'T BEAT THE SYSTEM: TKP-45.

The one camera camera system.

The only thing the RCA TKP-45 has in common with other portable TV color cameras is portability. From there on, it's an almost total departure from anything else.

For one thing, the TKP-45 has every studio camera feature. It has been slimmed down to 19.4 pounds, including viewfinder (less lens) by designing new lightweight circuitry, not by eliminating big camera features. So it performs like the finest studio camera, wherever it's needed, inside or out. Imagine the cost-effectiveness of having one camera for every use.

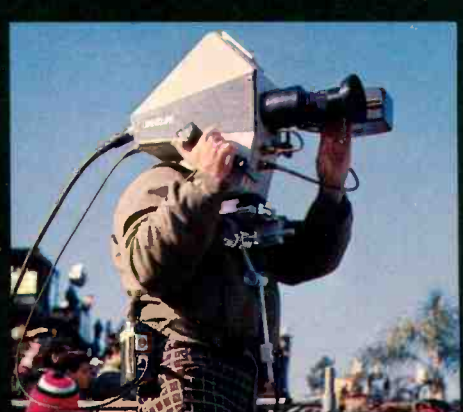
How portable can you get?

As portable as you want to be. Consider:

With the TKP-45, the cameraman has up to 1500 feet of small-diameter, lightweight cable leading to the CCU. It has just half the weight of other mini-cable. There's no backpack to add weight, no tangles to avoid. Your cameraman can concentrate on picture-getting.

If that isn't enough portability, then pipe the TKP-45 into our "Minipack" CCU. This 35-pound option has a self-contained, rechargeable DC battery unit and AC power adapter. The camera can rove up to 300 feet from a Minipack, or a crewman can easily move this lightweight CCU to the action.

A lightweight junction box is belt-worn, for two-way intercom and audio pickup. And portability imposes no restrictions on lens selection, automatic video control, or any of the TKP-45's studio camera features.



Meanwhile, back at the studio...

Place the TKP-45 on a tripod or pedestal, and—presto!—it's a full-capability studio camera. Indoors or out, you can use fixed optics (teles, wide-angles, fish eyes), or zooms through 34:1 ratio; the choice is yours.

Pick a 3" or 7" viewfinder—no compromise to camera size in the viewing department. Let the TKP-45 perform beside a TK-44 or TK-45, then try to tell the difference. A full range of automatic controls and video performance features says you can't!

For proof, ask MTS.

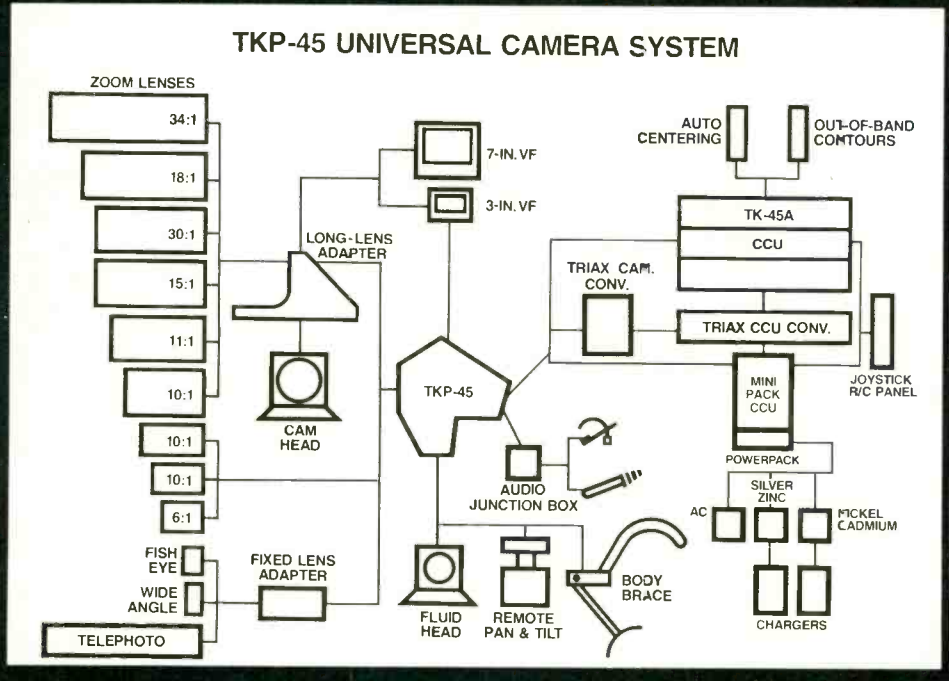
MTS, Mobile Television Services, is a teleproduction company on the move—to the tune of 20,000 miles in its first four months. This unique firm operates a 40-foot mobile unit that houses more than a million dollars' worth of broadcast television gear. The equipment, equal to many a commercial broadcast station, includes:

5—TK-45A color cameras with joystick controls
1—TKP-45 portable color camera
2—TR-61 video tape recorders
2—Slo-Mo video tape recorders
Custom audio and video switching systems

MTS began in mid-1974 as the production company for the World Football League's "Game of the Week". The first season involved 20 games, including WFL action and bowl games, the Miss World Pageant, several "Wide World of Entertainment" segments for ABC, and the new show, "Almost Anything Goes."

TKP-45 gets the action.

Right from the start, the TKP-45 played an integral part in every production. At



We'd welcome the chance to pit the TPK-45 against any newsgathering or studio cameras to prove that "you can't beat The System" for quality and features at an attractive price.

the sports events, it is used to capture action scenes and impromptu interviews, with all the picture quality of its TK-45 companions. And it adds tremendously to MTS' in-studio productions.

Quality is the MTS cornerstone. "You're only as good as your last job," says MTS Executive Vice President Howard Zuckerman. "Every assignment must be done right, without skimping or corner-cutting."

It's no coincidence that MTS picked the TKP-45 to add the final touch to its RCA camera lineup.

RCA

NEWS

three-year study, "Technological Boundaries of TV," undertaken for the FCC. Among other items, he described a new method for bandwidth compression of video signals, called Sample Dot, based on pseudo-random scanning of the video raster. Robert Stone of General Electric, inventor of Sample Dot, showed a Sample Dot transmitted picture, side by side with standard transmission. The Sample Dot picture had good IEEE quality with a video bandwidth of .45 MHz (in a form with memory attached).

The other 15 or so papers were all of equally high quality, providing a particularly rich two-day sampling of current trends in broadcasting technology. Chairman of the Washington Section of the IEEE, which organized the symposium, is Lewis F. Page of Harris Corp., Vice-Chairman Victor Nicholson of the Cable Television Information Center, Secretary Neil Smith, and Treasurer Delmer Ports of NCTA.

NAB Briefs . . . .

Broadcasters have urged the FCC to reject as totally lacking in merit a suggestion that it **ban the advertising of over-the-counter medications** on TV before 9 p.m. each day. Opposition comments filed by the NAB said Frank Bellotti, Massachusetts attorney general, and other petitioners failed to submit any evidence that TV commercials contribute to drug abuse among children because there is none . . . . The NAB has urged the FCC to let radio stations that record and **broadcast telephone conversations** notify the other party after the conversation, not before, in order to maintain spontaneity . . . . The Small Market Radio Committee of the NAB recently passed a resolution calling for the FCC to exempt stations having 15 or fewer employees from filing an **equal employment plan.**

News Briefs

The Video Systems Division of Peirce-Phelps, Inc. has been awarded a contract for $2 million to furnish and install a color TV studio and multiple monitoring locations for the National Military Command Center at the Pentagon, Washington, D.C. . . . . **Ampex Corp.** has delivered over $500,000 worth of TV broadcast equipment in the form of 6 AVR-2 modular color videotape recorder/reproducers to Mid New York Broadcasting Corp. . . . . Retlaw En-

terprises, Inc. has placed a $320,000 order for a BT-30U, 30 kW UHF transmitter to be used by station KJEO-TV, Fresno, Calif., with **Harris Corp.**

RCA Broadcast Systems recently announced an equipment order of over $330,000 by WSAV-TV, Savannah, Ga., which includes a Turnstile II low-band superturnstile broadcast antenna and an RCA TT-25-FL 25 kW transmitter. WSAV will become the first TV station to install the Turnstile II antenna . . . . **RCA** also announced a $500,000 order by Rust Craft Broadcasting Co., Pittsburgh, Pa. which includes 8 RCA TK-45A cameras. Two cameras each will be installed at 4 of the group's stations: WSTV-TV, Steubenville, Ohio; WROC-TV, Rochester, N.Y.; WRCB-TV, Chattanooga, Tenn.; and WRCW-TV, Augusta, Ga. . . . . **Ampex Corp.** has announced a contract for approximately $2 million with the Korea Educational Development Institute to construct a TV/radio facility near Seoul, Korea.

Kaman Sciences Corp. has announced that station KTVT, Ft. Worth, Texas has installed a BCS 1100 traffic/accounting system, will install a Vital Industries BIX 2MC Master Control switching system early in 1976 and a Vital Viman 200 Control system will provide the interface to give total broadcast automation to the station . . . . **Andrew Corp.** has been awarded a contract by the Alaskan Small Earth Station Program to provide 100, 4.5 meter earth station antennas for the joint State of Alaska-RCA Alascom project . . . . **Philips Audio Video Systems Corp** will supply color videocassette player/recorder equipment to See and Go, Inc. for use in the new See and Go Travel Network, a program to provide travel agents with videotaped travel stories for their clients.

Collins Radio Group of Rockwell International Corp. has sold 8 FM transmitters for installation atop the Canadian National Tower in Toronto (world's highest free standing structure) . . . . The Canadian Broadcasting Corp. will use 13 **RCA** Video IV character generating systems in TV coverage of the 1976 Montreal summer Olympics . . . . Station XHLZ, Guadalajara, Mexico will go on the air later this year with approximately $104,000 worth of **RCA** studio and transmitting equipment, including RCA's DAP-5000 Digital Automatic Programmer . . . . **Vedco, Inc.,** Metaire, La., manufacturer of radio and TV equipment, has announced a contract to furnish a routing switcher system to Total CATV, Inc., operator of the Baton Rouge CATV system.

Collins Radio Group of Rockwell International Corp. has announced the appointment of Applied Electronics, Ltd., Toronto, Canada, as its authorized representative for Collins broadcast products in Canada, the Northwest territories, and the Yukon . . . . **Ampro Corp.** has moved to new, larger quarters at 850 Pennsylvania Blvd., Feasterville, PA. 19047; new telephone number 215-322-5100 . . . . Chicago-based Heller-Oak Cable Finance Corp. has announced a change in name to **Heller-Oak Communications Finance Corp.** to indicate the expansion of the corporation into the financing of radio and TV . . . . **The Computer Exchange, Inc.,** Great Neck, N.Y., has acquired approximately 99% of the outstanding shares of common stock of Systems Resources Corp., Plainview, N.Y., manufacturers of TV graphics and titling equipment . . . . **Devlin Productions** has announced a major expansion in all phases of video services, from initial production to post-production and duplication. For further information contact Devlin at 55 W.

continued on page 15

Lenco's 300 System is - - -

CHECK ONE ✓

☐ A Digital Master Sync Generator with Change Over
(Can even use one External Generator)

☐ A Gen Loc Video Test Set
(**Your** choice of Test Signals)

☐ A Gen Loc Digital Proc Amp
(Helical or RS-170 Signals)

☐ A Unique Pulse Distribution System
(Throw away your Pulse DA's & Delay Lines)

☐ A Remote Studio Pulse System
(Use a jitter free Generator Substitute Unit)

☑ All of the Above!
(And for Less Money!)

LENCO's 300 System's unique concept allows you to build any system to **your** requirements - - - Any way you want! Simply pick the units from the 29 available and plug them in. **No** modification or re-wiring of the shelf necessary!

"QUALITY WITH RELIABILITY AT A REASONABLE PRICE"

LENCO, INC., ELECTRONICS DIVISION
319 WEST MAIN ST., JACKSON, MO. 63755
314-243-3147

Circle 107 on Reader Service Card

NEWS

55th St., N.Y., N.Y. 10019; 212-582-5572.

Data Communications Corp. announced that its BIAS (Broadcast Industry Automation System) has added 10 new radio and TV stations to their list of subscribers. The stations are: WCSC-TV, WCSC-AM, and WXTC-FM, Charleston, S.C.; WSPD-AM, Toledo, Ohio; WGBS-AM, Miami, Fla.; WSM-AM, Nashville, Tenn.; KVOA-TV, Tucson, Ariz.; WLTV, Jacksonville, Fla.; WFAA-TV, Dallas, Texas; and the Global Television Network, Toronto, Canada . . . **Home Box Office, Inc.** has announced the appointment of Trans World International, Inc., as a sports program consultant for the HBO pay TV network and the naming of Richard M. Clurman as program and development advisor.

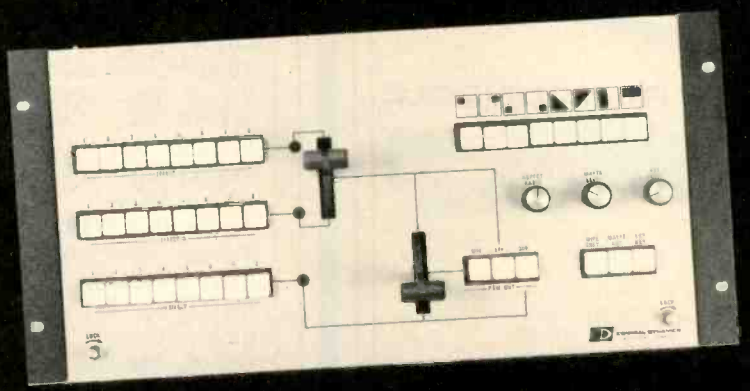
MPCS Communications Industries, Inc. is expanding its services of video equipment sales, rental and production studios, and is currently working on a TV special about the Road Atlanta's Grand Prix over last Labor Day weekend . . . . **The CableSystem Theatre,** Toledo, Ohio, is expanding its film services which currently provide vintage movies in black and white to include more recent, color motion pictures via Telemation's new color film chain . . . . **MDS** (Multipoint Distribution Service) is being used to distribute "Private Channel Club" pay TV programs to cable systems in Miami, Fla. and St. Louis, Mo. . . . . The **Marconi** Mark VIII camera, tripod mounted, has been successfully used by station WBGU-TV, Archbold, Ohio to film the low-light interior of the Bicentennial "Freedom Train."

Scientific-Atlanta, Inc. has announced the expansion of its Atlanta facilities by the lease of a 20,000 square foot building in an industrial area near its main plant which will be dedicated to the company's rapidly-expanding satellite communications equipment business . . . . **McFarlane Mobilvision** of Saratoga, Calif., has moved into its new custom Mobile Unit 2 . . . . **Berkey Manhattan Filmstrip and Slide Laboratories** have installed a Pako 35-KOII processor to meet the demand for high quality negatives . . . . **Cape Cod Cablevision Corp.,** the second largest cable system in New England, is moving ahead with its 18 months, $2½ million expansion program covering a construction path of some 290 miles which, upon completion, will consist of 620 miles with capability of service

continued on page 17

small... is sometimes BIG ENOUGH!

Central Dynamics Introduces the New VS-10 TV Color Production Switcher for Mobile, CATV, Industrial and Educational Applications



Priced at Only $3350, we believe it represents a major value breakthrough for professional programming with true broadcast quality

You don't always have to be *big* and sophisticated to make it as a TV Color Production Switcher. The low cost VS-10 is an 8-input, 3-bus, compact, self contained, vertical interval, solid state switcher with ample sophistication for professional programming with *true broadcast quality*. Impressive special effects, mix amplifier, wipe/key amplifier, output selector and broad operational capabilities provide real production talent. A unique automatic special effects preview allows presetting keys and wipes for smooth, dramatic transitions to effects. The VS-10 lets you chroma key, matte key, wipe or dissolve to keys, dissolve or wipe between program sources, dissolve to special effects, or insert titles. Other standard features include a Cut Bus and true On-Air tally system. The VS-10 is compatible with NTSC, PAL-M and PAL color systems. All this . . . plus the proven reliability of the largest and most sophisticated Central Dynamics Production Switchers.

Sometimes . . .
SMALL *is* Big Enough!

Control Features

Wipe - Fader positions A & B signals. Aspect Ratio Control varies configuration of 4 corner patterns.

Keys - Wipe Keys on or off. Key Level Control adjusts slicing level of key signals. Matte Level Control adjusts luminance value

Mix - Fader proportionally controls output signals from the Direct Bus and the Key/Wipe Amplifier.

Switches - Crosspoint *and* Output Selection switched in vertical interval with illuminated momentary pushbuttons. Wipe, Key Mode & Pattern switches are mechanically interlocked pushbuttons. Tally lights on each input bus indicate "on-air" signal.

Specifications

Video - 8 loop through inputs (BNC) externally terminated.
1 V p-p composite *or* 0.7 V p-p non-composite synchronous signals.
1 External/Chroma Key input terminated internally. (CDL Chroma Keyer Module is optional)

Pulse - 1 Sync input (BNC) externally terminated, 2 to 6 V p-p.

Tally - Relay interface with 14-pin Amphenol connector with mating connector.

Power - 115 VAC ±10% 60 Hz or 230 VAC ± 10% 50 Hz (switchable). 50 VA.

Mounting - Rack frame mountable with hinged front panel. 19" (483 mm) W x 8-¾" (22 mm) H x 7" (178 mm) D. All external connections are on rear of frame. 18 lbs. (8.5 Kg.)

Unit includes module extender, Operating & Maintenance Manual.

Central Dynamics has earned a reputation as one of the unquestioned leaders in TV Broadcast Equipment. Our standard line of production switchers are priced from $11,000 to $70,000.

The VS-10 is the first of a series to be *engineered* and *priced* to fill the gap between inexpensive, inadequate switchers and the more sophisticated, expensive ones.

Solid-state technology, and volume production techniques allow the VS-10 to be offered at this remarkable price.

However, you purchase the VS-10 with complete confidence that it is backed by the engineering experience, integrity and reputation of Central Dynamics.

We are convinced, as you will be, that the VS-10 *Broadcast Quality*, TV Color Production Switcher is the best value available on the market. We're delivering production units now.

Order yours today . . . at only $3350.

CENTRAL DYNAMICS LTD

Canada:
147 Hymus Blvd., Montreal, Que., H9R-1G1
514-697-0811

U.S.A.
230 Livingston Street, Northvale, N.J. 07647
201-767-1300

Circle 109 on Reader Service Card

NEWS

to approximately 31,000 homes.

George J. Arkedis, Vice President, CBS Radio and General Manager, CBS Radio Network, recently announced that advertiser investment on the **CBS Radio Network** during all of August and September nearly exhausted their commercial inventory from 6:00 AM to 6:00 PM and that advertiser interest in the fourth quarter is at a very high level . . . . **KNTV (Channel 11),** San Jose, Calif. is the first station in the country to begin airing a series of 30-second commercial spots promoting Youngs Drug Products Corp.'s Trojan Brand condom. The station has received a large amount of calls and letters and the ads, mostly in favor and Carol Hemingway, **KABC (Los Angeles)** devoted an hour and 45 minute talk show exclusively to the subject which included listener comments . . . . **The American Society of Association Executives** has launched its first public service TV campaign—"Strength in Numbers"—a series of 3, 30-second colors spots in behalf of business and professional associations in the U.S.

Ampex, Corp. has been named to provide $3.5 million in TV broadcasting equipment to the State of Bahrain as part of the State's expansion of its TV network . . . . **International Video Corp.** has been selected by the Executive Committee of the Pan American Sports Organization to provide the videotape recording equipment for worldwide broadcast transmission of the 1975 Pan American Games to be held in Mexico City, Oct. 12-26. Lhe 6 IVC-9000 videotape systems, 3 IVC-7000 color TV cameras and 1 IVC-7000P portable camera are being leased by the Organization and will later be delivered to customers in Latin America . . . . **Coastcom** has been awarded a contract from GTE International Systems Corp. to furnish the world's first single program audio channel per carrier systems for the domestic satellite system being installed in Algeria.

CCA Electronics Corp. has received an order for a 50,000 watt AM broadcast transmitter and related equipment to be installed in Kuwait.

The American Cassette Corp. has recently been formed and will manufacture high-energy ¾" videocassettes, as well as offer reloading service for ¾" cassettes containing damaged tape. For further information and location of distributors, contact the company at P.O. Box 2751, Orlando, Fla 32802 (305) 843-8982 . . . . Laurence J. Anderson and Eric J. Behre have an-

continued on page 19

IT'S TIME YOU CHANGED THE WAY YOU LOOK AT THINGS.

Broadcast people, you've changed. Over the last few years, you've effectively turned the industry on its ear with a determination to provide your public with more, and *more effective* coverage. Your resolve has brought about vast changes in camera technology—in size, weight, mobility and versatility.

PV10 x 15B. Lowest-priced 10:1 for major broadcast cameras.

We've been changing, too. While quietly supplying the broadcast industry with high-quality optics for the last two decades, we've been hard at work, developing a family of lenses to expand the capabilities of broadcast TV equipment...while keeping the economics under control.

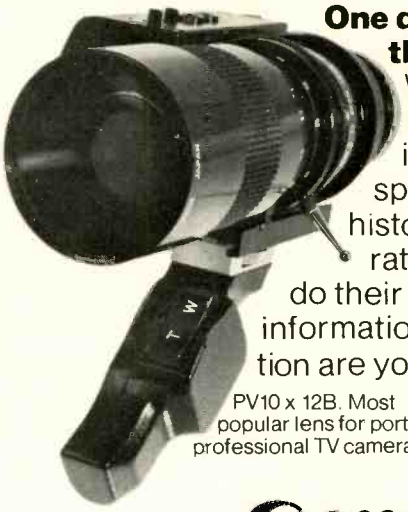
You are our requirements. More than any other factor, Canon products are the result of user inputs. So it's no coincidence that we offer the widest, most customized range of optical products for the broadcast field—in terms of function *and* price. From the lightest-weight, most compact (and by the way, most popular) 12-120mm on the market to an enormously-versatile 32-1070mm with *continuous* zoom and 1.8 meter minimum object distance. Your requirements also inspired our new budget-stretching Versatility Packages—a family of two-lens systems that give one camera the versatility of two at substantial savings. (And we're always listening for new ideas.)

PV25 x 16B-DZ. Longest low-cost lens for 1" plumbicons*

We've invested in you. Because major optical advances don't happen without a lot of expensive thinking and heavy experimentation. While the dividends are visible in every Canon product (for example, for some years now, we've been pioneers in super spectral coating), they've also won us acclaim in the process. Like a special award from the Motion Picture Academy of Arts and Sciences. No less important, our sizeable investment in manufacture and quality control insures that the advances in our labs aren't diminished on the production line.

You make us look good. Service isn't just a matter of goodwill—it's good business. So we support what we sell with an extensive staff of factory-trained technicians, headquartered in New York, Chicago and Costa Mesa, California. Equipped with the finest, latest test equipment—much of it of our own design. To help insure the consistency of our standards...and facilitate the fastest possible turn-around time.

PV34 x 24B-DZ. Widest range double-zoom lens.



PV10 x 12B. Most popular lens for portable, hand-held professional TV cameras.

One demo is worth a thousand claims. We could spend a lot of time on awe-inspiring technical specs and case-histories. But we'd rather let our lenses do their own talking. More information, or a demonstration are yours for the asking.

Canon®

Canon U.S.A. Inc.
Head Office, 10 Nevada Drive,
Lake Success, N.Y. 11040
140 Industrial Drive
Elmhurst, Illinois 60126
123 Paularino Avenue East,
Costa Mesa, Ca. 92626

Canon Optics & Business Machines Canada, Ltd. 3245 American Drive,
Mississauga, Ontario. L4V 1B8, Can.

Canon Amsterdam N.V.
Industrial Products Division
De Boelelaan 8
Amsterdam, Netherlands

* ® N.V. Philips of Holland

Circle 111 on Reader Service Card

NEWS

nounced the formation of **The Cable People, Inc.,** a marketing company which offers a package to cable systems of direct sales, advertising, and installations. The company can be reached at P.O. Box 212, Atkinson, N.H. 03811 (617) 375-1570, collect.

Capital Magnetic Products has announced the formation of a totally separate sales force for professional products which will be headed by Larry C. Hockmeyer, recently named nations sales manager, professional products. This major reorganization of the company's marketing effort has been made to enable it to concentrate on duplicator, recording studio, audio-visual and broadcast product markets . . . . **Unimedia Corp.** has moved to a new facility in Grass Valley, Calif, built specifically for producing color monitors . . . . **Television Research International, Inc.,** San Francisco Peninsula developer of electronic systems for the TV industry, has consolidated its engineering, research and development, manufacturing and administrative departments in a new 32,000 square foot facility at 1003 Edwell Court, Palo Alto, Calif. 94303 (415) 961-7475 . . . . **Las Vegas Television Productions** has announced the purchase of a multi-purpose production center, which will be located at 2925 South Highland Drive, Las Vegas, Nev., that will house over $5 million of broadcast equipment.

Berkey Manhattan Filmstrip & Slide Laboratory has announced complete Super 8mm Filmstrip services which include 24 hour service for answer prints. The company is at 222 E. 44th St., NY, NY 10017 (212) 661-5610 . . . . **Jerrold Electronics** has announced that it will supply a new computerized signal survey for customers planning MATV systems as an adjunct to the MATV system engineering and design services the company offers . . . . **Data Communications Corp.,** operators of BIAS (Broadcast Information Automated Systems) and the Donovan Data Systems, which supplies a computerized information service to advertising agencies, have moved into Phase III of their three-way computerized information exchange which will eventually offer an interchange of information between BIAS and its customer stations.

People

Joseph Ewansky has joined Fernseh Group of Robert Bosch Corp. as Re-

continued on page 20

NEWS

gional Sales Manager for the Northeast Region . . . . **Eric Falkenberg** has been appointed Eastern Sales Manager of Cinema Products Corp. . . . . CMX Systems has announced the appointment of **Walter A. Shubin** as Western Regional Sales Manager . . . . **Ken W. Gangwer** returns to Davis Manufacturing after a two year absence to become General Manager of Marketing.

Sheldon Pines, a partner in A-Vid Electronics Co., has joined the company on a full-time basis . . . . Orban Associates Division has recently appointed **Eric Small** as exclusive marketing agent for the Orban/Broadcast OPTIMOD 8000 . . . . Cambridge Industrial Products Corp. has announced the appointment of **Robert M. Hochheiser** as Vice President/Marketing . . . . **Robert N. Blair** has joined Fernseh Group of Robert Bosch Corp. as Product Manager.

Joel Maxwell has joined the staff of Camera Mart in a newly created position in Sales and Public Relations . . . . Worldwide Electronics has appointed **Anthony Misso** as their New England Sales Manager . . . . The Broadcast Products Division of Harris Corp. has announced the appointment of Frank N. Cambria as Asst. Manager of Harris, Eastern Service Center . . . . National Economic Research Associates, Inc., one of the nation's largest economic research and consulting firms providing services in areas wuch as environmental and energy economics, has appointed **Stanley J. Solson** as Senior Consultant in the firm's New York Office.

Rahall Communications Corp. has appointed **Murray J. Green** General Manager of radio stations WNDE-AM and WFBQ-FM, Indianapolis, Ind. . . . . **William H. Nott** has been appointed project engineer for Conrac Video Products . . . . **Warren Happel** has joined John F.X. Browne & Associates, a Michigan consulting engineering firm.

Stephen M. Lefkowitz has been elected President of GBC Closed Circuit TV Corp. . . . . **Robert A. Spann** has been promoted to the position of Vice President and General Manager of Gilbert Engineering Co., Inc. . . . . Viacom International Inc. has announced the promotion of **George C. Castell** to Vice President-General Manager of the Communications Equipment Division of Microwave Associates . . . . **Camille Charlton** has been named Vice President of The Jones Group, Ltd., a CATV brokerage firm.

Guy M. Lewis has been promoted to the position of Manager, Radio Station Equipment Product Management, for RCA Broadcast Systems . . . . **Robert B. Wilkes** has been named manager of the newly created Applications Systems section of Data Communications Corp.

James P. Rodgers has been promoted to Videotape Product Manager at International Video Corp. . . . . The Broadcast Products Division of Harris Crop. has announced the recent promotions of **Thomas G. Schoonover** to Manager, Television Sales and **Curtis I. Kring** to Manager, Industry Relations and Government Sales . . . . **Thomas G. Cheetham** has been promoted to the position of Midwest Regional Manager for the AudioCom Group, Audio Division and **Frederick L. Bones** has been promoted to Northeast Regional Sales Manager, Broadcast Equipment Division at Philips Audio Video Systems Corp. Corp.

Peter Lymburner has been appointed General Manager of Chromacord Corp. (U.S.) and Chromacord Corp. International Ltd. (Canada) and will direct operations

continued on page 22

How flat is each input on your console? What about distortion? Noise? Crosstalk?

Your answers to these and lots of other questions come easily with modern Spectrum Analysis. Quickly and effectively you can do your audio maintenance, testing and monitoring. Do your audio proofs of performance too, with a 5L4N Spectrum Analyzer and a few related instruments.

Transmitter maintenance, antenna testing and rf proofs are easily handled with the 7L12 Spectrum Analyzer.

Two new booklets describe FM/AM broadcast measurements using the 5L4N and 7L12 Spectrum Analyzers. Step-by-step instructions are included. Ask for your copies.

Write: Tektronix, Inc., Box 500A, Beaverton, Oregon 97077. In Europe, write: Tektronix Limited, P.O. Box 36, St. Peter Port, Guernsey, Channel Islands.

☐ Send me a copy of AM Broadcast Measurements.
☐ Send me a copy of FM Broadcast Measurements.
☐ Have a Field Engineer contact me.

NAME _____

TITLE _____

STATION OR COMPANY _____

ADDRESS _____ PHONE _____

CITY _____ STATE _____ ZIP _____

TEKTRONIX®
committed to technical excellence

Circle 114 on Reader Service Card

NEWS

from Montreal . . . . Cambridge Products Corp., manufacturers of CATV connectors, has announced the promotion of **Carl Richard** to the position of National Accounts Manager . . . . **S. Kent MacNown** has been elected Vice President and Director of Cape Cod Cablevision Corp.

Lawrence Webb has been named Engineering Assistant to FCC Commissioner Robert E. Lee . . . . **Ted Abbott** has been named Program Director and **Dan Fischer** adds the duties of Operations Manager to his job of News Director at WKSN and WHUG, Jamestown, N.Y. . . . . **Marty Pasetta** has been signed by executive producers Divid L. Wolper and Herman Rush to produce and direct "The American Spirit," a 90-minute variety event to air in January, 1976, over ABC-TV as a Bicentennial special.

Producer **George Pal,** veteran film animator, has received the Ink Pot Award at the National Comic Magazine Convention for Achievement in Cinematic Arts . . . . **Harold R. Krelstein,** Board Chairman of the Plough Broadcasting Co., Memphis, Tenn., has been re-elected Chairman of the Radio Board of Directors of the National Association of Broadcasters . . . . **Wilson C. Wearn,** president of Multimedia Broadcasting Co., Greenville, S.C., was elected unanimously as chairman of the 48-member Board of Directors of the National Association of Broadcasters . . . . **Robert L. Schmidt** has been named President of the National Cable Television Association . . . . **Ralph H. Alexander, Jr.** has been named Executive Director of the National Advertising Review Board, the self-regulatory body of the advertising industry.

Wayne E. Killmer has become General Manager of KGVO-TV, Missoula, Mont.

Everett E. Revercomb, Secretary Treasurer of the National Association of Broadcasters has announced that he is retiring after 32 years with the NAB, 19 of them in his current position . . . . **William G. Harley,** president of the National Association of Educational Broadcasters for the past 16 years, has announced that he will retire from that position on November 16th . . . . **Robert B. Wetson** has retired after 32 years with the FCC . . . . **Leroy Fiedler,** 67, Chief Engineer at WKBW Radio, Buffalo, N.Y., has retired after 50 years with the station . . . . **Ken Nielsen** is retiring from his current position of manager of KALW-FM, San Francisco, Calif., after 35 years with the station.

Old-New Reel Time Recorder

Telex/Magnecord series 1400 broadcast quality recorder/reproducer. An old name that spells reliability. A new design for today's state of the art.

• The Old. Telex/Magnecord products are still made in the USA so parts and service are always available. The series 1400 is still built on a solid die cast aluminum main frame for reliable operation around the clock. It's still available in full, half and quarter track configurations. has fail safe differential brakes and accepts 8¼ inch reels. It also still comes with three motors—but then, that's touching on the new.

• The New. A brushless d.c. servo drive with a crystal oscillator control reference so accurate it virtually eliminates program timing errors. New, three speeds: 3¾ - 7½ - 15 ips. New catenary head block for straight tape loading, the convenience of one hand cueing and the bi-level illumination of push button controls. New DTL logic controls eliminate EMI and provide fast, spill proof tape handling gentle enough for half mil tape. And new electronics, clean to 60 dB S/N at all speeds.

• If you're looking for a real time, reel recorder with old name reliability but designed for today's demands, you'll find it in the Telex/Magnecord series 1400. For complete information please write:

PRODUCTS OF SOUND RESEARCH

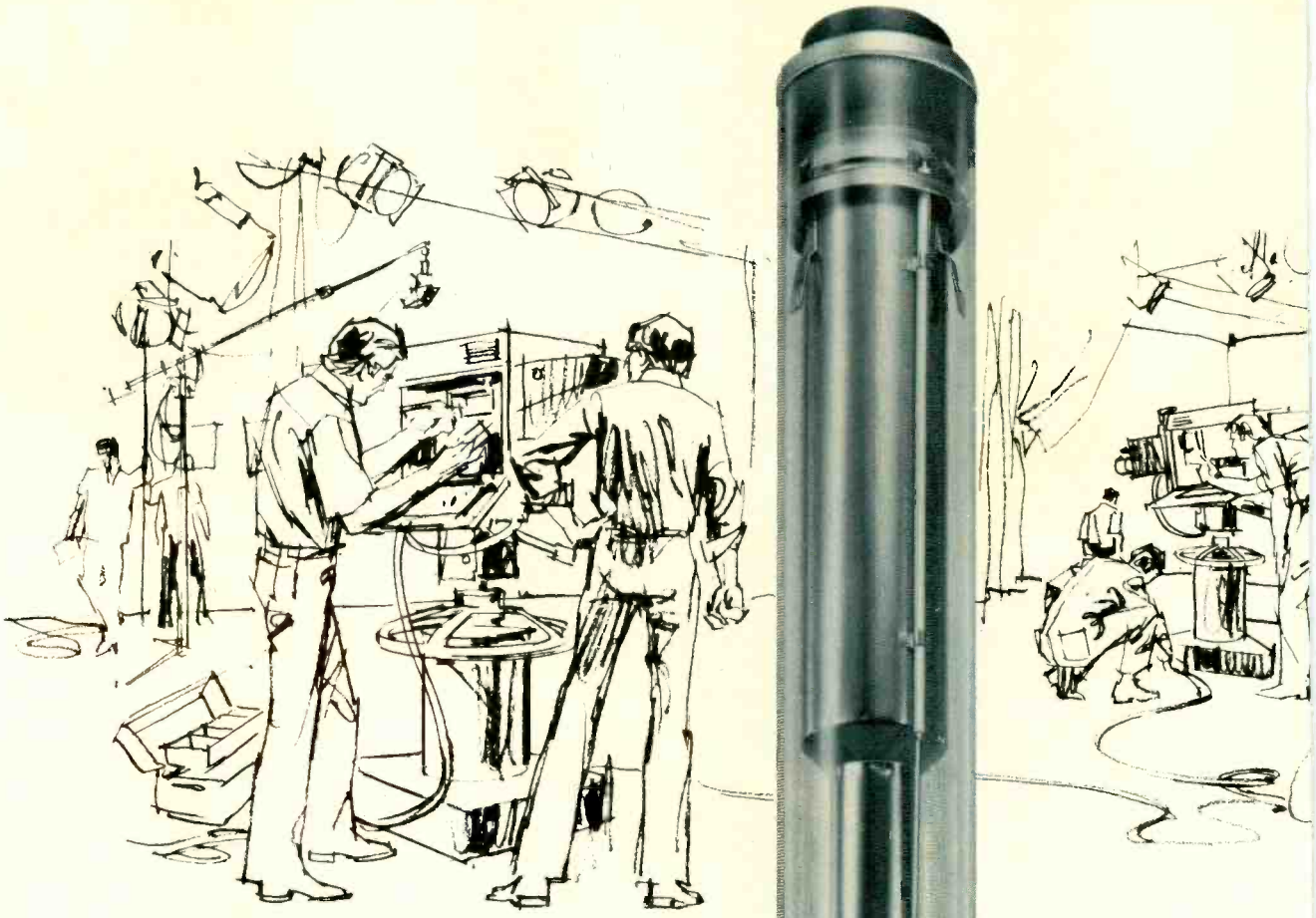
TELEX®

COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.

Europe: 22, rue de la Legion-d'Honneur, 93200 St. Denis, France
Canada: Telak Electronics, Ltd., Scarborough, Ontario

Circle 116 on Reader Service Card



Some day, somebody may imitate the Product...

...but nobody will ever duplicate the Service!

And in TV Broadcasting, it's the service behind the product...that keeps the product out front

On the way to selling more than 30,000 Plumbicon* TV camera tubes, we learned how important Service is to the broadcaster. The first thing we learned was about availability — No TV station, commercial or educational, can ever afford to shut down an operation while "waiting for parts." Plumbicon tubes are instantly available, at all times, through local franchised distributors and through Amperex factory sales representatives.

And we learned the importance of the name Plumbicon to TV stations who have come to depend on it as their assurance of consistent performance and quality.

Because no product is ever "good enough," we taught ourselves to build smaller and smaller Plumbicon tubes that provide performance standards similar to the original (we're down to ⅔ inch tubes now,) and we learned to produce tubes with reduced comet tailing, with higher resolution and modulation depth, with extended-red response, and with minimum lag. Contemporary camera tubes outperform the original Plumbicon by a wide margin.

We learned that the TV camera user is concerned about the operation of his camera . . . not merely about the performance characteristics of our tubes. So we provide him with a wide range of expert and valuable information, in print and via our field engineers, to help him get the most out of his TV camera-system. Plumbicon users who are about to install a new camera need only give our field engineering staff a call and we'll have an expert there to help with the job.

Our franchised distributors, (your own local businessmen,) are carefully selected for their ability to support Plumbicon TV camera systems with on-the-spot customer support and service. We, in turn, support our distributors with two kinds of "seminars" for Plumbicon camera users. One is on video tape, the other is presented "live" by an Amperex field engineer. The purpose of both is to maximize the value of Plumbicon camera systems.

Finally, we learned that the best way to deal with warranty questions was to design the warranty for the customer's benefit — not to protect ourselves . . . and even then, to interpret the warranty in the customer's favor whenever possible. For example, a customer may return any Plumbicon tube for testing (even one that's technically out of warranty) and we'll subject it to a complete technical evaluation at our expense . . . and send the customer a detailed engineering report on the tube.

Yes, we've learned a lot about the importance of Service in the ten years, in the more than 30,000 tubes sold, in the 600-plus TV stations served, since the Plumbicon tube won the Emmy award. Little wonder, then, that the Plumbicon, after all this time, still offers the best all-around package of performance, price, reliability and service available. Little wonder, then, people keep on saying, "There's only one Plumbicon."

Electro-Optical Devices Division, Amperex Electronic Corporation, Slatersville, Rhode Island 02876, Telephone: 401-762-3800

Amperex®

A NORTH AMERICAN PHILIPS COMPANY

There is only one Plumbicon

* Reg. T.M. of N.V. Philips of the Netherlands

Circle 117 on Reader Service Card

INTERPRETING THE

FCC RULES & REGULATIONS

The WOOK Decision

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

After more than nine years, the Commission has denied United Broadcasting Company's renewal application for standard broadcast station WOOK in Washington, D.C.[1] At the same time, the Commission awarded a license for the WOOK frequency to Washington Community Broadcasting Company.

This decision is significant to broadcasters for several reasons. First, it illustrates that the Commission does not now, and will not in the future, hesitate to cumulatively consider a broadcaster's ostensibly minor infractions of Commission Rules in conjunction with license renewal. When a broadcaster is competing "head-to-head" with a rival applicant, the cumulative impact of a series of minor rule infractions can prove decisional. Second, the Commission has ruled again that broadcasters have an especially stringent "due care" responsibility in operating in their facilities for the benefit of the public.

The Decision

The Commission effectively modified the Administrative Law Judge's Initial Decision which found that United Television (United) and Washington Community Broadcasting Company (Community) were both qualified to be Commission licensees. Specifically, the Administration Law Judge found both applicants to be qualified, but recommended award of the license to Community because of "United's history of violations of the Commission's Technical Rules . . . United lacked the 'requisite comparative qualifications' to remain Commission licensee;" he, therefore, recommended the grant of Community's application. The Commission, however, found that United was unqualified to be a licensee and concluded that, in light of Community's basic qualification, no comparative qualification issue survived.

Broadcast of Lottery Information

The Commission, unlike the Administrative Law Judge, found that United had broadcast material that violated the federal lottery laws.[2] WOOK had allowed use of its broadcast facilities by ministers who interspersed religious programming with coded words that relayed "numbers" (illegal gambling) information to WOOK's listening public. The method utilized by the ministers was simple. In the course of religious programming, each minister would refer to specific scripture citations or religious song numbers which, in reality, represented the daily winning number. WOOK listeners were encouraged to send "offerings" to these ministers for the purpose of receiving in return "financial blessings."

The Initial Decision found no violation of Section 1304 because (1) no *specific* lottery was referred to and (2) United was unaware that lottery information was being broadcast by the ministers. The Commission found otherwise. The numbers game, it reasoned, is a definable lottery even though it is operated by several different "backers" who work in concert. Further (and this has grave consequences for all broadcasters), the Commission found that a violation will be found where a licensee simply *intended to do the allegedly violative acts but did not have knowledge that such acts were in violation of law.*

The Commission here is plainly reiterating its longstanding requirement that good faith reliance upon others (i.e., those who conduct specific programs for broadcast) is inadequate to discharge a broadcaster's responsibility. In this case, the Commission found that United's very lack of awareness that lottery information was being broadcast "reflects the lack of responsible supervision over program content on the part of the licensee."

Religious Programming

The Commission, having dismissed United's "due care" defense, also dismissed its constitutionally-based, freedom of religion defense. United argued that the Commission "may not inquire into the truth or falsity of what is preached as 'religion';" since United was constitutionally constrained from doing so either, it could not be held responsible by the Commission for failing to do so.

The Commission agreed with United's first allegation saying, ". . . the truth of a sincerely held religious belief may not be questioned." The Commission noted, however, the outer parameter of this constitutional right: Particular expressions of belief that violate *social duties or law* may be proscribed. Specifically, the Commission held that ". . . the good faith of the broadcasting ministers may be considered in order to protect radio listeners from fraud." This, it declared, clearly does not violate the First Amendment.

Lack of Good Faith

United's argument that it acted in "good faith" in operating WOOK, but was "victimized" by clever subterfuges of the broadcasting ministers, and was unaware of the significance or meaning of the broadcasts, was rejected by the Commission. Community, the competing applicant, raised the illegal lottery information broadcast issue in a "Petition to Deny" United's renewal application. United made no moves to halt the improper use of its broadcast facilities, nor made any changes in broadcast policy.

United could, if it had acted with "reasonable care," have discovered the illegal broadcasts. Its failure to do so obviated any reliance on a "good faith" defense. Indeed, after notice of these possible violations, United

continued on page 28

[1] *In re Application of United Broadcasting Company, Inc.*, FCC 75-1018, adopted, September 9, 1975, released, September 12, 1975.

[2] 18 U.S.C. 1304 provides: *Whoever broadcasts . . . or . . . knowingly permits the broadcast of, any advertisement of or information concerning any lottery, gift, interprise, or similar scheme, offering prizes intended in whole or in part upon lot or chance, or any list of the prizes drawn or awarded by means of any such lottery, gift enterprise, or scheme, whether said list contains part or all of such prizes, shall be fined not more than $1,000 or imprisoned not more than one year, or both.*

Harris leads the way in transmitter engineering.

Progressive Series Modulation.

Another First—Harris Progressive Series Modulator in the MW-1, 1kW solid-state AM transmitter is highly efficient, is DC coupled, has excellent transient response, and requires no modulation transformer, reactor or filter inductor.

IF Modulation.

Introduced in Harris color television transmitters. Simplicity of IF MODULATION results in nearly perfect signal linearity for superb color fidelity.

Pulse Duration Modulator.

This exclusive, Harris-designed AM modulation system is nearly 90% efficient! This means the Harris MW-50 and MW-5 offer less power consumption than any other 50kW or 5kW transmitter.

Direct Carrier Frequency Modulation.

Harris was first with this FM design, where the oscillator operating at the transmitted frequency is modulated, thereby providing greater carrier stability and unsurpassed frequency response.

For complete information about any of these transmitter advancements, write Harris Corporation, Broadcast Products Division, Quincy, Illinois 62301.

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

Circle 118 on Reader Service Card

had an *affirmative duty* to prevent any recurrences. Failure to do so constituted "callous disregard" (according to the Administrative Law Judge) for its listening audience.

False Advertising

The Commission affirmed the Administrative Law Judge's finding that WOOK's religious programs held out a variety of products (including "roots," "incense" and "spiritual bath") as a means of gaining financial benefits and/or solving personal problems. United simply offered no valid basis in fact with which to refute the charge that these products were at all beneficial as advertised.

Technical Rule Violations

The Commission affirmed the Administrative Law Judge's finding that United's long history of technical rule violations dictated a "comparative disqualification" in the license renewal proceedings. United had been assessed a $7,500 forfeiture for some of these past technical rule violations. Similar violations continued thereafter. 19 specific violations were noted pursuant to a special Commission inspection in 1969. United went so far as to hire a "technical expert" on two separate occasions to insure that no further violations occurred. The Commission found these hirings to be mere "window dressing" because they were made *only* subsequent to designation of technical rule violation issues for hearing in conjunction with United's renewal application. In light of United's frequent past violations, and "unfulfilled" renewal application promises to comply with the Rules in the future, the Commission found that:

> ". . . United's past representations were of no value, . . . no reliance can be placed on its present promises of future compliance, and . . . there are no mitigating factors."

Based upon these findings, of technical rule violations, the Commission found that, *standing alone*, United's renewal application must be denied.

Conclusion

Broadcasters may certainly learn some valuable lessons from the WOOK decision. First, a licensee cannot, in good faith, rely upon those who produce and air programs on the licensee's station to comply with Federal law and the Commission's Rules and Regulations. The licensee must supervise program content to insure conformance with Federal laws and Commission Rules. Second, a licensee may be held to have violated the law if it *intended* to do a proscribed act, even if it had no knowledge that said act was illegal. Third, a broadcaster has an affirmative duty to conduct (with reasonable care) an investigation into possibly illegal broadcasting activity on its station if it has *notice* of such activity. Indeed, a licensee is responsible for *understanding* what is broadcast over its station. Fourth, a broadcaster has an affirmative duty to prevent further improper broadcasts if it has notice of *prior* improper broadcasts. Fifth, and finally, a variety of individually minor Commission Rule infractions can lead to serious consequences when aggregated in conjunction with renewal proceedings. **BM/E**

Fernseh means television.

And television means bringing the best to the most. Even if you're not ABC, CBS, or NBC.

Take a look at camera number 3 in the picture.

It's our KCP-40, a straightforward, lightweight camera that offers performance equal to the finest broadcast camera system available (which happens to be our own KCU-40, camera number 1).

With remote operating controls as standard equipment, the KCP provides the incredible picture quality and lightness of weight that make broadcast applications such as 34 to 1 zoom shots from the Goodyear airship possible.

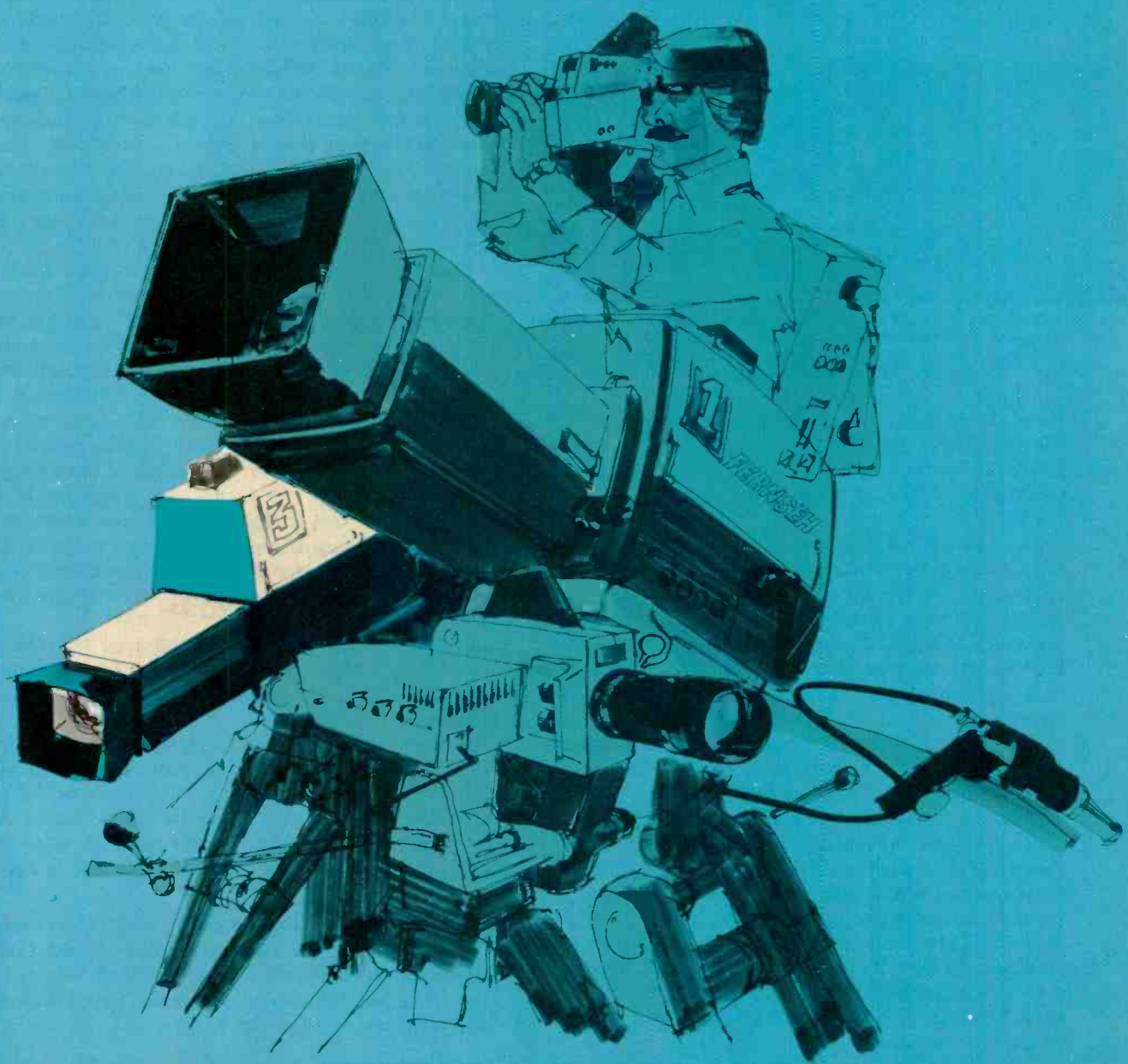
What's more, with a simple lens change, the KCP-40 camera head can be directly mounted on a Fernseh multiplexer for telecine applications.

Whether you're a broadcaster or a professional user, for the money you can't do better.

Because Fernseh *means* television.

We'd welcome the opportunity to demonstrate the superior capabilities of Fernseh television equipment. A call to your nearest office will bring any further information you require.

Saddle Brook, Headquarters (201) 797-7400
Chicago (312) 681-5000 Houston
(713) 688-9171 Los Angeles (213) 649-4330



FERNSEH Robert Bosch Corporation

Circle 120 on Reader Service Card

For Teaching Broadcasters: A Superb Television Production Plant

by Carol Sanders

The television-radio center given to Syracuse University by newspaper-broadcast-station owner Samuel Newhouse combines a television production plant that any broadcaster might envy with up-to-the-minute teaching facilities.

View of the S.I. Newhouse School of Public Communications complex at Syracuse University. Building on the right is Newhouse II, the broadcast journalism center. Building on left is Newhouse I, which is oriented to the print media.

It is called Newhouse II, and, like Newhouse I (a center for the study of print media), it was given to Syracuse University by Samuel I. Newhouse, whose fortune, appropriately enough, is based on newspapers and broadcasting.

Newhouse II is a four-story, 72,000 square-foot building designed by Skidmore Owings and Merrill, architects responsible for a score of the most prestigious modern buildings. On the four floors are up-to-the-minute and richly equipped teaching facilities, with a top-grade television production plant; and every opportunity has been taken to integrate the two functions to their mutual advantage.

The plant does not at present include a television transmitter, but it does include the student-operated FM station, WAER, with 6kW of ERP.

Syracuse University has a long history of interest in and activity in broadcasting. The teaching of broadcasting as an academic subject began in 1934; the university station WAER went on the air in 1947; a graduate program in television got under way in 1950 with 14 students. The university was the first to have a television studio on campus. It has also for many years cooperated with local commercial radio and television stations with workshops that produced public affairs programs as well as teaching broadcasting skills.

This work with local stations is being expanded with the production efficiency of Newhouse II as an aid. The center was dedicated in May, 1974, with William S. Paley, Chairman of CBS, as the principal speaker. It certainly ranks among the top academic installations for study and "Hands On" practice in television production, in both the creative and the technical functional areas.

As the floor plans show, the television production is based on two large studios, Studio A with 5,000 square feet and Studio B with 3,000 square feet. Both studios extend up through two floors of the building. Each studio has a control room, and the video master control and production area is between the studios.

The third floor of the building is the main teaching area, with several multi-media equipped classrooms, a large theatre type classroom in which TV and film programs can be screened, and faculty and administrative offices. Among other facilities, there is a separate three-room system for teaching broadcast journalism: it includes a wire-service room with UPI news wire, a typing laboratory, and editing and graphics carrels.

The teaching area is where a majority of the television programs are finally "delivered." A proportion of the programs go to one or another of the local commercial stations: arrangements are made along various contact routes for public service, news, or documentary productions, or a student or group may make a program and simply offer it to one of the local stations.

Most programs, however, get screening and critiques with faculty and students, as guidance for the students who made them. The teaching area makes this process efficient and attractive.

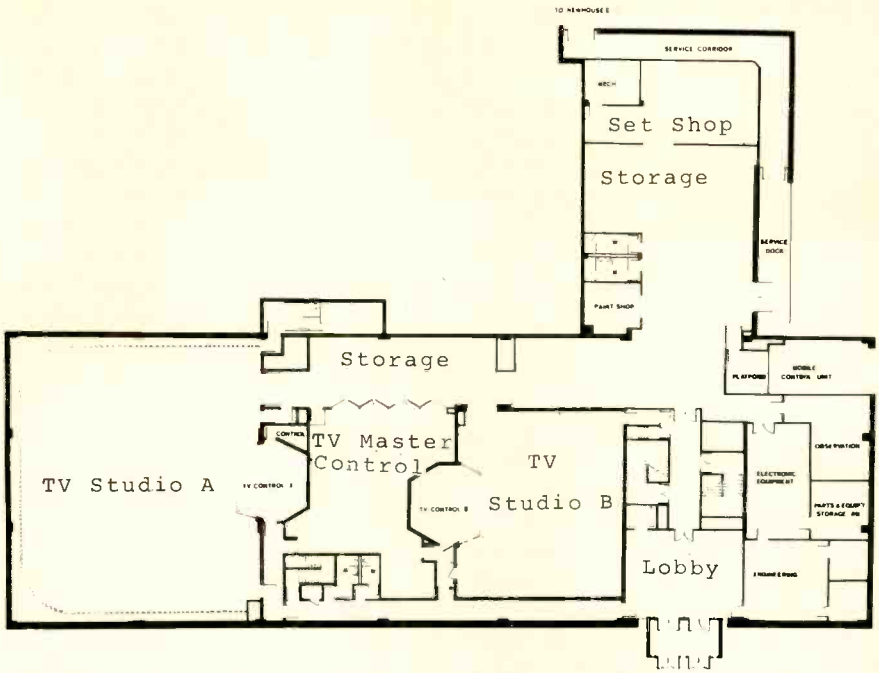
A video tape duplication and production center, with two Ampex quads, time base corrected helical scan recorders, (IVC, Ampex, Sony, Panasonic) and ¾" cassette video tape recorders are located in the master control area. From this facility most types of video tape program material can be duplicated, edited or distributed.

System design and installation engineers of Newhouse II from SU Video Services were: W.F. Denne, video service supervisor; video engineers Rodger Albert, Ray Dow, John Soergel and Jim Martin and junior engineers Jack Wells and Vic Buddie.

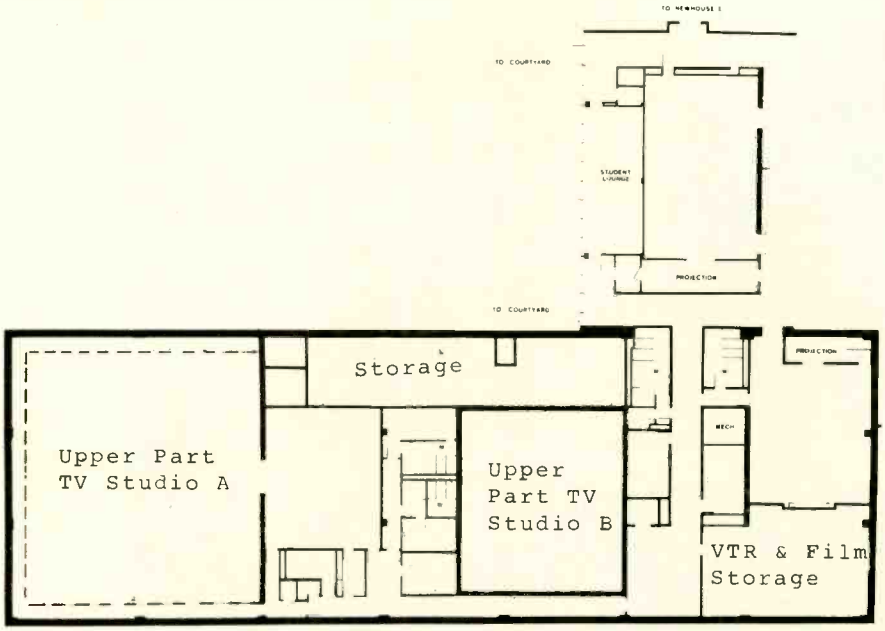
Audio equipment

Studio 3, on the fourth floor, is the main audio originations area. It is equipped with a 16/4 Neve console, eight track Ampex MM1000, Dolby model M16, four track

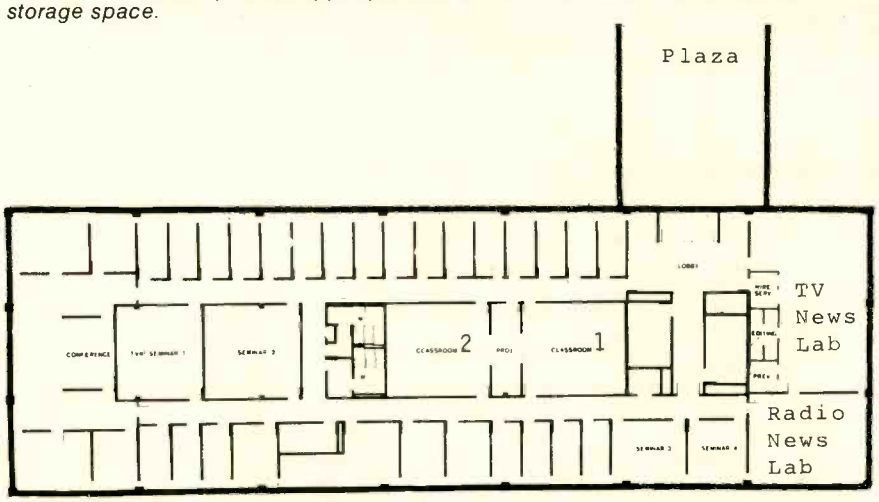
Ms. Sanders is with the News Bureau, Syracuse University.



Floor One of the building (ground level floor) is made up of the TV production Studios A and B, TV Master Control, various shops and storage areas.



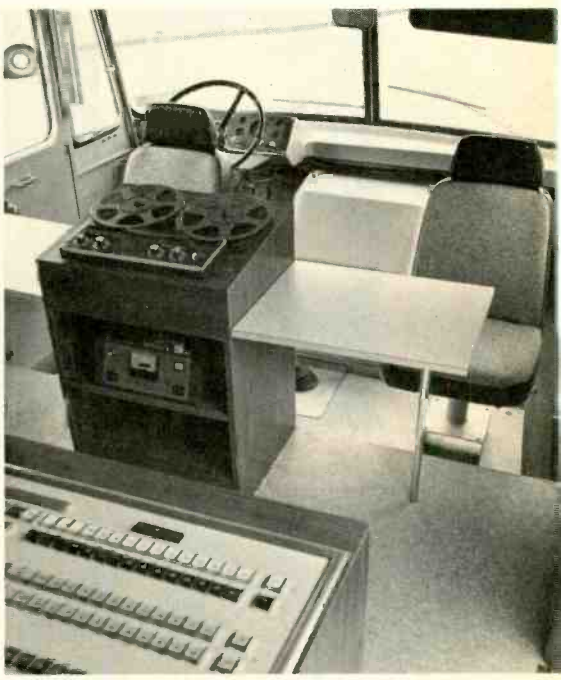
Floor Two is made up of the upper portions of the TV studios, lecture halls and storage space.



Floor Three shows seminar and classrooms in the center of the floor, offices along three outer edges and TV and radio labs along the far right.

Interior of Studio A shows lighting control board in use. Three Ampex BC-230B color cameras are in use in the background. The control room is at the right behind glass.

Student working at console in Studio A Switching Control Room.



Interior shot of Mobile Television van used for special events broadcasting shows Tapecaster cart machine underneath a reel-to-reel machine. Van also carries three Ampex BC-230B color cameras.

TEACHING BROADCASTERS

Scully 280, two track Ampex AG440, two track Ampex 440 with Magnatech sync type 92C, 16mm Magnatech film equipment with four playback units and one record, Bell and Howell 16mm projector and a Magnatech footage counter type 9D. Sound is added to film productions here, too.

Studio 3 is capable of film interlock to a second floor lecture hall (room 254—see photo) and to video master control where the film or tape then may be used on the RF distribution and/or the baseband video distribution system.

The whole studio and its control room are suspended on springs to give maximum sound isolation from the rest of the building.

Used in conjunction with Studio 3 is the film-sound production studio consisting of a Gates 80 console modified for dual programming, two Ampex 350's, a 400-X Magnasync, Nagra-3 resolver, turntable, and a Gates cart machine. In this studio students are able to do preliminary work on their lab assignments before doing their final mix in Studio 3, putting sound on film productions.

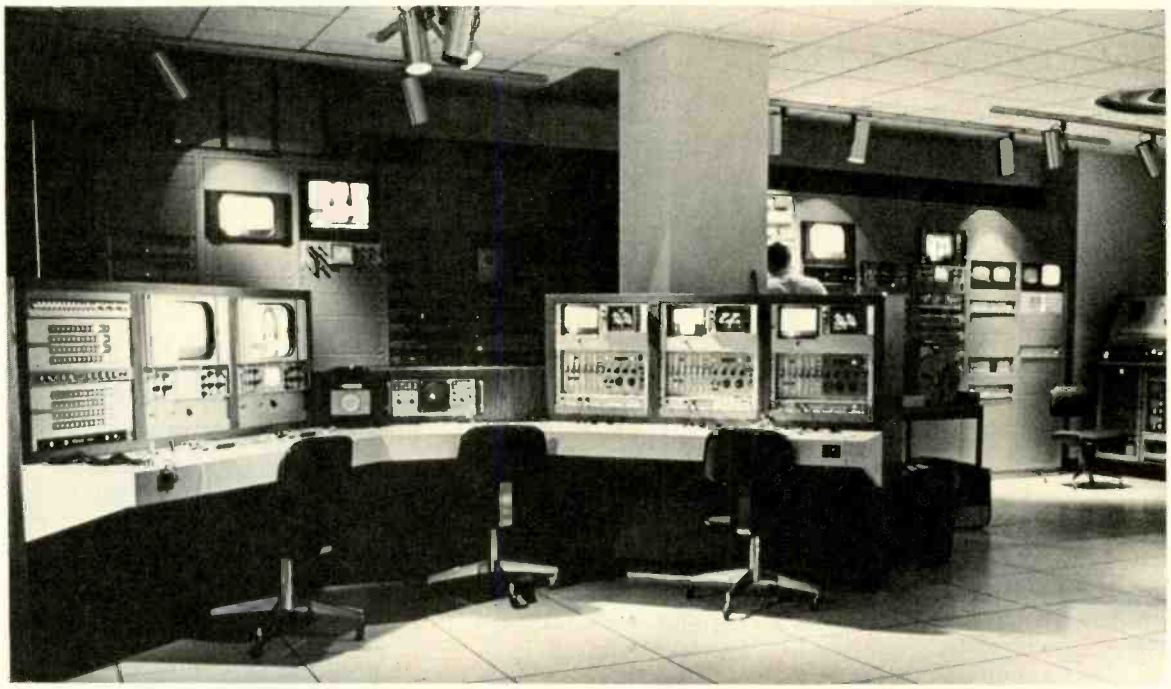
Studio 1 (audio production) is a four track studio with 12/4 Tascam board, two track Ampex 350, four track Tascam, Fairchild stereo compressor/limiter, two Gates turntables and two Tapecaster cart machines. This studio is set up with an announce booth, giving the flexibility to teach announcing, studio recording and/or engineering.

Along with Studio 1 there are four audio-carrels for student lab assignments. Audio Carrel I has a mono Sparta board and two Ampex 350's; Audio Carrell II is equipped with a stereo Sparta and two Ampex 354's. Audio Carrel II has two Ampex 354's and a stereo McMartin B502 Console, and Audio Carrel IV has a mono G.E. BC21 board and two Ampex 350's.

Radio master control is a combination of a production studio and audio distribution point. The control board is a Gates Stereo 80 reworked by University staff to complete dual channel capability. Other equipment consists of two Ampex AG440's, two Gates turntables, and three stereo cart machines.

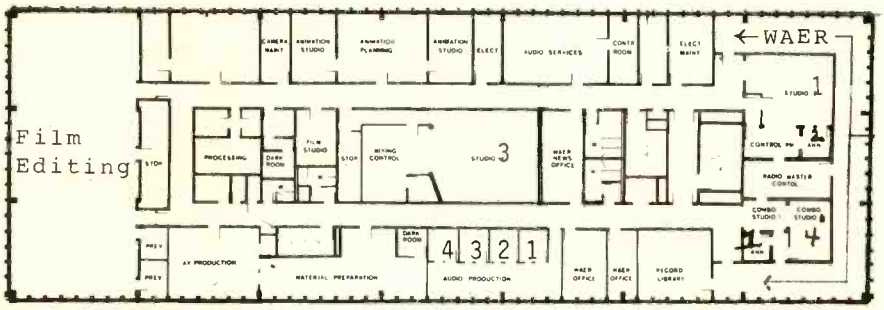
The control room is also used in conjunction with Studio 4 which has a kidney-shaped table equipped with a speaker telephone allowing panel type discussion and phone participation.

The audio distribution system includes audio tie lines to all control rooms, studios and classrooms in this build-



The Video Master Control Room, which is the heart of the school's video systems.

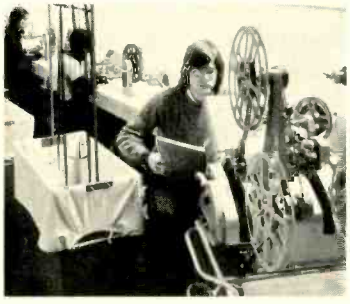
Student previews a mix in the Sound Studio 3 control room.



Floor Four is the production floor. Large room on the left contains film editing equipment, other rooms are film studios, animation work areas, audio production, audio studio, record library. Far right is the office of WAER, student FM radio station.

(Left) Interior of lecture hall which includes closed circuit TV and film projection capabilities.

(Right) Student at work in one of the audio carrels which contains two Ampex reel-to-reel tape decks.



(Left) WAER disc jockey fills out the FCC log during a music broadcast over the student-operated FM station.

(Right) Students at work in the Film Editing Lab. Student in the foreground is working on the Moviola vertical editing machine.

ing. Along with these is a 30-pair audio line throughout the campus and also a 25-pair telephone line. The lines allow the sending or receiving of audio to or from other auditoriums on campus. All these lines terminate in a patch field. Also at this control point there are two Dynaco tuners and three Crown D60 amplifiers. One tuner-amplifier combo is used for off-air stereo feed to all control rooms. Another is used as an off-air mono distribution feed to speakers throughout the hallways and offices.

FM station WAER

The main on-the-air control room/studio for WAER, the student-operated radio station is called "Combo." The room is outfitted with three Gates turntables, two Ampex 440's and three Tapecaster cart machines. Two of the cart machines are stereo for production spots and special music cuts and the third cart machine is mono for news actualities. The control board is a Gates Stereo 80, modified for full dual programming. Two JBL 88's are used for monitoring, driven by a Crown D60 power amplifier.

Student Production Company Formed At Syracuse U. School To Make And Sell TV Programs

A recent extension of the training given graduate students at Syracuse University's Newhouse School of Communications (see accompanying article) is the formation of a student-run TV production company. Richard Barnhill, associate professor of television-radio, says that the quasi-corporation, named "Pepper Productions," will operate much like a major commercial production house. There will be departments to handle program development, operations, sales, and promotion. The objective will be to generate actual programs for on-the-air TV stations, with the elaborate TV facilities of the Newhouse School used for production.

"This course is meant to bridge the gap between academia and reality by working with a professional station, creating a show from scratch, and selling it," Barnhill explained. The course is the culmination of the work for a master's degree, and gives the student practical commercial experience, on top of the school's "hands on" production training.

The transmitter control rack is also located in Combo. It houses the EBS Monitor, Rust remote control unit, Belar mono and stereo modulation and frequency monitors, stereo patch bays and the CBS Audiomax and Volumax.

WAER has a faculty manager and a staff engineer. It is on 24 hours a day, the year round, operating at 6kW ERP, in stereo. The transmitter is a 3kW CCA FM3000DS with a new RCA BFH-4A Bay circular antenna. The transmitter and 90 ft. tower are at the top of one of the 10-story dormitories on a hill overlooking the campus and the city.

The audio facilities in Newhouse II were designed and installed by the university's Audio and Visual Support Services staff which includes: Richard Pitzeruse, director; William Cooper, audio supervisor; Dave Wickham, chief engineer, WAER; William Hume, audio engineer, and technicians Tom Zorn, Mark Gander and Stuart Barlow.

Audio Services, based on the equipment in Newhouse II, works for all academic departments at the university. It provides audio cassette and reel-to-reel tape duplication and on-location audio tape recording. Additionally, this service provides professional facilities to make studio tape recordings, maintenance and a repair of WAER and all university-owned audio and public address equipment.

Most cassette duplication is done on a Pentagon SRCR 2250-8. As back-up, there are two Recordex duplicators model MT2000. The reel-to-reel duplicator is an Ampex model 3200. A separate recording studio is equipped with a Gates Stereo 80 console modified for dual programming, two Ampex 440's, Scully 280 playback, two stereo Wollensak cassette tape recorders and three Pultec equalizers.

Film

Film activity at Syracuse University is centered on the fourth floor of Newhouse II. Included are film studios, laboratory facilities for film processing, studios and control rooms for soundtrack recording and mixing, darkrooms, interlock facilities, a 50-position master editing room, advanced editing rooms with horizontal format

continued on page 34

editing machines, two preview and screening rooms, animation preparation areas and an Oxberry animation stand.

Students in television and film also have a wide range of portable professional motion picture equipment available, including Eclar, Beaulieu, Auricon, Canon and Bolex 16mm cameras, Nagra and Tandberg tape recorders, Colortran lighting instruments, Gossen light meters, fluid friction head tripods, wireless and conventional microphones and accessories.

A supporting graphics preparation area contains a hot-press, dry mounting presses, copy stands and a wide range of graphics production materials.

Throughout the building the climate is independently controlled at 72 degrees with 45 per cent humidity, allowing only a two-unit tolerance to keep machines, films and tapes in perfect condition.

The video equipment

Total investment in major video equipment is one million dollars, according to W.F. Denne, video service supervisor for the facility.

There are six Ampex BC230 (three-plumbicon type) color television cameras. Three are consigned to Studio A and three go with a mobile unit (see photos). Studio B is designed to operate with the three color cameras from the mobile van; however, the primary training equipment in Studio B is monochrome Sony. Six cameras can be used simultaneously in either studio.

The Studio A control room has a Sarkes Tarzian dual re-entry video switcher, a Neve audio board, digital timers and all the normal support equipment.

The television master control between the two studios is the heart of the Center's video systems. The master control room's electronic functions are enhanced visually by the sweeping lines of the control consoles that were designed by SU Video Service engineers and built by master craftsman Frank Patsos.

The equipment inventory in video master control includes two film islands, each equipped with Cohu 1500 film cameras, Kodak CT 500 (16mm), Kodak pneumatic multiplexers and Kodak super 8mm projectors. The Ampex CCU's are in master control along with a Sarkes Tarzian baseband distribution system which is supplemented by a Jerrold RF distribution system.

The course of study

An undergraduate student at Syracuse University can earn a degree in television-radio with a variety of specialties through a number of joint programs in other schools and colleges in the university. Also offered is a degree in film as well as courses leading to the master's and doctorate degrees. About 500 undergraduate and 80 graduate students are enrolled each year.

Commenting on the present influx of students into the broadcasting field, Dr. Lawrence Myers, Jr., chairman of the Television-Radio Department said: "There is still room in the field for good people who not only excel as students but also get involved in a variety of practical experiences, which is what we advocate at Newhouse."

BM/E

Circle No. 123 on Reader Service Card for Central Dynamics ►

When it comes to computer editing... If you haven't spoken to CDL, you're getting less than half the story.

We've been a recognized leader in T.V. Automation and Video Switchers and we should be the recognized leader in Computer Editing.

After all — we started it all back in '69. We were and *still are* the innovators in the field . . . but we haven't been telling you about it . . . and we apologize.

As a matter of fact . . . our PEC-102 *is* the *State-of-the-art!*

Its technical virtuosity permits creative people to accurately and efficiently make artistic decisions with complete freedom.

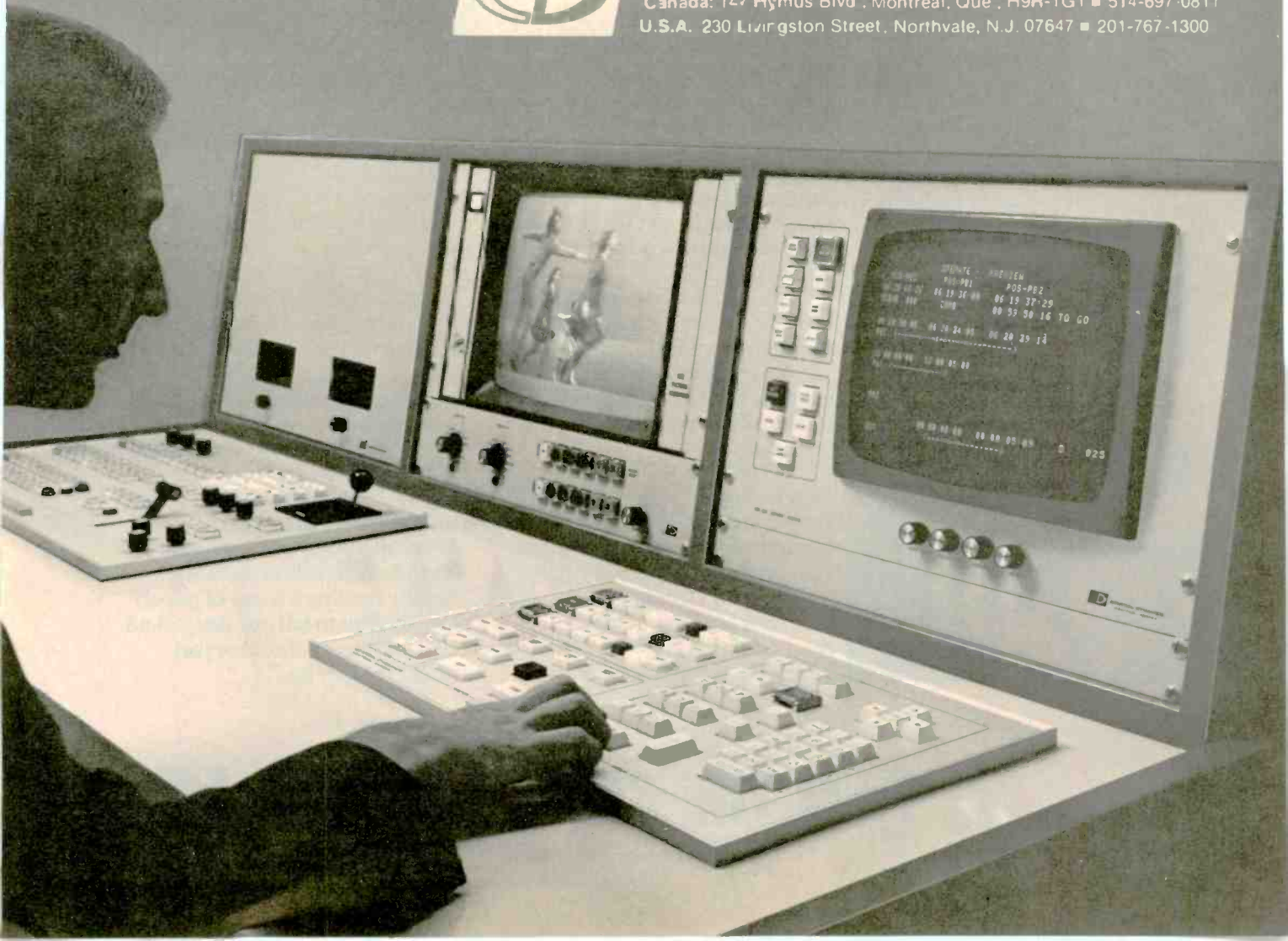
CDL Computer Editing Systems are in use in the U.S. and around the world for the production of Prime Time Shows, National Network Commercials, "Talk" Shows and Children's Programming.

We have a 13 minute color video cassette which shows you what is being done every day with CDL Computer Editing Systems in production and post production facilities . . . and what you could be doing.

If you would like to see it, write to us on your company letterhead; c/o Sales Dept. BM/E *or give us a call. Or, ask for our Computer Editing Brochures.*

CENTRAL DYNAMICS LTD

Canada: 147 Hymus Blvd., Montreal, Que., H9R-1G1 ■ 514-697-0811
U.S.A. 230 Livingston Street, Northvale, N.J. 07647 ■ 201-767-1300



AT KY-3-TV, THE BRAND OF REPORTING AND THE BRAND OF FILM HAVE A LOT IN COMMON.

When the people in this picture wave 3 fingers in the air, what they're saying is, "We're number one" at Springfield, Missouri, Channel 3. Thanks to hard-nosed reporting and hard-hitting promotion, KYTV is the undisputed broadcast king in the Queen City of the Ozarks. By a margin of 3 to 1.

In addition to top-notch journalism, smart programming has meant taking maximum advantage of both videotape and film. And when the film cameras roll, the film they use is Eastman film.

Over the past year, Channel 3 news cameras unlocked the secret of behavior modification programs in a Missouri federal prison; dug up a problem in the underground water supply; whooped it up at a genuine hoe-down; and made friends with a mountain hermit whose only other visitors dropped in by UFO.

Besides winning viewers, their documentaries have won a

silver gavel from the American Bar Association, a certificate of achievement from the state medical association, and an Emmy nomination.

For station manager Don Moeller, film is a logical choice: the equipment is rugged enough for any job, portable enough for even the tightest spots, and the end product "looks absolutely great on the air."

When the KYTV cameras aren't recording news, the KYTV people are busy making it, through locally produced sports and entertainment shows. Take Virgil Ward (front row left) and the capable assistant you see perched on his lap. You can catch their weekly fishing show on 87 markets in the U.S. and Canada. And when Virgil packs his rod and reel, he includes a reel of Eastman film.

Then there's Promotion Director Clarence Martin (front row right). His 10-second-film ID spots for the station not only built awareness, but they helped develop a new market for locally produced commercials.

In the words of News Director Bill Williams (2nd row, 4th from right), "Film is essential to everything we do. After all, TV is *the* visual medium, and it wouldn't do to have a person on camera merely reading a piece of paper. We use film to tell our story. And, besides, our anchormen just aren't that pretty."

FILM. THE BASIC MEDIUM. Kodak

Circle 124 on Reader Service Card

How To Build A $1.5 Million AV/TV Facility—On Time, And Under Budget

by Bob Paulson

Xerox Corporation, with the help of a knowledgeable consultant (Hubert Wilke, Inc.), and a competent contractor (Pierce-Phelps) planned and built a most elaborate AV/TV support system for their huge new training center near Washington. The carefully-orchestrated triumvirate of client-consultant-contractor worked so well that the AV/TV facility came in on schedule, at one-half the preliminary budget estimate!

Fig. 1 - Air view of Xerox training center, Leesburg, Va.

The Xerox Corporation knew that a massive employee training program would be essential for their planned 10-year expansion from 70,000 to 135,000 employees. The skills the company would need ranged from management at many levels, through specialized accounting, to sales, maintenance, and service of the company's machines on a world-wide scale.

Accordingly, the management decided to build a centralized training center that could handle around a thousand resident students at one time, with the most efficient and complete classroom and teaching facilities that could be devised for the purpose. The site chosen is at Leesburg, Virginia, near the Dulles International Airport, for easy access by air from any part of the U.S. and abroad. The whole center is on a plot of over 2,000 acres and total investment is more than $70 million. (Fig. 1)

The general education scheme is built on small classes (10 students each, or less) in many different classrooms, as described in more detail presently. Xerox wanted each classroom to have the most efficient AV/TV support equipment that technology could provide, but designed so that the equipment was in the service of the teacher, and not the other way around. The company's success in getting exactly what they wanted resulted not only from the specifics of the design, but also from the management methods applied to the creation of a design and to the building of the facility.

Covering a three year time span, the design and construction of the AV/TV facility followed the steps of a three-phase project management plan developed by New York systems consulting and design firm Hubert Wilke, Inc. Its foundation is a Client/Consultant/Contractor triumvirate working relationship, with the responsibilities of each party cleanly spelled out from pre-project conceptual discussions to post-project evaluation of future possible changes.

The accompanying flow chart shows how the Xerox project's step-by-step progress toward completion was scheduled and controlled. It is a textbook for managing systems design and construction projects of any larger or smaller scale and scope. Decision-making points have branching paths to follow for "Yes," "Yes-but," and "No" answers to the wide ranging questions of the three phases.

Values of the triumvirate approach to large system project management

Planning and building even the simplest aural-visual communications facility is a series of three sequential efforts:

Defining the *communications* problem;
Identifying the *alternative* system solutions;
Designing and installing the best system.

These require many types of mental and manipulative skills and experience:

Defining a communications problem is a job for people schooled in the behavioral sciences—teachers, researchers, consultants and engineers.

Identifying alternative systems solutions is a job for people informed on developments in product technology, who understand the system- and human-interface problems and performance advantages and deficiencies of available products—sales engineers, consultants, system designers.

Designing and installing the "best" system is a job for people with specific skills or knowhow on the products selected and the type of system to be put together—systems engineers, consultants and technicians—backed by financially sound, well-managed organizations.

In a small organization, or in a large organization undertaking a small system expansion, all these parts may be played by one individual, or an AV/TV administrator or production specialist assisted by a technician. "Consultants" are listed as sources of ideas and work skills in all three efforts. It is seldom that people with both up-to-date knowledge of new developments in

Bob Paulson, manager of AVP Communication, Westborough, Mass., worked closely with Hubert Wilke and Pierce-Phelps in preparing this article.

AVR-2—your b
Over 400 units

The bottom line is this: Higher productivity in the tape room means increased operational economy and a better on-air look.

How does AVR-2 help? Simpler design, for one thing, inside and out. It lets your operator function at top efficiency, regardless of his experience or workload. Look at the design and location of controls shown here for proof.

Contact your local Ampex sales representative for more information on how to improve your bottom line.

AMPEX

Ampex Corporation
Autio-Video Systems Division
401 Broadway
Redwood City, California 94063

est investment.
in use prove it!

Operational and Editing Controls

All controls are on open, visible panels. Operational and editing controls are user-located at fingertip level, so your operator (experienced or not) is never confused by exposed electronics.

Fast editing. It's easy to align the playback of AVR-2 to match the new program material from any camera, tape machine, or remote telco line. The program doesn't even have to be synchronous with your system!

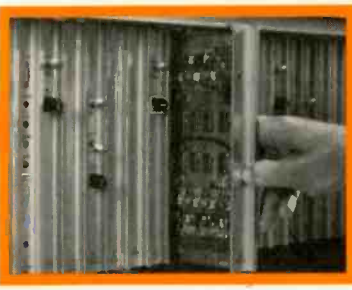
Your operator simply pushes one button and sets one control to line up vertical lines on a unique split screen display. **Result:** fast, easy, perfect edits —especially for inexperienced operators. And all from one control panel.

Secondary Controls

Playback equalization and differential gain controls—necessary in highly critical editing operations—are located conveniently on a tilt-out panel to allow for quick playback setup.

Video head optimizing takes less than a minute on the AVR-2. It's a simple, one-hand operation, as easy as tuning a home hi-fi receiver.

Setup Controls



Instant visibility, accessibility, changeability. Maintenance is a cinch on AVR-2 because everything is clearly marked and accessible. There are no confusing, unmarked boards or flashing lights.

You can operate most AVR-2 set-up controls in unity (fixed position) with the door closed, for normal operation or inexperienced operators.

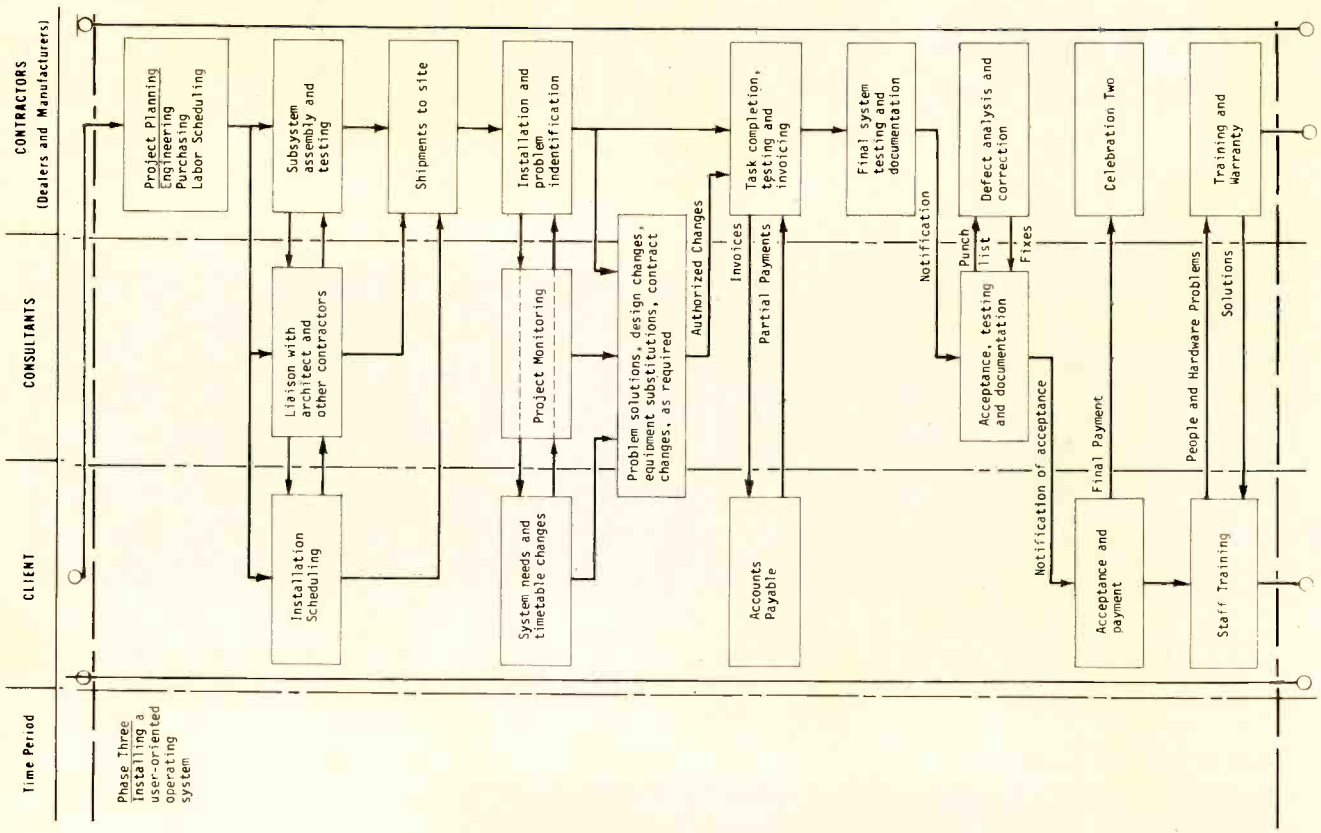
—or open the door and quickly switch into variable operation to adjust for any unusual condition. Switches are locking type toggles, so a knee-bump can't change their position. And don't worry about air circulation, either. AVR-2 is air-cooled whether the door is open or not.

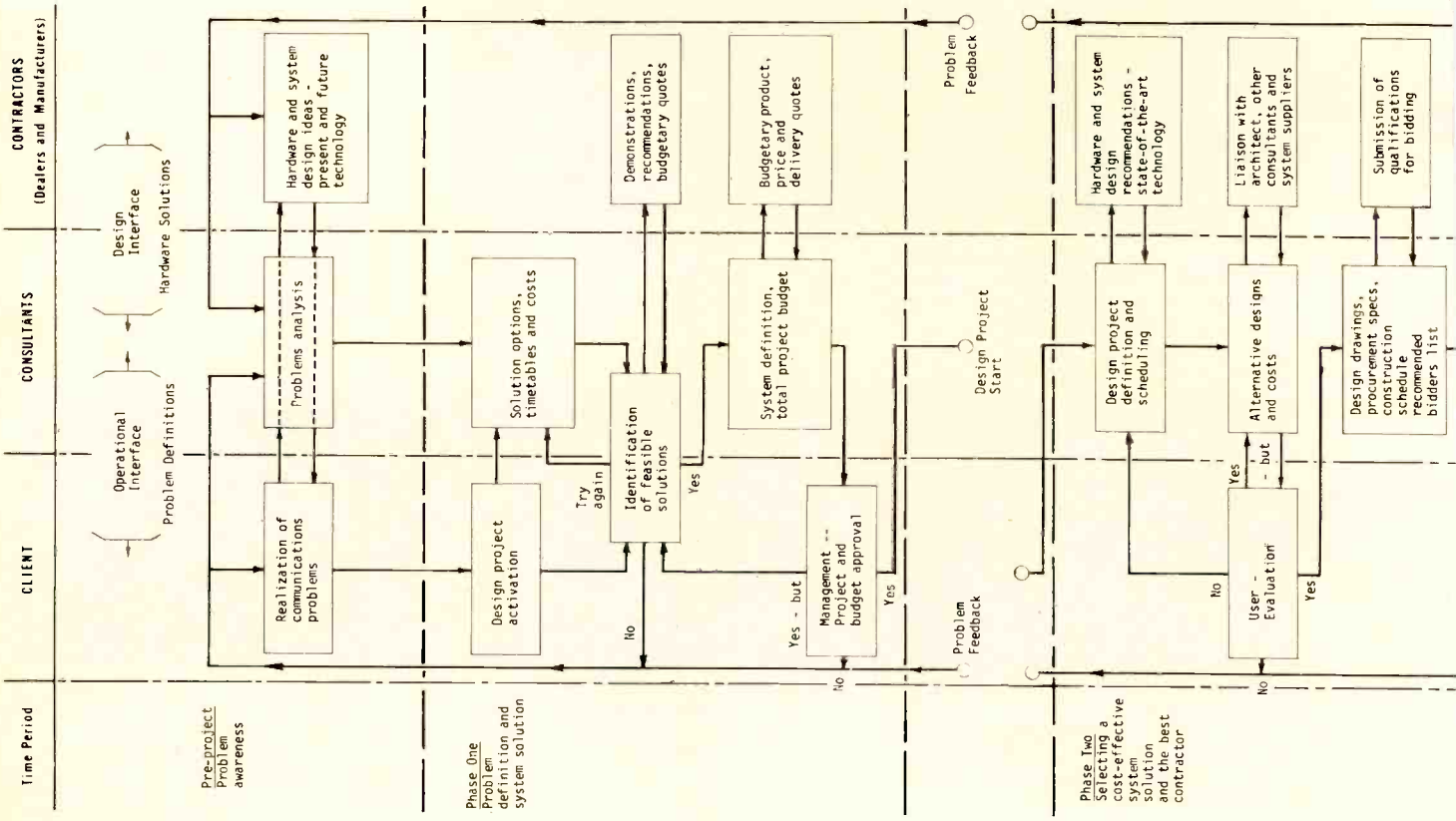
Circle 121 on Reader Service Card

technology and the experience to design them into systems are employed either by the Client or the Contractor. Consultant skills must be sought in the outside world.

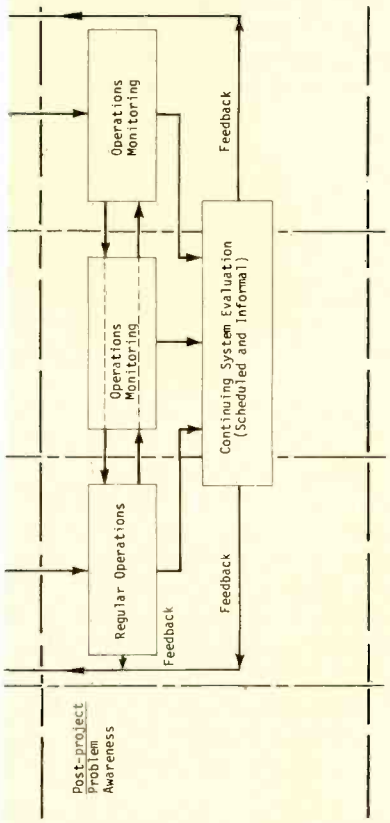
Is this a single expert? An independent firm (firms)? Someone (self- or management-designated) or several individuals or a department elsewhere within a large organization? Knowledgeable sales engineers from rep firms, manufacturers, distributors, dealers, systems houses? Other AV/TV professionals who have experienced and solved similar communications problems?

All these people can be sources of good system con-

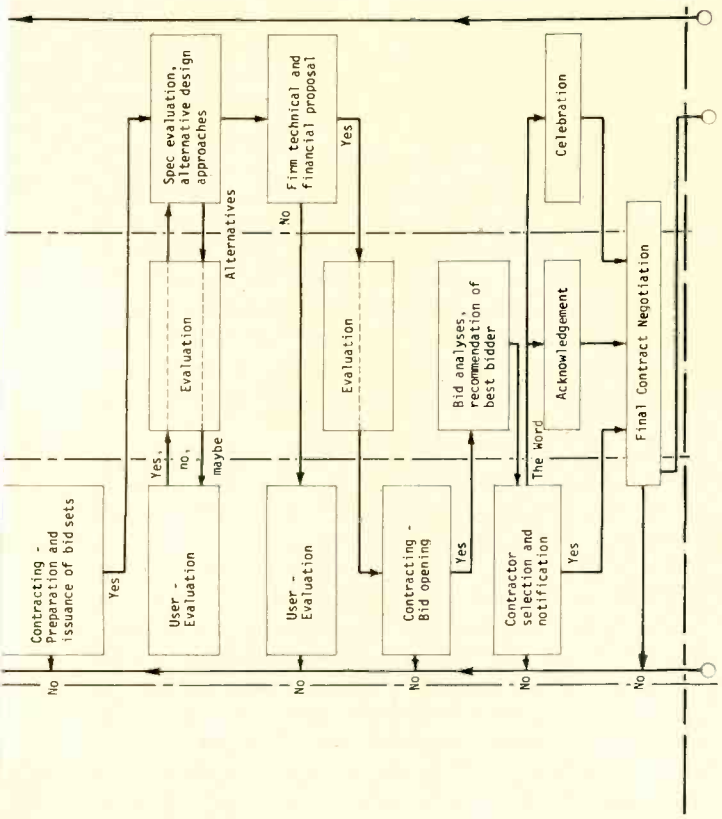




cepts, compatible product choices, and workable user interfaces. Xerox chose to use an independent consultant for this project because of its scope, a lack of qualified systems design people elsewhere at Xerox, and the management's problem-solving philosophy. Because of its built-in checks and balances, the three part approach—client, outside consultant, contractor—should be used on any project which will take several months and tens of thousands of dollars to complete. Results of not having checks and balances are evidenced by the numbers of systems managers who are unhappy—or out of work—as a result of initial costs far above the budget, system inadequacies or high operating costs.



Flow charts (to read turn magazine 90° clockwise, start at upper left) show how information and decisions were developed by the triumvirate of client-consultant-contractor. Frequent check-points to evaluate the effects of decisions allowed for re-direction before commitments were made along "wrong" paths.



Project Phase One—problem definition and system solution

Xerox's Rod Paine and Wilke's Bob Nissen spearheaded this phase, during which they visited every Xerox installation with any significant involvement in training, to find out what they're using, why, and how.

They picked up and studied samples of all the media being used—mixed format video tapes, projection visuals in every format, print media visuals, text books, sound films, sound-slide presentations, models. They compared the "what, why and how" answers on media use against their own observations of use effectiveness and projections of better usage with new technology. During the almost 12 months spent on this effort, Wilke people prepared five reports summarizing findings and making preliminary proposals. In particular they incorporated design concepts which would eliminate the most common frustrations: "Where's the projector ac cord?" "I can't see the screen!" "The sound is distorted." "How do I turn down the lights?" "This cable doesn't have the right connectors!" "I can't hear you over the projector noise!" "What's that little word in the corner of your transparency?"

During Bob Nissen's Phase One travels, he and other Wilke people constantly reviewed their tentative conclusions and proposals with the architects and other consultants for the effects on total floor space and ceiling height requirements, traffic flow determined by other function locations, HVAC load including allowable temperature and humidity ranges, cable conduit runs, wall structure acoustic and isolation specs, power distribution and room and TV lighting, and walls and floors surface treatment.

After eight months Paine and Nissen began to zero in on the system bill of materials by product names, model numbers and list prices in accord with Xerox's commitment to quantity, classroom size, etc. The original budget estimate for system procurement and installation totaled over $3 million. Xerox management accepted Wilke's system and facilities design recommendations in mid-1972, and after approval of the huge campus facilities budget and relatively modest $3 million AV/TV center construction budget, Phase Two activities began in earnest.

Phase Two—selecting a cost-effective system solution and the best contractor

Phase Two also spanned the better part of a year. It included constant monitoring of the two principal influences on system budget cost—inflation, and the price penalty for taking advantage of state-of-the-art technological advances.

An unexpected result of this effort changed many anticipated price penalties into price rewards, without any abatement of system performance, capability or reliability specifications. The facility had been budgeted to include the finest quad VTRs and studio cameras, for instance. But before the original high budget was submitted, Xerox and Wilke people were already investi-

gating new product offerings from Sony, Fernseh and others. Some of these design decisions resulted in the building of a $3 million facility for $1.5 million!

Phase Two included four major sub-phases managed by Wilke: *1. System design,* which up to the day the bids were sent could incorporate advantageous new technology changes into the specifications, or work around complications identified by other consultants; *2. Recommended bidders list,* contractors and suppliers recommended by Wilke, not binding on the client to accept: he may shorten or lengthen it; *3. Alternative design proposals,* all the prospective bidders are encouraged to work directly with the Client during the bid preparation sub-phase, to determine his attitude toward alternative designs or product offerings—Wilke does not participate in this process; and *4. Bid evaluation and best bidder recommendation,* a side-by-side evaluation of the detailed bids received. Obviously the "best bidder" in Wilke's view may not be the low bidder, but again the client is not bound to accept Wilke's recommendation.

The final system design had 49 large and 39 small classrooms, each with multi-media capabilities for television display, rear screen projection of slides plus audio only and sound-slide presentations; and 65 small rooms for role-play video taping and playback. Full details of the system are given further on.

From system spec to contract award

The eventual contract award was made to Peirce-Phelps, Inc., of Philadelphia. For the next 18 months a substantial portion of the skills and energies of its 20-person Video Systems Division would be directed toward the successful, profitable completion of the project.

The list of candidates had been slim. Bob Nissen says, "We keep detailed files on systems houses', distributors' and dealers' capabilities as a client service. For the Xerox project there were fewer than six companies in the United States who could meet our qualification criteria. And because of their job loadings at the time, we couldn't recommend a couple of these. The Peirce-Phelps firm was recommended to us by an independent consultant in mid-1973, and after a thorough investigation we added them to our list."

The views of Rod Paine about the bid evaluation and award process offer additional food for thought both by contractors interested in similar projects and the engineers responsible for vendor selection: "Peirce-Phelps called and wrote to us several times during the bid response period. They asked why we specified certain capabilities as we had. They wanted to know how we would react to alternative recommendations which might add capabilities or reduce costs. And they identified a very few omissions or vagaries in the Wilke specifications and drawings on which they were submitting requests for waivers. When they found installation problems not anticipated when the specs were originally written, they went about remedying them without haggling about renegotiating the contract."

Phase Three—the installation story

Phase Three, spanning a year from the start of equipment procurement to system performance testing by Wilke and acceptance by Xerox, has as many innovations in procedures and project management as the first two. Phase Three began with Contract Administrator Mike Glenn placing purchase orders for 1100 line items itemized in the specification, plus scores of orders for installation materials. This blanket ordering procedure is standard for Peirce-Phelps on major contracts as it insures getting earliest possible deliveries of specified equipment at quoted prices. The 1% monthly inventory burden is a small price to pay for guaranteed protection against future price increases and costs incident to later uncertain deliveries.

As soon as the material arrived, system fabrication began in the Peirce-Phelps Philadelphia warehouse in a space the size of the Master Control Room beginning to take form in Leesburg. Special equipment pallets were built to the sizes of all racks, consoles and benches, with clearances identical to the computer flooring on which the equipment would be installed. Temporary cable trays and power outlets duplicated those called for in the Wilke drawings.

What were the benefits to Peirce-Phelps of this build it/test it/tear it down/ship it/assemble again/ test again procedure? Henry Grove, Manager of Peirce-Phelps Video Systems Division, has positive answers: "It enabled us to make on-time deliveries, even ahead-of-schedule deliveries when Xerox asked for them. With 100% checkout of each item in Philadelphia, we could immediately spot and fix troubles in our shop, eliminating the costs and delays of trouble-shooting and repair in the field. Finally, because we could call on all our technical manpower when needed, we assembled each rack and console, cut and connected the interface wiring, and debugged each line, far more quickly and efficiently than we could have on site."

Peirce-Phelps also maintained close and constant liason with the base building contractors putting in walls, flooring and air-conditioning, and painting and decorating. Without this liason function, everybody emphasizes, the contractor could never have kept the delivery commitment.

Mike Wetmore's Master Schedule was displayed in PERT chart form and updated regularly, to provide management with frequently updated information on work progress and all technical problems. Mike Glenn prepared a weekly report which similarly detailed progress in billing Xerox for work completed, cost data on material and labor charges to the job, and kept Henry Grove posted on weekly progress toward the planned profit which would show up on the books after system acceptance.

After 16 weeks of system assembly and checkout in Philadelphia, in May 1974 a large moving van backed up to the Peirce-Phelps shipping dock. Shoehorning the last subsystem in and closing the tailgate, three technicians followed the van to Leesburg for eight more weeks of installation and checkout work under Mark Everett. The contract called for complete, *documented* proof-of-performance testing by Peirce-Phelps before Hubert Wilke's acceptance testing would begin. Documentation included verifying the functioning of every switch and control and the performance of every circuit. It also included preparation of a set of drawings to show the layout and interfacing of the system as built. There were 32 E-Sized drawings of the original Wilke bid set, with few changes.

Payment terms of the contract were not unusual, but are important to mention because of their fairness to both parties, and their usefulness in motivating the contractor to manage well! Invoices were mailed concurrent with each shipment or labor task completion. Xerox paid 80% of the total value of each invoice 30 days after its date. It paid another 10% when the invoiced equipment installation was completed at Leesburg. The final 10% on all invoices was held back until Wilke completed system acceptance testing on behalf of Xerox, and Peirce-Phelps had wiped out the last of a (very small) "punch list" of system defects.

Formal acceptance testing of the system by Wilke's Bob Nissen and his engineers was a brief series of end-to-end operations which identified the problems needing attention.

Post-sale services by consultant and contractor

Bob Nissen now looks back on his three year involvement as "the fastest moving project I've ever seen." He maintains periodic contact with Rod Paine about the performance of the facility. In another two or three years, however, the two will begin another intensive investigation of the Center's new communications capabilities needs for 1980 and beyond. Again the study will center first on what training results will be required, and then evaluate the pace of communications technology toward providing products to satisfy these needs.

As for Peirce-Phelps, the final commendation was earned by their completion ahead of timetable, and under budget. The consultant was concerned that the $1.5 million installation budget estimate made 18 months earlier might have been made unreachable because of inflation or the higher costs of technologically advanced products. The client worried about that and was also concerned that construction schedule slippages by base building contractors would impact on the AV/TV center schedule. The contractors project management approach prevented either problem from happening.

The complete facility—details of the system

What Xerox got for its money and its management expertise is one of the most efficient and complete AV/TV facilities ever built. Here is a more complete description of the system:

Distribution. From Master Control (see below) a cable-TV system (*not* MATV), designed and installed by Jerrold Electronics, carries material to classrooms and entertainment areas. Regular strand amplifiers are installed in ceilings; there are more than 1300 taps off the coax throughout the area. Provision is also made for both audio and video base-band distribution.

Classrooms. Both the 49 large and 39 small classrooms are octagon shaped (Fig. 2) ranging in size from 22×22 to 29×33-foot wall-to-wall dimensions. Each has an AV/TV wall (Fig. 3), which is one side of a rear-projection AV/TV equipment room. There is never any need to set up and operate equipment within the classroom.

The wall includes a 25-inch TV set (Sony), a switchable audio amplification system connected to ceiling speakers, a Sony ¾-U Videocassette machine, and a 4×4 foot rear projection screen to display slides. Painstaking space design and selection of projection

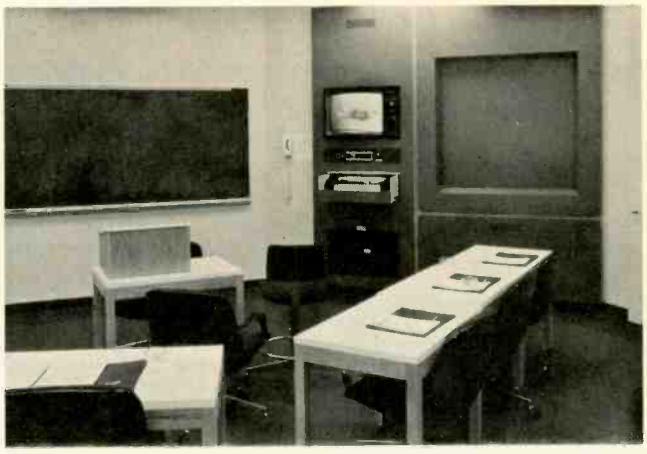


Fig. 2. (far left) shows small class room with AV/TV wall at the right. Facility includes 39 rooms of this size.

Fig. 3. (left) is close-up of AV/TV wall in classrooms. U-Matic player is in drawer, large rear-projection screen at right, communication panel in center.

Fig. 4. (far left) is interior of large type of classroom; there are 49 such rooms in training center. Modular furniture can be rearranged for various class sizes.

Fig. 5. (left) is "role-playing" room. It allows teacher to demonstrate interpersonal procedures, handling of relations inside and outside of company.

lenses kept the size of the rear area equipment module to a minimum. The required 15-foot throw of the 5-inch projection lens is kept within a 4-foot square floor space by using front-surface mirrors. Projectors are accessible for loading in an acoustically sealed drawer opening into the classroom.

A communication panel connects the classroom to Master Control and provides for remote RF channel input selection, projection and playback equipment start-stop, lighting and audio control, and two-way communication with the role-play rooms. The instructor has no AV hardware impediments to his total control of the teaching-learning environment in the classroom.

In acknowledgement of the fact that nobody can plan ahead perfectly all the time, however, each classroom has a pull-down screen, chalkboard, and auxiliary audio input for instructors who bring in their own aural-visual materials and AV equipment. The large classrooms have larger multimedia display walls for simultaneous, remote-controlled rear projection of film, slides, visuals and TV. Modular furniture can be rearranged to accommodate varying class sizes and demonstration equipment (Fig. 4). Associated with each group of three small classfooms are five of a total of 65 role-play rooms (Fig. 5), each 12×9 feet. In any given class period the instructor can have at least one or two role play rooms available to his five to seven students.

Television production and distribution. TV *earned* its role as the principal means for AV material production and distribution: choice was not automatic.

Some of the TV alternatives were easily chosen. Color versus mono, for instance. Constantly falling price levels for high quality color equipment made much of its acquisition possible at prices previously paid for monochrome systems. Other plusses for producing in color were the ability to pick up more detail when shooting inside machines, conveying the color codes of wiring and components, and the improved impact of visuals.

Another early decision was the choice of a broadcast-quality videotape production facility over film. Xerox has substantial film production expertise, particularly in Rochester where all sales promotional software is still planned and produced. But TV beat out film from the cost and time standpoints.

Both the Sony MV-10000 VTR selected for installation in 1973, a "1.5-head," 2-inch helical scan format, and the Fernseh KPC-40 studio camera were unavailable when the design project began in 1971. The camera choice was made on its own merits, but the VTR considerations had many more variables. The MV-10000 picture and sound bandwidths and SNR gained it immediate consideration. And its additional features of two program audio channels plus cue channel for SMPTE time code, built-in assemble and insert editing, and interfaces to the Microtime standalone time base and velocity error correctors and to the Datatron 5050 frame-accurate editor, won it its place in the Master Control Room (Fig. 6). The fact that these equipment choices saved Xerox about $100,000 was a benefit, not a primary consideration, however. CVI time base correctors are also used.

For the TV production and distribution, there is also a 3M processing amplifier; and quality control is aided with a battery of Tektronix test equipment including vectorscopes, waveform monitors, spectrum analyzers.

Fig. 6—Some of originating equipment in master control is Sony MV-10000 helical VTR, (left and center right), Datatron editor, TMI time base correctors, Tektronix monitoring and test units.

Fig. 7—Overall view of one wall of master control room shows, at far left, bank of U-Matic duplicators, patch panels in center, switching, control, monitoring in right wall. Room has 2700 square feet. Also facilities for VTR recording and post production.

Fig. 8—Film island also in master control, includes a Cohu film camera, Eastman 16mm projector, Spindler and Sauppe slide projector. Film island includes a Super 8mm projector as well, for faculty who bring in material in that form.

Another program facility is a bank of U-Matics operated by a Telemation automatic controller, and feeding entertainment movies, over the internal cable system, to the living areas. Students have a choice of movies they can see in their rooms or in lounge areas.

The Master Control (Fig. 7) is an immense 2700 square foot operating and administrative and control facility. VTR recording and post production are at far right. The film island (Fig. 8) uses a Cohu film camera, Eastman 16mm projector and Spindler/Saupe slide machine. There is also a Super 8 projector, to accommodate company officials who bring in material in this form. These functions, as well as videotape and audiotape playback, videocassette duplication, camera control, on-line systems monitoring and maintenance, and patching and distribution functions are all spatially organized with clear sight lines from any operating station to all others. Built on a raised computer floor, the room can be readily rearranged and expanded as new capabilities are added.

Selecting the media standard (finally the ¾-U videocassette format) was the toughest problem. Its competition included various ½- and 1-inch open-reel and cassette formats and the much-heralded video disc. In retrospect, the decision was obviously right for its time. The videodisc is still not a commercial reality. The ¾-U format was proliferating, with increasingly sophisticated products available from many manufacturers now including portable units and electronic editing. Instructional, cultural, motivational and entertainment software availability in the ¾-U format has similarly increased and improved.

Several hundred ¾-U recorders and players are now in daily use throughout the world-wide Xerox organization. At Leesburg there's at least one in each classroom. Over 40 learning carrels for self-paced instruction are either equipped with a playback unit or RF interconnected to a library unit. A bank of ten U-matic units in Master Control provides immediate short-run duplication of center produced masters or programs on other tape or film formats.

Graphic arts, film and audio production

The two operational TV studios have permanent lighting and cycloramas for still photography as well as TV. A nearby shop is equipped for building needed sets, props and models.

Graphic arts support to the TV studio operation and instructors is provided in a graphic arts studio, two photo labs and a slide reproduction lab. Instructors are encouraged to bring both their existing visuals—and requirements for new art to the Center, where they are converted to 35mm slides and videotapes by the professional staff.

Audio is also treated as an important standalone communications medium throughout the installation, as well as a quality adjunct in slide-film and TV productions. Two audio recording studios and an audiocassette duplication facility operate separately from all other activities. Audio production uses three TEAC 12-in-4-out consoles, and TEAC tape decks. Audiscan and Wollensak slide sync equipment is available in classrooms to playback sound/slide film productions without instructor at-

continued on page 46

$1.5 MILLION AV/TV FACILITY

tention. Singer Caramate units are installed in the learning carrels located throughout the Leesburg site.

AD/TV center staffing

Instructors in the Xerox Center classrooms concentrate full-time on their tasks of instructing, without the distraction of the mechanics of operating support equipment. Just as important, in their course preparation efforts, they don't have the time-consuming tasks of material preparation.

A staff of 12 people is completely dedicated to instructor support. They include Supervising Engineer Bob Jackson and two electronic technicians who operate and maintain the Master Control, studio, classroom and distribution electronic hardware. Three senior graphic designers and a production artist, and a photographer, script writer and production assistant provide graphics and video production skills.

Cooperative work-study programs are also being developed with nearby Washington Technical Institute and Northern Virginia Community College, to add students in camera and technical jobs when needed. On-camera performers when required are recruited from the instructor, student and Xerox administrative ranks. Much of the audio on the Center's productions is voice over, and professional announcers are used to record these tracks.

This permanent staff devoted to training material production and delivery works closely with another permanent staff of academic professional specialists in its design and preparation. The broad overall education research and development responsibility of these two groups, in support of the instructional staff, is to improve the effectiveness of education through the application of AV/TV media.

The present and future of Xerox Leesburg

Full scale operation of the AV/TV Center began late in 1974. Its smooth functioning in its assigned roles has verified the soundness of the project planning and management technique and the rightness of the overwhelming majority of its design and product selection decisions. "Of 1100 line items called out in the bid specifications, we missed on only 7," Rod Paine has reported.

"Most important to our top management," he continues, "the Center has proved to be more economical in our training than all of the previously decentralized activities, even when we include air fares to Washington. The student load now averages over 700 per week, and all the divisions are enthusiastic about scheduling new and veteran employees in for training."

He adds: "We expect that by 1980 some of the system's hardware will be well on the way to being worn out. And certainly the pace of technology is going to make many new products look very attractive, not only for replacement but also expansion of our system's capabilities. The one area where we won't be planning changes, however, is in the project planning and management technique we used the first time around." **BM/E**

now a color camera coupler...

battery operated!

"Let's have a CU on camera 2 . . . hold the LS on camera 1 and now a MCU on 2" . . . and so goes the direction.

A job for expensive broadcast equipment? Not if you have two JVC portable color cameras, a PV4800 tape deck, headphones, a hand mike and the all new GK-2000U which makes the two camera sync coupling possible.

Now you can get clean, noiseless, vertical interval color switching. Mix and match camera inputs when doing remotes . . . and all mind you . . . battery powered.

JVC has done it again. First in the field with a truely fine color portable and now the GK-2000U . . . the first battery or AC operated sync coupler.

Get a demonstration from your JVC video dealer and learn how you can dazzle the competition or your customers with this new found video capability.

JVC Industries, Inc., 50-35 56th Road, Maspeth, N.Y. 11378, Tel.: (212) 392-7100. In Chicago: 3012 Malmo Dr., Arlington Hgts., IL. 60005, Tel.: (312) 593-8997. In Los Angeles: 1011 W. Artesia Blvd., Compton, CA. 90220, Tel.: (213) 537-8230.

GK-2000U sync coupler weighs 26.4 lbs. with 2 CCU's. Approx. 19" wide, 14" deep, 6" high.

JVC Best by Design

JVC

JVC INDUSTRIES, INC.

Circle 127 for literature
Circle 128 for a demonstration

JVC Industries, Inc. • 50-35 56th Road
Maspeth N.Y. 11378 • (212) 392-7100

BM/E-115

Please send me information on

- ☐ 2 Camera synchronizer
- ☐ Camera
- ☐ VTR
- ☐ Complete system
- ☐ Please arrange a demonstration

Name

Title

Organization

Address

City

State Zip

Telephone

The Character Generator: Versatile Tool For The Educator

by Frank J. D'Ascenzo

Perhaps the first application of an electronic character generator in an educational television facility took place in late 1967, at Channel 2 in Dade County (Miami) Florida. Using what was then a prototype of the later to be introduced A.B. Dick Model 990 Character Generator, producer Bob Pinson of Channel 2 and myself succeeded in video taping eight, one-half hour segments of a complex in-service video training series in a little more than two days.

What was significant about this incident was the fact that over 1,200 "supers" were used in the eight shows. That's an average of 150 per show, or about five per minute. Can you imagine handling over five super cards per minute; simulating vertical and horizontal "reveals," effecting transposition of words; and doing all this on cue with a rather technical script. Many long hours had gone into artwork preparation, rehearsing, and taping prior to our effort—all to no avail. A second attempt was about to be made when the "prototype" character generator was brought in.

The success achieved with this early prototype unit paved the way for the subsequent entry of the A.B. Dick Model 990 character generator and the eventual development of what is rapidly becoming one of the more exciting product developments of the 70's.

The eight year span from 1967 to 1975 has seen a number of exciting developments in character generator design. So many, in fact, that character generators can no longer be thought of as simple titling machines—an easier, better way to create a television super—but as true graphics tools. From the standard dot-matrix character of 1967, modern day machines have advanced to presentation of truly high-resolution alpha/numeric displays and multi-font capability. Today's advanced features include:

- Random Access Memory with large storage capability
- Smooth edged character formation
- Character edging and colorization
- Multi-font capability
- Font composition
- "Type-setting" style editing features
- Video-graphics capability The last mentioned innovation, "video-graphic capability," is in its infancy at the present time. However, the capability to store and display video art in digital form is an exciting prospect. Viable video art memory systems will certainly see the light of day within the next two years.

Mr. D'Ascenzo is sales manager of video products, Mincom Division, 3M Company.

Character Generators Are Everywhere In TV Today—Education Use Is Heavy

The video character generator today, of course, does a workhorse job in educational and commercial television stations. It produces show credits, stores and presents statistics (baseball player's batting average), displays election returns, superimposes news flashes over regular shows, shows graphics, advertising messages, and much other material.

Here are two out of hundreds of educational applications:

A truly innovative use of the video character generator can be observed at Channel 2 in Miami, Florida. Here, the producers at Dade County Public Television make use of a video titling system in the production of various educational programs. Producers Marc Chinoy and Bob Pinson, for example, are currently producing an interesting adult education series called "Adult Metrics," a state series designed to acquaint the people of Florida with the metric system. When completed, they will have produced about five one-half hour shows, each consisting of 100 or more segments ranging from 30 seconds to five minutes in length. One such segment utilizes 70 "title-cues" in five minutes. That's about 14 each minute. And the way these producers utilize the CG system borders on the art of animation. There is no doubt in the mind of Marc Chinoy regarding the importance of the video titling system to Channel 2: "It makes it possible for an otherwise low budget operation to achieve outstanding titling graphics while saving both time and money."

Staten Island Community College, in New York City, has developed a unique language program which includes basic use of a CG. Their Media Center has shown that it's easier to learn a language when you can see and hear it spoken, and see it written, all at the same time. Professor Jerry P. Melmed, the Center's Acting Director and Producer, attributes the College's success in teaching languages to this unique application of video electronics combined with conventional instructional techniques.

Videotapes are produced in the Center's own studio, each dramatizing scenes from everyday life, such as shopping, in which only Spanish is spoken.

After the actors have completed their conversations, the scene is repeated while each line of Spanish dialogue is visually "crawled" across the television screen, with the 3M Datavision Character Generator. This allows the student to see and hear the words simultaneously, and observe how the sounds are formed by the actors. Scenes requiring explanation are enhanced with video graphics edited into the tapes.

The College also uses their video character generator

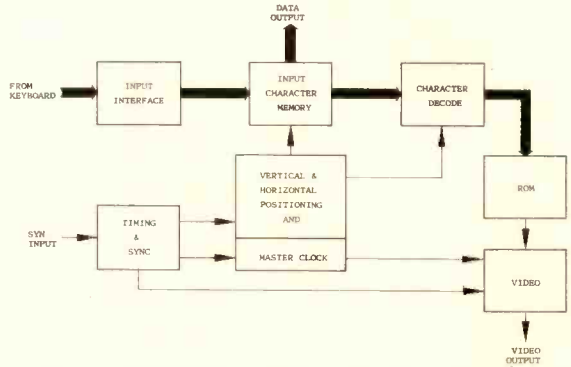
continued on page 50

for live titling of a series of programs produced in their own studio and viewed throughout the greater New York City area. It is used to produce instructional videotapes on biology and nursing, for use in classroom instruction and for private viewing by students in the Biology-Nursing Departments' Auto-Tutorial Laboratory, and at the Learning Center in the Library.

The versatility of the CG is evident in a tremendous variety of applications in CATV, industrial, and com-

Basic Operation Of Character Generators

Basically, the video character generator is a digital-to-video converter, translating a digital input signal from the alpha-numeric keyboard to a video signal suitable for display in a television system. A functional diagram is shown below.



Input Interface Information from the keyboard enters at the Input Interface in digital or data form, such as USASCII data code, and is stored in a small buffer memory. Information can, of course, enter from sources other than the keyboard, such as magnetic tape or disc readers interfaced with the character generator.

Master Timing and Positioning A video character generator utilizes the video system sync signals to develop internal timing to properly sync the characters generated with the display, and to provide proper format of the video output. Detection of the vertical sync pulse from an external source synchronizes the internal master clock (a high frequency oscillator in the 10 MHz range or better). All internal timing and positioning control is derived from the master clock. It develops a series of on-off pulses in each horizontal scan line that define the characters as the line crosses the screen.

For compatibility with standard television scanning techniques, a complete line of characters is built up simultaneously, in scanning-line segments. The vertical count is advanced once per scan line. Because of the television interlaced scanning system, two fields are interlaced at the 30 Hz frame rate in the vertical structure.

Input Character Memory The Character, or Main Memory, is a read/write type, since information can be stored (read into the memory), and the same information transferred from the memory. Its storage capacity is equal to the number of characters that can be displayed on the screen at one time. New data can replace whatever is currently stored (read into the memory), and the same information transferred from the memory. Its storage capacity is equal to the number of characters that can be displayed on the screen at one time. New data can replace whatever is currently stored. Memory loading/unloading timing is derived from the Master Clock. While different types of memory systems are in use, 3M uses modern bi-polar RAMs (Random Access Memories) because of their design freedom and simpler machine logic structures.

Character Decode and Generation The ROM (Read-Only Memory) is a storage area for the particular font or characters used. The size of the memory determines the "resolution" or definition of the character. A 6,400 bit memory, for example, is sufficient for displaying 64, 11X9, dot matrix type characters. Smoother characters, such as those produced by 3M Datavision equipment, uses as much as 80,000 bits of ROM storage. The character decoding logic interfaces the Character Memory and the ROM, interpreting which character in the memory is being accessed for display, and directing the ROM to generate the pulses required to produce the character on the television raster.

Video Output The proper video synchronization information is now added to the ROM output, so that the character generator output is in accordance with the requirements of the video system. This utilizes the same external sync source that started the generator and provided internal timing through the Master Clock. The output may be treated as any standard EIA video signal source, such as a television camera signal. The synchronization signal may come from the video system master EIA RS170 sync generator, or may be the composite video signal of a television camera or switcher output.

The Three Different Character Generators: What Each Does, What It Costs

(Editor's Note: Since the broad term "character generator" covers three different classes of instrument of widely different capability and cost, BM/E got permission from Joseph L. Scheuer, vice-president of Chiron Telesystems, to publish the following adaptation of a talk he gave recently defining those differences in particularly clear terms.) Character generators are actually divided into three sub-species. These are:

The basic character generator ($2000-$6000)
The titling generator ($5000-$35,000)
The graphics generator ($45,000 and up)

In broad terms the definitions of the three classes are as follows:

The **basic character generator** provides a series of letters on the screen generally without proportional spacing and certainly without any ability to adjust the positioning of these letters either horizontally or vertically. The letters are usually formed by a dot matrix. The rough angularity of dot matrix letters does not fit well in the reading experience of most people, and is contrary to the physiological traits of the human seeing system which have led to the art of typography.

Basic character generators are normally used in a live mode of operation since they do not contain more than a single page of storage. This is useful for *announcement* purposes but is not useful for preparing graphics of readable text. The need for varying font styles and sizes and intermixes of them in order to change emphasis for emotional content is well established in the publishing industry and should not fall by the wayside in the *electronic* publishing industry, simply because hardware of a few years ago was not capable of producing full electronic equivalents of the photo composing systems.

The **titling generator** *does* have proportional spacing and the ability to alter this spacing somewhat. It also has the ability to provide more than one font and intermix these fonts. It can provide color on a letter by letter or word by word basis to provide emphasis for certain startling effects. It offers a fair degree of editing flexibility. Titling generators normally have multi-page or screen storage capability with relatively fast access to those pages. They also provide more than just a rudimentary roll or crawl. In other words, they contain the ability to roll or crawl multi-pages in a link mode of operation.

The **graphics generator** is an extremely versatile device which is capable of storing many fonts at one time with the ability to change those fonts almost instantly. Furthermore, it is able to present not only letters but also symbols such as logos, mathematical symbols, music symbols and language symbols without restriction. The construction of these symbols is simple. It is easily performed by the instructor or his assistant in the visual group. Special symbols can be readily available and are positionable at any given point on the screen in both the vertical and horizontal plane.

Because of the vast amount of instructional material educational broadcasting must provide and because the need for graphic creativity is more pronounced in educational broadcasting than in other broadcast arreas, the graphics generator is likely to be highly desirable for the educational broadcaster or CCTV instructional program.

mercial communications. The following small sampling may suggest to educators new ways in which they can adapt the CG to their own needs.

Training Communications A major application of video character generators is production of industrial and business training materials. Text can be prepared in advance and stored for presentation live over closed-circuit television for sales training, seminars, management meetings, and other presentations. Or, complete training aids can be prepared on videotape for regular classroom sessions, field training, or self-study.

Prudential Life Insurance Company's home office in Newark uses a 3M Video Character Generator to produce training videotapes, such as "Basic Introduction to Accounting, Part One." This training material, produced by Dick Van Duesen, Audio Visual Manager, required 194 visuals, of which 170 were text only. Mr. Van Duesen used a video character generator to produce these panels, saving both production time and money. (At $25.00 per storyboard art, these panels would have cost more than the purchase price of the character generator.)

This lesson on double-entry accounting runs 40 minutes, and was produced directly onto videotape using the output of the video character generator. Panels requiring complex artwork were added separately. The voice track was added after editing. The character

continued on page 52

generator's "word flash" capability was used for emphasis as required.

CATV Public Service Programming Cable TV systems are meeting local origination requirements in different ways. One system that has been particularly active in this area is North Bergen Cable TV. The Program Director, Pete Mecca, produces live shows in their studio four nights a week.

Additionally, he has made a channel available to their 4,000 subscribers in North Bergen and Hoboken, New Jersey, for public service announcements. The channel operates 24 hours a day using video copy produced on a 3M Datavision Character Generator. In the Hoboken area the produced material is bilingual because of the heavy concentration of Spanish-speaking residents.

The information channel is a kind of electronic community bulletin board. About 15 minutes of community interest text crawls up and off the screen and then the message repeats. A new series of messages is prepared every Monday morning using the character generator. The messages are stored on audiotape through a special interface available for the unit.

The system also advertises its own public service broadcasts on the channel. Shows like "Sportswhirl" which is an interview and commentary on local sports; "Newsmagazine" a local news show; and "CAC Viewpoint" a show produced by the North Bergen Community Action Council.

The character generator is used for titling local programs, creating local advertisements, and showing the daily television schedule on all channels.

Commercial Communications Park City Shopping Center in Lancaster, Pennsylvania, has one of the most sophisticated closed-circuit communications systems in the country—and a captive audience of 750,000 customers per week.

The Shopping Center is one of the largest fully-enclosed shopping centers in the world. It houses over 140 stores along eight spokes which radiate from the center hub. There is parking for 9,000 cars.

Park City Communications has installed a network of 20 double-sided color TV pylons spaced throughout the fully-carpeted walkways of the mall. From 10 am when the shopping center opens until its 9:30 pm closing, continuous programming is provided over the communications system. It consists of news, interviews, and spot advertising—all prepared in the firm's own studio in the lower level.

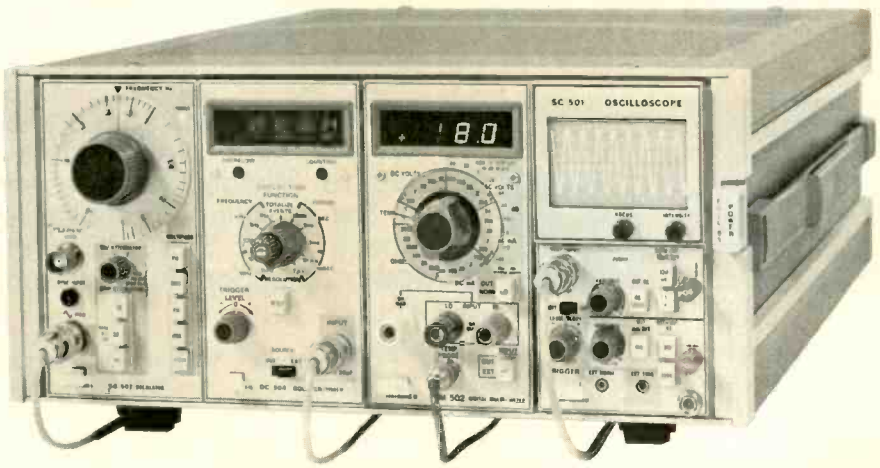
Copy for the messages and advertisements is produced on a 3M Video Character Generator. As seen by the customer, the video characters appear almost two inches high on the 24-inch screens in the pylons. Messages can be read from 30 feet away, and are always accompanied by a sound track.

Spot announcements are sold on the basis of running time from 15 to 45 seconds, based on the time it takes a shopper to walk between monitors. Both local and national chain ads are aired on the system. Shoppers and retailers alike find this communications system a valuable working tool.

Industrial CCTV Communications The Magnavox factory in Greenville, Tennessee, has a unique ap-

continued on page 80

It makes audio communications measure-ments too...



Tektronix TM 500

- **digital multimeters**
- **counters**
- **generators**
- **amplifiers**
- **power supplies**
- **oscilloscopes**
- **a blank plug-in for your own circuitry**
- **and more**

The TEKTRONIX modular Audio Frequency Instrumentation group provides the test and measurement instruments you most frequently need . . . for only $1970* These compact light weight instruments work together as a system or independently within a TM 504 power module/mainframe.

The above TM 500 configuration features a dB reading DM 502 Digital Multimeter with 3½ digit display and optional ($125)*temperature measurement capability (a function that has proven valuable in identifying active solid-state device circuit problems); the SG 502 Audio Oscillator provides 5 Hz to 500 kHz sine and square waves, 600Ω output, and low distortion (0.035% from 20 Hz to 50 kHz); the DC 504 Digital Counter offers 5-digit LED display of frequency to 80 MHz and period resolution to 1 μs; and the SC 501 Oscilloscope is a single-channel, dc-to-5 MHz modular instrument with triggered sweep and vertical sensitivity to 10 mV/division.

All TM 500 plug-ins are readily interchangeable within the entire TM 500 line. Plus there's a blank plug-in kit, which allows you to add your own special circuits to a TM 500 system. The plug-ins can work together synergistically through the common interface circuit board of the power module/mainframes. So you can tailor a system of instrumentation exactly to your needs . . . a system that's only 6" x 11" x 20" and weighs less than 30 lbs. . . . and a system that offers you benefits difficult to duplicate with "monolithic" instruments.

TM 500 is a growing, compatible family of 29 plug-in modular instruments, accessories, and one, three, four, and six-compartment power module/mainframes. Package configurations can be selected for work in high-speed logic circuitry, medical instrumentation, instrumentation calibration, industrial equipment, and more. All may be hand carried, all go on the bench, and there are rack-mounting and SCOPE-MOBILE® configurations as well. You can select from general-purpose instruments, such as the DM 501 Digital Multimeter, or highly specialized instruments, such as the AF 501 Tunable Bandpass Filter or AM 502 high-gain amplifier with calibrated gain to 100 dB and switch-selectable high and low-pass filters. If your work requires the measurement of electrical phenomena in the audio frequency range, Tektronix TM 500 offers substantial benefits to you.

Find out what TM 500 can do for you. Get the TM 500 Catalog A-3072 with full specifications and applications information. Or contact your local Tektronix Field Engineer for a demonstration of how TM 500 offers a better solution to your needs. Write to Tektronix, Inc., P.O. Box 500, Beaverton, Oregon 97077. In Europe, write Tektronix Limited, P.O. Box 36, St. Peter Port, Guernsey, Channel Islands.

TEKTRONIX®
committed to technical excellence

* U.S. Sales Prices FOB Beaverton, Oregon

Circle 133 on Reader Service Card

FM Broadcasters Declare They're Radio In Expectation Of Dominating AM

At the NAFMB Atlanta Conference, the association renamed itself the National Radio Broadcasters Association. With their broadened perspective, broadcasters present showed keen interest in AM stereo. But exhibitors grumbled as overfull program schedule cut down booth traffic. FCC emerged with new respect as spokesmen showed concern for industry problems.

The shift had been carefully orchestrated. For two years running the National Association of FM Broadcasters convention has been billed as the National Radio Broadcasters Conference. During this time, youthful FM pioneer president Jim Gabbert, K101 San Francisco, has been careful to describe FM not as the superior sounding medium but simply as radio. Gabbert even bought an AM station; he could speak sincerely. At the convention he repeatedly strove, in the dialogue with legislators and the FCC, to get TV distinguished as *the* markedly separate medium, having little in common with radio. And implicitly in the process he linked the NAB as the association representing TV interests.

Ergo, a new radio association, the NRBA is needed to do battle for a five-year license renewal bill for *radio*. If three-year renewals are proper for TV because that's where the public concern is, argues the NRBA, let only TV be so handicapped. NRBA also envisions itself as the major force pushing for all-channel legislation.

And as FM becomes radio, it leaves behind only as a memory its legacy as the classical music medium. For several years now FM has thought of itself as radio first, signal quality second. Rock moved in as the route to youth. For the older demographics, beautiful music became the dominant format. Both formats helped sell FM sets to new buyers. But as more consumers became owners of FM sets it was inevitable that Easy Listening might be less restrictive than B.M. So it came as no surprise that MOR programming was the big comer at the Atlanta conference—especially for the smaller markets that can't risk fractionalizing the audience.

Thus the earlier distinctions that separated AM from FM are no longer present. Country music that saved some AM stations from oblivion is producing good ratings for FMers. All-news is no longer the sole province of AM now that NBC has launched its all news information network—a service available to both AM and FMers.

In announcing the organizational name change, Board Chairman Robert Herpe said "Our association should no longer concern itself with just FM broadcasting, which has achieved a parity with AM broadcasting. We recognize that we as broadcasters share a mutuality of problems and concerns with broadcasters across the entire radio spectrum, that there is a need for an organization to give exclusive representation to radio."

Nevertheless there was a strong sense of loyalty or identification with FM. The FM Pioneers institutionalized themselves by forming a group headed by T. Mitchell Hastings, WBCN, one of the original founders of NAFMB. And it was with some personal pride that FM pioneers heard Jack Taylor, President of NBC Radio, announce that FM audience share is now at 40% in Philadelphia, Detroit, Washington D.C.* and that it will gain this status in a number of other major markets by next year. The sound of FM is the heart of FM, Thayer said, and he predicted that such coming things as discrete quadraphonic broadcasting via four channels will make it better yet.

By 1985 FM would be responsible for 55% of the revenues in the top ten markets and 45% nationally, Thayer predicted. (But he warned that this won't come about unless broadcasters show courage and don't get trapped in the rut of "repetitious mediocrity.")

High interest in four channel FM and stereo AM

The NRBA Conference marked the first time a full presentation had been made to any group following the tests on various quadraphonic broadcast systems conducted by the National Quadraphonic Radio Committee. The work of the committee is near an end, said Ed Tingley of EIA, who served as executive secretary to NQRC. Three reports are being prepared: Volume I will be the Summary and System Description report. Volume II will include compilations of data taken and the results measured for the various systems. Volume III will include a broader base of data of archival nature. Volume I is expected to be available to broadcasters in the future at no charge. Volume II will be available for sale, but there are no plans to publish Volume III.

The material in the reports will be descriptive and will not recommend one system or another. But the issues or trade-offs at stake will be set forth clearly and the report should make it easy for the FCC to proceed with a proposed rule making. All of the systems proposed are compatible meaning that existing sets would produce a satisfactory mono or stereo program when material was being quadraphonically broadcast. The various systems use different ways of dividing up the band. In some, the SCA service is restricted or the subcarrier shifted so that more bandwidth is available to rear speakers and crisscross between front and back speakers. Systems described included that of Quadracast, RCA, G.E., Zenith, and Nippon Columbia. RCA offered both a 4-4-4 and a 4-3-4 system the inside figure indicating the number of channels or subcarriers required. The 4-2-4 system of Nippon Columbia was based on the Cooper BMX system.

There were seven panel committee reports covering ranges for various for various SNRs, needed interconnecting facilities, transmitter compatability, receiver compatability, system standards, subjective tests and compatability of existing matrix systems with four channel.

To get a 50dB SNR, panel one found that mono would extend to 128

Recent Arbitron Radio study of FM listening in top ten markets over a five-year period shows FM's share is up 8. During this time FM station's per market grew 31%.

FM BROADCASTERS

miles, stereo to 62 miles and quad from 46 to 58. All have the same threshold. If four 15 kHz lines are not available from the studio to the transmitter for quadraphonic transmission, an encoded composite signal could be sent via STL requiring a bandwidth of 100 kHz. (Both approaches are possible now.) Transmitters are currently compatible said panel III. Most interesting results came from the listener location preference tests for 4-4-4, 4-3-4 and 4-2-4 systems. The latter was the Nippon Columbia BMX system (without logic separation). Three different tests were made. The first two were localization tests; the third was a musical preference test. The first localization test presented auditors with bursts of pink noise as real, phantom, and isophonic sources. The second was a more complex sound such as a chirp. Results showed 4-4-4 and 4-3-4 systems decidedly better than the 4-2-4 system tested in terms of ability to localize the apparent source for real and phantom sources. The 4-4-4 ranked better than the 4-3-4 for real sources but was ranked the same as the 4-3-4 for phantom sources. All three systems were ranked equal for isophonic presentations.

In the musical test, listeners were switched between system A or B and told to register a preference. Results ranked the 4-4-4 and 4-3-4 system "decidedly" higher than the 4-2-4 system and the 4-4-4 slightly higher than or equal to 4-3-4 systems.

If the foregoing suggests that 4-2-4 systems will not be able to compete if the FCC approves one or another of the 4-4-4 or 4-3-4 systems, 4-2-4 system promoters are not dismayed! They see around the corner AM stereo and such a system will need 4-2-4 encoding/decoding.

There was high interest in AM stereo but the concensus of those with experience indicated that first the FCC must decide what standards to set for quadraphonic broadcasting and then it can begin to analyze standards for AM stereo. The FCC will try to move with dispatch in coming up with a decision on an acceptable quadraphonic system. Once it gets the EIA report, it will try to go directly to a Notice of Proposed Rule Making. This should happen early next year. Thus a decision might occur in 1976. A decision on AM stereo could come two years behind that.

It became clear at Atlanta as a result of the discussion on quadraphonics and AM stereo, FCC Chairman Wiley's speech, and the Thursday afternoon panel session conducted by the

continued on page 56

FCC, that the Commission has changed from former years. It intends to move quickly on all matters before it and to come to decisions quickly, it wants to maintain a dialogue with broadcasters.

Contemporary equipment meets contemporary needs

The exposition of the 1975 National Radio Broadcasters Conference and Exposition didn't turn out to offer much to write home about. In truth, there wasn't much news to miss since the exhibitors tended to be a repeat performance of the NAB (Las Vegas) Convention, save for some further advances in automation.

But to the dismay of exhibitors present, there were very few visitors to miss either the old or new. Attendance was a disappointment. Although about 800 broadcasters did register, time available to inspect exhibits was limited—the program schedule was crowded and it consistently ran into overtime. On Friday afternoon when the only scheduled event was a business meeting, an opportunity for Atlanta sightseeing turned out to be an unfair attraction.

The highlights of the exhibit area did not go unnoticed, however. There were four EBS equipment manufacturers present who were visited by the chief of the Atlanta FCC Field Office and informed that they were violating FCC regulations with their EBS displays. The FCC rules state that a manufacturer cannot offer for sale equipment presumed to meet FCC requirements if such equipment needs to be type accepted or type approved and such approval has not been granted. Since none of the exhibitors present had yet had their equipment type accepted (to conform with the latest August rulemaking), they were not supposed to show their equipment with intent to take orders. The Field Office was not overjoyed with its charge to enforce the rule since learning about EBS solutions was high on the priority list of most visitors. (Indeed, many FCC personnel would have been denied the opportunity to see for themselves the new two-tone equipment if it had not been on exhibit.)

EBS equipment is definitely part of the bicentennial year says Joseph Wu, president of TFT.

No citations were issued. No one was caught actually selling or promoting the sale of EBS and order blanks quickly disappeared. All exhibits quickly became stricly educationally oriented!

The EBS equipment on display did reveal differences. Fundamentally, all used roughly the same circuitry; what was different were mechanical construction features. Some companies aimed for the least cost approach—silk-screening panel markings rather than engraving them, etc. Such differences plus probably a different overhead figure did mean that EBS equipment ranging from $295 to $395 will be available.

Those displaying equipment for "educational" purposes were Alpha, Audio Services Inc., McMartin and Time and Frequency Inc. All of these companies expect to have their equipment type-accepted and ready for delivery by the time the FCC's April 15, 1976 deadline for installation of the equipment rolls around.

Next month: advances in automation and other products.

BEAT 'EM TO THE DRAW

With the Superscope Action-Corder

Ready when you are. With the fastest news team in town. Superscope's rugged, pocket-sized C-106 Action-Corder with built-in condenser microphone. And the ingenious, optional Pistol Grip accessory that lets you stop and start the Action-Corder in the time it takes to pull the trigger-switch.

Aim for the heart of the story—even if you have to go over the crowd to get it. The optional Pistol Grip gives you a full arm's reach and one free hand. No cords, microphone cables, plugs or worthless weight. You'll be wrapped up in the action—not in the wires.

Fire, flood or fuel shortage—one disaster is enough. You don't need risky erasures, fluffs or blank spots. With the Pistol Grip stop/start switch, you can edit as you go and integrate your own commentary when you're ready. Now that's good news!

Superscope C-105 Professional Three-Head Cassette Recorder features three heads for tape/source monitoring that allow instant comparison of program source to actual recording. A built-in condenser microphone that picks up any sound within earshot. And special features for taped discussions and professional interviews that include a special telephone pickup jack and a mechanical instant pause control. For more convenience, get the Superscope EC-3S hand-held condenser microphone with remote stop/start switch. When not in use, the microphone snaps into a unique slide holder on the shoulder strap to leave your hands free.

Superscope EC-12B Tie Clasp/Wand Electret Microphone engineered for use with any portable recorder or PA system. Telescopic wand extends to 17½" for hand-held or podium use. Unscrew the wand, and microphone instantly converts for tie clasp application. See the entire line of Superscope professional tape equipment, microphones and accessories at your nearest Superscope dealer.

from the makers of Marantz

SUPERSCOPE

Listen to us.

Circle 138 on Reader Service Card

The Only True Route to High-Grade AM Audio. Part 2.

by Fred Riley and Harrison J. Klein

In this concluding part of their comprehensive treatment of AM audio, the authors discuss how to use audio processing.

Last month, we told how to make the antenna and transmitter adjustments that must come first in the improvement of audio quality. In this final installment we move on to the audio line, to the proper use of audio processing. We repeat that you must first identify the competition so you can beat him at his own game. What is it about his signal that prompted your investigation? Is he louder? Is his *apparent* fidelity better? Is his apparent fidelity consistent from record to record while yours isn't? Identify precisely what you are going to have to achieve to beat him.

Is being louder the whole answer? Remember, jet noise is extremely loud. This does not imply that making your audio sound like jet noise will gain you more listeners. Listenability is a result of more than merely loudness. It is a combination of many factors.

The two main areas you will want to work on are equalization and dynamic range reduction (i.e. compression, limiting, clipping, etc.). Both are important, with equalization becoming increasingly important as the amount of compression used by stations approaches a limit (and in some cases oversteps the limit).

STEP #5—Using equalization the right way

The whole idea behind equalization is to make up for

continued on page 60

Frequency	Music Setting Response	Voice Setting
50Hz	– 3	– 3
100Hz	0	0
350Hz	– 2	0
500Hz	– 4	0
1000Hz	– 7	0
2000Hz	–10	– 2
4000Hz	–17	– 9
6000Hz	–25	–18
8000Hz	–29	–29
10,000Hz	–40	–40

Signal Level	Audio Output Level
10uv= –90dB	No Output
30uv= –80dB	0dB (reference level)
100uv= –70dB	+ 6dB
300uv= –60dB	9.1dB
1000uv= –50dB	11.1
3000uv= –40dB	11.4
10,000uv= –30dB	11.7
30,000uv= –20dB	12.2
.1V= –10dB	12.6
.3V= 0dB	13.3
1V= +10dB	14dB

Fig. 9. Typical response of small AM radio shows severe falling off in high frequencies which must be compensated by equalization of audio line feeding the transmitter. Model tested was 1968 Delco car radio. Effects of AGC can be seen in relations of signal level to audio output.

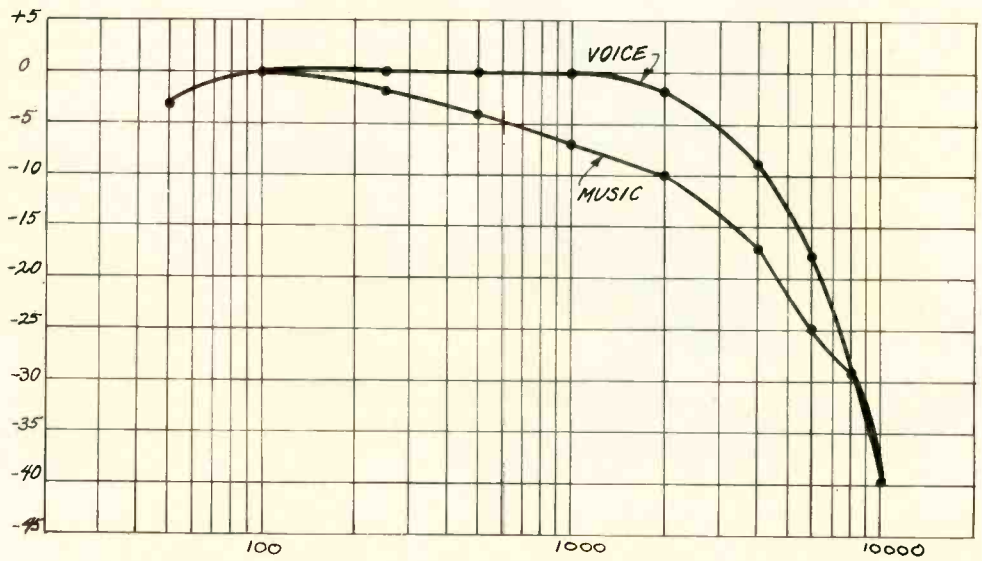


Fig. 10. Car radio response is charted with "music" and "voice" settings of audio control. Response at "voice" setting shows boosting of mid-highs, followed by rapid fall-off in upper highs.

DISCOVER

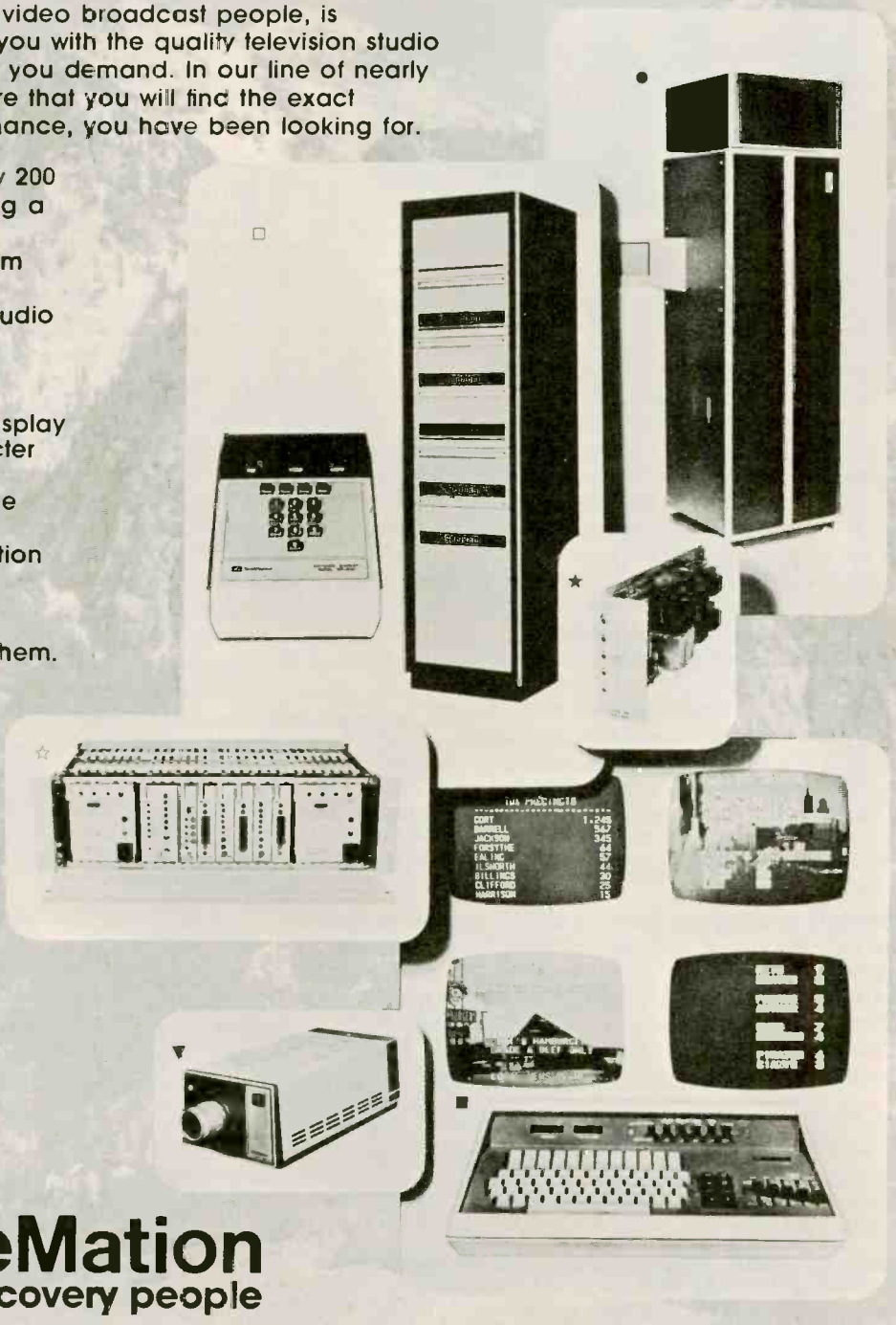
WHAT TELEMATION IS OFFERING THE BROADCASTER

Discover for yourself—
TeleMation, founded by video broadcast people, is dedicated to supplying you with the quality television studio and terminal equipment you demand. In our line of nearly 200 products, we are sure that you will find the exact equipment, and performance, you have been looking for.

Here, out of those nearly 200 products, we are showing a few examples:

- ● TCF-3000 Broadcast Film Camera
- □ TVS/TAS-1000 Video/Audio Distribution Switcher
- ☆ 525 Series Broadcast Terminal Equipment
- ■ TED Television Event Display and TCG-1425 Character Generator
- ▼ TMC-1100 Monochrome Camera (keying)
- ★ TAA-525 Audio Distribution Amplifier

There are many more.
Let us tell you about them.



TeleMation
the discovery people

P.O. Box 15068, Salt Lake City, Utah 84115 — (801) 487-5399

TeleMation Broadcast Sales Offices Worldwide

Atlanta, Chicago, Los Angeles, New York, Salt Lake City

Beirut, Lebanon • London, England • Mexico City, Mexico • Rio de Janeiro, Brazil • Santiago, Chile

Circle 139 on Reader Service Card

the abominable frequency response of virtually every AM radio is use today. Mid frequency response is terrible, rolling off in most radios sharply above 1 kHz. Response at 5 kHz is usually doWn about 10-20 dB. The bass end is practically flat, but very inconsistent from radio to radio due to speaker design and mounting.

So you've got to boost highs enough to make up for bad receiver response, but not so much that the total apparent loudness goes down after limiting. Consistency is as important as actual sound; not only from record to record (which is fairly easy to achieve) but especially between music, microphones, and spot material.

There are two basic philosophies of equalization that can be used. One is to keep the program line flat, and equalize every program source to match the desired station sound. Everything is put on cart through an equalizer so it comes out on the air the way you want it. A mike equalizer is also needed. If you use turntables for music, you'll have to re-equalize them. This method requires one person who really has the ears to hear the sound for which you are aiming. He should be the one to cart everything, unless you have an amazingly consistent set of staff ears.

The other philosophy recognizes that the weak point in AM is the receiver, and uses one equalizer in the program line to make up for the deficiences of a typical composite AM receiver/speaker system. Sources within the studio are kept flat unless there is an obvious need for correction (such as excessive bass in a particular record). Remember that most music is produced with AM in mind, and equalized to sound reasonable when broadcast.

When this method is used it is a bit easier to maintain consistency since most things can be recorded flat by any staff member. If a source sounds good on the console monitor, it will sound good on the air, without having to mentally correct for the AM radio response. Figs. 9 and 10 will give you some idea of the AM radio response curves you are correcting for, along with typical AGC performance.

A mike equalizer is an exception to the "flat" rule. No one microphone is good for all announcers, and even the best mike suited to a particular voice may not be perfect. Experimentation can result in an equalizer setting which is different for each announcer, adding to the consistency of the station sound.

You should decide which of the above two

IN JANUARY

BM/E will take a second annual comprehensive view of how electronic news gathering is developing across the land. If your station is into ENG and is flourishing (or floundering) give us a call. We'd like to report on your experiences.

philosophies you like best, and stick with it. Changing from one system to the other requires major equipment changes and extensive re-recording.

Since highs are so important, it is imperative to keep as wide a bandwidth as possible between the studio and the transmitter. Unless it's economically infeasible, use a 15 kHz line to a remote transmitter.

Your equalization is somewhat dependent on your transmitter type. Most transmitters are not capable of handling high levels of heavily limited low frequencies (i.e. low frequency square waves). They will *severely* overheat, as well as distort grossly due to tilt and overshoot. Unless you have a transmitter with a modulation system capable of good low frequency square wave response, it's best not to do any low frequency boosting. Keep things flat down to about 100 Hz, then roll off. However, if you can safely boost bass, about 3 dB boost at 100-125 Hz will give a pleasing "thumping" sound.

Generally, a net high frequency boost of about 5 dB at 4 or 5 kHz in your transmitter output, however arrived at, will provide adequate highs in most AM radios. The best procedure is to pick a curve you think will work, install it, and listen for a few days (or minutes, if it's that bad!) and then make whatever small changes are needed. When you find the "best" output characteristic, leave it alone.

STEP #6—Putting compression/limiting to work

The idea behind dynamic range reduction is to keep your average modulation as high as possible without sounding distorted (pumps, thumps, holes, etc.). Systems range from a simple limiter at the transmitter to prevent overmodulation, all the way to systems with several AGC's, compressors, limiters, and clippers.

Starting from the studio end: if you can afford it, a mike limiter can be a helpful addition to consistency. Since most recorded material is compressed before it gets to you, a mike limiter will keep the announcer from sounding thin compared to the music. It also helps during talkovers—keeping the announcer audible without "dumping" the music. Make sure the limiter doesn't destroy the asymmetry of the voice, or your expensive asymmetrical limiter at the transmitter will be wasted by eliminating the very asymmetries that make high positive modulation available.

Most limiting systems require consistent input levels. An AGC is usually needed to make up for the poor level control of an average board man. An AGC is not a limiter—it is a backup for poor gain control. It should keep the average level constant over about a 20-30 dB input range. It should be of the gated gain variety operated in the expansion mode so that sudden pauses don't result in a whoosh upward of noise. If you are following the AGC with a good limiter system, keep the AGC's release time slow. Too many unrelated short release times will confuse things.

We need a word here about compression systems in general. The single most important parameter in such a device is the release time algorithm (how the release circuit acts as a function of the actual signal). The attack time *must* be less than a few milliseconds to be in-

continued on page 62

audible, but as long as it's short, nothing fancy needs to be done to make it sound good.

Release time, however, is much more important. Too short a release time results in severe audible pumping and low frequency distortion. Too long a release time results in little dynamic range reduction as well as the possibility of "holes" in the program caused by high level input transients.

Thus, a good AGC should have several release times, which can be automatically matched to the signal material. For example there is the dual-time-constant system which allows the top 1 or 2 dB of limiting to have very rapid release times. A short duration peak should cause a quick release, while sustained high levels should cause a slower release. Investigate the release time circuitry of any unit you buy; it should have a complex release time circuit if it is to sound good.

Your limiter should have an attack time on the order of a few microseconds to prevent any possible overshoot of a high frequency transient, and should possess asymmetrical switching ability. If it uses clipping, make sure the clipping is appropriate for your transmitter. Limit as much as you think necessary, but more than 5-8 dB of limiting usually provides no increase in loudness and can sound distorted. This is especially true when low frequencies have been boosted.

Some stations use a split-band, dual or triple AGC system. This involves splitting the audio into two or three frequency bands with some sort of electronic or passive crossover, and individually processing each band. The segments are then recombined before final limiting. This is an expensive system, but capable of giving dramatic results without sounding over-processed.

Now we come to clipping. Here your transmitter makes all the difference. If you have a standard transmitter with lots of iron core transformers in it, don't try to clip below about 400 Hz or above 3 kHz. Clipping below 400 Hz will result in tilt of the waveform and overmodulation, due to low frequency phase shift. Clipping above 3 kHz can lead to spurious emissions and extremely high modulation component voltages and currents. Keep a close check on core temperature of the modulation transformer and reactor if you try it.

If you have one of the newer transmitters that has very good phase and transient characteristics, you can clip and get away with it. Clip the entire equalized, limited signal with a *good* clipper (it must not tilt the resultant square waves!) by about 1-2 dB for the loudest signal without audible distortion, and by 3-5 dB for the loudest signal without questioning distortion. Usually only contemporary music can be clipped this much and survive intact; again, the quality of the audio being clipped must be immaculate. A word of caution: unless the transmitter has an audio filter of some type, clipped audio can cause excessive bandwidth.

What about reverb? If you want it, it should probably be used only on the announcer's mike and in the production studio. Reverb on pre-recorded sources is generally ill-advised because, first, they have already been produced by people with access to reverb who used it as they saw fit to make the end product the most effective;

continued on page 64

for automation. . . .

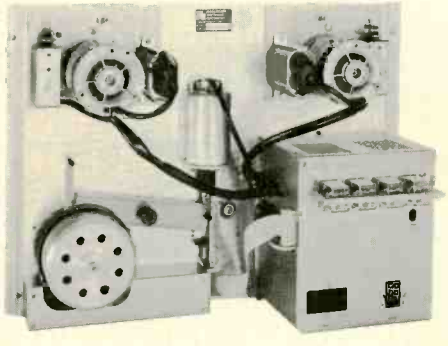
ITC's *NEW* 750 Series

A professional ITC reproducer for $1150

Why settle for a consumer machine?

Before you sign, check with a leading automation manufacturer about installing ITC's 750 Series in your system.

If you'd like more information first, give ITC a collect call (309-828-1381). We'll tell you all about our 750 and send you a complete brochure.



Rugged simplicity . . .

INTERNATIONAL TAPETRONICS CORPORATION 2425 S. MAIN STREET BLOOMINGTON ILLINOIS

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

Circle 142 on Reader Service Card

and secondly, reverb on an entire pre-recorded source makes it all come out mush since the reverberation acts on all components simultaneously. Reverb should be used on each component part (i.e. instruments, voices) separately for the best effect. Also, heavy (5-8 dB) limiting acts as a sort of reverb since decaying waveforms are enhanced by the gain increase of the limiter.

Dynamic enhancers and loudness controllers work on the "presence band" around 3-5 kHz, the frequency range which gives audio intelligibility and "crispness." This range is boosted if the device determines there is not enough relative energy in it. The difficulty arises in the time constants involved. For example, if a song is played which results in a large presence boost, and a segue into a jingle occurs, the jingle will sound excessively shrill until the unit recovers. Problems such as these usually make these devices more trouble than help.

Review

We have a transmitter and antenna system optimized for best performance. Now we also should have a consistent, clean audio signal feeding the transmitter.

Stop here! Again, use the system you've settled on for two or three weeks before you tweak it! Beat the competition at his own game. Compare continuously his signal—the one you want to beat—with yours. *Are your goals achieved?* If not, list on paper what is missing. Be receptive to comments from other station personnel but hold off the tweaking until you have a track record established. Then, if a change or two is required, know beforehand what you intend to try. Make the changes and give those changes time to gel. Don't be misled by one or two records when you are adjusting. Have a fixed plan—try it—and stay with it awhile.

Remember: processed audio should not be distorted, piercing, or unintelligible. The object is the cleanest, clearest, most consistent signal in town. Also: a transmitter modulated linearly to 80% will be cleaner and much more listenable than a transmitter pushed to 125%. If you intend to hold 125% continuously you better make sure beforehand that the transmitter will handle it. Also: proper processing is expensive. Giz whidgets and dodads that promise the moon for $800 should be viewed with a critical eye.

And finally, never forget that processing *is not* a requirement. It should be used only after it is logically determined that you will improve the station's revenue by installing it. The height of folly is for an ethnic or small-market, low-competition station to buy $10,000 worth of audio gear for processing. Remember, identify the competition and beat him at his own game.

An illuminating example of success with minimum processing is the station in my (Riley) hometown in Ohio. They use only a limiter (a tube-type unit, 15 years old). Average modulation is low but their ground wave signal is exceptional. They sound great and they cover their service area in style. They don't need processing. Do you?

We conclude by offering our thanks to Jim Loupas of WCFL in Chicago; Ed Buterbaugh of CKLW in Windsor; and to Bill McCaren of CBS for their knowledgeable critiques, comments, and assistance in the preparation of this paper. **BM/E**

We put some of our best heads together and came up with a mike that will satisfy almost everybody. The multi-module AKG electret condenser system.

It's an AKG condenser microphone. It's an electret. It can be phantom powered also. (Your choice.)

A twist of the wrist changes modules from a cardioid-to a cardioid/integral windscreen-to a omni-directional-to a lavelier.

To make sure the system performs at top specifications we make it with FET pre-amplifiers and gold-vapored Teflon™ diaphragms in the modules. Humidity can't hurt it. (Temperature/Humidity range from −5° F/99% to +125° F/95%.) And aging won't cause deterioration either.

It's a professional system in every way. Sensitivity variance between modules is remarkably low.

College stations and studios on a tight budget find the AKG compact electret system an easy step-up to AKG quality without straining the budget. All four modules are interchangeable on the power supply/handle. That saves equipment purchases.

The AKG electret system components are all available separately or in several economical combinations. They're perfect for young recording outfits that need growing room without obsoleting anything.

See your professional equipment dealer. Or write to us. Good things happen when you put our heads together.

AKG MICROPHONES • HEADPHONES
distributed by:
PHILIPS AUDIO VIDEO SYSTEMS CORP.,
AUDIO DIVISION
91 McKee Drive, Mahwah, New Jersey 07430
A North American Philips Company

Four heads are better than one.

Introducing the AKG multi-module miracle mike.

TM—E. I. du Pont de Nemours & Co.

Circle 144 on Reader Service Card

Addendum: The Source '75

Make these additions and corrections to your copy of "The Source '75," BM/E's September guide to broadcasting equipment. We tried hard to make it perfect, but didn't quite succeed.

Additional Equip Manufacturers (Clip and add to September issue)

AMBER ELECTRO DESIGN, LTD., 1064 CHEMIN DU GOLF, MONTREAL, QUEBEC, H3E 1H4 ..... 514 769-2739
multipurpose audio test set; audio spectrum display VS

AMPEREX ELECTRONIC CORP 230 DUFFY AVE HICKSVILLE NY 11803 .. 516 931-6200
power tubes for RF, VHF and UHF, variable vacuum capacitors, klystrons VS

DIGITAL VIDEO LABORATORIES 512 McNICOLL AVE WILLOWDALE ONTARIO M2H 2E1 ..... 416 499-4826
time base correctors VS

EDUTRON INC 3700 NE 53RD AVE GAINESVILLE FL 32601 ..... 904 377-1411
time base correctors (ready January 1976)

INDUSTRIAL SCIENCES INC 3521 SW 42ND AVE GAINESVILLE, FL 32608 ..... 800 874-7590
video, pulse, subcarrier dist amps; color gens; colorizers; chorma keyers; audio dist & monitor amps; video processing amps; special effects gens; video production switchers VS

MCI 4007 NE 6TH AVE FT LAUDERDALE FL 33308 ..... 305 566-2853
audio tape recorders; audio consoles VS

OPTEK PRODUCTS DISTR'D EXCLSY BY BROADCAST COMMUNICATIONS DEVICES INC 5526 E LA PALMA AVE ANAHEIM CA 92807 ..... 714 528-9505
transmitter demods; video noise meter; bulk tape degausser; mini SMPTE time code gen; movable storage systems

VISUAL INFORMATION INSTITUTE INC BOX 33 XENIA OH 45385 .... 513 372-8637
video test gens; sync gens; monitor calibrators

Incorrect and Missing Data

Page 50: under AMTRON add VS

Page 54: add to CENTRAL DYNAMIC'S address the corporate headquarters, 147 Hymus Blvd. Montreal, Quebec H9R 1G1 . . . 514 697—0810

Page 83: under THOMSON-CSF LABORATORIES correct the area code to read 203 and add the following regional office:
Ca P.O. Box 36, La Canada CA 91011 . . . 213 790-4393

Page 78: "Studel" should, of course, be STUDER

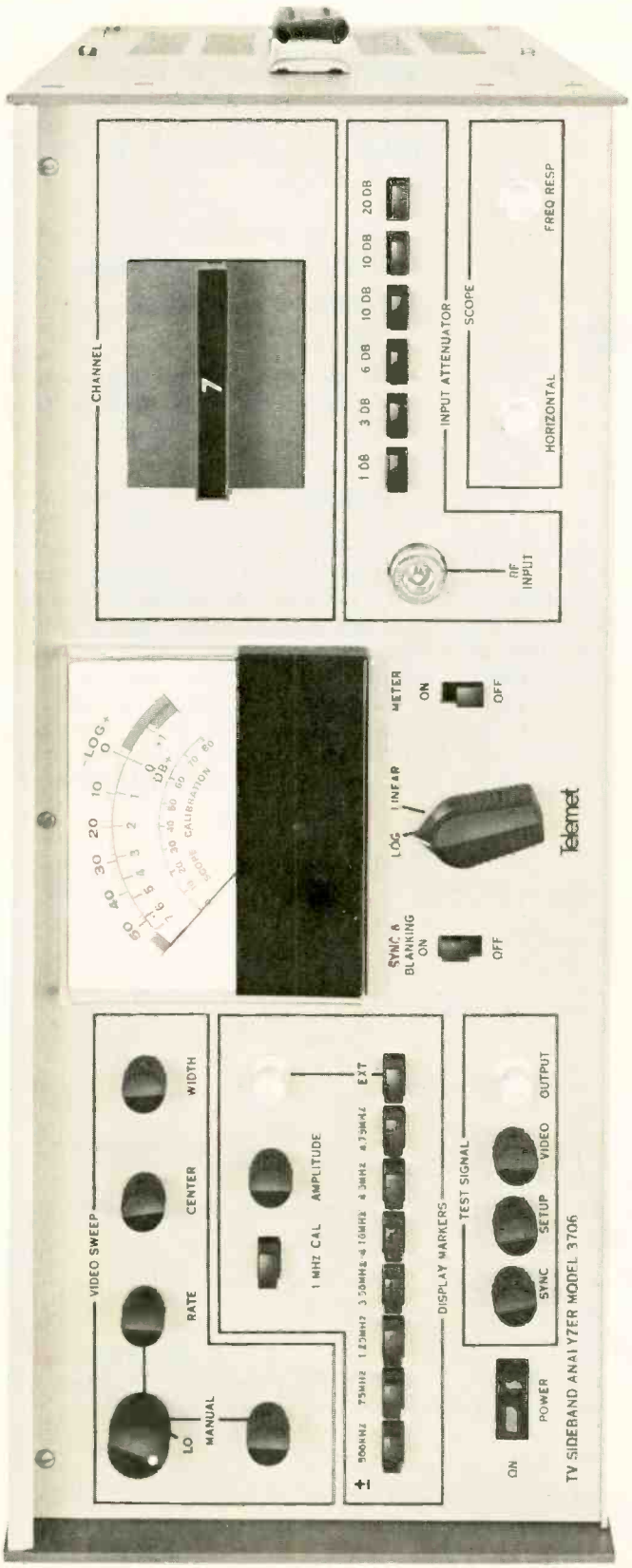
Page 72: under MULTRONICS, "rf power indicators" should read "rf power inductors;" "contractors" should read "contactors"

Page 87: under WILKINSON ELECTRONICS, "Chestnut, PA" should read "Chester, PA"

Source Locater Additions

Under Audio, audio consoles, add MCI 2 & number 2 to Ward Beck. Under Components, power tubes add Amperex. Under Measuring/Monitoring/Timing Equipment, add Telemet to: demods, sideband analyzers, diff. phase & gain measurement, VITS systems, video test gens, demod tester, group delay measurement. Add Optek to demodulation. Under Measuring/Monitoring, add Amber to audio gens, spectrum analyzers, Add Visual Information Institute to video test gens. Under Video Equipment, add Industrial Sciences to categories of pulse & dist amps, color gens, colorizers, chroma keyers, video processing amps, special effects gens, video production switchers. Add Visual Information Institute to sync gens, monitor calibrators.

Any Way You Look At It... Telemet's $4,600 Sideband Analyzer Comes Up First!



We've turned our 3706 on end so that you could see how much this sideband analyzer has going for you.

And check these features to see why broadcast engineers from coast-to-coast are insisting on buying Telemet's Sideband Analyzer:

- ☐ Single channel plug-in crystal controlled for frequency stability
- ☐ Crystal filtered dual conversion IF
- ☐ −50dB scope display
- ☐ Composite or noncomposite outputs
- ☐ H Sync & blanking internally generated
- ☐ Variable sweep rates including manual control
- ☐ Point to point response readout on front panel meter
- ☐ 7 discrete crystal markers at the required measuring frequencies
- ☐ 1 MHz crystal comb frequency markers across the sweep width

Best of all is its price: only $4,600 for VHF channels; add another $500 for the UHF to VHF Down Converter.

But this product is only part of the extensive Telemet line of video equipment. Get the whole story. Use the coupon below or call Your Telemet representative for information on:

Video Test Signal Generators
Envelope Delay Test Set
Differential Phase and Gain Measuring Systems
Remote Control Vertical Interval Test Sets
Video Sweep Generators
Modulators
Demodulators—Fixed Frequency
Demodulators—Variable Tuned
Video Signal Conditioners
Audio Monitors
Audio Distribution Amplifiers
Video Distribution Amplifiers
Pulse Distribution Amplifiers
Clamper Amplifiers
Monoscope Generator
Video Routing Switchers
Video Production Switchers
Chroma Keyer—RGB
Chroma Keyer Decoder—NTSC

A GEOTEL COMPANY

Telemet

Amityville, New York 11701, (516) 842-2300

TWX 510-227-9850

O.K. Telemet send me the following:

- ☐ Information on Model 3706 Sideband Analyzer
- ☐ Complete Catalog
- ☐ Please put me on your Technical Bulletin Mailing List

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Circle 146 on Reader Service Card

GREAT IDEA CONTEST

Here are six more useful ideas. Look them over and be sure to vote for your favorites on the Reader Service Card. Next month will end the 1975 Contest.

34. $15 Audio Frequency Counter

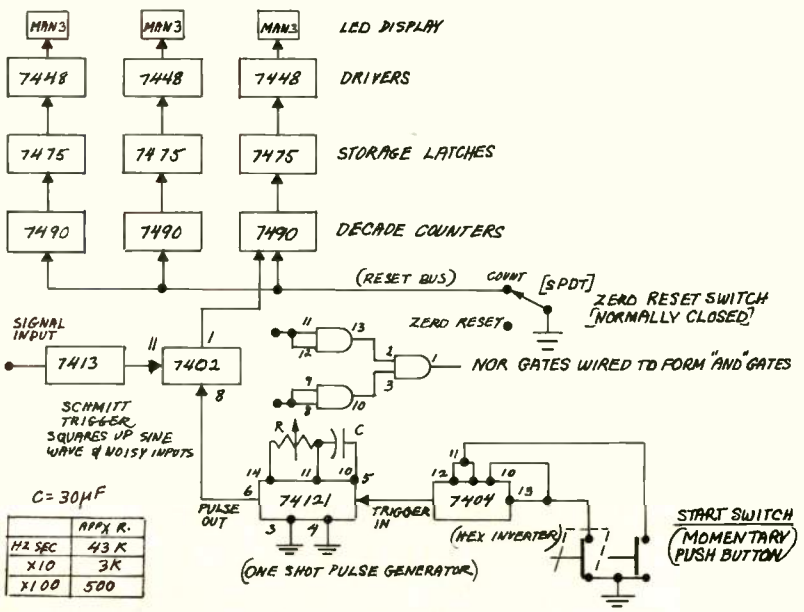
Michael E. Marion, WTFM-FM, Fresh Meadows, N.Y.

Problem: To build a very low cost audio frequency counter. Using inexpensive TTL logic IC's, I built a frequency counter with a three-digit LED readout, usable to 99.9 kHz. By purchasing the parts surplus, I kept total cost to $15.

Solution: The circuit basically consists of three decade counters connected in series to give a three-digit readout capability. Each decade counter (SN 7490) is connected to a quad storage latch (SN 7475) which is in turn connected to a LED driver (SN 7448) to drive a seven-segment common cathode LED (such as the MAN 3). The input of the counter/display section is fed by an SN 7402 quad NOR gate which has three of the NOR gates connected to form an AND gate. The fourth gate is unused.

One input of the AND gate (+ out only if both inputs are +) is fed by an SN 74121 monostable pulse generator. By delivering a fixed interval positive pulse, it keeps the AND gate open for this specific interval. The time interval is selected by the values of R and C connected to the SN 74121. The other input of the AND gate is fed by the Schmitt trigger (SN 7413) which conditions the signal to be counted, by which it is fed.

Two of the six inverters in the hex inverter (SN 7404) are connected to form a flip-flop which serves as a bounce-less pushbutton trigger for the 74121. Depending on the values of R and C, the counter will count the input pulses for 1 sec., 0.1 sec., or 0.01 sec. The frequency counter uses a well regulated 5 Vdc power supply, and draws about 0.5 A.



Marion's audio frequency counter.

35. An Odds-and-Ends Emergency Lighting Scheme

Alan M. Finkelman, Transmitter Operator, WBNG-TV, Binghamton, N.Y.

Problem: To provide emergency lighting in the transmitter building during intervals between power blackouts and the emergency generator running on-line. We considered buying commercially available lighting units, but the cost of four units plus installation was deemed excessive.

Solution: Our emergency system consists of drawing power from the generator storage batteries and lamp-

continued on page 70

If we didn't make a better refurbished quad head than either Ampex or RCA and with a better price/performance ratio we'd have been out of it a long time ago.

(And that's the truth)

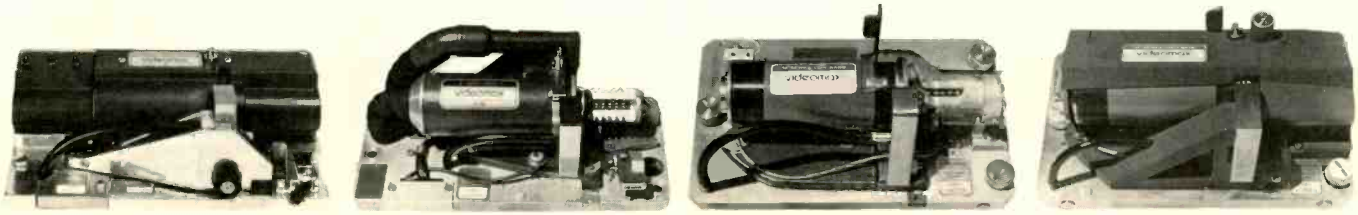
Videomax began to make refurbished quad heads 5 years ago. We were convinced a better job could be done and that you should have a choice. We were also convinced that a small company of specialists could offer a better product than the large multi-product manufacturers. Nothing since has changed our minds or the minds of our **more than 600 customers.**

Today, no one in the business comes close to our level of cost/performance. No one in the business exceeds our warranty protection. No one in the business offers a wider variety of refurbished Ampex and RCA heads. And no one, according to our long list of customers, has a more respected manufacturing and Q.C. history.

So, if you need a Mark X or a Mark III quad head in our "L" or "M" Series ... or an RCA High Band or Low Band quad head in our "M" Series ... contact Videomax.

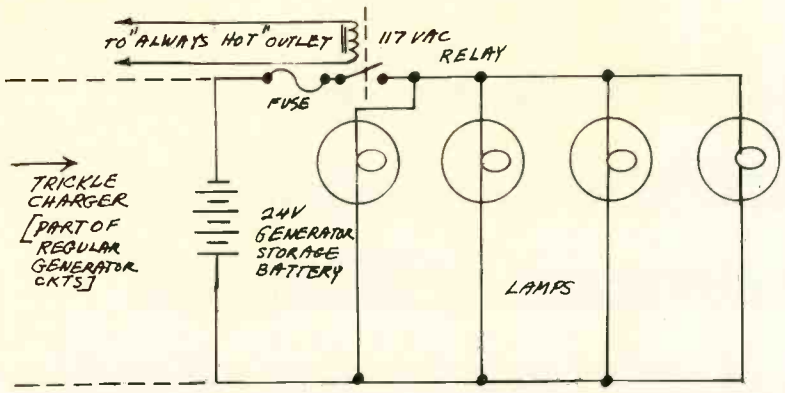
VMX™ videomax™

An ORROX company



MARK X | MARK III | RCA HIGH BAND | RCA LOW BAND

Circle 147 on Reader Service Card



Finkleman's lighting scheme

ing the areas with surplus 25-watt, 30-volt street railway lamps. The lamp medium-screw bases fit regular porcelain sockets. They draw power via a relay which, wired across the power line, drops out when commercial power fails. Total cost (sockets, relay and lamps) is under $15. We already had the wire, and we did the installation ourselves. Since the system operates at 24 volts, no conduit is required. The light from the four lamps is more than sufficient to illuminate the stairway, basement, generator room, and control room.

36. Modifying a Tek 147A for Noncomposite Output

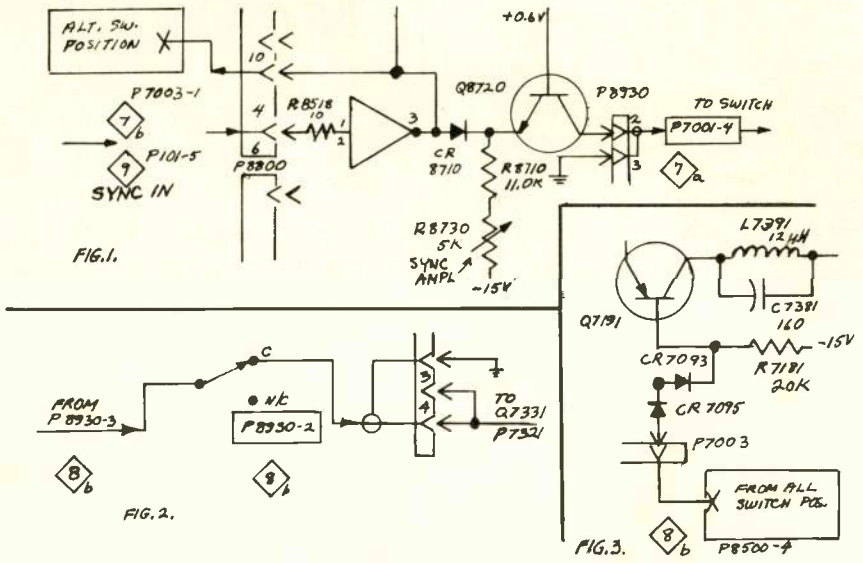
Kurt M. Blackburn, Engineer, KVIQ-TV, Eureka, Calif.

Problem: To modify a composite-output test signal generator for non-composite output used for repair of video equipment such as camera encoders, image enhancers, and video switchers.

Solution: A Tektronix 147A generator was modified to give a non-composite output. Two methods were tried; neither requires modification to the generator circuit boards.

Method 1—This is the method used at our station. The sync line between Modulator P8930-2, seen in figure 1, and Output Amplifier P7001-4, in figure 2, was broken near the P7001 end of the lead. The end coming from P8930 was then wired into pin 2 of a three-pin Waldom Molex female connector, and the pigtail from P7001 was wired into pin 3 of the same connector. The shields of the two leads were tied together and wired to pin 1 of the connector. Thus, the unit can be restored to normal operation simply by installing a jumper plug to short pins 2 and 3.

Two miniature coax leads were then wired to pins 2 and 3 of the three-pin male mating connector (shields to pin 1), and the leads routed through the wiring harness to the back panel of the 147A. A miniature toggle switch (SPST) was mounted at the center of the rectangle formed by components J9003, J9004, J9005, and J9006, where it has clearance even if all four



Blackburn's modification design

connectors are in use. The two coax lines were wired to this switch, with the shields left floating. When the switch is closed, the unit operates normally; when the switch is opened, the full field test signal outputs become noncomposite. The rest of the 147A is unaffected.

Method 2—The first method is not completely compatible with some equipment since it allows the color burst to remain in the signal which uses back porch clamps, or which is sensitive to signals below the blanking level. This mod eliminates the burst along with the sync (by breaking the sync signal to the burst timing circuits), but it also inhibits sync to the VITS level correction circuit. See figure 3. It is therefore not recommended if the unit is normally in use while adding an external test signal (such as color bars to make up a transmitter remote control VITS set).

The mod now consists of placing the switch in the line running out of the Modulator P8500-6, instead of in the previous modification of Method 1. If it is desirable to have a noncomposite signal without burst, and method 2 is not satisfactory, it now becomes necessary to modify one of the circuit boards. First perform the mod outlined in Method 1, and then do this:

Install a second switch on the back panel (for Burst On/Off). On the Modulator circuit board, locate integrated circuit U8510. Find pin 3 and follow the foil until you reach the connection to P8500-4. Break the foil path after the P8500-4 connection but before the junction of R8715/C8535. Run another pair of miniature coax lines to the second rear panel switch (just as in method 1) and wire the other two ends to the two sides of the gap cut in the foil. This also may be wired through a Molex plug if desired. The coax shields should be grounded close by, and left floating at the switch. When the switch is closed, the burst will be present on the signal. When the switch is open, the burst is removed. This is true regardless of the setting of the composite/noncomposite switch.

37. Fool-Proof Transmitter Remote Control

Robert G. Purrington, Chief Engineer, KLLL-AM, Lubbock, Texas

Problem: To install a simplified transmitter remote control. The original installation of a Gates BC5H, operating at 5 kW and 500 watts with day and night pattern changes, was to be operated by qualified engineering personnel. Accordingly, all transmitter functions and pattern changes were brought separately to 20 positions on a 24-function remote control unit. A total of 48 DPDT relays were slaved to the unit to isolate transmitter and power change voltages from the small relays in the remote control transmitter.

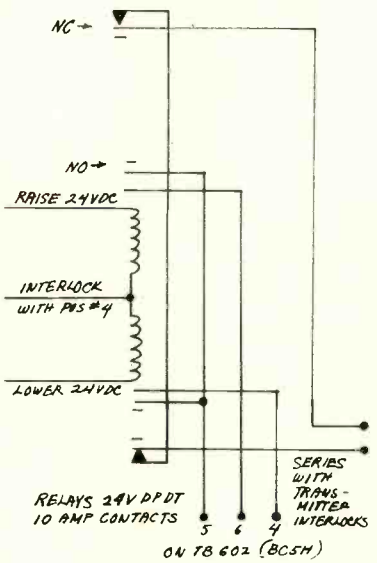
But, with the change to operation by holders of third phone permits, the confusion reigned supreme: meters burned out, and 5000 watts inadvertently was routed to a 500-watt pattern.

continued on page 72

GREAT IDEAS

Solution: Move the power change function to an unused set of relays, and provide automatic restoration of power after the power change. Since the power change in the BC5H can be made only with the HV off, the series connection of the N.C. back relay contacts in the interlock circuit will remove the HV. The N.O. contacts will provide the closure for the power change. At this point the transmitter will be on the power desired, but the HV will remain off.

On the HV contactor will be found two unused sets of contacts: one set is N.O. when the contactor is open, the other is N.C. Connect this to the HV-on circuit (#5 and #7 on TB 602). When the interlock circuit is remade through the series contacts on the relays, these contacts will then provide the necessary momentary contact to restore HV, and open as the contactor closes.



Purrington's remote control

38. Another Free-Heat Idea

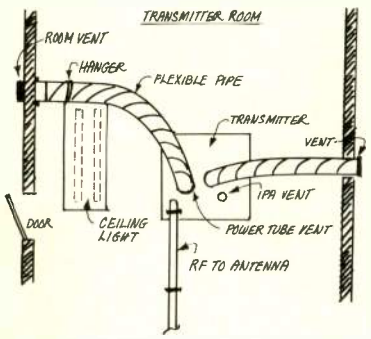
John E. Shepler, Chief Engineer, WACI-FM, Freeport, Ill.

Problem: To capture and use the heat released by the transmitter as cheaply as possible. Since our front office has always been a bit chilly during the winter months, I decided to tap our "free-heat" source: the transmitter.

Solution: A *Sears, Roebuck & Co.*

GREAT IDEAS

Hush Vent Kit was purchased for under $10. It contains a vent originally designed for gas dryers, and eight feet of flexible pipe with clamps. Using a sabre saw, I cut a 4-in.-diameter hole through the wall between the office and the transmitter room. The vent is held in place with two wood screws on the front, and a metal plate on the back. The flexible pipe stretches from the vent to the heat duct of the transmitter. To support the pipe overhead, I made a hanger from heavy wire and secured it to an overhead fluorescent fixture.



Shepler's free-heat plan

Our CCA transmitter has 4-in. heat outlets which match the pipe size perfectly. For other size outlets, a reducer or different pipe is necessary. An additional vent leading to the outside of the building is very handy during the summer months. It is a simple matter to switch pipes as the weather changes.

39. Voice-Only Air Checks for Jocks

Ken Shumate, Program Director, KBRS-AM, Springdale, Arkansas

Problem: To enable the program director to audit jocks or enable the jocks to make voice-only air checks.

Solution: We use the N.O. side of a muting relay (originally installed with a control room police monitor), which is connected to a sub-miniature plug. When plugged into a cassette recorder switch jack, this did the trick. Audio is supplied by an unused receiver, and the result is programming taped only when the mic is open.

The same hookup could be wired to the remote start of a standard reel-to-reel recorder, but our method does not tie up a control room deck. It supplies the jocks with a tape they all can listen to at home, and I can listen to in my office.

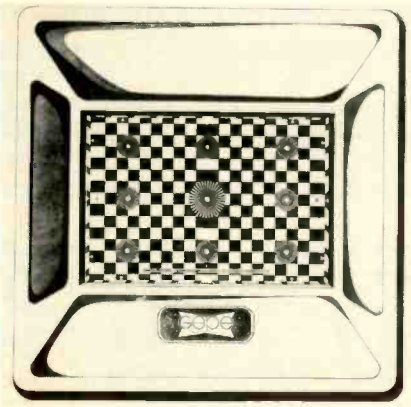
BROADCAST EQUIPMENT

For more information circle bold face numbers on reader service card

Portable cable testers can locate faults within a fraction of an inch in short lines and within a yard as far away as 50,000 feet, in any kind of cable from lamp cord to coax, as well as many broadband components, such as antennas and connectors. Model 1502 is for high-quality evaluation by manufacturers and installers of coax,

has maximum range of 2000 feet, and can identify impedance changes as small as 0.1 ohm. Model 1503 ranges to 50,000 feet, has 3-foot resolution, and is calibrated in return loss. TEKTRONIX **300**

Alignment slides allow easy precision alignment of projectors in a slide dissolve system. Dissolve System Alignment Slide Set uses pairs of slides, with checkerboard patterns,



one green, and one red; perfect alignment forms a red and green pattern on screen, misalignments show up as yellow areas. SPINDLER AND SAUPPE **301**

Follow spotlight for studio lighting has no lenses. "Colorspot" has an alumized optical projection mirror and develops 800,000 beam candlepower with a 1 kW tungsten-halogen lamp in a 9° field. It has a five-color boomerang, an optional 9X20-degree spread lens, and is capable of throws from 30 to 100 feet. BERKEY COLORTRAN **302**

Compact quartz location lighting kit is packed in an aluminum case. The

"Aero-Kit" weighs less than 31 lbs., includes two focusing 600-watt spots, two detachable rotating four-way barndoors, one focusing 600-watt fill light with integral barndoors, as well as scrims, cables, stands. $425.00. CINEMA PRODUCTS CORP. **303**

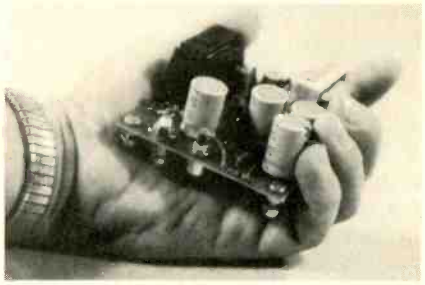
On-line RF system gain monitor provides automatic continuous check on RF performance up to 18 GHz. The unit consists of an adjustable-amplitude microwave signal generator and a gain monitor. The generator puts a pilot signal on the edge of the band, or on an unusual channel, which can be read by the monitor. Standard features include digital or analog readout, recorder output, and alarm output. COMMUNICATION TECHNIQUES, INC. **304**

Earth receiving station incorporates a 10-meter antenna, low noise amplifier, TV receiver, elliptical wave guide and coax cable, plus automatic pressuring. Adjustment range (FCC requirement) is from 70° West to 135° West, for reception anywhere in the continental U.S. Antenna is erectable without a crane. ANDREW CORP. **305**

Remote mixer/compressor has three-channel input. Model I.C.B.M. is designed primarily for stations handling many sports remotes, has individual compression on each channel, plus overall compression to maintain a constant high output level. $180.00. HTS ELECTRONICS CO. **306**

Tape delay modification for Revox A-77 tape recorder provides five seconds of program delay for censorship on talk shows. It can be added to existing machines or supplied with A-77 as a complete package. DYMA ENGINEERING **307**

Optical demodulator kit can be added to Sony Trinitron and other TV receivers to convert them to receiver-monitors. Model D1 and D1A Electro Optical Isolator Demodulator Kits are small self-contained units that can be installed in about 30 minutes. Bandwidth, 1 Hz to 8 MHz; diff. gain, less than 2%; diff. phase, less than 2°;



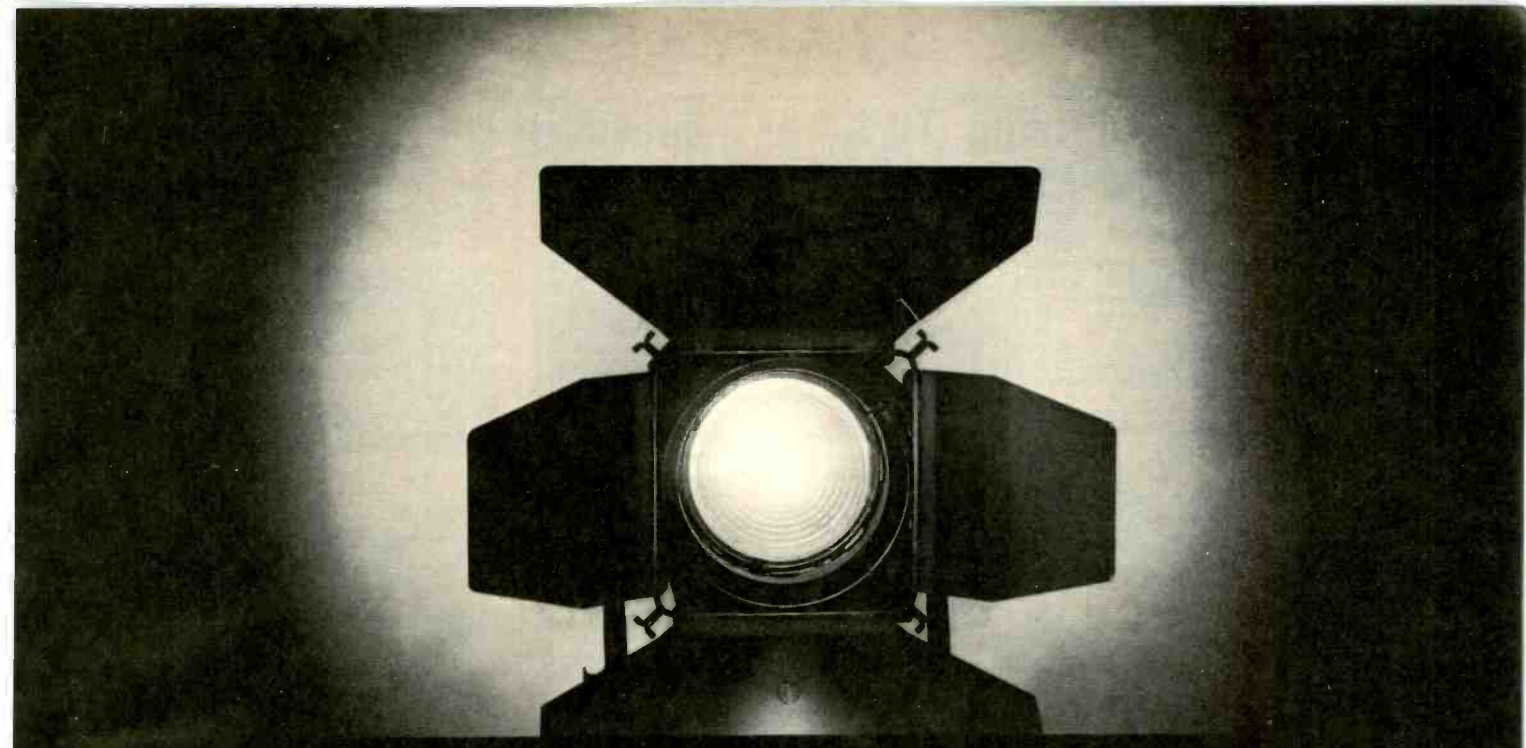
video output, 1 v p-p into 75 ohms. $129. VIDEO AIDS OF COLORADO **308**

Frame grabber stores TV images in a storage tube; they can later be printed on demand, or transmitted over dial-up voice-grade telco lines before printout. System consists of Model 400 or 600 push-to-print hard-copy recorder interfaced to a scan converter for putting 525-line video into slow TV frames. $795 to $2500. ALDEN ELEC. AND IMPULSE RECORDING CO. **309**

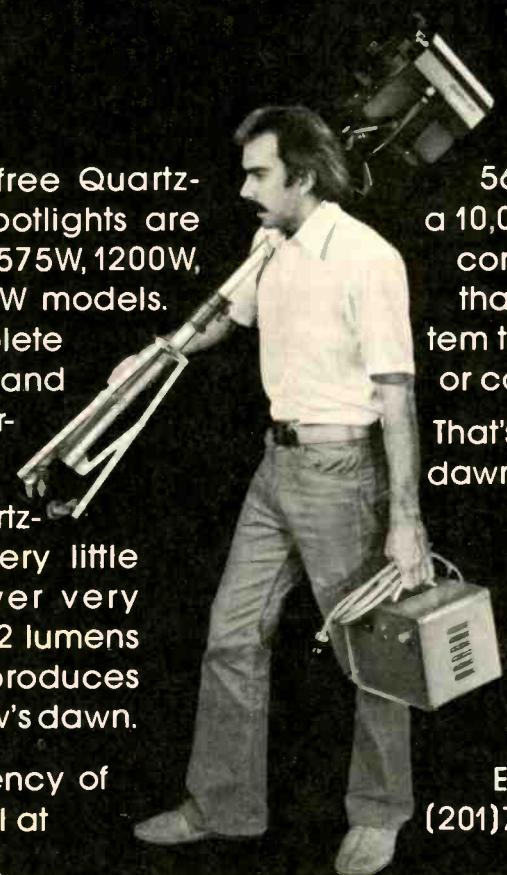
Portable color signal generator produces bar patterns in accordance with NTSC standards. Model CG-1 uses a plug-in converter to cover all channels in the 5-300 MHz range. The batteries are good for 15 hours of operation, are rechargable from 110 v ac $1,995.00, plus $400 for each converter. DIX HILLS ELECTRONICS **310**

Interlock system allows audio cassettes to be synchronized with virtually any standard 16mm or 35mm film projector. Elf Digital Interlock uses a step drive motor, driven by pulses from a

continued on page 76



Introducing the dawn of a new era. Flicker-free HMI daylight.



Our new flicker-free Quartzcolor daylight spotlights are now available in 575W, 1200W, 2500W and 4000W models. Each unit is complete with lamp, cable and the special flicker-free ballast.

What's more, Quartzcolor radiates very little heat, uses power very sparingly (85 - 102 lumens per watt), and produces light like tomorrow's dawn.

The output efficiency of our 2500W model at 5600° K is equal to that of a 10,000W incandescent unit corrected to daylight. And that's a lot of light. In a system that doesn't weigh a ton or cost a fortune to operate.

That's lanito Quartzcolor. The dawn of a new era in lighting.

For details, write Ed Gallagher, National Director of Television/ Motion Picture Sales.

Strand Century Inc
20 Bushes Lane
Elmwood Park, NJ 07407
(201)791-7000 (212)947-2475

STRAND CENTURY INC
A COMPANY WITHIN THE RANK ORGANISATION

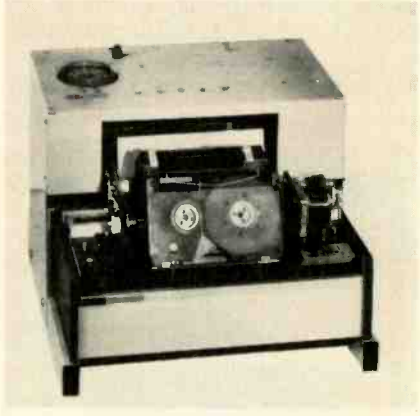
Circle 154 on Reader Service Card

PRODUCTS

same transponder as the video. Model SBC-440 eliminates special processing of the video signal, with carrier output of transmitter bridged onto video baseband on a loop-through basis. Unit has a tracking filter, and compatibility with both NTSC and PAL, can operate on either full or half transponder. COASTCOM **320**

Instant replay color video disc recorder claims jitter-free forward and reverse slow motion as well as freeze frame. Time capacity is 10 seconds, rate variable from 60 fields/second to still image, SNR 46 dB. Output can be time-base corrected for broadcast use; recorder can be locked to station vertical sync. Disc is in a cassette, allowing instant change. Under $10,000; cassettes $75 each. EIGEN VIDEO **321**

Video movie player, VMP-3, features automatic continuous play, rewind and replay facilities. It pays up to three U-matic cassettes. An external source circuit panel for playing external audio and/or video sources is an option. Cue tones set tape advance or switch to external source. The VMP-3 measures 20½ × 20½ × 15½" and weighs about 75 pounds. $2,995. SYSTA-MATICS **322**



NOAA VHF radio weather system receiver operates on 162.40 and 162.55 MHz. It includes tone alerts for disaster warnings, and has internal rechargeable battery with automatic switchover from ac; field-strength meter is an option. SCIENTIFIC RADIO SYSTEMS **323**

Video distribution amplifiers, the 4000 Series, combine up to 10 video and/or pulse distribution amplifiers in a single, 3½" × 19" rack. Plug-in Model 420 VDA provides five 75-ohm output signals from one bridging input signal. Module 450, a pulse distribution amplifier, provides five 75-ohm regenerated output pulses from a single loop-through input. DYNASCIENCES VIDEO PRODUCTS **324**

NEW LIT

For copies of these literature offerings, circle number for appropriate items on Reader Service Card.

A new 8-page product guide, **General Purpose, High Performance Cameras and Video Products,** CCV-118, covers low cost cameras, including the TC1000 family used widely for surveillance systems, and the high performance TC1005 cameras used for CCTV, CATV, MATV, broadcast and industrial use. The publication is designed to provide a quick overview of your CCTV system product needs. RCA. **250**

Two new reports on CATV operations have recently been issued. **Selecting a Cable System Operator,** which is 74-pages long and contains 3 sections, deals with the various methods which can be used to select a system operator, application forms, and guidelines to be followed in analizing information obtained from franchise applicants. **Use of Financial Analysis in Decision Making,** 40-pages, was written to aid local officials in securing all possible services from a cable system that a system operator can afford to provide. Both reports are being sent automatically to Publication Service subscribers; individual copies of "Selecting a Cable System Operator," $7.50 and "The Use of Financial Analysis in Decision Making," $3.50, plus $1.50 postage and handling for any order, can be obtained from the Cable Television Information Center, 2100 M St., N.W., Washington, D.C. 20037, Att: Information Group.

Design digest covering **magnetic tape heads** features a technical section written to answer questions about magnetic head design, applications, and circuit considerations for typical audio applications. The book also contains a bibliography of magnetic recording, covering both theory and practical applications. The catalog section covers audio heads from 24-channel, 2-inch studio heads to cassette heads for 0.150-inch tape. Nortronics. **251**

"Radio Musical Monthly" is a new magazine available on a controlled circulation basis to broadcasters who program a significant amount of concert music as a regular part of their broadcast schedule. Write to RMM Publishing, 90-58 201st St., Hollis, N.Y. 11423. **252**

CHARACTER GENERATORS cont. from pg. 52

plication of a CG. Their Quality Control Department uses one to generate messages which are carried on new television sets coming off the production line. Each set carries instructions to testing department personnel, describing which of their 18 test lines to place on that particular model for its 24-hour burn-in.

A typical message, displayed in one line across the bottom of the picture tube, reads "LOAD 4096 ON 2." The message is displayed over a color test pattern developed from a test set.

Another example of in-plant communications through use of a CG is at Firestone Ltd. of Hamilton, Ontario, Canada. They have found that a CG can be used to solve the old problem of effective employee communications.

Firestone has created an electronic house organ using the plant's closed-circuit television system and a 3M Datavision Character Generator.

Plant employees are kept fully informed of events that affect them, both social and job related, as well as keeping the latest production figures fresh in their minds. The closed-circuit TV personnel information system displays text only messages on large-screen monitors in the factory's recreation areas. Each day, 80 different messages are produced for in-plant viewing.

The foregoing, not directly applicable to most educational needs, nevertheless suggest that an imaginative approach to CG capabilities may well enhance educational efficiency in new, unexpected, and comparatively inexpensive ways. **BM/E**

BM/E CLASSIFIED MARKETPLACE

CLASSIFIED ADVERTISING RATES

DISPLAY CLASSIFIED ADVERTISING: $32.50 per inch 1x; $30.00 per inch 6x; $27.50 per inch 12x. ALL OTHER CLASSIFIED ADVERTISING 35¢ per word; minimum $3.50. BLIND BOX NUMBER: $1.00 extra charge. Replies sent to address below will be forwarded to you. PAYABLE IN ADVANCE; send check with order. CLOSING DATE: 5th of 2nd month preceding issue date.

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

EMPLOYMENT OPPORTUNITIES

FIELD SERVICE ENGINEER

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

ELECTRONIC MAINTENANCE TECHNICIAN/ENGINEER, with executive potential, for Computer Animation system and supporting hardware. Should also have a good familiarity with basic broadcast video equipment. New York City location. Call J. Mitwell, (212) 628-5987, 10-12 a.m.

AUDIO ENGINEER — BS or equivalent experienced in design of solid state professional broadcast & recording systems. Ability to work with customers. Opportunity for advancement in growing company. Send resume including salary requirements to Robins/Fairchild, 75 Austin Blvd., Commack, N.Y. 11725
An E.O.E. M/F

CHIEF ENGINEER FOR KODIAK PUBLIC BROADCASTING CORP.

NEW PUBLIC *FM* IN KODIAK, ALASKA NEEDS CHIEF ENGINEER.

At least five years engineering experience in commerical, public or educational broadcasting, with FM Stereo equipment. Must have First Class F.C.C. License. Experience as a chief engineer helpful. Must also be able to pull board shift. Send resume to: Alaska Educational Broadcasting Commission, Attention Michael F. Porcaro, Assistant Director, 308 "G" Street, Anchorage, Alaska 99501. Deadline for applications is: November 15, 1975.

EQUIPMENT FOR SALE

FOR SALE: Television STL System Raytheon KTR 2 7 GHZ dual link for audio and video complete with ant., trans. line, and 8′ × 12′ reflector. Also TR22 High Band Color Video Tape machine. Write: WXON-TV, Box 2020, Southfield, Mich. 48075 or call (313) 355-2901.

CCA APS-1 Automation system, including 40 event/hour programmer, clock timer unit with single 25HZ cue detector, dual 25HZ cue detector, installation assistance in central midwest. WWCT, 232 SW Jefferson, Peoria, ILL. 61602. (309) 674-2000.

SPOTMASTER, FIDELIPAC, RUSSCO, ROH, ELECTRO-VOICE, OTARI, RAMKO, SCOTCH, STANSON, NORTRONICS, SHURE, SENNHEISER, TELEX, MAGNECORD AND VIKING are all items distributed and serviced by COMMUNICATION MEDIAS/BROADCAST COMPONENT DISTRIBUTORS, P.O. Box 54, Allentown, PA. 18105. (215) 437-0607. "Sudden Service" our specialty.

BROADCAST AND RECORDING EQUIPMENT: Scully, V.I.F. International, Metrotech, Langevin, Electrodyne, Q.R.K., Micro-Trak, MRL, Nortronics, McMartin, U.R.E.I., E.V., A.K.G., Stevenson, Gately, D.B.X., Advent, Altec, Fairchild, Audio Designs, 3M, Magnecord, Telex, Inovonics, Nagra, Uher, Tape-Athon, Package Deals, Installations, Service, Request Flyer. Weigand Audio, Middleburg, PA. 17842. (717) 837-1444.

AMPEX, SCULLY, TASCAM, all major professional audio lines. Top dollar trade-ins. 15 minutes George Washington Bridge. PROFESSIONAL AUDIO VIDEO CORPORATION, 342 Main Street, Paterson, N.J. 07505. (201) 523-3333.

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

EQUIPMENT FOR SALE (Cont'd)

SPOTMASTER PARTS—24 hour service—repairs and rebuilding of your equipment. Franchised SPOTMASTER repair service. COMMUNICATION MEDIAS/BROADCAST COMPONENT DISTRIBUTORS, P.O. Box 54, Allentown, PA. 18105. (215) 437-0607.

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

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

WHATEVER YOUR EQUIPMENT NEEDS—new or used—check us first. We specialize in broadcast equipment. Send $1.00 for our complete listings. Broadcast Equipment and Supply Co., Box 3141, Bristol, TN 37620.

One stop for all your professional audio requirements. Bottom line oriented. F.T.C. Brewer, Box 8057, Pensacola, Florida 32505.

UP TO 45% OFF

on Stage, Studio and Projector lamps. Complete stocks. Rapid service. SITLER'S SUPPLIES, INC., 215 N. Iowa Ave., P.O. Box 10-M, Washington, Iowa 52353. Phone (319) 653-2123.

10 IVC — Model 800 VTR's Record-Players. Color. All OK. 4 new scanners. Dave Costellano, 640 Parkway, South San Francisco, CAL. (415) 221-7975. Extra Tapes Free.

EQUIPMENT WANTED

WANTED — FM Transmitter, 25, 20 or two 10 KW. Stereo STL System. Remote Control. Belar SCA Monitor. FM RF Amplifier. 98.5 Mhz Antenna. Glen Barnett, KWXY, Palm Springs, CAL. 92262. Phone (714) 328-1104.

WANTED — 14" Aluminum Tape Reels. Multimedia Associates, 3290 East 48th Street, Indianapolis, IND. 46205.

INSTRUCTIONS

First phone through tape recorded lessons at home plus one week personal instruction in Washington, D.C., Atlanta, Boston, Detroit, New Orleans, Minneapolis, Seattle, Denver, Portland, Los Angeles. Proven results. Our 17th year teaching FCC license courses. Bob Johnson Broadcast License Training, 1060D Duncan, Manhattan Beach, Calif. 90266. 213-379-4461.

PROGRAM SERVICES

"FREE" CATALOG . . . Everything for the Deejay! Custom I.D.'s, Promos, Airchecks, Wildtracks, Books, FCC Tests, Comedy, and more! Write: Command, Box 26348-A, San Francisco 94126.

"RAMBLINGS" is a short radio commentary fulfilling a need in a world that cries out for hope, humor, inspiration and motivation. 30 programs a month. $30. Pierce, Box 91, Spanish Fork, Utah 84660.

Deejays! New Comedy! 11,000 classified one-line gags, $10. Catalog FREE! Edmund Orrin, 2786-M West Roberts, Fresno, CA. 93705.

PROFESSIONAL CARDS

COHEN & DIPPEL, P.C.
CONSULTING ENGINEERS
527 Munsey Bldg.
(202) 783-0111
Washington, D. C. 20004
Member AFCCE

RALPH E. EVANS ASSOCIATES
Consulting TeleCommunications Engineers
AM-FM-TV-CATV-ITFS
3500 North Sherman Boulevard
MILWAUKEE, WISCONSIN 53216
Phone: (414) 442-4210
Member AFCCE

Midwest Engineering Associates
Consulting Engineers
F.W. Hannel, P.E.
BSEE; MSEE
7304 N. Oxford, Peoria, Illinois 61614
(309) 691-3426

McCLANATHAN & ASSOCIATES
Consulting Engineers
APPLICATIONS & FIELD ENGINEERING
TURNKEY INSTALLATIONS — RADIO & TV
Domestic and Foreign
P. O. Box 750
PORTLAND, OREGON 97207
Phone: 503/246-8080

SALES OFFICES

Broadband Information Services, Inc.
295 Madison Ave.
New York, New York 10017

EASTERN & MIDWESTERN STATES
295 Madison Avenue
New York, New York 10017
212-685-5320
Kenneth F. Luker, Jr.

WESTERN STATES
1212 Hearst Building
San Francisco, California 94130
415-495-0990
William J. Healey & Associates

P.O. Box 49206
Los Angeles, California 90049
213-476-6451
Art Mandell

JAPAN
Nippon Keisoku Inc.
P.O. Box 410
Central Tokyo, Japan
Tokyo (03) 667-7681
Yoshi Yamamoto

ADVERTISER'S INDEX

Memorex Video Cassette quality lasts

100 passes.

and lasts

200 passes.

and lasts

300 passes.

and lasts

400 passes.

and lasts.

500 passes.

As you can see, the Memorex Chromium Dioxide Cassette picture is still sharp after 500 passes. And we're confident you'll discover the same high quality throughout our entire video tape line, which includes all popular configurations for both helical scan and broadcast applications.

(All unretouched photos.)

MEMOREX VIDEO TAPE.

From Sony. A videocassette player that flies by the seat of your pants.

Finally, a U-matic® player you can carry onto the plane and tuck under your seat.

It's that compact.

With our new VideoTraveler™ all the advantages of videocassettes go portable. You can take them anywhere.

And when you arrive, the VideoTraveler sets up fast and plays 20-minute cassettes on almost any available TV set.

Dual audio tracks handle technical/non-technical, bilingual, and other duo audio techniques.

Both pause and still-frame controls keep your presentation as flexible as the situation demands.

And the VideoTraveler is compatible with all other ¾" U machines.

You already know how well your cassette presentations come across. Now learn how easily they come along. With the Sony VideoTraveler.

You'll really appreciate its compact portability. Whether you're traveling from city to city.

Or just from room to room.

For complete information, write: Sony Corporation of America, Video Information Center Dept. 225-A, Box 1594, Trenton, N.J. 08607.

SONY®
VideoTraveler.

Circle 167 on Reader Service Card for a demonstration
Circle 168 on Reader Service Card for literature